

IBM TotalStorage UltraScalable Tape Library 3584



Maintenance Information

IBM TotalStorage UltraScalable Tape Library 3584



Maintenance Information

Note!

Before using this information and the product it supports, be sure to read the general information in “Notices” on page 733.

Review “Read This First” on page iii to learn about changes since the previous edition of this document, and the use of a revision bar to identify the changes.

Ninth Edition (June 2003)

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Read This First

This *IBM TotalStorage UltraScalable Tape Library 3584 Maintenance Information* (MI) contains service information **only** for trained service personnel. Use the MI as a guide when you make a service call to diagnose or maintain an IBM TotalStorage UltraScalable Tape Library 3584 subsystem.

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A revision character (I), like the one to the left of this line, appears to the left of some pages in this document. This character identifies information that has been added or changed since the previous release.

Note: Go to the **Start section** (Table 11 on page 51) to begin all service activities.

What's New in This Edition

- Support for up to 16 Frames, 192 Drives / Logical Libraries, with New Style Track cables (four lengths) to support up to 16 Frames (See Table 16 on page 99 for additional information).
- Libraries greater than 6 frames require special Library FW, Drive Code, and MCP support. (See "Attention" on page 84).
- New / Revised / Withdrawn Feature Codes (see Chapter 5. Install, "Feature Codes" on page 142)
- New Dual ac Line Cord Feature (FC 1901). See "Dual AC Line Cords and Power Distribution Unit (PDU)" on page 620.
- Dxx frames shipped with an FCA will not longer come with a 37V DC power supply installed. (See Chapter 5. Install, step 3d on page 84 and "Frame Control Assembly (FCA)" on page 618 for more information). How library firmware controls turning on and off 37V DC Power Supplies (See "37 V DC Power Supply" on page 544 for detailed information and troubleshooting).
- Host Fibre cable should not be immediately connected when Fibre drives are replaced (See "Drive Tray Assembly – LTO Fibre" on page 587.)
- Drive Dumps / Library Logs are required for URCs B302, B303, B312, B313, A425–A428. Additional support information on URC A4C7. (see Chapter 7. Unit Reference Codes)
- Spring Clip Kit to resolve B881 errors (extraction force) affecting URCs C831, C931, CA31, CB31, CC31, CD31. (see page 703, "Spring Clip Kit, L1, LTO" and referenced URCs.)
- Stuck Cartridges can be reused only after thorough inspection (See Chapter 11. CARR, "From an LTO Drive" on page 674).
- Lithium battery replacement procedure added for ACC and OPC node cards. (See "Cards" in Chapter 11. CARR, "From an LTO Drive" on page 674).
- Drive Tray-to-Canister conversion FRU Kits available for SCSI and Fibre (See Chapter 14. Parts Catalog)
- Added visibility to Preventative Maintenance. (See "Maintenance Tasks" on page 55).

Changes in the Eighth Edition (February 2003)

- Reorganized START Section.
- Correction to installing Rail Rods (see Chapter 5. Install, Step 48b on page 93)
- New style X-Axis Flex Cable; PDC Card replacement (see Chapter 5. Install, Step 54 on page 96 and Chapter 11. CARR)
- LTO Drives not always replaced for stuck tape problems (see Chapter 11. CARR, “From an LTO Drive” on page 674)
- Node cards (ACC, MCP, MDA, OPC) must never be replaced in pairs (see Chapter 11. CARR, “Cards” on page 558,)

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Preface

IBM has prepared this maintenance information (MI) manual to guide IBM service representatives (Customer Engineers) during installation, maintenance, and repair of the tape library. This publication is not intended for any other purpose.

To purchase IBM publications, contact your IBM representative or the IBM branch office in your area.

Tape Library Models Included

This manual contains information about the following models:

- IBM 3584 UltraScalable Tape Library Model L32 (Base Frame)
- IBM 3584 UltraScalable Tape Library Model D32 (Expansion Frame - LTO Drive)
- IBM 3584 UltraScalable Tape Library Model D42 (Expansion Frame - DLT-8000 Drive) **No longer offered**

Using This Manual

Service personnel should use this maintenance information to install, remove, diagnose, repair, or test the IBM TotalStorage UltraScalable Tape Library 3584.

Use the information and instructions in this maintenance information (MI) as follows:

1. Read this preface and Chapter 1, "Introduction", on page 1 to get a summary of the tape library and how it is repaired.
2. Start all maintenance at Chapter 2, "Start", on page 49.
The instructions in "Start of Call" on page 50 will guide you to the procedures necessary for maintenance and testing.
3. End maintenance at "End of Call" on page 489.

Related Publications

Additional information related to the library is available in the following publications:

- *IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584*, GA32-0408
- *IBM TotalStorage UltraScalable Tape Library 3584 SCSI Reference*, GA32-0454

For related information about the Ultrium Tape Drive, refer to:

- *IBM TotalStorage LTO Ultrium Tape Drive SCSI Reference*, GA32-0450
- *IBM Ultrium Device Drivers Installation and User's Guide*, GA32-0430

For definitions of terms and acronyms, refer to:

- *IBM Dictionary of Computing*, ZC20-1699

For safety information, refer to:

- *Electrical Safety for IBM Customer Engineers*, S229-8124

iSeries (AS/400) Information

For additional information about the iSeries (AS/400) subsystems and software, refer to the following publications:

- *Application System/400 Physical Planning Guide and Reference*, GA41-9571
- *Application System/400 Service Functions*, SY44-3902
- *Application System/400 System Operation*, SC41-3203

- *Application System/400 Physical Planning Reference*, SA41-3109
- *Application System/400 Physical Planning Summary*, SA41-3108
- *Application System/400 Control Language Reference*, SC41-0030
- *Application System/400 Security Concepts and Planning*, SC41-8083
- *Automated Tape Library Planning and Management Guide*, SC41-3309

pSeries (RISC System/6000) Information

For additional information about the pSeries (RISC System/6000) systems and software, refer to the following publications:

- *RISC System/6000 Getting Started: Using RISC System/6000*, GC23-2521
- *RISC System/6000 Getting Started: Managing RISC System/6000*, GC23-2378
- *RISC System/6000 V4 Problem Solving Guide*, SC23-2606
- *RISC System/6000 V4 Message Guide & Reference*, SC23-2641
- *RISC System/6000 Problem Solving Guide*, SC23-2204
- *RISC System/6000 System Overview and Planning*, GC23-2406
- *RISC System/6000 Planning for System Installation*, GC23-2407
- *IBM 7015 Install and Service Guide*, SA23-2628

9076 SP2 Information

- *Scalable POWERparallel Systems: System Site Planning*, GC23-3905
- *Scalable POWERparallel Systems: Installation Guide*, SH23-3865
- *Scalable POWERparallel Systems: High-Performance Technical Computing Solutions*, GH23-2485
- *Scalable POWERparallel Systems: Business Solutions*, GA23-2475
- *IBM 9076 Scalable POWERparallel Systems: SP2 Administration Guide*, SH26-2486
- *IBM 9076 Scalable POWERparallel Systems: SP2 Diagnosis and Messages*, SC23-3866
- *IBM 9076 Scalable POWERparallel Systems: SP2 Command and Technical Reference*, GC23-3900
- *IBM 9076 Scalable POWERparallel Systems: Maintenance Information, Volume 1*, SY66-0294
- *IBM 9076 Scalable POWERparallel Systems: Maintenance Information, Volume 2*, SY66-0295

Device Driver Information

- *IBM Ultrium Device Drivers: Installation and User's Guide*, GA32-0430
- *IBM Ultrium Device Drivers: Programming Reference*, WB1304

Note: DLT-8000 drives use the DLT-8000 device drivers provided with your operating system.

Quantum Information

- *Quantum DLT-8000 Tape System Product Manual*

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| The IBM TotalStorage UltraScalable Tape Library 3584 is a standalone device that provides automated
| tape handling and storage for unattended mid-range systems and network servers. The basic library is a
| single storage unit known as the base frame. The library's scalability allows you to increase storage
| capacity by adding up to 15 additional storage units, called expansion frames. Each frame in the library
| may contain up to 12 Ultrium Tape Drives or DLT-8000 Tape Systems, but may not contain a mix of both.
| The minimum number of frames in a library containing DLT-8000 Tape System is two, a base frame which
| may contain only Ultrium Tape Drives, and one expansion frame for the DLT-8000 Tape System. The
| library offers outstanding retrieval performance, with typical cartridge move times of less than 3 seconds
| for a two-frame library with LTO drives.

Notes:

1. The claims made here and the values shown here are for LTO drives and tapes, unless otherwise stated. These values will differ for a DLT-8000 drive or tape in a D42 expansion frame.
2. To save space in this publication (in tables, for example), occasionally the shortened term 'DLT' replaces the term 'DLT-8000.'

To match your system capacity and performance needs, you can tailor the TotalStorage UltraScalable Tape Library 3584 to take advantage of the following features:

- The library been enhanced to a maximum of 16 frames, 192 drives, and 6881 cartridges. This enhancement represents a library capacity of up to 1376 TB (2752 TB at 2:1 compression).
- The Ultrium 2 Tape Drive technology features a native capacity of 200 GB (400 GB at 2:1 compression) with the IBM TotalStorage LTO Ultrium 200 GB Data Cartridge. It also features a native data rate of 35 MB/s (70 MB/s at 2:1 compression). Ultrium 2 Tape Drives can read and write Ultrium 1 Tape Drive data cartridges, and Ultrium 2 Tape Drives and cartridges can reside in the same frame with Ultrium 1 Tape Drive drives and data cartridges.
- For the IBM Ultrium Tape Drive, support of any combination of interfaces, including Fibre Channel, Low Voltage Differential (LVD) Ultra2 SCSI, and High Voltage Differential (HVD) Ultra SCSI
- For the DLT-8000 Tape System, support of the Fast/Wide LVD and HVD SCSI interfaces
- Multi-Path Architecture that enables a single library to be shared by multiple homogeneous or heterogeneous applications
- Support of any combination of frames that use DLT-8000 or LTO Ultrium media

Figure 1 on page 4 shows an IBM TotalStorage UltraScalable Tape Library 3584 that contains 16 frames.

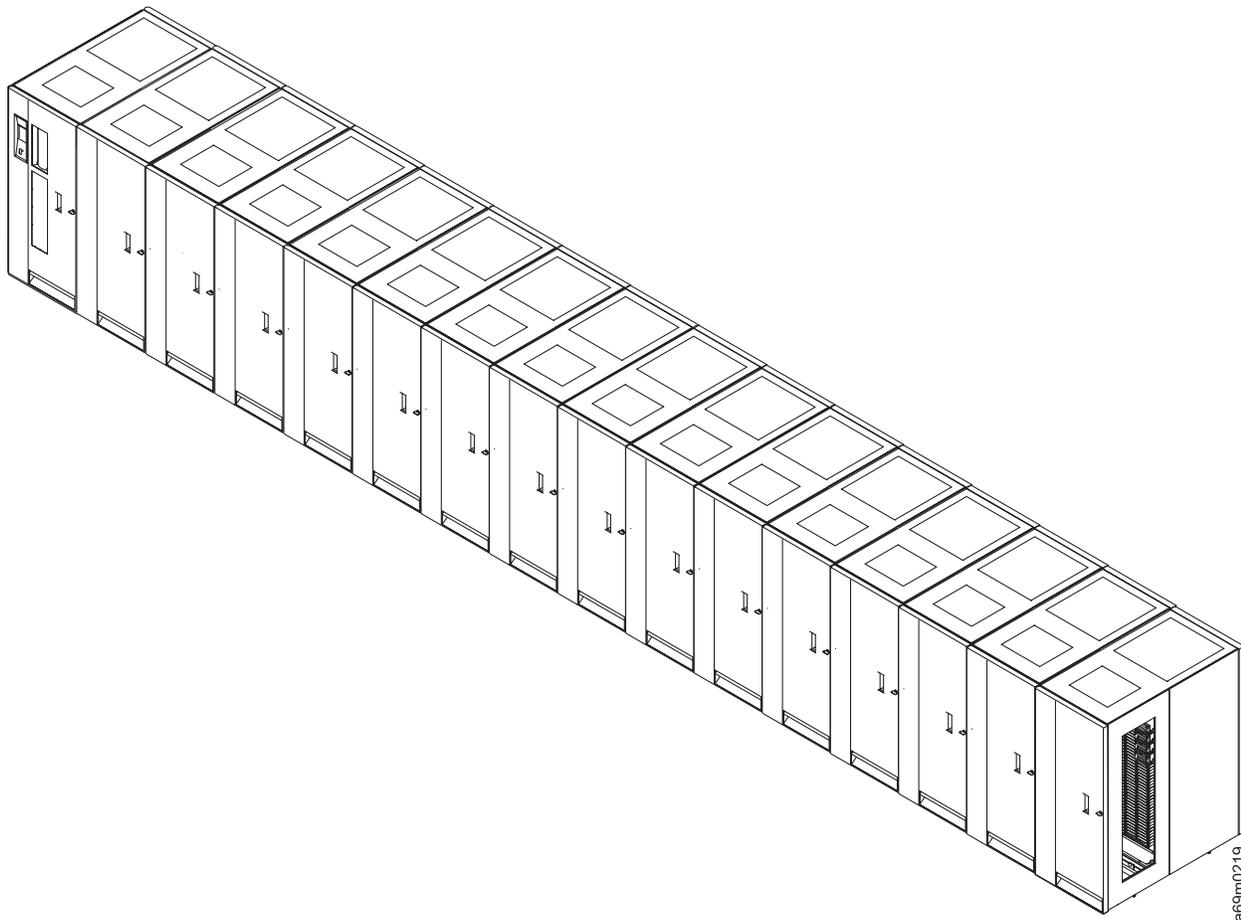


Figure 1. TotalStorage UltraScalable Tape Library 3584 with 16 Frames. Model L32 base frame (left) and fifteen Model D32 expansion frames (right of base frame).

With the Capacity Expansion Feature (additional storage slots enabled on the front door), the base frame (Model L32) in the library has as many as 281 cartridge storage slots and can support as many as 12 Ultrium Tape Drives. It contains a 10-slot input/output (I/O) station for moving cartridges to and from the library without requiring a re-inventory. For greater storage capacity, you can attach an expansion frame to the base frame. Each expansion frame (Model D32) has as many as 440 cartridge storage slots and contains as many as 12 Ultrium Tape Drives.

A fully-configured TotalStorage UltraScalable Tape Library 3584 (with one L32 base frame and fifteen D32 expansion frames) contains 2481 storage slots, and contains 4 to 72 tape drives (the number of storage slots will decrease as the number of tape drives is increased).

Figure 2 on page 5 shows a base frame and one expansion frame in the TotalStorage UltraScalable Tape Library 3584.

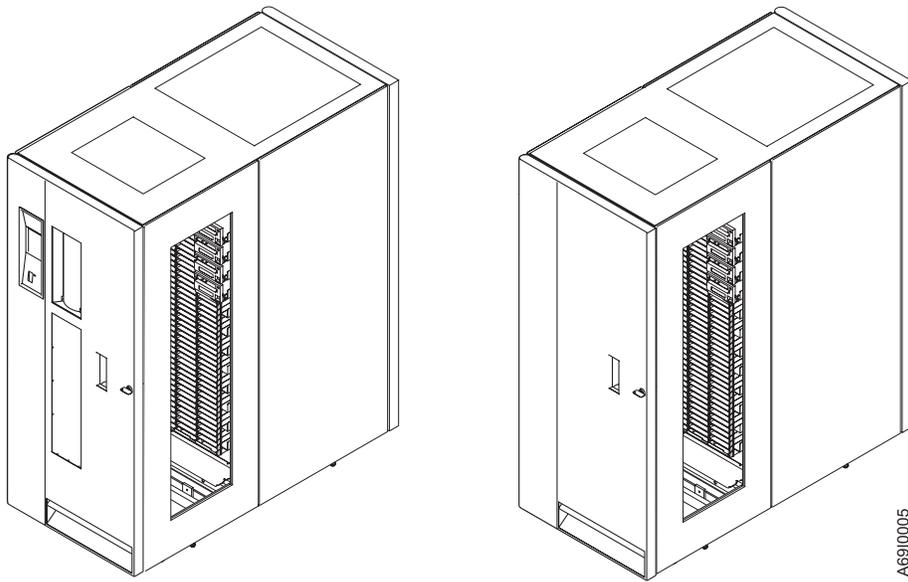


Figure 2. TotalStorage UltraScalable Tape Library 3584 Frames. Model L32 base frame (left) and Model D32 expansion frame which attaches to base frame.

The quantity of storage slots in the tape library reduces incrementally whenever you install one or more sets of 4 drives. Table 1 lists the number of storage slots available per quantity of drives in the Model L32 frame (both with and without the Capacity Expansion Feature). Table 2 lists the number of storage slots available per quantity of drives in the Model D32 frame. Table 3 lists the number of storage slots available per quantity of drives in the Model D42 frame.

Table 1. Quantity of LTO Storage Slots in Base Frame (Model L32). The quantity depends on how many drives are in the frame.

Quantity of Drives Per Frame	Slots in Model L32 Frame	Slots in Model L32 Frame with Capacity Expansion Feature
1-4	141	281
5-8	113	253
9-12	87	227

Table 2. Quantity of LTO Storage Slots in Expansion Frame (Model D32). The quantity depends on how many drives are in the frame.

Quantity of Drives Per Frame	Slots in Model D32 Frame
0	440
1-4	423
5-8	409
9-12	396

Table 3. Quantity of DLT-8000 Storage Slots in Expansion Frame (Model D42). The quantity depends on how many drives are in the frame.

Quantity of Drives/Control Ports Per Frame	Slots in Model D42 Frame
0	360
1-4	346
5-8	333
9-12	324

The TotalStorage UltraScalable Tape Library 3584 features Multi-Path Architecture, which allows similar or dissimilar open system hosts to share the library's robotics without middleware, or with a dedicated server acting as a library manager. Multi-Path Architecture makes sharing possible by letting you partition the TotalStorage UltraScalable Tape Library 3584 storage slots and tape drives into *logical* libraries, with at least one control path for each logical library. Host systems can then run separate applications in each logical library. Multi-Path Architecture also lets you configure additional control paths for any one logical library. This allows the cartridge inventory of the TotalStorage UltraScalable Tape Library 3584 to be shared by multiple, open-systems hosts. Additional control paths also reduce the possibility that failure in one control path will cause a breakdown in the entire library. For details about configuring the library to share robotics, see "Library Configurations" on page 38.

Mixed Media (no longer offered)

The TotalStorage UltraScalable Tape Library 3584 allows you to combine Models L32, D32, and D42. You can order a Model L32 frame (or a feature for an existing frame) such that the device that moves the cartridges (the gripper) can handle both LTO (L1 & L2) and DLT-8000 media. The upper I/O station contains 10 storage slots for LTO media, and you can order an 18-slot, lower I/O station for DLT-8000 media.

If you use mixed media, you must configure the LTO and DLT-8000 elements (drives, storage slots, grippers) into separate logical libraries. See the *IBM Ultrium 3584 Ultra-Scalable Tape Library, Planning and Operator Guide* for details about partitioning and labeling logical libraries.

Expanded I/O Capacity

To insert cartridges into and remove them from the library (without requiring a reinventory), the library offers two input/output (I/O) stations located on the front door of the base frame (Model L32). The upper I/O station contains 10 slots for LTO Ultrium-1 or Ultrium-2 tape cartridges. The quantity of storage slots in the lower I/O station varies, depending on whether you use mixed media. For LTO tape cartridges, the lower I/O station contains 20 slots; for DLTape IV, the lower I/O station contains 18 slots. A frame cannot combine the two types of cartridges. However, in a library that uses mixed media, you may insert DLTape IV tape cartridges into the lower I/O station of a Model L32 frame for transport (by the cartridge accessor) to a Model D42 frame.

Capacity Expansion Feature

- | The capacity expansion feature is firmware that lets the customer use the storage slots on the front door of the TotalStorage UltraScalable Tape Library 3584. With the capacity expansion feature installed, the base frame offers a maximum of 281 cartridge storage slots. The capacity expansion feature is required when you add one or more expansion frames (Model D32) to the base frame.

When customers order the library, they may specify that the capacity expansion feature be factory installed, or they may order the feature and have the IBM customer engineer (CE) install it at a later date.

Control Path Failover Feature

Automatic Library Control Path Failover Feature enables the library to resend the command to another control path target for the same logical library. With automatic control path failover installed, the target can be another HBA, SAN, or library control path drive. The library initiates error recovery and continues the operation on the other control path without interrupting the application. Only AIX commands are supported for this feature; DLT control ports are not supported.

When customers order the library, they may specify that the Control Path Failover feature be factory installed, or they may order the feature and have the IBM customer engineer (CE) install it at a later date.

Dual ac Power Cord Line Feed

- | The library's dual ac power cord line feed supports 110 Vac or 220 Vac. It provides two independent line cords that may be connected to two independent branch circuits and therefore to two receptacles. A power switch connects to one of the two branch circuits and passes all ac power to the frame from that circuit.
 - | The switch monitors the ac line voltage from the circuit it is using and automatically switches to the alternate power circuit if the incoming voltage is lost.
-

Multi-Path Architecture

The TotalStorage UltraScalable Tape Library 3584 features the Storage Area Network (SAN)-ready Multi-Path Architecture, which allows homogeneous or heterogeneous open systems applications to share the library's robotics without middleware or a dedicated server (host) acting as a library manager. The SAN-ready Multi-Path Architecture makes sharing possible by letting you partition the library's storage slots and tape drives into logical libraries. Servers can then run separate applications for each logical library. This partitioning capability extends the potential centralization of storage that the SAN enables. The Multi-Path Architecture is compliant with the following attachment interfaces:

- Small Computer Systems Interface (SCSI)
- Fibre Channel

Whether partitioned or not, the 3584 Tape Library is certified for SAN solutions (such as LAN-free backup).

The Multi-Path Architecture also lets you configure additional control paths for any one logical library. A control path is a logical path into the library through which a server sends standard SCSI Medium Changer commands to control the logical library. Additional control paths allow the cartridge inventory of the TotalStorage UltraScalable Tape Library 3584 to be shared by multiple IBM *e*server, iSeries, and IBM AS/400 servers, or other open systems hosts that run the same applications. Additional control paths also reduce the possibility that failure in one control path will cause the entire library to be unavailable.

Supported Servers and Requirements

The IBM TotalStorage UltraScalable Tape Library 3584 is supported by a wide variety of servers, operating systems, and adapters. These supported attachments can change throughout the life cycle of the product. To determine the latest attachments, visit the website at <http://www.ibm.com/storage/1to> or contact your customer's IBM marketing representative.

Attachments to the IBM TotalStorage UltraScalable Tape Library 3584 include (but are not limited to) those shown in Table 4.

Table 4. Supported Servers and System Attachments

Server	Operating System
IBM @server iSeries and IBM AS/400 [®] (see Note)	OS/400 [®] (for LTO drives only)
IBM @server pSeries and IBM RS/6000 [®] and RS/6000 SP [™] [®]	IBM AIX [®]
IBM @server xSeries and Netfinity [®]	Microsoft [®] Windows NT [®] and Windows 2000 [®]
HP [®]	Hewlett-Packard HP-UX [®]
Intel [®] -compatible servers	Microsoft [®] Windows NT [®] and Windows 2000 [®]
Sun [®] SPARC [™] PCI	Sun Solaris [®]
Sun [®] SPARC [™] Sbus	Sun Solaris [®]

Note: The IBM @server iSeries and AS/400 do not support the D42 expansion frame.

Supported Software

IBM does not provide application software with the IBM TotalStorage UltraScalable Tape Library 3584. To order software, have your customer contact the IBM marketing representative, IBM business partner, or an independent software provider.

The following are among many software products that support the IBM TotalStorage UltraScalable Tape Library 3584. To get a comprehensive list of compatible software, have your customer visit the Web at <http://www.ibm.com/storage/1to> or contact the IBM representative.

- Tivoli[®] Storage Manager[™] (formerly IBM ADSTAR[®] Distributed Storage Manager (ADSM))
- Backup Recovery and Media Services (BRMS)
- Computer Associates ARCserve[®]
- Dantz Retrospect
- Sterling Alexandria
- Legato Systems NetWorker
- SCH Technologies
- VERITAS NetBackup and Backup Exec[®]
- Help/Systems, Inc. Robot/SAVE

Supported Device Drivers

The DLT-8000 Tape System is supported by native operating system device drivers. For instructions about installing, configuring, and operating system device drivers for the DLT-8000 tape system, refer to the documentation for your operating system.

IBM provides device driver support for the Ultrium tape drive and robotics for the TotalStorage UltraScalable Tape Library 3584 (including the Model D42 frame). IBM maintains the latest levels of device drivers and driver documentation on the internet. Your customer can access this material from the browser or via the IBM FTP site by doing the following:

Note: If your customer does not have Internet access, contact the IBM marketing representative for information about device drivers.

- From a browser, type one of the following URLs:
http://www.ibm.com/storage/techsup/tapetech/tapetech.html
ftp://ftp.software.ibm.com/storage/devdrv
ftp://207.25.253.26/storage/devdrv
- Using an IBM FTP client, enter the following specifications:
FTP site: ftp.software.ibm.com
IP Addr: 207.25.253.26
Userid: anonymous
Password: (use your current e-mail address)
Directory: /storage/devdrv

If you do not have internet access and you need information about device drivers, contact your customer's IBM Sales Representative.

IBM provides PostScript- and PDF-formatted versions of its documentation in the /storage/devdrv directory:

- IBM_ultrium_tape_IUG.pdf and IBM_ultrium_tape_IUG.ps contain the current version of the *IBM Ultrium Device Drivers Installation and User's Guide*.
- IBM_ultrium_tape_PROGREF.pdf and IBM_ultrium_tape_PROGREF.ps contain the current version of the *IBM Ultrium Device Drivers Programming Reference*.

Device drivers for each supported server are under /storage/devdrv/ in the following directories:

- AIX/
- HPUX/
- Solaris
- WinNT
- Win2000

Note:

- The device driver for the AS/400 is included in the OS/400 operating system.
- DLT-8000 drivers are not supported on the AS/400.

For more information about device drivers, refer to the preceding device driver operating system directories.

Attachment Interfaces

The TotalStorage UltraScalable Tape Library 3584 supports three types of attachment interfaces: Fibre Channel, LVD SCSI, and HVD SCSI. The information that follows describes each type.

Fibre Channel

- | In addition to using SCSI interfaces to attach to servers, the 3584 tape library also can use a Fibre Channel interface. Fibre Channel is a 200 MB-per-second, full-duplex, serial-communications technology
- | capable of interconnecting Ultrium tape drives and servers that are separated by as much as 11 kilometers

(7 miles). Fibre Channel technology combines the best features of traditional input/output (I/O) interfaces (such as the throughput and reliability of SCSI and Programmed Control Interrupt) with the best features of networking interfaces (such as the connectivity and scalability of Ethernet and Token Ring). Fibre Channel technology offers a new transport mechanism for delivering commands, and provides high performance by allowing processing to be done in the hardware.

You can establish Fibre Channel connections between Fibre Channel ports that reside in the library and one or more servers, and the network interconnecting them. The network can consist of such elements as switches, hubs, bridges, and repeaters used in the interconnection.

LVD SCSI

The TotalStorage UltraScalable Tape Library 3584 operates as a set of SCSI-3 devices. Any Ultrium Tape Drive in the library can attach to a server through a Low Voltage Differential (LVD) Ultra2 SCSI interface, and any DLT-8000 Tape System can attach to a server through a Fast/Wide LVD SCSI interface. Each drive uses shielded, VHDCI, 68-pin connectors and can attach directly to a 2-byte-wide SCSI cable (the earlier version of the library used drives with HD68 connectors).

Any combination of initiators (servers) and targets (devices) up to a total of 16 is allowed if:

- The SCSI bus is terminated properly at each end
- Cable restrictions are followed according to SCSI-3 standards

Under the SCSI-3 standards, this type of attachment allows cable lengths of up to 25 m (81 ft), with the appropriate cable and terminator.

HVD SCSI

The TotalStorage UltraScalable Tape Library 3584 operates as a set of SCSI-3 devices. Any Ultrium Tape Drive in the library can attach to a server through a High Voltage Differential (HVD) Ultra SCSI interface. Any DLT-8000 Tape System can attach to a server through a Fast/Wide HVD SCSI interface. Each drive uses shielded, VHDCI, 68-pin connectors and can attach directly to a 2-byte-wide SCSI cable (the earlier version of the library used drives with HD68 connectors).

Any combination of initiators (servers) and targets (devices) up to a total of 16 is allowed if:

- The SCSI bus is terminated properly at each end
- Cable restrictions are followed according to SCSI-3 standards

Under the SCSI-3 protocol, this type of attachment allows cable lengths of up to 25 m (81 ft), with the appropriate cable and terminator.

IBM TotalStorage Tape Library Specialist (formerly StorWatch™)

IBM TotalStorage Tape Library Specialist (formerly StorWatch, IBM's Enterprise Storage Resource Management solution), is a growing software family whose goal is to enable storage administrators to efficiently manage storage resources from any location within an enterprise. By using this solution, your customer can view and manage widely dispersed storage resources through a single, cohesive control point.

The Specialist family includes a number of storage "specialists," interfaces that enable you to manage specific storage devices. The (StorWatch) Specialist for the 3584 Tape Library is a platform-independent, web-based, user interface that lets your customer configure and monitor the library from a remote location.

Configuring the IBM TotalStorage Tape Library Specialist is an operator task. The operator should reference the 3584 Planning and Operator Guide for setup and configuration information.

Remote Support (Call Home Feature)

Optional remote support is available for the 3584 Tape library through its Call Home capability. This feature minimizes the time it takes to correct library problems. It uses a modem connection to report failures that are detected by the library. Whenever the library detects a failure, the Call Home feature sends detailed error information to IBM. The IBM Service Representative can prepare an action plan to handle the problem before traveling to the library.

The Call Home feature handles library problems, including those related to loading and unloading the drive; it does not handle drive read/write or server interface problems.

Hardware requirements for the remote support function vary, depending on whether you already have one or more 3584 Tape Libraries. Table 5 indicates the requirements.

Table 5. Remote Support Requirements (Call Home Feature)

Quantity of L32 Frames	Requirement
1	Remote Support Facility (modem and cable; feature code #2710)
2	Remote Support Switch (feature code #2711)
3 or more	Remote Support Attachment (cable; feature code #2712)

Library Components – Locations

The TotalStorage UltraScalable Tape Library 3584 consists of the following major components shown in Figure 3 on page 15. The following paragraphs give a very brief description of each component. For greater detail, see “Library Components – Detail” on page 16:

1 Library frames

The base frame (Model L32) and the expansion frame (Model D32 or D42). Each frame contains a rail system, cartridge storage slots, and as many as 12 tape drives.

2 Door safety switch

A device in each frame that shuts off power to the accessor motors when the front door of that frame is opened. Power remains on at the accessor logic (electronic cards).

3 Operator panel and operator panel controller

Located on the front of the base frame, the operator panel is the set of indicators and controls that let you perform operations and determine the status of the library. The panel consists of the library power switch, a power-on indicator, a touchscreen liquid crystal display (LCD) and controller, and the controller for the I/O Station. The operator panel controller is a logic card that facilitates communication between the operator panel and the accessor controller. The operator panel controller posts (to the LCD on the operator panel) status information and information about the sensing and locking of the I/O Station.

4 I/O station

A compartment located on the front door of the base frame (L32). Allows the operator to insert or remove tape cartridges.

5 Front door

The front door of any frame. The front door contains 140 storage slots on the base frame (Model L32) and 220 storage slots on the expansion frame (Model D32). When the Capacity Expansion Feature is added to the Model L32, the storage slots become enabled and can increase the capacity of the tape library.

6 Cartridge storage slots

Units that are mounted in the tape library and used to store tape cartridges while they are in the library. The quantity of available storage slots varies, depending on the type of frame that you have (Model L32, Model L32 with Capacity Expansion Feature, or Model D32) and the quantity of drives that are installed (see Table 1 on page 6, Table 2 on page 6, Table 3 on page 6).

7 Accessor Controller Card (ACC)

A logic card that facilitates all accessor motion requests (such as calibrations, moves, and inventory updates). The accessor controller also facilitates other aspects of the library, such as configuration, move and eject operations, automatic drive cleaning, and determination of whether an element (such as a tape drive) is empty or occupied.

8 Rail system

The assembly on which the cartridge accessor moves through the library to add or remove tape cartridges. Includes top and bottom rails.

9 Cartridge accessor

The assembly that moves tape cartridges between storage slots, tape drives, and an I/O Station.

10 Dual-gripper assembly

A device that gets and puts tape cartridges from and to storage slots, tape drives, and an I/O Station.

11 Tape drive

Mounted in the TotalStorage UltraScalable Tape Library 3584, one or more units that read and write data stored on tape cartridges. The LTO tape drive provides a path for communication between host systems and the accessor controller. The DLT-8000 tape drive uses a separately-installed control path for communication between host systems and the accessor controller.

12 Frame Control Assembly (FCA)

An assembly of components that facilitate RS-422 communication between the set of drives within a frame and the accessor controller and operator panel controller. Includes the Media Changer Pack (MCP), power supply, and frame control assembly (FCA) which houses a receptacle for the incoming main AC power, 3 circuit protectors, and 2 vertical rows of 5 AC outlets for powering the tape drives.

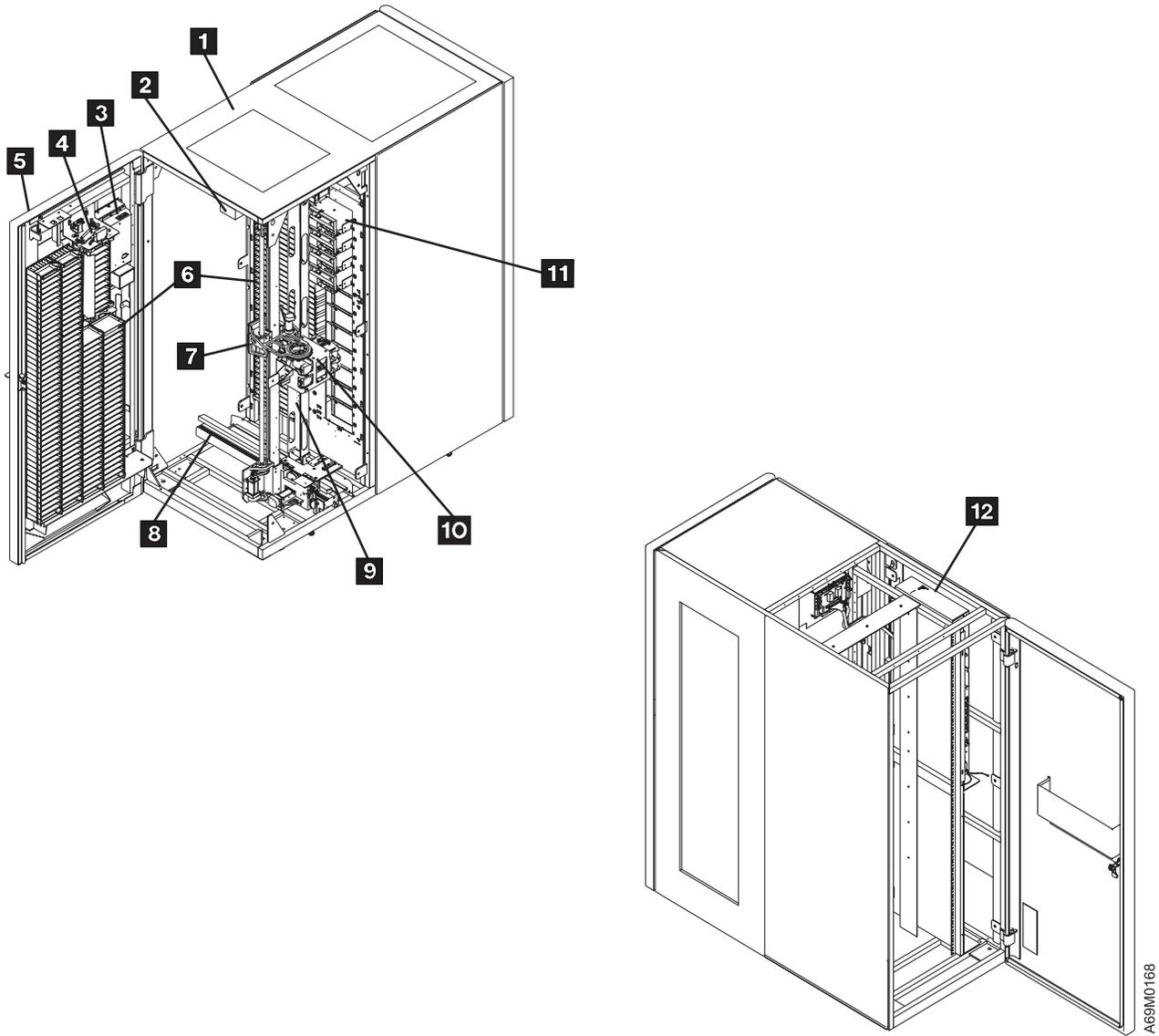


Figure 3. IBM TotalStorage UltraScalable Tape Library 3584 Components. The front and rear of the library are shown.

Library Components – Detail

Library Frames

The library frame (**1** at Figure 3 on page 15) is the basic building block for the TotalStorage UltraScalable Tape Library 3584. There are three types of frames:

- Base frame (Model L32)
- Expansion frame (Model D32)
- Expansion frame (Model D42) (No longer offered)

Each frame is 7.5 cm (29.5 in.) wide, and contains a rail system, cartridge storage slots, and as many as 12 tape drives. The base frame includes:

- Cartridge accessor
- Accessor controller
- Input/Output (I/O) Station with 10 storage slots
- Operator panel
- Operator panel controller

The first Model D42 expansion frame in a library requires at least one control port. The control port passes host commands over an RS-422 interface to the library.

All components of the TotalStorage UltraScalable Tape Library 3584 are contained inside the frames. The tops of the frames have windows to allow for ambient lighting. In addition, windows are located at each end of the library.

Located at the front of each frame is a front door. The door allows access to the cartridge storage slots and allows service personnel to access the rail system, cartridge accessor, and accessor controller. The front door of the base frame includes the operator panel, power switch, I/O Station, handle for opening the door, and keylock.

Inside each frame, cartridge storage slots and I/O slots are mounted on the interior of the front door. Opposite the front door, cartridge storage slots and drives are mounted on the frame wall. The cartridge accessor accesses these storage slots and drives.

At the rear of each frame is a service access door that lets service personnel access the tape drives and frame control assembly (FCA). Each frame that contains at least one installed drive also contains an FCA. An FCA is a sheet-metal box that houses circuit breakers, AC outlets for powering the tape drives and all other components in that frame, and a receptacle for the incoming main AC power.

Cartridge Storage Slots

Cartridge storage slots are mounted inside the library's frames and are used to store tape cartridges. Each storage slot has a unique ID to indicate its physical location. The storage slot ID consists of three values:

Frame number

Represented as F_x, where x equals the frame number. For the base frame, the frame number is 1; for each adjacent expansion frame, the frame number increments by one.

Column number

Represented as C_{xx}, where xx equals the column number. For each frame, the left frame wall column is column number 1. The column number increments in a zig-zag pattern, alternating between the frame wall and the door wall, and progressing from left to right. Thus, all column numbers on the frame wall are odd numbers, and all column numbers on the door wall are even numbers. The base frame (Model L32) has 8 columns; the expansion frame (Model D32, D42) has 10 columns. Refer to Figure 4 on page 18 for base frame, and Figure 5 on page 19 for expansion frames.

Note: Refer to Figure 4 on page 18. If the capacity expansion feature is NOT installed, the cartridge slots (shown in a crossed-out circle), on the front door of the base frame will NOT be accessible.

Row number

Represented as Rxx, where xx equals the row number. For each column, the row number is 1 for the top storage slot in a column and increments by one for each row beneath the top slot. Regardless of whether a storage slot is installed in row number 1, the row numbering is the same for every column.

For example, the storage slot ID F1–C03–R22 means:

F1 Frame 1 (base frame)

C03 Column 3 (second column from left on frame wall)

R22 Row 22 (twenty-second position down from the top of the column)

Storage Slots in Model L32 (Frame 1)

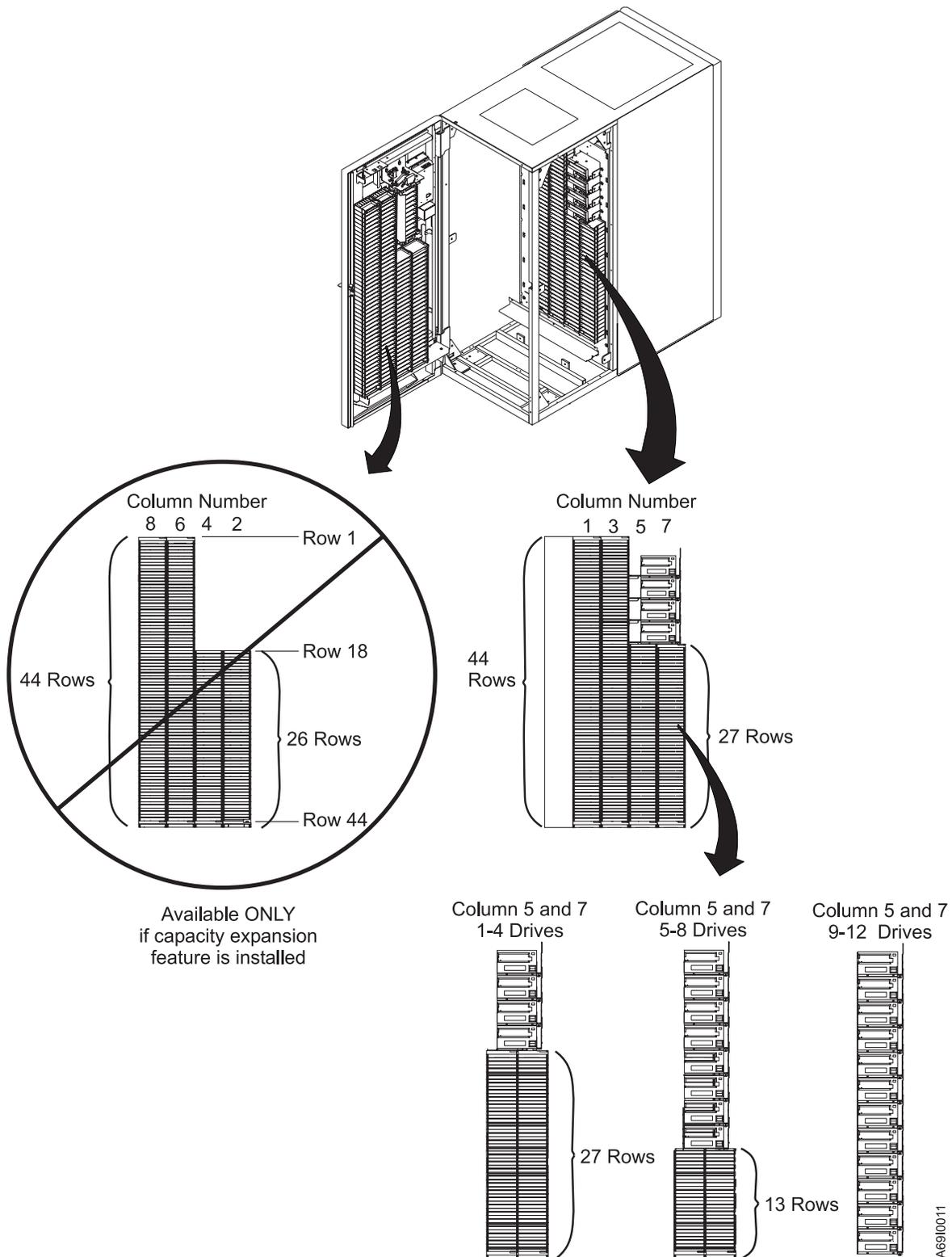


Figure 4. LTO Storage Slots Base Frame (L32). Use this numbering scheme to determine the physical ID (location) of each storage slot. The L32 door storage, depicted by the crossed out circle, is only available if the Capacity Expansion Feature is enabled. Door storage in columns 2 and 4 is not present if the optional, second I/O station is installed.

Storage Slots in Model D32 (Frame 2 to 6)

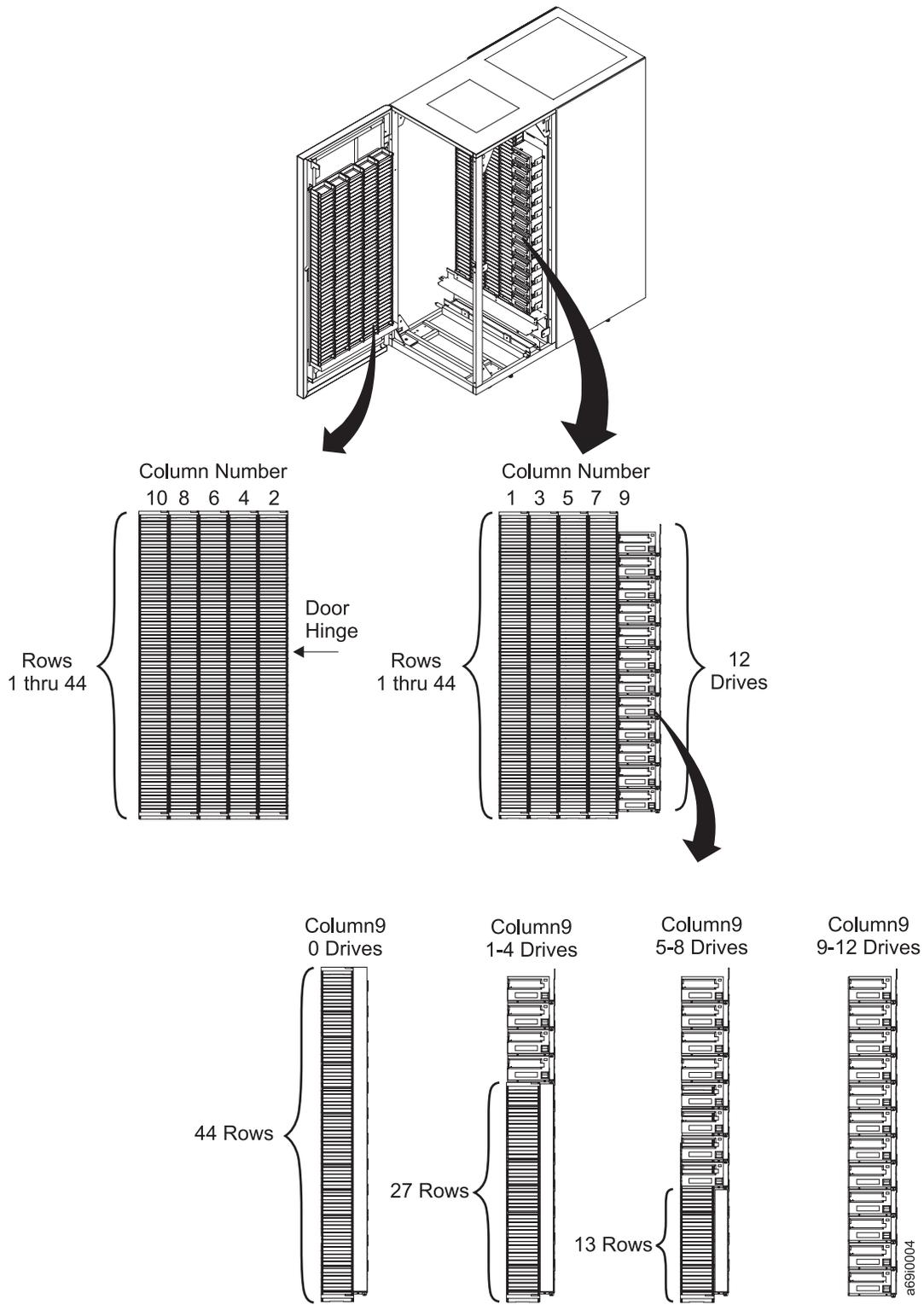


Figure 5. LTO Storage Slots Expansion Frames (D32). Use this numbering scheme to determine the physical ID (location) of each storage slot.

Storage Slots in Model D42 (Frame 2 to 6)

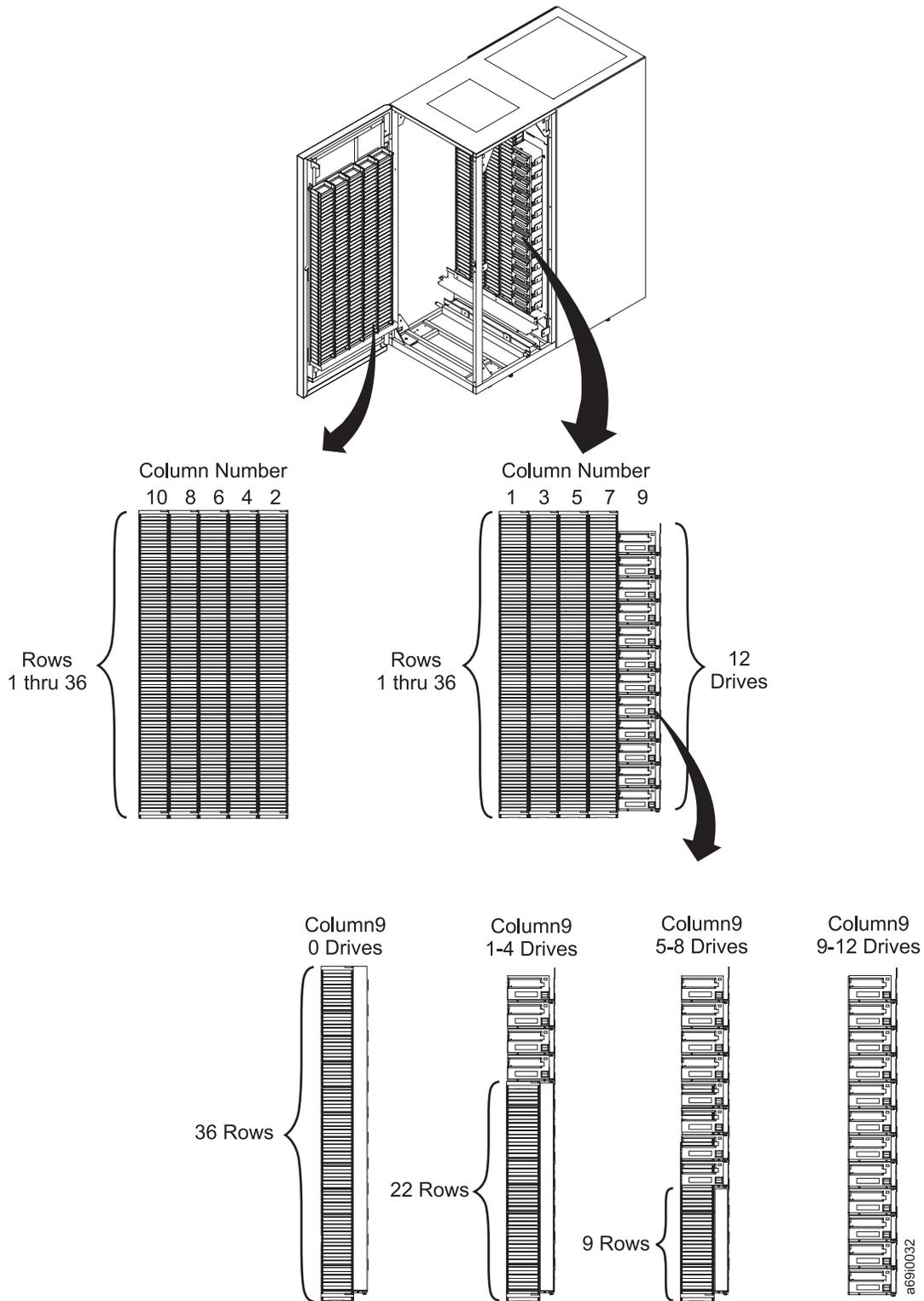


Figure 6. DLT-8000 Storage Slots Expansion Frames (D42). Use this numbering scheme to determine the physical ID (location) of each storage slot.

Accessor Controller Card (ACC)

The accessor controller card (**7** on Figure 3 on page 15) is an associated controller (logic card) for the cartridge accessor. The accessor controller handles accessor motion requests, including calibrations, moves, and inventory updates. It also provides centralized management for other aspects of the entire library, including configuration, insert and eject operations, automatic drive cleaning, and determination of element status.

Communication between the accessor controller card (ACC), motor driver assembly (MDA), Media Changer Pack (MCP), and operator panel controller (OPC) is provided by the Controller Area Network (CAN) bus. Communication between the accessor controller card (ACC) and all drives within any one frame is provided by the Media Changer Pack (MCP) in that frame, using the RS-422 interfaces.

Rail System

The cartridge accessor moves through the library on a rail system (**8** in Figure 3 on page 15). The rail system consists of a lower X-rail, an upper X-rail, and a trough for the power and control cable. The lower X-rail includes a main bearing way with a rack gear. The L-shaped, upper X-rail runs along the top of the frames. The power and control cable is kept clear of the accessor in a covered trough located at the bottom rear of the library.

Cartridge Accessor

The cartridge accessor (**9** on Figure 3 on page 15) moves cartridges between the storage slots, tape drives, and the I/O Station. The accessor consists of several components:

X-Axis motion assembly

Group of parts that includes a controller with the Controller Area Network (CAN) interface, servo motor, and pinion drive gear. Provides the motive force to move the accessor side-to-side within the frames.

Y-Axis motion assembly

Group of parts that includes a controller with the Controller Area Network (CAN) interface, servo motor, and a lead screw. Provides the motive force to move the pivot assembly and gripper assembly up and down within the frames.

Pivot assembly

Group of parts that provides a mounting platform for the dual gripper assembly **10**, calibration sensor, and the bar code reader. Capable of 180° rotation about the vertical axis.

Dual gripper assembly

Electromechanical device (mounted on the pivot assembly) that gets or puts cartridges from or to a storage slot, a drive, or the I/O station. There are two grippers on the assembly (Gripper 1 and Gripper 2). Each gripper is independently controlled and can grip a single cartridge. The grippers are located in the dual-gripper assembly **10**, on Figure 3 on page 15.

Bar code scanner

A component (mounted on the rear of the gripper assembly) that reads the bar code on the labels of cartridges or empty storage slots. It is used during configuration, inventories, audits, insertions, and inventory updates (a process that is invoked each time the front door is opened; the inventory update determines whether cartridges have been added to or removed from the library, or moved within the library).

Calibration sensor

Component that provides a means to locate certain positions within the library very precisely during the calibration operation. It is mounted on the bottom of the upper gripper. All positions are calculated from these locating positions.

Tape Drives

Attention: Do not mix Ultrium Tape Drives and DLT 8000 Tape Systems in the same frame or an error will occur when you configure the library.

The Ultrium Tape Drive and the DLT 8000 Tape System are high-performance, high-capacity data storage units that can be installed in the TotalStorage UltraScalable Tape Library 3584. Up to 12 Ultrium Tape Drives or DLT 8000 Tape Systems may be installed in each frame of the library, however, the two types of drives may not be installed in the same frame.

Table 6 lists the characteristics of the Ultrium Tape Drive and the DLT 8000 Tape System.

Table 6. Characteristics of LTO and DLT-8000 Tape Drives

Characteristics	Tape Drive	
	Ultrium-1 / Ultrium-2	DLT-8000
Native sustained data rate	15 / 35 MB per second	6 MB per second
Compressed data rate (at 2:1 compression)	30 / 70 MB per second	12 MB per second
Supported interface (see Note)	LVD Ultra2 SCSI	Fast/Wide LVD SCSI
	HVD Ultra SCSI	Fast/Wide HVD SCSI
	Fibre Channel	--

Note: In an Ultrium frame, any combination of interfaces for the Ultrium Tape Drive is supported (including Fibre Channel); in a DLT frame, only LVD or HVD SCSI interfaces can be used.

Tape Drive – LTO

| The LTO Ultrium Generation 1 and 2 Tape Drive is a high-performance, high-capacity data-storage unit
| that is installed in the TotalStorage UltraScalable Tape Library 3584. As many as 12 Ultrium Tape Drives
| can be installed in the base frame and 12 Ultrium Tape Drives (SCSI, fibre channel, or a combination of
| both) in any D32 expansion frame of the TotalStorage UltraScalable Tape Library 3584. See Table 6 for
| characteristics of the Ultrium Tape Drive.

The Ultrium Tape Drive uses magneto-resistive heads to record with a linear, serpentine recording method. Located on the heads are high-availability redundant servo readers which ensure consistent data integrity.

Tape Drive – DLT-8000

The DLT-8000 Tape System technology has been introduced to help customers work with two types of media (LTO and DLT-8000) in the same library. To use DLT-8000 Tape System technology, the first expansion frame (D42) in a library requires a separate control path to be installed in place of one drive. The base frame is always LTO-only.

As many as 11 DLT-8000 tape drives can be installed in the first D42 expansion frame of the TotalStorage UltraScalable Tape Library 3584. Twelve DLT-8000 tape drives can be installed in subsequent D42 expansion frames. DLT-8000 tape drives and tape cartridges cannot be mixed with LTO drives and tape cartridges in the same expansion frame.

Front Door

Located at the front of the base frame is the front door, shown in Figure 7. The door allows the service representative access to storage slots, rail system, accessor, and other components that may require service.

The operator panel **1** is mounted on the front door of the base frame (Model L32). Also located on the base frame door are the power switch **2** and input/output (I/O) Station **3**. A door handle **4** and a keylock (with key) **5** are included on the front door of all frames. To unlock and open the front door of any frame, insert the key into the keylock and turn it counterclockwise approximately 180°. Some customers order the library with an optional second (or lower) I/O station, which will be located in place of the blank panel **6**.

Each frame of the IBM TotalStorage UltraScalable Tape Library 3584 also includes a rear door with a keylock (and key). To unlock the rear door of any frame, insert the key into the keylock and turn it counterclockwise. The keys to the front and rear doors are not interchangeable.

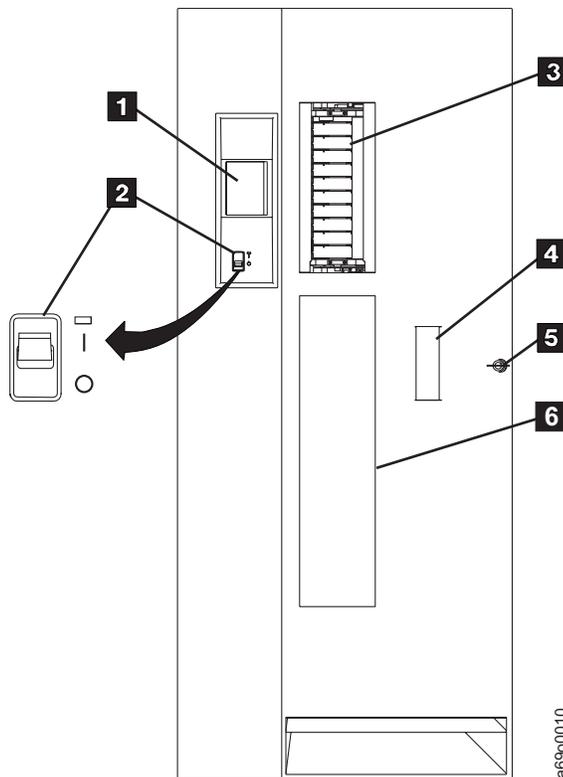


Figure 7. Base Frame Front Door

Note: The door of the I/O Station **3** is shown in an open position.

Front Door Safety Switch

Each frame includes a door safety switch that automatically turns off power to the accessor motors whenever you open the front door of that frame. Power remains on at the accessor electronics (logic cards).

I/O Station

A 10-slot cartridge storage unit is located on the inside of the Model L32 tape library front-door. The I/O station allows the operator or CE to insert or remove library tape cartridges.

Operator Panel

The operator panel shown in Figure 8 on page 27 is located in the front door of the base frame (Model L32). The operator panel provides information screens and controls that allow you to perform operations, and determine the status of the library. Use the operator panel to check error logs, run diagnostics, and perform other service operations. The operator panel consists of:

1 Library power switch

A toggle switch that allows you to power on and power off the IBM TotalStorage UltraScalable Tape Library 3584. To power on the library, push the power switch to **I**. To power off the library, push the power switch to **O**.

2 Power-on indicator

A green light that, when lighted, indicates that the library power switch is on and the EPO circuit is enabled.

3 Touchscreen LCD

A liquid crystal display (LCD) that, when touched, allows access to the library's status and menus. Use the display to perform basic and advanced operations, diagnostics, and other service operations. If you are interrupted during an operation and leave the display unattended for more than 5 minutes, the Activity screen displays (see "Activity Screen" on page 28).

4 Touch keys

An array of up to four pressure-sensitive keys along the bottom of the LCD that lets you select and manipulate menus. For most menus, the four keys are defined as BACK, UP, DOWN, and ENTER.

The operator panel controller facilitates communication between the accessor controller and the operator panel. It provides input and output to and from the LCD. It senses and locks the I/O Station. In addition, the LCD activity and service menus are executed in the operator panel controller, with support from the accessor controller and the drives (via the Media Changer controllers).

The operator panel connects to the accessor controllers and all Media Changer controllers via the Controller Area Network (CAN).

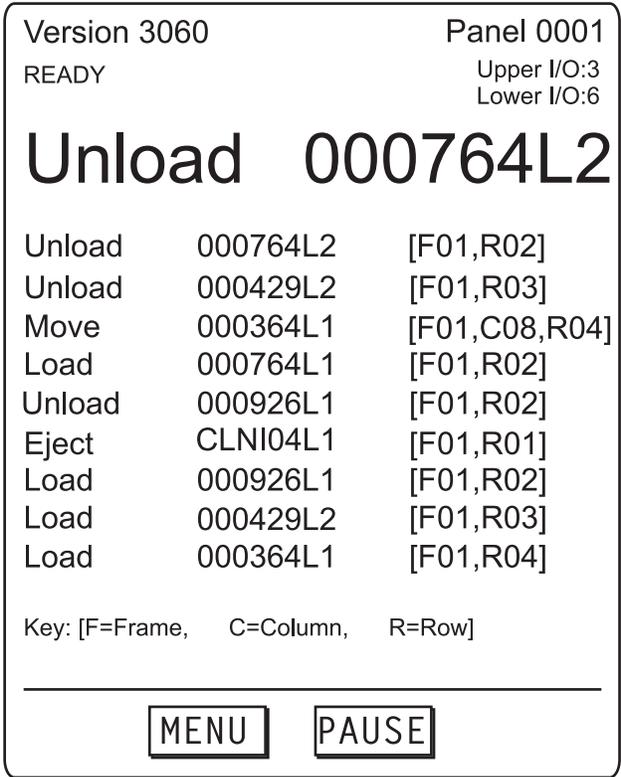


Figure 8. Operator Panel

Activity Screen

The Activity screen displays on the LCD of the operator panel when the library is Ready. It shows the current activity in a large font type and provides a history of preceding operations in a smaller font type. The operations are listed from top to bottom, with the most recent at the top and oldest at the bottom. The first line of smaller font types gives a detailed description of the current activity (for example, in the following sample Activity screen, a cartridge with a volume serial number (VOLSER) of 000764L1 was unloaded from the drive in frame 1, row 2).

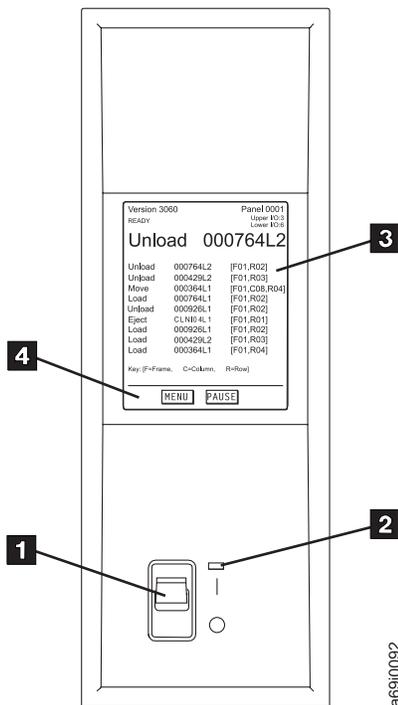


Figure 9. Activity Screen

Information in the Activity screen is automatically replaced by an error message whenever the library detects that:

- An error has occurred
- A drive requires cleaning, automatic cleaning has been enabled, and no cleaning cartridge is present in the library

Menu Key

The [MENU] key is located on the Activity screen of the display. Press the [MENU] key to display the Main menu, allowing you to scroll through the various options that are available to the operator, and those options that are available exclusively to the customer engineer.

Pause Key

Press the [PAUSE] key before you power-off the library or open a front door. The Pause key is located on the Activity screen of the display. The Pause key causes the library to park the cartridge accessor in an area that gives you clear access to the library's interior if you open a front door.

Note: If the door was opened and closed during the pause, the library will inventory itself before resuming customer operations.

The library will resume operation (if the door was not opened) when the pause is over.

Frame Control Assembly (FCA)

The frame control assembly (FCA) **12**, in Figure 3 on page 15 consists of the following:

1. Media Changer Pack (MCP) hot-pluggable FRU, located inside the FCA, has two main functions:
 - a. It controls the initial power up sequence, including turning on power to the drives and turning on one 37 V dc supply to power up the ACC, MDA, and OPC node cards.
 - b. It handles communications between the drives using its RS-422 interfaces and the rest of the library, using the CAN interfaces.
An expansion frame may contain an optional FCA and MCP (required if the expansion frame will contain drives).
2. The 37 V dc power supplies, located inside of the FCA, are hot-pluggable FRUs
 - a. The base frame (Model L32) FCA always contains two 37 V dc power supplies if you have a single-frame library. If one power supply fails, the other power supply can provide ample power for the library.
 - b. If the first expansion frame (Model D32) has an FCA installed it will have only one 37 V dc power supply. Additional D32 expansion frames with FCAs will **not** have 37 V dc power supplies, unless FC 1902 (Redundant 37 V dc power supply) has been installed.
 - c. These power supplies provide power to the I/O Station, ACC, OPC, MDA, and accessor motors.
 - d. Redundant power supplies are enabled and disabled as needed under control of the ACC. Do NOT regard a power supply as faulty unless the library logs a power supply problem.
3. Three circuit protectors
 - a. One main line circuit-protector on each FCA. This protector shuts off ac power to the FCA and the entire library (if there is no other FCA powered on).
 - b. Two drive power circuit protectors on each FCA. These protectors provide ac power to each bank of 5 drive power receptacles.
4. Ten ac power receptacles for the drive power cables.
5. 24 V dc power supply for EPO circuits, door interlock circuits, frame-counting circuits, and the MCP.
6. Power receptacle for incoming ac power.

Controller Area Network (CAN)

The Controller Area Network (CAN) is a serial bus system that complies with ISO Standard 11898. Developed originally for passenger cars, CAN is used in millions of industrial control devices, sensors, and actuators. Features of the system include simplicity and high transmission reliability.

In the IBM TotalStorage UltraScalable Tape Library 3584, the CAN bus communicates with all the node cards. A list of CAN bus functions includes:

- Broadcasts communication from the Access Controller Card (ACC) to all node cards (for example, a command to set the SCSI status to not ready/ready).
- Provides point-to-point communication between the ACC and any MCP (for example, a response to a normal work request)
- Provides point-to-point communication between the ACC and the MDA (for example, an accessor service request and response)
- Provides point-to-point communication between the operator panel controller (OPC) and the ACC (for example, an accessor service request and response) or any MCP (for example, a drive service request and response).

Node Cards

There are four “node” cards in a 3584 Model L32. Although some may appear to be more than just a card, they are called node cards because they function much like nodes on a LAN; they all communicate with each other by sending messages over the CAN bus. The four node cards are (or are contained within) these FRUs:

- Accessor Control Card (ACC)
- Motor Driver Assembly (MDA)
- Operator Panel Controller (OPC)
- Media Changer Pack (MCP)

Accessor Control Card (ACC)

The **ACC** node card is the controller for the accessor mechanism. It has several functions:

- Contains the master copy of the library configuration, calibration, VPD, error log, and inventory
- Provides high level control of all cartridge movement; issuing commands to the MDA when X/Y motion is required
- Directly operates the pivot mechanism, grippers, calibration sensor, and bar code reader
- Controls redundant 37 V dc power within the entire library
- Includes the system real-time clock

Motor Driver Assembly (MDA)

The **MDA** node card has several functions related to the X and Y motors and home sensors:

- Directly controls the X and Y servo motors.
- Performs the X and Y rezero functions when commanded by the ACC.
- Contains the dynamic brake card, the XY controller, and the XY motor amps.
- Triggers the bar code scanner, allowing high-speed inventory

Operator Panel Controller (OPC)

The **OPC** node card has these main functions:

- Directly operates the I/O station lock solenoid and monitors the I/O station sensors.
- Performs all the front panel operations, including displaying status, performing manual operations, and initiating maintenance functions such as Library Verify.
- Contains a backup of the library configuration, calibration, VPD, error logs, and inventory.
- Includes a real-time clock

Media Changer Pack (MCP)

The **MCP** node card has the following functions:

- The MCP node card provides a communication path to each tape drive and control port (via the RS-422 interface) so that library commands can be received from the tape drives or control port and sent to the accessor. It includes one RS-422 interface port allotted for each drive in the frame and two Controller Area Network (CAN) ports. It also provides management and service interfaces to outside hosts.
- The MCP node card controls the initial power-up sequence, including turning on power to the drives and turning on one 37 V dc supply to power up the ACC, MDA, and OPC nodes.
- The MCP has six RS-232 ports. The bottom port is used to connect a modem for Remote Support.
- Support via the Web user interface. With proper authorization, the Web supports the following tasks:
 - Enable/disable control paths
 - Change drive SCSI IDs
 - Clean a drive

- Configure logical libraries
- Move cartridges
- Perform inventory
- Change automatic-cleaning setting
- Update library firmware
- Update drive firmware
- Update control path firmware
- Download logs
- Library verify

Functional Block and Cable Diagrams

Figure 10 and Figure 11 on page 33 show an IBM TotalStorage UltraScalable Tape Library 3584 cable overview for the major components in a library. Figure 12 on page 34 shows a FRU block diagram that ties all the components together for a two-frame library containing a full complement of drives.

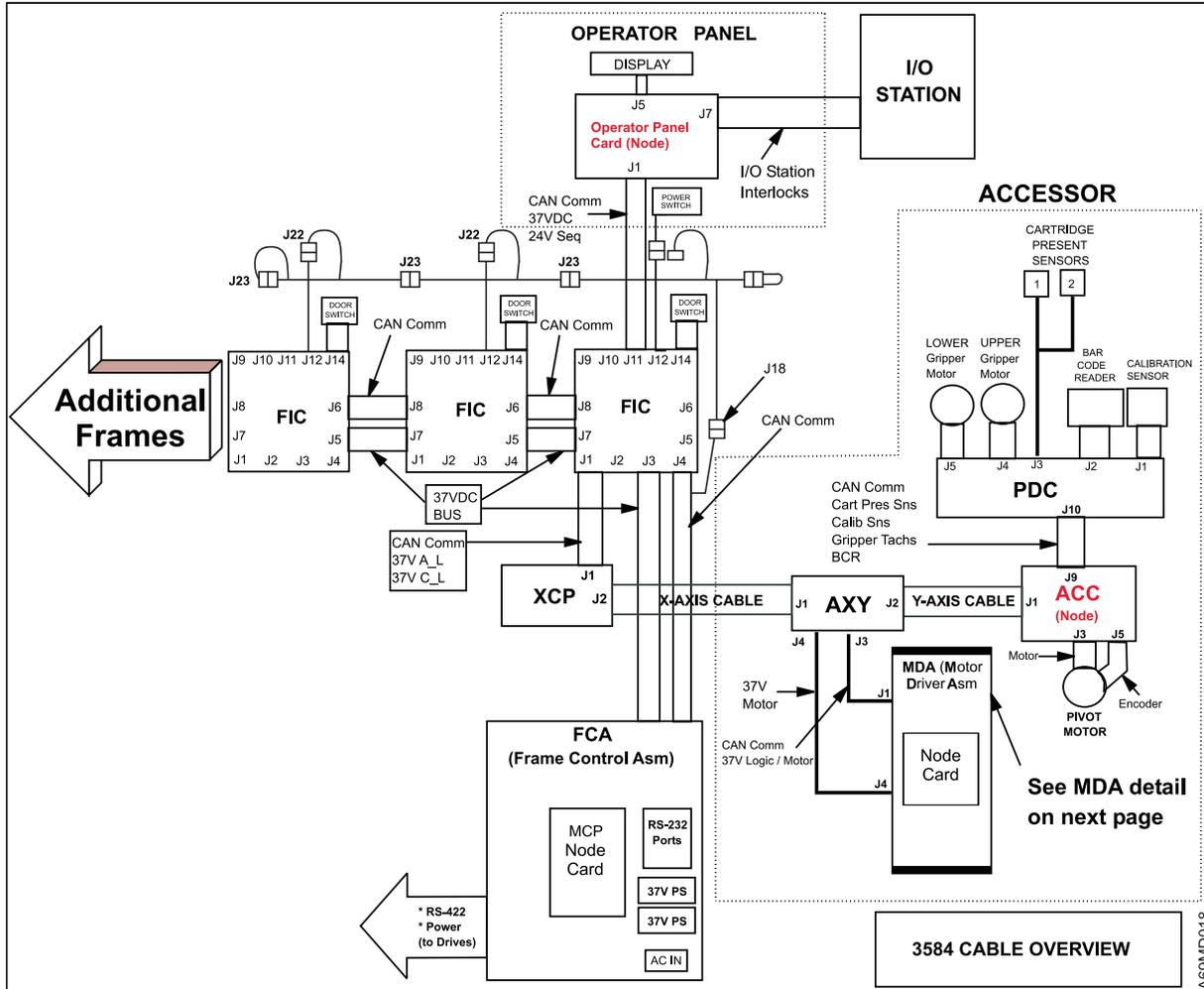


Figure 10. Cable Overview – Library

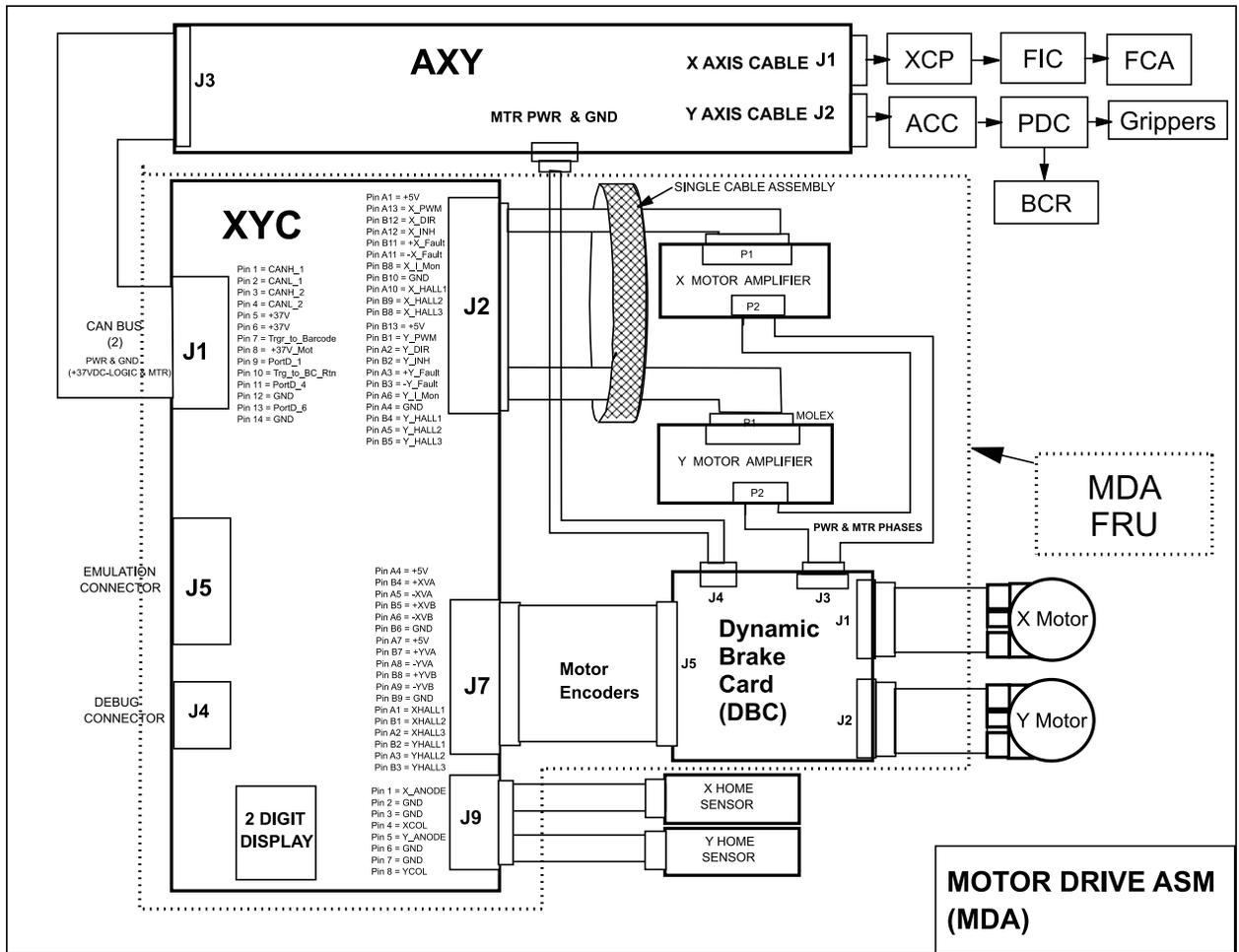


Figure 11. Cable Overview – Motor Drive Assembly

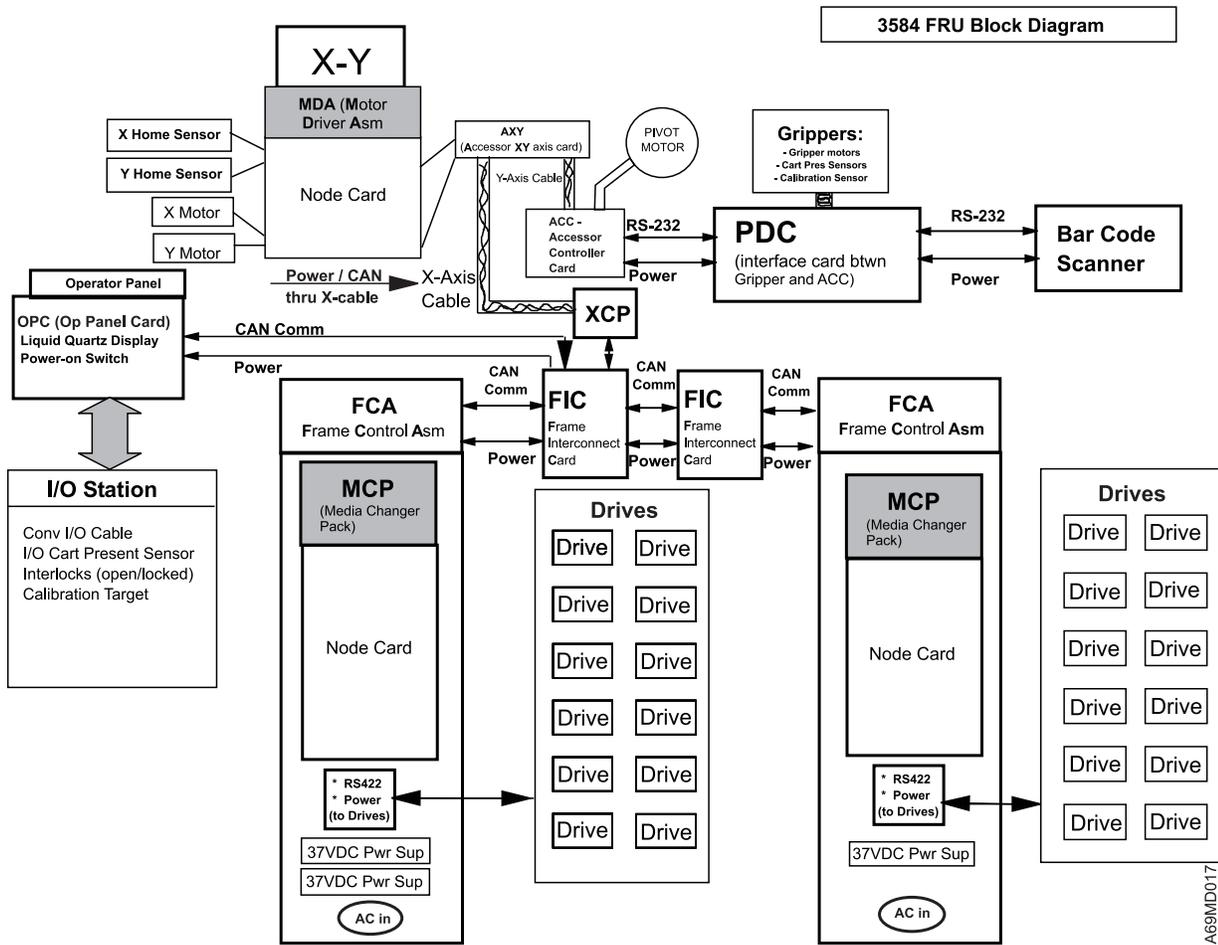


Figure 12. Cable Overview – FRU Block Diagram

Node Card Firmware

All of the node cards within a 3584 subsystem contain firmware stored on flash ROMs. The same firmware image is stored on each card, avoiding the need to keep multiple code images in sync. A node card may only use a small portion of the firmware image, but it has the whole image in its flash.

Product Development and Manufacturing can update the flash ROM from a debug port on the card. There is little need for you to use the debug port unless the node card has not yet been loaded with firmware.

The node card firmware provides capability to communicate with other node cards over the CAN bus. The node cards can determine the level of firmware on other node cards, and can request a copy of the firmware from another node card. This ability allows the cards to automatically operate at a consistent firmware level throughout the library subsystem.

When a node card completes its POST, it asks all of the other node cards to report their firmware levels. If it determines that another node card has a higher version of firmware it will obtain the firmware from that node card and update its flash ROM before coming Ready. This ensures that when a node card FRU containing downlevel firmware is installed in the library it will automatically be updated.

Each node card contains two complete copies of firmware in flash ROM for redundancy. If a problem such as a power failure interrupts a firmware update, the node card can automatically switch over to the backup copy. Another attempt can then be made to update the firmware. Since the update process always overwrites the damaged or oldest firmware image first, the node cards should always have a usable level of firmware.

For library firmware updates when a CE is present, and to enable future remote support functions, the MCP has the capability to broadcast a new level of firmware to all the other node cards in the subsystem. If a CE needs to install a code update on the library, the CE Thinkpad can be connected to the MCP using a 9-pin serial cable. A Windows program running on the Thinkpad can download the new firmware image to the MCP. Once the entire image is downloaded, the MCP will broadcast the new firmware image to the entire subsystem. This will allow a CE to obtain the latest library firmware image from the intranet and install it on the entire subsystem using only the CE Thinkpad and a standard 9-pin serial cable. For the procedure to attach the CE Thinkpad service tool and perform the code update, see “CETool Procedures” on page 500.

The CE Thinkpad service tool will include, among other things, downloading a dump to the CE Thinkpad.

Tape Cartridges

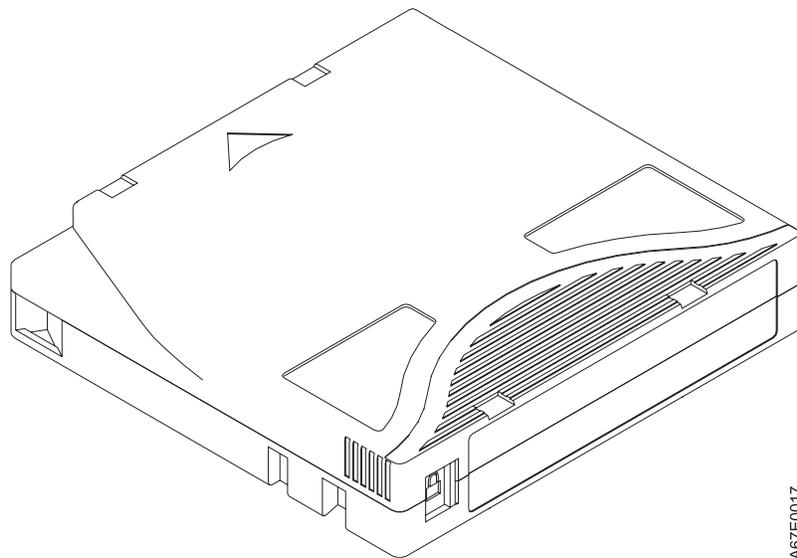
The Ultrium Tape Drive within the TotalStorage UltraScalable Tape Library 3584 uses the single-reel IBM LTO Ultrium Data Cartridge. The cartridge contains 1/2-inch, metal-particle tape with a highly dense recording area.

The capacity for supported cartridges is:

- IBM TotalStorage LTO Ultrium 200 GB Data Cartridge (native capacity of 200 GB; compressed capacity of 400 GB at 2:1 compression).
- IBM LTO Ultrium Data Cartridge (native capacity of 100 GB; compressed capacity of 200 GB at 2:1 compression)

The Ultrium Tape Drive also can read from and write to 10 GB, 30 GB, and 50 GB data cartridges.

Figure 13 shows the IBM LTO Ultrium Data Cartridge.



A67E0017

Figure 13. IBM LTO Ultrium Tape Cartridge

Within the LTO Ultrium Data Cartridge is the LTO Cartridge Memory (LTO-CM), a silicon chip that contains information about the cartridge and the tape (such as the name of the manufacturer who created the tape). It also contains the cartridge volume serial (VOLSER) number and statistical information about cartridge usage.

The LTO-CM enhances the efficiency of the cartridge. For example, the LTO-CM stores the end-of-tape location which (when you next insert a cartridge and issue the Write command) enables the drive to quickly locate the recording area and begin recording. The LTO-CM also aids in determining the reliability of the cartridge by storing statistical data about its age, how many times it has been loaded, and how many errors it has accumulated.

The LTO Ultrium Data Cartridge has an anticipated life of 5000 load and unload cycles.

DLT 8000 Tape Systems must use DLTtape IV Tape Cartridges. A frame cannot combine the two types of cartridges. However, in a library that uses mixed media, you may insert DLTtape IV Tape Cartridges into an 18-slot, lower I/O station of a Model L32 frame for transport (by the cartridge accessor) to a Model D42 frame.

Cleaning Cartridge

To maintain the operating efficiency of the drive, IBM supplies a specially labeled IBM LTO Ultrium Universal Cleaning Cartridge with each TotalStorage UltraScalable Tape Library 3584. Each drive in the library determines when it needs to be cleaned, and alerts the library. The library can use the cleaning cartridge to automatically clean the drive. For more information about cleaning methods, see “Drive Cleaning” on page 47.

Diagnostic Cartridge

One cartridge slot in the base frame (Model L32) is reserved to house the LTO diagnostic cartridge when the cartridge is not being used. The diagnostic cartridge is a cartridge with known good media that is reserved for diagnostic purposes only. It is used during service calls to ensure that the tape drives are running correctly and operating within specification.

The slot that is reserved for the LTO diagnostic cartridge is in the base frame (F1) rear wall, leftmost cartridge storage rack (C01), at the top (R01).

Two cartridge slots in the first Model D42 expansion frame are reserved for DLT-8000 diagnostic cartridges, and are located at the top (C01, R01 and C01, R02). For your level of hardware, the DLT-8000 diagnostic cartridge should be installed in C01, R01.

The LTO and DLT-8000 diagnostic cartridges are scratch tapes with special bar codes identifying them as diagnostic cartridges.

Library Configurations

The TotalStorage UltraScalable Tape Library 3584's default configuration allows a single application or host to operate the library via a single control path. (A control path is a logical path into the library through which a server sends standard SCSI Medium Changer commands to control the logical library.) Often, however, it is advantageous to be able to share a single library between heterogeneous (dissimilar) or homogeneous (similar) applications or hosts. Some applications (and some host systems) do not allow for sharing a library between systems. With the IBM TotalStorage UltraScalable Tape Library 3584, however, you can create configurations that enable the library to process commands from multiple dissimilar hosts (for example, an RS/6000 and a Windows NT server) and multiple, similar hosts (for example, several RS/6000s).

From the TotalStorage UltraScalable Tape Library 3584 operator panel, you can:

- Configure the library so that it is partitioned into separate *logical libraries* that independently communicate with separate applications or hosts via separate control paths. This configuration (see **1** in Figure 14 on page 39) is commonly called the Logical Libraries Configuration and requires no special capabilities from the host system or application. For more information, see “Logical Libraries Configuration” on page 40.
- Configure any single logical library (including the entire physical library) to be shared by two or more hosts. Depending on the capabilities of the host system and application, there are several ways to set up this type of configuration. Three typical ways include:
 - Configuring one server (host) to be responsible for communicating with the library via a single control path; all other servers (hosts) will send requests to that server (host) via a network (see **2** in Figure 14 on page 39). This configuration is not applicable to the IBM @server iSeries or IBM AS/400 servers and requires special capabilities from the application.
 - Configuring all of the hosts to communicate with the library via a single, common control path (see **3** in Figure 14 on page 39). This configuration is not applicable to the IBM@server iSeries or IBM AS/400 servers, and requires special capabilities from the application.
 - Configuring a single logical library to communicate with multiple servers (hosts) via multiple control paths. This configuration (see **4** in Figure 14 on page 39) requires that you add Control Paths and is required by IBM @server iSeries or IBM AS/400 servers. For more information, see “Control Paths” on page 41.

Notes:

1. Only one HVD drive is allowed on each SCSI bus when attached to an AS/400 host.
2. The IBM @server iSeries or IBM AS/400 servers do not support DLT 8000 Tape Systems.

The customer's library configuration is not limited to the examples shown in Figure 14 on page 39. Many configurations are possible, and the configuration can be designed according to business needs. The customer can partition the TotalStorage UltraScalable Tape Library 3584 into as many as 32 logical libraries by using one of two methods:

- Manually installing logical library bar code labels to identify the elements (storage slots and drives) that the customer wants to include in the library, then selecting the Configure Library menu option to identify them to the library. This method enables the customer to view the partition at a glance when the front doors are opened. For examples of these labels and where they may be placed, see “Logical Library Bar Code Labels” on page 41. A maximum of five logical libraries can be configured using this method.
- Identifying the elements that the customer wants to include in each logical library by selecting them from the Advanced Configure menu. This method makes it unnecessary for the customer to manually label the elements, but you cannot view the partition whenever the front doors are opened.

Your customer can create or change the configurations for the TotalStorage UltraScalable Tape Library 3584 by following the procedures in the IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584 entitled “Changing the Library Configuration.”

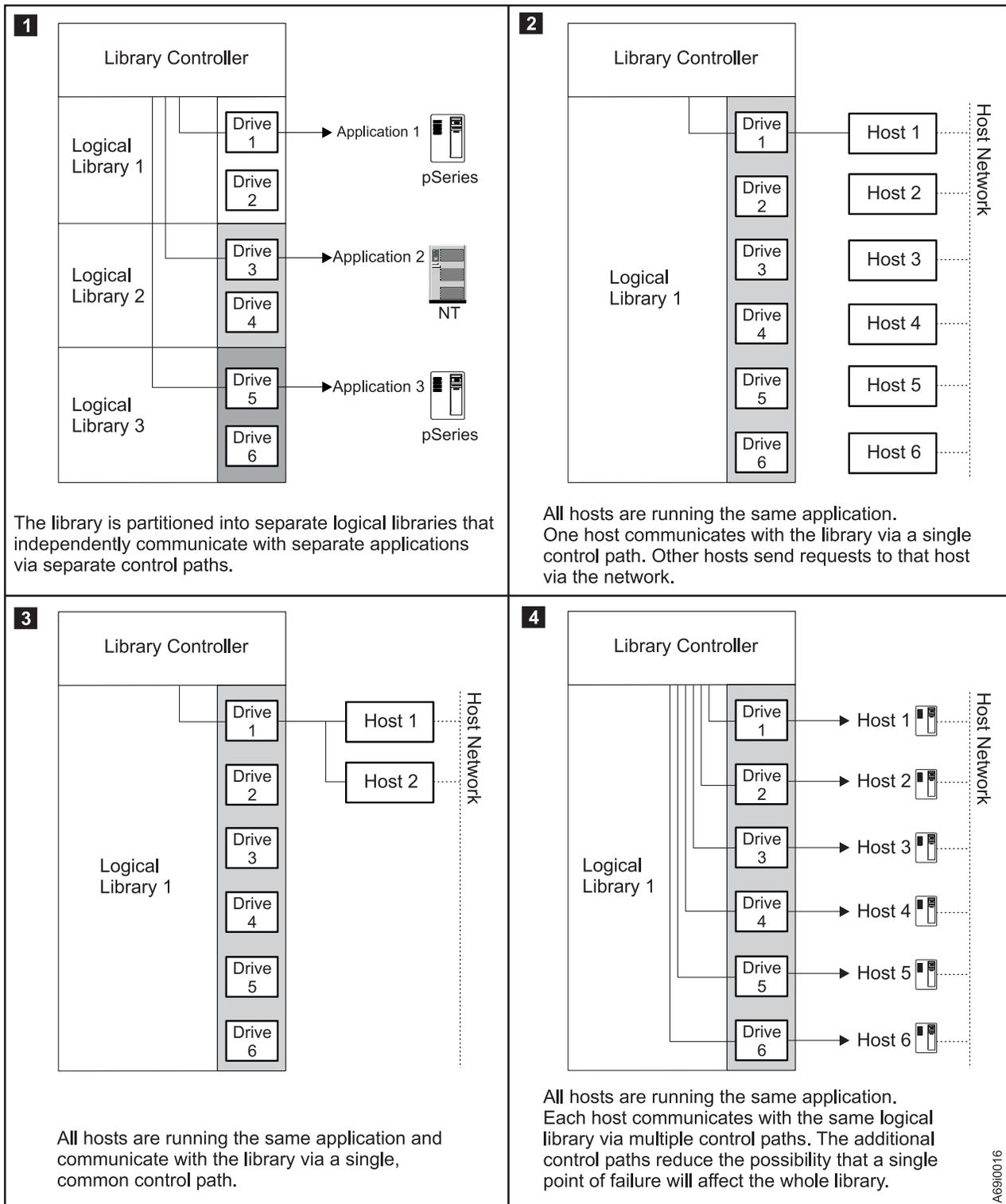


Figure 14. Sample Configurations

Logical Libraries Configuration

The customer can create a Logical Libraries Configuration that allows a single library to be used by multiple systems by partitioning the physical library's storage slots and tape drives into two or more logical libraries. Each logical library consists of:

- Tape drives
- Storage slots
- Input/output (I/O) slots
- Cartridge accessor

Each logical library has its own control path (a logical path into the library through which a server sends standard SCSI Medium Changer commands to control the logical library). A logical library cannot share another logical library's tape drives and storage slots. However, it does share the I/O slots and the cartridge accessor on a first-come, first-served basis. In addition, a logical library cannot include mixed media. That is, you must configure LTO and DLT elements (drives, storage slots, I/O slots, and grippers) into separate logical libraries.

A logical libraries configuration is an effective way for the TotalStorage UltraScalable Tape Library 3584 to simultaneously back up and restore data from unshared applications. For example, you can configure the library to process commands from Host 1 (example: Department A) in Logical Library 1, commands from Host 2 (example: Department B) in Logical Library 2, and commands from Host 3 (example: Department C) in Logical Library 3. In this configuration, the storage slots and drives in each logical library are dedicated to that library and are not shared among other libraries. Commands issued by the hosts travel to the library via three unique control paths or control ports. Thus, the data processing for Department A is confined to the storage slots and drives in Logical Library 1, processing for Department B is confined to the storage slots and drives in Logical Library 2, and so forth.

For Ultrium frames, each logical library control path is available to servers via logical unit number 1 (LUN 1) of the first drive that is defined within that logical library. A logical unit number is a number used by a server to identify a drive.

For DLT frames, each logical library control path is available to servers via LUN 0 of a dedicated control port.

When automatic cleaning is enabled, any cleaning cartridge may be used to clean a drive in any configured logical library of the same media type, even if the cartridge resides in a different logical library.

Frames that use Ultrium Tape Drives can be partitioned into twelve logical libraries, and frames that use DLT-8000 Tape Systems can be partitioned into six logical libraries. Your customer can partition multiple logical libraries by using one of two methods:

- Opening the door of the library and manually labeling the elements (storage slot columns and drives) that he wants to include in each logical library (see the section about 'configuring the library using labels' in the *IBM 3584 UltraScalable Tape Library Planning and Operator Guide*). This method enables the customer to view his partitions at a glance whenever he opens the front doors.
- Identifying the quantity of elements that he wants to include in each logical library, then using operator panel menus to create the logical libraries (see the section about 'configuring the library by using menus' in the *IBM 3584 UltraScalable Tape Library Planning and Operator Guide*). This method makes it unnecessary for the customer to manually label the elements, but he cannot view his partitions whenever he opens the front doors.

Note: If you have made a change to the configuration of the library subsystem, and if the library is connected to a SAN, it may be necessary to reset various components of the SAN so they will recognize the changes. As an example, a 2108 SAN Data Gateway may need to be reset or IPLed to recognize that new devices have been added.

Control Paths

In addition to partitioning storage slots and drives into logical libraries, you also can configure any logical library so that it shares its entire cartridge inventory between multiple IBM @server, iSeries, or IBM AS/400 servers, or other open-systems hosts that run the same applications. When you add one or more control paths (by enabling LUN 1 of Ultrium Tape Drives or by installing control ports with DLT-8000 Tape System), any single, configured logical library can be accessed by multiple servers. Additional control paths reduce the possibility that failure in one control path will cause a breakdown in the entire library.

You can configure the TotalStorage UltraScalable Tape Library 3584 so that servers send commands to it through the multiple control paths. Access by the server to the library is on a first-come, first-served basis. Each control path port for a logical library can accept commands while the library is in use by another port.

Note: Microsoft Windows 2000 Removable Storage Manager (RSM) does not support multiple control paths within a logical library.

To add or remove additional control paths, see the *IBM 3584 UltraScalable Tape Library Planning and Operator Guide*.

Logical Library Bar Code Labels

The customer may use logical library bar code labels to designate, then observe, the physical breakout of the logical libraries. Each IBM TotalStorage UltraScalable Tape Library 3584 comes with one sheet of 18 labels for each of 5 logical libraries and 6 holders for logical library labels. A sample label and holder are shown in Figure 15.

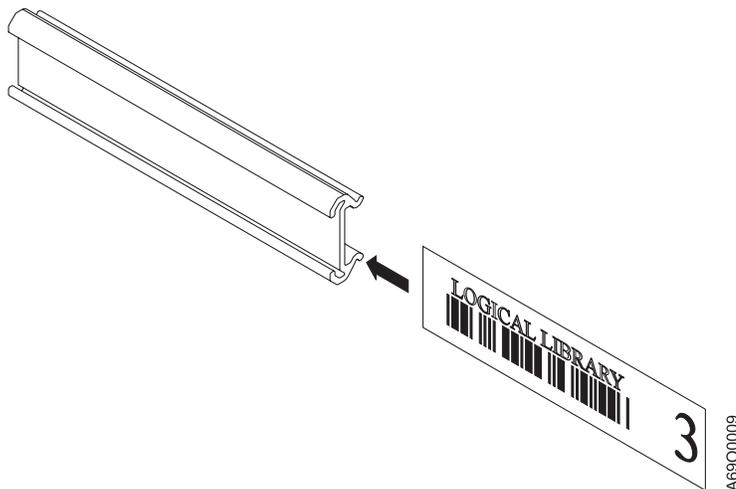
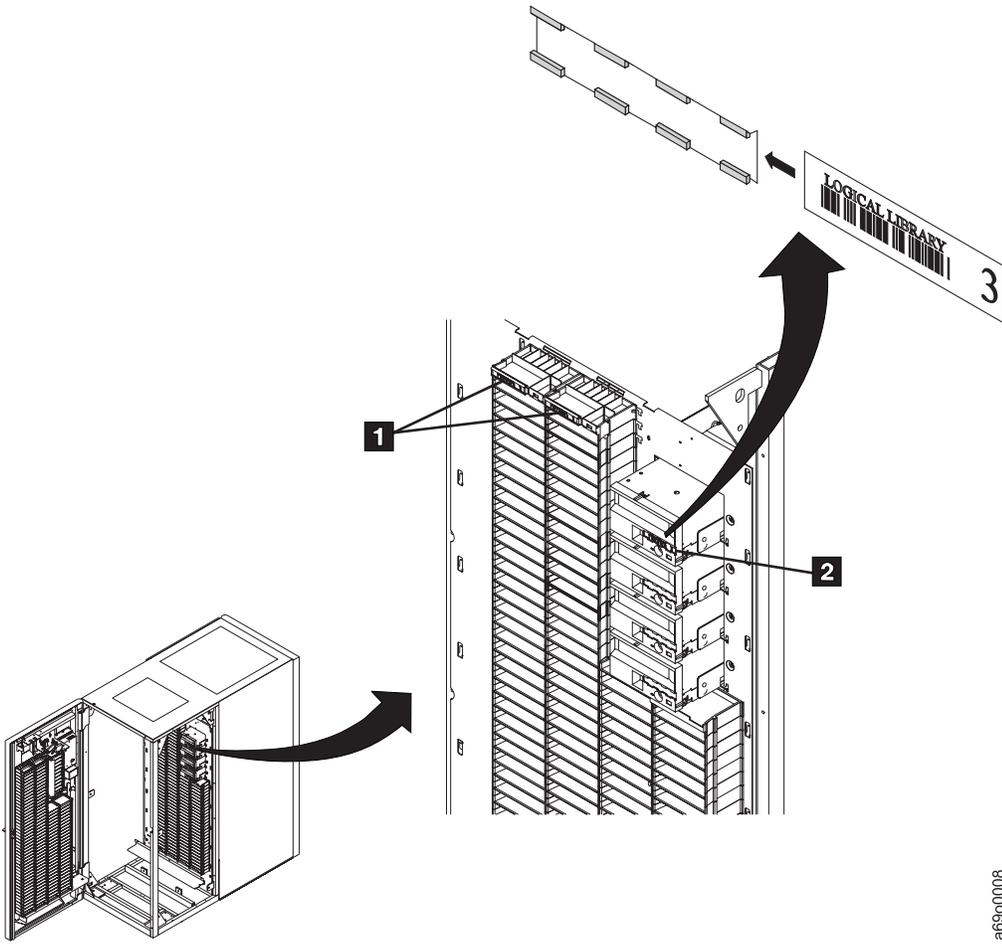


Figure 15. Sample Label and Holder

Examples of label and holder placements in the IBM TotalStorage UltraScalable Tape Library 3584 are shown in Figure 16 on page 42.



a6900008

Figure 16. Sample Label and Holder Placement

Physical and Logical Addresses

Each element in the IBM TotalStorage UltraScalable Tape Library 3584 (the cartridge storage slots, I/O storage slots, and tape drives) has two addresses:

- Physical address
- Logical SCSI element address

When initiating an operator-panel operation such as moving a tape cartridge or performing manual cleaning, the customer can use the physical or logical address to specify a location in the library.

The physical address consists of **frame**, **column**, and **row** identifier that defines a unique physical location in the library. The address is represented as:

- Fx, Cyy, Rzz for a storage slot (where F equals the frame and x equals its number, C equals the column and yy equals its number, and R equals the row and zz equals its number).
- Fx, Rzz for a tape drive and I/O storage slot (where F equals the frame and x equals its number, and R equals the row and zz equals its number).

The SCSI element address consists of a number that defines to the SCSI interface a logical location in the library. This logical address is represented as xxxx(X'yyy'), where xxxx is a decimal value and yyy is a hex value. It is assigned and used by the host when the host processes SCSI commands. The SCSI element address is not unique to a storage slot, drive, or I/O slot; it varies, depending on the quantity of drives in the library.

Drive Performance

If you run applications that are highly dependent on tape-processing speed, you can take advantage of the significant performance improvements provided by the Ultrium Tape Drive and the DLT 8000 Tape System. Table 7 lists the performance characteristics of each.

Table 7. Performance characteristics of the Ultrium Tape Drives and the DLT-8000

Performance Characteristic	Tape Drive		
	Ultrium Tape Drive (Generation 2)	Ultrium Tape Drive (Generation 1)	DLT-8000
Native sustained data rate	35 MB/s	15 MB/s	6 MB/s
Compressed data rate (at 2:1 compression)	70 MB/s	30 MB/s	12 MB/s
Maximum sustained data rate (at maximum compression)	110 MB/s	60 MB/s	12 MB/s
Burst data rate for Fibre Channel drives	200 MB/s	100 MB/s	Not applicable
Burst data rate for Low Voltage Differential (LVD) SCSI drives	160 MB/s (Ultra160)	80 MB/s (Ultra2)	20 MB/s (Fast/Wide)
Burst data rate for High Voltage Differential (HVD) SCSI drives	40 MB/s (Ultra)	40 MB/s (Ultra)	20 MB/s (Fast/Wide)
Nominal load-to-ready time	15 seconds	20 seconds	130 seconds (formatted)
			133 seconds (unformatted)
Nominal unload time	15 seconds	18 seconds	21 seconds
Average search time to first byte of data	49 seconds	73 seconds	60 seconds

Table 7. Performance characteristics of the Ultrium Tape Drives and the DLT-8000 (continued)

Performance Characteristic	Tape Drive		
	Ultrium Tape Drive (Generation 2)	Ultrium Tape Drive (Generation 1)	DLT-8000
Note: The results for DLT-8000s were produced from models, but are consistent with expectations.			

Note: Always refer to the *IBM Ultrium 3584 Ultra-Scalable Tape Library, Planning and Operator Guide* for the most current performance values.

The tape drives provide efficient tape operations and relief to users who have difficulty completing tape activities in the time available. By using their data compression capability (which enhances data transfer rates and throughput), your customer can rapidly process tape applications and run tape-related workloads. If there is limited time for system backup or there are large amounts of disk storage, he can use the tape drives to quickly and efficiently back up his systems. If the host files become lost or damaged, the high performance of the tape drives permits fast system recovery.

Your customer can use the built-in data-compression capability of the tape drives to achieve greater data rates than the native data transfer rate. Actual throughput is a function of many components, such as the host system processor, disk data rate, block size, data compression ratio, SCSI bus capabilities, and system or application software. While the TotalStorage UltraScalable Tape Library 3584 is capable of up to a 7.8-TB/hour rate with Ultrium Tape Drives (at a 2:1 compression), other system components may limit the actual data rate.

For maximum performance with SCSI drives, multiple SCSI busses may be required and the TotalStorage UltraScalable Tape Library 3584 devices must be the only target devices that are active on each SCSI bus. For more information, see the section about the SCSI interface in the *IBM 3584 UltraScalable Tape Library Planning and Operator Guide*.

Library Performance

The following performance values, whether measured on test systems or modeled through simulations, are based on a fixed set of workload assumptions to ensure accurate comparisons; however, the results were not evaluated in all production environments. Thus, the performance values show the relative performance of the systems and may not be absolute indicators of performance in your specific environment.

Some of the specific assumptions may not pertain to a given operating environment. Actual performance may vary. Accordingly, the performance information in this section does not constitute a performance guarantee or warranty. Verify that the performance of the library is acceptable in your specific environment.

Cartridge Inventory

The typical time required for the library to inventory cartridges is less than 60 seconds per frame.

A cartridge inventory operation includes a check to determine whether each cartridge storage slot in the library is empty or full, and a scan of the bar code labels. An inventory occurs whenever the customer:

- Does a power-on of the TotalStorage UltraScalable Tape Library 3584
- Issues the SCSI Initialize Element Status with Range command
- Selects the appropriate menus from the Library Specialist web interface
- Selects inventory from the Manual Operations menu
- Closes the front door

Note: The TotalStorage UltraScalable Tape Library 3584 tracks the logical location of all elements in the library by performing an automatic inventory as required (if you issue the SCSI Initialize Element Status command, it is allowed but ignored). The automatic inventory improves application audit performance.

When the library performs an automatic inventory because the front door was closed, the inventory will occur only for those frames whose doors had been opened.

The time required for the library to inventory cartridges is less than 60 seconds per frame.

Cartridge Move Times

Move time is the time required to pick a cartridge from a slot, pivot (if required), move the cartridge to a drive, and insert the cartridge into the drive. It is also the time required to pick a cartridge from a drive, pivot (if required), move the cartridge to a slot, , and insert the cartridge into the slot. Move time does not include load and thread times.

Table 8 lists the move times for the TotalStorage UltraScalable Tape Library 3584.

Table 8. Cartridge Move Times

Library Configuration	Tape Drive	
	Ultrium Tape Drive	DLT-8000
1 frame	Less than 2.5 seconds	6.2 seconds
2 frames	Less than 3 seconds	6.7 seconds
4 frames	3.4 seconds	7.4 seconds
6 frames	3.8 seconds	8.2 seconds
8 frames	4.0 seconds	N/A
12 frames	4.5 seconds	N/A
16 frames	5.7 seconds	N/A

Mount Throughput

Mount throughput is a measure of the overall capability of the cartridge accessor and tape drives. It is defined as the number of cartridges that the tape library can mount in one hour. A mount, often called the mount/demount cycle, involves:

- Removing the cartridge from a drive
- Returning the cartridge to its storage slot
- Collecting another cartridge from a random storage slot
- Moving the cartridge to the drive
- Loading the cartridge into the drive

Table 9 shows the mount throughput performance for frames that contain LTO Ultrium tape cartridges and DLT-8000 tape cartridges.

Table 9. Mount Throughput Rate

Library Configuration	Mounts Per Hour	
	LTO Ultrium Tape Drive	DLT-8000
1 frame	601	220
2 frames	505	210
4 frames	406	190
6 frames	340	170
8 frames	316	N/A
12 frames	267	N/A
16 frames	218	N/A

Fetch Rate

Fetch rate is a measure of the overall capability of the cartridge accessor, without the involvement of the tape drive. It is defined as the number of cartridges that the tape library can fetch in one hour. A fetch involves moving the cartridge from an I/O slot to a random storage slot or returning it from that storage slot to the I/O slot. Each move is a fetch.

Table 10 shows the fetch rate for LTO Ultrium Tape Cartridges and DLT Tape Cartridges.

Table 10. Fetch Rate

Library Configuration	Fetches per Hour	
	LTO Ultrium Tape Drive	DLT-8000
1 frame	1500	800
2 frames	1150	730
4 frames	850	640
6 frames	700	560
8 frames	570	N/A
12 frames	472	N/A
14 frames	432	N/A
16 frames	380	N/A

Drive Cleaning

The head of every tape drive in the TotalStorage UltraScalable Tape Library 3584 must be kept clean to prevent errors caused by contamination. You can keep the drives clean by using the cleaning cartridge. Whenever the library senses that a drive needs to be cleaned, it alerts the customer with a message on the library display or the host console. The library uses the cleaning cartridge to clean the drive with whatever cleaning method that the customer chose. Whichever of the three methods is used, cleaning is performed after the data cartridge has been unloaded from the drive and before the next cartridge is loaded.

IBM recommends that the customer always keeps automatic-cleaning enabled. By continually keeping itself clean, the drive does not shut itself down because of improper maintenance or contaminants that can cause the drive to fail.

For instructions about inserting or removing a cleaning cartridge, or enabling or disabling automatic cleaning, refer to the *IBM Ultrium 3584 Ultra-Scalable Tape Library, Planning and Operator Guide*, GA32-0408.

Automatic Cleaning

Automatic cleaning enables the library to automatically respond to any tape drive's request for cleaning, and to begin the cleaning process. Automatic cleaning makes the cleaning process transparent to any host application using the library. You can enable or disable automatic cleaning by using the menus on the library display, or by using the IBM Tape Library Specialist web interface (formerly StorWatch). The setting is stored in non-volatile memory and becomes the default during subsequent power-on cycles. It applies to all logical libraries that are configured for the TotalStorage UltraScalable Tape Library 3584. When enabled, any cleaning cartridge may be used for all logical libraries of the same type, that are configured.

Host Cleaning

Host cleaning requires that a host application detect the need to clean a drive. It also requires host application control of the cleaning process. Host cleaning with a cleaning cartridge is only supported when you disable automatic cleaning and only for the logical library in which each cartridge is stored. When you enable automatic cleaning or when the cleaning cartridge is stored in a different logical library, the host application does not have access to the cleaning cartridge.

Manual Cleaning

Manual cleaning requires that you select a menu option from the library display or IBM Specialist web interface to perform cleaning on one or more of the Ultrium Tape Drives. Manual cleaning is always supported regardless of whether automatic cleaning is enabled or disabled. Refer to the *IBM Ultrium 3584 Ultra-Scalable Tape Library, Planning and Operator Guide*.

Preventive Maintenance (PM)

PM is performed during an annual service call, or every 500,000 meters traveled on the Y-Axis. See "Preventive Maintenance (PM)" on page 686 for more details.

TapeAlert Support

The TotalStorage UltraScalable Tape Library 3584 is compatible with TapeAlert technology, which provides to the server error and diagnostic reporting for the drives and the library.

SNMP Messaging

Occasionally, the library may encounter a situation that you want to know about, such as an open door that causes the library to stop. Because many servers can attach to the TotalStorage UltraScalable Tape Library 3584 by differing attachment methods, the library provides a standard TCP/IP protocol called Simple Network Management Protocol (SNMP) to send alerts about conditions (such as an opened door) over a TCP/IP LAN network to an SNMP monitoring station. These alerts are called SNMP traps. Using the information supplied in each SNMP trap, the monitoring station (together with customer-supplied software) can alert operations staff of possible problems or operator interventions that occur. Figure 17 shows the flow of SNMP traps over the Ethernet local area network (LAN) to an SNMP monitoring station.

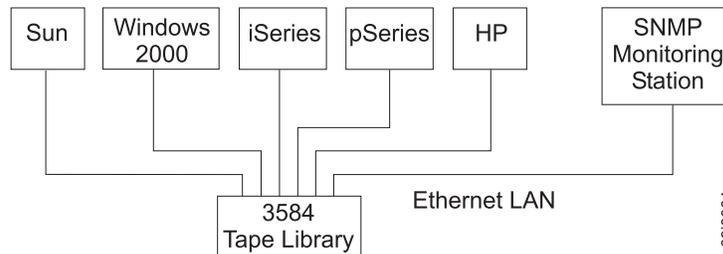


Figure 17. The SNMP Messaging System. The TotalStorage UltraScalable Tape Library 3584 issues SNMP traps to a monitoring station.

Each trap includes the following fields, which enable staff to locate and resolve the problem:

- Machine type
- Model number
- Serial number
- Failing frame number
- Failing drive number
- SCSI sense key
- SCSI additional sense code
- SCSI additional sense code qualifier
- Hardware error code
- Hardware error code qualifier
- Unit reference code
- TapeAlert number
- Text message

Chapter 2. Start

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Start of Call

Before you begin:

If the library is NOT on a Maintenance Agreement, go to Chapter 6, “Safety and Inspection”, on page 159 before returning here.

Note:

- Do not remove any cartridges from the storage slots, the tape drives, or the grippers, unless instructed to do so.
- If you are having intermittent failures, read “Intermittent Failures” on page 56 before continuing.

Note:

- See Table 11 on page 51 when working with a problem.
- See Table 12 on page 55 for normal maintenance tasks.

Failures are categorized into these areas in the following tables:

1. Problems resulting in Library or Drive Error Codes and/or Sense Data
 - URC
 - Library Error Codes (HEC/HECQ or Two-character Display)
 - Library Sense Data
 - Library TapeAlert
 - Drive Error Codes (ASC/ASCQ or Single-character Display)
 - Drive Sense Data
 - Drive TapeAlert
2. Problems that do NOT result in Library or Drive Error Codes and/or Sense Data
 - Stuck Tape and other media-related problems
 - Host connectivity (SCSI or Fibre Channel) problems
 - Ethernet (IBM Specialist (formerly Storwatch) or SNMP) problems
 - Configuration doesn't accurately discover installed hardware
 - Power problems
 - Call Home problems (Call Home doesn't work)
3. Intermittent or Not Listed

Find the **Error Indication** or **Task** in the left column, then perform the **Action** in the right column.

Note: To view the library or drive error logs, see “Display Error Logs” on page 491. The library error log also may be viewed by using CETool. See “Viewing Error Log Entries” on page 505.

Working with a Problem

Table 11. Failure Start

Error Indication	Action
Library Error Codes, Messages, & Sense Data	
URC from Call Home or the library operator panel	Go to "URC Description With Action and FRUs" on page 226, locate the URC, and follow the instructions.
Error message on the library operator panel. (Usually shows the HEC and HECQ.)	Use 04 44 00 followed by the error code you received in the error message (example: if the HEC and HECQ are B8 82, use 04 44 00 B8 82). Go to "Library Sense Data to URC Table" on page 170 to obtain the URC. When you have found the URC, go to "URC Description With Action and FRUs" on page 226, locate the URC, and follow the instructions.
Library Error Log contains recent entries (SK, ASC and ASCQ, HEC and HECQ) data	Go to "Library Sense Data to URC Table" on page 170, and obtain the URC. Locate this URC in "URC Description With Action and FRUs" on page 226, and follow the instructions.
Library sense data from host error logs	Go to "Library Sense Data to URC Table" on page 170, and obtain the URC. Locate this URC in "URC Description With Action and FRUs" on page 226, and follow the instructions.
DOOR OPEN message on the library operator panel	Use URC A285 and go to "URC Description With Action and FRUs" on page 226 to locate the code, and follow the instructions.
Two-character display code on ACC, MCP, MDA, or OPC (includes blank two-character display)	Go to "Node Card LED Display Codes" on page 412 to locate the Library Error Code, and follow the instructions.
Tape alert message from the library. SNMP alert from the library	<ol style="list-style-type: none"> 1. Check the library error log or the host error log for any library error sense data. 2. Go to "Library sense data from host error logs" in this table.
Drive Error Codes, Messages, & Sense Data	
Drive error message on the library operator panel	<p>Go to "Drive Sense Data to URC Tables" on page 188 to look for a drive URC.</p> <p>Note: The error message may only contain the ASC and ASCQ, so you may need to ignore the SK field. When you have found the URC, go to "URC Description With Action and FRUs" on page 226, locate the URC, and follow the instructions.</p> <p>Note: Older versions of library and/or drive code do not display the drive SCSI sense log. The only available information for these machines is the error code and the FSC. If you are working on a drive error displayed on the library operator panel, and the ASC and ASCQ are not displayed, then obtain the FSC (see "Drive Error Detail" on page 525), go to "LTO Ultrium-1 Drive FSC to URC Table" on page 215 to obtain the URC. Then go to "URC Description With Action and FRUs" on page 226 to locate the URC, and follow the instructions.</p>
LTO drive single-character display code only	<ol style="list-style-type: none"> 1. If drive sense is available either by viewing the drive error log or the host error log, see "Drive sense data from host error logs" in this table. 2. If drive sense is not available, go to "LTO Drive Single-Character Display (SCD) Codes" on page 410 to obtain the URC. When you have found the URC, go to "URC Description With Action and FRUs" on page 226, locate the URC, and follow the instructions.
Drive Error Log contains recent entries (SK, ASC, and ASCQ) data	<ul style="list-style-type: none"> • If LTO drive, go to "LTO Drive Sense Data to URC Table" on page 189, find the matching SK, ASC and ASCQ that points to the URC in the table. Locate the URC in "URC Description With Action and FRUs" on page 226, and follow the repair procedure. • If DLT drive, go to "DLT-8000 Drive Sense Data to URC Table" on page 208, find the matching SK, ASC, and ASCQ that points to the URC in the table. Locate the URC in "URC Description With Action and FRUs" on page 226 and follow the repair procedure.

Table 11. Failure Start (continued)

Error Indication	Action
Drive sense data from host error logs	Go to “Drive Sense Data to URC Tables” on page 188 to determine which drive is affected, determine the drive type, and obtain the URC. When you have found the URC, go to “URC Description With Action and FRUs” on page 226, locate the URC, and follow the instructions.
LTO drive FSC	If drive sense is available (either by viewing the drive error log or by viewing host error logs), see “Drive sense data from host error logs” in this table. If drive sense is not available, go to “LTO Ultrium-1 Drive FSC to URC Table” on page 215 to obtain the URC. When you have found the URC, go to “URC Description With Action and FRUs” on page 226, locate the URC, and follow the instructions.
Tape alert message from a drive. SNMP alert from a drive	<ol style="list-style-type: none"> 1. Check the drive error log (LTO only) or the host error log for any drive error sense data. 2. Go to “Drive sense data from host error logs” in this table.
Tape Cartridge Media Problems	
Remove a stuck cartridge	Go to “Manually Removing Cartridge” on page 672.
Leader pin missing or out of position in LTO cartridge	<p>Re-position the leader pin.</p> <p>Visually check for damage to the leader and leader pin in the tape cartridge. If the leader is damaged it must be repaired using a Leader Pin Replacement Kit before attempting to recover the data from the cartridge.</p>
Tape broken, stretched, folded over, or wrinkled inside the cartridge	Replace the tape cartridge. If the problem continues, replace the drive.
Dropped or damaged DLT-8000 leader	The drive tape leader may have detached. Go to “Detached DLT Leader Service Check” on page 678.
Communication Problems	
Host/Controller SCSI bus or fibre channel error message from the host or controller. Cannot establish connection.	Go to “SCSI Bus Problems” on page 514 or “Fibre Channel Problems” on page 522 to isolate, and repair the problem.
CommFail message on the operator panel	Note the Frame and Row information associated with the message. Go to “Library Sense Data to URC Table” on page 170, look up library sense 04 44 00 38 82, and obtain the URC. Locate this URC in “URC Description With Action and FRUs” on page 226, and follow the instructions.
Host fails to communicate with one or more drives	Go to “SCSI Bus Problems” on page 514 or “Fibre Channel Problems” on page 522 to isolate, and repair the problem.
Ethernet problems – introduction	See “Ethernet Problems” on page 483.
Call Home Problems (Call Home doesn't work)	See “Call Home Facility Configuration” on page 508 to verify Call Home setup. If FC 2711 (WTI Switch) is installed, verify it is setup correctly. Setup procedures are near the end of the Install section. Ensure you have the latest level Library Firmware installed on your system. The latest version is out on the PFE website.

Table 11. Failure Start (continued)

Error Indication	Action
Configuration & Calibration Problems	
Configuring the library resulted in less storage slots than are actually present	<p>Refer to Table 1 on page 6, Table 2 on page 6, and Table 3 on page 6. Compare the information in the tables with the information displayed during the physical configuration process.</p> <ul style="list-style-type: none"> • If the base frame (model L32) shows fewer storage slots than expected it may be because the Capacity Expansion Feature is not installed. This is not a hardware problem. • If any frame shows fewer storage slots than expected, see if the number discovered corresponds to a frame with more drives than are actually installed. If this is the case it indicates that the library does not believe storage slots are installed in the position. The library uses the bar code scanner to discover the storage slots by looking for either a valid cartridge label or an empty slot label. If no bar code label is found then the library assumes there are no storage slots present. This problem could be caused by cartridges with no label or unreadable labels, by missing/damaged empty slot labels, or by a faulty bar code scanner.
Logical library configuration using bar code labels does not function, as expected	Use URC A4C7, and go to “URC Description With Action and FRUs” on page 226 to locate the code and follow the instructions.
CONFIG message on the library operator panel	For library configuration procedure, go to the “Library Configuration” on page 511.
CALIBRATE message on the library operator panel	Perform the calibration procedure. From the Activity screen, press [MENU]. From the Main Menu screen, select Service and press [Enter]. From the Service screen, select Calibration and press [Enter]. From the Calibration screen, select Calibrate Library , and press [Enter].
Library calibration results in error	See, “Error message on the library operator panel” in this table. Using the error code, go to “Library Sense Data to URC Table” on page 170 to obtain the URC.
Power Problems	
Power switch ON and power indicator OFF	Go to “Power Isolation MAP” on page 449.
37 V dc power supply – LED status indicator problem	<p>Check the library error log for an error with HEC 34xx. If an error is found, go to “Library sense data from host error logs” in this table. If no error is found, then the power supply is functional but has been turned off by the redundant power control code. This is not an indication of a problem.</p> <p>For more information on how the 37 V power supplies function with each other, see “Frame Control Assembly (FCA)” on page 29 and “37 V DC Power Supply” on page 544.</p>
Obvious Symptoms & Mechanical Problems	
Library display is blank but power is ON, and the library and drives are operational	<p>Use the following FRU list:</p> <ol style="list-style-type: none"> 1. FIC card fuse 37 V (check FIC card blown fuse indicator) 2. Operator Panel Card Assembly (OPC) 3. Cable, FIC to OPC 4. Medium Changer Pack (MCP) 5. Frame Interconnect Card (FIC) 6. Frame Control Assembly (FCA) 7. If FC 1901 (Dual AC Line Cords) is installed, the Power Distribution Unit (PDU) could be defective.

Table 11. Failure Start (continued)

Error Indication	Action
Any library display visual problem (incorrect characters, missing characters, and so forth) dim display or key buttons problem.	<ul style="list-style-type: none"> • Later style operator panels come with a pot to adjust contrast (see “Operator Panel Assembly (OPC)” on page 568 • Replace the Operator Panel Card (OPC) (see “Operator Panel Assembly (OPC)” on page 568).
I/O station door will not open	This is normal while the library is scanning or accessing the I/O station. It also is normal if the host has issued a prevent medium removal SCSI command. If neither condition is true, use URC B330 and go to “URC Description With Action and FRUs” on page 226, locate the URC, and follow the instructions.
I/O station door does not lock when closed	Use URC B331 and go to “URC Description With Action and FRUs” on page 226, locate the URC, and follow the instructions.
Bar code scanner problem with no error code. Example: blank or invalid VOLSER	Use URC A4C5 and go to “URC Description With Action and FRUs” on page 226 to locate the code and follow the instructions.
Gripper assembly binds while moving up and down the Y-axis	Go to “Y-Axis Assembly” on page 552 to correct the bind.
X-Axis binding	Go to “X-Axis Assembly” on page 551 to correct the bind. Also ensure the bottom track is aligned correctly between frames.
Noisy accessor	Go to “Y-Axis Assembly” on page 552 and “X-Axis Assembly” on page 551 to ensure the accessor runs smoothly in all directions. what else.....
Intermittent or Not Listed	
Intermittent failure	Go to “Intermittent Failures” on page 56.
A problem is suspected	Go to “Library Verify Test” on page 507.
Any problem not listed	Go to “Library Verify Test” on page 507.

Maintenance Tasks

Table 12. Tape Library Maintenance Tasks

Task	Action
Install (either new or transferred)	Go to Chapter 5, "Install", on page 77.
Run verification tests	Go to "Library Verify Test" on page 507.
Drive code update	See "Firmware Update Procedures" on page 493.
Library code update	See "Firmware Update Procedures" on page 493.
FRU exchange history and EC history	Go to Chapter 12, "History", on page 689.
Theory of library operation	Go to Chapter 1, "Introduction", on page 1.
Safety inspection	Go to Chapter 6, "Safety and Inspection", on page 159.
Accepting a machine for service agreement	Go to Chapter 6, "Safety and Inspection", on page 159.
Providing per-call service	Go to Chapter 6, "Safety and Inspection", on page 159.
Reviewing changes or attachments on any IBM machine that is leased, on service agreement, or on per-call service	Go to Chapter 6, "Safety and Inspection", on page 159.
Discontinue	Go to "Discontinue or Relocate a Library" on page 139.
Relocate	Go to "Discontinue or Relocate a Library" on page 139.
Sense information	Go to Chapter 9, "Sense", on page 421.
FRU locations within the library	Go to Chapter 14, "Parts Catalog", on page 697.
Obtain library or tape drive error information at the host	See Chapter 4, "Messages", on page 65.
Clean message from the host or a Clean indicator is on at the drive	See "Drive Cleaning Procedure" in the <i>IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584</i> , GA32-0408. For highlights about drive cleaning, see "Drive Cleaning" on page 47.
Preventative Maintenance (PM) is performed once a year (or every 500,000 meters of Y-axis travel).	Go to "Preventive Maintenance (PM)" on page 686.

Intermittent Failures

Intermittent failures cannot be repeated consistently by running diagnostic routines or by running customer jobs. The time and number of operations vary between failures.

Intermittent failures are corrected by updating code or by exchanging the most likely failing FRU and monitoring for a recurring failure. If the failure recurs, the next most likely FRU is exchanged and tested. This process continues until the failure is resolved.

Information to handle intermittent failures is provided in the following sections of this MI:

- “URC Description With Action and FRUs” on page 226 of this MI provides a FRU list for hardware failures.
- Chapter 9, “Sense”, on page 421 of this MI provides detailed sense byte descriptions. Then go to “Library Sense Data to URC Table” on page 170 or “Drive Sense Data to URC Tables” on page 188 to determine a URC.
- “Library Verify Test” on page 507 provides the ability to exercise the library. Routines are also provided in the Diagnostics to give complete coverage of library operations.

Table 13 lists hardware problems that may cause intermittent failures. These hardware failures may occur randomly in the machine cycle.

Table 13. Intermittent Errors

Symptom	Possible Cause	Action
Intermittent random failures (Library or drives)	Code problem	Check VPD for code levels. If a later version of code is available, install it. If the problem persists, contact your next level of support (see “Firmware Update Procedures” on page 493).
	Loose or broken cables	See “Cables” on page 540.
	Environment, such as ambient temperature or relative humidity	If the temperature or humidity is out of range, ask the customer to correct the situation.
	Close to noisy equipment, RF sources such as radio, TV, or radar transmitters	Call your next level of support.
	Tape cartridge defect	Try a different cartridge.
Intermittent SCSI bus failures	SCSI hardware	See “SCSI Bus Problems” on page 514.
Intermittent fibre channel failures	Fibre channel hardware	See “Fibre Channel Problems” on page 522.

Chapter 3. Operator Panel

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General Information

The following information applies to all screens or menus that display on the IBM TotalStorage UltraScalable Tape Library 3584:

- The Operator Panel on the IBM TotalStorage UltraScalable Tape Library 3584 features a touch sensitive display. The display will show current status of the library at the **Activity** screen. When the operator or customer engineer presses the **Menu** button, the screen will display the Main Menu, allowing the user to select operational or service options.
- When the touch sensitive display is touched by a user, a timer is set. Each time the screen is touched, the timer is reset. If no “touch” activity is detected for 5 minutes, the screen will reset back to the Activity screen.
- The bottom line of each screen will contain from one to four “buttons.” These buttons are icons that correspond to functions such as **Back**, **Up**, **Down**, and **Enter**. Other buttons may be labeled **Continue**, **Cancel**, or **Details**.
- The first time each menu is displayed, the top item will be visibly pre-selected (highlighted). The **Up** or **Down** buttons will change the highlighted selection.
- Pressing the **Back** button will take you back to the previous screen. You may need to press the **Back** button several times to get all the way back to the Activity screen.
- If any menu selection is attempted that will disrupt library operations, the user will be warned and given the choice to Continue or to Cancel the operation.
- When a screen is scrolled down, each depression of the **Down** button will move the cursor down one line. When a screen has an extremely large amount of data to display, such as displaying a list of cartridges in the library, pressing and holding the **Down** button will cause the scrolling operation to speed up. The longer the button is held down, the faster it scrolls. Scrolling will end when the **Down** button is released or the end of screen lines has been reached. The same fast scrolling will occur in the upward direction if the **Up** button is pressed and held.
- While the screen buttons will not visibly change when depressed, a beep will occur to indicate that the depression was detected. These beeps may be disabled or enabled using the Settings menu.
- In general, user actions at the touch panel display will have a higher priority than host initiated activity, to minimize the wait time for the user. Confirmation screens will allow the user to decide whether to interrupt host operations.

Library Console Screens

Figure 18 on page 60 provides an overview of operator functions. Figure 19 on page 61 and Figure 20 on page 62 together show an overview of service functions that are available to the service representative.

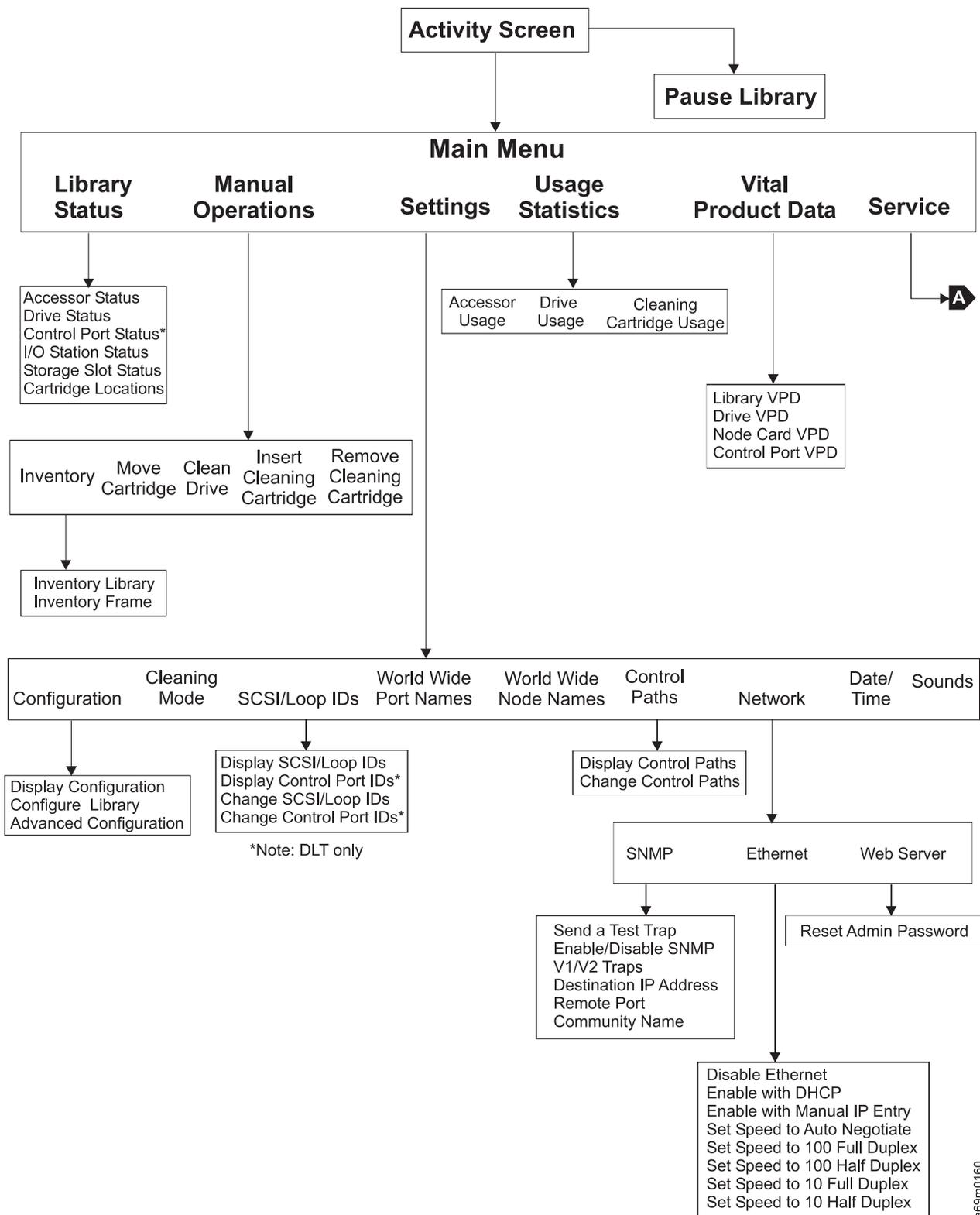
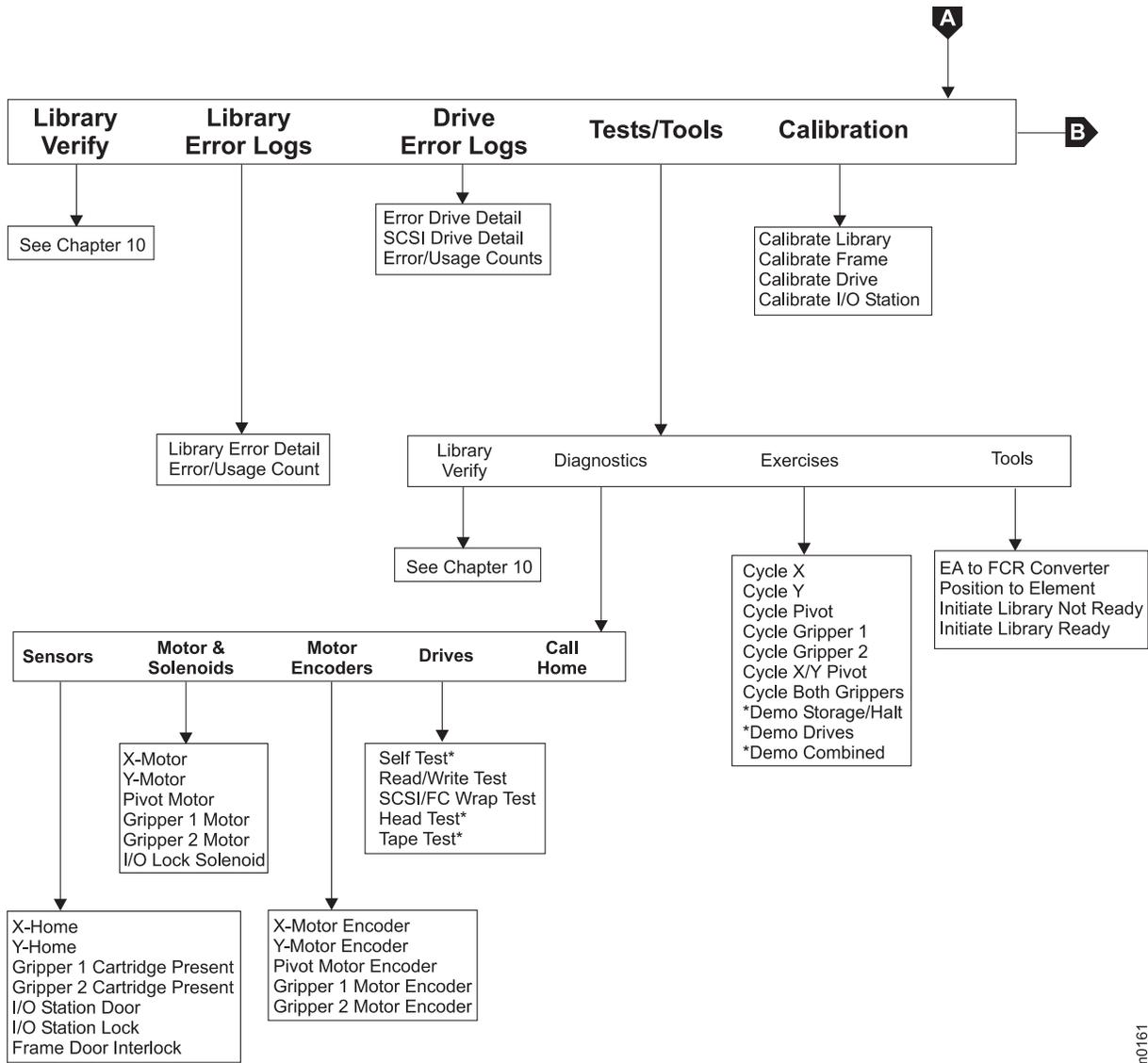


Figure 18. Operator Function Menu Tree

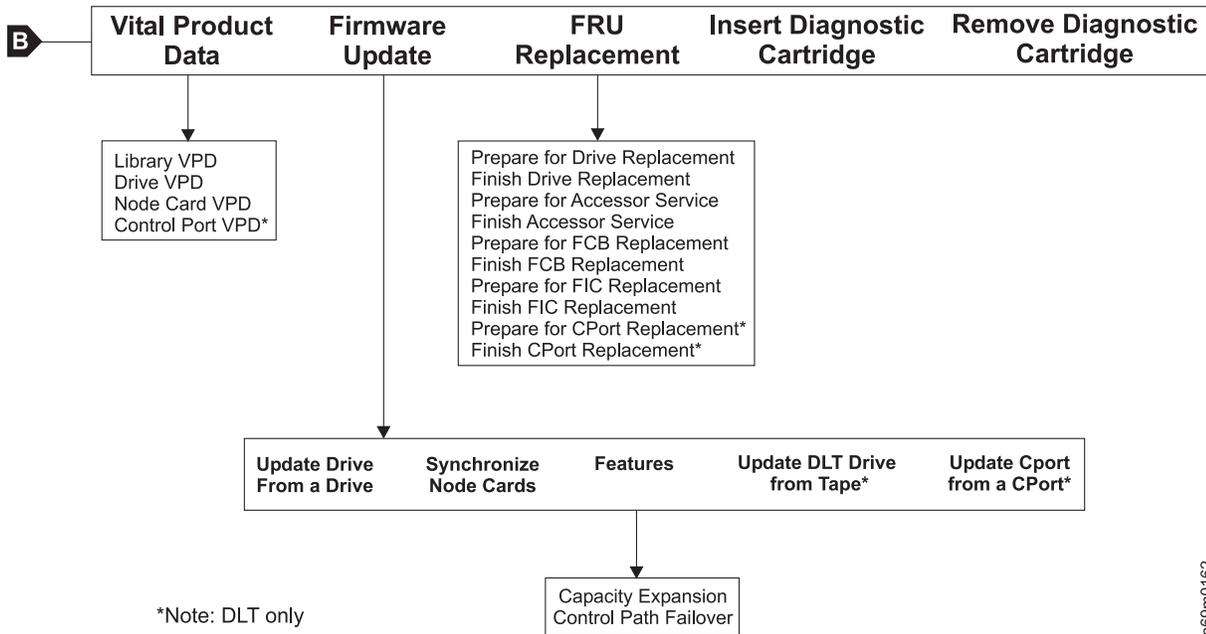
a69m0160



***Ultrium only**

Figure 19. Service Function Menu Tree

a69m0161



a69m0162

Figure 20. Service Function Menu Tree (Continued)

Activity Screen

The Activity screen, that the operator sees during library operations will look similar to the example shown in Figure 21.

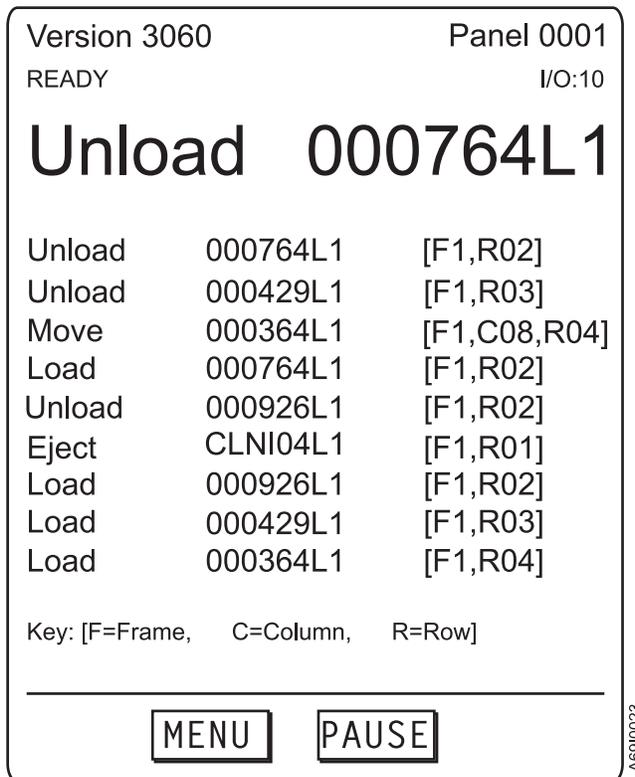


Figure 21. Activity Screen (Library Status Screen)

Note the following:

- The top line will display the code version number (nnnn) and the number of the panel (**Panel 0001**).
- The second line displays library status, READY/NOT READY/INITIALIZING and I/O station status, such as "I/O: OPEN" for when the I/O station is open, "I/O: CLOSED" for the time between closing the I/O station and completing the I/O scan, and "I/O: xx" showing the number of cartridges in the I/O station after the I/O scan has completed.
- The current activity, **Unload 000764L1**, is in a large font. This large font allows the customer to see the current operation at a greater distance from the operator panel.

Note: Some messages may take two lines of large font to display the current activity.

- A rolling history of operations appears in the order the operations occurred, beginning with the current operation. The older activities are found lower on the screen. As new activities occur, the older activities are pushed down and off the screen.

Note: The locations for slots are shown in [frame, column, row] notation. The locations for drives and I/O station are shown in [frame, row] notation.

- The message area of the screen will be overwritten if a permanent error occurs or if a drive needs to be cleaned and auto-clean is disabled or there is no cleaning cartridge in the library. An error message might be: "ERROR xxyy" where xx is the Hardware Error Code (HEC) and yy is the Hardware Error Code Qualifier (HECQ). A cleaning message might be: "Clean Drive [Fx, Ryy]" where x is the frame number and yy is the drive number.
- High priority messages will be removed from the large font area in the following conditions:

- Open Door messages will be cleared by closing the door.
- Error message will be cleared by pressing the MENU button.
- Clean Drive message will be cleared by cleaning the drive.

When a message is cleared it will remain in the normal font area until it scrolls down.

- A time (hh:mm) will be displayed with each message to provide the user feedback as to how long the library has been in this condition.
- Action buttons **[MENU]** and **[PAUSE]**.
 1. Pressing **[MENU]** will take the user to Panel 0002, the “Main Menu”.
 2. Pressing **[PAUSE]** will display panel 0013 with a text string and options which looks like the following screen:

```
Warning:                               Panel 0013

If you open the door the library will go Not Ready and any remaining
jobs in the work queue may fail. Press ENTER to Continue.

[BACK]                                [ENTER]
```

If you wanted to Pause the library, you would select [PAUSE]. **Use CAUTION here. Customer jobs may be running.** At panel 0013, if you select [ENTER], the code will begin the Pause operation. If you press [BACK] at panel 0013, you will be returned to the previous screen.

3. In most cases, you will want to select [MENU] which will take you to the Main Menu screen below.

Main Menu

```
Main Menu                               Panel 0002

Library Status
Manual Operations
Settings
Usage Statistics
Vital Product Data
Service

[BACK] [ UP ] [DOWN] [ENTER]
```

For information on the following selections, go to the *IBM 3584 UltraScalable Tape Library, Planning and Operator Guide*, GA32-0408.

- **Library Status**
- **Manual Operations**
- **Settings**
- **Usage Statistics**
- **Vital Product Data**

If **Service** was selected, go to “Service Menus” on page 523.

Chapter 4. Messages

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Obtaining Tape Drive Error Information at the Host

IBM device drivers for the RS/6000 and AS/400 systems log error information when an error occurs on a tape drive or library.

The error information includes the following:

1. Device VPD
2. SCSI command parameters
3. SCSI sense data (if available)

When you have obtained the SCSI sense data, go to “Library Sense Data to URC Table” on page 170 or “Drive Sense Data to URC Tables” on page 188.

Obtaining Error Information From an RS/6000

The AIX[®] Tape and Media Changer Device Driver for the RS/6000 provides logging to the system error log for a variety of errors. You can view the error log by following this procedure.

1. At the AIX command line, type **errpt lpg** to display a summary report, or type **errpt -a lpg** to display a detailed report. Press **[Enter]**.

Note: In most cases you will use the summary report to find the date and time of any errors related to library devices, then use the detail report to obtain the sense data needed to identify the cause of the error.

2. Press **[Enter]** to scroll through the error log.
3. Type **q** and press **[Enter]**, to quit the error log at any time.

To correct a problem you noticed in the **errpt** report, determine the type of error by using the examples that follow:

- For library errors [Resource Name = **smcn** (for example, smc0) and Resource Type = 3584]), refer to Figure 22 on page 67 and locate the SCSI sense data. After you have located and recorded the sense data, go to “Library Sense Data to URC Table” on page 170 to resolve the problem.
- For drive errors [Resource Name = **rmtn** (for example, rmt0) and Resource Type = LTO or DLT], refer to Figure 23 on page 68 and locate the SCSI sense data. After you have located and recorded the sense data, go to “Drive Sense Data to URC Tables” on page 188 to resolve the problem.
- For SCSI bus errors (not SCSI adapter errors), refer to Figure 24 on page 70 and Figure 25 on page 71 to determine which host adapter, SCSI bus, and device or devices are affected. After you have determined which device or devices are affected, go to “SCSI Bus Problems” on page 514 to resolve the problem.
- For fibre channel errors (not fibre channel adapter errors), determine which host adapter and device are affected, and go to “Fibre Channel Problems” on page 522.
- For SCSI adapter errors (not SCSI bus errors), use the maintenance package for the host.

Note: See Chapter 9, “Sense”, on page 421 for further details on sense data.

Library Error Log Example

```

LABEL:          TAPE_ERR2
IDENTIFIER:     476B351D

Date/Time:     Wed Oct 11 11:42:17
Sequence Number: 25265
Machine ID:    000D090D4C00
Node ID:      tsm
Error Class:   H
Error Type:    PERM
Resource Name: smc0
Resource Class: tape
Resource Type: 3584
Location:     40-60-00-0,1
VPD:
    Manufacturer.....IBM
    Machine Type and Model.....03584L32
    Serial Number.....000000010031
    Device Specific . (FW) .....2460 (Firmware Level)

Description
TAPE DRIVE FAILURE

Probable Causes
TAPE DRIVE

Failure Causes
TAPE
TAPE DRIVE
    Recommended Actions
    PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
SENSE DATA
0C00 0000 A500 0001 0104 0401 0000 0000 0000 0000 7000 0400 0000 0046 0000 0000
4400 0000 0000 B882 0000 0080 1114 0200 4801 E300 0000 0090 0104 8004 0100 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

```

Figure 22. AIX ERRPT Library Error Log Example

Table 14. AIX ERRPT Library Sense Data

Hex	Description
A5	SCSI Command
0001, 0104, 0401	Command Parameters
70	Byte 0 of Library Sense Data
04	Sense Key
4400	ASC/ASCQ (Additional Sense Code/Additional Sense Code Qualifier)
B882	HEC/HECQ (Hardware Error Code/Hardware Error Code Qualifier)
80	Mechanism Status Bit Map
11	Control Path Frame / Control Path Device (Drive)
14	Failing Frame / Failing Device (Drive)
90	Source Element Bit Map
0104	Source Element Address

Table 14. AIX ERRPT Library Sense Data (continued)

Hex	Description
80	Destination Element Bit Map
0401	Destination Element Address
Bytes 41 to 46	Secondary source and Destination Element Bit Maps and Element Address

Drive Error Log Example

```

LABEL:          TAPE_ERR1
IDENTIFIER:     4865FA9B

Date/Time:     Wed Oct 10 11:39:43
Sequence Number: 25264
Machine ID:    000D090D4C00
Node ID:      tsm
Class:        H
Type:         PERM
Resource Name: rmt2
Resource Class: tape
Resource Type: LTO
Location:     40-60-00-2,0
VPD:
  Manufacturer.....IBM
  Machine Type and Model.....ULT3580-TD1
  Serial Number.....1300015078
  Device Specific.(FW).....25D4 (Firmware Level)
Description
TAPE OPERATION ERROR

Probable Causes
TAPE

User Causes
MEDIA DEFECTIVE
DIRTY READ/WRITE HEAD

      Recommended Actions
      FOR REMOVABLE MEDIA, CHANGE MEDIA AND RETRY
      PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
SENSE DATA
0602 0000 0100 0000 0200 0000 0000 0000 0000 0000 7000 0300 0000 001C 0000 0000
5200 0700 20B0 0000 0000 0000 0000 0000 0000 0000 058A 0213 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

```

Figure 23. AIX ERRPT Drive Error Log Example

Table 15. AIX ERRPT Drive Sense Data

Hex	Description
01	SCSI Command
0000, 0200, 0000	Command Parameters

Table 15. AIX ERRPT Drive Sense Data (continued)

Hex	Description
70	Byte 0 of Tape Drive Sense Data
03	Sense key (Hardware error in this example)
5200	ASC/ASCQ (Additional Sense Code/Additional Sense Code Qualifier)
20B0	FSC (Fault Symptom Code)
058A	Relative LPOS
02	SCSI ID
13	Frame/row of the drive within the library
	Note: This byte is only valid if the drive firmware level is 1550 or higher AND the library firmware level is 130 or higher.

SCSI Bus Error Example

```
LABEL:          SCSI_ERR10
IDENTIFIER:     0BA49C99

Date/Time:     Wed Oct 17 09:55:32
Sequence Number: 16140
Machine Id:    00003ABF4C00
Node Id:      ofgtsm
Class:        H
Type:         TEMP
Resource Name: scsi3
Resource Class: adapter
Resource Type: sym896
Location:     40-59
VPD:
  Product Specific.( ).....DUAL CHANNEL PCI TO ULTRA2 SCSI
                        ADAPTER
  Part Number.....03N3606
  EC Level.....F71335
  Manufacture ID.....A16592
  Serial Number.....0749

Description
SCSI BUS ERROR

Probable Causes
CABLE
CABLE TERMINATOR
DEVICE
ADAPTER

Failure Causes
CABLE LOOSE OR DEFECTIVE
DEVICE
ADAPTER

  Recommended Actions
  PERFORM PROBLEM DETERMINATION PROCEDURES
  CHECK CABLE AND ITS CONNECTIONS

Detail Data
SENSE DATA
0001 0017 0000 0000 0000 0091 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 4304 0000 0000 0000 0000 2000 0003 0203 6760 9808 0000 F7FB E1B8
0000 0015 000B 0210 0678 C800 0000 8200 8277 1B20 00A2 ED00 0000 0002 FFFF FFFF
00FF 0000 111F F000 F3DF F110
```

Figure 24. Example of Error Suggesting SCSI Bus Problem, Which Takes Down Entire Bus

SCSI Bus Error Example

```
LABEL:          TAPE_ERR4
IDENTIFIER:     5537AC5F

Date/Time:     Wed Oct 17 09:00:41
Sequence Number: 16101
Machine Id:    00003ABF4C00
Node Id:      ofgtsm
Class:        H
Type:         PERM
Resource Name: smc0
Resource Class: tape
Resource Type: 3584
Location:     40-58-00-0,1
VPD:
  Manufacturer.....IBM
  Machine Type and Model.....03584L32
  Serial Number.....000000010031
  Device Specific.(FW).....1200

Description
TAPE DRIVE FAILURE

Probable Causes
ADAPTER
TAPE DRIVE

Failure Causes
ADAPTER
TAPE DRIVE

Recommended Actions
PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
SENSE DATA
0600 0000 1200 0000 FF00 0000 0000 0000 0200 0800 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
```

Figure 25. SCSI Problem Points to Library Control Path as Possible Cause

Summary Report

1	2	3	4	5	6	7
FFE2F73A	1012150900	U	H	rmt5	UNDETERMINED ERROR	
0BA49C99	1012150800	T	H	scsi8	SCSI BUS ERROR	
C60BB505	1012141500	P	S		SOFTWARE PROGRAM ABNORM TERMINATED	
C42F11D4	1012105200	U	S	VSC:DE	SOFTWARE ERROR	
C42F11D4	1012105000	U	S	VSC:DE	SOFTWARE ERROR	
FFFA352B	1012104900	U	S	MS:CS	SOFTWARE ERROR	
FFFA352B	1012104900	U	S	MS:CS	SOFTWARE ERROR	
5537AC5F	1012091700	P	H	rmt9	TAPE DRIVE FAILURE	
5537AC5F	1012091700	P	H	rmt9	TAPE DRIVE FAILURE	
5537AC5F	1012091700	P	H	rmt9	TAPE DRIVE FAILURE	
5537AC5F	1012091600	P	H	rmt8	TAPE DRIVE FAILURE	
5537AC5F	1012091600	P	H	rmt8	TAPE DRIVE FAILURE	
5537AC5F	1012091600	P	H	rmt8	TAPE DRIVE FAILURE	
C60BB505	1012082000	P	S		SOFTWARE PROGRAM ABNORM TERMINATED	
C42F11D4	1011183600	U	S	VSC:DE	SOFTWARE ERROR	
C42F11D4	1011183300	U	S	VSC:DE	SOFTWARE ERROR	
C42F11D4	1011181800	U	S	VSC:DE	SOFTWARE ERROR	
C42F11D4	1011174700	U	S	VSC:DE	SOFTWARE ERROR	
FFFA352B	1011172900	U	S	MS:CS	SOFTWARE ERROR	
FFFA352B	1011172900	U	S	MS:CS	SOFTWARE ERROR	
C42F11D4	1011155300	U	S	VSC:DE	SOFTWARE ERROR	
C42F11D4	1011153900	U	S	VSC:DE	SOFTWARE ERROR	
C42F11D4	1011153800	U	S	VSC:DE	SOFTWARE ERROR	
C42F11D4	1011150900	U	S	VSC:DE	SOFTWARE ERROR	

Figure 26. AIX ERRPT Commands Error Log Example

NUMBER	DESCRIPTION
1	Error ID
2	Timestamp
3	Error Type
4	Error Class
5	Resource Name
6	Error Description
7	How SCSI Bus Error will Display in Log

ERROR CLASS	DESCRIPTION
H	Hardware
S	Software
O	Informational

ERROR TYPE	DESCRIPTION
PEND	The availability loss of a device or component is imminent.
PERF	The performance of a device or component has degraded to an unacceptable level.
PERM	A hardware or software condition that could not be recovered from.
TEMP	A hardware condition that was recovered from after several unsuccessful attempts.
UNKN	The severity of the condition could not be determined.

A69M0170

Obtaining Service Information Message from an AS/400

To gain access to the AS/400 problem logs and error logs, sign on at any available workstation using the QSRV logon and its security password (QSRV). After sign on, the proper access authorizations will be granted and the AS/400 MAIN MENU displays.

AS/400 System with RISC Processor

1. Type STRSST (Start System Service Tools) command on the command entry line on the AS/400 Main Menu, and press **[Enter]**.
2. On the "System Service Tool (SST)" screen, select **Start a service tool**, and press **[Enter]**.
3. On the "Start a Service Tool" screen, select **Product activity log**, and press **[Enter]**.
4. On the "Product activity log" screen, select **Analyze log**, and press **[Enter]**.
5. On the "Select Subsystem Data" screen, select **Magnetic media**, enter the From and To time period for searching the error log, and press **[Enter]**.
6. On the "Select Analysis Report Options" screen, select the following, and press **[Enter]**.
 - a. Report type. 1
 - b. Optional entries to include
 - 1) Informational YES
 - 2) Statistic NO
 - c. Reference code selection
 - 1) Option 1
 - 2) Reference codes. *ALL
 - d. Device selection
 - 1) Option 1
 - 2) Device type or resource names . . *ALL
7. On the "Log Analysis Report" screen, enter a **5** on an error line that has a resource type of 3584 (library) or 3580 (drive), and press **[Enter]**.
8. On the "Display Detail Report for Resource" screen, press:
 - F4=Additional Information.
Pressing F4 will display the machine type and serial number of the device. It also will display SCSI sense data, if available.
 - F6=Hexadecimal report.
Pressing F6 will display the device hexadecimal data (for support use).
 - F9=Address Information.
Pressing F9 will display the SCSI address information.

Obtaining Error Information From a Sun System

The Sun system does not provide error logs for analysis; therefore, you must use error logs from the application (such as Tivoli Storage Manager), or the Device Error Log for problem determination. When you have located the error information, go to Chapter 2, “Start”, on page 49.

The two following service aid programs are provided with the IBM SCSI Tape Device Driver for SunOS:

- Tape service program

A tape service program called **tapesrv.c** is provided and contains the following service aids:

- Query device serial number
- Format tape cartridge
- Force device error dump
- Save device error dump
- Download device code

The tape service program is invoked by using the **/opt/stdutil/tapesrv** command.

Note: You must have root authority to run the tape service program.

The program is menu driven. Use discretion when running this program because it opens the device in diagnostic mode.

- Sample program

A sample program called **tapetest.c** is provided, which gives a demonstration of the device driver interface usage.

The sample program is invoked by using the **/opt/stdutil/tapetest** command. The program is useful for verifying that the device driver and the device are functional. The program is menu driven.

Obtaining Error Information From an HP-UX System

The HP-UX system does not provide error logs for analysis; therefore, you must use error logs from the application (such as Tivoli Storage Manager), or the Device Error Log for problem determination. When you have located the error information, go to Chapter 2, “Start”, on page 49.

Call Home Screen

Figure 27 on page 75 shows an example of a Call Home screen as it might appear at the host. For information on how to configure the library for Call Home, see “Call Home Facility Configuration” on page 508.

```

38554 CL1L1 SV4 <-PROB-STAT-SV B227 C000 A11 RRH <-B/O
TAPECH 1 DIA P1 <-QUE-LVL-CAT-PPG 12345 <-GP1
L095 000 USA <-CTR-CTRY-BU-PRS DO NOT DISPATCH <-CP2
D/T3584L42 13AAA25 <-DEV-SER <-CON
<-ALIAS OEMXX T NET/ <-TERR-NET
FE010615 <-T/D-ECT URSF] 3584 13AAA25 <-CPU
TA43210 <-NQ/C-C# TUCSON RAS LAB - DO NOT DISP <-CUST
PMR Call <-CMTS

```

```

# Begin of call home record ..... =
# Product Manufacturer ID and Date ..... =
# Business/Company Name..... =
# Product Machine type and model number... = 3584 L32
# Remote service call back number ..... =
# Call back expander port ID..... =
# Call Back Password ..... =
# Outside Line Prefix ..... =
# Customer voice phone number ..... = 123-4567
# Customer offshift voice phone number ... = 123-4567
# LIC level of local complex..... =
# LIC level of remote complex..... =
# Reporting Cluster Number..... =
# Record Type..... = 1
# Report Time/Date stamp..... = Jun 7 2002 08:12:09
# Host system type(s)..... =
# Level_CPSS information..... =
# Remaining Presentations..... = 0

```

```

Manufacturer.....IBM
Machine Type and Model.....3584 L32
Serial Number.....13AAA25
Library Firmware Level .....211f

```

Detail Data

```

URC.....0xC800
Failing Frame.....0x00
Failing Device.....0x01
Tape Alert.....0x01
COMMAND.....0x00
PARAMETERS.....0x0000 0x0000 0x0000
Sense Key..... 0x4
ASC_ASCQ .....0x4400
HEC_HECQ.....0x3880
FRU.....0x00
BitFields.....0x00
FieldPointerLSB.....0x00
MechanismStateBitMap.....0x00
CallingFrameDevice.....0x00
Retry Count.....0x0
ObjectId.....0x00
ObjectError.....0x0102
SourceElementBitMap.....0x0D
FirstDestinationElementBitmap .....0x02
SecondSourceElementBitmap.....0x02
SecondDestinationElementBitmap.....0x00

```

Figure 27. Call Home Screen Example

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Introduction

If a library failure prevents you from continuing with a procedure, go to Chapter 2, “Start”, on page 49 to correct the problem. Return to the steps in this section after making the repairs.

If you have a quality problem with this installation, call the quality hotline (see “Manufacturing Problems? Call Quality Hotline” on page 138).

Install Time

Plan install time to allow 3.7 hours for an L32 frame and 4.0 hours for each additional D32 (LTO) or D42 (DLT-8000) frame. Actual hardware install time is typically about 1.8 hours for an L32 frame and 2 hours for each additional D32 or D42 frame. Be sure to report pre-installation planning time as PLAN/INSTL/RR code 1, and actual hardware install time as PLAN/INSTL/RR code 2.

The drives that are located within an IBM TotalStorage UltraScalable Tape Library 3584 are features of the library. All installation and repair call reporting should reference the library machine type and serial number. Installation reporting and call reporting must be completed for each library frame.

Preparation for Installation

Ensure the customer has completed all pre-installation planning tasks (see the *IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584*, GA32-0408).

| Configurations on initial shipments of the IBM TotalStorage UltraScalable Tape Library 3584 can include as many as 16 frames. When planning for a smaller installation (fewer than 16 frames), consider the possibility of adding more frames in the future. Complete a library configuration plan defining the frame layout before you start the installation. The base frame (Model L32) is always on the left and as many as 15 additional expansion frames (Model D32) can be added to the right side.

| **Notes:**

- | 1. **The correct initial positioning of the base frame is critical for a successful installation.**
- | 2. If your customer plans to expand this library with additional expansion frames in the future, you should take this into consideration when you work with the customer to plan the machine layout.

Door keys are shipped with each frame. The key with the round opening is the customer key for the front door. The key with the square opening is the CE key for the rear door.

| The IBM TotalStorage UltraScalable Tape Library 3584 requires at least one cleaning cartridge and one CE diagnostic cartridge to be installed within the library subsystem. A mixed media library (no longer offered), one that contains both LTO and DLT-8000 drives, must contain a diagnostic cartridge and a cleaning cartridge for each media type. These cartridges are shipped with the 3584.

Installing New or Transferred Library

Follow each section in the order shown, unless told to skip a section. Perform each step within a section in sequence. **Check off each step after you complete it.**

Unpack

Be aware that this topic does not give the complete unpacking instructions. For complete instructions, see the unpacking instructions for each 3584 frame.

Some parts you need are packaged in the packing material and are labeled. When you unpack the frames and remove the packing material, do not lose or misplace any enclosed parts.

Refer to Figure 28 on page 81 as you unpack the library:

Attention

1. If you are installing a base frame, and one or more expansion frames, unpack the base frame first, then unpack the first expansion frame, and repeat the procedure until all frames have been unpacked.
2. If you are adding one or more expansion frames (model D32) to an existing IBM TotalStorage UltraScalable Tape Library 3584 subsystem, unpack the first expansion frame, then repeat the procedure until all frames have been unpacked.

- ___ 1. If you are not unpacking a base frame (model L32), go to step 10.
- ___ 2. Remove the shipping carton from the base frame.
- ___ 3. Remove the base frame shipping braces and packing materials per the unpack instructions.
- ___ 4. Locate and remove the set of keys taped to the door handle.
- ___ 5. Open the front door **2**.
- ___ 6. Remove the packing material and tie wraps from the cartridge accessor and Y-Axis assembly.
- ___ 7. Remove the X-Axis shipping pin located on the lower left side of the X-Axis assembly.

Note: Store the shipping pin in the hole **4** in the frame (this is not the hole used to secure the X-Axis assembly for shipping). The bracket and cable should remain in the machine. Ensure the shipping pin cable is positioned so as not to interfere with the accessor movement.

- ___ 8. Move the cartridge accessor **5** vertically and horizontally to ensure that all packing material was removed and that no binds exist.

Note: When moving the picker assembly **3** vertically, lift the picker assembly from underneath the ACC card. To avoid damaging the gripper/pivot assembly, do not lift the picker assembly using the gripper.

- ___ 9. If you are not unpacking any expansion base frames, go to step 13.
- ___ 10. Remove the shipping carton from the expansion frame.
- ___ 11. Remove the parts packed in the shipping carton.
- ___ 12. Remove the expansion frame shipping braces and packing materials per the unpack instructions.
- ___ 13. If the Library is new or was previously covered by an IBM Service Agreement, continue with the next step. Otherwise, go to Chapter 6, "Safety and Inspection", on page 159 and perform a complete Safety Inspection before continuing.

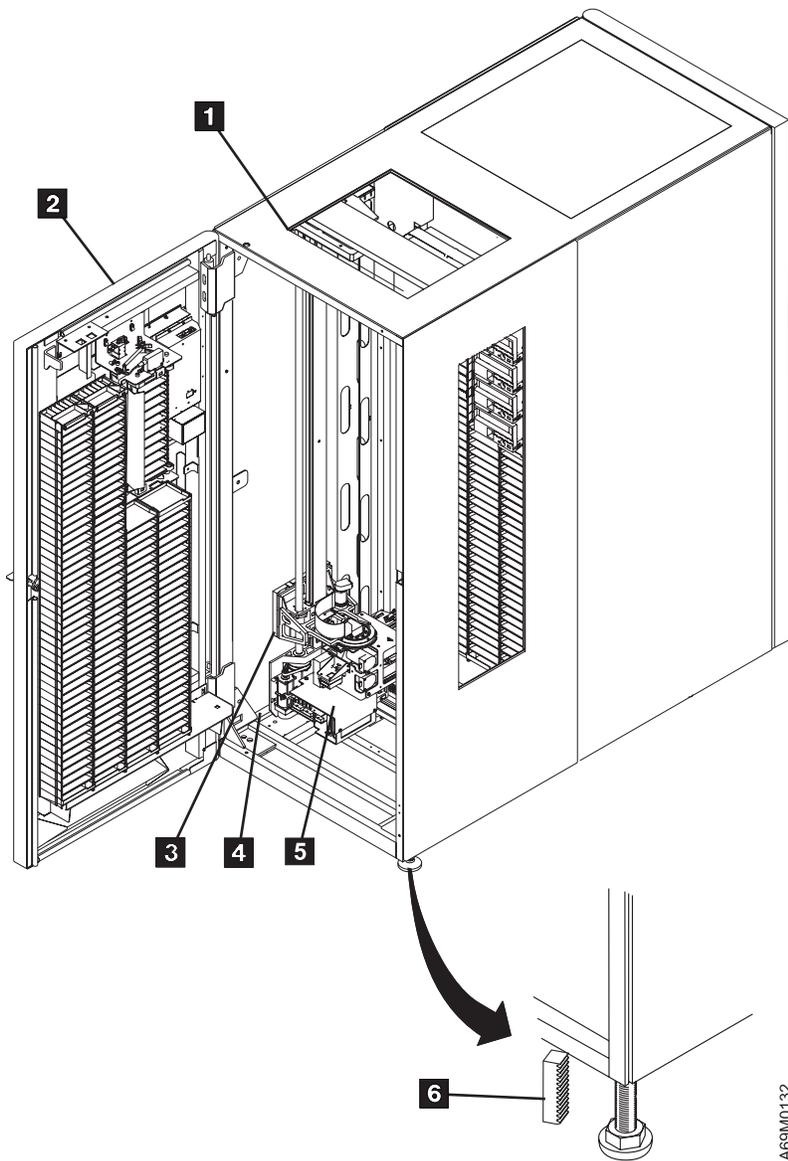


Figure 28. Base Frame

__ 14. **Check the Ship Group.**

Refer to your ship group documentation (the packing list) and verify that all listed parts and supplies have arrived and are not damaged. If parts are missing or damaged, refer to “Manufacturing Problems? Call Quality Hotline” on page 138.

__ 15. If you have more frames to unpack, go back to step 10 on page 80.

__ 16. To install a base frame, go to “Base Frame (L32) Installation” on page 82.

__ 17. If you are installing an expansion frame, go to “Expansion Frame (D32) Installation” on page 84.

Base Frame (L32) Installation

- ___ 1. If this is a raised floor environment, ensure that there is a cutout in the floor for the power and communications cables. The cutout should be near the rear of the base frame, and must not be close enough to the leveling pads to allow a leveling pad to fall into the hole.
- ___ 2. Locate the device driver kit and ask the customer to install the device driver and utilities.

Note: Since the host will need to be reconfigured to connect to the library, the customer should be able to load the device driver and utilities with minimum impact. This will help ensure that the utilities are available if you should need them for future service actions.

- ___ 3. Move the base frame into position on the floor.
- ___ 4. Open the front door.
- ___ 5. Loosen the locknuts on the leveling pads and lower the leveling pads to the floor.
- ___ 6. Using the 5/16" hex bit (supplied with the base frame), adjust the leveling pads so that the clearance from the floor to the bottom of the frame is approximately 113 mm (4.5 in.) at all four corners of the base frame. The frame should be approximately level, and the casters must be off the floor. You may use the rack alignment tool P/N 50G0406 **6** as a floor-to-frame clearance gauge for your initial adjustment. The tool length is 84 mm (3.3 in.). Refer to Figure 28 on page 81.

Note: The 113 mm (4.5 in.) clearance may be needed to ensure that any variation in the level of the customer's floor will not affect the installation of the expansion frames.

- ___ 7. Install the LTO CE Diagnostic Cartridge (P/N 19P0405) into column 1, row 1 (on the top left of the rear wall; see Figure 4 on page 18). Each column is identified with a numbered label located below the column. Rows are identified with labels located to the left of column 1.
- ___ 8. Move the cartridge accessor assembly to the left side of the base frame.
- ___ 9. Refer to Figure 29 on page 83. Place the level **3** on the right side of the base frame. Ensure that the base frame is level from front to back.

The bubble should be centered between the two lines.

- If the bubble is too close to the rear of the frame, raise the front of the frame by turning **both** front leveling pads an equal number of turns.
- If the bubble is too close to the front of the frame, raise the rear of the frame by turning **both** rear leveling pads an equal number of turns.

Note: If any leveling pad is off the floor, turn the pad jackscrew down to the floor and then turn $\frac{1}{2}$ turn more.

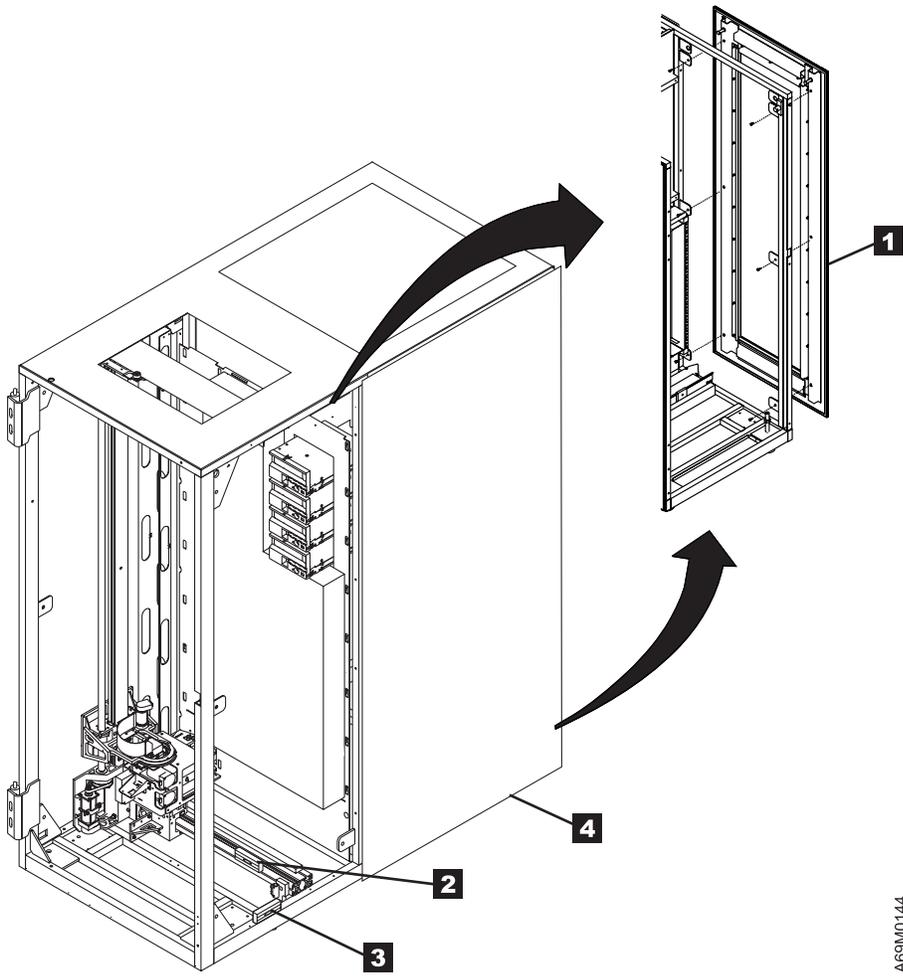
Refine the leveling adjustments until the bubble is centered between the two lines.

- ___ 10. Place the level **2** on the lower X-rail assembly (parallel to and just in front of the X-rail rack). Ensure that the X-rail is level (left to right).

The bubble should be centered between the two lines.

Refine the leveling adjustments until the bubble is centered between the two lines.

- ___ 11. Repeat steps 9 and 10 until the frame is level (front to rear) and (left to right).
- ___ 12. If you **ARE NOT** adding an expansion frame (D32) at this time, tighten the locknuts on the base frame leveling pads, and then go to "Installing Tape Drives and Control Ports" on page 104.
- ___ 13. If you are **ARE** adding an expansion frame at this time, go to "Expansion Frame (D32) Installation" on page 84.



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Figure 29. Leveling

Expansion Frame (D32) Installation

Expansion frames are added to the right side of the base frame.

Note:

- Any references made in this MI to the 'previous frame' means the frame to the left of the frame you are installing.
- Group all frames of a particular drive type to be next to similar frames. Stated another way, assemble a library that has two LTO (L32, D32) frames and one DLT (D42) frame into an LTO/LTO/DLT arrangement, not an LTO/DLT/LTO footprint.
- If you are adding an expansion frame to an existing library, ensure all previously-installed frames are not resting on the casters, and ensure they are leveled before you begin this procedure.

| **Attention:** If you are installing a library **larger** than 6 frames, be sure to review the "Prerequisite" section of the Install Instruction for "Additional Expansion Frame Attachment (FC 1814, or 1816)" for information on:

- | • Library firmware requirements
- | • LTO drive code levels for both Ultrium-1 and Ultrium-2
- | • MCP (with Ethernet support) in your L32
- | • Later-style MCPs (without Ethernet support) in D-frames 2–6.

| Required library firmware and drive code can be downloaded from the following websites.

| For IBM service personnel with access to the Internal PFE website:

| <http://snj1nt02.sanjose.ibm.com/tape/tapetec.nsf/>

| For non-IBM personnel (and those without access to the IBM intranet) the following external website provides code and support for 3584:

| <http://ssddom02.storage.ibm.com/techsup/webnav.nsf/support/3584>

- ___ 1. Remove the shipping lumber (2X4s) attached to the left side of the expansion frame.
- ___ 2. If you are installing a new library, go to step 8 on page 85. If you are adding an expansion frame to a previously installed library, continue with the next step.
- ___ 3. If the library subsystem is NOT already powered off, perform the following steps:
 - ___ a. Notify the customer that you will be powering the subsystem down to begin the installation of the additional expansion frame.
 - ___ b. Power off the base frame.
 - ___ c. Power off the main circuit breaker **1** on every frame that contains an FCA.
 - ___ d. If this is the **first** D32 being installed in the library (and it has an FCA **without** a 37V power supply), do the following:
 - | • Open the rear door of the L32 frame.
 - | • Remove the 37V power supply in position 2 (right-hand side).
 - | • Reinstall the 37V power supply in the FCA in the NEW D32 frame in position 1 (left-hand side).

| **Note:** This will post an error 34A2 which should be ignored. When configuration is performed the library firmware will note that the L32 has only one PS and the D32 has one. After configuration is completed both power supplies will be enabled and no further errors will be generated.

Note: FC 1902 (Redundant 37V DC Power Supply) provides an additional (3rd or more) 37V DC power supply to the library. This Feature Code is intended for customers who wish to have this additional redundancy.

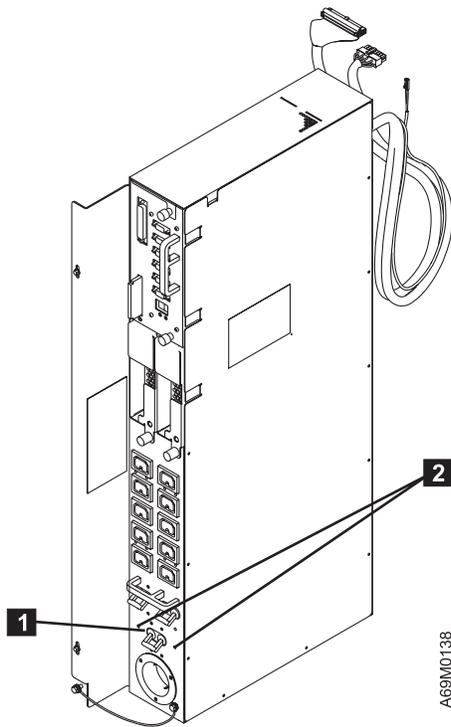


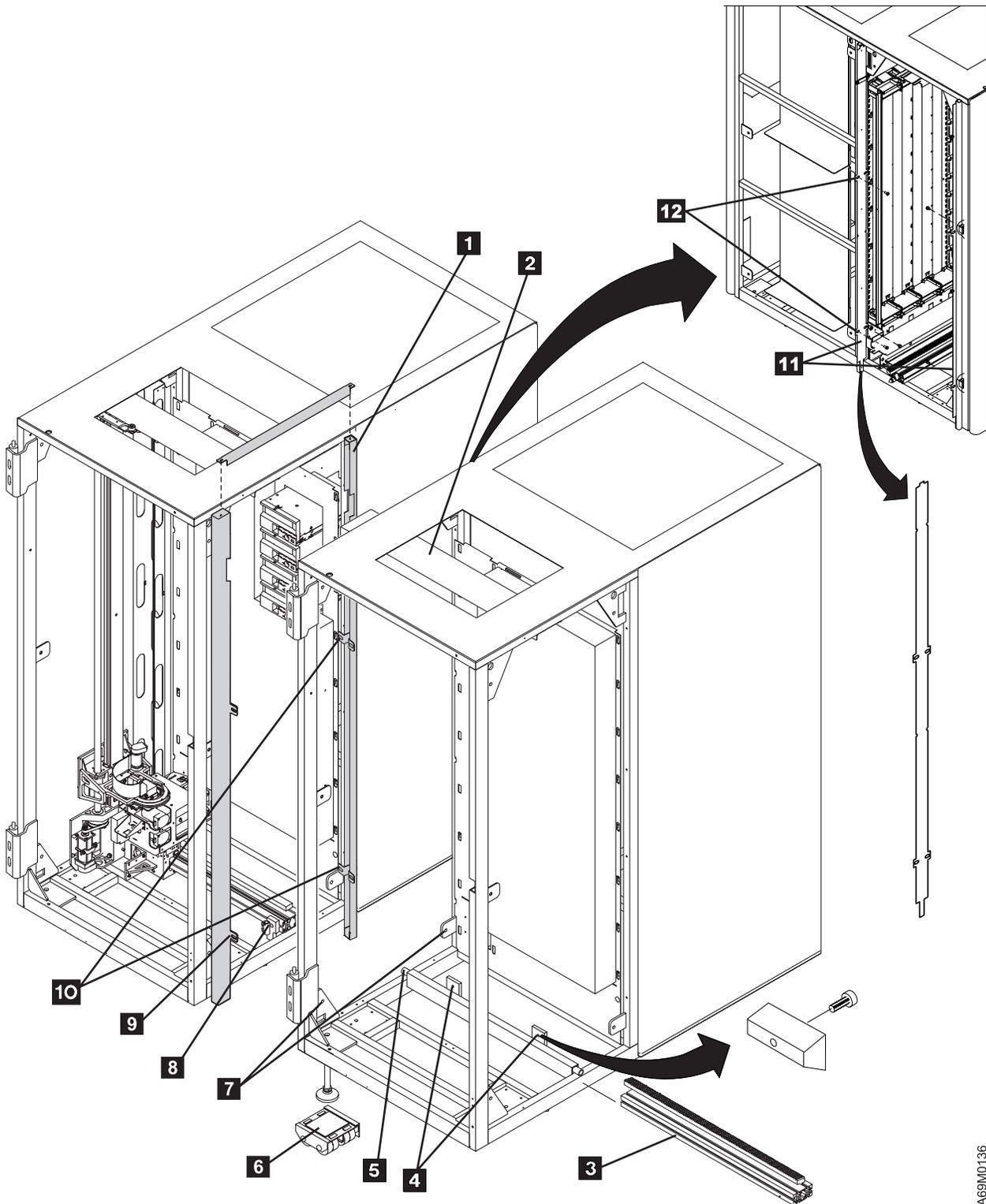
Figure 30. FCA Assembly

- 4. See Figure 29 on page 83 and remove the right side cover **1** of the previous frame (if not already removed).

Note: The right side covers will be reinstalled on the last expansion frame.

- 5. If your expansion frame came with rear side covers **4** it is an early level frame. Note whether you have an early level or later level frame. You will need this information later in the install process.
- 6. If you have a later level expansion frame, remove the right side cover **4** of the previous frame (if not already removed).
- 7. Move the cartridge accessor assembly to the left side of the base frame.
- 8. Refer to Figure 31 on page 86. If the X-axis (horizontal) right end bumper **8** has not been removed from the previous frame, remove it by removing the center screw. Slide the T-nut to the right until it comes out of the rail. **Be careful not to move the cartridge accessor assembly too far to the right until after the bumper has been reinstalled. The accessor assembly could come off the rail.**

Note: This bumper and T-nut will be reinstalled later on the right side of the last expansion frame.



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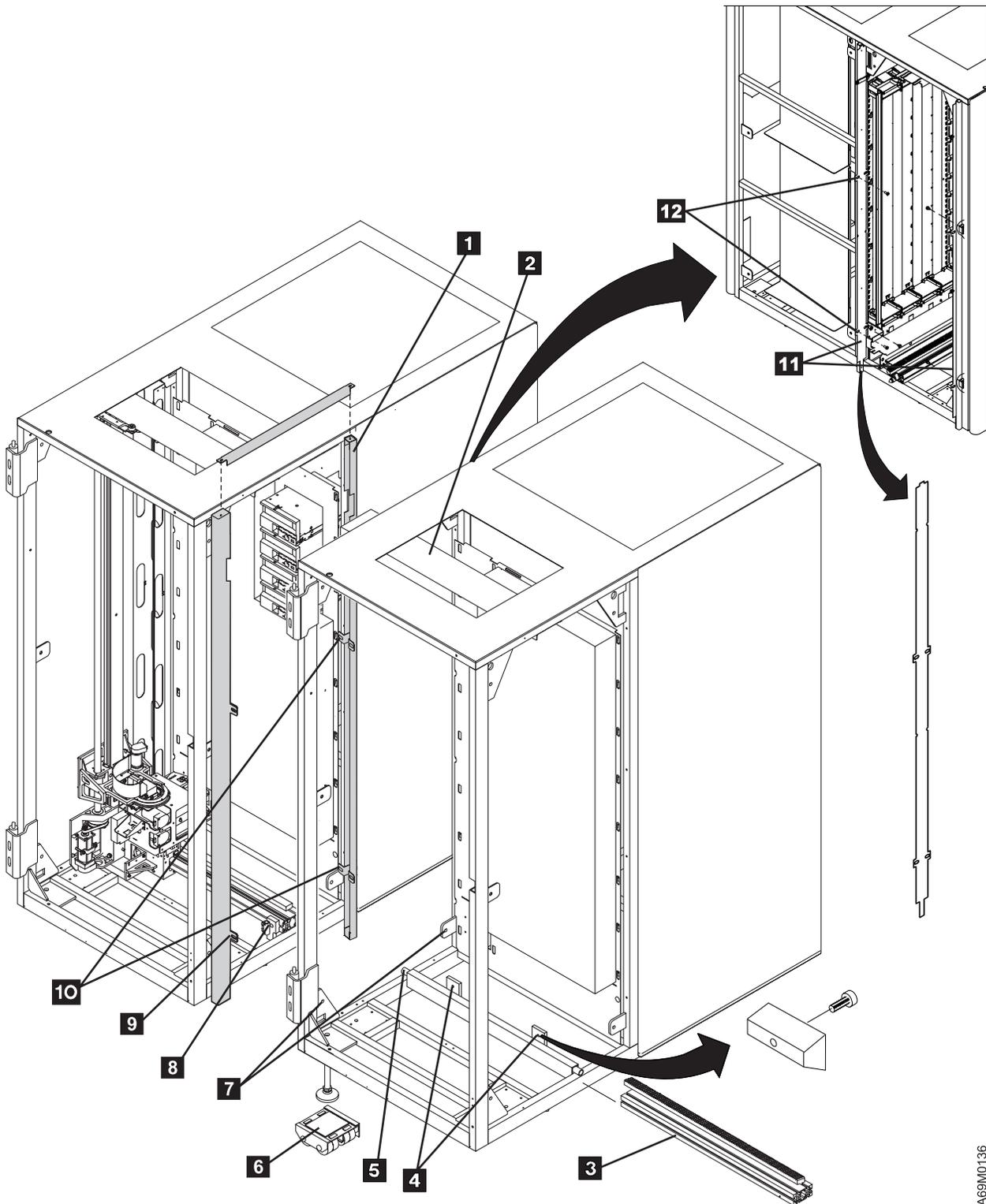
Figure 31. Frame-to-Frame Attachment (A). This figure will be repeated for the benefit of the CE.

- 9. Locate the upper X-axis guide rail **2** in the frame you are installing. Ensure the left end of the upper X-axis guide rail does NOT extend past the left side of the frame. If necessary, loosen the four screws holding the guide rail and slide the guide rail to the right so it will not interfere when joining the two frames together.

Note: The slots in the guide rail are keyed, so if you slide the guide rail too far to the right it can come off the screws.

- ___ 10. Refer to Figure 31 on page 86. Loosen the two short T-nuts **4** on the expansion frame and slide the lower X-rail **3** to the right about 15 cm (6 in.). This will prevent the rail from interfering when joining the two frames together. Retighten the two short T-nuts **4**.
- ___ 11. If this is a raised floor environment, and if the expansion frame you are installing has drives or an optional Frame Controller Assembly (FCA), ensure that there is a cutout in the floor for the power and communications cables. The cutout should be near the rear of the frame, and must not be close enough to the leveling pads to allow a leveling pad to fall into the hole.
- ___ 12. On early-style frames only, bend the tabs **1**, **9**, **10** on the front and rear frame separators inward approximately 6 mm ($\frac{1}{4}$ in.) so that they do not interfere when the two frames are pushed together.
- ___ 13. Move the expansion frame you are installing into position beside the previous frame. The alignment rod **5** should just touch the previous frame, and the front covers of the two frames should be approximately even.
- ___ 14. Loosen the locknuts on the expansion frame leveling pads and unscrew the locknuts.
- ___ 15. Place a frame skate **6** P/N 05H7999 under the two leveling pads on the left side of the frame you are installing, and lower the leveling pads into the recessed area on top of each frame skate. The skates should be positioned so they will roll toward the base frame.
- ___ 16. Raise the left side of the expansion frame by adjusting the left-side leveling pads evenly until the alignment rod **5** is aligned with the hole in the previous frame.

Note: The left side of the frame you are installing is supported by the leveling pads and frame skates. The right side of the frame is resting on the casters. Do NOT lower the right side leveling pads until instructed to do so.



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Figure 32. Frame-to-Frame Attachment (B). This figure is repeated for the benefit of the CE.

- ___ 17. Refer to Figure 33 on page 91. Carefully push the expansion frame against the previous frame until the alignment rod **5** is fully seated in the hole of the previous frame. The front cover of the frame you are installing should be parallel to the front cover of the previous frame.

Note: You must not push so hard that you move the previous frame. If the alignment rod is at the correct height, and if the frames are in line along the X-axis, then the alignment rod can be pushed into its seat easily.

- ___ 18. Visually check that the lower X-rail in the expansion frame is in line with the lower X-rail in the previous frame. If necessary, move the right side of the expansion frame forward or back to align the X-rails.
- ___ 19. Insert an M8 bolt (P/N 1621592) from the left, through the hole in the lower front frame stiffener **7** on the previous frame and through the corresponding hole in the expansion frame. Install and finger-tighten nut P/N 1622406 on the bolt.
- ___ 20. Repeat the previous step, installing another bolt through the lower frame stiffener at the rear of the accessor aisle.

Note: The bolts ensure that the alignment rod will not fall out of the hole in the previous frame. They should NOT be tight, yet.

- ___ 21. Raise the left-side leveling pads of the expansion frame off the frame skates. The weight of the expansion frame will be on the alignment rod and the right side casters.

Note: This will allow alignment of the frames using only the two leveling pads on the right side of the expansion frame.

- ___ 22. Remove the frame skates **6**, and store them in rear of the last frame. **DO NOT lower the leveling pads on the left-side of the expansion frame until instructed to do so.**
- ___ 23. If you are installing on carpet, put a carpet pad P/N 05H7004 under each of the leveling pads.
- ___ 24. Lower the right side leveling pads until the right side of the frame is approximately 84 mm (3.3 in.) from the floor.
- ___ 25. **Refer to Figure 33 on page 91.** Tighten the two M8 bolts located in bottom corners **7** of the accessor aisle until they are just snug. **Do not overtighten and bend the tabs.**
- ___ 26. Place the level on the lower X-rail assembly in the expansion frame (see **2** in Figure 29 on page 83). Raise or lower the two leveling pads on the right side of the expansion frame until the lower X-rail is level (left to right). Ensure that the alignment rod **5** was not driven out or allowed to slip out when you tightened the M8 bolts **7**. **DO NOT overtighten and bend the tabs.**

Note: The bubble should be centered between the two lines.

- If the bubble is too far to the right, lower the right side of the frame by raising **both** right-side leveling pads.
- If the bubble is too far to the left, raise the right side of the frame by lowering **both** right-side leveling pads.
- Refine the right side leveling pad adjustments until the bubble is centered between the two lines.

- ___ 27. Align the upper X-rails **2**.
- a. Loosen the screws holding the right side of the upper X-rail in the PREVIOUS FRAME.
 - b. Slide the EXPANSION FRAME upper X-rail **2** to the left, and visually check the alignment of the front vertical surface of the two upper X-rails. Adjust as follows:
 - Use the RIGHT SIDE leveling pads only. To move the upper X-rail in the expansion frame toward the rear, raise the front of the machine and lower the rear of the machine an equal amount. The front vertical surface of the upper X-rail is the critical surface, and is used as a track for the top roller of the accessor.

OR

 - Use the RIGHT SIDE leveling pads only. To move the upper X-rail in the expansion frame toward the front, lower the front of the machine and raise the rear of the machine an equal amount.
 - c. Connect the two upper X-rails together, overlapping the upper rail in the previous frame. The upper X-rail vertical edges should be touching. Finger tighten the screws at this time.
 - d. Continue to adjust the leveling pads until the upper X-rail vertical edges are in alignment.
- ___ 28. Recheck the lower X-rail to ensure it is still level and adjust the frame level, if necessary.
- ___ 29. Recheck the upper X-rail to ensure it is still aligned with the previous frame and adjust, if necessary.
- ___ 30. Turn both left-side leveling pads by hand until they are snug to the floor, then tighten them an additional 1/4 turn (90°). **Do not overtighten, as this may raise the library.**

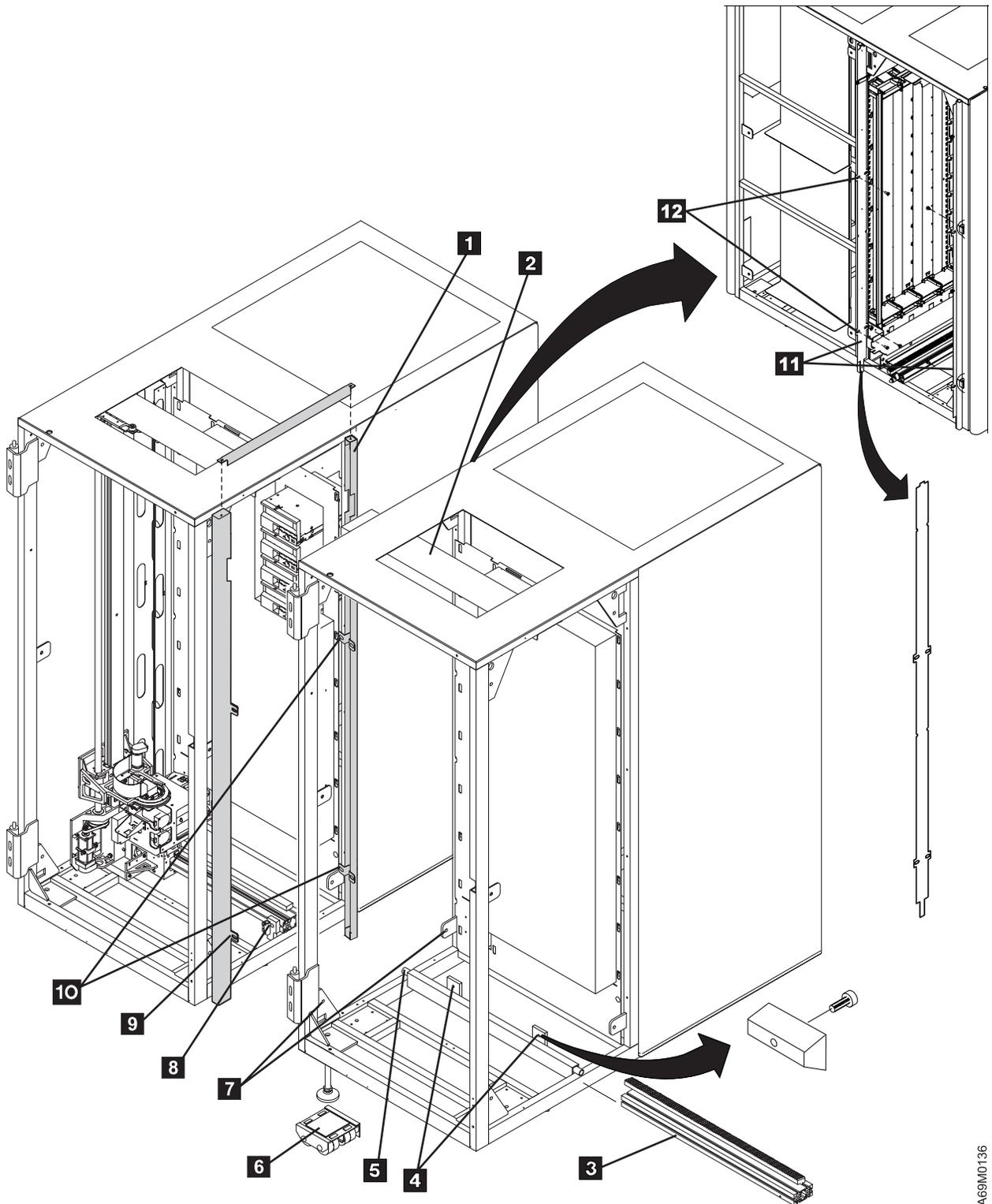


Figure 33. Frame-to-Frame Attachment (C). This figure is repeated for the benefit of the CE.

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- ___ 31. Slightly loosen the T-nut bolts to allow the lower X-rail to slide.
- ___ 32. Verify that no debris or burrs exist on the bottom of the lower X-rail geared rack.
- ___ 33. When the lower X-rail is aligned, slide the expansion frame X-rail back to the right approximately 150 mm (6 in.) to allow room to insert the long T-nut.
- ___ 34. Install the setscrews P/N 1621731 **1** into the long T-nut P/N 34G9644 **2**, if not already installed.

Note: The T-nut should have the setscrew sockets facing the front.

- ___ 35. Insert the long T-nut **2** approximately halfway into the opening closest to the front of the library on the X-rail assembly of the previous frame. Snug but do not fully tighten the set screws in the T-nut.
- ___ 36. Slide the lower X-rail assembly **4** in the expansion frame to the left onto the long T-nut until the gear teeth of both X-rail surfaces are touching. The lower X-rail assembly should slide freely into the previous frame. **Do not force the X-rail assembly into the next frame.**
- ___ 37. Snug, but do not fully tighten, the long T-nut **1** (setscrews) and the two short T-nut **3** screws.
- ___ 38. Refer to Figure 35 on page 95. Check the X-Axis rail alignment using the cable trough cover **2** as a straight edge. Use a light to ensure no gap **1** in the center or either end is visible. A piece of white paper under the trough cover may also make the gap, if any, more visible. If necessary, move the expansion frame to align.

Note: When installing multiple expansion frames it is important that the frames are properly aligned. The method described above (using the trough cover as a straight edge) becomes less accurate as more frames are added. Two alternate methods are available:

- a. If you have access to a laser level it is recommended that you use the laser level to align the frames.
 - b. If you do not have access to a laser level, you can use masonry string P/N 34G8395 to align the frames. Tie a loop in the end of the masonry string. Insert an allen wrench or similar tool into the right end of the lower X rail in the expansion frame and use it to hold the end of the masonry string. Stretch the masonry string along the X rail rack as far into the base frame as possible. Now you can use the string as a straight edge and visually check that the X rail rack in each frame is aligned with the masonry string.
- ___ 39. Refer to Figure 33 on page 91. Visually check that the alignment rod **5** is fully seated in the hole in the previous frame. If it is NOT fully seated you must fully seat it and recheck the frame alignment before you continue.
 - ___ 40. Retighten the frame M8 bolts.

Note: Do not overtighten the frame M8 bolts. Their function is just to keep the frames together.

- ___ 41. Place the rack alignment tool **6** on the junction of the two gear racks.
- ___ 42. Hammer the rack alignment tool onto the racks until the tool is fully seated in the gear teeth on both X-rail assemblies. Ensure no gap exists between the tool teeth and the rail teeth.
- ___ 43. Tighten the two short T-nuts **3** in the expansion frame to secure the T-nut. Recheck the track alignment.
- ___ 44. Tighten the setscrews on the long T-nut **1**.
- ___ 45. Recheck the alignment between the upper X-rails (from the base frame to the expansion frame). When both the upper X-rails and the lower X-rails are aligned, tighten the screws to secure the upper guide rails.
- ___ 46. Place the two X-axis bearing way rods (rods) P/N 05H8105 **5** in their slots against the X-rail assembly rods in the previous frame. One X-axis bearing way rod goes on top and the other goes on the bottom of the lower edge of the X-rail assembly.
- ___ 47. **Ensure each rod touches the rod in the previous frame. They must be tight end-to-end**

| __ 48. Starting from the left end, press the rods in place with the bearing shaft clamp tool PN 50G0405
| **7** . The rods fit tightly in the recesses of the X-rails, so start on the left side and clamp the shafts
| in place about every 50 mm (2 in.) to the fully-seated position.

| **Notes:**

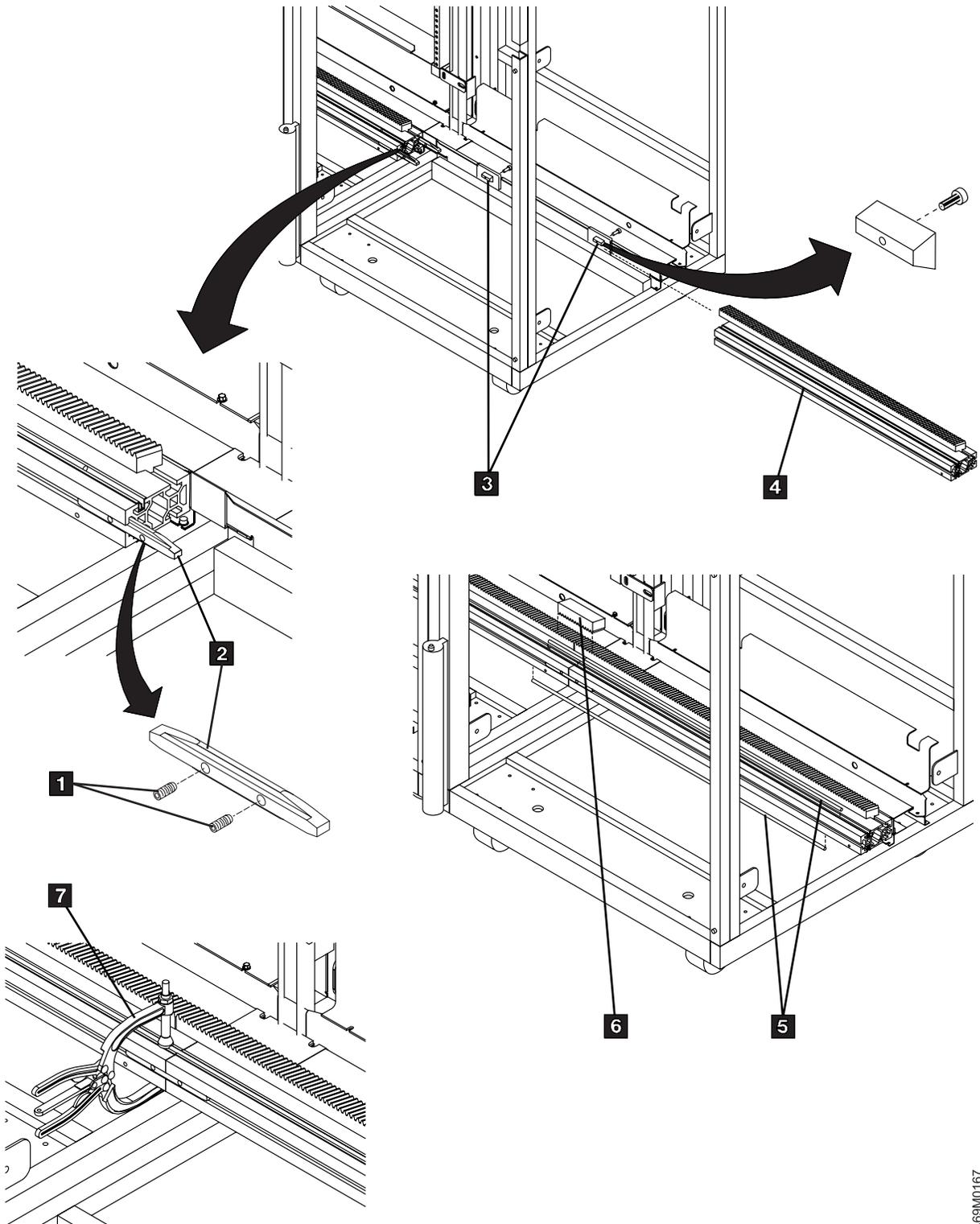
- | a. If the rods do not seat fully, adjust the bearing shaft clamp tool to provide more pressure to the
| rod.
- | b. **Do not** use the accessor to press the rods into place. While this may have worked on 3494, it
| will not work on 3584.
- | c. In the next step, to prevent the cartridge accessor assembly from falling off the X-rail, do not
| move the cartridge accessor assembly to the extreme right until after the right bumper has
| been reinstalled.

__ 49. If this is the last expansion frame to be installed, reinstall the X-Axis right side bumper. First, install
the short nut. The flat surface of the T-nut should face to the front, with the bumper assembly to
the right. The bumper should rest against the right side of the frame. Tighten the mounting screw.

__ 50. Move the cartridge accessor across the junctions of the upper guide rail and the lower bottom
X-rail. If you can feel any binds, correct the alignment of the frame before continuing.

| **Notes:**

- | a. If you hear any 'clicking' sounds, this indicates the bearing rods are not flush, or a gap exists
| between the rods.
- | b. If you feel a 'bump,' this indicates that either the gear rack is not flush, or gear rack spacing is
| incorrect, or the upper rail vertical alignment is not flush.
- | c. Do not damage the X-axis cable. The expansion frame X-axis cable trough cover is not
| installed yet.



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Figure 34. Base Frame with Expansion Frame

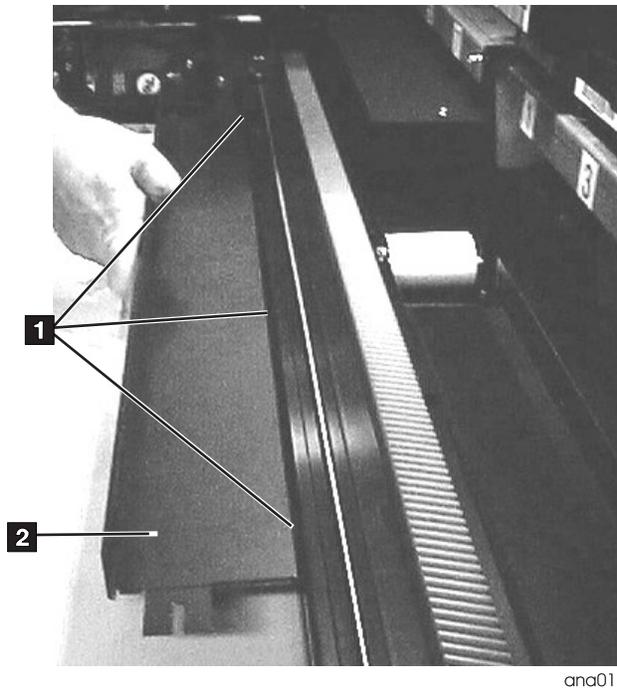


Figure 35. X-Rail Alignment Check

- ___ 51. Refer to Figure 36. Locate the three frame-to-frame attachment brackets **1** that are factory-mounted on the left side of the expansion frame. Locate screws **2** P/N 1624790 provided in the ship group. You will install them in the following steps.

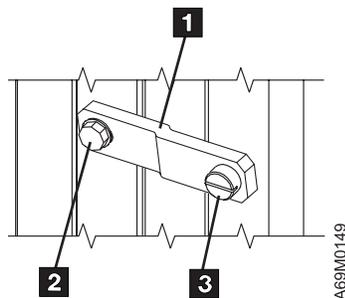


Figure 36. Expansion Frame Attachment Bracket – Positioning

- ___ 52. Refer to Figure 37 on page 96. Connect a frame-to-frame attachment bracket **1** near the top of the front vertical frame, connecting the expansion frame to the previous frame.

Notes:

- a. The slotted side of the bracket **1** must be on the previously-installed frame. **Note:** Factory installed.
- b. The screw **3** and bushing (or the shoulder screw on some machines) must be installed in the round hole. **Note:** Factory installed.
- c. The remaining screw **2** must be installed in the slotted hole.

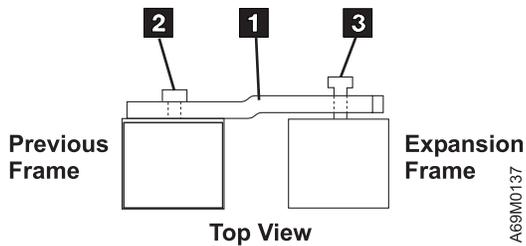


Figure 37. Expansion Frame Attachment Bracket – Offset

- ___ 53. Refer to Figure 33 on page 91 on earlier-style frames only, connect frame spacers **1** and **9** to the previous frame by installing screws into the frame spacer mounting slots **10**. On later-style frames only, connect frame spacers **11** to the previous frame by installing screws into the frame spacer mounting slots **12**.
- ___ 54. **X-Axis Track Cable**
Track cable installation will be affected if your library install falls into one of the following two categories:
 - a. You are installing a second expansion frame (the library is now 3 frames long), and you received a new X-axis track cable to replace your existing cable. Use Table 16 on page 99 to determine where the X-axis flex cable will be clamped down to the cable trough, then refer to, “X-Axis Flex Cable” on page 653 to remove the old 2-frame cable and replace it with the new cable. Then return here to continue with the installation at Step 61 on page 99.
 - b. You are installing a library with 3 or more frames. Your L32 came **without** a track cable installed in your L32, and you received a **new** 3-6 frame track cable with your machine. Continue at the next step.
- ___ 55. Refer to Figure 38 on page 97. Lay the X-axis cable **4** in the cable trough **2**. Position the end with the plastic track (plastic track up **1**) at the left end of frame 1, with the connector for the accessor AXY card protruding out the left end approximately 300 mm (12 in.).
- ___ 56. Run the end without the plastic track **3** back under the cable trough. The cable will be looped around the end of the cable trough in frame 3 **2** for (3 through 6 frame libraries.)
- ___ 57. Refer to Figure 40 on page 99. Fold the XCP-card end of the X-axis cable **4** toward the rear wall (XCP card) and under the trough. Plug the cable into the XCP card **1**.
- ___ 58. Attach the mid-cable end of the cable track **5** to the trough by following these steps:
 - a. Refer to Figure 39 on page 98 and Figure 40 on page 99 to determine if you have the **OLD** or **NEW** style track cable.
 - b. (**OLD** style) Remove cable mounting block **3** from the end of the cable track **2**.
 - c. (**OLD** style) Attach the cable mounting block **3** (provided with the cable) to the right end of the cable trough in the appropriate frame (as shown in Table 16 on page 99) with 2 screws P/N 1621510 and tighten the screws.
 - d. (**OLD** style) Re-attach the cable **2** to the cable mounting block **3** and tighten the screws **1**.
 - e. (**NEW** style) Attach the cable mounting block assembly to the right end of the cable trough in the appropriate frame as shown in Table 16 on page 99. Install two M4x12 screws **1** PN 1695243 through the cable mounting block and into the holes originally used to mount the old style mounting block. Tighten screws securely.

59. See Table 16 on page 99 to identify your track cable. If your library has a 7 to 14 frame track cable, and you are installing frame 8 or greater, install the X-axis trough liner, P/N 05H7979 **5** in frames 8 through 14. If your library has an 8 to 16 frame track cable, **remove** the trough liner from frame 8 and install trough liners P/N 05H7979 **5** in frames 9 through 16.

Note: The liner protects the foam strips on the trough covers from damage.

- a. Hook the left end mounting tabs of the liner on the left end of the trough.
- b. Attach the right end mounting tabs of the liner to the trough with two screws P/N 1621510 and tighten the screws.

Note: Due to manufacturing logistics, you may receive an extra trough liner. This liner is not needed and may be discarded after you finish the installation.

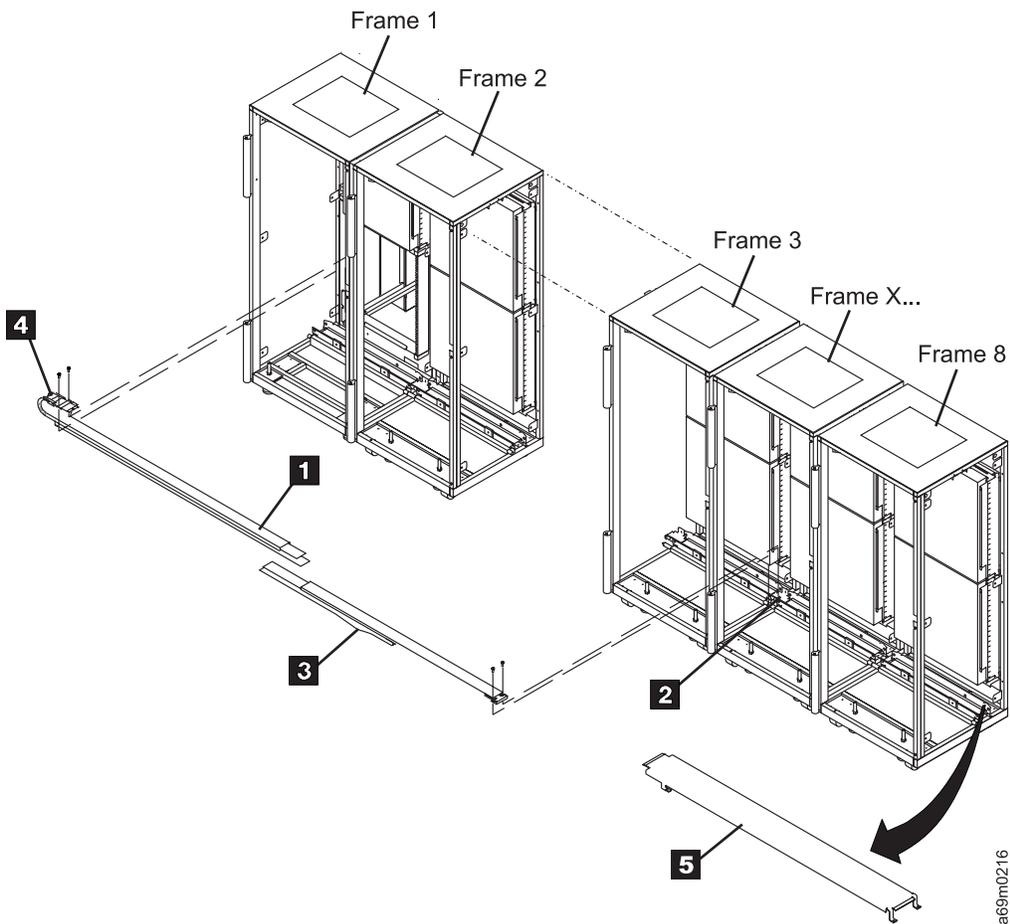


Figure 38. X-Cable Frame Attachment

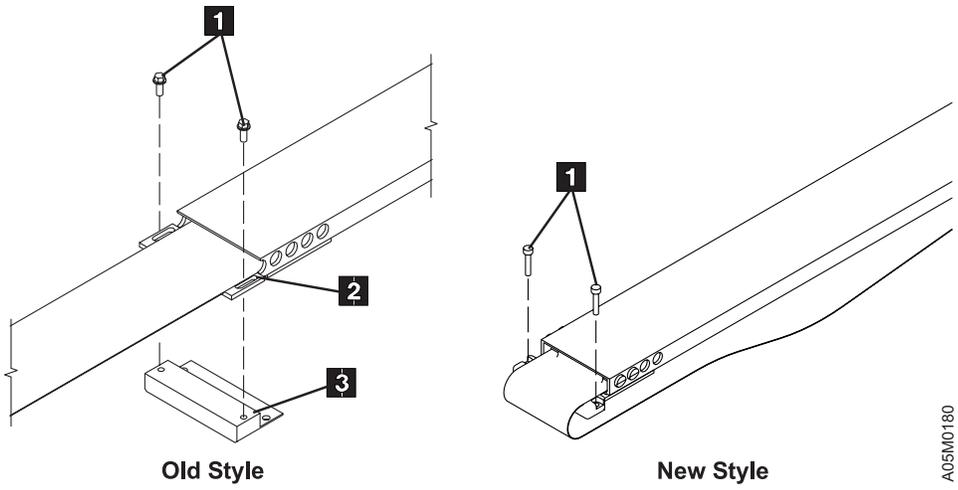


Figure 39. Cable Mounting (Old and New Style)

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- ___ 60. Refer to Figure 40. Move the accessor over the X-axis cable. Loop the accessor end of the cable around the end of the accessor (as shown) and plug it into the AXY card **1**. On the **old style** cable, attach the X-axis cable bracket to the accessor with two screws **2** P/N 1621510. On the **new style** cable, slide the metal mounting plate **6** **under** the AXY card **3**. Plug the cable into the AXY card, then install two M3x10 screws **2** PN 05H1779 through the larger holes in the card and into the metal plate. Tighten screws securely.
- Track cable activities are now complete. Continue with the rest of the Installation.

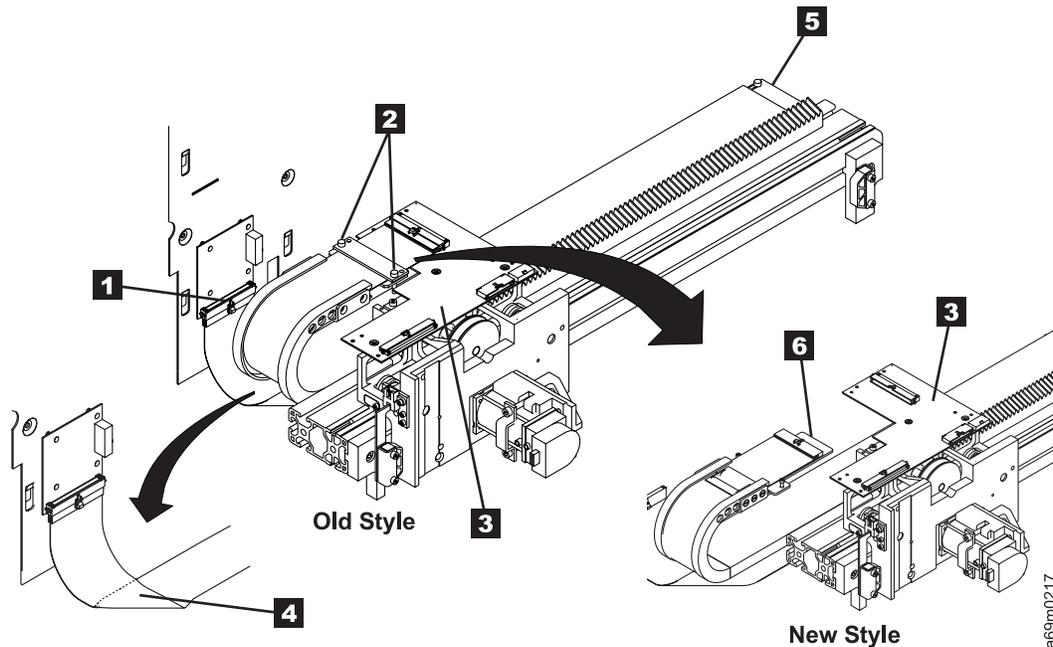
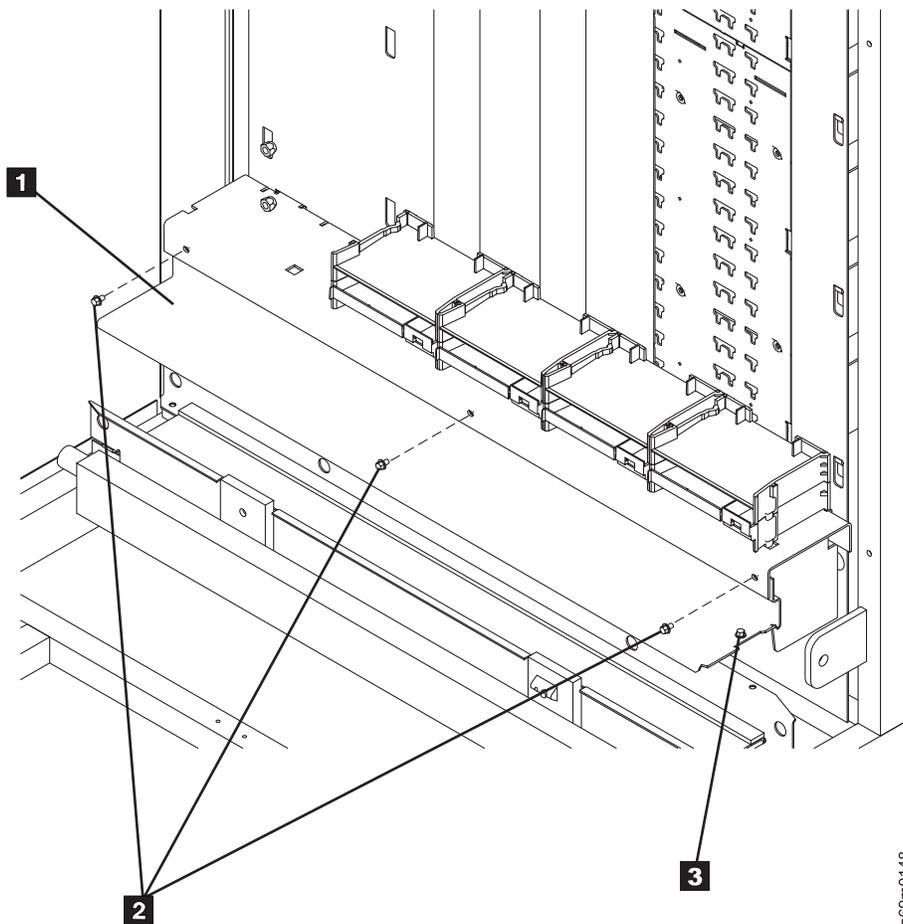


Figure 40. X-Cable to AXY Connections

Table 16. X-Axis Flex Cable Positioning

Number of Frames	Cable PN	X-Axis Flex Cable Attaches in:
1 or 2	19P5789	Frame 1
3 to 6	19P5788	Frame 3
7 to 14	19P6036	Frame 7
8 to 16	19P6035	Frame 8

- ___ 61. See Figure 33 on page 91. On earlier-style frames only, install and tighten one screw into the mounting slot of each separator **10** of the previous frame. On later-style frames only, install and tighten the two screws **12** on the previous frame.



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Figure 41. Cable Trough Cover

- ___ 62. See Figure 41. Use screws P/N 1624764 **2** to install the X-rail cable trough covers P/N 35L0192 (L32), P/N 35L0185 (D32 or D42) **1** .

Note: Early level trough covers connect to the previous trough cover with a short screw **3** . If you are installing an early level trough cover with a short screw **3** , ensure that the screw does not protrude below the trough cover since it could damage the X-axis flex cable. If it protrudes below the trough cover you must add a washer under the head of the screw to ensure it does not protrude below the trough cover. Later level trough covers will use a tab and slot to connect to the previous trough cover. No short screw **3** is needed for later level trough covers.

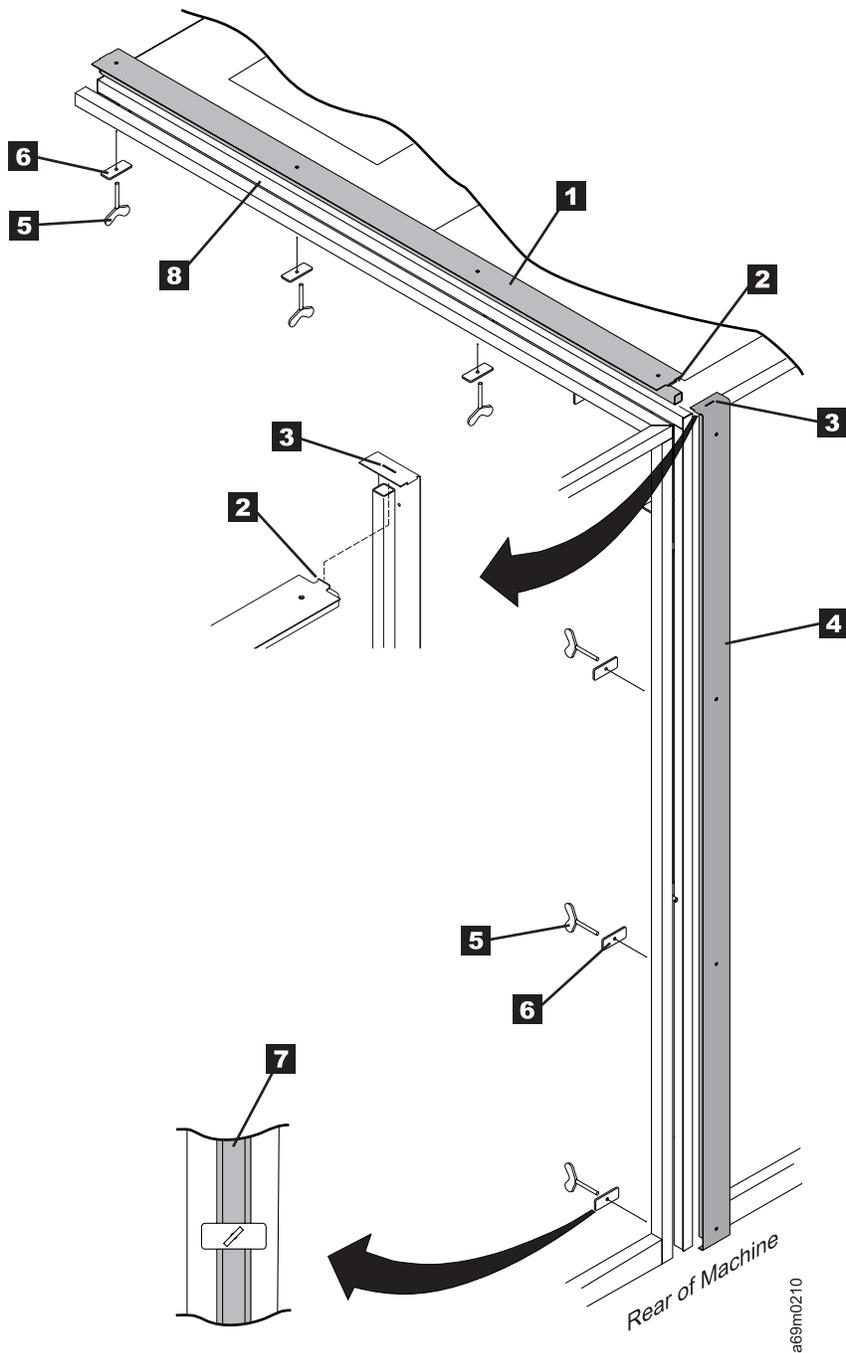


Figure 42. Expansion Frame Spacers

- ___ 63. If you installed a **later-style expansion frame**, refer to Figure 42 and use the following procedure to install two RFI seals:
- The RFI seals **1** and **4** were shipped with the retainer plates **6** and wing-screws **5** already installed.
 - Lay the top seal **1** in place between the frames **8**. Turn the retainer plates **6** so they drop between the frames.
 - On the rear seal **4**, remove the three retainer plates **6** and wing screws **5**.
 - Install the rear seal **4**, hooking the tab **2** on the top seal into the slot **3** on the rear seal.
 - Reinstall the three retainer plates **6** and wing-screws **5** in the rear seal as shown.

f. Position the plates as shown in **7**. Securely tighten the three wing screws on the rear seal first, then tighten the three screws on the top seal.

- ___ 64. If you have more expansion frames to install, go back to step 1 on page 84 and install the next frame.
- ___ 65. Tighten the locknuts on the leveling pads of all the frames.
- ___ 66. Install the right side covers (removed earlier) to the last expansion frame.

Note: In the next step, early-style frames route frame-to-frame cables into accessor aisle through foam-covered holes and back into the next frame. On later-style frames, frame-to-frame cables are routed from one frame to the next in the rear of the machine.

- ___ 67. Refer to Figure 43 on page 103.
- ___ 68. Early-Style Frames: Thread the three (frame-to-frame) cables from the rear of the last frame (through the foam covered hole in the upper right corner of the frame bulkhead) to the front of the last frame.
- ___ 69. Thread the cables through the upper rear frame member into the previous frame and then into the rear of the previous frame. Continue threading cables from frame-to-frame, until all the frame cables are threaded.
- ___ 70. Later-Style Frames: Route and install the three (frame-to-frame) cables inside the rear of the frames (rather than out the accessor aisle and back in again).
- ___ 71. Connect interframe power cable from connector J5 of the FIC card in the rear of the last frame to J7 on the previous frame (for more details on FIC card connectors, see Figure 10 on page 32).

Note: Ensure that the cable connector numbers match the FIC card connector numbers (J5 to J5, and J7 to J7).

Continue to connect the power cables (J5 to J7) in all of the frames.

- ___ 72. Connect the interframe signal cable from connector J6 of the FIC card in the rear of the last frame to J8 on the previous frame.

Note: Ensure that the cable connector numbers match the FIC card connector numbers (J6 to J6 and J8 to J8).

Continue to connect the signal cables (J6 to J8) in all of the frames.

- ___ 73. Refer to Figure 43 on page 103. Connect interframe EPO cable connectors P23 on the previous frame.

Continue to connect the EPO cables P23 in all of the frames.

- ___ 74. Ensure that the tethered jumper **1** of the EPO cable is installed on the last expansion frame as shown.
- ___ 75. Ensure that the jumper is installed on the base frame **4**, as shown.
- ___ 76. The following steps remove extra terminators from the FIC cards. **If these terminators are not removed, they may cause problems with communications between frames and may cause a problem with the power-up sequence. Ensure that you follow the next two steps very carefully. When completed, you should have a terminator on connector J15 **3** of the base frame and on connector J16 **2** of the last expansion frame. Only the last frame receives the tethered jumper.**
- ___ 77. Remove the multi-pin terminators if present from connector J15 **3** on all of the FIC cards in the expansion frames.
- ___ 78. Remove the multi-pin terminators if present from connector J16 **2** on all of the FIC cards, except in the last frame.

Note: Excess terminators should be stored on one row of pins on the FIC cards, as shown.

- ___ 79. If you are installing the first DLT-8000 (D42) expansion frame, install the DLT-8000 CE diagnostic cartridge (P/N 59H3040) into column 1, row 1 (on the top left of the rear wall).
- ___ 80. Go to "Installing Tape Drives and Control Ports" on page 104.

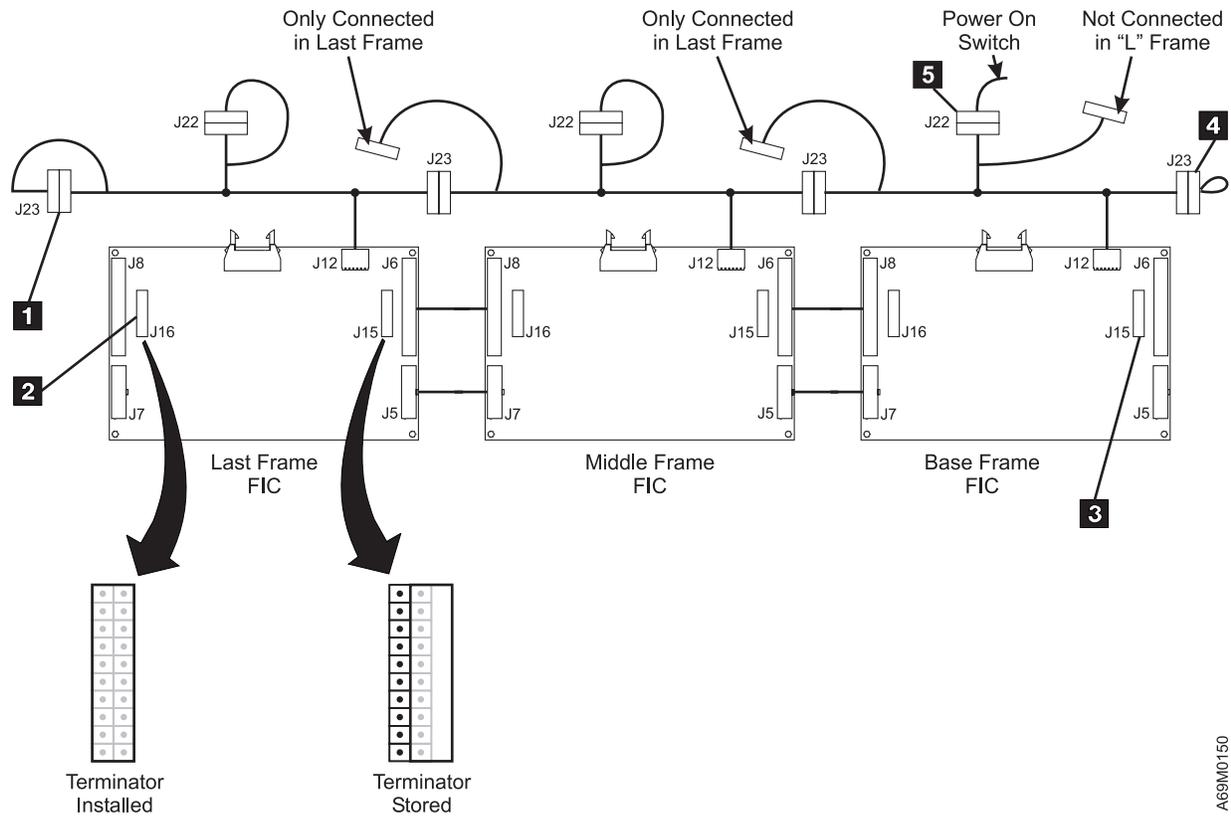


Figure 43. FIC Card Interface Cables Schematic. Three-Frame Example

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Installing Tape Drives and Control Ports

1. If all the tape drives were pre-installed in the frames you are installing, or if you do not have any drives to install, go to “Drive Cabling” on page 113.
2. Examine the packing list for each frame to determine the quantity of drive features, and the types that were ordered for each frame. Use the following information to determine where to install the tape drives and the control ports.

For Model L32 or D32:

Table 17. Feature Codes and Drive Types (L32/D32)

Feature Code	Description
1454	LTO Ultrium-1 (L1) LVD Drive Canister
1455	LTO Ultrium-1 (L1) HVD Drive Canister
1456	LTO Ultrium-1 (L1) Fibre Channel Drive Canister
1464	LTO Ultrium-1 (L1) LVD Drive Tray
1465	LTO Ultrium-1 (L1) HVD Drive Tray
1466	LTO Ultrium-1 (L1) Fibre Channel Drive Tray
1474	LTO Ultrium-2 (L2) LVD Drive Canister
1475	LTO Ultrium-2 (L2) HVD Drive Canister
1476	LTO Ultrium-2 (L2) Fibre Channel Drive Canister

Stacking Drives – Drives must be installed starting in Row 1 (the top drive position). Additional drives in the same frame must be installed in the vertically-adjacent positions. Stated another way, if you are installing four drives in a frame, they must be in rows 1 through 4 in the same column. If there is a mixture of drive features (a mixture of SCSI LVD, SCSI HVD, or Fibre Channel), install drives with the same feature number in adjacent positions. As an example, if you install two SCSI LVD drives and two SCSI HVD drives, stack the two LVD drives next to each other, and stack the two HVD drives next to each other. This is necessary if you have more than one drive on a SCSI bus. And if you have a mixture of drive trays and hot swap canisters, you should group the hot swap canisters together, if possible, to allow redundant (drive) power cables to be installed.

For Model D42:

Table 18. Feature Codes and Drive Types (D42)

Feature Code	Description
1458	DLT LVD Drive Canister
1459	DLT HVD Drive Canister
1605	DLT LVD Control Port Canister
1606	DLT HVD Control Port Canister

Orienting Control Ports – If the packing list for the D42 shows at least one control port, you must install the first control port in Row 0 (above the top drive position). If the packing list shows additional control port features, you will need to discuss with the customer how they want to set up their logical libraries. Each DLT-8000 logical library must contain one control port followed by one or more DLT-8000 drives. As an example, if you are installing a D42 with two control ports and 4 drives, check to see if the customer wants two drives in each of the DLT-8000 logical libraries. If so, install the first control port in row 0, drives in rows 1 and 2, the next control port in row 3, and drives in rows 4 and 5.

If there is a mixture of attachment types (SCSI LVD and SCSI HVD), group devices of the same attachment-type together. So in the previous example, if you have one LVD control port, two LVD

drives, one HVD control port, and two HVD drives; be sure to group the LVD control port with the LVD drives and the HVD control port with the HVD drives.

3. Use the procedures in Table 19 when installing the various drive types and control ports.

Table 19. Drive Type Installation Procedures

Drive Type	Use the Procedures At
Drive tray assemblies	“LTO Drive Tray Installation”
Drive and control port canister (all hot swap canister models)	“Drive Canister or Control Port Canister Installation” on page 107

LTO Drive Tray Installation

1. See Figure 44 on page 106 and Figure 45 on page 106. From the rear of the library, slide the drive assembly into the highest available drive location.

Attention:

- Ensure that the tab at the front of the drive (the end opposite the cable-end) is seated into the slots in the bulkhead.
- Ensure that the drive tray is completely seated at both tabs before tightening the screws **3**; each tab should be flush to the frame. To prevent deforming the tabs, ensure the drive tray is not skewed before you begin to tighten the screws. Failure to properly install the drive will bend the tabs, and prevent the gripper assembly from picking a cartridge.
- Do NOT remove the drive safety flaps when installing drives. The safety flaps will pivot up out of the way.

2. Tighten the two screws **3**.
3. Repeat the previous steps to install the remaining LTO drive tray assemblies.
4. If all drives and drive types have been installed, go to “RS-422 Cables and Power Cables Installation” on page 111. If more drives are to be installed, go to the appropriate procedure in Table 19.

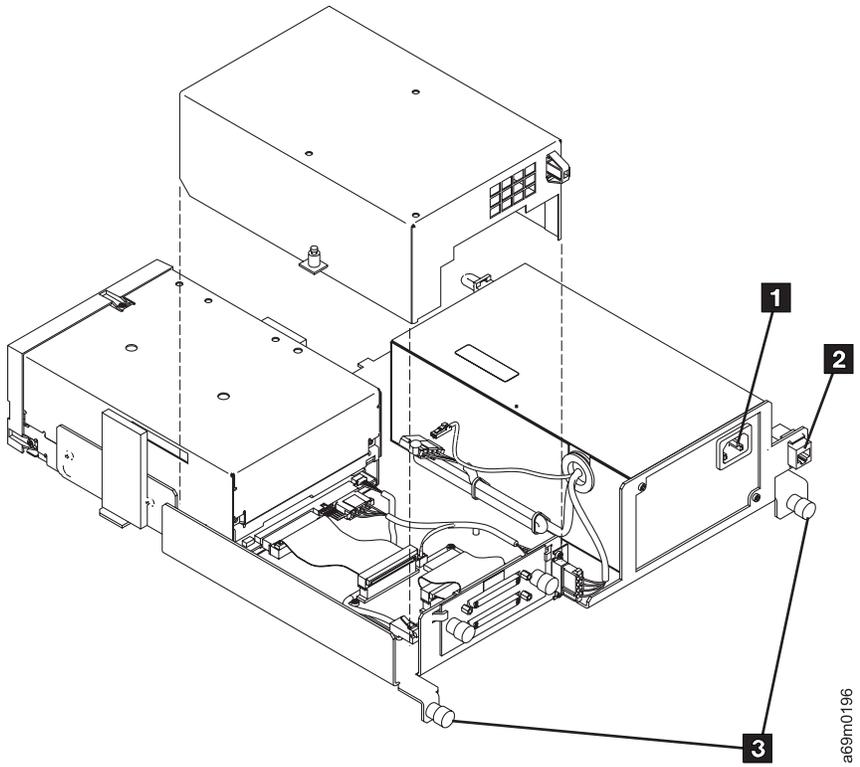


Figure 44. LTO SCSI Drive Tray Assembly

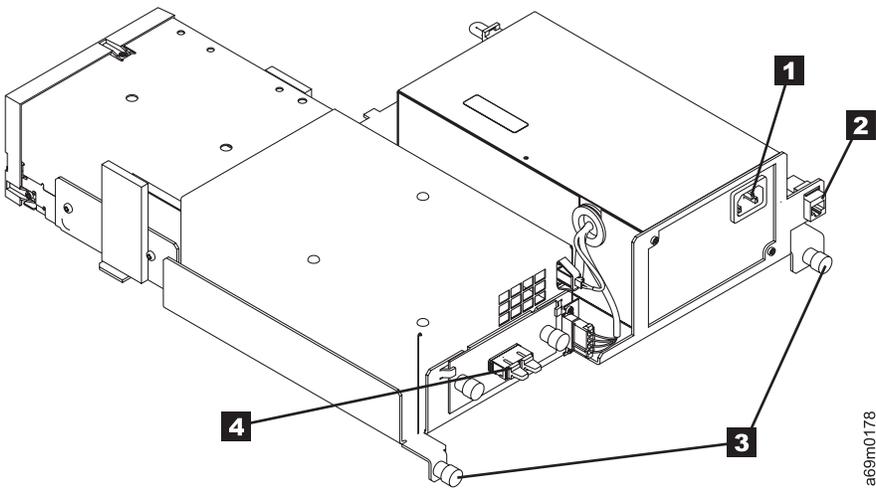


Figure 45. LTO Fibre Drive Tray Assembly

Drive Canister or Control Port Canister Installation

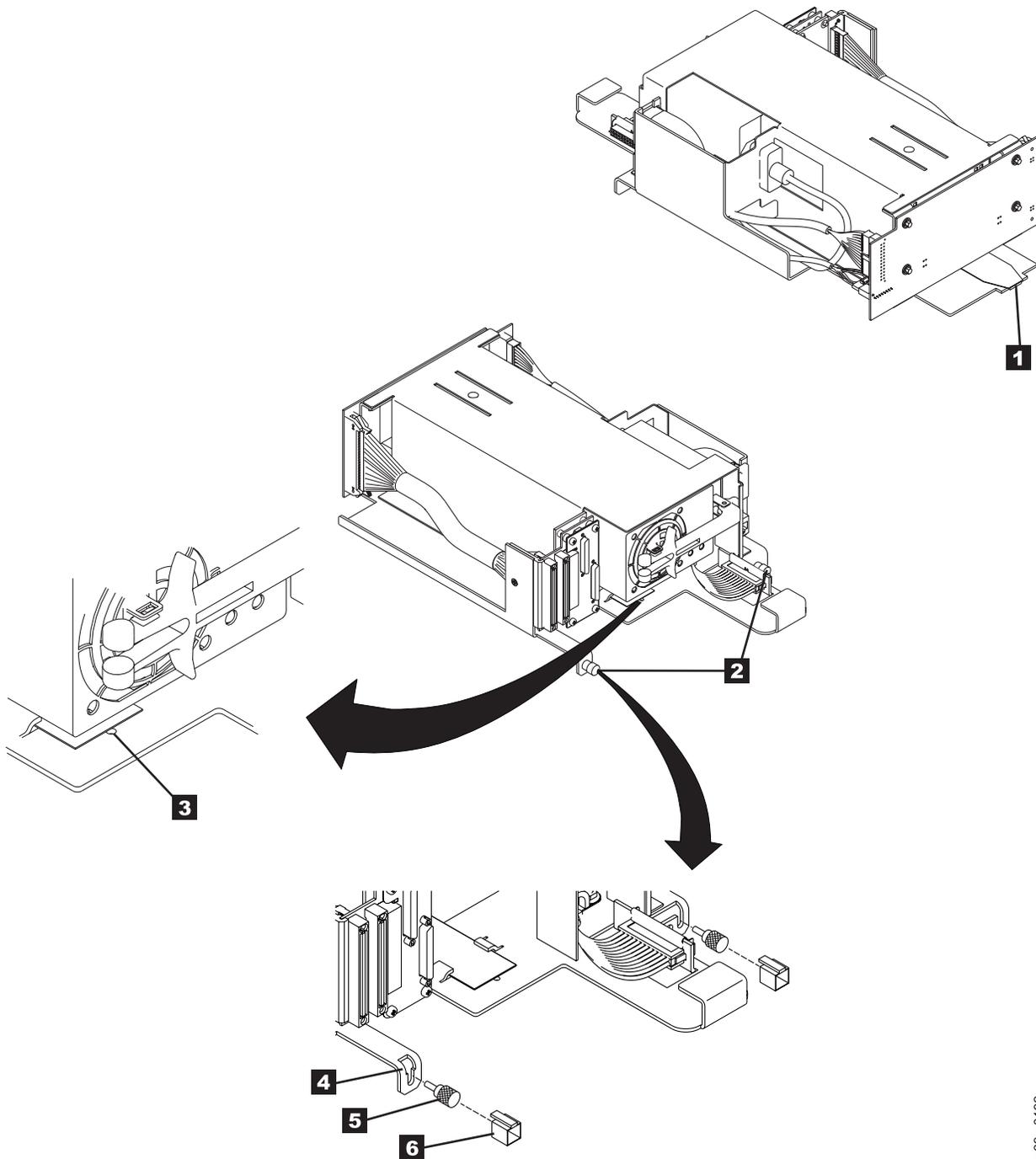
Attention: All canister Feature Codes require a fixed tray assembly.

Use this procedure for all drives and control ports in canisters.

1. Slide in the fixed tray assembly, keeping it toward the right side. Ensure the front locating tab **1** on the tray assembly slides securely into the front slot in the frame (see Figure 46 on page 108).

Note: As the front locating tab seats into the slot in the frame, the indicator slide will move to partially cover the indicator hole **3**. If you see the indicator slide move toward the indicator hole (partially covering it), then the locating tab is positioned in the slot. If the indicator slide does not move, slide the front of the fixed tray assembly left or right until the locating tab slides into the slot.

Note: The drive safety flaps must NOT be removed when installing the drives. The safety flaps will pivot up out of the way when the drive is installed.



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Figure 46. Fixed Tray

- 2. Tighten both thumbscrews **2** to **fingertight only**. Do not overtighten these screws.
- 3. If your fixed tray has notches **4** near the thumbscrews, **5** slide the thumbscrew caps **6** over the screws until the tab slides completely into the notch.
- 4. See Figure 47 on page 109. Carefully slide the drive canister into the left side of the fixed tray assembly.
- 5. While holding the locking lever **2** **up** to ensure the tabs on both sides of the lever will clear the frame.
- 6. Grasp the drive canister handle **3**, and carefully but firmly push the drive into position. Ensure the connectors to the right correctly align and fully engage with the fixed tray connectors.

- ___ 7. Lower the locking lever **2** until it snaps into place.

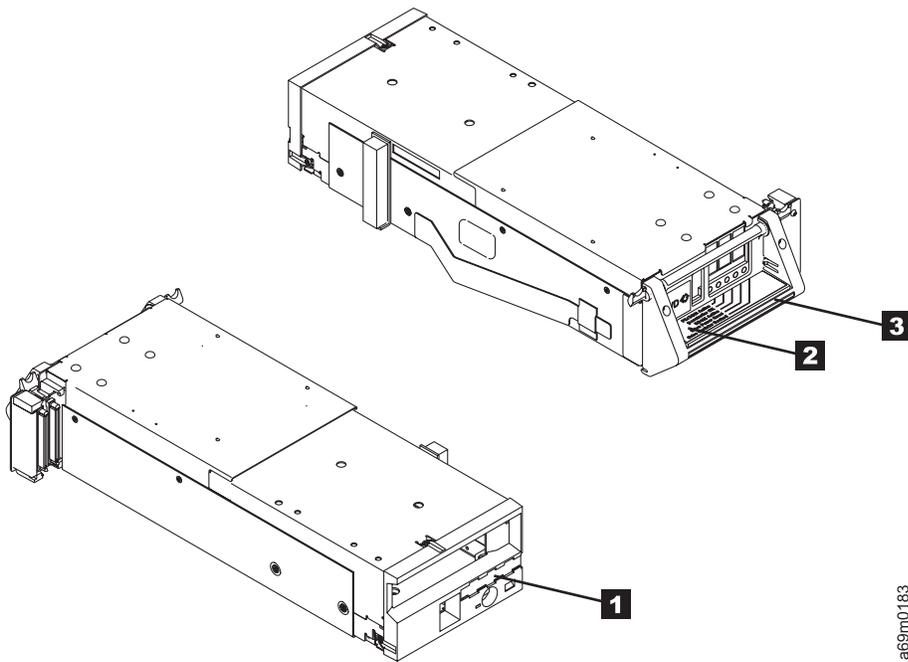
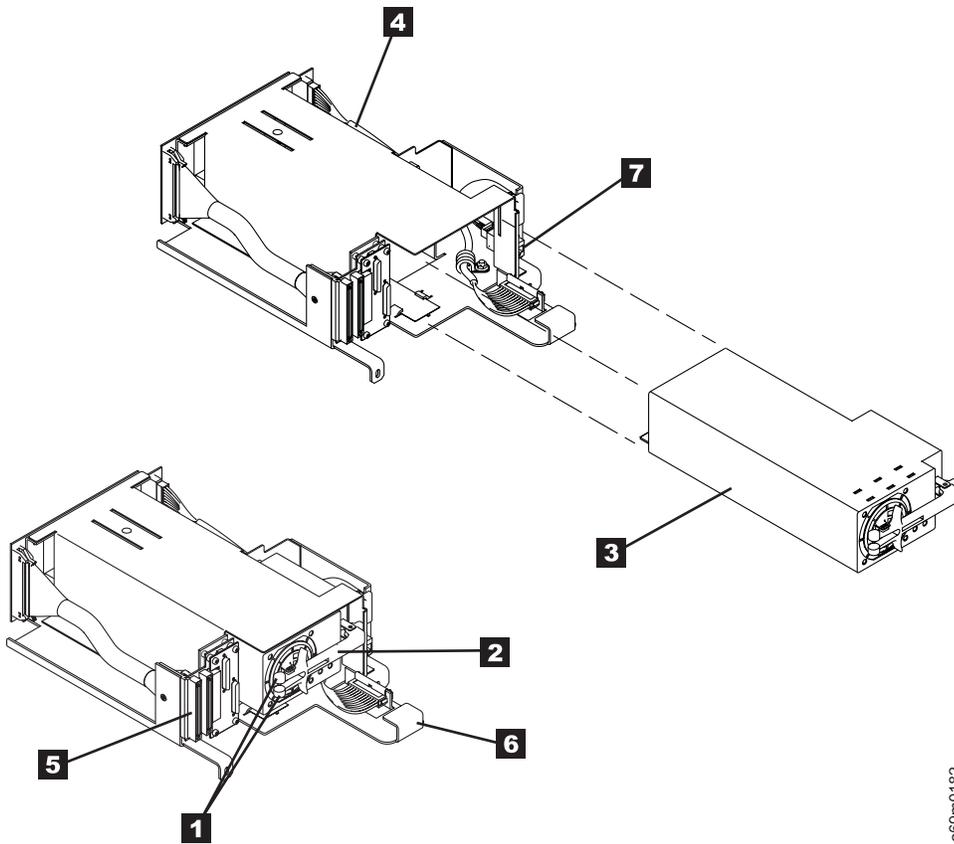


Figure 47. Drive Canister

- ___ 8. See Figure 48 on page 110. Visually check to see if the hot swap power supply **3** is already installed in the fixed tray. If it is already installed, go to step “RS-422 Cables and Power Cables Installation” on page 111. If it is not installed, continue with the next step.



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Figure 48. Hot Swap Power Supply

- ___ 9. Pivot locking arm assembly **2** outward.
- ___ 10. Firmly slide the power supply **3** into the fixed tray assembly.
- ___ 11. Swing the locking arm to the left while you pinch the two locking tabs **1** together, securing the arm in place.

RS-422 Cables and Power Cables Installation

1. Connect the RS-422 cable to connector **2** on the right side of the drive tray or fixed tray assembly. If the drive tray or fixed tray is in Row 1 to 12, use the RS-422 cable attached to MCP connector J7. Be sure to use the connector labeled with the row number. For model D42 only, if the control port fixed tray is in Row 0, use the RS-422 cable that is attached to MCP connector J3.

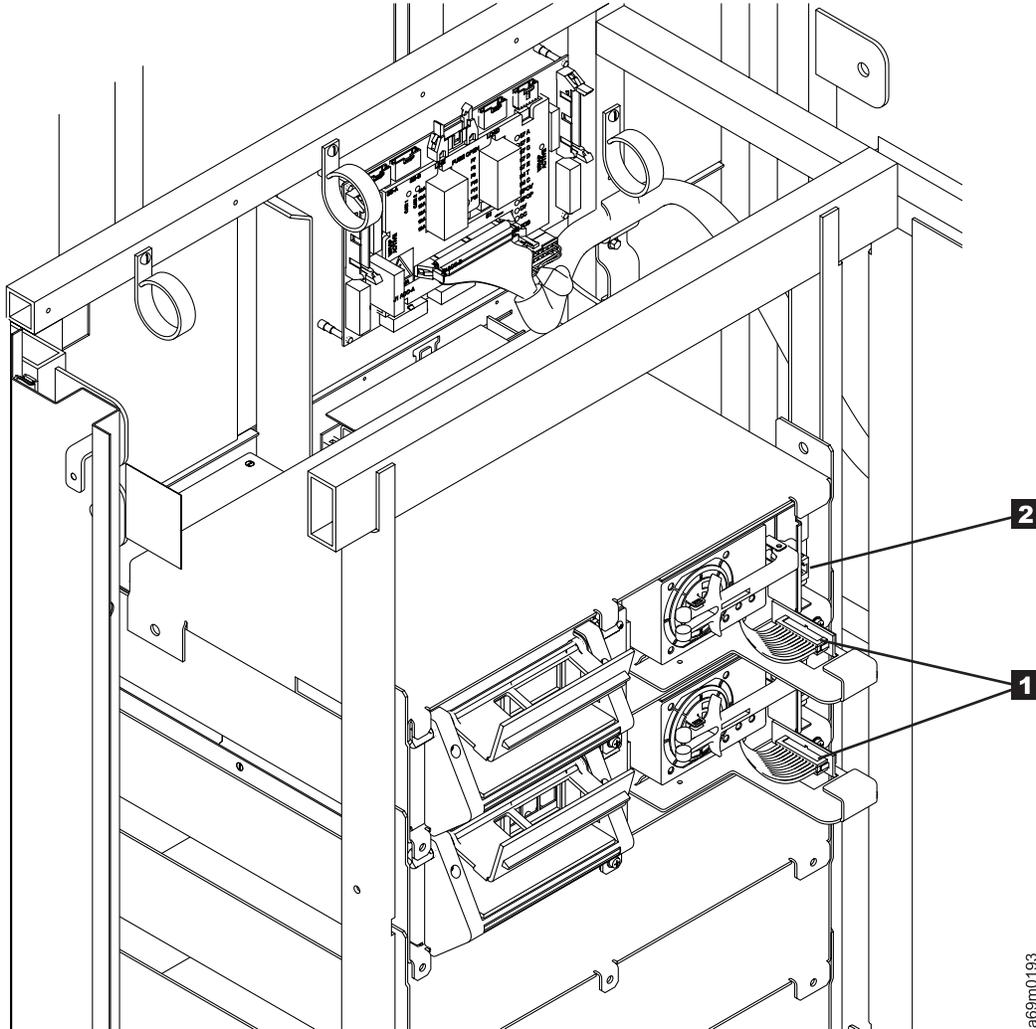


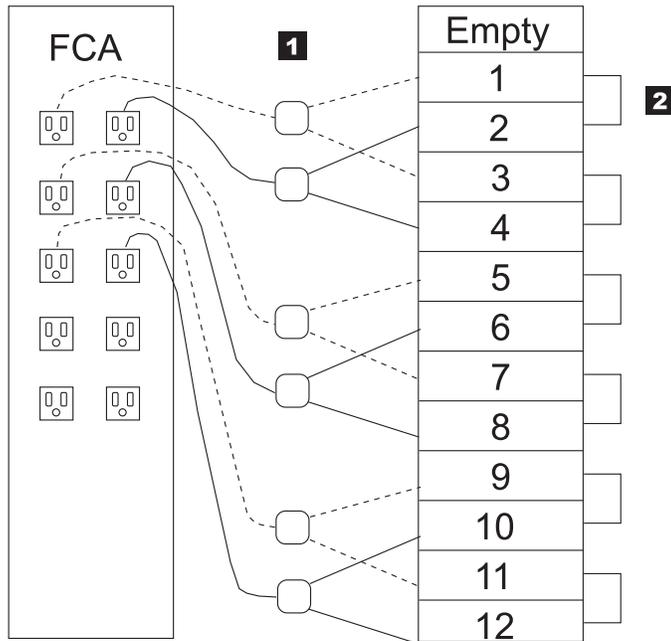
Figure 49. Cables and Power Cord

2. For canister devices only, install the appropriate Redundant Power Supply power cables (19P1223) between the fixed trays **1**, depicted as **2** or **4** in Figure 50 on page 112.

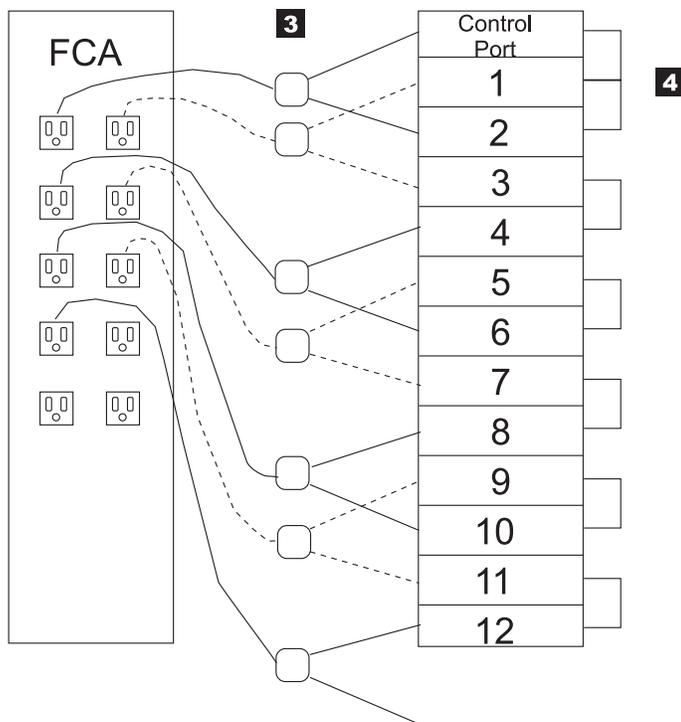
Note: For model D42 only, a special, 3-connector, redundant power cable (19P3026) is used for the control port in Row 0. The connector labeled **0** must connect to the fixed tray in Row 0.

3. Connect the bifurcated power cord on the right side **2** of the new fixed tray assembly (see Figure 49). This is depicted as **1** or **3** in Figure 50 on page 112. For canister devices, ensure you install the power cords exactly as shown in Figure 50 on page 112 to ensure optimum redundancy.
4. Go to “Drive Cabling” on page 113.

L32/D32 - LTO Drive Redundant Power



D42 - DLT Drive Redundant Power



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Figure 50. Redundant Power Cabling

Drive Cabling

Table 20 provides pointers to the cabling procedures for all newly installed drives.

Table 20. Drive Cabling Procedures

Drive Type Installed	Use Cabling Procedure At
Fibre Channel Canister	Use the procedure at “Fibre Cabling (Canisters)”.
SCSI Canister	Use the procedure at “SCSI Cabling (Canisters)”.
LTO Fibre Channel Drive Tray	“Fibre Cabling (Trays)” on page 114.
LTO SCSI Drive Tray	“SCSI Cabling (Trays)” on page 115.

Fibre Cabling (Canisters)

- ___ 1. If you are not installing any fibre drive **canisters**, go to “SCSI Cabling (Canisters)”.
- ___ 2. Carefully route each cable to the left side frame, through the plastic cable clamps. Do not overtighten the clamp. To prevent damage to the fibre cables, do not use the metal SCSI cable clamps to secure the fibre cables.
- ___ 3. Connect one end of each fibre cable to the fibre connection at the back of a drive tray.
- ___ 4. Route the fibre cables through the plastic clips at the bottom of the frame. Form a loop with any excess cable.
- ___ 5. Plug the fibre cables into the back of the bulkhead, at the bottom of the frame.
- ___ 6. Go to “Attach Power and Bring-Up” on page 116.

SCSI Cabling (Canisters)

If you are not installing any SCSI drives **canisters**, go to “Fibre Cabling (Trays)” on page 114.

- ___ 1. Consult with your customer and review the examples shown in Figure 51 on page 114. You will be attaching necessary SCSI cables and terminators in the following steps.

Attention: Only one HVD drive is allowed on each SCSI bus when attached to an AS/400 host.

- A maximum of four drives is supported on a single SCSI bus. For best performance, one drive per SCSI bus is recommended.

Attention: The following comments apply to Figure 51 on page 114.

- RS/6000 does not support High Availability (HA) on LVD devices.
 - An RS/6000 LVD adapter card does not allow you to remove termination. Using an external Y-cable and terminator will cause multiple termination problems.
 - The RS/6000 does not offer a VHDCI Y-cable.
 - Due to a SCSI-stub maximum-length limitation of 10 cm (3.9 in.), you cannot use an HD68-to-VHDCI interposer cable on a Y-cable.
- ___ 2. If the customer configuration requires more than one drive on each SCSI bus, install the appropriate SCSI drive-to-drive cables.

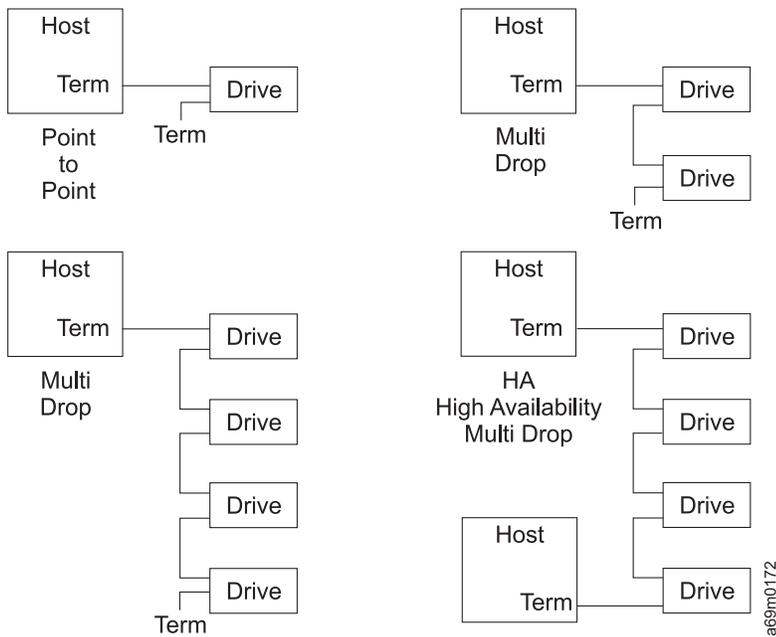


Figure 51. SCSI Interface Cables (Various Layouts)

- ___ 3. Ensure that every SCSI bus (even if the SCSI bus has only a single drive) has a SCSI bus terminator installed at the end of the bus farthest from where the host SCSI cable will connect.

Notes:

- a. Ensure that you use an LVD terminator (34L3926) on an LVD drive and an HVD terminator (09L0877) on an HVD drive.
- b. The two SCSI connectors on the fixed tray are interchangeable, it makes no difference which connector you use for which cable.
- c. If a terminator is not installed at the end of each SCSI bus, failures will occur when the host application tries to use the library.
- ___ 4. Connect the appropriate drive-to-drive SCSI cables. Route each cable through the fixed tray cable guide **6** in Figure 129 on page 616. Secure the cables by using the strain relief clamps that are located on the side wall, to the right of the fixed trays. You will be instructed to connect host SCSI cables in another procedure.

Fibre Cabling (Trays)

Note: If you are not installing any fibre drive **trays**, go to “SCSI Cabling (Trays)” on page 115.

- ___ 1. Locate a 2 m (6.56 ft) fibre drive cable that was shipped with each drive.
- ___ 2. Connect one end of each fibre cable to the fibre connection at the back of a drive tray.
- ___ 3. Carefully route each cable to the left side frame, through the plastic cable clamps. Do not overtighten the clamp. To prevent damage to the fibre cables, do not use the metal SCSI cable clamps to secure the fibre cables.
- ___ 4. Route the fibre cables through the plastic clips at the bottom of the frame. Form a loop with any excess cable.
- ___ 5. Plug the fibre cables into the back of the bulkhead, at the bottom of the frame.
- ___ 6. Return to Table 20 on page 113 and continue to cable other drive types that are not done yet. If you have completed the cabling of the various drive types for this library, go to “Attach Power and Bring-Up” on page 116.

SCSI Cabling (Trays)

Note: If you are not installing any SCSI drive **trays**, go to “Attach Power and Bring-Up” on page 116.

- ___ 1. Consult with your customer and review the examples shown in Figure 52. You will be attaching necessary SCSI cables and terminators in the following steps.

Attention: Only one HVD drive is allowed on each SCSI bus when attached to an AS/400 host.

- A maximum of four drives is supported on a single SCSI bus. For best performance, one drive per SCSI bus is recommended.

Attention: The following comments apply to Figure 52.

- RS/6000 does not support High Availability (HA) on LVD devices.
- An RS/6000 LVD adapter card does not allow you to remove termination. Using an external Y-cable and terminator will cause multiple termination problems.
- The RS/6000 does not offer a VHDCI Y-cable.
- Due to a SCSI-stub maximum-length limitation of 10 cm (3.9 in.), you cannot use an HD68-to-VHDCI interposer cable on a Y-cable.

- ___ 2. If the customer configuration requires more than one drive on each SCSI bus, install the appropriate SCSI drive-to-drive cables.

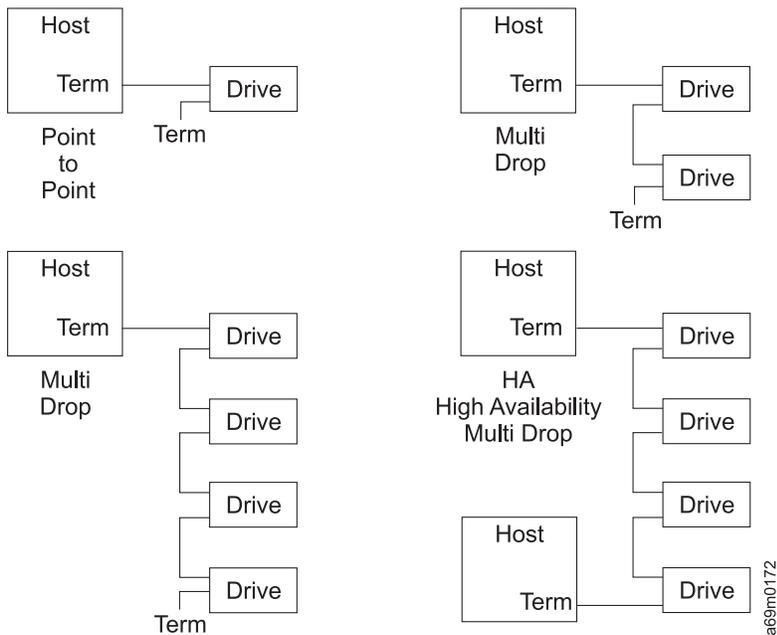


Figure 52. SCSI Interface Cables (Various Layouts)

- ___ 3. Ensure that every SCSI bus (even if the SCSI bus has only a single drive) has a SCSI bus terminator installed at the end of the bus farthest from where the host SCSI cable will connect.

Notes:

- a. Ensure that you use an LVD terminator on an LVD drive and an HVD terminator on an HVD drive.
- b. The two SCSI connectors on the drive tray are interchangeable, it makes no difference which connector you use for which cable.
- c. If a terminator is not installed at the end of each SCSI bus, failures will occur when the host application tries to use the library.

Attach Power and Bring-Up

This procedure will direct you to attach the library power cord to the base frame and any expansion frame with an FCA installed.



Be aware that each frame that contains an FCA is protected by a main line circuit protector (CP) in the FCA. Each FCA must be further protected by a circuit breaker (CB) of the proper rating at the service rail (customer outlet).

- ___ 1. Have the customer switch on the circuit breakers that supply mainline ac voltage to the customer power receptacles.
- ___ 2. Go to Chapter 6, “Safety and Inspection”, on page 159, and perform the power receptacle safety check. If you have already performed a Safety inspection, go to the next step.
- ___ 3. Locate the AC power cords provided with the library.

Notes:

- a. If this is a single frame installation (base frame only), you will have only one power cord.
 - b. If an expansion frame is being installed, and it does NOT contain the optional Frame Control Assembly (FCA), then it will not have a power cord.
- ___ 4. Visually inspect the power cord plugs to ensure they match the customer receptacles. If a plug does not match the receptacle, refer to “Power Cord, Plug, and Receptacle Specifications” on page 417 to determine the correct power cord, and order the cord through your local ordering procedures.

Note: In many countries, the end of the power cord that will connect to the customer receptacle comes without a plug. It is the customer’s responsibility to furnish this plug. The plug that connects to the Frame Control Assembly (FCA) is standard for all installations.
 - ___ 5. Refer to Figure 53 on page 117. For each frame being installed, secure each power cord **1** coming from the customer power source to the FCA with two plastic cable ties **2** (P/N 1159519), using the EIA holes to the left of the FCA **3**. Place one tie near the FCA [about 35.6 cm (14 in.)] below the FCA power receptacle and another near the bottom of the frame [about 20.3 cm (8 in.)], above the access hole **4** in the bottom of the frame.

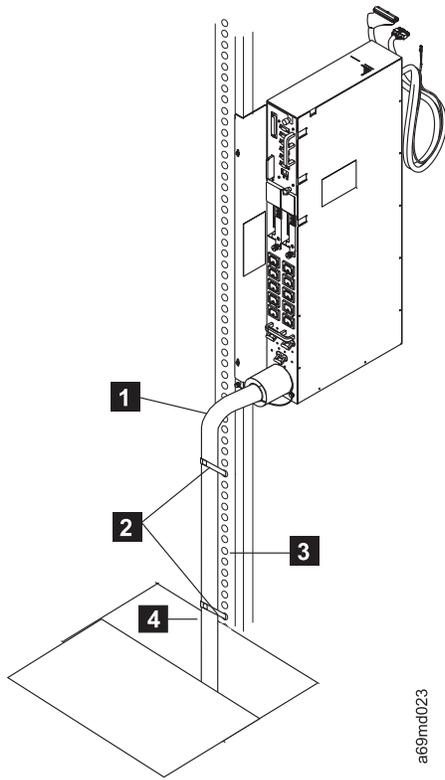


Figure 53. Securing 220V Power Cord

Continue with this procedure on the following page.

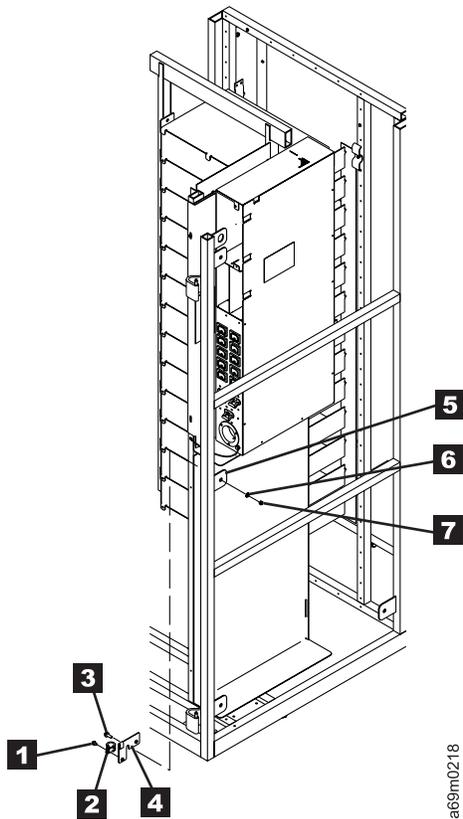


Figure 54. Securing 110V Power Cord

- ___ 6. If you are installing a 110V FCA (FC 1452 with SC 9951) a 110V power cord strain relief bracket must be installed. These parts are provided with the 110V FCA. See Figure 54 for the following steps:
- ___ 7. Install a P-clamp **2** on the 110V power cord. Mount the P-clamp to the bracket **4** with an M6x8 screw **1** . If this is the last frame in your library, hook the bracket over the tab **5** and use the end cover mounting screw to hold it in place.
- ___ 8. If this is NOT the last frame in the library, hook the bracket over the tab **5** and secure it using an M6x14 screw **3** , washer **6** , and nut **7** through the tab as shown.
- ___ 9. Ensure that all the FCA power switches (located on the rear of the FCA just above the power cord receptacle) are off.
- ___ 10. Ensure that the library power switch (located on the front panel, below the operator panel) is OFF (O).
- ___ 11. Connect the AC power cords into the FCA receptacles in the rear of the base and any expansion frames. See Figure 55 on page 119.

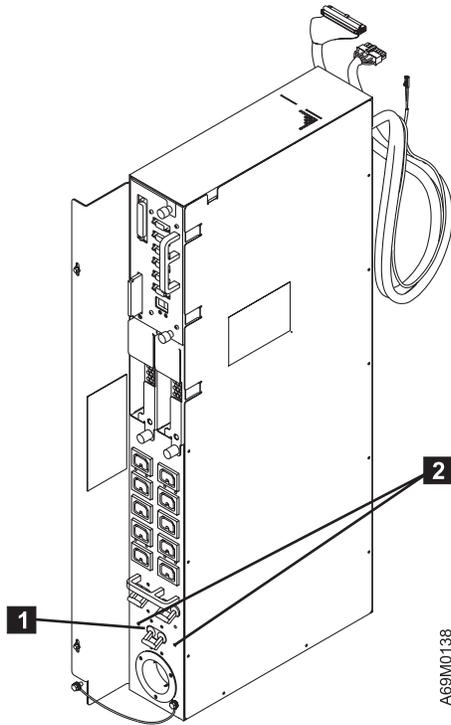


Figure 55. FCA Assembly

- __ 12. Connect the power cords to the customer power receptacles.
- __ 13. Starting at the base frame, switch on all the FCA circuit protectors.
- __ 14. If the power and interframe cables are connected correctly:
 - Each FIC card's green LED EPOV **1** should be On.
 - The wrap active green LED **2** should be On in the base frame and Off in all other frames.
 - The wrap active green LED **3** should be On in the last frame and Off in all other frames. **3**.

Note: If this is a base frame only installation, both wrap active LEDs will be On.

If the green LEDs are not correct, recheck your cabling and the FIC card termination jumpers. If you do not find a problem, go to "Power Isolation MAP" on page 449 to correct the problem, and return here.

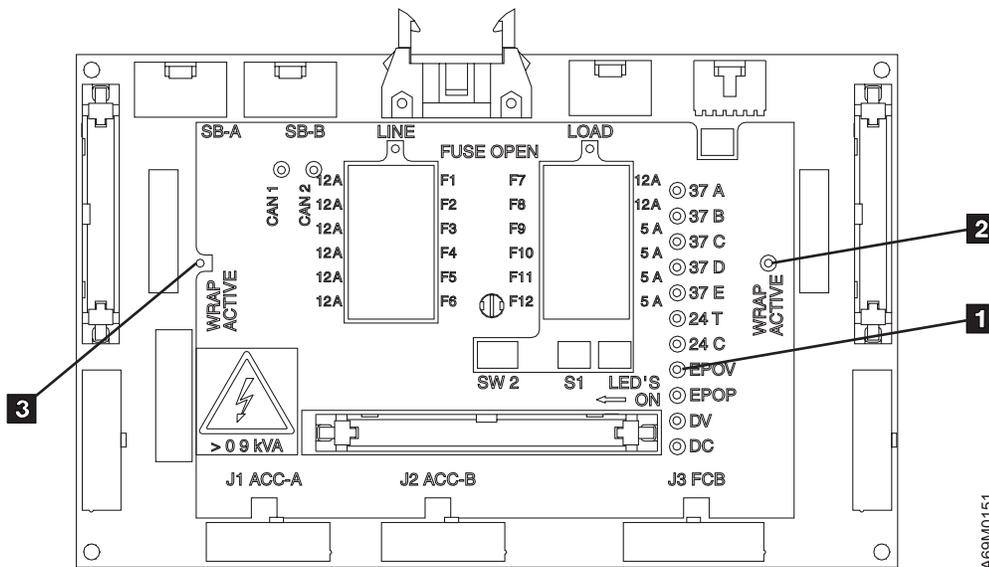


Figure 56. FIC Card Indicator Lights

Power On And Set Up

- ___ 15. Ensure all front doors are closed.
- ___ 16. Power on the library at the front panel power switch.
- ___ 17. The power indicator (located on the library front panel) should be On. If NOT, go to “Power Isolation MAP” on page 449, correct the problem, and return here.
- ___ 18. Near the top of each installed FCA is a Media Changer Pack (MCP). The two-character display on the rear of each MCP should display numbers starting at X'FF and counting down. These numbers have the following meaning:
 - Numbers in the range from X'E0 through X'FF indicate stages in the MCP Power On Self Test (POST). If the two-character display continues to show a number in this range for more than 5 minutes it indicates a problem. If a problem is detected, go to Chapter 2, “Start”, on page 49, locate a match to your symptom, and repair the problem. Return here when the problem is fixed.
 - Numbers in the range from X'20 through X'DF indicate that an error has been detected after MCP POST completed. If you see numbers between X'20 and X'DF, determine the error code. The first 2 numbers of the error code are displayed for about two seconds, then the second two numbers are displayed for about one second, then it repeats. As an example, if X'34 shows for about two seconds, then X'91 shows for about one second, this indicates the error code X'3491. When you have determined the error code, go to Chapter 2, “Start”, on page 49, locate a match to your symptom, and repair the problem. Return here when the problem is fixed.
 - Numbers in the range from X'0E and X'0F indicate that the library is transferring code to one or more node cards. Wait as long as 30 minutes for the code transfer to complete before you continue.
 - Numbers in the range from X'00 through X'16 are used for Frame Counting. This is an indication that MCP POST has completed with no critical errors. The two-character display will alternate between X'00 and X'nn (where nn is the frame number).

Note: The frame number is 01 for the base frame, 02 for the first expansion frame, 03 for the next expansion frame, and so on. As an example, the two-character display on the base frame will display 00, then 01, and then repeat. If the first expansion frame (frame 2) has an FCA, its two-character display will display 00, then 02, and then repeat. If the wrong frame number is indicated, go to Chapter 2, “Start”, on page 49, locate a match to your symptom, and repair the problem. Return here when the problem is fixed.

- ___ 19. When the MCP has completed its POST successfully, it will enable power to the accessor and the front panel display. The two-character displays on the ACC, MDA, and OPC should light up and show progress through the POST procedures. The information on the two-character displays has the same meaning as in the last step.
- ___ 20. When the ACC, MDA, and OPC have completed their POST procedures, the accessor will attempt to rezero (move the accessor to bottom left side of the base frame, the home position). If the rezero is successful, the accessor performs an inventory of any frames that are already configured. As an example, if you are adding an expansion frame to an existing base frame, an inventory of the base frame will take place. If an error is detected, the operator panel will display the error information. Go to Chapter 2, “Start”, on page 49, locate a match to your symptom, and repair the problem. Return here when the problem is fixed.

Capacity Expansion Feature

Notes:

- a. If you are adding one or more expansion frames to an existing library that already has two or more frames, go to **Configuration** below.
- b. If you are installing a base frame with expansion frames, go to step 21.
- c. If you are installing a base frame only, the “Capacity Expansion” feature is optional. Look at the packing list to see if the customer ordered the feature. If the customer ordered the feature, go to step 21. If the customer did not order the feature, go to **Configuration** below.
- ___ 21. Perform the following steps to determine if the “Capacity Expansion” feature is installed on the base frame.
 - a. At the **Activity** screen, press [MENU].
 - b. At the **Main Menu** screen, use the [DOWN] button to locate **Settings**, and press [ENTER].
 - c. At the **Settings** screen, select **Configuration**, and press [ENTER].
 - d. At the **Configuration** screen, select **Display Configuration**, and press [ENTER].
 - e. At the **Physical Configuration** screen, look at the total storage slots.
 - If the number of total storage slots is **more than 160** (example: 227, 253, or 281), the “Capacity Expansion Feature” is already enabled. Go to **Configuration** below.
 - If the number of total storage slots is **less than 160** (example: 87, 113, or 141), go to the next step.
- ___ 22. Look in the ship group or the MES kit for the “Capacity Expansion” feature. Obtain the capacity expansion feature key, then perform the following:
 - a. At the **Activity** screen, press [MENU].
 - b. At the **Main Menu** screen, using the [DOWN] button, select **Service**, and press [ENTER].
 - c. At the **Service** screen, select **Firmware Update**, and press [ENTER].
 - d. At the **Firmware Update** screen, select **Enable Features**, and press [ENTER].
 - e. At the **Enable Features** screen, select **Capacity Expansion Feature**, and press [ENTER].
 - f. Enter the capacity expansion feature key, and press [ENTER].
 - g. Once the capacity expansion feature is enabled, press the [BACK] button to exit this routine.

Configuration

Note: By default, the library subsystem is configured as one logical library. If necessary, the subsystem can be configured as multiple logical libraries. The maximum number of logical libraries is the number of tape drives, although we recommend at least two tape drives per logical library.

For more detailed information about configuration, see the *IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584*.

If the customer wants to define a single logical library, go to step 24. If the customer wants to define multiple logical libraries, ask whether they want to install logical library bar code labels or whether they need to use **Advanced Configuration**.

Note: Most customers will use logical library bar code labels. However, if the customer needs to configure logical libraries in ways that can not be accomplished using logical library bar code labels, then they can use Advanced Configuration. As an example, if the customer needs to define logical libraries that are smaller than one column (or smaller than two columns if the Capacity Expansion Feature is enabled), they must use Advanced Configuration.

- ___ 23. If the customer wants to use logical library bar code labels, open the front doors, install the logical library bar code labels as required by the customer, then close the front doors.

Note: Logical library bar code labels must be positioned at the top of each odd-numbered column and on the bezel of each drive.

- ___ 24. At the **Activity** screen, press [MENU].
- ___ 25. At the **Main Menu** screen, using the [DOWN] button, select **Settings**, and press [ENTER].
- ___ 26. At the **Settings** screen, select **Configuration**, and press [ENTER].
- ___ 27. At the **Configuration** screen, select **Configure Library** or **Advanced Configuration**, and press [ENTER].

Notes:

- a. If the customer used logical library bar code labels, or if this is a single-library configuration, select **Configure Library**.
 - b. If this is a multiple-library configuration and the customer did not use logical library bar code labels, select **Advanced Configuration**.
- ___ 28. Follow the instructions on the screens to complete the configuration.

Note: When the configuration has been completed, the library will be calibrated automatically, if necessary.

- ___ 29. If you have installed any frames containing drives, go to the operator panel.
- a. At the **Activity** screen, press [MENU].
 - b. At the **Main Menu** screen, using the [DOWN] button, select **Settings**, and press [ENTER].
 - c. At the **Settings** screen, select **SCSI/Loop IDs**, and press [ENTER]. Assign SCSI or loop IDs to each drive you installed. Return here when you have finished setting the SCSI or loop IDs.
- ___ 30. Review the packing list to see if you have any of the (FC) feature codes listed below to install. If you have a feature to install go to "Installing Remote Support (Call Home Feature)" on page 123 to determine the feature you will be installing. If you do not have a feature to install go to "Completing and Verifying Installation" on page 135.
- FC 2710, Remote Support Facility (modem and cable)
 - FC 2711, Remote Support Switch
 - FC 2712, Remote Support Attachment (cable)
 - FC 1662, IBM TotalStorage UltraScalable Tape Library Specialist (formerly StorWatch) (See Note below)

Note: **Configuring the IBM TotalStorage Tape Library Specialist is an operator task.** The operator should reference the 3584 Planning and Operator Guide for setup and configuration information.

Installing Remote Support (Call Home Feature)

Optional remote support is available for the 3584 library through its Call Home capability. This feature minimizes the time it takes to repair library problems. It uses a modem connection to report failures that are detected by the library. Whenever the library detects a failure, the Call Home feature sends detailed error information to IBM. The IBM service representative can then prepare an action plan to handle the problem before traveling to the library.

The Call Home feature handles library problems (including those related to loading and unloading the drive); it does not handle drive read/write or server interface problems.

Hardware requirements for the remote support function vary, depending on whether you already have one or more 3584 Tape Libraries. Table 21 indicates the requirements.

Table 21. Requirements for Remote Support (Call Home Feature)

Quantity of L32 Frames	Requirement	Perform this Procedure
1	Remote Support Facility (modem and cable; feature code #2710)	"Remote Support Facility (FC 2710) – Modem Installation and Initialization"
2	Remote Support Switch (feature code #2711)	"Remote Support Facility WTI Switch (FC 2711)" on page 124
3 or more	Remote Support Attachment (cable; feature code #2712)	"Remote Support Attachment (FC 2712)" on page 130

Remote Support Facility (FC 2710) – Modem Installation and Initialization

If Feature Code 2710 (modem and cable) is to be installed on this library, perform the following procedure.

Note: An analog telephone line and an ac power receptacle will be needed to complete the installation.

Note: When installing the modem and cables, ensure that the cables are placed where they do not cause a tripping hazard.

1. Place the modem outside the L32 frame, or where the customer wants to have it installed.
2. Plug the modem power adapter into the modem and an ac power receptacle.

Note: The modem does not receive power from the library.

3. Power off the modem.
4. Connect the modem cable (19P4692) between the 3584 L32 MCP connector **J6** and the modem.

Note: Route the cable through the opening in the bottom of the L32 frame.
5. Connect the modem phone cable (provided with the modem) from the 'line' jack on the back of the modem to the customer's analog phone jack.
6. Power on the modem.
7. Connect the CETool serial cable (19P1061) to the 3584 L32 MCP connector **J1**.
8. If you do NOT already have CETool Version 2.8 (or higher) installed on your CE laptop, see "Downloading and Installing CETool" on page 500.
9. Perform Call Home configuration (see "Call Home Facility Configuration" on page 508. This will configure your modem automatically as part of the procedure.
10. Quit CETool.
11. Using the library front panel display, send a test call home as follows:-
 - a. Select **Main Menu**.
 - b. Select **Service**.
 - c. Select **Tests/Tools**.

- d. Select **Diagnostics**.
 - e. Select **Call Home**.
12. To verify that the test worked, access RETAIN directly or ask your local Support Center to check that a RETAIN PMR was opened. The call home record will show, -URC = ACCA (Call Home Test).
 13. If this is the last feature code for Remote Support you will be installing go to "Completing and Verifying Installation" on page 135. If you have another feature code to install go to Table 21 on page 123 to determine the next feature code to be installed.

Remote Support Facility WTI Switch (FC 2711)

If feature code 2711 is to be installed on this library, perform the following procedure.

1. On the back of the WTI switch, check and set the line voltage to the proper voltage for your user's environment (115 V ac or 230 V ac).
2. Located on the bottom of the WTI switch is an 8-position feature switch. Set the switch so positions 2, 4, 5, 6, and 7 are ON; positions 1, 3, and 8 are OFF.
3. Plug the WTI switch power cord into the switch and into the customer power receptacle.
4. Connect one end of the DB9F to DB9F Null Modem cable (P/N 19P4693) to port 1 on the WTI switch.
5. Connect the other end of the cable to a serial port on your MOST Laptop PC (or any Windows PC).

The following steps start the HyperTerminal program and ensure that it can communicate with the WTI switch.

Note: If you normally use a different terminal emulator program (such as NetTerm), you can use it for this procedure. Only the initial setup to connect to the switch will be different.

6. Start the HyperTerminal program on the PC:
 - a. For Window NT, click on **Start**. Select **Programs, Accessories, HyperTerminal, HyperTerminal**. The HyperTerminal program will start.
 - b. For Window 95/98, click on **Start**. Select **Programs, Accessories, Communications, HyperTerminal**. The HyperTerminal folder displays. Double-click on the Hypertrm icon (hypertrm.exe). The HyperTerminal program will start.
7. If a Location Information screen appears, select your country/region, enter your area code, and click on the **Close** button. This information will not be used in this procedure, but is required for the HyperTerminal program.
8. If a message appears stating that 'You need to install a modem before you can make a connection. Would you like to do this now?,' click on the **No** button.
9. At the Connection Description screen, type **APS16** in the 'name' field, and click on **OK**.
10. At the Connect To screen, set the 'Connect using' field to the Comm port you plugged the WTI switch cable into (example: COM1), and click on **OK**.
11. At the Port Settings screen, set the 'Bits per second' field to 38400, and click on **OK**.
12. Ensure the PC Caps Lock is OFF before continuing.
13. Turn on the WTI switch. The power switch is located on the back of the WTI switch.
14. Reset the WTI switch by pressing and holding for at least three seconds both the **SET** button and **CLEAR** button.

Note: This clears any settings that were previously stored in the WTI switch, and causes the switch to function as specified by the feature switches.

15. Use the keyboard of your PC to issue the Wake Port command. Use this to ensure the WTI switch is ready to receive commands. Follow these steps:
 - a. Type / (forward slash).
 - b. Type **Ctrl+e** (hold down the **CTRL** key, type the letter **e**, then release the **Ctrl** key).
 - c. Press Enter.

16. The HyperTerminal screen should show one of the following prompts.

APS> This indicates a good connection between HyperTerminal and the WTI switch.

ATH Enter Password

This also indicates a good connection between HyperTerminal and the WTI switch, but should only occur if a password was previously set into the WTI switch. Since the previous step reset the switch, this should not occur. If it does occur, enter the password, and the APS> prompt should appear. The default password is 'pfe4u' though in some cases the customer may have specified a different password.

Blank

This indicates that the WTI switch is not communicating with the HyperTerminal program. Check the WTI switch feature switch settings and the cable connections, and reset the WTI switch. If you are unable to establish a connection, possible causes are a problem with the PC serial port, the wrong COM port is specified in HyperTerminal, the WTI switch is defective, or the cable is defective.

17. At the APS> prompt, type **/h**, and press **Enter**. The Command menu displays.

Note: Your PC may default to a different font, so entries may not line up as neatly as is shown in Figure 57. This will not cause problems performing the procedure.

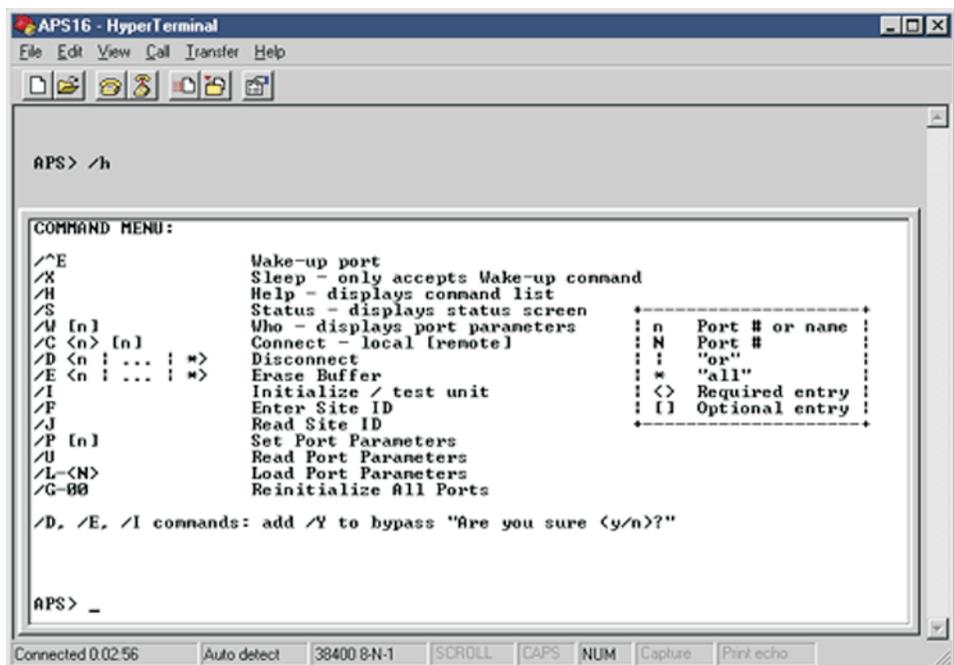


Figure 57. WTI Command Menu (FC2711)

18. At the APS> prompt, type **/s**, and press **Enter**. The System Status screen displays.

24. Type **71**, and press **Enter** to select the RESET STRING option.
25. Press the spacebar once, then press **Enter** to clear the RESET STRING.
26. Type **72**, and press **Enter** to select the INIT STRING option.
27. Press the spacebar once, then press **Enter** to clear the INIT STRING.
28. Type **73**, and press **Enter** to select the HANG-UP STRING option.
29. Type **ATH0** (0 is the number zero), then press **Enter** to set the HANG-UP STRING to ATH0.
30. Type **2**, and press **Enter** to select the PASSWORD option.
31. Type **pfe4u**, and press **Enter** to set the PASSWORD to 'pfe4u.'

Note: If the customer requests a specific password, enter the customer's password in place of 'pfe4u.'

32. Verify that items 1 and 7 are set to 'Modem', item 2 is set to 'pfe4u' (or the customer password), items 71 and 72 are set to '(undefined)', and item 73 is set to 'ATH0.' If any of these items is not set correctly, set it again before you continue. The screen should look like Figure 60.

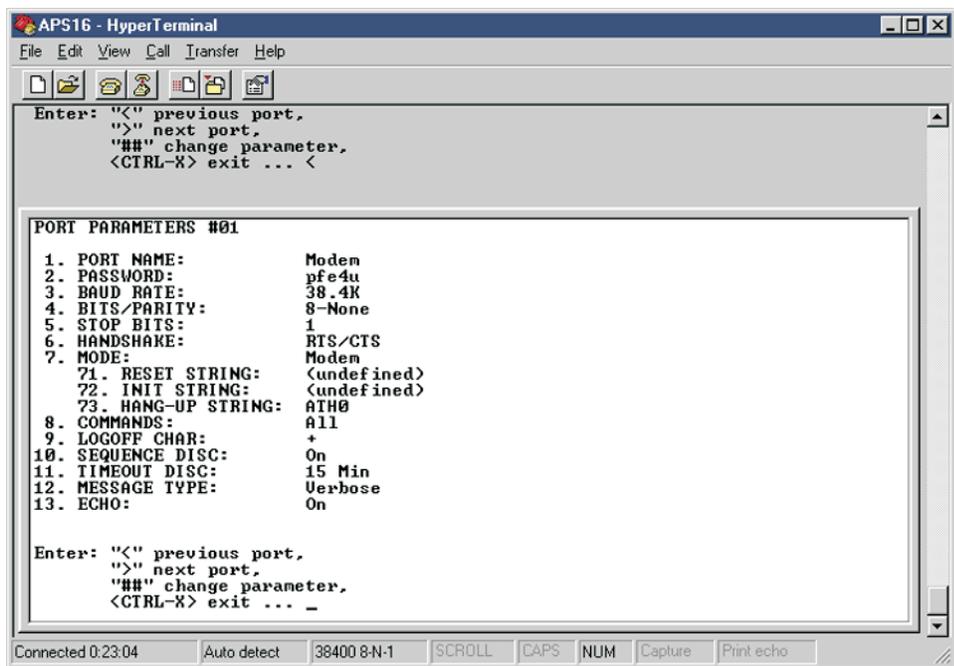


Figure 60. WTI Port Parameters #01 Screen (FC2711)

33. Press **Ctrl+X** to exit the Port Parameters screen.

Note: If prompted to enter the password, type **pfe4u** (or the customer password), and press **Enter**.
The following steps setup switch ports 2 - 16 for connection to the IBM 3584 Ultrascalable Tape Library.

34. At the APS> prompt, type **/p n** (where n is the port number where a 3584 will be connected), and press **Enter** (example: /p 2). The Port Parameters screen displays.

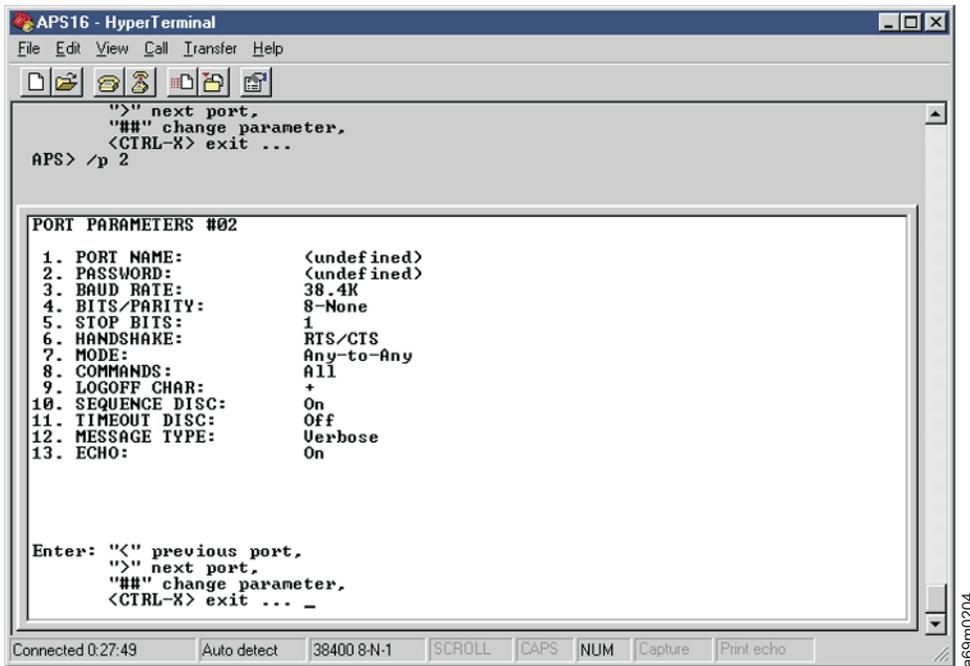


Figure 61. WTI Port Parameters #02 Screen (FC2711)

35. Type **1**, and press **Enter** to select the PORT NAME option.
36. Type **IBM3584A** (or any other descriptive name the customer wants to call the first library - it must start with an alpha character, contain no blanks, and be no more than 8 characters long), and press **Enter**.
37. Press **Ctrl+X** to exit the Port Parameters screen.

Note: Leave all Port Parameters, except for the Port Name, set to the defaults.

38. Repeat steps 34 on page 127 through 37, selecting the next port number, until all ports that will be connected to 3584 libraries have been named.
39. Type **/s**, and press **Enter** to display the System Status screen.
40. Verify that port 1 is named Modem, and any port from 2 - 16 that will be connected to a 3584 library is named with a unique descriptive name. If any port shows the wrong name, correct it before you continue. The screen should now appear as shown in 34 on page 127.

Note:

- There could be more libraries attached.
- Customer descriptive names may be used in place of the library names in the following screen.

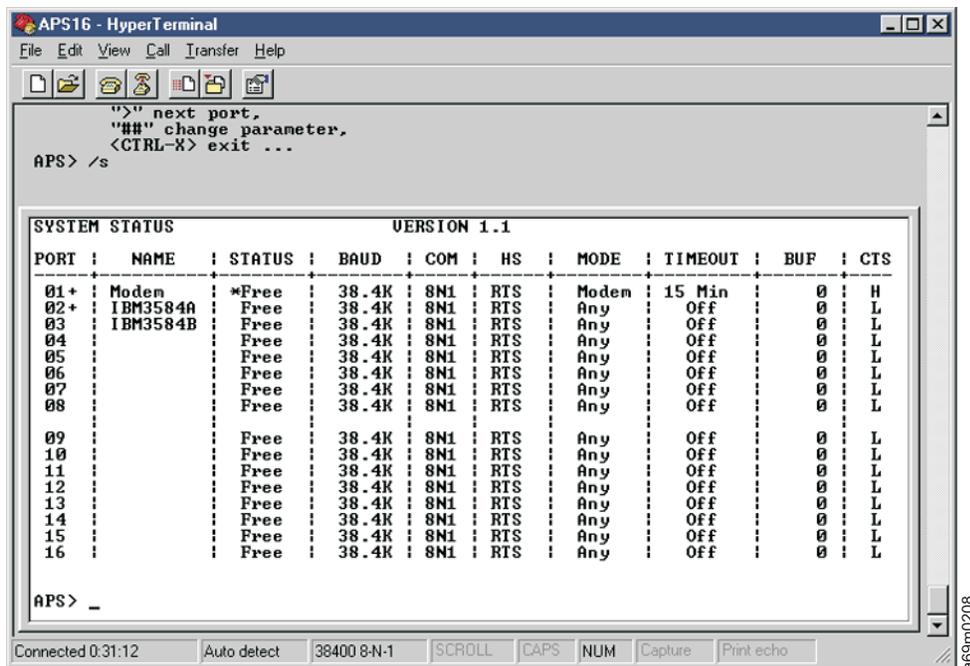


Figure 62. WTI System Status Screen - Second View (FC2711). Includes 'Status Name.'

41. Type **/x**, and press **Enter**. The word Asleep will be displayed, indicating that the switch is now in sleep mode.
42. Turn off the WTI switch.
43. Close the HyperTerminal program. When asked whether you want to disconnect now, click on **Yes**. When asked whether you want to save session APS16, click on **No**.

The following steps connect the WTI switch to the modem and to each 3584 library.

44. Remove the cable from switch port 1.
45. Acquire the DB9F-to-DB25M modem cable (P/N 19P4692). Attach the DB9F-end of the modem cable to port 1 of the WTI switch.
46. Attach the DB25M-end of the modem cable (P/N 19P4692) to the modem.
47. Locate a DB9F-to-DB9F Null Modem cable (P/N 19P4693) for each 3584 library that will be connected to the WTI switch.
48. Connect the Null Modem cable to port 2 of the WTI switch and to the J6 connector on the MCP in frame 1 of the first library (called IBM3584A, in the example).
49. Repeat the previous step for each library until all 3584 libraries have been connected to the designated ports on the switch.
50. Ensure that the modem is connected to the phone line and that the modem is powered on.
51. Ensure that the WTI switch is powered on.

The following steps configure the 3584 to call home through the WTI switch.

52. Use CETool version 2.7 or higher to set the Remote Support Configuration. This must be done on each 3584 library that is connected to the WTI switch. See "Call Home Facility Configuration" on page 508.

Note: Ensure that the WTI Switch field is checked, and that the Switch Port Number field is set to the number of the WTI switch port connected to the library.

53. Perform a Call Home test at the library before you proceed to configure the next library. At the library front panel, press **MENU**, then select **SERVICE, TESTS/TOOLS, DIAGNOSTICS, CALL HOME**.

54. Verify that RETAIN received the Call Home with URC ACCA from the library. If no Call Home was received, verify that all of the Call Home configuration information was entered correctly, that the WTI switch and modem are powered on, that all cables are securely connected, and that the phone line is active.
55. Repeat steps 52 on page 129 through 54 until all 3584 libraries connected to the WTI switch have been configured and have called home successfully.
56. If this is the last feature code for Remote Support you will be installing go to “Completing and Verifying Installation” on page 135. If you have another feature code to install go to Table 21 on page 123 to determine the next feature code to be installed.

Remote Support Attachment (FC 2712)

This procedure helps you setup the remote support cable for the WTI switch.

1. Unplug the modem cable from port 1 of the WTI switch.
2. Connect one end of the DB9F to DB9F Null Modem cable (P/N 19P4693) to port 1 on the WTI switch.
3. Connect the other end of the cable to a serial port on your MOST Laptop PC (or any Windows PC).

The following steps start the HyperTerminal program on the PC, and ensure that it can communicate with the WTI switch.

Note: If you normally use a different terminal emulator program (such as NetTerm), you can use it for this procedure. Only the initial setup to connect to the switch will be different.

4. Start the HyperTerminal program on the PC:
 - For Window NT, click on **Start**. Select **Programs, Accessories, HyperTerminal, HyperTerminal**. The HyperTerminal program will start.
 - For Window 95/98, click on **Start**. Select **Programs, Accessories, Communications, HyperTerminal**. The HyperTerminal folder displays. Double-click on the Hypertrm icon (hypertrm.exe). The HyperTerminal program will start.
5. At the Connection Description screen, type **APS16** in the 'name' field, and click on **OK**.
6. At the Connect To screen, set the 'Connect using' field to the Comm port you plugged the WTI switch cable into (example: COM1), and click on **OK**.
7. At the Port Settings screen, set the 'Bits per second' field to 38400, and click on **OK**.
8. Ensure the PC Caps Lock is OFF before continuing.
9. Turn the WTI switch off, then on. The power switch is located on the back of the WTI switch. The HyperTerminal screen should show one of the following prompts:

ATH0 Enter Password

This also indicates a good connection between HyperTerminal and the WTI switch, but also indicates that a password was previously set into the WTI switch. Enter the password, and the APS> prompt should appear. The default password is 'pfe4u' though in some cases the customer may have specified a different password.

APS> This can indicate both:

- That a good connection exists between HyperTerminal and the WTI switch.
- No password was previously set into the WTI switch. If a password should have been set, refer to the WTI switch configuration procedure, and set a password on modem port 1 using the Port Settings command (**/p 1**).

Blank

This indicates that the WTI switch is not communicating with the HyperTerminal program. Check the WTI switch feature switch settings, the cable connections, and the HyperTerminal COM settings. Turn the WTI switch off, then on.

Note: If you are unable to correct the problem, you can reset the WTI switch by pressing and holding for at least 3 seconds both the SET button and the CLEAR button . Release the CLEAR

button first, then release the SET button. This clears any settings previously stored in the WTI switch and causes the switch to function as specified by the feature switches.

If you do this, you **MUST** locate the WTI switch configuration procedure (either in the Feature Code 2711 installation instructions, or in the MI) and reconfigure the WTI switch. If you reconfigure the WTI switch according to the Feature Code 2711 installation instructions, you will not need to return to the 2711 instructions, but should still consider feature code 2711 installed.

If you are still unable to establish a connection, the possible causes are a problem with the PC serial port, a defective WTI switch, or a defective cable.

- At the APS> prompt, type **/h**, and press **Enter**. The Command menu displays.

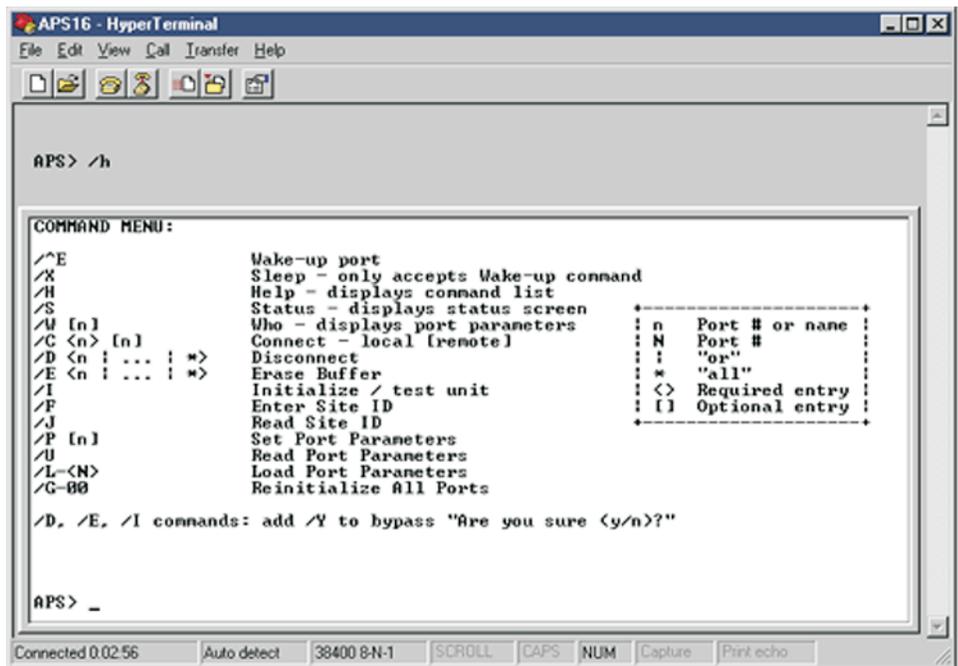


Figure 63. WTI Command Menu (FC2712)

- At the APS> prompt, type **/s**, and press **Enter**. The System Status screen displays.

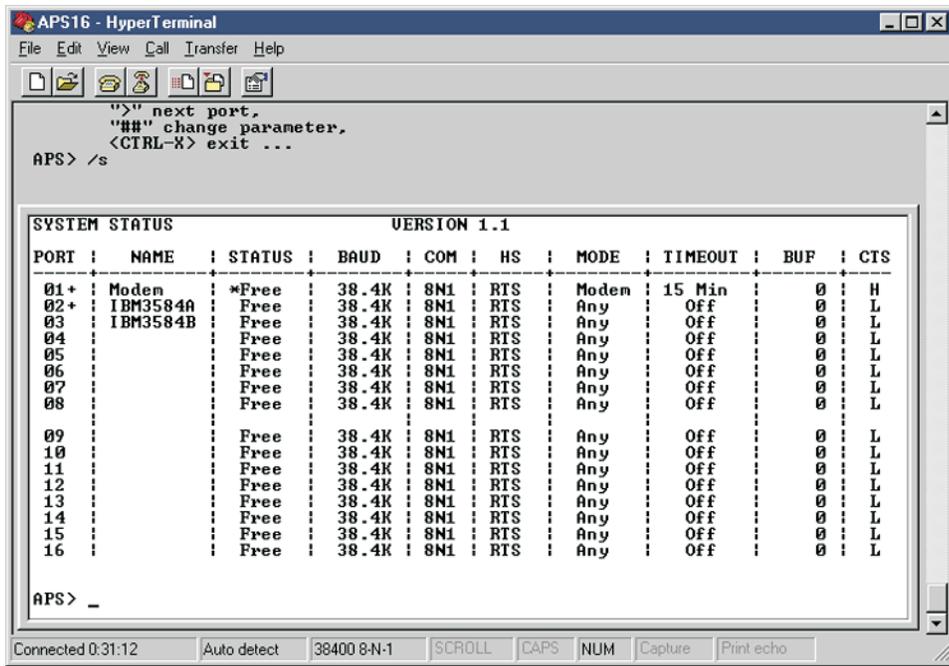


Figure 64. WTI System Status Screen (FC2712)

Note: Figure 64 assumes three 3584 libraries are already connected to the WTI switch. The number of ports that are in use and the port name of ports 2 - 16 may be different in your environment.

The following steps setup one additional switch port for connection to the IBM 3584 Ultrascable Tape Library.

- At the APS> prompt, type /p n (where n is the next unused port number where a 3584 will be connected), and press **Enter** (example: /p 4). The Port Parameters screen displays.

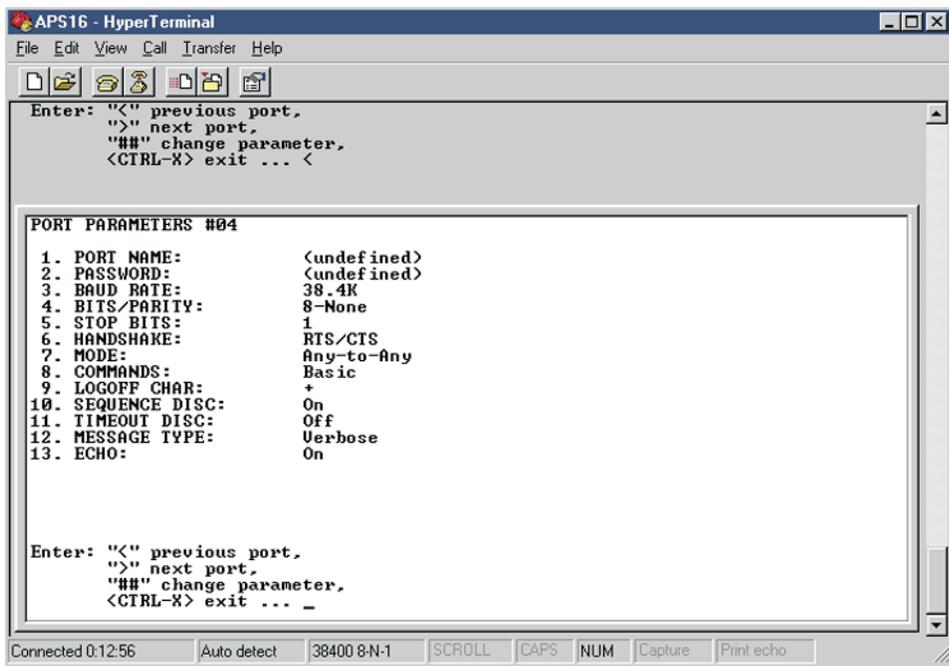


Figure 65. WTI Port Parameters Screen (FC2712)

13. Type **1**, and press **Enter** to select the PORT NAME option.
14. Type **IBM3584C** (or any other descriptive name the customer wants to call the first library; it must start with an alpha character, contain no blanks, and be no more than 8 characters long), and press **Enter**.
15. Press Ctrl+X to exit the Port Parameters screen.

Note: Leave all Port Parameters except for Port Name set to the defaults.

16. If you are adding more than one library to the WTI switch, repeat steps 12 on page 132 through 15, selecting the next port number until all ports that will be connected to 3584 libraries have been named.
17. Type **/s** and press **Enter** to display the System Status screen.
18. Verify that port 1 is named Modem, and any port from 2 - 16 that will be connected to a 3584 library is named with a unique descriptive name. If any port shows the wrong name, correct it before you continue. The screen should now be as follows (customer descriptive names may be used in place of the library names in the following screen):

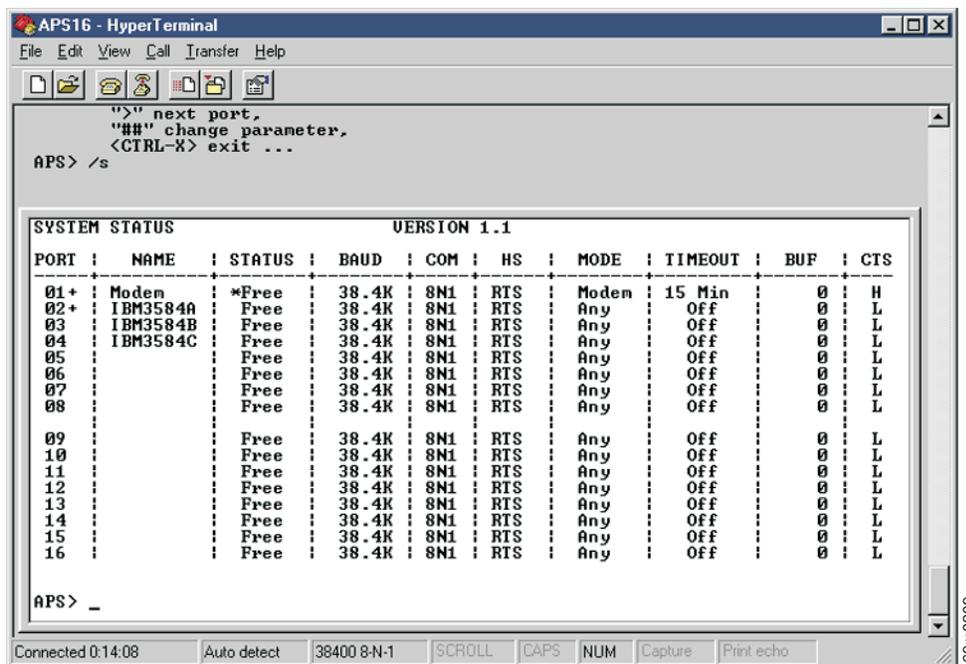


Figure 66. WTI System Status Screen-Updated (FC2712)

19. Type **/x**, and press **Enter**. The word Asleep displays, indicating that the switch is now in sleep mode.
20. Turn off the WTI switch.
21. Close the HyperTerminal program. When you are asked whether you want to disconnect now, click on **Yes**. When you are asked whether you want to save session APS16, click on **No**.

The following steps connect the WTI switch to the modem and to each 3584 library.

22. Remove the cable from switch port 1.
23. Reconnect the modem cable (disconnected in step 1 of this procedure) to port 1 of the WTI switch.
24. Locate a DB9F to DB9F Null Modem cable (P/N 19P4693) for each 3584 library that is being added to the WTI switch.
25. Connect the Null Modem cable to the next port of the WTI switch and to the J6 connector on the MCP in frame 1 of the first library (in the example, the library called IBM3584C is connected to port 4 of the WTI switch).

26. Repeat the previous step for each library until all 3584 libraries have been connected to the designated ports on the switch.
27. Ensure that the WTI switch is powered on.

The following steps configure the 3584 to call home through the WTI switch.

28. Use CETool version 2.7 or higher to set the Remote Support Configuration. This must be done on each 3584 library that is connected to the WTI switch. See “Call Home Facility Configuration” on page 508.

Note: Ensure that the WTI Switch field is checked, and that the Switch Port Number field is set to the number of the WTI switch port connected to the library.

29. Perform a Call Home test at the library before you proceed to configure the next library. At the library front panel, press **MENU**, then select **SERVICE, TESTS/TOOLS, DIAGNOSTICS, CALL HOME**.
30. Verify that RETAIN received the Call Home with URC ACCA from the library. If no Call Home was received, verify that all of the Call Home configuration information was entered correctly, that the WTI switch and modem are powered on, that all cables are securely connected, and that the phone line is active.
31. Repeat steps 28 through 30 until all 3584 libraries connected to the WTI switch have been configured and have called home successfully.
32. Go to “Completing and Verifying Installation” on page 135

Completing and Verifying Installation

- ___ 1. Open and close all the front doors one at a time to verify correct operation of each door and interlock switch. When you open a front door, the operator panel will show DOOR OPEN. When all front doors are closed, the operator panel will show DOOR CLOSED and an inventory will be performed.
- ___ 2. Verify that you have installed the LTO CE diagnostic cartridge in the base frame: column 1, row 1 (see Figure 4 on page 18). If you are installing one or more D42 expansion frames, verify that you have installed the DLT-8000 diagnostic cartridge into the first slot (C01, R01) in the first expansion frame.
- ___ 3. Set Date and Time:
 - a. At the **Activity** screen, press [MENU].
 - b. At the **Main Menu** screen, select **Settings**, and press [ENTER].
 - c. At the **Settings** screen, select **Date/Time**, and press [ENTER].
 - d. Follow the instructions on the screen.
- ___ 4. Run Library Verify (see “Library Verify Test” on page 507). If a failure occurs, go to “Working with a Problem” on page 51 to repair the problem. Return here when the problem is fixed.
- ___ 5. Load the cleaner cartridge into the library (see “Cleaning the Tape Drive” in the *IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584, GA32-0408*).
- ___ 6. Set automatic clean to ON (see “Cleaning the Tape Drive” in the *IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584, GA32-0408*).
- ___ 7. If you installed SCSI drives, attach the external (drive to host) SCSI cables to the drives and host SCSI adapters. If connecting to a fixed tray (used with drive canisters), route the cables through the fixed tray cable guide **6** in (see Figure 123 on page 609). Secure the cables by using the strain relief clamps that are located on the side wall.

Notes:

- a. The length of any SCSI bus (including any drive-to-drive SCSI cables) must not exceed the maximum lengths specified in Table 22.
- b. Cable labels are provided. It is recommended that you label the drive and host end of each external cable.

Table 22. SCSI Cable Length Maximums

SCSI Bus Type	Maximum Length
SCSI HVD	25 Meters (82.02 ft)
SCSI LVD Point-to-Point (one host adapter and one drive)	25 Meters (82.02 ft)
SCSI LVD Multidrop	12 Meters (39.37 ft)

Notes:

- a. In most configurations, the host SCSI adapter is at the end of the SCSI bus. If so, ensure that the host SCSI adapter is terminated.
- b. If you have made a change to the configuration of the library subsystem, and if the library is connected to a SAN, it may be necessary to reset various components of the SAN so they will recognize the changes. As an example, a 2108 SAN Data Gateway may need to be reset or IPL'd to recognize that new devices have been added.
- ___ 8. If you installed Fibre drives, attach the external Fibre Channel cables to the Fibre Channel bulkhead. Consult with the customer to determine where to connect the host end of each Fibre Channel cable.

Note: Cable labels are provided. It is recommended that you label each end of each external cable.

- ___ 9. Reinstall any access panels or covers removed during installation.

- ___ 10. Give the front door keys to the customer and inform the customer that the tape library is ready to be configured to the host system and is available for use.
- ___ 11. Give one copy of the *IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584* to the customer.
- ___ 12. **Complete a separate install (service code 20, PLAN/INSTL/RR code 2) for each library frame that you installed. If you installed any drives, they are NOT reported as separate installations unless they were provided in MES Kits. The drive are a feature of the library and are not separate machines.** Any time spent repairing the library or drives during the installation should be charged to the appropriate frame serial number.

Note: Time associated with attachment, configuration, or service of devices not provided with the library must not be charged against the 3584 library.

- ___ 13. Give the shipping material to the customer to use for future relocations.
- ___ 14. Store this copy of the Maintenance Information, one copy of the *IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584*, and other ship group items that may be needed on future service calls, in the storage bin on the inside of the base frame rear door.

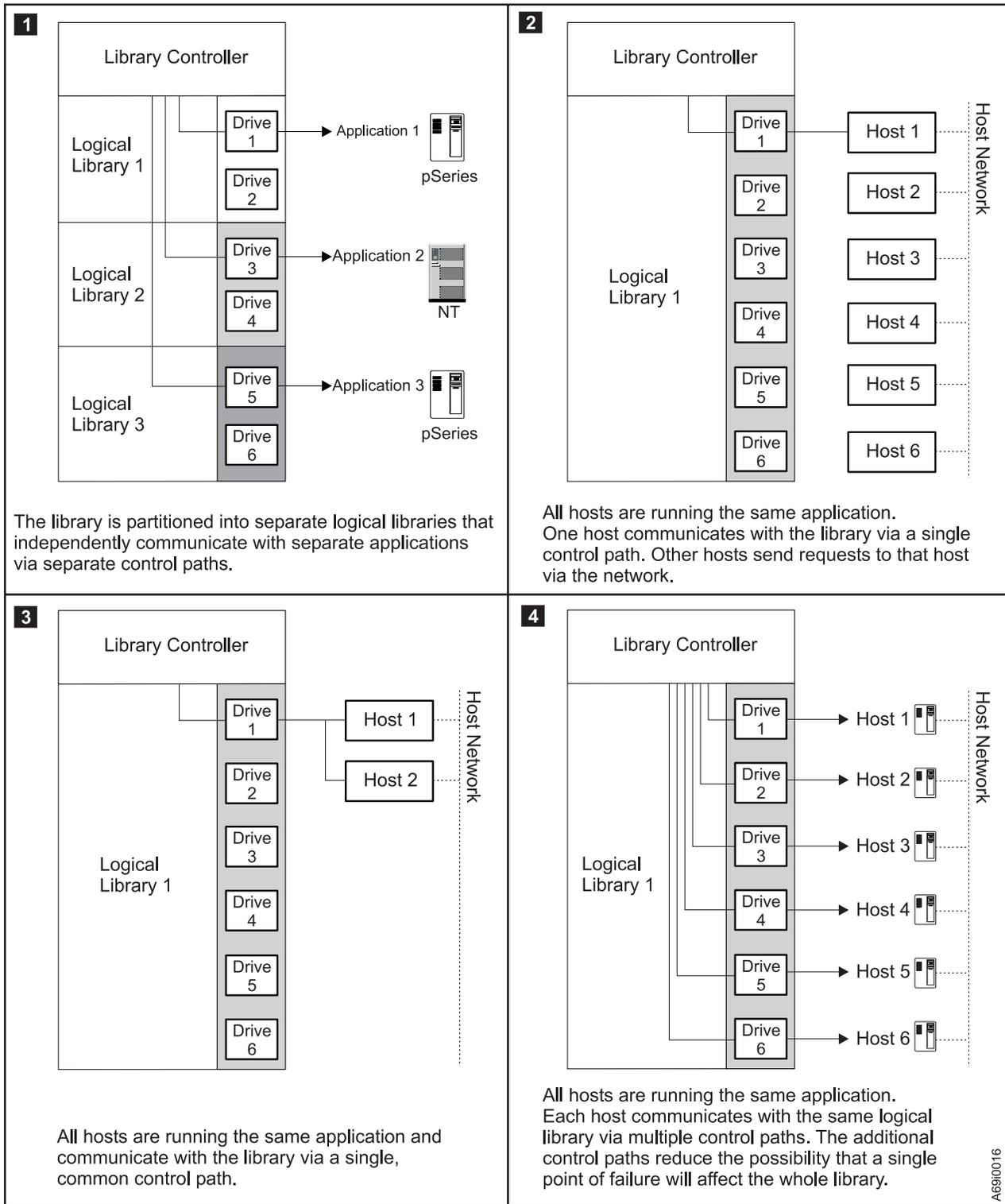


Figure 67. Cabling Examples

Manufacturing Problems? Call Quality Hotline

IBM needs your timely feedback on the IBM TotalStorage UltraScalable Tape Library 3584 products (new installations, EC activities, or MES changes). This will allow us to quickly correct any quality problem and implement any necessary changes for future shipments.

HOTLINE telephone numbers

U.S. and Canada - Teline **8-648-8459 or 1-800-442-6773**

Note: If using the toll-free number, select option 1: Tape Quality Hotline.

| For EMEA countries you have to address quality problems and missing parts with the 'Missing Parts Form'
| to CIM-Copenhagen (CIM = Central Inventory Management). For details, contact your local support who
| will provide you the 'Missing Parts Form'.

WT - Teline **8-648-8459 or 1-770-858-8459**

Use this HOTLINE immediately if you have any quality problems, questions, or concerns during installation, EC activity, or MES change with a 3584 tape library.

Have the following information available:

- Your name and telephone number
- Machine type, model, and serial number
- Branch office, territory, and area (if IBM CE)
- Customer name
- Customer telephone number
- Activity (new installation, EC, or MES)
- Description of the problem
- Other pertinent information:
 - Incident number
 - EC number
 - MES number
 - FCS number
 - Bill of material number

This HOTLINE will be answered Monday through Friday (except holidays) from 7:00 a.m. to 4:00 p.m., PST. At all other times, leave a detailed message for action during the next work day.

This HOTLINE is an addition to existing reporting and service procedures, but it does not replace them.

Thank you,

IBM TotalStorage UltraScalable Tape Library 3584 Manufacturing

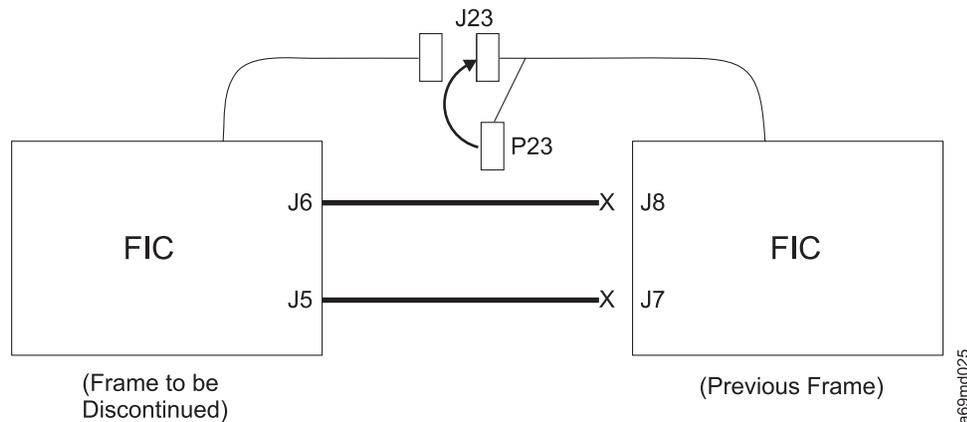
Discontinue or Relocate a Library

- ___ 1. Early libraries have a Drive Removal label that is mounted inside the rear of the library, near the drive tray mounting shelves. Visually check for the following label: "ATTENTION: The tape drive assemblies MUST be removed from this frame before any relocation." In the following steps you will need to know if the Drive Removal label is present in the frame that is being removed.
- ___ 2. Verify the ordering of correct packing materials and instructions. For more information, go to: <http://rtsatl.ibm.com/Homepage.nsf/FramelIndex/packingsealing.html>

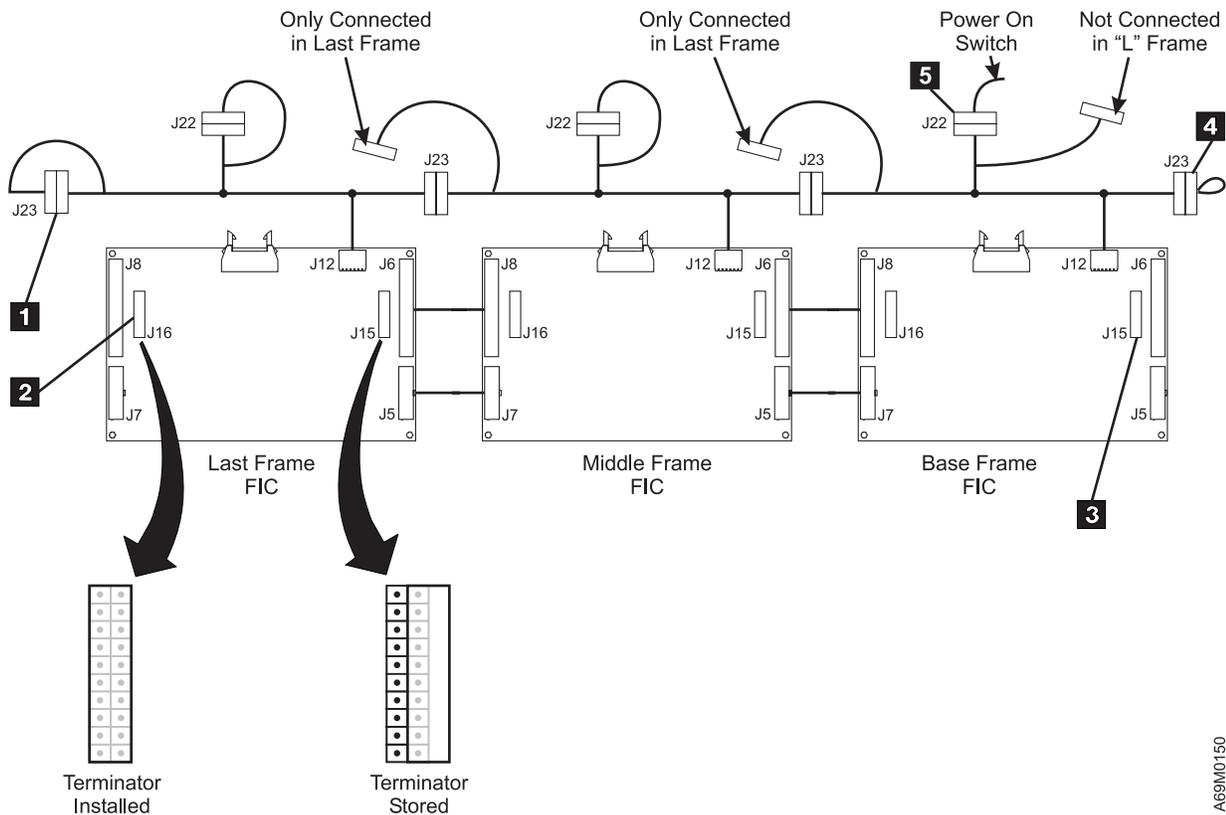
Notes:

- a. Ensure the relocation kit and packing materials are on site before beginning to discontinue or pack a 3584 library.
- b. The library requires special packing material. For instructions and part numbers, see "Relocation Kit" in Chapter 14, "Parts Catalog", on page 697. If the Drive Removal label is present, order extra packing materials for the drive tray assemblies.
- ___ 3. Run Library Verify (see "Library Verify Test" on page 507). If Library Verify fails, go to "Working with a Problem" on page 51 to repair the problem. Return here when the problem is fixed.
- ___ 4. Power off (O) the library.
- ___ 5. Open the front door.
- ___ 6. Ask the customer to remove all tape cartridges from the library frames to be discontinued.
- ___ 7. Manually move the cartridge accessor into the base frame.
- ___ 8. Power off (O) customer power to all FCAs.
- ___ 9. Disconnect the power cord from the frames to be discontinued.
- ___ 10. Disconnect the controller SCSI cables from the frames to be discontinued.
- ___ 11. If the Drive Removal label is present in a frame to be discontinued, remove all drive tray assemblies from that frame.
- | ___ 12. See Figure 68 for "Previous Frame" activities. Disconnect the interframe EPO cable at J23 and plug the tethered EPO jumper (P23) into J23 as shown. Disconnect J7 and J8 on the FIC. Now put all three cable ends into the frame that is being discontinued.

| **Note:** If the library is NOT going to be discontinued, ensure that the terminators are reinstalled in the previous frame as shown in Figure 69 on page 140. If the library IS going to be discontinued, ensure that the terminators are reinstalled in the L32 base frame.



| Figure 68. FIC Connections



AG9M0150

Figure 69. FIC Card Interface Cables Schematic

- ___ 13. If you are discontinuing an L32 base frame only (a base frame with no expansion frames), go to step 27 on page 141.
 - ___ 14. Refer to Figure 33 on page 91. Loosen the screws that secure the upper X-axis guide rail **2**. Slide the rail to the right.
 - ___ 15. Refer to Figure 35 on page 95. Remove the cable trough cover.
 - ___ 16. Refer to Figure 33 on page 91 to remove the frame-to-frame separators. On early-style frames, remove the screws **10** holding the frame separator to the previous frame. On later-style frames, remove the screws **12** holding the frame separator **11**.
- Note:** The frame separator will be left attached to the expansion frame.
- ___ 17. Remove the right bumper **8**. This bumper will be reinstalled on the base frame or the last expansion frame in the library.
 - ___ 18. Remove the M8 bolts **7** that hold the frames together. You will find two bolts at the bottom and possibly two bolts at the top.
 - ___ 19. Refer to Figure 34 on page 94. Loosen the X-axis rail holding screws **3** and the X-axis rail long T-nut setscrews **1**. Slide the X-axis rail **4** to the right.
 - ___ 20. Refer to Figure 37 on page 96. Remove the screw **2** from the three frame-to-frame attachment hardware brackets. Leave the brackets attached to the expansion frame.
 - ___ 21. Raise the two left side leveling pads on the frame to be discontinued. Insert a frame skate under each leveling pad. Lower the leveling pads until the pads are on the skates (see item **6** in Figure 31 on page 86). Turn the leveling pads an additional 90° ($\frac{1}{4}$ turn).
 - ___ 22. Raise the leveling pads (all the way up) on the right side of the frame to be discontinued.
 - ___ 23. Move the frame away from the preceding frame.
 - ___ 24. Raise the leveling pads (all the way up) on the left side of the frame.

- ___ 25. Pick up the frame skates and store them in a safe place. DO NOT leave the skates on the floor where someone could step on them.
- ___ 26. Return to step 14 on page 140 for the next expansion frame. If all expansion frames have been disconnected, continue with the next step.
- ___ 27. If the base frame is to be discontinued, continue with the next step. If the base frame is NOT going to be discontinued, go to step 29.
- ___ 28. Raise the four leveling pads on the base frame all the way up.
- ___ 29. Using the packing instructions, pack the tape library frames for shipment.
- ___ 30. Verify that the ship group items are packed with the correct machine.
- ___ 31. Complete a separate discontinuance (service code 20, PLAN/INSTL/RR code 3 or 4) for each library frame that you discontinued. The drives are a feature of the library and are not separate machines.

Feature Codes

A customer who orders a tape library uses feature codes to:

- Specify plant or field installation of tape drives
- Specify host configurations
- Identify the specific attachment type
- Order open systems device drivers

Depending on the model, different features are available for the tape library. Table 23 lists the feature codes for Model L32 and Table 24 lists the feature codes for Model D32 and D42.

Feature Codes for Base Frame (Model L32)

Table 23. Model L32 Feature Codes

Feature Code	Description
1454	LTO Ultrium-1 (L1) Low-Voltage Differential (LVD) drive canister
1455	LTO Ultrium-1 (L1) High-Voltage Differential (HVD) drive canister
1456	LTO Ultrium-1 (L1) fibre channel drive canister (FC-AL)
1458	DLT LVD drive (field installed)
1459	DLT HVD drive (field installed)
1462	Fibre channel patch panel
1464	LTO Ultrium-1 (L1) SCSI (LVD) drive in a tray (Withdrawn)
1465	LTO Ultrium-1 (L1) SCSI (HVD) drive in a tray (Withdrawn)
1466	LTO Ultrium-1 (L1) Fibre drive in a tray (Withdrawn)
1474	LTO Ultrium-2 (L2) SCSI (LVD) drive in a tray
1475	LTO Ultrium-2 (L2) SCSI (HVD) drive in a tray
1476	LTO Ultrium-2 (L2) Fibre drive in a tray
1603	Capacity expansion feature (field installed)
1605	LVD control port (either first or additional installed)
1606	HVD control port (either first or additional installed)
1607	Mixed media/D-frame support (Withdrawn)
1653	Capacity expansion feature (factory installed)
1657	20 additional LTO I/O slots
1660	Ethernet 10/100 support (field installed)
1662	IBM TotalStorage UltraScalable Tape Library Specialist feature (formerly StorWatch Specialist)
1663	Drive removal
1664	Patch panel removal (Withdrawn)
1665	Drive Reinstall (see note 2)
1666	Drive install, 1663/1455 (Withdrawn — See FC 1665)
1667	Drive install, 1663/1456 (Withdrawn — See FC 1665)
1668	DLT LVD drive (install of customer FC 1458)
1669	DLT HVD drive (install of customer FC 1459)
1670	Patch Panel install (Withdrawn) (see note 3)
1671	LTO Ultrium-1 (L1) SCSI (LVD) drive (install of customer FC 1464)

Table 23. Model L32 Feature Codes (continued)

Feature Code	Description
1672	LTO Ultrium-1 (L1) SCSI (HVD) tray (install of customer FC 1465)
1673	LTO Ultrium-1 (L1) Fibre tray (install of customer FC 1466)
1680	Control Path Failover
1802	1 to 2 Frame Track Cable
1806	3 to 6 Frame Track Cable
1814	7 to 14 Frame Track Cable
1816	8 to 16 Frame Track Cable
1901	Dual AC Line Cords (110V & 220V)
1902	Add Redundant 37V PS
2710	Remote Support Facility (modem and cable, see note 4)
2711	Remote Support switch (see note 4)
2712	Remote Support attachment (cable, see note 4)
2895	Interposer, IBM iSeries or AS/400 server
5096	Interposer SC-LC fibre
5098	Inline HVD SCSI terminator
5099	VHDCI-to-HD68 cable/interposer
5305	HD68-to-HD68 SCSI cable, 5 m (16.4 ft)
5310	HD68-to-HD68 SCSI cable, 10 m (32.8 ft)
5318	HD68-to-HD68 SCSI cable, 18 m (59 ft)
5325	HD68-to-HD68 SCSI cable, 25 m (82 ft)
6004	LC-LC Fibre cable, 5 m (16.4 ft)
6013	LC-LC Fibre cable, 13 m (42.6 ft)
6025	LC-LC Fibre cable, 25 m (82 ft)
6061	LC-LC Fibre cable, 61 m (200 ft)
5604	VHDCI (0.8mm)-to-HD68 SCSI cable, 4.5 m (14.8 ft)
5610	VHDCI (0.8mm)-to-HD68 SCSI cable, 10 m (32.8 ft)
5620	VHDCI (0.8mm)-to-HD68 SCSI cable, 20 m (65.6 ft)
5625	VHDCI (0.8mm)-to-HD68 SCSI cable, 25 m (82 ft)
5704	VHDCI-to-VHDCI SCSI cable, 4.5 m (14.8 ft)
5710	VHDCI-to-VHDCI SCSI cable, 10 m (33 ft)
5720	VHDCI-to-VHDCI SCSI cable, 20 m (66 ft)
5725	VHDCI-to-VHDCI SCSI cable, 25 m (82 ft)
5805	SC-SC Fibre cable, 5 m (16.4 ft)
5813	SC-SC Fibre cable, 13 m (42.6 ft)
5825	SC-SC Fibre cable, 25 m (82 ft)
5861	SC-SC Fibre cable, 61 m (200 ft)
5907	LC-SC Fibre cable, 7 m (23 ft)
5913	LC-SC Fibre cable, 13 m (42.6 ft)
5922	LC-SC Fibre cable, 22 m (72 ft)
5961	LC-SC Fibre cable, 61 m (200 ft)

Table 23. Model L32 Feature Codes (continued)

Feature Code	Description
6005	LC-LC Fibre cable, 5 m (16 ft)
6013	LC-LC Fibre cable, 13 m (43 ft)
6025	LC-LC Fibre cable, 25 m (82 ft)
6061	LC-LC Fibre cable, 61 m (200 ft)
8750	Ultrium cleaning cartridge
8757	Ultrium data cartridge, 20-pack, unlabeled
9002	First expansion frame attachment (for tracking purposes only)
9003	Additional expansion frame attachment (for tracking purposes only)
9007	Mixed media support (LTO/DLT)
9210	Attached to HP-UX system
9211	Attached to Sun system
9212	Attached to Windows system
9213	Attached to other non-IBM system
9215	Attached to Linux system
9316	8 to 16 Frame Track cable (Factory only)
9400	Attached to iSeries or AS/400 system
9600	Attached to pSeries or RS/6000 system
9660	Ethernet 10/100 support
9700	No Host Attach cables from plant
9724	Power cord, EMEA, hard-wired
9951	Power cord, 110V option
9986	Power cord, 1.8 m (6ft), non-watertight connector, Chicago (available only in the U.S.A., and at time of order)
9987	Power cord, 250 V ac 30 A with Hubbell twistlock, non-watertight connector, (available only in the U.S.A. and Canada at time of order)

Notes:

1. Remote Ethernet 10/100 (feature code 9660) is required with all new orders.
2. Feature code 1665 provides installation of **all** customer-provided LTO Ultrium drives (previously removed by feature code 1663) into an existing library. After installation, Machine Level Control records are updated to indicate that feature code 1462 is installed in the library.
3. Feature code 1670 (installation of a customer-provided fibre channel patch panel) is withdrawn. Order limits have been removed from FC 1462.
4. Hardware requirements for the remote support function vary, depending on whether you already have one or more 3584 Tape Libraries. Table 5 on page 12 indicates the requirements.

Feature Codes for Expansion Frame (Model D32)

Table 24. Model D32 Feature Codes

Feature Code	Description
1452	Frame control assembly
1454	LTO Ultrium-1 (L1) Low-Voltage Differential (LVD) drive canister
1455	LTO Ultrium-1 (L1) High-Voltage Differential (HVD) drive canister
1456	LTO Ultrium-1 (L1) fibre channel drive canister
1458	DLT LVD drive canister (field installed)
1459	DLT HVD drive canister (field installed)
1462	Fibre channel patch panel
1464	LTO Ultrium-1 (L1) SCSI (LVD) drive in a tray
1465	LTO Ultrium-1 (L1) SCSI (HVD) drive in a tray
1466	LTO Ultrium-1 (L1) Fibre drive in a tray
1474	LTO Ultrium-2 (L2) Low-Voltage Differential (LVD) drive canister
1475	LTO Ultrium-2 (L2) High-Voltage Differential (HVD) drive canister
1476	LTO Ultrium-2 (L2) Fibre drive in a tray
1605	LVD control port (either first or additional installed)
1606	HVD control port (either first or additional installed)
1607	Mixed media/D-frame support (Withdrawn)
1653	Capacity expansion feature
1663	Drive removal
1664	Patch panel removal (Withdrawn)
1665	Drive Reinstall (see note 2)
1666	Drive install, 1663/1455 (Withdrawn — See FC 1665)
1667	Drive install, 1663/1456 (Withdrawn — See FC 1665)
1668	DLT LVD drive (install of customer FC 1458)
1669	DLT HVD drive (install of customer FC 1459)
1670	Patch Panel install (Withdrawn) (see note 3)
1671	LTO Ultrium-1 (L1) SCSI (LVD) drive (install of customer FC 1464)
1672	LTO Ultrium-1 (L1) SCSI (HVD) tray (install of customer FC 1465)
1673	LTO Ultrium-1 (L1) Fibre tray (install of customer FC 1466)
1680	Control Path Failover
1901	Dual AC Line Cords (110V & 220V)
1902	Add Redundant 37V PS
2895	Interposer, IBM iSeries server or AS/400 server
5096	Interposer SC-LC fibre
5098	Inline HVD SCSI terminator
5099	VHDCI-to-HD68 cable/interposer
5305	HD68-to-HD68 SCSI cable, 5 m (16.4 ft)
5310	HD68-to-HD68 SCSI cable, 10 m (32.8 ft)
5318	HD68-to-HD68 SCSI cable, 10 m (32.8 ft)

Table 24. Model D32 Feature Codes (continued)

Feature Code	Description
5805	SC-SC Fibre cable, 5 m (16.4 ft)
5813	SC-SC Fibre cable, 13 m (42.6 ft)
5825	SC-SC Fibre cable, 25 m (82 ft)
5861	SC-SC Fibre cable, 61 m (200 ft)
5907	LC-SC Fibre cable, 7 m (23 ft)
5913	LC-SC Fibre cable, 13 m (42.6 ft)
5922	LC-SC Fibre cable, 22 m (72 ft)
5961	LC-SC Fibre cable, 61 m (200 ft)
6005	LC-LC Fibre cable, 5 m (16 ft)
6013	LC-LC Fibre cable, 13 m (43 ft)
6025	LC-LC Fibre cable, 25 m (82 ft)
6061	LC-LC Fibre cable, 61 m (200 ft)
5325	HD68-to-HD68 SCSI cable, 10 m (32.8 ft)
5620	VHDCI-to-HD68 SCSI cable, 20 m (65.6 ft)
5625	VHDCI (0.8mm)-to-HD68 SCSI cable, 25 m (82 ft)
5704	VHDCI-to-VHDCI SCSI cable, 4.5 m (14.8 ft)
5710	VHDCI-to-VHDCI SCSI cable, 10 m (33 ft)
5720	VHDCI-to-VHDCI SCSI cable, 20 m (66 ft)
5725	VHDCI-to-VHDCI SCSI cable, 25 m (82 ft)
5805	SC-SC Fibre cable, 5 m (16.4 ft)
5813	SC-SC Fibre cable, 13 m (42.6 ft)
5825	SC-SC Fibre cable, 25 m (82 ft)
5861	SC-SC Fibre cable, 61 m (200 ft)
5907	LC Fibre cable, 7 m (23 ft)
5913	LC Fibre cable, 13 m (42.6 ft)
5922	LC Fibre cable, 22 m (72 ft)
5961	LC Fibre cable, 61 m (200 ft)
9001	Frame without drive (customer must order drive feature or specify 'none')
9210	Attached to HP-UX system
9211	Attached to Sun system
9212	Attached to Windows system
9213	Attached to other non-IBM system
9400	Attached to AS/400 system
9600	Attached to RS/6000 system
9986	Power cord, 1.8 m (6ft), non-watertight connector, Chicago (available only in the U.S.A. at time of order)
9987	Power cord, 250 V ac 30 A with Hubbell twistlock, non-watertight connector, (available only in the U.S.A. and Canada at time of order)

Table 24. Model D32 Feature Codes (continued)

Feature Code	Description
<p>Notes:</p> <ol style="list-style-type: none"><li>1. Remote Ethernet 10/100 (feature code 9660) is required with all new orders.<li>2. Feature code 1665 provides installation of all customer-provided LTO Ultrium drives (previously removed by feature code 1663) into an existing library. After installation, Machine Level Control records are updated to indicate that feature code 1462 is installed in the library.<li>3. Feature code 1670 (installation of a customer-provided fibre channel patch panel) is withdrawn. Order limits have been removed from FC 1462.	

SCSI Configuration

SCSI configuration of the tape library may be performed by the customer or by a service representative. The following information is for reference only.

Physical Interface Characteristics

The tape library operates as a set of SCSI-3 devices. Each drive in a tape library attaches to host system processors through an Ultra-2/Wide, HVD or LVD. Early LTO SCSI drives use shielded, high-density SCSI-3, 68-pin P-connectors and can attach directly to a 2-byte wide, SCSI-3 P-cable. Current LTO and DLT-8000 drive canisters use Very High Density Centronics Interface (VHDCI) connectors (also known as 0.8 mm).

Under the SCSI-3 protocol, this type of attachment allows cable lengths of up to 25 m (82 ft) with the appropriate cable and terminator selection. Table 25 gives the maximum bus path-length between terminators for HVD and LVD interfaces.

Table 25. Maximum Bus Path Length Between Terminators

Type of Interconnection	Maximum Bus Path Length Between Terminators – In Meters (Feet)	
	LVD	HVD
Point-to-point (one host adapter and one drive)	25 (82 ft)	25 (82 ft)
Multidrop	12 (39.4 ft)	25 (82 ft)

The tape library also logically supports the narrow (8-bit) protocol. You need an interposer to connect the tape library to an 8-bit SCSI-2 bus. Use of 8-bit SCSI is not recommended since performance may be unacceptable.

Note: Only eight bus addresses (0 to 7) are valid for an 8-bit bus.

Default SCSI ID and LUN Assignments

Based on its physical position in the library, each tape drive is assigned a default SCSI ID (from 0 to 12). Table 26 lists the SCSI ID for each drive.

Table 26. Default SCSI ID and LUN for Each Device in Tape Drive

Drive	SCSI ID	LUN
Drive 1	0	0
Drive 2	1	0
Drive 3	2	0
Drive 4	3	0
Drive 5	4	0
Drive 6	5	0
Drive 7	6	0
Drive 8	8	0
Drive 9	9	0
Drive 10	10	0
Drive 11	11	0
Drive 12	12	0

One or more LTO tape drives operate as a 2-LUN device, with separately addressable Sequential Access (drive) and (Independent) Media Changer (library) devices. These devices are compatible with SCSI-2 or SCSI-3.

In all cases, the tape drive is always LUN 0. The Media Changer is always LUN 1 through an LTO control port drive or LUN 0 through a control port. All other LUNs are invalid unit addresses. For information about the SCSI commands for a Sequential Access or Media Changer device, see the applicable sections in the *IBM 3584 UltraScalable Tape Library SCSI Reference*, GA32-0410.

Note: You can change the SCSI IDs for the drives or control ports by using the SETTINGS menu option on the operator panel. You can enable additional LTO drives to optionally provide Media Changer (LUN 1) addressing by configuring more than one logical library or by enabling additional control paths (using the SETTINGS menu option).

Using Multiple Buses

The tape library has two a SCSI connectors for each tape drive or control port in the library. Each device can be daisy-chained by using a SCSI bus jumper which is included with each tape drive.

You can create up to 12 SCSI buses per frame for attachment to multiple hosts or to multiple SCSI adapter cards on one host. Multiple SCSI buses may be required for maximum performance, depending on the customer application and data compression ratio. However, note that library control is required on at least one SCSI bus (that which includes the Media Changer device). The Media Changer device is required to be addressed via LUN 1 of the lowest numbered drive of each LTO logical library. The Media Changer Device may additionally be addressed via LUN 1 of other drives in any LTO logical library (referred to as *Additional Control Paths Configuration*). The media changer device is addressed in LUN0 of the final control port of each DLT-8000 logical library. For information about control paths, see “Library Configurations” on page 38.

Any bus containing a Media Changer device is referred to as a control/data path. Any other bus is referred to as a data path.

Terminating the Bus

Each end of the SCSI bus must be properly terminated according to the SCSI standard.

Note: The SCSI terminator **must be installed on the back of the tape drive if it is the last (or only) drive on a bus**. The only exception is an HVD High Availability (HA) configuration where termination is at the host adapters.

An external LVD terminator is included with each LVD tape drive. An external HVD terminator is included with each HVD tape drive.

SCSI Cables, Connectors, and Interposers

AS/400

Attention

Only one HVD drive is allowed on each SCSI bus when attached to an AS/400 host.

Figure 70 shows the connectors, and interposers that the AS/400 uses to attach to the tape library. Table 27 describes the connectors and interposers.

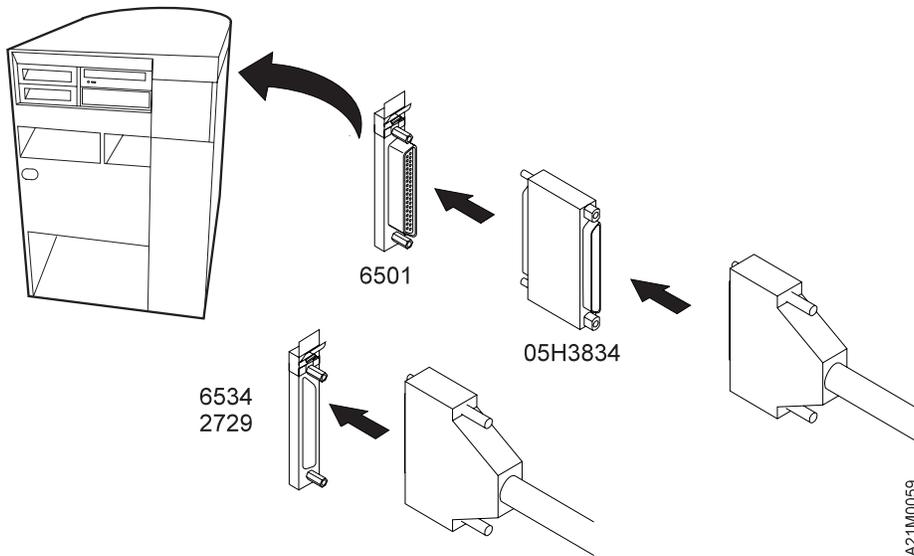


Figure 70. AS/400 SCSI Cable Attachment to Library. The controllers are identified by feature code; the interposers are identified by part number.

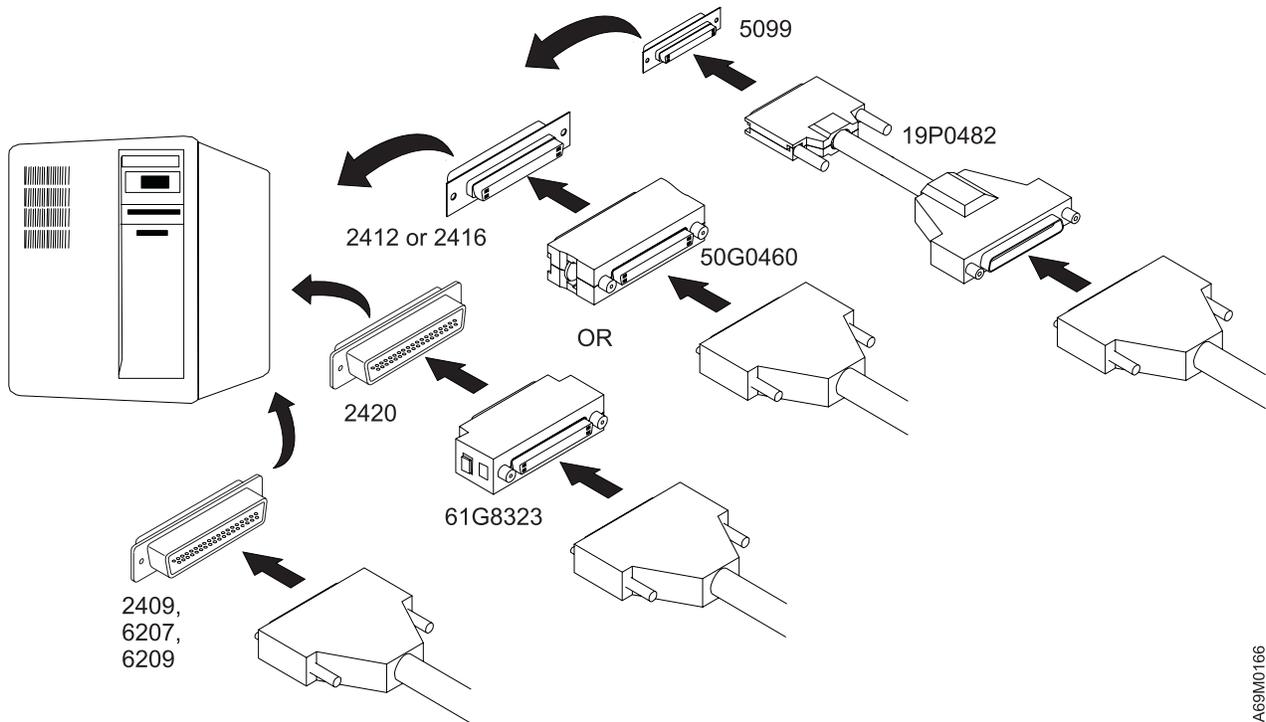
Table 27. Connectors and Interposers for AS/400

Host Connector and IBM Feature Codes (FC)	Interposer Part Number and IBM Feature Code (FC)
Magnetic Media Subsystem Controller (FC 6501)	05H3834 (FC 2895)
Magnetic Media Subsystem Controller (FC 6534)	None required
Magnetic Media Subsystem Controller (FC 2729)	None required
Magnetic Media Subsystem Controller (FC 2749)	None required

Note: The AS/400 host attachment cables all use an HD68 connector at the host end of the cable (either directly to the AS/400 IOP, or in the case of IOP 6581 to the FC 2895 interposer).

RS/6000

Figure 71 shows the SCSI connectors and interposers that the RS/6000 uses to attach to the tape library. Table 28 describes the connectors and interposers.



A69M0166

Figure 71. SCSI Cable Attachment of RS/6000 to Library. The adapters (and controller) are identified by feature code; the interposers are identified by part number.

Table 28. Connectors and Interposers for RS/6000

Host Connector and IBM Feature Codes (FC)	Interposer Part Number and IBM Feature Code (FC)
Enhanced SCSI-2 Differential Fast/Wide Adapter/A (FC 2412, identifier 4-C)	50G0460 (FC 2892)
SCSI-2 Differential Fast/Wide Adapter/A (FC, 2416 identifier 4-6)	50G0460 (FC 2892)
SCSI-2 Differential Fast/Narrow High-Performance External I/O Controller (FC 2420, identifier 4-2)	61G8323 (FC 2891)
PCI SCSI-2 Differential Fast/Wide Adapter (FC 2409, identifier 4-B)	None required
PCI SCSI-2 Differential Fast/Wide Adapter (FC 6207, identifier 4-L)	None required
PCI SCSI-2 Fast/Wide Differential Adapter (FC 6209, identifier 4-B)	None required
SCSI LVD/SE Adapter (FC 6205, identifier 4-R)	19P0482 (FC 5099)
SCSI LVD/SE Adapter (FC 6203, identifier 4-Y) Ultra3	19P0482 (FC 5099)

Connectors And Interposers For Other Supported Host Systems

Table 29. Connectors and Interposers for Other Supported Host Systems

Host	Host Connector	Interposer Part Number and Feature Code (FC)
HP	HP-PB Fast/Wide Differential Adaptec® 28696A	None required
Sun	Sun SBus Ultra Differential Fast/Wide Intelligent SCSI-2 Host Adapter	None required
Sun	Sun Dual-Channel Differential Ultra SCSI Host Adapter (PCI)	None required
Sun	Sun PCI Wide Ultra SCSI Adapter	(FC 5099)
Windows NT	Adaptec AHA® 2944UW PCI-to-Ultra Wide Differential SCSI Adapter	None required
Windows NT	Adaptec AHA 2940U2W PCI-to-Ultra-2 SCSI Adapter	None required

Cables

Table 30. Feature Codes and Lengths for SCSI and Fibre Channel Cables

Feature Code	IBM Part Number (P/N)	Cable Length (Approximate)
FC5098	19P0378	Inline HVD SCSI Terminator
FC5099	19P0482	VHDCI-to-HD68 SCSI Cable/Interposer
FC 5305	19P0052	HD68-to-HD68 SCSI Cable, 5 m (16.5 ft)
FC 5310	19P0053	HD68-to-HD68 SCSI Cable, 10 m (32.8 ft)
FC 5318	19P0097	HD68-to-HD68 SCSI Cable, 18 m (59 ft)
FC 5325	19P0054	HD68-to-HD68 SCSI Cable, 25 m (82 ft)
FC 6005	19K1252	LC-LC Fibre cable, 5 m (16.4 ft)
FC 6013	11P3880	LC-LC Fibre cable, 13 m (42.6 ft)
FC 6025	19K1253	LC-LC Fibre cable, 25 m (82 ft)
FC 6061	11P3884	LC-LC Fibre cable, 61 m (200 ft)
FC 5604	19P0050	VHDCI (0.8 mm)-to-HD68 SCSI Cable, 4.5 m (15 ft)
FC 5610	19P0048	VHDCI (0.8 mm)-to-HD68 SCSI Cable, 10 m (32.8 ft)
FC 5620	19P0049	VHDCI (0.8 mm)-to-HD68 SCSI Cable, 20 m (65.6 ft)
FC 5625	35L1977	VHDCI (0.8 mm)-to-HD68 SCSI Cable, 25 m (82 ft)
FC 5704	19P2499	VHDCI-to-VHDCI SCSI Cable, 4.5 m (14 ft)
FC 5710	09L0881	VHDCI-to-VHDCI SCSI Cable, 10 m (33 ft)
FC 5720	19P1904	VHDCI-to-VHDCI SCSI Cable, 20 m (65 ft)
FC 5725	19P2500	VHDCI-to-VHDCI SCSI Cable, 25 m (822 ft)
FC 5805	19P2367	SC-SC Fibre Channel Cable, 5 m (17 ft)
FC 5813	19P2368	SC-SC Fibre Channel Cable, 13 m (43 ft)
FC 5825	19P2369	SC-SC Fibre Channel Cable, 25 m (82 ft)
FC 5861	19P2370	SC-SC Fibre Channel Cable, 61 m (200 ft)
FC 5907	19P3972	LC-SC Fibre Channel Cable, 7 m (23 ft)
FC 5913	See Chapter 14, "Parts Catalog", on page 697.	LC-SC Fibre Channel Cable, 13 m (43 ft)
FC 5922	See Chapter 14, "Parts Catalog", on page 697.	LC-SC Fibre Channel Cable, 22 m (72 ft)

Table 30. Feature Codes and Lengths for SCSI and Fibre Channel Cables (continued)

Feature Code	IBM Part Number (P/N)	Cable Length (Approximate)
FC 5961	See Chapter 14, "Parts Catalog", on page 697.	LC-SC Fibre Channel Cable, 61 m (200 ft)
Notes:		
1. On AS/400 systems, cable lengths up to 25 m (82 ft) can be used with feature code 2729, 6501, and 6534.		
2. On RS/6000 systems, cable lengths greater than 18 m (59 ft) are not permitted with feature code 2420. Cable lengths up to 25 m (81 ft) can be used with feature code 2409, 6207, 6209, 2412, or 2416.		

Connecting Tape Library To Multiple Systems

AS/400

You cannot connect an AS/400 system on the same logical library, with any other host system (including another AS/400). Instead, you must configure the tape library with multiple logical libraries before you can attach it to an AS/400 and another type of host at the same time (see "Logical Libraries Configuration" on page 40).

RS/6000

You can attach multiple RS/6000 systems to a tape library. For cabling information, refer to the documents listed in "pSeries (RISC System/6000) Information" on page xx.

Hewlett-Packard

You can attach multiple Hewlett-Packard host systems to a tape library. For cabling information, consult your system manuals.

Sun

You can attach multiple Sun host systems to a tape library. For cabling information, consult your system manuals.

Windows NT

You can attach multiple Windows NT systems to a tape library. For cabling information, consult your system manuals.

Fibre Channel Information

- Fibre channel configurations do not accept 'daisy chaining,' which is the practice of directly connecting a drive to another drive. Each drive must connect directly to a host, switch, system, network, or hub.
- When a single fibre-channel drive powers on, all drives on the same hub can be affected. This includes unplugging and replugging a single drive.

External Fibre Channel Device Info

If the fibre channel drives in the 3584 are attached to a McData ES-1000, default configuration settings on the ES-1000 must be changed to avoid problems when replacing drives or adding new drives. If the ES-1000 is configured in **Shared** (Hub) or **Switch** mode, adding a new drive (or replacing an existing drive) can cause an active drive (running backup/restore operations) to abort the host job. To avoid this problem, set the ES-1000 **Fabric Address Notification** (FAN) option to **Enable**. Refer to the ES-1000 documentation for configuration procedures.

Fibre Channel Attachment

Direct fibre channel attachment is available on LTO fibre drives. You also can attach the library via a storage area network (SAN), hub, or switch, to any RS/6000, Windows NT/2000, Sun, or other host system that supports the fibre channel, and has the proper device drivers installed.

The drive node name and two port names are worldwide, unique names that are set by the library.

Fibre Channel Cables

Each drive has one external, fibre channel port. The cable is a shortwave or multi-mode type (50 micron cable), and is suitable for distances up to 500 m (1640.4 ft). The connection is a duplex, SC connector type for Ultrium-1 (L1) drives, or LC connector type for Ultrium2 (L2) drives.

Table 31. Feature Codes and Lengths for Fibre Cables

Feature Code	IBM Part Number (P/N)	Cable Length (Approximate)
FC 6005	19K1252	LC-LC Fibre cable, 5 m (16.4 ft)
FC 6013	11P3880	LC-LC Fibre cable, 13 m (42.6 ft)
FC 6025	19K1253	LC-LC Fibre cable, 25 m (82 ft)
FC 6061	11P3884	LC-LC Fibre cable, 61 m (200 ft)
FC 5805	19P2367	SC-SC Fibre cable, 5 m (16.4 ft)
FC 5813	19P2368	SC-SC Fibre cable, 13 m (42.6 ft)
FC 5825	19P2369	SC-SC Fibre cable, 25 m (82 ft)
FC 5861	19P2370	SC-SC Fibre cable, 61 m (200 ft)

Notes:

1. A customer who requires cable lengths greater than 61 m (200 ft) should contact IBM Site and Connectivity Services (I/T Consulting and Implementation Services in the U.S.A.) for custom cable system design and installation.
2. When installing LTO Fibre drives, a 2 m (6.6 ft) cable (P/N 11P2227) goes from the drive ports to an interposer connector on a bulkhead at the bottom of the frame. The customer's cable attaches to the other side of the bulkhead connector. See Figure 72 on page 155.

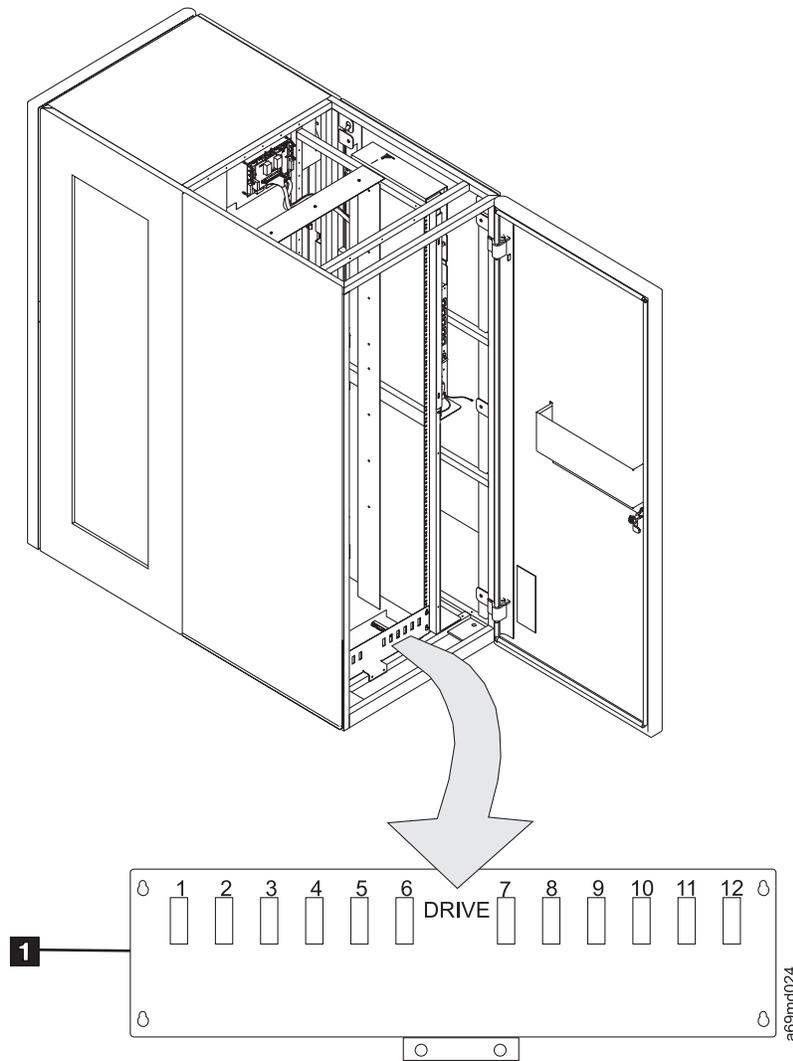


Figure 72. Fibre Channel Bulkhead

Fibre Channel Device Drivers

The device driver tables in this section provide the following information:

- Adapters supported
- Location of supported device driver level for host bus adapters
- Operating system levels supported
- RMSS device driver levels supported for continuing test for the Ultrium Fibre Attachment

The version information listed below was accurate as of March 1, 2002. Check the following website for updates:

Required library firmware and drive code can be downloaded from the following websites.

For IBM service personnel with access to the Internal PFE website:

<http://snj1nt02.sanjose.ibm.com/tape/tapetec.nsf/>

For non-IBM personnel (and those without access to the IBM intranet) the following external website provides code and support for 3584:

<http://ssddom02.storage.ibm.com/techsup/webnav.nsf/support/3584>

For RS/6000 Attachment

Table 32. RS/6000 Drivers and Locations

Component	Minimum Acceptable Level	Location
Gigabit Fibre Channel Adapter for PCI bus - FC 6227	3.21A0 for AIX 4.3.3 3.22A0 for AIX 5.1 APAR IY17356 is required for AIX 4.3.3	http://www.rs6000.ibm.com/support/micro/download.html
Gigabit Fibre Channel Adapter for 64-bit PCI bus - FC 6228	3.82A0 for AIX 4.3.3 or AIX 5.1 APAR IY16132 and IY17356 is required for AIX 4.3.3	http://www.rs6000.ibm.com/support/micro/download.html
Atape Ultrium Driver Level	6.0.2.0	ftp://ftp.software.ibm.com/storage/devdvr/AIX
IBM 2108 SAN Data Gateway	3.42.12	http://www.storage.ibm.com/hardsoft/products/sangateway/support/form1.htm
IBM 2109 Fibre Channel Switch	2.1.7	http://www.storage.ibm.com/ibmsan/products/2109/download.html

For Sun Attachment

Table 33. Sun Device Drivers and Locations

Component	Minimum Acceptable Level	Location
QLogic QLA2200F Fibre Channel Adapter for PCI Bus (for PCI-based systems only)	Driver 8.00.08 BIOS 1.61	http://www.qlogic.com
Solaris Operating System Level	2.6, 2.7, or 2.8	
IBMTape Ultrium Driver Level	4.0.4.7	ftp://ftp.software.ibm.com/storage/devdvr/Solaris/

For Microsoft Windows 2000 Attachment

Table 34. Microsoft Windows 2000 Device Drivers Locations

Component	Minimum Acceptable Level	Location
QLogic QLA2200F Fibre Channel Adapter for PCI Bus (for PCI-based systems only)	Driver 8.00.08 BIOS 1.61	http://www.qlogic.com
Windows 2000 Operating System	Build 2195 or later. Service Pack 2 if attaching through the 2108.	
IBMtape Ultrium Driver Level	5.0.2.4	ftp://ftp.software.ibm.com/storage/devdvr/Win2000/
IBM 2108 SAN Data Gateway	3.42.12	http://www.storage.ibm.com/hardsoft/products/sangateway/support/form1.htm
IBM 2109 Fibre Channel Switch	2.1.7	http://www.storage.ibm.com/ibmsan/products/2109/download.html

For Microsoft Windows NT Attachment

Table 35. Microsoft Windows NT Device Drivers and Locations

Component	Minimum Acceptable Level	Location
QLogic QLA2200F Fibre Channel Adapter for PCI Bus (for PCI-based systems only)	Driver 8.00.08 BIOS 1.61	http://www.qlogic.com
Emulex LP8000 and LP9002 Fibre Channel Adapters Note: If using cascaded switches you must enable FCTape support in the Emulex cards for proper error recovery. Contact Emulex for instructions.	Multiprotocol Port Driver 4–2.00a14	http://www.emulex.com
Windows NT Operating System	Server Version 4 with Server Pack 6 Server Pack 6A if attaching through the 2108	
IBMtape Ultrium Driver Level	1.1.7.8	ftp://ftp.software.ibm.com/storage/devdvr/WinNT/

Table 35. Microsoft Windows NT Device Drivers and Locations (continued)

Component	Minimum Acceptable Level	Location
IBM 2108 SAN Data Gateway	3.42.12 for model R03 3.43.07 for model R07	http://www.storage.ibm.com/hardsoft/products/sangateway/support/form1.htm
IBM 2109 Fibre Channel Switch	2.1.7	http://www.storage.ibm.com/ibmsan/products/2109/download.html

Chapter 6. Safety and Inspection

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General Instructions

The safety checklist procedures in this chapter ensure that a 3584 not under an IBM maintenance agreement has the necessary safety items installed, and that no changes were made to the product to make it unsafe. Each 3584, as designed and assembled, has safety items installed to protect operators and service personnel from injury. These checklist procedures verify only these items.

The safety checklist procedures must be performed before the normal inspection for a maintenance agreement. *The 3584 must be considered unsafe until the presence and condition of all checklist items are satisfied and verified.* If any unsafe conditions are present, you must decide how serious the hazard is and whether you can continue without first correcting the problem.

When performing the safety checklist procedures, consider the following conditions and the potential safety hazards they present:

- Electrical, especially primary power. For example, an electrically-charged library frame can cause serious or lethal electrical shock.
- Explosive. For example, damaged or expanding capacitors can cause serious injury.
- Mechanical hazards. For example, missing safety covers can cause injury to service personnel.

Education

Service personnel must be trained on the 3584, and on the following:

- General maintenance agreement qualification (MAQ)
- Tailored maintenance agreement qualification
- Changed machine safety inspection procedures as part of the electrical safety course

Safety Notices

There are three levels of safety notices that appear in the Maintenance Information.

Danger – Calls attention to a situation that is potentially lethal or extremely hazardous to people.

Caution – Calls attention to a situation that is potentially hazardous to people.

Attention – Alerts you to the possibility of damage to a program, device, system, or data.

The following notices are the Dangers and Cautions that are used in the Maintenance Information. Attention notices and Notes may be located throughout the Maintenance Information, but are not listed here.

Table 36. Danger and Caution Notices

C04	CAUTION: This product complies with the performance standards set by the U.S.A. Code of Federal Regulations (CFR) and IEC825 for a Class 1 and a Class II laser product.
	The bar code scanner contains a Class II laser.
	
	Class II
C05	CAUTION: This product complies with the performance standards set by the U.S.A. Code of Federal Regulations (CFR) and IEC825 for a Class 1 and a Class II laser product.
C06	CAUTION: Do NOT leave the switch bypassed, as this is a safety exposure.
D02	DANGER
	<div style="border: 1px solid black; padding: 5px;">Hazardous voltages are present. Do not touch the internal parts (pins and sockets) of the outlet.</div>

Safety Inspection Procedure

This topic provides the inspection procedures needed to ensure that the 3584 has the necessary safety items installed and that no changes made it unsafe.

Preparation

The following reference items are useful during the inspection:

- Copies of safety service memorandums (SMs) and engineering change announcements (ECAs) for this machine type
- Parts catalog
- 3584 history (see Chapter 12, “History”, on page 689)
- *Electrical Safety for IBM Customer Engineers*, S229-8124

Branch Circuit CB Switched Off Check



Be aware that each frame that contains an FCA is protected by a main line circuit breaker (CB) in the FCA. Each FCA must be further protected by a circuit breaker (CB) of the proper rating at the service rail (customer outlet).

- ___ 1. Have the customer locate and switch off the circuit breaker (CB) for each branch circuit that supplies voltage to a 3584 line cord.
- ___ 2. Perform one of the following for each receptacle:

Note: There is a line cord for each control unit frame and drive unit frame in the library.

- A metal clad connector is not an approved connector to use on this product. If a metal clad connector is used, perform the “Safe-to-Handle Check” and the “Disconnect Precautions” procedures in “Miscellaneous Safety Tips” of the *Electrical Safety for IBM Customer Engineers*.
- If the power cord has an insulated plug, grip the plug without touching any metal parts, and remove the plug from the customer power receptacle.

- ___ 3. Perform the “Power Receptacle Safety Check” in *Electrical Safety for IBM Customer Engineers*.

D02 DANGER

Hazardous voltages are present. Do not touch the internal parts (pins and sockets) of the outlet.

- ___ 4. Measure the phase-to-ground voltage at each receptacle.
If a neutral is present, measure the phase-to-neutral voltage, phase-to-ground voltage, and the neutral-to-ground voltage.
If all voltage values are not less than 1.0 V ac, have an electrician check the circuit.

Safety Labels and AC Grounds

Understand the meaning of the safety labels before beginning any repair of a component with a label.

Check that the labels are located where shown in Figure 73 on page 165. Make any necessary corrections. See Chapter 14, "Parts Catalog", on page 697 for part numbers of labels in the various languages.

The general caution symbol



identifies conditions where caution must be used.

The electrical caution symbol



identifies electrical hazards where extreme caution must be used. The electrical caution label locations may change.

The laser radiation label



shows that the 3584 contains a Class II laser device. It is located within the bar code scanner.

A similar symbol defines the use of a Class I laser for the fibre channel feature.



See also "Laser Safety and Compliance".

Laser Safety and Compliance

This product complies with the performance standards set by the U.S. Food and Drug Administration for a Class II Laser Product. This product belongs to a class of laser products that requires precautions be taken to avoid prolonged viewing of the laser beam. Under normal working conditions, the operator should not come in direct contact with the laser beam. This classification was accomplished by providing the necessary protective housings and scanning safeguards to ensure that laser radiation is inaccessible during operation or is within Class II limits. These products have been reviewed by external safety agencies and have obtained approvals to the latest standards as they apply to this product type.

Safety Labels and Grounds for the Model L32 (Base) Frame

Figure 73 on page 165 shows the approximate locations of the following:

- 1 Class II laser caution label, bar code scanner

- 2** Current leakage caution label
- 3** Power cord label

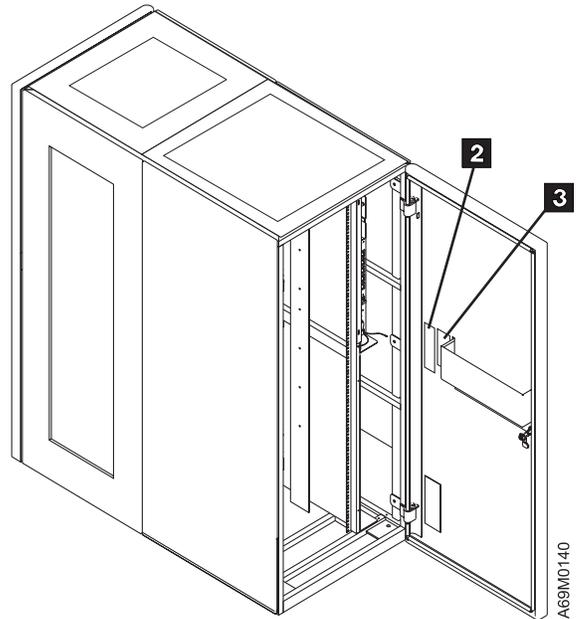
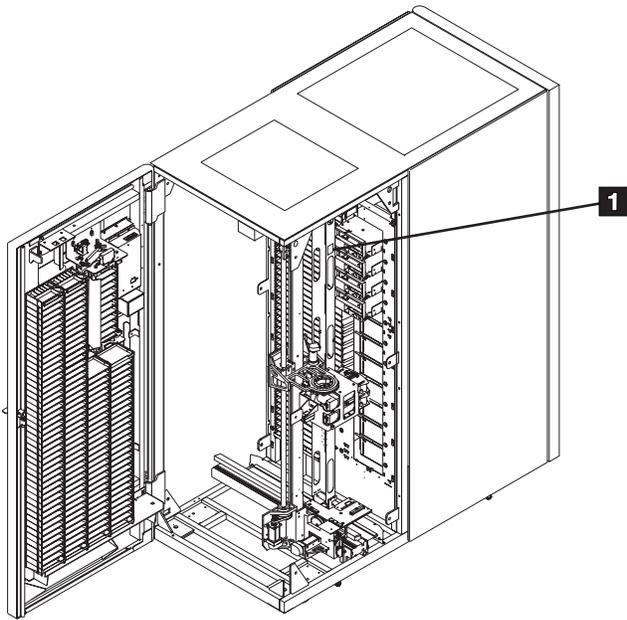


Figure 73. Base Frame Safety Labels

Safety Labels and Grounds for the Model D32 and D42 (Expansion) Frames

Use Figure 73 on page 165 keys **2** through **3** for the locations of the safety labels in the expansion frames.

Note: If the expansion frame has no FCA, it may not have any safety labels.

Safety Engineering Changes

Check the following safety items and correct as needed:

- 1. All safety engineering changes (ECs) have been installed correctly.
- 2. The location or list of engineering change announcements (ECAs) is accessible.

Safety Checks

Refer to Figure 74 on page 167 as you perform the following safety checks.

Note: The 3584 must be powered off, with the main power cable leading to each FCA disconnected from the customer's power source. See item **7**.

Check the following safety items and correct as needed:

- 1. All hinges and latches are in acceptable operating condition and are not broken or corroded.
- 2. All door interlocks and safety switches are operating and are not bypassed with jumpers or taped closed.
- 3. All ac power cables have the correct part number.

Note: See Chapter 14, "Parts Catalog", on page 697 for the correct part number for the power cables. See also *IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584, GA32-0408*.

- 4. The two screws with lock washers holding the yellow/green ground strap item **6** are tight. See Figure 74 on page 167.
- 5. The two mounting bolts **3** for each FCA are tight.
- 6. Check that all covers, housings, and metal box sides have proper ground continuity (less than 0.1 ohm).
- 7. Check continuity between the FCA and its frame. A reading must be less than 0.1 ohm.
- 8. Check continuity between each main power cord ground pin, item **7**, and the associated FCA yellow/green ground strap, item **6**. A reading must be less than 0.1 ohm.
- 9. For any library with 2 or more frames, check continuity between one frame and the next at the yellow/green ground wire, item **6**. A reading must be less than 0.1 ohm.
- 10. Inspect covers and sheet metal:
 - All access safety covers must be in place.
 - Sharp corners or edges should be protected.
- 11. The customer's circuit breakers and circuit panels for the 3584 frames are identified as 3584 branch circuits.
- 12. No obvious non-IBM changes have been made.
- 13. No metal filings, dirt, contaminants, water, or other fluids are present.
- 14. There are no marks from earlier smoke or burning. Check the maintenance agreement qualification (MAQ) report for the correct procedures for repair action, if needed.
- 15. No damaged or frayed power wiring.

- __ 16. The 37 V dc power supplies are secure within their housings.
- __ 17. All latches or clamps are in acceptable condition.

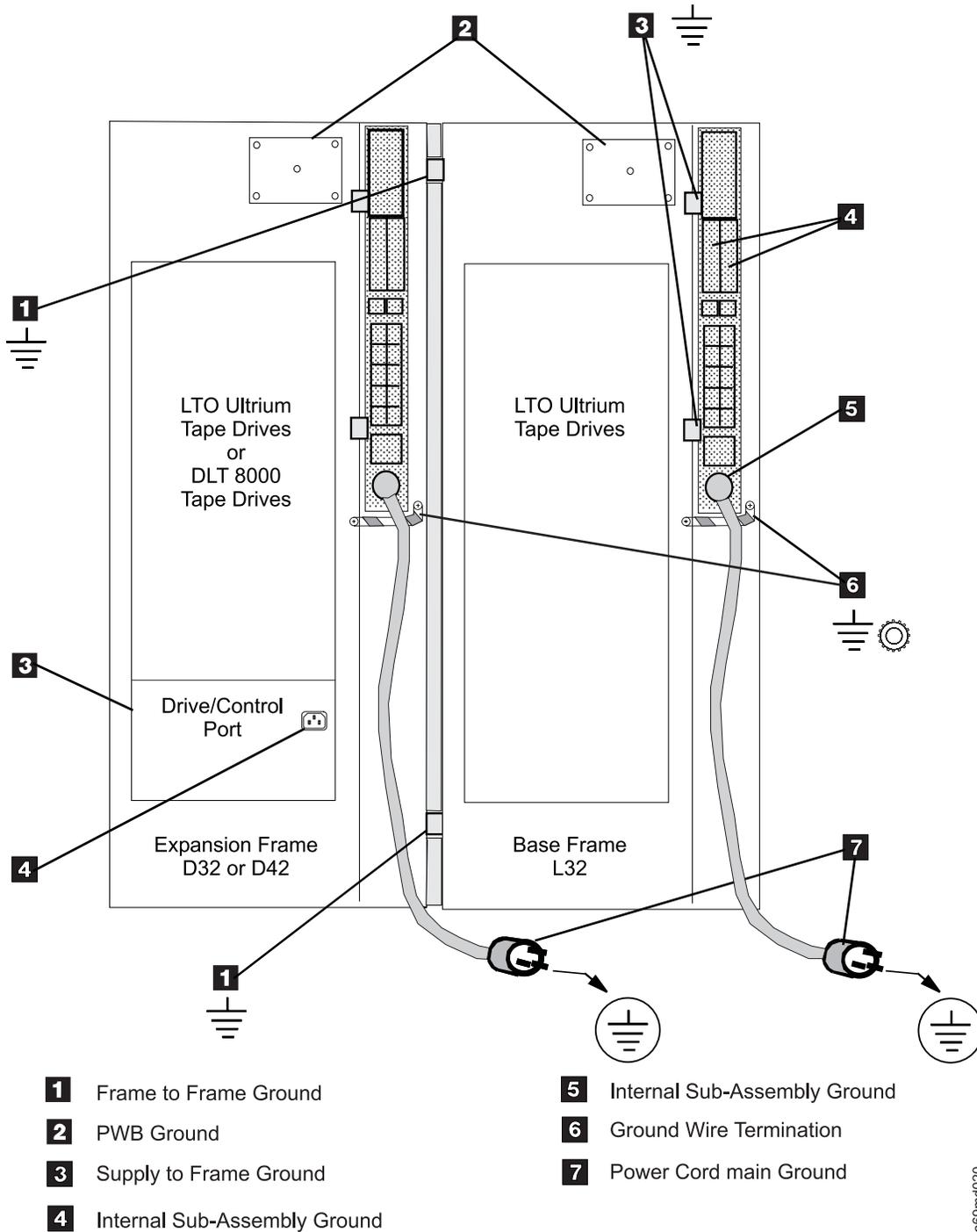


Figure 74. AC Grounding Diagram. (50 Hz and 60 Hz)

Completion Report and Signature

Use this form to aid you with conducting a safety inspection. After completing the inspection, sign and date the checklist and store it with the maintenance agreement inspection. You are signing to verify the following activities:

- Safety inspection for machine type 3584
- General safety inspection
- Maintenance agreement qualification (MAQ)

Name/Signature

Date

Safety Hazards

List all safety hazards. If you did not find any, write 'None.'

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Chapter 7. Unit Reference Codes and Other Code Types

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Node Card LED Display Codes	412

Identifying Device Type

Before you look up the library sense data in Table 39 on page 171, you may need to know what type of device is causing the failure. In some cases, you will need to determine a drive type, gripper type, I/O station type, or storage column/cell type before you can determine which URC to use as a symptom. The following information is designed to assist you in determining the devices installed. When you have determined the type of devices you are dealing with, look up the URC in Table 39 on page 171 and go to “URC Description With Action and FRUs” on page 226 to repair the problem.

Identifying Drive Type

If you need to determine a drive type, first determine the location of the affected drive. See the failing frame/device byte in the library sense data. As an example if the failing frame/device byte is X'14' (hex) this indicates that the drive is located in frame 1, row 4. When you have determined the frame and row number of the drive, visually check to see whether the drive assembly is a tray or a canister. To determine the type of drive that is in your library, consider the following:

- Determine the drive type (LTO/DLT and LVD/HVD/FC) by referring to the labels on the back of the drive.

Note: Drive types may be abbreviated on the labels. D8 indicates a DLT-8000 drive. L1 indicates an LTO Ultrium-1 drive. L2 indicates an LTO Ultrium-2 drive.

- Early drive tray assemblies did not have labels. Regard these as LTO1 DT LVD drives.
- For further information on drive trays and drive canisters, see the table at Table 63 on page 584 and review the listed procedures and drawings for each type of drive.

Identifying Library Component Type

- To determine a gripper type, determine the second digit of the model number of each library frame. If all the frames have the same second digit, then all grippers are the same type (x3x indicates LTO grippers, x4x indicates a DLT gripper in gripper 2). If all the frames do NOT have the same second digit, then this is a mixed media library (gripper 1 is LTO, gripper 2 is DLT).
- To determine an I/O station type, visually check the I/O station for a type label (LTO or DLT). There may be a type label on the front of the I/O station. If there is no type label on the front, check the bar code label on the back of the I/O station.

The upper I/O station is always LTO. Use Table 38 to determine the type of I/O station in the (optional) lower position.

Table 38. Quantity of Slots in an optional I/O Station

I/O Station Type	Quantity of Slots
LTO	20
DLT-8000	18

- To determine a storage column/cell type, first determine in which frame the column/cell is located. See the failing frame/device byte in the library sense data. The first digit of the failing frame/device byte is the frame in which the column/cell is located. After you locate the frame, find the model number of that frame. The second digit of the model number indicates the column/cell type (model x3x contains LTO columns/cells, model x4x contains DLT columns/cells).

Library Sense Data to URC Table

The data in the **Error Data** column of Table 39 on page 171 is divided into 5 groups. These groups from left to right are:

- Sense Byte 02 = SK (Sense Key)
- Sense Byte 12 = ASC (Additional Sense Code)

- Sense Byte 13 = ASCQ (Additional Sense Code Qualifier)
- Sense Byte 18 = HEC (Hardware Error Code)
- Sense Byte 19 = HECQ (Hardware Error Code Qualifier)

Table 39 also contains an error **Description** and a **URC** for the error data.

Notes:

1. The URC is for reference only and is not part of the sense data.
2. In the **Error Data** column of the following table, a ‘—’ denotes that data is not applicable. An ‘xx’ denotes variable data will occur.
3. If you are working with sense data from an **LTO Drive**, go to “LTO Drive Sense Data to URC Table” on page 189.
4. If you are working with sense data from a **DLT-8000 Drive**, go to “DLT-8000 Drive Sense Data to URC Table” on page 208.
5. The following abbreviations apply to Table 39:

LTO1 DT LVD. LTO Ultrium-1 drive tray (SCSI Low Voltage Differential)

LTO1 DT HVD. LTO Ultrium-1 drive tray (SCSI High Voltage Differential)

LTO1 DT FC. LTO Ultrium-1 drive tray (Fibre Channel)

LTO1 DC LVD. LTO Ultrium-1 drive canister (SCSI Low Voltage Differential)

LTO1 DC HVD. LTO Ultrium-1 drive canister (SCSI High Voltage Differential)

LTO1 DC FC. LTO Ultrium-1 drive canister (Fibre Channel)

LTO2 DC LVD. LTO Ultrium-2 drive canister (SCSI Low Voltage Differential)

LTO2 DC HVD. LTO Ultrium-2 drive canister (SCSI High Voltage Differential)

LTO2 DC FC. LTO Ultrium-2 drive canister (Fibre Channel)

DLT DC LVD. DLT drive canister (SCSI Low Voltage Differential)

DLT DC HVD. DLT drive canister (SCSI High Voltage Differential)

CP LVD. Control Port canister (SCSI Low Voltage Differential)

CP HVD. Control Port canister (SCSI High Voltage Differential)

Table 39. Library Sense Data to URC

Error Data	Description	URC
00 00 00 — —	No sense information. This usually means there was no error. In rare instances it also can occur when a SCSI failure prevents the library from returning sense information.	A000
01 44 00 xx xx	Recovered error (logged but not reported as SCSI sense). In most cases you should not attempt to repair anything due to a recovered error. However if you are seeing excessive numbers of a specific recovered error you can repair it as follows: <ol style="list-style-type: none"> 1. Determine the ASC, ASCQ, HEC, and HECQ for the recovered error you want to repair. 2. Substitute Sense Key 04 in place of sense key 01. As an example, 01 44 00 40 81 becomes 04 44 00 40 81. 3. Look up the new sense data in this table, find the URC, then go to “URC Description With Action and FRUs” on page 226 to repair the problem. 	— — — —

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
02 04 00 — —	Not ready — Logical unit is offline (maintenance mode).	A200
02 04 01 — —	Not ready — Logical unit is in process of becoming ready.	A201
02 04 03 — —	Not ready — Manual intervention required.	A203
02 04 83 — —	Not ready — Library has not been setup (needs configuration or calibration).	A283
02 04 84 — —	Not ready — I/O Station open. Note: I/O Station Open is usually not considered to be an error unless a command that involves the I/O station (such as a move from or to the I/O station) is received while the I/O station is open. In this case you should just close the I/O station. The only time this condition requires a repair action is if it is reported when the I/O station is closed.	A284
02 04 85 — —	Not ready — Door open. Note: Door Open is usually not considered to be an error unless a command that requires accessor motion is received while the door is open. In this case you should just close the door. The only time this condition requires a repair action is if it is reported when the door is closed.	A285
04 44 00 00 00	If this sense combination is received at the host it indicates that the Control Path drive or Control Port experienced a problem communicating with the library MCP over the RS-422. See "Identifying Device Type" on page 170.	LTO1 DT LVD – 3009 LTO1 DT HVD – 3409 LTO1 DT FC – 3809 LTO1 DC LVD – 3C09 LTO1 DC HVD – 4009 LTO1 DC FC – 4409 LTO2 DC LVD – 4809 LTO2 DC HVD – 4C09 LTO2 DC FC – 5009 CP LVD – E009 CP HVD – E109
04 44 00 21 80	MCP Internal Failure.	A421
04 44 00 22 80	OPC Internal Failure.	A422
04 44 00 23 80	ACC Internal Failure.	A423
04 44 00 24 80	MDA Internal Failure.	A424
04 44 00 25 xx	MCP in frame xx not responding on CAN bus.	A425
04 44 00 26 xx	OPC in frame xx not responding on CAN bus.	A426
04 44 00 27 xx	ACC in frame xx not responding on CAN bus.	A427
04 44 00 28 xx	MDA in frame xx not responding on CAN bus.	A428
04 44 00 29 80	No response from any other card on the CAN bus.	A429
04 44 00 30 80	Frame Sequencing failure.	A430
04 44 00 30 81	Frame Not Found failure.	A431
04 44 00 30 82	Door interlock frame number sensing failure.	A432

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 31 80	FCA Cooling Fan Failure.	A440
04 44 00 33 81	24 V dc PS#1 out of range – probable failure of 24 V dc PS#1.	A451
04 44 00 33 82	24 V dc PS#2 out of range – probable failure of 24 V dc PS#2.	A452
04 44 00 34 81	37 V dc PS#1 out of range – probable failure of 37 V dc PS#1.	A453
04 44 00 34 82	37 V dc PS#2 out of range – probable failure of 37 V dc PS#2.	A454
04 44 00 34 91	37 V dc PS#1 will not turn on – probable failure of 37 V dc PS#1.	A455
04 44 00 34 92	37 V dc PS#2 will not turn on – probable failure of 37 V dc PS#2.	A456
04 44 00 34 A1	37 V dc PS#1 not present – probably disconnected.	A457
04 44 00 34 A2	37 V dc PS#2 not present – probably disconnected.	A458
04 44 00 35 81	Drive Power Supply not present – probably disconnected.	A45D
04 44 00 35 82	Drive Power Supply reported an error.	A45E
04 44 00 38 80	MCP cannot sense a configured drive (or control port) on RS-422 cable loop. See “Identifying Device Type” on page 170.	LTO1 DT LVD – C800 LTO1 DT HVD – C900 LTO1 DT FC – CA00 LTO1 DC LVD – CB00 LTO1 DC HVD – CC00 LTO1 DC FC – CD00 LTO2 DC LVD – CE00 LTO2 DC HVD – CF00 LTO2 DC FC – D000 DLT DC LVD – C400 DLT DC HVD – C500 CP LVD – E000 CP HVD – E100

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 38 81	MCP cannot get a response from a configured drive (or control port) on RS-422. See "Identifying Device Type" on page 170.	LTO1 DT SCSI LVD – C801 LTO1 DT HVD – C901 LTO1 DT FC – CA01 LTO1 DC LVD – CB01 LTO1 DC HVD – CC01 LTO1 DC FC – CD01 LTO2 DC LVD – CE01 LTO2 DC HVD – CF01 LTO2 DC FC – D001 DLT DC LVD– C401 DLT DC HVD – C501 CP LVD – E001 CP HVD – E101
04 44 00 38 82	MCP detected an RS-422 problem communicating with a configured drive (or control port) – possible parity problem. See "Identifying Device Type" on page 170.	LTO1 DT SCSI LVD – C802 LTO1 DT HVD – C902 LTO1 DT FC – CA02 LTO1 DC LVD – CB02 LTO1 DC HVD – CC02 LTO1 DC FC – CD02 LTO2 DC LVD – CE02 LTO2 DC HVD – CF02 LTO2 DC FC – D002 DLT DC LVD – C402 DLT DC HVD – C502 CP LVD – E002 CP HVD – E102

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 38 83	MCP detected too many retries communicating with a configured drive (or control port) over RS-422. See "Identifying Device Type" on page 170.	LTO1 DT SCSI LVD – C803 LTO1 DT HVD – C903 LTO1 DT FC – CA03 LTO1 DC LVD – CB03 LTO1 DC HVD – CC03 LTO1 DC FC – CD03 LTO2 DC LVD – CE03 LTO2 DC HVD – CF03 LTO2 DC FC – D003 DLT DC LVD – C403 DLT DC HVD – C503 CP LVD – E003 CP HVD – E103
04 44 00 38 84	MCP can't get a response from the DCC card in a configured drive canister (or control port canister). See "Identifying Device Type" on page 170.	LTO1 DC LVD – CB04 LTO1 DC HVD – CC04 LTO1 DC FC – CD04 LTO2 DC LVD – CE04 LTO2 DC HVD – CF04 LTO2 DC FC – D004 DLT DC LVD – C404 DLT DC HVD – C504 CP LVD – E004 CP HVD – E104

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 39 80	MCP timed out waiting for a configured drive (or control port) to complete an RS-422 command. See "Identifying Device Type" on page 170.	LTO1 DT SCSI LVD – C810 LTO1 DT HVD – C910 LTO1 DT FC – CA10 LTO1 DC LVD – CB10 LTO1 DC HVD – CC10 LTO1 DC FC – CD10 LTO2 DC LVD – CE10 LTO2 DC HVD – CF10 LTO2 DC FC – D010 DLT DC LVD – C410 DLT DC HVD – C510 CP LVD – E010 CP HVD – E110
04 44 00 39 81	MCP received unknown RS-422 message from a configured drive (or control port). See "Identifying Device Type" on page 170.	LTO1 DT LVD – C811 LTO1 DT HVD – C911 LTO1 DT FC – CA11 LTO1 DC LVD – CB11 LTO1 DC HVD – CC11 LTO1 DC FC – CD11 LTO2 DC LVD – CE11 LTO2 DC HVD – CF11 LTO2 DC FC – D011 DLT DC LVD – C411 DLT DC HVD – C511 CP LVD – E011 CP HVD – E111

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 39 82	MCP detected that drive/canister type does not match what is currently configured. See "Identifying Device Type" on page 170.	LTO1 DT LVD – C812 LTO1 DT HVD – C912 LTO1 DT FC – CA12 LTO1 DC LVD – CB12 LTO1 DC HVD – CC12 LTO1 DC FC – CD12 LTO2 DC LVD – CE12 LTO2 DC HVD – CF12 LTO2 DC FC – D012 DLT DC LVD – C412 DLT DC HVD – C512 CP LVD – E012 CP HVD – E112
04 44 00 39 83	MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.	LTO1 DT LVD – C813 LTO1 DT HVD – C913 LTO1 DT FC – CA13 LTO1 DC LVD – CB13 LTO1 DC HVD – CC13 LTO1 DC FC – CD13 LTO2 DC LVD – CE13 LTO2 DC HVD – CF13 LTO2 DC FC – D013 DLT DC LVD – C413 DLT DC HVD – C513 CP LVD – E013 CP HVD – E113

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 39 84	MCP received unexpected or invalid diagnostic status from a drive.	LTO1 DT LVD – C814 LTO1 DT HVD – C914 LTO1 DT FC – CA14 LTO1 DC LVD – CB14 LTO1 DC HVD – CC14 LTO1 DC FC – CD14 LTO2 DC LVD – CE14 LTO2 DC HVD – CF14 LTO2 DC FC – D014 DLT DC LVD – C414 DLT DC HVD – C514 CP LVD – E014 CP HVD – E114
04 44 00 40 81	Gripper #1 will not move – no encoder pulses.	LTO Gripper – B301 DLT Gripper – B201
04 44 00 40 82	Gripper #1 encountered unexpected hard stop while extending.	LTO Gripper – B302 DLT Gripper – B202
04 44 00 40 83	Gripper #1 encountered unexpected hard stop while retracting.	LTO Gripper – B303 DLT Gripper – B203
04 44 00 40 84	Gripper #1 encountered high current condition while extending.	LTO Gripper – B304 DLT Gripper – B204
04 44 00 40 85	Gripper #1 encountered high current condition while retracting.	LTO Gripper – B305 DLT Gripper – B205
04 44 00 40 86	Gripper #1 unable to find hard stop while extending.	LTO Gripper – B306 DLT Gripper – B206
04 44 00 40 87	Gripper #1 unable to find hard stop while retracting.	LTO Gripper – B307 DLT Gripper – B207
04 44 00 40 88	Gripper #1 unable to get cartridge.	LTO Gripper – B308 DLT Gripper – B208
04 44 00 40 89	Gripper #1 unable to put cartridge.	LTO Gripper – B309 DLT Gripper – B209
04 44 00 40 8A	Gripper #1 lost 37 V dc power.	LTO Gripper – B30A DLT Gripper – B20A

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 40 8B	Gripper #1 encountered a low current condition while retracting.	LTO Gripper – B30B DLT Gripper – B20B
04 44 00 40 8C	Gripper #1 cartridge misplaced.	LTO Gripper – B30C DLT Gripper – B20C
04 44 00 40 8D	Gripper #1 wrong type – does not match configuration.	LTO Gripper – B30D DLT Gripper – B20D
04 44 00 40 91	Gripper #2 will not move – no encoder pulses.	LTO Gripper – B311 DLT Gripper – B211
04 44 00 40 92	Gripper #2 encountered unexpected hard stop while extending.	LTO Gripper – B312 DLT Gripper – B212
04 44 00 40 93	Gripper #2 encountered unexpected hard stop while retracting.	LTO Gripper – B313 DLT Gripper – B213
04 44 00 40 94	Gripper #2 encountered high current condition while extending.	LTO Gripper – B314 DLT Gripper – B214
04 44 00 40 95	Gripper #2 encountered high current condition while retracting.	LTO Gripper – B315 DLT Gripper – B215
04 44 00 40 96	Gripper #2 unable to find hard stop while extending.	LTO Gripper – B316 DLT Gripper – B216
04 44 00 40 97	Gripper #2 unable to find hard stop while retracting.	LTO Gripper – B317 DLT Gripper – B217
04 44 00 40 98	Gripper #2 unable to get cartridge.	LTO Gripper – B318 DLT Gripper – B218
04 44 00 40 99	Gripper #2 unable to put cartridge.	LTO Gripper – B319 DLT Gripper – B219
04 44 00 40 9A	Gripper #2 lost 37 V dc power.	LTO Gripper – B31A DLT Gripper – B21A
04 44 00 40 9B	Gripper #2 encountered a low current condition while retracting.	LTO Gripper – B31B DLT Gripper – B21B
04 44 00 40 9C	Gripper #2 cartridge misplaced.	LTO Gripper – B31C DLT Gripper – B21C
04 44 00 40 9D	Gripper #2 wrong type – does not match configuration.	LTO Gripper – B31D DLT Gripper – B21D
04 44 00 41 81	Gripper #1 sensor hard failure (sensor blocked when it should not be).	LTO Gripper – B30E DLT Gripper – B20E

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 41 82	Gripper #1 sensor hard failure (sensor not blocked when it should be).	LTO Gripper – B30F DLT Gripper – B20F
04 44 00 41 83	Gripper #1 sensor marginal	LTO Gripper – B30E DLT Gripper – B20E
04 44 00 41 84	Gripper #1 sensor failure - output not within acceptable limits	LTO Gripper – B30E DLT Gripper – B20E
04 44 00 41 91	Gripper #2 sensor failure (sensor blocked when it should not be).	LTO Gripper – B31E DLT Gripper – B21E
04 44 00 41 92	Gripper #2 sensor failure (sensor not blocked when it should be).	LTO Gripper – B31F DLT Gripper – B21F
04 44 00 41 93	Gripper #2 sensor marginal	LTO Gripper – B31E DLT Gripper – B21E
04 44 00 41 94	Gripper #2 sensor failure - output not within acceptable limits	LTO Gripper – B31E DLT Gripper – B21E
04 44 00 42 80	Calibration sensor failure (sensor blocked when it should not be).	A460
04 44 00 42 81	Calibration sensor failure (sensor not blocked when it should be).	A461
04 44 00 43 80	X home sensor failure (sensor blocked when it should not be).	A470
04 44 00 43 81	X home sensor failure (unable to find sensor during re-zero).	A471
04 44 00 44 80	Y home sensor failure (sensor blocked when it should not be).	A480
04 44 00 44 81	Y home sensor failure (unable to find sensor during re-zero).	A481
04 44 00 45 80	X motor will not move (no encoder pulses).	A490
04 44 00 45 81	X motion cannot find a hard stop while moving left.	A491
04 44 00 45 82	X motion cannot find a hard stop while moving right.	A492
04 44 00 45 83	X motion encountered an unexpected hard stop while moving left.	A493
04 44 00 45 84	X motion encountered an unexpected hard stop while moving right.	A494
04 44 00 45 85	X motion – excessive force required to move left.	A495
04 44 00 45 86	X motion – excessive force required to move right.	A496
04 44 00 45 87	X motion failed due to loss of 37 V dc.	A497
04 44 00 45 88	X motion failure – probable motor driver problem.	A498
04 44 00 45 89	X motion failure – re-zero detected positioning drift.	A499
04 44 00 46 80	Y motor will not move (no encoder pulses).	A4A0
04 44 00 46 81	Y motion cannot find a hard stop while moving up.	A4A1
04 44 00 46 82	Y motion cannot find a hard stop while moving down.	A4A2
04 44 00 46 83	Y motion encountered an unexpected hard stop while moving up.	A4A3
04 44 00 46 84	Y motion encountered an unexpected hard stop while moving down.	A4A4
04 44 00 46 85	Y motion – excessive force required to move up.	A4A5
04 44 00 46 86	Y motion – excessive force required to move down.	A4A6

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 46 87	Y motion failed due to loss of 37 V dc.	A4A7
04 44 00 46 88	Y motion failure – probable motor driver problem.	A4A8
04 44 00 46 89	Y motion failure – re-zero detected positioning drift.	A4A9
04 44 00 47 80	Pivot motor will not move (no encoder pulses).	A4B0
04 44 00 47 81	Pivot motion cannot find a hard stop while pivoting toward door.	A4B1
04 44 00 47 82	Pivot motion cannot find a hard stop while pivoting toward rear.	A4B2
04 44 00 47 83	Pivot motion encountered an unexpected hard stop while pivoting toward door.	A4B3
04 44 00 47 84	Pivot motion encountered an unexpected hard stop while pivoting toward rear.	A4B4
04 44 00 47 85	Pivot motion – excessive force required to pivot toward door.	A4B5
04 44 00 47 86	Pivot motion – excessive force required to pivot toward rear.	A4B6
04 44 00 47 87	Pivot motion failed due to loss of 37 V dc.	A4B7
04 44 00 5B 80	Element scan failed (bar code scanner failure).	A4C0
04 44 00 5B 81	Bar code mis-compare (bar code was read twice with different results).	A4C1
04 44 00 5B 82	MDA to ACC loopback test of bar code scanner trigger circuit failed.	A4C2
04 44 00 5B 83	ACC cannot trigger the bar code scanner.	A4C3
04 44 00 5B 84	MDA cannot trigger the bar code scanner.	A4C4
04 44 00 5B 85	Bar code unreadable – probable missing or damaged label.	A4C5
04 44 00 5B 86	Frame machine type and model, or frame serial number bar code label unreadable – probable missing or damaged label.	A4C6
04 44 00 5B 87	Unexpected logical library bar code label configuration.	A4C7
04 44 00 5B 88	Bar code scanner test label (located above drive F1, R1) is unreadable.	A4C8
04 44 00 90 80	Source element unexpectedly empty (status message).	A4D0
04 44 00 94 80	Destination element unexpectedly full (status message).	A4D1
04 44 00 9C 80	No LTO diagnostic cartridge found in library.	A4DC
04 44 00 9C 81	No DLT 8000 diagnostic cartridge found in library.	A4DD
04 44 00 A0 80	Invalid Config – No gripper is installed for an installed frame (media) type.	B320
04 44 00 A0 81	Invalid Config – Mixed grippers are installed but only one frame (media) type is installed.	B321
04 44 00 A0 82	Invalid Config – Mixed media – DLT gripper 1 with LTO gripper 2.	B322
04 44 00 A0 85	Invalid Config – No I/O is installed for an installed frame (media) type.	B325
04 44 00 A0 86	Invalid Config – An I/O station is installed with no matching frame (media) type.	B326
04 44 00 A0 87	Invalid Config – L-frame 10 cartridge I/O is not the same media type as the L-frame.	B327
04 44 00 A0 8D	Invalid Config – Drive type incompatible with frame type.	B32D

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 A0 8F	Invalid Config – More than one DLT Control Port in the same logical library.	B32F
04 44 00 A1 80	Invalid Config – The frame serial number in VPD does not match the frame serial number bar code label.	A4CC
04 44 00 B0 80	Cannot open Top I/O station (solenoid failure or sensor not blocked when it should be).	LTO I/O – B330 DLT I/O – B230
04 44 00 B0 81	Cannot lock Top I/O station (solenoid failure or sensor blocked when it should not be). See “Identifying Device Type” on page 170.	LTO I/O – B331 DLT I/O – B231
04 44 00 B0 82	Top I/O station type does not match configuration. See “Identifying Device Type” on page 170.	LTO I/O – B332 DLT I/O – B232
04 44 00 B0 90	Cannot open bottom I/O station (solenoid failure or sensor not blocked when it should be). See “Identifying Device Type” on page 170.	LTO I/O – B338 DLT I/O – B238
04 44 00 B0 91	Cannot lock bottom I/O station (solenoid failure or sensor blocked when it should not be). See “Identifying Device Type” on page 170.	LTO I/O – B339 DLT I/O – B239
04 44 00 B0 92	Bottom I/O station type does not match configuration. See “Identifying Device Type” on page 170.	LTO I/O – B33A DLT I/O – B23A
04 44 00 B2 82	Top I/O Station get failure (I/O station will not release cartridge). See “Identifying Device Type” on page 170.	LTO I/O – B340 DLT I/O – B240
04 44 00 B2 88	Top I/O Station put failure (I/O station will not accept cartridge). See “Identifying Device Type” on page 170.	LTO I/O – B341 DLT I/O – B241
04 44 00 B2 8F	Top I/O Station is full so cartridge export not possible. See “Identifying Device Type” on page 170.	LTO I/O – B34F DLT I/O – B24F
04 44 00 B2 92	Bottom I/O Station get failure (I/O station will not release cartridge). See “Identifying Device Type” on page 170.	LTO I/O – B348 DLT I/O – B248
04 44 00 B2 98	Bottom I/O Station put failure (I/O station will not accept cartridge). See “Identifying Device Type” on page 170.	LTO I/O – B349 DLT I/O – B249
04 44 00 B2 9F	Bottom I/O Station is full so cartridge export is not possible. See “Identifying Device Type” on page 170.	LTO I/O – B34E DLT I/O – B24E
04 44 00 B3 82	Slot get failure (slot will not release cartridge). See “Identifying Device Type” on page 170.	LTO Slot – B350 DLT Slot – B250
04 44 00 B3 88	Slot put failure (slot will not accept cartridge). See “Identifying Device Type” on page 170.	LTO Slot – B351 DLT Slot – B251
04 44 00 B4 80	X or Y motion command exceeds limits – calibration data may be corrupted. See “Identifying Device Type” on page 170.	AACA
04 44 00 B5 8x	Calibration encountered a missing fiducial on column x. See “Identifying Device Type” on page 170.	LTO Column – B360 DLT Column – B260

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 B6 8x	Calibration encountered a missing fiducial on drive x. See "Identifying Device Type" on page 170.	LTO1 DT LVD – C820 LTO1 DT HVD – C920 LTO1 DT FC – CA20 LTO1 DC LVD – CB20 LTO1 DC HVD – CC20 LTO1 DC FC – CD20 LTO2 DC LVD – CE20 LTO2 DC HVD – CF20 LTO2 DC FC – D020 DLT DC LVD – C420 DLT DC HVD – C520
04 44 00 B7 8x	Calibration encountered a missing fiducial on I/O station x. See "Identifying Device Type" on page 170.	LTO I/O – B370 DLT I/O – B270
04 44 00 B7 9x	Calibration encountered a missing second fiducial on I/O station x. See "Identifying Device Type" on page 170.	LTO I/O – B371 DLT I/O – B271
04 44 00 B8 81	Drive unload failure (get failure at drive – unable to get a cartridge that is in the unloaded position at the drive). See "Identifying Device Type" on page 170.	LTO1 DT LVD – C831 LTO1 DT HVD – C931 LTO1 DT FC – CA31 LTO1 DC LVD – CB31 LTO1 DC HVD – CC31 LTO1 DC FC – CD31 LTO2 DC LVD – CE31 LTO2 DC HVD – CF31 LTO2 DC FC – D031 DLT DC LVD – C431 DLT DC HVD – C531

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 B8 82	Drive eject failure (there is no cartridge in the unloaded position in the drive). See "Identifying Device Type" on page 170.	LTO1 DT LVD – C832 LTO1 DT HVD – C932 LTO1 DT FC – CA32 LTO1 DC LVD – CB32 LTO1 DC HVD – CC32 LTO1 DC FC – CD32 LTO2 DC LVD – CE32 LTO2 DC HVD – CF32 LTO2 DC FC – D032 DLT DC LVD – C432 DLT DC HVD – C532
04 44 00 B8 83	Drive load failure (put failure at drive – unable to extend cartridge to the drive load position). See "Identifying Device Type" on page 170.	LTO1 DT LVD – C833 LTO1 DT HVD – C933 LTO1 DT FC – CA33 LTO1 DC LVD – CB33 LTO1 DC HVD – CC33 LTO1 DC FC – CD33 LTO2 DC LVD – CE33 LTO2 DC HVD – CF33 LTO2 DC FC – D033 DLT DC LVD – C433 DLT DC HVD – C533

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 B8 84	Drive load failure (put failure at drive – drive loader did not load the cartridge after it was extended to the drive load position). See “Identifying Device Type” on page 170.	LTO1 DT LVD – C834 LTO1 DT HVD – C934 LTO1 DT FC – CA34 LTO1 DC LVD – CB34 LTO1 DC HVD – CC34 LTO1 DC FC – CD34 LTO2 DC LVD – CE34 LTO2 DC HVD – CF34 LTO2 DC FC – D034 DLT DC LVD – C434 DLT DC HVD – C534
04 44 00 B8 85	Unable to cycle drive door – cartridge may be extending from the drive. See “Identifying Device Type” on page 170.	DLT DC LVD – C435 DLT DC HVD – C535
04 44 00 B8 86	Canister cooling fan failure	LTO1 DC LVD– CB36 LTO1 DC HVD– CC36 LTO1 DC FC– CD36 LTO2 DC LVD– CE36 LTO2 DC HVD– CF36 LTO2 DC FC– D036 DLT DC LVD– C436 DLT DC HVD– C536 CP LVD– E036 CP HVD– E136
04 44 00 BA 21	Battery failure on ACC.	ABB1
04 44 00 BA 22	Battery failure on OPC card.	ABB2
04 44 00 CA 80	Call Home successful – information only – not an error.	ACCA
04 44 00 CA 81	Call Home failed – try again later.	ACCA
04 44 00 CA 82	Call Home failed – machine not registered with Retain.	ACCA
04 44 00 CA 83	Call Home failed because it is disabled or not configured.	ACCA
04 44 00 CA 84	Call Home failed - the library is unable to establish a connection between the library MCP and the local modem.	ACCA
04 44 00 CA 85	Call Home failed - the library is unable to contact the remote modem using the primary phone number.	ACCA
04 44 00 CA 86	Call Home failed - the library is unable to contact the remote modem using the secondary phone number.	ACCA

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
04 44 00 CA 87	Call Home failed - the library established a connection to the remote modem but could not log into the ATT Global Network.	ACCA
04 44 00 CA 88	Call Home failed - the library logged into the ATT Global Network but could not establish a TCP/IP connection to RETAIN using the primary IP address.	ACCA
04 44 00 CA 89	Call Home failed - the library logged into the ATT Global Network but could not establish a TCP/IP connection to RETAIN using the secondary IP address.	ACCA
04 44 00 CA 8A	Call Home failed - the library established a TCP/IP connection but could not log into RETAIN.	ACCA
04 44 00 CA 8B	Call Home failed - the library is unable to establish a connection from the library MCP to the local WTI switch.	ACCA
04 44 00 CA 8C	Call Home failed - the library established a connection to the local WTI switch, but is unable to establish a connection from WTI switch to the local modem.	ACCA
04 44 00 CA 8D	Call Home failed - the local modem Carrier Detect signal was high before the library attempted to dial the modem. This indicates that either a modem connection was previously established by another modem session which did not hang up, or that there is a problem with the modem or modem setup.	ACCA
04 44 00 CA CA	Call Home Test performed.	ACCA
04 44 00 CB CB	Library Firmware downloaded failed or was interrupted.	ACCB
04 44 00 CB CC	Corrupted Library Firmware was downloaded and rejected.	ACCB
04 44 00 CB CD	An attempt to update drive code failed.	ACCD
04 44 00 CC CC	Library Firmware Error (see Object ID and Object Error).	ACCC
04 44 00 CE CE	Configuration of more than one frame was attempted but the Base frame does not have the Capacity Expansion Feature installed.	ACCE
05 1A 00 — —	Parameter list length error.	A51A
05 20 00 — —	Invalid command operation code.	A520
05 21 01 — —	Invalid element address.	A521
05 24 00 — —	Invalid field in CDB (see field pointer).	A524
05 25 00 — —	Logical unit not supported.	A525
05 26 00 — —	Invalid field in parameter list (see field pointer).	A526
05 2C 00 — —	Command sequence error.	A52C
05 39 00 — —	Saving parameters not supported.	A539
05 3B 0D — —	Media destination element full.	A53B
05 3B 0E — —	Media source element empty.	A53C
05 3B 80 — —	Media transport element full.	A53D
05 3B 81 — —	Element Not Accessible, Cartridge Present was Exported by another logical library.	A53E
05 3B 82 — —	Element Not Accessible, drive is Not Present.	A53F
05 3D 00 — —	Invalid bits in identify message.	A540
05 53 02 — —	Media removal prevented (status message).	A553
05 80 00 — —	CU Mode, vendor-unique.	A580

Table 39. Library Sense Data to URC (continued)

Error Data	Description	URC
06 28 00 — —	Not-ready-to-ready transition, media may have changed.	A628
06 28 01 — —	I/O station accessed.	A620
06 29 00 — —	Power-on or reset occurred.	A629
06 2A 01 — —	Mode parameters changed.	A62A
06 3F 01 — —	Microcode has been changed.	A63F
0B 1B 00 — —	Synchronous data transfer error.	AB1B
0B 43 00 — —	Message error.	AB43
0B 44 00 — —	Internal target failure.	AB44
0B 45 00 — —	Select or reselect failure.	AB45
0B 47 00 — —	SCSI parity error.	AB47
0B 48 00 — —	Initiator detected error message received.	AB48
0B 49 00 — —	Invalid message error.	AB49
0B 4A 00 — —	Command phase error.	AB4A
0B 4B 00 — —	Data phase error.	AB4B
0B 4E 00 — —	Overlapped commands attempted.	AB4E

Notes:

1. For any of the sense key 05 conditions, the command was rejected as invalid and no motion was attempted.
2. For MCP or power supply problems, see failing frame number.
3. For fiducial-related failures at columns or I/O stations, see failing frame number.
4. For drive or control port-related failures, see failing frame and drive numbers.

Drive Sense Data to URC Tables

There are two different drive technologies available in the library, LTO and DLT-8000. Before you can correlate drive sense data to a URC, you must determine with which drive technology you are working:

1. Obtain the model number of each frame in the library subsystem.
2. If the second digit of the model number of ALL frames is a 3 (example: L32) then all drives in the library are LTO. Go to “LTO Drive Sense Data to URC Table” on page 189.
3. If you are working with a drive error reported on the library front panel, the drive location, presented in frame/row format, displays on the library front panel. You can determine the drive type visually by going to the rear of the library and matching the frame/row information (from the library front panel) to the Frame and Row location for that frame (see “Drive Types” on page 584 to identify the drive or canister type).
 - Any drive in a fixed tray assembly is LTO.
 - If the drive assembly is a canister, refer to the labels on the back of the drive canister to determine whether it is an LTO or DLT-8000 drive.

Note: Drive types may be abbreviated on the labels. D8 indicates a DLT-8000 drive. L1 indicates an LTO Ultrium-1 drive, L2 indicates an LTO Ultrium-2 drive..

If the drive is LTO, go to “LTO Drive Sense Data to URC Table” on page 189. If the drive is DLT-8000, go to “DLT-8000 Drive Sense Data to URC Table” on page 208.

4. If you are working with a drive error reported at the host, you will need to use host utilities to identify the drive type. The host should be able to display the inquiry string or VPD for the drive.
 - If the inquiry string is “ULT3580–TD1,” then the drive is LTO Ultrium-1. Go to “LTO Drive Sense Data to URC Table” on page 189.
 - If the inquiry string is “ULT3580–TD2,” then the drive is LTO Ultrium-2. Go to “LTO Drive Sense Data to URC Table” on page 189.
 - If the inquiry string is “DLT-8000,” then the drive is DLT-8000. Go to “DLT-8000 Drive Sense Data to URC Table” on page 208.

LTO Drive Sense Data to URC Table

The data in the **Error Data** column of Table 40 on page 190 is divided into 3 groups. These groups from left to right are:

- Sense Byte 02 = Sense Key (SK)
- Sense Byte 12 = Additional Sense Code (ASC)
- Sense Byte 13 = Additional Sense Code Qualifier (ASCQ)

In the **Error Data** column of Table 40 on page 190, a ‘—’ denotes that data is not applicable. An ‘xx’ denotes variable data will occur. Table 40 on page 190 also contains an error **Description** and a **URC** column.

The following abbreviations apply to the URC column:

LTO1 DT LVD. LTO Ultrium-1 drive tray (SCSI Low Voltage Differential)

LTO1 DT HVD. LTO Ultrium-1 drive tray (SCSI High Voltage Differential)

LTO1 DT FC. LTO Ultrium-1 drive tray Fibre Channel

LTO1 DC LVD. LTO Ultrium-1 drive canister (SCSI Low Voltage Differential)

LTO1 DC HVD. LTO Ultrium-1 drive canister (SCSI High Voltage Differential)

LTO1 DC FC. LTO Ultrium-1 drive canister Fibre Channel

LTO2 DC LVD. LTO Ultrium-2 drive canister (SCSI Low Voltage Differential)

LTO2 DC HVD. LTO Ultrium-2 drive canister (SCSI High Voltage Differential)

LTO2 DC FC. LTO Ultrium-2 drive canister Fibre Channel

Determine what type of LTO drive assembly you are working with (see notes below), look up the drive sense data in this table to determine the URC, then go to “URC Description With Action and FRUs” on page 226 to repair the problem.

Notes:

1. The URC is for reference only and is not part of the sense data.
2. If you are working with **Library** sense data, go to “Library Sense Data to URC Table” on page 170.
3. If the drive is a DLT-8000, go to “DLT-8000 Drive Sense Data to URC Table” on page 208.
4. If you need to determine a drive type, first determine the location of the affected drive. See byte 35 of the drive sense data. As an example if the failing frame/device byte is X'14' (hex) this indicates that the drive is located in frame 1, row 4. When you have determined the frame and row number of the drive, visually check to see whether the drive assembly is a tray or a canister. To determine the type of drive that is in your library, consider the following:
 - Determine the drive type (LTO/DLT and LVD/HVD/FC) by referring to the labels on the back of the drive.

Note: Drive types may be abbreviated on the labels. D8 indicates a DLT-8000 drive. L1 indicates an LTO Ultrium-1 drive. L2 indicates an LTO Ultrium-2 drive.

 - Early drive tray assemblies did not have labels. Regard these as LTO1 DT LVD drives.
 - For further information on drive trays and drive canisters, see the table at Table 63 on page 584 and review the listed procedures and drawings for each type of drive.

Table 40. LTO Drive Sense Data to URC

Error Data	Description	URC
00 00 00	No sense information. This usually means there was no error. In rare instances it also can occur when a SCSI failure prevented the drive from returning sense information. If the flags in the sense data are non-zero they indicate the reason this sense was returned. See "Identifying Device Type" on page 170.	LTO1 DT LVD — 3010 LTO1 DT HVD — 3410 LTO1 DT FC — 3810 LTO1 DC LVD — 3C10 LTO1 DC HVD — 4010 LTO1 DC FC — 4410 LTO2 DC LVD — 4810 LTO2 DC HVD — 4C10 LTO2 DC FC — 5010
00 00 01	Filemark Detected — A Read or Space command terminated early because a File Mark has been encountered. The File Mark flag is set. See "Identifying Device Type" on page 170.	LTO1 DT LVD — 3011 LTO1 DT HVD — 3411 LTO1 DT FC — 3811 LTO1 DC LVD — 3C11 LTO1 DC HVD — 4011 LTO1 DC FC — 4411 LTO2 DC LVD — 4811 LTO2 DC HVD — 4C11 LTO2 DC FC — 5011
00 00 02	EOM — A Write or Write File Marks command ended in the early warning area. The EOM flag is set. See "Identifying Device Type" on page 170.	LTO1 DT LVD — 3012 LTO1 DT HVD — 3412 LTO1 DT FC — 3812 LTO1 DC LVD — 3C12 LTO1 DC HVD — 4012 LTO1 DC FC — 4412 LTO2 DC LVD — 4812 LTO2 DC HVD — 4C12 LTO2 DC FC — 5012

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
00 00 04	BOM — A Space command ended at Beginning of Tape. The EOM flag is also set. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3013 LTO1 DT HVD — 3413 LTO1 DT FC — 3813 LTO1 DC LVD — 3C13 LTO1 DC HVD — 4013 LTO1 DC FC — 4413 LTO2 DC LVD — 4813 LTO2 DC HVD — 4C13 LTO2 DC FC — 5013
00 82 82	Drive Requires Cleaning — The drive has detected that a cleaning operation is required to maintain good operation. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3015 LTO1 DT HVD — 3415 LTO1 DT FC — 3815 LTO1 DC LVD — 3C15 LTO1 DC HVD — 4015 LTO1 DC FC — 4415 LTO2 DC LVD — 4815 LTO2 DC HVD — 4C15 LTO2 DC FC — 5015
01 37 00	Recovered Error — A Mode Select command parameter has been rounded because the drive cannot store it with the accuracy of the command. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3019 LTO1 DT HVD — 3419 LTO1 DT FC — 3819 LTO1 DC LVD — 3C19 LTO1 DC HVD — 4019 LTO1 DC FC — 4419 LTO2 DC LVD — 4819 LTO2 DC HVD — 4C19 LTO2 DC FC — 5019

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
01 5D 00	Recovered Error — Failure Prediction thresholds have been exceeded indicating that a failure may occur soon. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 301A LTO1 DT HVD — 341A LTO1 DT FC — 381A LTO1 DC LVD — 3C1A LTO1 DC HVD — 401A LTO1 DC FC — 441A LTO2 DC LVD — 481A LTO2 DC HVD — 4C1A LTO2 DC FC — 501A
02 04 00	Not Ready — Cause Not reportable. A cartridge is present in the drive, but it is in the process of being unloaded. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 301B LTO1 DT HVD — 341B LTO1 DT FC — LTO1 DC LVD — 3C1B LTO1 DC HVD — 401B LTO1 DC FC — 441B LTO2 DC LVD — 481B LTO2 DC HVD — 4C1B LTO2 DC FC — 501B
02 04 01	Not Ready — Becoming Ready. A Media Access command was received during a load. The drive has not finished the load and thread process yet. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 301C LTO1 DT HVD — 341C LTO1 DT FC — 381C LTO1 DC LVD — 3C1C LTO1 DC HVD — 401C LTO1 DC FC — 441C LTO2 DC LVD — 481C LTO2 DC HVD — 4C1C LTO2 DC FC — 501C

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
02 04 02	Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 301D LTO1 DT HVD — 341D LTO1 DT FC — 381D LTO1 DC LVD — 3C1D LTO1 DC HVD — 401D LTO1 DC FC — 441D LTO2 DC LVD — 481D LTO2 DC HVD — 4C1D LTO2 DC FC — 501D
02 30 03	Not Ready — Cleaning Cartridge Installed. An operation could not be carried out because the cartridge in the drive is a cleaning cartridge. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 301E LTO1 DT HVD — 341E LTO1 DT FC — 381E LTO1 DC LVD — 3C1E LTO1 DC HVD — 401E LTO1 DC FC — 441E LTO2 DC LVD — 481E LTO2 DC HVD — 4C1E LTO2 DC FC — 501E
02 30 07	Not Ready — Cleaning Failure. A cleaning operation was attempted, but could not be completed. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 301F LTO1 DT HVD — 341F LTO1 DT FC — 381F LTO1 DC LVD — 3C1F LTO1 DC HVD — 401F LTO1 DC FC — 441F LTO2 DC LVD — 481F LTO2 DC HVD — 4C1F LTO2 DC FC — 501F

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
02 3A 00	Not Ready — Media Not Present. A Media Access command was received when there was no cartridge loaded. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3020 LTO1 DT HVD — 3420 LTO1 DT FC — 3820 LTO1 DC LVD — 3C20 LTO1 DC HVD — 4020 LTO1 DC FC — 4420 LTO2 DC LVD — 4820 LTO2 DC HVD — 4C20 LTO2 DC FC — 5020
02 3E 00	Not Ready — Logical Unit Not Configured. The drive has just powered on or reset, and has not completed POST and configuration. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3021 LTO1 DT HVD — 3421 LTO1 DT FC — 3821 LTO1 DC LVD — 3C21 LTO1 DC HVD — 4021 LTO1 DC FC — 4421 LTO2 DC LVD — 4821 LTO2 DC HVD — 4C21 LTO2 DC FC — 5021
03 0C 00	Write Error — A Write operation has failed. This is probably due to a media defect, but may be a drive failure. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3022 LTO1 DT HVD — 3422 LTO1 DT FC — 3822 LTO1 DC LVD — 3C22 LTO1 DC HVD — 4022 LTO1 DC FC — 4422 LTO2 DC LVD — 4822 LTO2 DC HVD — 4C22 LTO2 DC FC — 5022

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
03 11 00	Unrecovered Read Error — A Read operation failed. This is probably due to a media defect, but may be a drive failure. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3023 LTO1 DT HVD — 3423 LTO1 DT FC — 3823 LTO1 DC LVD — 3C23 LTO1 DC HVD — 4023 LTO1 DC FC — 4423 LTO2 DC LVD — 4823 LTO2 DC HVD — 4C23 LTO2 DC FC — 5023
03 14 00	Recorded Entity Not Found — A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to a media defect, but may be a drive failure. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3024 LTO1 DT HVD — 3424 LTO1 DT FC — 3824 LTO1 DC LVD — 3C24 LTO1 DC HVD — 4024 LTO1 DC FC — 4424 LTO2 DC LVD — 4824 LTO2 DC HVD — 4C24 LTO2 DC FC — 5024
03 30 01	Unknown Format — An operation could not be carried out because the cartridge in the drive has a logical format that is not recognized by the drive. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3025 LTO1 DT HVD — 3425 LTO1 DT FC — 3825 LTO1 DC LVD — 3C25 LTO1 DC HVD — 4025 LTO1 DC FC — 4425 LTO2 DC LVD — 4825 LTO2 DC HVD — 4C25 LTO2 DC FC — 5025

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
03 30 02	Incompatible Format — An operation could not be completed because the cartridge in the drive has a Logical Format that is not correct. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3026 LTO1 DT HVD — 3426 LTO1 DT FC — 3826 LTO1 DC LVD — 3C26 LTO1 DC HVD — 4026 LTO1 DC FC — 4426 LTO2 DC LVD — 4826 LTO2 DC HVD — 4C26 LTO2 DC FC — 5026
03 31 00	Media Format Corrupted — Data could not be read because the format on tape is not valid, but is a known format. A failure occurred attempting to write the file ID. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3027 LTO1 DT HVD — 3427 LTO1 DT FC — 3827 LTO1 DC LVD — 3C27 LTO1 DC HVD — 4027 LTO1 DC FC — 4427 LTO2 DC LVD — 4827 LTO2 DC HVD — 4C27 LTO2 DC FC — 5027
03 3B 00	Sequential Positioning Error — A command has failed and left the logical position at an unexpected location. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3028 LTO1 DT HVD — 3428 LTO1 DT FC — 3828 LTO1 DC LVD — 3C28 LTO1 DC HVD — 4028 LTO1 DC FC — 4428 LTO2 DC LVD — 4828 LTO2 DC HVD — 4C28 LTO2 DC FC — 5028

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
03 50 00	Write Append Error — A Write type command failed because the point at which to append data was unreadable. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 302A LTO1 DT HVD — 342A LTO1 DT FC — 382A LTO1 DC LVD — 3C2A LTO1 DC HVD — 402A LTO1 DC FC — 442A LTO2 DC LVD — 482A LTO2 DC HVD — 4C2A LTO2 DC FC — 502A
03 52 00	Cartridge Fault — A command could not be completed due to a fault in the tape cartridge. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 302B LTO1 DT HVD — 342B LTO1 DT FC — 382B LTO1 DC LVD — 3C2B LTO1 DC HVD — 402B LTO1 DC FC — 442B LTO2 DC LVD — 482B LTO2 DC HVD — 4C2B LTO2 DC FC — 502B
03 53 00	Media Load/Eject Failed — An attempt to load or eject the cartridge failed due to a problem with the cartridge. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 302C LTO1 DT HVD — 342C LTO1 DT FC — 382C LTO1 DC LVD — 3C2C LTO1 DC HVD — 402C LTO1 DC FC — 442C LTO2 DC LVD — 482C LTO2 DC HVD — 4C2C LTO2 DC FC — 502C

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
04 04 03	Manual Intervention Required — A cartridge is present in the drive but cannot be loaded or unloaded without manual intervention. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 302D LTO1 DT HVD — 342D LTO1 DT FC — 382D LTO1 DC LVD — 3C2D LTO1 DC HVD — 402D LTO1 DC FC — 442D LTO2 DC LVD — 482D LTO2 DC HVD — 4C2D LTO2 DC FC — 502D
04 40 XX	Diagnostic Failure — A diagnostic test has failed. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 302E LTO1 DT HVD — 342E LTO1 DT FC — 382E LTO1 DC LVD — 3C2E LTO1 DC HVD — 402E LTO1 DC FC — 442E LTO2 DC LVD — 482E LTO2 DC HVD — 4C2E LTO2 DC FC — 502E
04 44 00	Internal Target Failure — A hardware failure has been detected in the drive and has caused the command to fail. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 302F LTO1 DT HVD — 342F LTO1 DT FC — 382F LTO1 DC LVD — 3C2F LTO1 DC HVD — 402F LTO1 DC FC — 442F LTO2 DC LVD — 482F LTO2 DC HVD — 4C2F LTO2 DC FC — 502F

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
04 51 00	Erase Failure — An Erase command failed to erase the required area on the tape. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3030 LTO1 DT HVD — 3430 LTO1 DT FC — 3830 LTO1 DC LVD — 3C30 LTO1 DC HVD — 4030 LTO1 DC FC — 4430 LTO2 DC LVD — 4830 LTO2 DC HVD — 4C30 LTO2 DC FC — 5030
04 53 00	Media Load/Eject Failed — An attempt to load or eject the cartridge failed due to a problem with the drive. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3031 LTO1 DT HVD — 3431 LTO1 DT FC — 3831 LTO1 DC LVD — 3C31 LTO1 DC HVD — 4031 LTO1 DC FC — 4431 LTO2 DC LVD — 4831 LTO2 DC HVD — 4C31 LTO2 DC FC — 5031
05 1A 00	Illegal Request — Parameter list length error. The amount of parameter data sent is incorrect. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3032 LTO1 DT HVD — 3432 LTO1 DT FC — 3832 LTO1 DC LVD — 3C32 LTO1 DC HVD — 4032 LTO1 DC FC — 4432 LTO2 DC LVD — 4832 LTO2 DC HVD — 4C32 LTO2 DC FC — 5032

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
05 20 00	Illegal Request — Invalid Command Operation Code in CDB. The Operation Code specified in the Command Descriptor Block was not valid. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3033 LTO1 DT HVD — 3433 LTO1 DT FC — 3833 LTO1 DC LVD — 3C33 LTO1 DC HVD — 4033 LTO1 DC FC — 4433 LTO2 DC LVD — 4833 LTO2 DC HVD — 4C33 LTO2 DC FC — 5033
05 24 00	Illegal Request — Invalid field in CDB. An invalid value was detected in the Command Descriptor Block. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3034 LTO1 DT HVD — 3434 LTO1 DT FC — 3834 LTO1 DC LVD — 3C34 LTO1 DC HVD — 4034 LTO1 DC FC — 4434 LTO2 DC LVD — 4834 LTO2 DC HVD — 4C34 LTO2 DC FC — 5034
05 25 00	Illegal Request — LUN not supported. The command was addressed to a non-existent Logical Unit Number. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3035 LTO1 DT HVD — 3435 LTO1 DT FC — 3835 LTO1 DC LVD — 3C35 LTO1 DC HVD — 4035 LTO1 DC FC — 4435 LTO2 DC LVD — 4835 LTO2 DC HVD — 4C35 LTO2 DC FC — 5035

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
05 26 00	Illegal Request — Invalid Field in Parameter List. An invalid value was detected in the data sent during the data phase. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3036 LTO1 DT HVD — 3436 LTO1 DT FC — 3836 LTO1 DC LVD — 3C36 LTO1 DC HVD — 4030 LTO1 DC FC — 4436 LTO2 DC LVD — 4836 LTO2 DC HVD — 4C30 LTO2 DC FC — 5036
05 53 02	Illegal Request — Media Removal Prevented. An Unload command was rejected because the drive previously received a Prevent Media Removal command. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3037 LTO1 DT HVD — 3437 LTO1 DT FC — 3837 LTO1 DC LVD — 3C37 LTO1 DC HVD — 4037 LTO1 DC FC — 4437 LTO2 DC LVD — 4837 LTO2 DC HVD — 4C37 LTO2 DC FC — 5037
05 82 83	Illegal Request — Bad Code Detected. The data transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3038 LTO1 DT HVD — 3438 LTO1 DT FC — 3838 LTO1 DC LVD — 3C38 LTO1 DC HVD — 4038 LTO1 DC FC — 4438 LTO2 DC LVD — 4838 LTO2 DC HVD — 4C38 LTO2 DC FC — 5038

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
06 28 00	Unit Attention — Not Ready to Ready Transition. A cartridge has been loaded successfully into the drive and is now ready to be accessed. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3039 LTO1 DT HVD — 3439 LTO1 DT FC — 3839 LTO1 DC LVD — 3C39 LTO1 DC HVD — 4039 LTO1 DC FC — 4439 LTO2 DC LVD — 4839 LTO2 DC HVD — 4C39 LTO2 DC FC — 5039
06 29 00	Unit Attention — Reset. The drive has powered on or received a reset since the initiator last accessed it. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 303A LTO1 DT HVD — 343A LTO1 DT FC — 383A LTO1 DC LVD — 3C3A LTO1 DC HVD — 403A LTO1 DC FC — 443A LTO2 DC LVD — 483A LTO2 DC HVD — 4C3A LTO2 DC FC — 503A
06 2A 01	Unit Attention — Mode Parameters Changed. The Mode parameters for the drive have been changed by an initiator other than the one issuing the command. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 303B LTO1 DT HVD — 343B LTO1 DT FC — 383B LTO1 DC LVD — 3C3B LTO1 DC HVD — 403B LTO1 DC FC — 443B LTO2 DC LVD — 483B LTO2 DC HVD — 4C3B LTO2 DC FC — 503B

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
06 3F 01	Unit Attention — Code Download. The firmware in the drive has just been changed. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 303C LTO1 DT HVD — 343C LTO1 DT FC — 383C LTO1 DC LVD — 3C3C LTO1 DC HVD — 403C LTO1 DC FC — 443C LTO2 DC LVD — 483C LTO2 DC HVD — 4C3C LTO2 DC FC — 503C
06 5D FF	Unit Attention — Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 303D LTO1 DT HVD — 343D LTO1 DT FC — 383D LTO1 DC LVD — 3C3D LTO1 DC HVD — 403D LTO1 DC FC — 443D LTO2 DC LVD — 483D LTO2 DC HVD — 4C3D LTO2 DC FC — 503D
07 27 00	Write Protect — A Write type operation has been requested on a cartridge which has been write protected. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 303E LTO1 DT HVD — 343E LTO1 DT FC — 383E LTO1 DC LVD — 3C3E LTO1 DC HVD — 403E LTO1 DC FC — 443E LTO2 DC LVD — 483E LTO2 DC HVD — 4C3E LTO2 DC FC — 503E

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
07 30 00	Incompatible Media Installed — A Write type operation could not be executed because it is not supported on the tape type that is loaded.	LTO1 DT LVD — 303F LTO1 DT HVD — 343F LTO1 DT FC — 383F LTO1 DC LVD — 3C3F LTO1 DC HVD — 403F LTO1 DC FC — 443F LTO2 DC LVD — 483F LTO2 DC HVD — 4C3F LTO2 DC FC — 503F
08 00 05	End Of Data — A Read or Space command terminated early because End of Data was encountered. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3040 LTO1 DT HVD — 3440 LTO1 DT FC — 3840 LTO1 DC LVD — 3C40 LTO1 DC HVD — 4040 LTO1 DC FC — 4440 LTO2 DC LVD — 4840 LTO2 DC HVD — 4C40 LTO2 DC FC — 5040
08 14 03	End Of Data Not Found — A Read type operation failed because of a format violation related to a missing EOD data set. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3041 LTO1 DT HVD — 3441 LTO1 DT FC — 3841 LTO1 DC LVD — 3C41 LTO1 DC HVD — 4041 LTO1 DC FC — 4441 LTO2 DC LVD — 4841 LTO2 DC HVD — 4C41 LTO2 DC FC — 5041

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
0B 3D 00	Aborted Command — Invalid Bits In Identify message. An illegal Identify Message was received by the drive at the start of a command. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3042 LTO1 DT HVD — 3442 LTO1 DT FC — 3842 LTO1 DC LVD — 3C42 LTO1 DC HVD — 4042 LTO1 DC FC — 4442 LTO2 DC LVD — 4842 LTO2 DC HVD — 4C42 LTO2 DC FC — 5042
0B 43 00	Aborted Command — Message Error. A message could not be sent or received due to excessive transmission errors. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3043 LTO1 DT HVD — 3443 LTO1 DT FC — 3843 LTO1 DC LVD — 3C43 LTO1 DC HVD — 4043 LTO1 DC FC — 4443 LTO2 DC LVD — 4843 LTO2 DC HVD — 4C43 LTO2 DC FC — 5043
0B 45 00	Aborted Command — Select/Reset Failure. An attempt to reselect an initiator in order to complete the command failed. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3044 LTO1 DT HVD — 3444 LTO1 DT FC — 3844 LTO1 DC LVD — 3C44 LTO1 DC HVD — 4044 LTO1 DC FC — 4444 LTO2 DC LVD — 4844 LTO2 DC HVD — 4C44 LTO2 DC FC — 5044

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
0B 48 00	Aborted Command — Initiator Detected Error Message. A command failed because an Initiator Detected Error message was received. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3045 LTO1 DT HVD — 3445 LTO1 DT FC — 3845 LTO1 DC LVD — 3C45 LTO1 DC HVD — 4045 LTO1 DC FC — 4445 LTO2 DC LVD — 4845 LTO2 DC HVD — 4C45 LTO2 DC FC — 5045
0B 49 00	Aborted Command — Invalid Message Error. A command failed because an invalid message was received by the drive. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3046 LTO1 DT HVD — 3446 LTO1 DT FC — 3846 LTO1 DC LVD — 3C46 LTO1 DC HVD — 4046 LTO1 DC FC — 4446 LTO2 DC LVD — 4846 LTO2 DC HVD — 4C46 LTO2 DC FC — 5046
0B 4A 00	Aborted Command — Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3047 LTO1 DT HVD — 3447 LTO1 DT FC — 3847 LTO1 DC LVD — 3C47 LTO1 DC HVD — 4047 LTO1 DC FC — 4447 LTO2 DC LVD — 4847 LTO2 DC HVD — 4C47 LTO2 DC FC — 5047

Table 40. LTO Drive Sense Data to URC (continued)

Error Data	Description	URC
0B 4B 00	Aborted Command — Data Phase Error. A command could not be completed because too many parity errors occurred during the Data phase. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3048 LTO1 DT HVD — 3448 LTO1 DT FC — 3848 LTO1 DC LVD — 3C48 LTO1 DC HVD — 4048 LTO1 DC FC — 4448 LTO2 DC LVD — 4848 LTO2 DC HVD — 4C48 LTO2 DC FC — 5048
0B 4E 00	Aborted Command — Overlapped Commands. An initiator selected the drive even though it already had a command outstanding in the drive. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 3049 LTO1 DT HVD — 3449 LTO1 DT FC — 3849 LTO1 DC LVD — 3C49 LTO1 DC HVD — 4049 LTO1 DC FC — 4449 LTO2 DC LVD — 4849 LTO2 DC HVD — 4C49 LTO2 DC FC — 5049
0D 00 02	Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The EOM flag is set. See “Identifying Device Type” on page 170.	LTO1 DT LVD — 304A LTO1 DT HVD — 344A LTO1 DT FC — 384A LTO1 DC LVD — 3C4A LTO1 DC HVD — 404A LTO1 DC FC — 444A LTO2 DC LVD — 484A LTO2 DC HVD — 4C4A LTO2 DC FC — 504A

DLT-8000 Drive Sense Data to URC Table

The data in the **Error Data** column of Table 41 is divided into 3 groups. These groups from left to right are:

- Sense Byte 02 = Sense Key (SK)
- Sense Byte 12 = Additional Sense Code (ASC)
- Sense Byte 13 = Additional Sense Code Qualifier (ASCQ)

In the **Error Data** column of Table 41, a ‘—’ denotes that data is not applicable. An ‘xx’ denotes variable data will occur. Table 41 also contains an error **Description** and a **URC** column.

The following abbreviations apply to the URC column:

DLT DC LVD. DLT drive canister (SCSI Low Voltage Differential)

DLT DC HVD. DLT drive canister (SCSI High Voltage Differential)

Determine what type of DLT-8000 drive assembly you are working with (see notes below), look up the drive sense data in this table to determine the URC, then go to “URC Description With Action and FRUs” on page 226 to repair the problem.

Notes:

1. The URC is for reference only and is not part of the sense data.
2. If you are working with **Library** sense data, go to “Library Sense Data to URC Table” on page 170.
3. If the drive is an LTO, go to “LTO Drive Sense Data to URC Table” on page 189.
4. If the library contains more than one type of drive (example: a mixture of DLT-8000 LVD and DLT-8000 HVD drives), you must first determine the position within the library of the drive you are working with. Use host configuration data or application configuration data to determine the host adapter number and SCSI ID of the affected drive. Once you have located the host adapter, you may need to follow the cable from the host to the library to locate the drive. If there are multiple drives on the affected host adapter then note the frame and row number of each drive on the bus, then go to the front panel of the library and view the SCSI ID of the drives to determine which one is affected.
5. When you have determined the frame and row number of the drive assembly you are working with, refer to the label on the back of the drive canister to determine the type.

Table 41. DLT-8000 Drive Sense Data to URC

Error Data	Description	URC
00 00 00	No sense information. This usually means there was no error. In rare instances it also can occur when a SCSI failure prevented the drive from returning sense information. If the flags in the sense data are non-zero they indicate the reason this sense was returned.	DLT DC LVD — 2010 DLT DC HVD — 2410
00 00 01	Unexpected Filemark Detected — A Read or Space command terminated early because a File Mark has been encountered. The File Mark flag is set.	DLT DC LVD — 2011 DLT DC HVD — 2411
00 00 02	End of Media (EOM) — A Write or Write File Marks command ended in the early warning area. The EOM flag is set.	DLT DC LVD — 2012 DLT DC HVD — 2412
00 00 04	Beginning of Media (BOM) — A Space command ended at Beginning of Tape. The EOM flag is also set.	DLT DC LVD — 2013 DLT DC HVD — 2413
00 27 82	Data Safety Write Protect.	DLT DC LVD — 203E DLT DC HVD — 243E

Table 41. DLT-8000 Drive Sense Data to URC (continued)

Error Data	Description	URC
00 5D 00	Failure Prediction Threshold Exceeded.	DLT DC LVD — 201A DLT DC HVD — 241A
01 00 17	Clean Requested.	DLT DC LVD — 2015 DLT DC HVD — 2415
01 0A 00	Recovered Error — Error Log Overflow.	DLT DC LVD — 20xx DLT DC HVD — 24xx
01 0A 80	Recovered Error — Error Log Generated.	DLT DC LVD — 20xx DLT DC HVD — 24xx
01 37 00	Recovered Error — A Mode Select command parameter has been rounded because the drive cannot store it with the accuracy of the command.	DLT DC LVD — 2019 DLT DC HVD — 2419
01 3B 08	Recovered Error — Repositioning Error.	DLT DC LVD — 2028 DLT DC HVD — 2428
01 44 C1	Recovered Error — EEROM Copy 1 Area Bad.	DLT DC LVD — 202E DLT DC HVD — 242E
01 44 C2	Recovered Error — EEROM Copy 2 Area Bad.	DLT DC LVD — 202E DLT DC HVD — 242E
01 47 00	Recovered Error — SCSI Parity Error.	DLT DC LVD — 2043 DLT DC HVD — 2443
01 48 00	Recovered Error — SCSI Initiator Detected Error message received.	DLT DC LVD — 2045 DLT DC HVD — 2445
01 51 00	Recovered Error — Erase Failure.	DLT DC LVD — 2030 DLT DC HVD — 2430
01 53 01	Recovered Error — Unload Tape Failure.	DLT DC LVD — 202C DLT DC HVD — 242C
01 5B 02	Recovered Error — Log Counter at maximum.	DLT DC LVD — 20xx DLT DC HVD — 24xx
01 80 02	Recovered Error — Cleaning Requested.	DLT DC LVD — 2015 DLT DC HVD — 2415
01 80 03	Recovered Error — Soft Error Exceeds Threshold.	DLT DC LVD — 201A DLT DC HVD — 241A
02 04 00	Not Ready — Cause Not reportable. A cartridge is present in the drive, but it is in the process of being unloaded.	DLT DC LVD — 201B DLT DC HVD — 241B
02 04 01	Not Ready — Becoming Ready. The drive has not finished the load, thread, and calibration process yet.	DLT DC LVD — 201C DLT DC HVD — 241C

Table 41. DLT-8000 Drive Sense Data to URC (continued)

Error Data	Description	URC
02 04 02	Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.	DLT DC LVD — 201D DLT DC HVD — 241D
02 04 03	Not Ready — Manual Intervention Required.	DLT DC LVD — 202D DLT DC HVD — 242D
02 30 02	Not Ready — Incompatible Format.	DLT DC LVD — 203F DLT DC HVD — 243F
02 30 03	Not Ready — Cleaning Cartridge Installed. An operation could not be carried out because the cartridge in the drive is a cleaning cartridge.	DLT DC LVD — 201E DLT DC — 241E
02 3A 00	Not Ready — Media Not Present. A Media Access command was received when there was no cartridge loaded.	DLT DC LVD — 2020 DLT DC HVD — 2420
02 3A 80	Not Ready — Media Not Present, Cartridge Missing.	DLT DC LVD — 2020 DLT DC HVD — 2420
02 5A 01	Not Ready — Operator Media Removal Request.	DLT DC LVD — 202D DLT DC HVD — 242D
03 00 00	Medium Error.	DLT DC LVD — 202B DLT DC HVD — 242B
03 0C 00	Write Error — A Write operation has failed. This is probably due to a media defect, but may be a drive failure.	DLT DC LVD — 2022 DLT DC HVD — 2422
03 11 00	Unrecovered Read Error — A Read operation failed. This is probably due to a media defect, but may be a drive failure.	DLT DC LVD — 2023 DLT DC HVD — 2423
03 11 08	Unrecovered Read Error — A Read operation failed before the entire block had been read. This is probably due to a media defect, but may be a drive failure.	DLT DC LVD — 2023 DLT DC HVD — 2423
03 14 00	Recorded Entity Not Found — A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.	DLT DC LVD — 2024 DLT DC HVD — 2424
03 15 02	Position error detected by read of media.	DLT DC LVD — 2028 DLT DC HVD — 2428
03 30 00	Cannot Read Media.	DLT DC LVD — 2025 DLT DC HVD — 2425
03 3B 00	Sequential Positioning Error — A command has failed and left the logical position at an unexpected location.	DLT DC LVD — 2028 DLT DC HVD — 2428
03 3B 08	Repositioning Error.	DLT DC LVD — 2028 DLT DC HVD — 2428
03 51 00	Erase Failure.	DLT DC LVD — 2030 DLT DC HVD — 2430

Table 41. DLT-8000 Drive Sense Data to URC (continued)

Error Data	Description	URC
03 80 00	Calibration Error.	DLT DC LVD — 20xx DLT DC HVD — 24xx
03 80 01	Cleaning Required.	DLT DC LVD — 2015 DLT DC HVD — 2415
03 81 00	Directory Read Error.	DLT DC LVD — 2023 DLT DC HVD — 2423
04 08 00	LUN Communication Failure.	DLT DC LVD — 2035 DLT DC HVD — 2435
04 08 01	LUN Communication Timeout.	DLT DC LVD — 2035 DLT DC HVD — 2435
04 0C 80	Write SCSI FIFO CRC Error.	DLT DC LVD — 202F DLT DC HVD — 242F
04 11 80	Read SCSI FIFO CRC Error.	DLT DC LVD — 202F DLT DC HVD — 242F
04 11 81	Block port detected EDC error.	DLT DC LVD — 202F DLT DC HVD — 242F
04 11 82	Block port detected record CRC error.	DLT DC LVD — 202F DLT DC HVD — 242F
04 15 01	Random Mechanical Positioning Error.	DLT DC LVD — 2028 DLT DC HVD — 2428
04 3B 08	Repositioning Error.	DLT DC LVD — 2028 DLT DC HVD — 2428
04 40 XX	Diagnostic Failure — A diagnostic test has failed.	DLT DC LVD — 202E DLT DC HVD — 242E
04 44 00	Internal Target Failure — A hardware failure has been detected in the drive and has caused the command to fail.	DLT DC LVD — 202F DLT DC HVD — 242F
04 44 83	SCSI Chip Gross Error.	DLT DC LVD — 202F DLT DC HVD — 242F
04 44 84	Unexplained Selection Interrupt.	DLT DC LVD — 202F DLT DC HVD — 242F
04 44 85	Immediate Data Transfer Timeout.	DLT DC LVD — 202F DLT DC HVD — 242F
04 44 86	Insufficient CDB Bytes.	DLT DC LVD — 2032 DLT DC HVD — 2432

Table 41. DLT-8000 Drive Sense Data to URC (continued)

Error Data	Description	URC
04 44 87	Disconnect/SDP Sequence Failed.	DLT DC LVD — 2044 DLT DC HVD — 2444
04 44 88	Bus DMA Transfer Timeout.	DLT DC LVD — 202F DLT DC HVD — 242F
04 44 8A	Over Temperature condition.	DLT DC LVD — 20xx DLT DC HVD — 24xx
04 44 C3	Both EEROM Copy areas bad.	DLT DC LVD — 202E DLT DC HVD — 242E
04 47 00	SCSI Parity Error.	DLT DC LVD — 2043 DLT DC HVD — 2443
04 48 00	Initiator Detected Error Message Received.	DLT DC LVD — 2045 DLT DC HVD — 2445
04 51 00	Erase Failure — An Erase command failed to erase the required area on the tape.	DLT DC LVD — 2030 DLT DC HVD — 2430
04 53 00	Media Load/Eject Failed — An attempt to load or eject the cartridge failed due to a problem with the drive.	DLT DC LVD — 2031 DLT DC HVD — 2431
04 53 01	Unload Tape Failure.	DLT DC LVD — 202C DLT DC HVD — 242C
04 84 01	Basic Health Check Failed.	DLT DC LVD — 202E DLT DC HVD — 242E
05 1A 00	Illegal Request — Parameter list length error. The amount of parameter data sent is incorrect.	DLT DC LVD — 2032 DLT DC HVD — 2432
05 20 00	Illegal Request — Invalid Command Operation Code in CDB. The Operation Code specified in the Command Descriptor Block was not valid.	DLT DC LVD — 2033 DLT DC HVD — 2433
05 24 00	Illegal Request — Invalid field in CDB. An invalid value was detected in the Command Descriptor Block.	DLT DC LVD — 2034 DLT DC HVD — 2434
05 24 81	Illegal Request — Invalid mode on write buffer command.	DLT DC LVD — 2034 DLT DC HVD — 2434
05 24 82	Illegal Request — Media in Drive.	DLT DC LVD — 20xx DLT DC HVD — 24xx
05 24 84	Illegal Request — Insufficient Resources.	DLT DC LVD — 20xx DLT DC HVD — 24xx
05 24 86	Illegal Request — Invalid Offset.	DLT DC LVD — 2034 DLT DC HVD — 2434

Table 41. DLT-8000 Drive Sense Data to URC (continued)

Error Data	Description	URC
05 24 87	Illegal Request — Invalid Size.	DLT DC LVD — 2034 DLT DC HVD — 2434
05 24 89	Illegal Request — Image Data Over Limit.	DLT DC LVD — 2038 DLT DC HVD — 2438
05 24 8B	Illegal Request — Image/Personality is bad.	DLT DC LVD — 2038 DLT DC HVD — 2438
05 24 8C	Illegal Request — Not Immediate Command.	DLT DC LVD — 2034 DLT DC HVD — 2434
05 24 8D	Illegal Request — Bad Drive/Server Image EDC.	DLT DC LVD — 2038 DLT DC HVD — 2438
05 24 8E	Illegal Request — Invalid Personality for Code Update.	DLT DC LVD — 2038 DLT DC HVD — 2438
05 24 8F	Illegal Request — Bad Controller Image EDC.	DLT DC LVD — 2038 DLT DC HVD — 2438
05 25 00	Illegal Request — LUN not supported. The command was addressed to a non-existent Logical Unit Number.	DLT DC LVD — 2035 DLT DC HVD — 2435
05 26 xx	Illegal Request — Invalid Field in Parameter List. An invalid value was detected in the data sent during the data phase.	DLT DC LVD — 2036 DLT DC HVD — 2436
05 30 00	Illegal Request — Incompatible Media.	DLT DC LVD — 2025 DLT DC HVD — 2425
05 39 00	Illegal Request — Saving parameters is not supported.	DLT DC LVD — 2034 DLT DC HVD — 2434
05 3D 00	Illegal Request — Invalid Bits in Identify message.	DLT DC LVD — 2042 DLT DC HVD — 2442
05 53 02	Illegal Request — Media Removal Prevented. An Unload command was rejected because the drive previously received a Prevent Media Removal command.	DLT DC LVD — 2037 DLT DC HVD — 2437
05 82 00	Illegal Request — Not allowed if not at Beginning of Tape (BOT).	DLT DC LVD — 20xx DLT DC HVD — 24xx
06 28 00	Unit Attention — Not Ready to Ready Transition. A cartridge has been loaded successfully into the drive and is now ready to be accessed.	DLT DC LVD — 2039 DLT DC HVD — 2439
06 29 00	Unit Attention — Reset. The drive has powered on or received a reset since the initiator last accessed it.	DLT DC LVD — 203A DLT DC HVD — 243A
06 2A 01	Unit Attention — Mode Parameters Changed. The Mode parameters for the drive have been changed by an initiator other than the one issuing the command.	DLT DC LVD — 203B DLT DC HVD — 243B

Table 41. DLT-8000 Drive Sense Data to URC (continued)

Error Data	Description	URC
06 2A 02	Unit Attention — Log Parameters Changed. The Log parameters for the drive have been changed by an initiator other than the one issuing the command.	DLT DC LVD — 203B DLT DC HVD — 243B
06 3F 01	Unit Attention — Code Download. The firmware in the drive has just been changed.	DLT DC LVD — 203C DLT DC HVD — 243C
06 5B 01	Unit Attention — Log Threshold Condition Met.	DLT DC LVD — 201A DLT DC HVD — 241A
07 27 xx	Write Protect — A Write type operation has been requested on a cartridge which has been write protected.	DLT DC LVD — 203E DLT DC HVD — 243E
08 00 05	End Of Data — A Read or Space command terminated early because End of Data was encountered.	DLT DC LVD — 2040 DLT DC HVD — 2440
09 xx yy	Code Update Event: xx = drive revision code, yy = controller revision code.	DLT DC LVD — 203C DLT DC HVD — 243C
0B 43 00	Aborted Command — Message Error. A message could not be sent or received due to excessive transmission errors.	DLT DC LVD — 2043 DLT DC HVD — 2443
0B 44 xx	Aborted Command — SCSI Sequence Error.	DLT DC LVD — 20xx DLT DC HVD — 24xx
0B 45 00	Aborted Command — Select/Reset Failure. An attempt to reselect an initiator in order to complete the command failed.	DLT DC LVD — 2044 DLT DC HVD — 2444
0B 47 00	Aborted Command — SCSI Parity Error.	DLT DC LVD — 2043 DLT DC HVD — 2443
0B 48 00	Aborted Command — Initiator Detected Error Message. A command failed because an Initiator Detected Error message was received.	DLT DC LVD — 2045 DLT DC HVD — 2445
0B 49 00	Aborted Command — Invalid Message Error. A command failed because an invalid message was received by the drive.	DLT DC LVD — 2046 DLT DC HVD — 2446
0B 4B 00	Aborted Command — Data Phase Error. A command could not be completed because too many parity errors occurred during the Data phase.	DLT DC LVD — 2048 DLT DC HVD — 2448
0B 4E 00	Aborted Command — Overlapped Commands. An initiator selected the drive even though it already had a command outstanding in the drive.	DLT DC LVD — 2049 DLT DC HVD — 2449
0D 00 00	Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The EOM flag is set.	DLT DC LVD — 204A DLT DC HVD — 244A
0E 00 00	Miscompare.	DLT DC LVD — 20xx DLT DC HVD — 24xx

LTO Ultrium-1 Drive FSC to URC Table

Determine what type of LTO Ultrium-1 drive assembly you are working with (see notes below), look up the drive FSC (fault symptom code) in this table to determine the URC (unit reference code), then go to “URC Description With Action and FRUs” on page 226 to repair the problem.

Notes:

1. The URC is for reference only and is not part of the sense data.
2. The information in Table 42 only applies to LTO Ultrium-1. If the drive is an LTO Ultrium-2, go to “LTO Drive Sense Data to URC Table” on page 189.
3. If you are working with **Library** sense data, go to “Library Sense Data to URC Table” on page 170.
4. If the drive is a DLT-8000, go to “DLT-8000 Drive Sense Data to URC Table” on page 208.
5. If you need to determine a drive type, first determine the location of the affected drive. See byte 35 of the drive sense data. As an example if the failing frame/device byte is X'14' (hex) this indicates that the drive is located in frame 1, row 4. When you have determined the frame and row number of the drive, visually check to see whether the drive assembly is a tray or a canister. To determine the type of drive that is in your library, consider the following:

- Determine the drive type (LTO/DLT and LVD/HVD/FC) by referring to the labels on the back of the drive.

Note: Drive types may be abbreviated on the labels. D8 indicates a DLT-8000 drive. L1 indicates an LTO Ultrium-1 drive. L2 indicates an LTO Ultrium-2 drive.

- Early drive tray assemblies did not have labels. Regard these as LTO1 DT LVD drives.
- For further information on drive trays and drive canisters, see the table at Table 63 on page 584 and review the listed procedures and drawings for each type of drive.

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
1000	3000	3400	3800	3C00	4000	4400
1010 through 1026	3000	3400	3800	3C00	4000	4400
1027	3007	3407	3807	3C07	4007	4407
1028	3005	3405	3805	3C05	4005	4405
1029	3000	3400	3800	3C00	4000	4400
1031 through 1033	3000	3400	3800	3C00	4000	4400
1035 through 1036	3000	3400	3800	3C00	4000	4400
1040 through 1047	3000	3400	38050	3C00	4000	4400
1050 through 1051	3005	3405	3805	3C05	4005	4405
1052 through 1058	3000	3400	3800	3C00	4000	4400

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion (continued)

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
1410 through 1415	3000	3400	3800	3C00	4000	4400
1420 through 1423	3008	3408	3808	3C08	4008	4408
1430 through 1431	3008	3408	3808	3C08	4008	4408
1432	300A	340A	380A	3C0A	400A	440A
1433	3008	3408	3808	3C08	4008	4408
1434 through 1435	300A	340A	380A	3C0A	400A	440A
1440	300A	340A	380A	3C0A	400A	440A
1450 through 1451	3003	3403	3803	3C03	4003	4403
1460	3008	3408	3808	3C08	4008	4408
1461	300D	340D	380D	3C0D	400D	440D
1462	300E	340E	380E	3C0E	400E	440E
1463	300F	340F	380F	3C0F	400F	440F
1C00 through 1C08	3000	3400	3800	3C00	4000	4400
1C09	3003	3403	3803	3C03	4003	4403
1C0A through 1C0F	3000	3400	3800	3C00	4000	4400
1C10	3003	3403	3803	3C03	4003	4403
1C11 through 1C17	3000	3400	3800	3C00	4000	4400
2000 through 2001	3000	3400	3800	3C00	4000	4400
2002 through 2004	3003	3403	3803	3C03	4003	4403
2005 through 2006	3004	3404	3804	3C04	4004	4404
2010 through 2012	3003	3403	3803	3C03	4003	4403
2013	3006	3406	3806	3C06	4006	4406

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion (continued)

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
2020 through 2025	3006	3406	3806	3C06	4006	4406
2026 through 202C	3000	3400	3800	3C00	4000	4400
202D	3006	3406	3806	3C06	4006	4406
2030 through 2034	3000	3400	3800	3C00	4000	4400
2040 through 2044	3005	3405	3805	3C05	4005	4405
204A	3005	3405	3805	3C05	4005	4405
2050 through 2052	3000	3400	3800	3C00	4000	4400
2060	3005	3405	3805	3C05	4005	4405
2061	3006	3406	3806	3C06	4006	4406
2062	3004	3404	3804	3C04	4004	4404
2070	300A	340A	380A	3C0A	400A	440A
2071 through 2072	3006	3406	3806	3C06	4006	4406
2073 through 2074	3000	3400	3800	3C00	4000	4400
2075	3006	3406	3806	3C06	4006	4406
2076	3000	3400	3800	3C00	4000	4400
2077	3006	3406	3806	3C06	4006	4406
2080 through 2081	3006	3406	3806	3C06	4006	4406
2082	3000	3400	3800	3C00	4000	4400
2083 through 2086	3007	3407	3807	3C07	4007	4407
2087	3000	3400	3800	3C00	4000	4400
2088 through 2091	3006	3406	3806	3C06	4006	4406
2092 through 2093	3000	3400	3800	3C00	4000	4400
2094	3006	3406	3806	3C06	4006	4406

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion (continued)

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
2095 through 2096	3000	3400	3800	3C00	4000	4400
2097	3005	3405	3805	3C05	4005	4405
2098	3004	3404	3804	3C04	4004	4404
2099 through 209C	3006	3406	3806	3C06	4006	4406
209D through 209F	3004	3404	3804	3C04	4004	4404
20A0 through 20A1	3007	3407	3807	3C07	4007	4407
20A2 through 20A5	3006	3406	3806	3C06	4006	4406
20A6 through 20A7	3000	3400	3800	3C00	4000	4400
20A8	3007	3407	3807	3C07	4007	4407
20B0 through 20B2	3007	3407	3807	3C07	4007	4407
2101 through 2102	3000	3400	3800	3C00	4000	4400
2119	3000	3400	3800	3C00	4000	4400
2133	3006	3406	3806	3C06	4006	4406
2136	3000	3400	3800	3C00	4000	4400
2147 through 2148	3006	3406	3806	3C06	4006	4406
2161	3006	3406	3806	3C06	4006	4406
2177	3006	3406	3806	3C06	4006	4406
2180	3006	3406	3806	3C06	4006	4406
2189	3006	3406	3806	3C06	4006	4406
2191	3006	3406	3806	3C06	4006	4406
2197	3005	3405	3805	3C05	4005	4405
219B	3006	3406	3806	3C06	4006	4406
219D	3004	3404	3804	3C04	4004	4404
21A3	3007	3407	3807	3C07	4007	4407
21A6	3007	3407	3807	3C07	4007	4407
21A7	3000	3400	3800	3C00	4000	4400

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion (continued)

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
2280	3006	3406	3806	3C06	4006	4406
2289	3006	3406	3806	3C06	4006	4406
22A6	3000	3400	3800	3C00	4000	4400
2800 through 2804	3006	3406	3806	3C06	4006	4406
2805	3007	3407	3807	3C07	4007	4407
2806	3006	3406	3806	3C06	4006	4406
2C00 through 2C09	3000	3400	3800	3C00	4000	4400
2C20 through 2C22	300A	340A	380A	3C0A	400A	440A
2C23 through 2C26	300C	340C	380C	3C0C	400C	440C
2C40	300A	340A	380A	3C0A	400A	440A
2C41	3000	3400	3800	3C00	4000	4400
2C42 through 2C26	3007	3407	3807	3C07	4007	4407
2C43 through 2C44	3007	3407	3807	3C07	4007	4407
2C45	3003	3403	3803	3C03	4003	4403
2C60 through 2C61	300A	340A	380A	3C0A	400A	440A
3001 through 3005	3003	3403	3803	3C03	4003	4403
3006 through 3007	300A	340A	380A	3C0A	400A	440A
3008	3006	3406	3806	3C06	4406	4406
3100 through 3101	3006	3406	3806	3C06	4006	4406
3102	3000	3400	3800	3C00	4000	4400
3103 through 3106	3006	3406	3806	3C06	4006	4406
3108 through 3110	3006	3406	3806	3C06	4006	4406
3111	300A	340A	380A	3C0A	400A	440A

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion (continued)

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
3112 through 3114	3006	3406	3806	3C06	4006	4406
3115 through 3118	3005	3405	3805	3C05	4005	4405
3119	3006	3406	3806	3C06	4006	4406
3200 through 3204	3006	3406	3806	3C06	4006	4406
3205	300A	340A	380A	3C0A	400A	440A
3206 through 3209	3006	3406	3806	3C06	4006	4406
3210	3007	3407	3807	3C07	4007	4407
3211 through 3214	3006	3406	3806	3C06	4006	4406
3215	3005	3405	3805	3C05	4005	4405
3216	3007	3407	3807	3C07	4007	4407
4001 through 4002	3006	3406	3806	3C06	4006	4406
4003 through 4006	3000	3400	3800	3C00	4000	4400
4007 through 4008	3006	3406	3806	3C06	4006	4406
4010	300C	340C	380C	3C0C	400C	440C
4095	3000	3400	3800	3C00	4000	4400
5000 through 500F	3003	3403	3803	3C03	4003	4403
5010 through 5013	3003	3403	3803	3C03	4003	4403
5020 through 5028	3003	3403	3803	3C03	4003	4403
5040 through 5042	3003	3403	3803	3C03	4003	4403
5060 through 5065	3003	3403	3803	3C03	4003	4403

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion (continued)

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
5070	3000	3400	3800	3C00	4000	4400
5100	3000	3400	3800	3C00	4000	4400
5101	3003	3403	3803	3C03	4003	4403
5110 through 5117	3005	3405	3805	3C05	4005	4405
5120	3005	3405	3805	3C05	4005	4405
5121	3004	3404	3804	3C04	4004	4404
5130 through 5133	3005	3405	3805	3C05	4005	4405
5140 through 5146	3008	3408	3808	3C08	4008	4408
5147	300F	340F	380F	3C0F	400F	440F
5148	3008	3408	3808	3C08	4008	4408
5150 through 5152	3009	3409	3809	3C09	4009	4409
5159 through 515B	3009	3409	3809	3C09	4009	4409
5160	300A	340A	380A	3C0A	400A	440A
5170 through 517E	3005	3405	3805	3C05	4005	4405
5180	3007	3407	3807	3C07	4007	4407
5190	3001	3401	3801	3C01	4001	4401
5191 through 5193	3002	3402	3802	3C02	4002	4402
5194 through 5197	3005	3405	3805	3C05	4005	4405
51A0	3003	3403	3803	3C03	4003	4403
51A1	3005	3405	3805	3C05	4005	4405
51A2	3004	3404	3804	3C04	4004	4404
51C0	3003	3403	3803	3C03	4003	4403
51C1	3004	3404	3804	3C04	4004	4404
51C2 through 51C4	3005	3405	3805	3C05	4005	4405
51D0	3005	3405	3805	3C05	4005	4405
51D1	3003	3403	3803	3C03	4003	4403

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion (continued)

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
51D2 through 51D3	3005	3405	3805	3C05	4005	4405
51D5 through 51D9	3005	3405	3805	3C05	4005	4405
51DC	3003	3403	3803	3C03	4003	4403
51E0 through 51E1	3003	3403	3803	3C03	4003	4403
51E2 through 51E3	3005	3405	3805	3C05	4005	4405
51E4	3005	3405	3805	3C05	4005	4405
51F0 through 51F1	3003	3403	3803	3C03	4003	4403
51F2 through 51F3	3005	3405	3805	3C05	4005	4405
5200	3005	3405	3805	3C05	4005	4405
5210	3003	3403	3803	3C03	4003	4403
5211 through 5212	3005	3405	3805	3C05	4005	4405
5220 through 5221	3003	3403	3803	3C03	4003	4403
5222 through 5223	300A	340A	380A	3C0A	400A	440A
5224	3003	3403	3803	3C03	4003	4403
5225	300A	340A	380A	3C0A	400A	440A
5230 through 5232	3005	3405	3805	3C05	4005	4405
5233	3003	3403	3803	3C03	4003	4403
5234	3005	3405	3805	3C05	4005	4405
5240 through 5242	3005	3405	3805	3C05	4005	4405
5250	3007	3407	3807	3C07	4007	4407
5251 through 5253	3006	3406	3806	3C06	4006	4406
5254	3003	3403	3803	3C03	4003	4403

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion (continued)

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
5260 through 5262	3007	3407	3807	3C07	4007	4407
5263	3006	3406	3806	3C06	4006	4406
5264	3003	3403	3803	3C03	4003	4403
5270	3007	3407	3807	3C07	4007	4407
5271 through 5272	300A	340A	380A	3C0A	400A	440A
5273	3006	3406	3806	3C06	4006	4406
5274	3003	3403	3803	3C03	4003	4403
5278	3007	3407	3807	3C07	4007	4407
5279 through 527B	3006	3406	3806	3C06	4006	4406
527C	3003	3403	3803	3C03	4003	4403
5280 through 5285	300A	340A	380A	3C0A	400A	440A
5290 through 5294	300A	340A	380A	3C0A	400A	440A
52A0 through 52AB	3005	3405	3805	3C05	4005	4405
52B0 through 52B5	3000	3400	3800	3C00	4000	4400
52C0	300A	340A	380A	3C0A	400A	440A
52C1	3003	3403	3803	3C03	4003	4403
52D0 through 52D1	300A	340A	380A	3C0A	400A	440A
52D2	3005	3405	3805	3C05	4005	4405
52D3	3003	3403	3803	3C03	4003	4403
5400	3006	3406	3806	3C06	4006	4406
5401	3007	3407	3807	3C07	4007	4407
5402	3006	3406	3806	3C06	4006	4406
5403 through 5404	3007	3407	3807	3C07	4007	4407
5405	3003	3403	3803	3C03	4003	4403
5410	3006	3406	3806	3C06	4006	4406
5411	3007	3407	3807	3C07	4007	4407

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion (continued)

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
5412	3003	3403	3803	3C03	4003	4403
5421	3007	3407	3807	3C07	4007	4407
5422	3003	3403	3803	3C03	4003	4403
5430 through 5434	3004	3404	3804	3C04	4004	4404
5435 through 5437	3000	3400	3800	3C00	4000	4400
5510	3006	3406	3806	3C06	4006	4406
5520	3006	3406	3806	3C06	4006	4406
5521	3007	3407	3807	3C07	4007	4407
5600	3003	3403	3803	3C03	4003	4403
5601 through 5605	3003	3403	3803	3C03	4003	4403
5606 through 5607	300A	340A	380A	3C0A	400A	440A
5608 through 5609	3006	3406	3806	3C06	4006	4406
5640 through 5644	3003	3403	3803	3C03	4003	4403
5645 through 5646	3006	3406	3806	3C06	4006	4406
5647	300A	340A	380A	3C0A	400A	440A
5680	3006	3406	3806	3C06	4006	4406
5681	3007	3407	3807	3C07	4007	4407
5682	300A	340A	380A	3C0A	400A	440A
5683 through 5684	3006	3406	3806	3C06	4006	4406
5700	3003	3403	3803	3C03	4003	4403
5701 through 5702	300A	340A	380A	3C0A	400A	440A
5703	3003	3403	3803	3C03	4003	4403
5704 through 5706	300A	340A	380A	3C0A	400A	440A
5707	3003	3403	3803	3C03	4003	4403

Table 42. LTO Ultrium-1 Drive FSC to URC Conversion (continued)

FSC	URC (SCSI LVD Drive Tray)	URC (SCSI HVD Drive Tray)	URC (FC Drive Tray)	URC (SCSI LVD Hot Swap Drive Canister)	URC (SCSI HVD Hot Swap Drive Canister)	URC (FC Hot Swap Drive Canister)
5708 through 570A	300A	340A	380A	3C0A	400A	440A
570B through 570E	3003	3403	3803	3C03	4003	4403
570F	300A	340A	380A	3C0A	400A	440A
5710	3003	3403	3803	3C03	4003	4403
5711 through 5712	300A	340A	380A	3C0A	400A	440A
5713	3008	3408	3808	3C08	4008	4408
5714	3003	3403	3803	3C03	4003	4403
5715 through 5718	300A	340A	380A	3C0A	400A	440A
F200	3000	3400	3800	3C00	4000	4400
F400	3000	3400	3800	3C00	4000	4400

URC Description With Action and FRUs

The first column in Table 43 lists the URC codes (unit reference codes) numerically. The second column gives a description of the URC, often followed by any associated **Failure Isolation Procedures**. In some cases, the Failure Isolation Procedures (also known as Checks) are followed by a **URC FRU List**. If the Checks find an obvious problem such as a loose cable, you may be able to repair the problem without referring to the FRU list. When FRUs (field replaceable units) are listed, they are in the order of probability of causing the error associated with that URC. The FRUs should be replaced and verified one at a time, in the order in which they are listed. You should **only** consider replacing **all** the FRUs shown in a list for a URC when you encounter an intermittent problem that is unusually difficult to diagnose.

If you have a URC that is not listed in Table 43, contact your next level of support.

Table 43. URC Description with Action and FRUs

URC	Description of Symptom, Required Action, and FRU
2000	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
2001	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec (too hot) environment, by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
2002	<p>Description</p> <p>5 V dc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is a separate FRU located on the fixed tray. Replace the drive power supply (see “Power Supply (LTO/DLT/Control Port), Redundant – Hot Swap” on page 597).</p>
2003	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2004	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
2005	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
2006	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). If the problem persists, contact your next level of support.</p>
2007	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
2008	<p>Description</p> <p>Drive SCSI error. The drive detected an error in the SCSI interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2009	<p>Description</p> <p>Drive RS-422 error. The drive detected an error in the RS-422 interface to the library.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame. If the problem persists, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). RS-422 cable from MCP to drives. MCP (see “Media Changer Pack (MCP)” on page 564).
200A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). If the problem persists, contact your next level of support.
200C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
2010	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
2011	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
2012	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2013	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag also is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
2015	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
2019	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
201A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
201B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
201C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
201D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
201E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
201F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 LVD Drive Tray (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
2020	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
2021	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, replace the Fixed Tray (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
2022	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different tape cartridge. If the problem persists, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2023	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists then replace the tape cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
2024	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
2025	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the tape has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an unknown format.</p>
2026	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the tape has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an incompatible format.</p>
2027	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the tape is not valid, but it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has a corrupted format.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2028	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
202A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
202B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
202C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From a DLT-8000 Drive” on page 676. Notify the customer that the cartridge should not be used again.</p>
202D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, go to “From a DLT-8000 Drive” on page 676.</p> <p>URC FRU List</p> <p>Replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
202E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>The drive tape leader may have detached. Go to “Detached DLT Leader Service Check” on page 678 then return here.</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
202F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
2030	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
2031	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From a DLT-8000 Drive” on page 676.</p> <p>URC FRU List</p> <p>Replace the DLT-8000 LVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>2032</p> <p>2033</p> <p>2034</p> <p>2035</p> <p>2036</p>	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=2032, Parameter list length error. • URC=2033, Invalid command operation code. • URC=2034, Invalid field in CDB (see field pointer). • URC=2035, Logical unit not supported. • URC=2036, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
<p>2037</p>	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>
<p>2038</p>	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists, obtain a new firmware file and attempt to apply it again. If the problem persists, contact your next level of support.</p>
<p>2039</p> <p>203A</p> <p>203B</p> <p>203C</p> <p>203D</p>	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=2039, Not-ready-to-ready transition, media was just loaded into the drive. • URC=203A, Power on or Reset occurred. • URC=203B, Mode select parameters were changed by another host. • URC=203C, Code Download. The firmware in the drive has just been changed. • URC=203D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
<p>203E</p>	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>203F</p>	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2040	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
2041	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>
2042 2043 2044 2045 2046 2047 2048 2049	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=2042, Invalid bits in Identify message. An illegal Identify Message was received by the drive at the start of a command. • URC=2043, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=2044, Select/Reselect Failure. An attempt by the drive to reselect an initiator in order to complete a command failed. • URC=2045, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=2046, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=2047, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=2048, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=2049, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
204A	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
2400	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2401	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec (too hot) environment, by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
2402	<p>Description</p> <p>5Vdc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is a separate FRU located on the fixed tray. Replace the drive power supply (see “Power Supply (LTO/DLT/Control Port), Redundant – Hot Swap” on page 597).</p>
2403	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
2404	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). If the problem persists, contact your next level of support.
2405	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2406	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). If the problem persists, contact your next level of support.</p>
2407	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
2408	<p>Description</p> <p>Drive SCSI error. The drive detected an error in the SCSI interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514.</p>
2409	<p>Description</p> <p>Drive RS-422 error. The drive detected an error in the RS-422 interface to the library.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame. If the problem persists, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. Fixed Tray assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. RS-422 cable from MCP to drives. 4. MCP (see “Media Changer Pack (MCP)” on page 564).
240A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
240C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
2410	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
2411	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
2412	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
2413	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag also is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
2415	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
2419	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
241A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
241B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
241C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
241D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
241E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
241F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 LVD Drive Tray (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
2420	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2421	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. Fixed Tray assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
2422	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different tape cartridge. If the problem persists, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
2423	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists then replace the tape cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
2424	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2425	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the tape has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an unknown format.</p>
2426	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the tape has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an incompatible format.</p>
2427	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the tape is not valid, but it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has a corrupted format.</p>
2428	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
242A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
242B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
242C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From a DLT-8000 Drive” on page 676. Notify the customer that the cartridge should not be used again.</p>
242D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, go to “From a DLT-8000 Drive” on page 676.</p> <p>URC FRU List</p> <p>Replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
242E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>The drive tape leader may have detached. Go to “Detached DLT Leader Service Check” on page 678 then return here.</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
242F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
2430	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). 2. If the problem persists, contact your next level of support.
2431	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From a DLT-8000 Drive” on page 676.</p> <p>URC FRU List</p> <p>Replace the DLT-8000 HVD Drive Canister (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590).</p>
2432 2433 2434 2435 2436	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=2432, Parameter list length error. • URC=2433, Invalid command operation code. • URC=2434, Invalid field in CDB (see field pointer). • URC=2435, Logical unit not supported. • URC=2436, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
2437	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>
2438	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists, obtain a new firmware file and attempt to apply it again. If the problem persists, contact your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>2439 243A 243B 243C 243D</p>	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=2439, Not-ready-to-ready transition, media was just loaded into the drive. • URC=243A, Power on or Reset occurred. • URC=243B, Mode select parameters were changed by another host. • URC=243C, Code Download. The firmware in the drive has just been changed. • URC=243D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
<p>243E</p>	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>243F</p>	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>2440</p>	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>2441</p>	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>2442</p> <p>2443</p> <p>2444</p> <p>2445</p> <p>2446</p> <p>2447</p> <p>2448</p> <p>2449</p>	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=2442, Invalid bits in Identify message. An illegal Identify Message was received by the drive at the start of a command. • URC=2443, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=2444, Select/Reselect Failure. An attempt by the drive to reselect an initiator in order to complete a command failed. • URC=2445, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=2446, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=2447, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=2448, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=2449, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
<p>244A</p>	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>3000</p>	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
<p>3001</p>	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec (too hot) environment, by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
<p>3002</p>	<p>Description</p> <p>5 V dc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is contained in the drive tray, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3003	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
3004	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3005	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3006	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). If the problem persists, contact your next level of support.</p>
3007	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3008	<p>Description</p> <p>Drive SCSI error. The drive detected an error in the SCSI interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514.</p>
3009	<p>Description</p> <p>The drive detected an error or timeout in RS-422 communications between the drive and the library MCP.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>Determine whether the problem still exists. At the front panel of the library, select [MENU], Library Status, and Drive Status. If the failing drive indicates CommFail then the problem still exists. If the problem does still exist, use the FRU list below to repair the problem. If the problem does not still exist then the failure is intermittent. This usually indicates a microcode problem. Capture a library dump, then attempt to capture a drive dump for possible analysis by IBM Support. Do not replace any FRUs unless instructed to do so by your next level of support.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
300A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
300C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
3010	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3011	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3012	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3013	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag also is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3015	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
3019	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
301A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
301B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
301C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
301D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
301E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
301F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
3020	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3021	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3022	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different tape cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3023	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists then replace the tape cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3024	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3025	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the tape has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an unknown format.</p>
3026	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the tape has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an incompatible format.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3027	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the tape is not valid, but it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has a corrupted format.</p>
3028	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
302A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
302B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
302C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674. Notify the customer that the cartridge should not be used again.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
302D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
302E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
302F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3030	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3031	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>3032</p> <p>3033</p> <p>3034</p> <p>3035</p> <p>3036</p>	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=3032, Parameter list length error. • URC=3033, Invalid command operation code. • URC=3034, Invalid field in CDB (see field pointer). • URC=3035, Logical unit not supported. • URC=3036, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
<p>3037</p>	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>
<p>3038</p>	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists, obtain a new firmware file and attempt to apply it again. If the problem persists, contact your next level of support.</p>
<p>3039</p> <p>303A</p> <p>303B</p> <p>303C</p> <p>303D</p>	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=3039, Not-ready-to-ready transition, media was just loaded into the drive. • URC=303A, Power on or Reset occurred. • URC=303B, Mode select parameters were changed by another host. • URC=303C, Code Download. The firmware in the drive has just been changed. • URC=303D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
<p>303E</p>	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>303F</p>	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3040	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
3041	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>
3042 3043 3044 3045 3046 3047 3048 3049	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=3042, Invalid bits in Identify message. An illegal Identify Message was received by the drive at the start of a command. • URC=3043, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=3044, Select/Reselect Failure. An attempt by the drive to reselect an initiator in order to complete a command failed. • URC=3045, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=3046, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=3047, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=3048, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=3049, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
304A	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
3400	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3401	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec environment (too hot), by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
3402	<p>Description</p> <p>5 V dc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is contained in the drive tray, replace the LTO Ultrium-1 HVD SCSI drive tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
3403	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it. If the problem persists, contact your next level of support.</p>
3404	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). If the problem persists, contact your next level of support.
3405	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3406	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3407	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
3408	<p>Description</p> <p>Drive SCSI error. The drive detected an error in the SCSI interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514.</p>
3409	<p>Description</p> <p>The drive detected an error or timeout in RS-422 communications between the drive and the library MCP.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>Determine whether the problem still exists. At the front panel of the library, select [MENU], Library Status, and Drive Status. If the failing drive indicates CommFail then the problem still exists. If the problem does still exist, use the FRU list below to repair the problem. If the problem does not still exist then the failure is intermittent. This usually indicates a microcode problem. Capture a library dump, then attempt to capture a drive dump for possible analysis by IBM Support. Do not replace any FRUs unless instructed to do so by your next level of support.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
340A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
340C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
3410	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3411	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3412	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3413	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag is also set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3415	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3419	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
341A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
341B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
341C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
341D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
341E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
341F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3420	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3421	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP. This would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
3422	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3423	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3424	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3425	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the cartridge has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has an unknown format.</p>
3426	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the cartridge has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has an incompatible format.</p>
3427	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the cartridge is not valid, although it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a corrupted format.</p>
3428	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
342A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
342B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
342C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674. Notify the customer that the cartridge should not be used again.</p>
342D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, power off the drive, then power it on and use the eject button to eject the cartridge. If the cartridge does not come out, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
342E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
342F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3430	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available, and install the newer code (see “CETool Procedures” on page 500).</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, contact your next level of support.
3431	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, power off the drive, then power it on and use the eject button to eject the cartridge. If the cartridge does not come out, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>
3432 3433 3434 3435 3436	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=3432, Parameter list length error. • URC=3433, Invalid command operation code. • URC=3434, Invalid field in CDB (see field pointer). • URC=3435, Logical unit not supported. • URC=3436, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
3437	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3438	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists obtain a new firmware file and attempt to apply it again. If the problem persists contact your next level of support.</p>
3439 343A 343B 343C 343D	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=3439, Not ready to ready transition, media was just loaded into the drive. • URC=343A, Power on or Reset occurred. • URC=343B, Mode select parameters were changed by another host. • URC=343C, Code Download. The firmware in the drive has just been changed. • URC=343D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
343E	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write-protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
343F	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
3440	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
3441	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>3442</p> <p>3443</p> <p>3444</p> <p>3445</p> <p>3446</p> <p>3447</p> <p>3448</p> <p>3449</p>	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=3442, Invalid bits in Identify Message. An illegal Identify Message was received by the drive at the start of a command. • URC=3443, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=3444, Select/Reselect Failure. An attempt failed by the drive to reselect an initiator in order to complete a command. • URC=3445, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=3446, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=3447, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=3448, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=3449, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
<p>344A</p>	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>3800</p>	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
<p>3801</p>	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec environment (too hot), by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>
<p>3802</p>	<p>Description</p> <p>5 V dc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is contained in the drive tray, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3803	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it. If the problem persists, contact your next level of support.</p>
3804	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, contact your next level of support.
3805	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, contact your next level of support.
3806	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3807	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
3808	<p>Description</p> <p>Drive fibre channel error. The drive detected an error in the interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “Fibre Channel Problems” on page 522.</p>
3809	<p>Description</p> <p>The drive detected an error or timeout in RS-422 communications between the drive and the library MCP.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>Determine whether the problem still exists. At the front panel of the library, select [MENU], Library Status, and Drive Status. If the failing drive indicates CommFail then the problem still exists. If the problem does still exist, use the FRU list below to repair the problem. If the problem does not still exist then the failure is intermittent. This usually indicates a microcode problem. Capture a library dump, then attempt to capture a drive dump for possible analysis by IBM Support. Do not replace any FRUs unless instructed to do so by your next level of support.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
380A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, contact your next level of support.
380C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
380D	<p>Description</p> <p>The drive determined that another device is using the same Fibre Channel AL_PA (Loop ID). The drive is offline.</p> <p>Failure Isolation Procedure</p> <p>This problem is caused when multiple devices on the same loop are set to the same Fibre Channel Loop ID. On the operator panel, press [MENU], select Settings, SCSI/Loop, Display SCSI/Loop IDs. Verify that all drives that are on a common loop (that is, attached to the same Fibre Channel hub) have different Loop IDs. If a conflict is found, press Back. Select Change SCSI/Loop IDs, and correct the problem.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>
380E	<p>Description</p> <p>The drive received an OFFLINE command from another device on the Fibre Channel Arbitrated Loop.</p> <p>Failure Isolation Procedure</p> <p>Go to “Fibre Channel Problems” on page 522.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>
380F	<p>Description</p> <p>Tape drive determined that there is no light on the Fibre Channel port.</p> <p>Failure Isolation Procedure</p> <p>Go to “Fibre Channel Problems” on page 522.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>
3810	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3811	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3812	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3813	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag is also set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3815	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>
3819	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
381A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>
381B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
381C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
381D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
381E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
381F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>
3820	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3821	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP. This would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). If the problem persists, replace the RS-422 cable from the MCP to the drives. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
3822	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). If the problem persists, contact your next level of support.
3823	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3824	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, contact your next level of support.
3825	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the cartridge has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has an unknown format.</p>
3826	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the cartridge has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has an incompatible format.</p>
3827	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the cartridge is not valid, although it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a corrupted format.</p>
3828	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
382A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, contact your next level of support.
382B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, contact your next level of support.
382C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674. Notify the customer that the cartridge should not be used again.</p>
382D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>
382E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
382F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, contact your next level of support.
3830	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available, and install the newer code (see “CETool Procedures” on page 500).</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587). 2. If the problem persists, contact your next level of support.
3831	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Tray Assembly – LTO Fibre” on page 587).</p>
3832 3833 3834 3835 3836	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=3832, Parameter list length error. • URC=3833, Invalid command operation code. • URC=3834, Invalid field in CDB (see field pointer). • URC=3835, Logical unit not supported. • URC=3836, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
3837	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3838	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists obtain a new firmware file and attempt to apply it again. If the problem persists contact your next level of support.</p>
3839 383A 383B 383C 383D	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=3839, Not ready to ready transition, media was just loaded into the drive. • URC=383A, Power on or Reset occurred. • URC=383B, Mode select parameters were changed by another host. • URC=383C, Code Download. The firmware in the drive has just been changed. • URC=383D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
383E	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write-protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
383F	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
3840	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
3841	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>3842</p> <p>3843</p> <p>3844</p> <p>3845</p> <p>3846</p> <p>3847</p> <p>3848</p> <p>3849</p>	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=3842, Invalid bits in Identify message. An illegal Identify Message was received by the drive at the start of a command. • URC=3843, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=3844, Select/Reselect Failure. An attempt failed by the drive to reselect an initiator in order to complete a command. • URC=3845, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=3846, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=3847, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=3848, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=3849, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
<p>384A</p>	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end-of-tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>3C00</p>	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
<p>3C01</p>	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec (too hot) environment, by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).</p>
<p>3C02</p>	<p>Description</p> <p>5 V dc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is a separate FRU located on the fixed tray. Replace the drive power supply (see “Power Supply (LTO/DLT/Control Port), Redundant – Hot Swap” on page 597).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3C03	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
3C04	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
3C05	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
3C06	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.</p>
3C07	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3C08	<p>Description</p> <p>Drive SCSI error. The drive detected an error in the SCSI interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514.</p>
3C09	<p>Description</p> <p>The drive detected an error or timeout in RS-422 communications between the drive and the library MCP.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>Determine whether the problem still exists. At the front panel of the library, select [MENU], Library Status, and Drive Status. If the failing drive indicates CommFail then the problem still exists. If the problem does still exist, use the FRU list below to repair the problem. If the problem does not still exist then the failure is intermittent. This usually indicates a microcode problem. Capture a library dump, then attempt to capture a drive dump for possible analysis by IBM Support. Do not replace any FRUs unless instructed to do so by your next level of support.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
3C0A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
3C0C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).</p>
3C10	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3C11	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3C12	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3C13	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag also is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3C15	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).</p>
3C19	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3C1A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).</p>
3C1B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3C1C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3C1D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3C1E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3C1F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Types” on page 584).</p>
3C20	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
3C21	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3C22	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different tape cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
3C23	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists then replace the tape cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
3C24	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
3C25	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the tape has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an unknown format.</p>
3C26	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the tape has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an incompatible format.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3C27	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the tape is not valid, but it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has a corrupted format.</p>
3C28	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).</p>
3C2A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.
3C2B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.
3C2C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674. Notify the customer that the cartridge should not be used again.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3C2D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, and go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).</p>
3C2E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
3C2F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
3C30	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
3C31	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>3C32</p> <p>3C33</p> <p>3C34</p> <p>3C35</p> <p>3C36</p>	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=3C32, Parameter list length error. • URC=3C33, Invalid command operation code. • URC=3C34, Invalid field in CDB (see field pointer). • URC=3C35, Logical unit not supported. • URC=3C36, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
<p>3C37</p>	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>
<p>3C38</p>	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists, obtain a new firmware file and attempt to apply it again. If the problem persists, contact your next level of support.</p>
<p>3C39</p> <p>3C3A</p> <p>3C3B</p> <p>3C3C</p> <p>3C3D</p>	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=3C39, Not-ready-to-ready transition, media was just loaded into the drive. • URC=3C3A, Power on or Reset occurred. • URC=3C3B, Mode select parameters were changed by another host. • URC=3C3C, Code Download. The firmware in the drive has just been changed. • URC=3C3D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
<p>3C3E</p>	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>3C3F</p>	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
3C40	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
3C41	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>
3C42 3C43 3C44 3C45 3C46 3C47 3C48 3C49	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=3C42, Invalid bits in Identify message. An illegal Identify Message was received by the drive at the start of a command. • URC=3C43, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=3C44, Select/Reselect Failure. An attempt by the drive to reselect an initiator in order to complete a command failed. • URC=3C45, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=3C46, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=3C47, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=3C48, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=3C49, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
3C4A	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
4000	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4001	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec (too hot) environment, by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584).</p>
4002	<p>Description</p> <p>5 V dc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is a separate FRU located on the fixed tray. Replace the drive power supply (see “Power Supply (LTO/DLT/Control Port), Redundant – Hot Swap” on page 597).</p>
4003	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
4004	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.
4005	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4006	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.</p>
4007	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
4008	<p>Description</p> <p>Drive SCSI error. The drive detected an error in the SCSI interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514.</p>
4009	<p>Description</p> <p>The drive detected an error or timeout in RS-422 communications between the drive and the library MCP.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>Determine whether the problem still exists. At the front panel of the library, select [MENU], Library Status, and Drive Status. If the failing drive indicates CommFail then the problem still exists. If the problem does still exist, use the FRU list below to repair the problem. If the problem does not still exist then the failure is intermittent. This usually indicates a microcode problem. Capture a library dump, then attempt to capture a drive dump for possible analysis by IBM Support. Do not replace any FRUs unless instructed to do so by your next level of support.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
400A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
400C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584).</p>
4010	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4011	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4012	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4013	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag also is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4015	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4019	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
401A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584).</p>
401B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
401C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
401D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
401E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
401F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4020	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4021	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP.
4022	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different tape cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4023	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists then replace the tape cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4024	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4025	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the tape has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an unknown format.</p>
4026	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the tape has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an incompatible format.</p>
4027	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the tape is not valid, but it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has a corrupted format.</p>
4028	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
402A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
402B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
402C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674. Notify the customer that the cartridge should not be used again.</p>
402D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, and go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584).</p>
402E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
402F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4030	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4031	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584).</p>
4032 4033 4034 4035 4036	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=4032, Parameter list length error. • URC=4033, Invalid command operation code. • URC=4034, Invalid field in CDB (see field pointer). • URC=4035, Logical unit not supported. • URC=4036, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
4037	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4038	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists, obtain a new firmware file and attempt to apply it again. If the problem persists, contact your next level of support.</p>
4039 403A 403B 403C 403D	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=4039, Not-ready-to-ready transition, media was just loaded into the drive. • URC=403A, Power on or Reset occurred. • URC=403B, Mode select parameters were changed by another host. • URC=403C, Code Download. The firmware in the drive has just been changed. • URC=403D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
403E	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
403F	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
4040	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
4041	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>4042</p> <p>4043</p> <p>4044</p> <p>4045</p> <p>4046</p> <p>4047</p> <p>4048</p> <p>4049</p>	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=4042, Invalid bits in Identify message. An illegal Identify Message was received by the drive at the start of a command. • URC=4043, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=4044, Select/Reselect Failure. An attempt by the drive to reselect an initiator in order to complete a command failed. • URC=4045, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=4046, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=4047, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=4048, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=4049, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
<p>404A</p>	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>4400</p>	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
<p>4401</p>	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec (too hot) environment, by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584).</p>
<p>4402</p>	<p>Description</p> <p>5 V dc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is a separate FRU located on the fixed tray. Replace the drive power supply (see “Power Supply (LTO/DLT/Control Port), Redundant – Hot Swap” on page 597).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4403	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
4404	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4405	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4406	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.</p>
4407	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4408	<p>Description</p> <p>Drive SCSI error. The drive detected an error in the SCSI interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514.</p>
4409	<p>Description</p> <p>The drive detected an error or timeout in RS-422 communications between the drive and the library MCP.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>Determine whether the problem still exists. At the front panel of the library, select [MENU], Library Status, and Drive Status. If the failing drive indicates CommFail then the problem still exists. If the problem does still exist, use the FRU list below to repair the problem. If the problem does not still exist then the failure is intermittent. This usually indicates a microcode problem. Capture a library dump, then attempt to capture a drive dump for possible analysis by IBM Support. Do not replace any FRUs unless instructed to do so by your next level of support.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
440A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
440C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
440D	<p>Description</p> <p>The drive determined that another device is using the same Fibre Channel AL_PA (Loop ID). The drive is offline.</p> <p>Failure Isolation Procedure</p> <p>This problem is caused when multiple devices on the same loop are set to the same Fibre Channel Loop ID. On the operator panel, press [MENU], select Settings, SCSI/Loop IDs, Display SCSI/Loop IDs. Verify that all drives that are on a common loop (that is, attached to the same Fibre Channel hub) have different Loop IDs. If a conflict is found, press Back. Select Change SCSI/Loop IDs, and correct the problem</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Canister (see “Drive Types” on page 584).</p>
440E	<p>Description</p> <p>The drive received an OFFLINE command from another device on the Fibre Channel Arbitrated Loop.</p> <p>Failure Isolation Procedure</p> <p>Go to “Fibre Channel Problems” on page 522.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Canister (see “Drive Types” on page 584).</p>
440F	<p>Description</p> <p>The drive determined that there is no light on the Fibre Channel port.</p> <p>Failure Isolation Procedure</p> <p>Go to “Fibre Channel Problems” on page 522.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Canister (see “Drive Types” on page 584).</p>
4410	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4411	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4412	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4413	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag also is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4415	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584).</p>
4419	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
441A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584).</p>
441B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
441C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
441D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
441E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
441F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Types” on page 584).</p>
4420	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4421	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP.
4422	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different tape cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4423	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists then replace the tape cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4424	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4425	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the tape has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an unknown format.</p>
4426	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the tape has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an incompatible format.</p>
4427	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the tape is not valid, but it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has a corrupted format.</p>
4428	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
442A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
442B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
442C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674. Notify the customer that the cartridge should not be used again.</p>
442D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, and go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584).</p>
442E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
442F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4430	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4431	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-1 FC Drive Canister (see “Drive Types” on page 584).</p>
4432 4433 4434 4435 4436	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=4432, Parameter list length error. • URC=4433, Invalid command operation code. • URC=4434, Invalid field in CDB (see field pointer). • URC=4435, Logical unit not supported. • URC=4436, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
4437	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4438	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists, obtain a new firmware file and attempt to apply it again. If the problem persists, contact your next level of support.</p>
4439 443A 443B 443C 443D	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=4439, Not-ready-to-ready transition, media was just loaded into the drive. • URC=443A, Power on or Reset occurred. • URC=443B, Mode select parameters were changed by another host. • URC=443C, Code Download. The firmware in the drive has just been changed. • URC=443D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
443E	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
443F	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
4440	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
4441	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>4442</p> <p>4443</p> <p>4444</p> <p>4445</p> <p>4446</p> <p>4447</p> <p>4448</p> <p>4449</p>	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=4442, Invalid bits in Identify message. An illegal Identify Message was received by the drive at the start of a command. • URC=4443, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=3044, Select/Reselect Failure. An attempt by the drive to reselect an initiator in order to complete a command failed. • URC=4445, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=4446, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=4447, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=4448, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=4449, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
<p>444A</p>	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>4800</p>	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
<p>4801</p>	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec (too hot) environment, by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).</p>
<p>4802</p>	<p>Description</p> <p>5 V dc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is a separate FRU located on the fixed tray. Replace the drive power supply (see “Power Supply (LTO/DLT/Control Port), Redundant – Hot Swap” on page 597).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4803	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
4804	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4805	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4806	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.</p>
4807	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4808	<p>Description</p> <p>Drive SCSI error. The drive detected an error in the SCSI interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514.</p>
4809	<p>Description</p> <p>The drive detected an error or timeout in RS-422 communications between the drive and the library MCP.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>Determine whether the problem still exists. At the front panel of the library, select [MENU], Library Status, and Drive Status. If the failing drive indicates CommFail then the problem still exists. If the problem does still exist, use the FRU list below to repair the problem. If the problem does not still exist then the failure is intermittent. This usually indicates a microcode problem. Capture a library dump, then attempt to capture a drive dump for possible analysis by IBM Support. Do not replace any FRUs unless instructed to do so by your next level of support.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
480A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
480C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).</p>
4810	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4811	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4812	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4813	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag also is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4815	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).</p>
4819	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
481A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).</p>
481B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
481C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
481D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
481E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
481F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Tray (see “Drive Types” on page 584).</p>
4820	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4821	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4822	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different tape cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4823	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists then replace the tape cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4824	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4825	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the tape has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an unknown format.</p>
4826	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the tape has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an incompatible format.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4827	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the tape is not valid, but it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has a corrupted format.</p>
4828	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).</p>
482A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.
482B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.
482C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674. Notify the customer that the cartridge should not be used again.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
482D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, and go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).</p>
482E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
482F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4830	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4831	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>4832</p> <p>4833</p> <p>4834</p> <p>4835</p> <p>4836</p>	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=4832, Parameter list length error. • URC=4833, Invalid command operation code. • URC=4834, Invalid field in CDB (see field pointer). • URC=4835, Logical unit not supported. • URC=4836, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
<p>4837</p>	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>
<p>4838</p>	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists, obtain a new firmware file and attempt to apply it again. If the problem persists, contact your next level of support.</p>
<p>4839</p> <p>483A</p> <p>483B</p> <p>483C</p> <p>483D</p>	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=4839, Not-ready-to-ready transition, media was just loaded into the drive. • URC=483A, Power on or Reset occurred. • URC=483B, Mode select parameters were changed by another host. • URC=483C, Code Download. The firmware in the drive has just been changed. • URC=483D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
<p>483E</p>	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>483F</p>	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4840	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
4841	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>
4842 4843 4844 4845 4846 4847 4848 4849	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=4842, Invalid bits in Identify message. An illegal Identify Message was received by the drive at the start of a command. • URC=4843, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=4844, Select/Reselect Failure. An attempt by the drive to reselect an initiator in order to complete a command failed. • URC=4845, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=4846, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=4847, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=4848, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=4849, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
484A	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
4C00	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4C01	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec (too hot) environment, by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584).</p>
4C02	<p>Description</p> <p>5 V dc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is a separate FRU located on the fixed tray. Replace the drive power supply (see “Power Supply (LTO/DLT/Control Port), Redundant – Hot Swap” on page 597).</p>
4C03	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
4C04	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.
4C05	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4C06	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.</p>
4C07	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
4C08	<p>Description</p> <p>Drive SCSI error. The drive detected an error in the SCSI interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514.</p>
4C09	<p>Description</p> <p>The drive detected an error or timeout in RS-422 communications between the drive and the library MCP.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>Determine whether the problem still exists. At the front panel of the library, select [MENU], Library Status, and Drive Status. If the failing drive indicates CommFail then the problem still exists. If the problem does still exist, use the FRU list below to repair the problem. If the problem does not still exist then the failure is intermittent. This usually indicates a microcode problem. Capture a library dump, then attempt to capture a drive dump for possible analysis by IBM Support. Do not replace any FRUs unless instructed to do so by your next level of support.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4C0A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4C0C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584).</p>
4C10	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4C11	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4C12	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4C13	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag also is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4C15	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Tray Assembly – LTO SCSI” on page 585).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4C19	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4C1A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584).</p>
4C1B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4C1C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4C1D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4C1E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4C1F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Tray (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4C20	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
4C21	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP.
4C22	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different tape cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4C23	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists then replace the tape cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4C24	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4C25	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the tape has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an unknown format.</p>
4C26	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the tape has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an incompatible format.</p>
4C27	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the tape is not valid, but it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has a corrupted format.</p>
4C28	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4C2A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4C2B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4C2C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674. Notify the customer that the cartridge should not be used again.</p>
4C2D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, and go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584).</p>
4C2E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4C2F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4C30	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
4C31	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584).</p>
4C32 4C33 4C34 4C35 4C36	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=4C32, Parameter list length error. • URC=4C33, Invalid command operation code. • URC=4C34, Invalid field in CDB (see field pointer). • URC=4C35, Logical unit not supported. • URC=4C36, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
4C37	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
4C38	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists, obtain a new firmware file and attempt to apply it again. If the problem persists, contact your next level of support.</p>
4C39 4C3A 4C3B 4C3C 4C3D	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=4C39, Not-ready-to-ready transition, media was just loaded into the drive. • URC=4C3A, Power on or Reset occurred. • URC=4C3B, Mode select parameters were changed by another host. • URC=4C3C, Code Download. The firmware in the drive has just been changed. • URC=4C3D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
4C3E	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
4C3F	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
4C40	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
4C41	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>4C42</p> <p>4C43</p> <p>4C44</p> <p>4C45</p> <p>4C46</p> <p>4C47</p> <p>4C48</p> <p>4C49</p>	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=4C42, Invalid bits in Identify message. An illegal Identify Message was received by the drive at the start of a command. • URC=4C43, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=4C44, Select/Reselect Failure. An attempt by the drive to reselect an initiator in order to complete a command failed. • URC=4C45, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=4C46, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=4C47, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=4C48, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=4C49, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
<p>4C4A</p>	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>5000</p>	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
<p>5001</p>	<p>Description</p> <p>Cooling problem. The drive has detected an overtemperature condition.</p> <p>Failure Isolation Procedure</p> <p>This problem could be caused by an out-of-spec (too hot) environment, by blocked air vents on the back of the drive tray, or by a hardware problem with the drive tray. If the room temperature is too high, notify the customer. Ensure the air vents on the back of the drive tray are not blocked.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584).</p>
<p>5002</p>	<p>Description</p> <p>5 V dc drive power problem. The drive detected that the power is outside the required voltage range.</p> <p>URC FRU List</p> <p>The drive power supply is a separate FRU located on the fixed tray. Replace the drive power supply (see “Power Supply (LTO/DLT/Control Port), Redundant – Hot Swap” on page 597).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
5003	<p>Description</p> <p>Drive code problem. The drive detected an internal code problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>
5004	<p>Description</p> <p>Drive code or drive hardware problem. The drive detected a problem but could not determine whether it is caused by drive code or by a drive hardware problem.</p> <p>Failure Isolation Procedure</p> <p>Obtain a drive dump from the failing drive (see “CETool Procedures” on page 500). Keep this drive dump in case it is needed by support.</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
5005	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
5006	<p>Description</p> <p>Drive hardware or media problem. The drive detected a problem, but could not determine whether it was caused by an internal hardware problem or by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). If the problem persists, contact your next level of support.</p>
5007	<p>Description</p> <p>Media problem. The drive detected a problem and determined that it was caused by a media defect.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it. If the problem persists, contact your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
5008	<p>Description</p> <p>Drive SCSI error. The drive detected an error in the SCSI interface to the host computer.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514.</p>
5009	<p>Description</p> <p>The drive detected an error or timeout in RS-422 communications between the drive and the library MCP.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the drive tray and at the MCP. Avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>Determine whether the problem still exists. At the front panel of the library, select [MENU], Library Status, and Drive Status. If the failing drive indicates CommFail then the problem still exists. If the problem does still exist, use the FRU list below to repair the problem. If the problem does not still exist then the failure is intermittent. This usually indicates a microcode problem. Capture a library dump, then attempt to capture a drive dump for possible analysis by IBM Support. Do not replace any FRUs unless instructed to do so by your next level of support.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 Fibre Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
500A	<p>Description</p> <p>Drive hardware problem. The drive detected an internal hardware problem.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available, install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
500C	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
500D	<p>Description</p> <p>The drive determined that another device is using the same Fibre Channel AL_PA (Loop ID). The drive is offline.</p> <p>Failure Isolation Procedure</p> <p>This problem is caused when multiple devices on the same loop are set to the same Fibre Channel Loop ID. On the operator panel, press [MENU], select Settings, SCSI/Loop IDs, Display SCSI/Loop IDs. Verify that all drives that are on a common loop (that is, attached to the same Fibre Channel hub) have different Loop IDs. If a conflict is found, press Back. Select Change SCSI/Loop IDs, and correct the problem</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 Fibre Drive Canister (see “Drive Types” on page 584).</p>
500E	<p>Description</p> <p>The drive received an OFFLINE command from another device on the Fibre Channel Arbitrated Loop.</p> <p>Failure Isolation Procedure</p> <p>Go to “Fibre Channel Problems” on page 522.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 Fibre Drive Canister (see “Drive Types” on page 584).</p>
500F	<p>Description</p> <p>The drive determined that there is no light on the Fibre Channel port.</p> <p>Failure Isolation Procedure</p> <p>Go to “Fibre Channel Problems” on page 522.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 Fibre Drive Canister (see “Drive Types” on page 584).</p>
5010	<p>Description</p> <p>No error. The operation was successful.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
5011	<p>Description</p> <p>Filemark detected. A Read or Space command terminated early because a File Mark was encountered. The File Mark flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
5012	<p>Description</p> <p>End of Media. A Write or Write File Marks command ended in the early warning area. The EOM flag is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
5013	<p>Description</p> <p>Beginning of Media. A Space command ended at Beginning of Media. The EOM flag also is set.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
5015	<p>Description</p> <p>The drive needs to be cleaned.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clean the drive.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584).</p>
5019	<p>Description</p> <p>Recovered Error. A Mode Select command parameter was rounded off because the drive cannot store it with the specified accuracy.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
501A	<p>Description</p> <p>Recovered Error. Failure Prediction thresholds have been exceeded indicating that a failure may occur soon.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584).</p>
501B	<p>Description</p> <p>Not Ready — Cause Not Reportable. A cartridge is present in the drive, but it is in the process of unloading.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
501C	<p>Description</p> <p>Not Ready — Becoming Ready. The drive has not finished the load and thread operation yet.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
501D	<p>Description</p> <p>Not Ready — Initializing Command Required. A cartridge is present in the drive, but is not logically loaded. A Load command is required.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
501E	<p>Description</p> <p>Not Ready — Cleaning Cartridge Installed. The host attempted to access the cartridge currently loaded in the drive, but it is a cleaning cartridge.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
501F	<p>Description</p> <p>Not Ready — Cleaning Failure. An attempt to clean the drive failed.</p> <p>Failure Isolation Procedure</p> <p>Attempt to clean the drive using a different cleaning cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Tray (see “Drive Types” on page 584).</p>
5020	<p>Description</p> <p>Not Ready — Media Not Present. The host attempted to access a cartridge in the drive, but there is no cartridge loaded.</p> <p>Failure Isolation Procedure</p> <p>No repair action required.</p>
5021	<p>Description</p> <p>Not Ready — Drive Not Configured. The drive has just powered on or reset, and it has not completed its POST and configuration process.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged in securely at the drive tray and at the MCP. Do not unplug the RS-422 cable from the MCP since this would affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP.
5022	<p>Description</p> <p>Write failure. The drive detected a Write failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job using a different tape cartridge. If the problem persists, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
5023	<p>Description</p> <p>Read failure. The drive detected a Read failure. This is probably due to bad media, but it may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists then replace the tape cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
5024	<p>Description</p> <p>Recorded Entity Not Found. A Space or Locate command failed because a format violation prevented the target from being found. This is probably due to bad media, but may be a drive failure.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
5025	<p>Description</p> <p>Unknown Format on Media. An operation could not be completed because the tape has a logical format that is not recognized by the drive.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an unknown format.</p>
5026	<p>Description</p> <p>Incompatible Format on Media. An operation could not be completed because the tape has a logical format that is not correct.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has an incompatible format.</p>
5027	<p>Description</p> <p>Media Format Corrupted. Data could not be read because the format on the tape is not valid, but it is a recognized format. A failure occurred attempting to write the file ID.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the tape has a corrupted format.</p>
5028	<p>Description</p> <p>Sequential Positioning Error. A command has failed and left the logical position at an unexpected location.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to unload and reload the cartridge. If the problem persists, replace the cartridge.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
502A	<p>Description</p> <p>Write Append Error. A Write command has failed because the point at which to append data was unreadable.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
502B	<p>Description</p> <p>Cartridge Fault. A command could not be completed because of a fault in the tape cartridge.</p> <p>Failure Isolation Procedure</p> <p>Replace the cartridge.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
502C	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the cartridge.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to load the cartridge, replace the cartridge. If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674. Notify the customer that the cartridge should not be used again.</p>
502D	<p>Description</p> <p>Manual Intervention Required. A cartridge is present in the drive, but it cannot be loaded or unloaded without manual intervention.</p> <p>Failure Isolation Procedure</p> <p>If the cartridge is still in the drive, and go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584).</p>
502E	<p>Description</p> <p>Diagnostic Failure. A diagnostic self-test failed.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
502F	<p>Description</p> <p>Internal Target Failure. A hardware failure has been detected in the drive.</p> <p>Failure Isolation Procedure</p> <p>See if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
5030	<p>Description</p> <p>Erase Failure. An Erase command failed to erase the specified area on the tape.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to try the job in a different drive. If the problem persists, replace the cartridge. If the problem only occurs in one drive, see if updated drive code is available (see “CETool Procedures” on page 500). If newer drive code is available install it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, contact your next level of support.
5031	<p>Description</p> <p>Load/Eject Failed. An attempt to load or eject the cartridge failed because of a problem with the drive.</p> <p>Failure Isolation Procedure</p> <p>If the problem occurred while trying to eject the cartridge and the cartridge is still in the drive, go to “From an LTO Drive” on page 674.</p> <p>URC FRU List</p> <p>Replace the LTO Ultrium-2 FC Drive Canister (see “Drive Types” on page 584).</p>
5032 5033 5034 5035 5036	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=5032, Parameter list length error. • URC=5033, Invalid command operation code. • URC=5034, Invalid field in CDB (see field pointer). • URC=5035, Logical unit not supported. • URC=5036, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
5037	<p>Description</p> <p>Illegal Request — Media Removal Prevented. An unload command was rejected because the drive previously received a Prevent Media Removal command.</p> <p>Failure Isolation Procedure</p> <p>Ask the customer to clear the Prevent Media Removal command from the host.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
5038	<p>Description</p> <p>Illegal Request — Bad Code Detected. The code transferred to the drive during a firmware upgrade is corrupt or incompatible with the drive.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists, obtain a new firmware file and attempt to apply it again. If the problem persists, contact your next level of support.</p>
5039 503A 503B 503C 503D	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=5039, Not-ready-to-ready transition, media was just loaded into the drive. • URC=503A, Power on or Reset occurred. • URC=503B, Mode select parameters were changed by another host. • URC=503C, Code Download. The firmware in the drive has just been changed. • URC=503D, Failure Prediction False. A Mode Select command has been used to test for Failure Prediction system. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
503E	<p>Description</p> <p>Write Protect. A Write operation was requested on a cartridge which has been write protected.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
503F	<p>Description</p> <p>Incompatible Media. A Write operation was requested on a cartridge which is not writable.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
5040	<p>Description</p> <p>End Of Data. A Read or Space command terminated early because End Of Data was encountered.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
5041	<p>Description</p> <p>End Of Data Not Found. A Read operation failed because of a format violation related to a missing End Of Data data set.</p> <p>Failure Isolation Procedure</p> <p>Notify the customer that the cartridge has a missing End Of Data data set.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>5042</p> <p>5043</p> <p>5044</p> <p>5045</p> <p>5046</p> <p>5047</p> <p>5048</p> <p>5049</p>	<p>Description</p> <p>Aborted Command:</p> <ul style="list-style-type: none"> • URC=5042, Invalid bits in Identify message. An illegal Identify Message was received by the drive at the start of a command. • URC=5043, Message Error. A message could not be sent or received due to excessive transmission errors. • URC=5044, Select/Reselect Failure. An attempt by the drive to reselect an initiator in order to complete a command failed. • URC=5045, Initiator Detected Error message. A command failed because the Initiator Detected Error message was received by the drive. • URC=5046, Invalid Message Error. A command failed because an invalid message was received by the drive. • URC=5047, Command Phase Error. A command could not be executed because too many parity errors occurred during the Command phase. • URC=5048, Data Phase Error. A command could not be executed because too many parity errors occurred during the Data phase. • URC=5049, Overlapped Commands. An initiator attempted to send a command to the drive even though it already had another command being processed in the drive. <p>Failure Isolation Procedure</p> <p>If the problem persists, go the “SCSI Bus Problems” on page 514.</p>
<p>504A</p>	<p>Description</p> <p>Volume Overflow — End Of Media. A command failed because the physical end of tape was encountered. The End Of Media flag is set.</p> <p>Failure Isolation Procedure</p> <p>No action is necessary. This is only a status message.</p>
<p>9020</p>	<p>Description</p> <p>I/O processor detected a SCSI bus configuration error.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514. If no problem is found, contact your next level of support.</p>
<p>9100</p>	<p>Description</p> <p>Interface error detected by I/O processor or by tape unit.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514. If no problem is found, contact your next level of support.</p>
<p>9200</p>	<p>Description</p> <p>I/O processor addressed the tape unit; no response.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514. If no problem is found, contact your next level of support.</p>
<p>9201</p>	<p>Description</p> <p>Tape unit command timeout.</p> <p>Failure Isolation Procedure</p> <p>Go to “SCSI Bus Problems” on page 514. If no problem is found, contact your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
9202	<p>Description</p> <p>Tape unit failed after Licensed Internal Code was loaded.</p> <p>Failure Isolation Procedure</p> <p>Display drive VPD. If the latest level drive code is not already installed, download and apply it using the “CETool Procedures” on page 500. If the problem persists, contact your next level of support.</p>
9210	<p>Description</p> <p>Illegal or unsupported tape-unit response.</p> <p>Failure Isolation Procedure</p> <p>Obtain the sense data from the response. Go to Chapter 2, “Start”, on page 49. If unable to correct the problem, contact your next level of support.</p>
9300	<p>Description</p> <p>Tape unit failure.</p> <p>Failure Isolation Procedure</p> <p>Obtain the sense data from the failure. Go to Chapter 2, “Start”, on page 49. If unable to correct the problem, contact your next level of support.</p>
9301	<p>Description</p> <p>Tape device failure, redundancy lost.</p> <p>Failure Isolation Procedure</p> <p>Obtain the sense data from the failure. Go to Chapter 2, “Start”, on page 49. If unable to correct the problem, contact your next level of support.</p>
9302	<p>Description</p> <p>Tape unit failure or media failure.</p> <p>Failure Isolation Procedure</p> <p>Obtain the sense data from the failure. Go to Chapter 2, “Start”, on page 49. If unable to correct the problem, contact your next level of support.</p>
9310	<p>Description</p> <p>Licensed Internal Code for the tape unit is not correct.</p> <p>Failure Isolation Procedure</p> <p>Contact your next level of support.</p>
9320	<p>Description</p> <p>Tape device licensed internal code failure.</p> <p>Failure Isolation Procedure</p> <p>Obtain the sense data from the failure. Go to Chapter 2, “Start”, on page 49. If unable to correct the problem, contact your next level of support.</p>
9350	<p>Description</p> <p>Tape unit detected a read or write error on tape media.</p> <p>Failure Isolation Procedure</p> <p>Obtain the sense data from the failure. Go to Chapter 2, “Start”, on page 49. If unable to correct the problem, contact your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
9351	<p><u>Description</u></p> <p>Tape with excessive error rate was mounted in tape device.</p> <p><u>Failure Isolation Procedure</u></p> <p>Obtain the sense data from the failure. Go to Chapter 2, “Start”, on page 49. If unable to correct the problem, contact your next level of support.</p>
9355	<p><u>Description</u></p> <p>The data format is incorrect, the tape cannot be read.</p> <p><u>Failure Isolation Procedure</u></p> <p>Obtain the sense data from the failure. Go to Chapter 2, “Start”, on page 49. If unable to correct the problem, contact your next level of support.</p>
9500	<p><u>Description</u></p> <p>I/O processor Licensed Internal Code error.</p> <p><u>Failure Isolation Procedure</u></p> <p>Contact your next level of support.</p>
980x	<p><u>Description</u></p> <p>I/O processor successfully recovered from temporary error.</p> <p><u>Failure Isolation Procedure</u></p> <p>No corrective action is required. If you need a description of the specific recovered error, obtain the sense data from the error. Go to Chapter 2, “Start”, on page 49.</p>
9900	<p><u>Description</u></p> <p>Tape unit Licensed Internal Code was not upgraded.</p> <p><u>Failure Isolation Procedure</u></p> <p>Display drive VPD. If the latest level drive code is not already installed, download and apply it using the “CETool Procedures” on page 500. If the problem persists, contact your next level of support.</p>
A000	<p><u>Description</u></p> <p>No additional sense information.</p> <p><u>Failure Isolation Procedure</u></p> <p>Run the Library Verify Test, (see “Library Verify Test” on page 507). If a failure occurs, follow that symptom.</p>
A200	<p><u>Description</u></p> <p>Not ready — Cause not reportable.</p> <p><u>Failure Isolation Procedure</u></p> <p>Call your next level of support.</p>
A201	<p><u>Description</u></p> <p>Not ready — In process of coming ready.</p> <p><u>Failure Isolation Procedure</u></p> <p>This is usually not a failure. If the problem persists, run the Library Verify Test , (see “Library Verify Test” on page 507).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
A203	<p>Description</p> <p>Not ready — Manual intervention required.</p> <p>Failure Isolation Procedure</p> <p>Check the library front doors to ensure that they are all closed. Ensure that power is on each of the Node cards. Possible failure of a door switch.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the Door Switch (see “Door Interlock Switch and Actuator” on page 582). 2. Replace the Door Switch Cable.
A283	<p>Description</p> <p>Not ready — Library has not been set up (needs configuration and/or calibration).</p> <p>Failure Isolation Procedure</p> <p>Have your customer run Library Configuration.</p>
A284	<p>Description</p> <p>Not ready — I/O Station Open.</p> <p>Failure Isolation Procedure</p> <p>Close the I/O Station if it is open. If not open, run the Library Verify Test , (see “Library Verify Test” on page 507).</p>
A285	<p>Description</p> <p>Not ready — Door Open (see frame number).</p> <p>Failure Isolation Procedure</p> <p>Close the doors if they are open. If they are not open, isolate failure in door lock or door lock sense circuits.</p> <p>URC FRU List</p> <p>Replace the Door Switch (see “Door Interlock Switch and Actuator” on page 582).</p>
A421	<p>Description</p> <p>MCP Internal Failure (see frame number).</p> <p>URC FRU List</p> <p>Replace the MCP (see “Media Changer Pack (MCP)” on page 564).</p>
A422	<p>Description</p> <p>OPC Card Internal Failure.</p> <p>URC FRU List</p> <p>Replace the OPC Card (see “Operator Panel Assembly (OPC)” on page 568).</p>
A423	<p>Description</p> <p>ACC Card Internal Failure.</p> <p>URC FRU List</p> <p>Replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558).</p>
A424	<p>Description</p> <p>MDA Internal Failure.</p> <p>URC FRU List</p> <p>Replace the MDA (see “Motor Driver Assembly (MDA)” on page 566).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
A425	<p>Description</p> <p>MCP not responding on CAN bus. See the HECQ (byte 19 of the SCSI sense data) to find the frame number of the failing MCP. This error will show on other node cards (ACC, MDA, OPC, and other MCPs if installed) if an MCP is unplugged or otherwise unable to communicate over the CAN bus. It will also show for a short time if the MCP is reset, but in this case it is not considered an error.</p> <p>Failure Isolation Procedure</p> <p>Note: If the affected node card appears to be powered on (the two-character display is not blank), please get library logs before you attempt to repair the problem.</p> <ul style="list-style-type: none"> • Ensure that the MCP is fully seated in the FCA, and that the retaining screws are tight. • Ensure that at least one of the 24 V dc indicators on the FCA are on. If not, go to the “Power Isolation MAP” on page 449. • If the failure is on a library subsystem containing only one frame, ensure that both of the Wrap Jumpers are installed on the FIC. If the failure is on a library subsystem containing multiple frames, ensure that the Wrap Jumpers are installed only on the right end (as viewed from the rear) of the base frame and the left end of the last expansion frame. Also for a library with multiple frames, ensure that the FIC-to-FIC signal cables are fully seated. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. MCP (see “Media Changer Pack (MCP)” on page 564). 2. FIC-to-FIC Signal Cable. 3. FIC Card (see “FIC Card” on page 562). 4. FCA Assembly (see “Frame Control Assembly (FCA)” on page 618).
A426	<p>Description</p> <p>OPC card not responding on CAN bus. This error will show on other node cards (ACC, MDA, and MCPs) if the OPC is unplugged or otherwise unable to communicate over the CAN bus. It also will show for a short time if the OPC is reset; but in this case it is not considered an error.</p> <p>Failure Isolation Procedure</p> <p>Note: If the affected node card appears to be powered on (the two-character display is not blank), please get library logs before you attempt to repair the problem.</p> <ul style="list-style-type: none"> • Ensure that the FIC to OPC cable is fully seated in the FIC and the OPC. • A two-character display on the OPC is blank may indicate a power problem. Visually check the 37E bus power indicator on the frame 1 FIC card. If this indicator is not lighted, there is no power to the OPC. This may be normal if “Prepare for FIC Replacement” has been run. It also could indicate a blown fuse. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. FIC card fuse (if the OPC two-character display is blank). 2. OPC (see “Operator Panel Assembly (OPC)” on page 568). 3. FIC-to-OPC Cable.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
A427	<p>Description</p> <p>ACC card not responding on CAN bus. This error will show on other node cards (MDA, OPC, and MCPs) if the ACC is unplugged, powered off, or otherwise unable to communicate over the CAN bus. It also will show for a short time if the ACC is reset; but in this case it is not considered an error.</p> <p>Failure Isolation Procedure</p> <p>Note: If the affected node card appears to be powered on (the two-character display is not blank), please get library logs before you attempt to repair the problem.</p> <ul style="list-style-type: none"> • Ensure that the cable connections from the FIC in frame 1, through the XCP, through the X-axis Flex Cable, through the AXY, through the Y-axis flex cable, to the ACC are fully seated. Check all these cables for visible damage, and replace any damaged cables. • If the two-character displays on both the ACC and the MDA are blank it may indicate a power problem. Visually check the 37C bus power indicator on the frame 1 FIC card. If this indicator is off then there is no power to the ACC and MDA. This may be normal if “Prepare for Accessor Service” has been run, but it could also mean that a fuse has blown or the 37 V dc power supplies have tripped due to an overcurrent. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. FIC card fuse (if both the ACC and MDA two-character displays are blank). 2. MDA (if both the ACC and MDA two-character displays are blank). 3. ACC Card (see “Accessor Controller Card (ACC)” on page 558). 4. Y-Axis Flex Cable (see “Y-Axis Flex Cable” on page 664) 5. X-Axis Flex Cable (see “X-Axis Flex Cable” on page 653). 6. AXY Card (see “AXY Card (X-Axis)” on page 560). 7. XCP Card (see “XCP Card” on page 574). 8. FIC Card (see “FIC Card” on page 562).
A428	<p>Description</p> <p>MDA card not responding on CAN bus. This error will show on other node cards (ACC, OPC, and MCPs) if the MDA is unplugged, powered off, or otherwise unable to communicate over the CAN bus. It also will show for a short time if the MDA is reset; but in this case it is not considered an error.</p> <p>Failure Isolation Procedure</p> <p>Note: If the affected node card appears to be powered on (the two-character display is not blank), please get library logs before you attempt to repair the problem. Ensure that the cable connections from the FIC in frame 1, through the XCP, through the X-axis Flex Cable, through the AXY, through the Y-axis flex cable, to the ACC are fully seated. Check all these cables for visible damage, and replace any damaged cables.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. AXY-to-MDA Cable. 2. MDA (see “Motor Driver Assembly (MDA)” on page 566). 3. X-Axis Flex Cable (see “X-Axis Flex Cable” on page 653). 4. AXY Card (see “AXY Card (X-Axis)” on page 560). 5. XCP Card (see “XCP Card” on page 574).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
A429	<p>Description</p> <p>No response from any other card on the CAN bus. This error will show on the two-character display on any node card (ACC, MDA, OPC, or MCP) if it is unable to communicate to any other node card over the CAN bus.</p> <p>If any two-character display on a node card is blank, go to “Power Entry MAP” on page 449.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • If 29 80 is observed on the two-character display on the ACC, ensure that the cable connections from the FIC in frame 1, through the XCP, through the X-axis Flex Cable, through the AXY, through the Y-axis flex cable, to the ACC are fully seated. Check all these cables for visible damage, and replace any damaged cables. • If 29 80 is observed on the two-character display on the MDA, ensure that the cable connections from the FIC in frame 1, through the XCP, through the X-axis Flex Cable, through the AXY, through the AXY to MDA cable, to the MDA are fully seated. Check all these cables for visible damage, and replace any damaged cables. • If 29 80 is observed on the two-character display on the OPC, ensure that the cable connections from the FIC in frame 1, through the FIC to OPC cable, to the OPC are fully seated. Check the cable for visible damage, and replace if damaged. • If 29 80 is observed on the two-character display on the MCP, ensure that the MCP is fully seated and that the mounting screws are securely fastened. Also ensure that the cable connections from that MCP to the FIC in the same frame are fully seated. If there is more than one MCP in the library subsystem, ensure that the FIC to FIC signal cables are fully seated and that the FIC Wrap Jumpers are installed ONLY at the ends of the bus (at the right side as viewed from the rear of the FIC in frame 1, and at the left side of the FIC in the last frame). • If the problem persists, and the ACC, MDA, and OPC two-character displays are blank, there is a 37 V dc power problem. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. The node card that is flashing 29 80. 2. CAN bus cabling between the failing node card and the other node cards. 3. FIC Card (see “FIC Card” on page 562).
A430	<p>Description</p> <p>Frame Sequencing failure. A frame sequencing operation produced invalid data.</p> <p>URC FRU List</p> <p>Replace the failing FIC (see “FIC Card” on page 562).</p>
A431	<p>Description</p> <p>Frame Not Found. At power on, a previously configured frame was not found by the frame sequencing operation. See the failing frame number in the sense data or in the library error log.</p> <p>URC FRU List</p> <p>Replace the failing FIC (see “FIC Card” on page 562).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
A432	<p>Description</p> <p>Door interlock frame number sensing failure. The library is unable to determine which door was opened.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • Ensure that the door interlock switch cable is securely connected at the FIC. Repeat for each frame. • If the library has only one frame go directly to the FRU list. If the library has more than one frame continue with the remaining steps in this Failure Isolation Procedure. • If the library has more than one frame, use the following procedure to determine which frame is causing the problem. <p>Note: You can use the automatic inventory which occurs after a front door has been opened/closed to determine which frame is causing the problem. If you open/close the front door on a frame that is NOT causing this problem then the automatic inventory will scan only the frame where the door was opened/closed. If you open/close the front door on the frame that IS causing this problem then the automatic inventory will scan ALL frames. The following procedure will guide you through the isolation process.</p> <ol style="list-style-type: none"> 1. Close all front doors and wait until the inventory has completed. 2. Open the front door on frame 1, then close it and observe the inventory process through the side window. 3. If the inventory scans ALL frames, then the problem is in frame 1. Use the FRU list to replace FRUs in frame 1 until the inventory scans only frame 1. 4. If the inventory scans only frame 1, the problem is not in frame 1. Go to the next frame and repeat steps 2 through 4. Continue to check each frame until you have identified the frame which is causing the problem. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the FIC (see “FIC Card” on page 562). 2. If the problem persists, replace the Door Switch (see “Door Interlock Switch and Actuator” on page 582).
A440	<p>Description</p> <p>FCA Cooling Fan Failure. See “FCA Cooling Fan Problems” on page 484 for the procedure to diagnose this problem.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If 37 V dc power is present at the ACC, MDA, and OPC, replace the failing FCA (see “Frame Control Assembly (FCA)” on page 618). 2. 37 V dc power is NOT present at the ACC, MDA, and OPC, Replace: <ol style="list-style-type: none"> a. MDA (see “Motor Driver Assembly (MDA)” on page 566). b. 37 V dc Power Supply (see “Power Supply, 37 V dc” on page 645).
A451 A452	<p>Description</p> <p>24 V dc PS Out Of Range — probable failure of 24 V dc PS.</p> <p>URC FRU List</p> <p>Replace the failing FCA (see “Frame Control Assembly (FCA)” on page 618).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>A453</p> <p>A454</p> <p>A455</p> <p>A456</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=A453, 37 V dc PS#1 out of range, — probable failure of 37 V dc PS#1. • URC=A454, 37 V dc PS#2 out of range, — probable failure of 37 V dc PS#2. • URC=A455, 37 V dc PS#1 will not turn ON, — probable failure of 37 V dc PS#1. • URC=A456, 37 V dc PS#2 will not turn ON, — Probable failure of 37 V dc PS#2. <p>Failure Isolation Procedure</p> <p>Check FIC cards for blown fuse. If you find a blown fuse, go to “Blown Fuse MAP” on page 468.</p> <p>Check the interframe power cables which connect FIC J5 to adjacent frame FIC J7 for a loose connection. Do NOT unplug the cables unless the library is already powered off.</p> <p>See Failing Frame in the sense data or library error log to determine in which frame the failing power supply is located. Check to see if the power supply is installed correctly (not loose).</p> <ol style="list-style-type: none"> 1. If URC = A453 or A455; the failure is with 37 V dc PS#1. 2. If URC = A454 or A456; the failure is with 37 V dc PS#2. <p>Note: PS#1 is on the left and PS#2 is on the right as viewed from the rear.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. 37 V dc Power Supply (see “Power Supply, 37 V dc” on page 645). 2. MCP (see “Media Changer Pack (MCP)” on page 564). 3. MDA (see “Motor Driver Assembly (MDA)” on page 566). 4. FIC (see “FIC Card” on page 562). 5. FIC-to-FIC power cable. 6. FCA (see “Frame Control Assembly (FCA)” on page 618).
<p>A457</p> <p>A458</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=A457, 37 V dc PS#1 not present, — probably disconnected. • URC=A458, 37 V dc PS#2 not present, — probably disconnected. <p>Failure Isolation Procedure</p> <p>See Failing Frame in the sense data or library error log to determine in which frame the failing power supply is located. Check to see if the power supply is installed correctly (not loose).</p> <ol style="list-style-type: none"> 1. If URC = A457; the failure is with 37 V dc PS#1. 2. If URC = A458; the failure is with 37 V dc PS#2. <p>Note: PS#1 is on the left and PS#2 is on the right as viewed from the rear.</p> <p>If the problem persists, exchange the power supply.</p> <p>If the problem still persists, the problem may be a bad connection in the MCP or the FCA. Note: You can remove and reinstall the MCP to reseal it without dropping power to the drives. However, it will affect all library communications through control path drives or control ports in the same frame as the MCP.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. 37 V dc Power Supply (see “Power Supply, 37 V dc” on page 645). 2. MCP (see “Media Changer Pack (MCP)” on page 564). 3. FCA (see “Frame Control Assembly (FCA)” on page 618).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
A45D	<p>Description</p> <p>Drive Power Supply not present — probably disconnected.</p> <p>URC FRU List</p> <p>Ensure that the power supply is present and connected.</p> <p>Replace the failing power supply (see “Power Supply (LTO/DLT/Control Port), Redundant – Hot Swap” on page 597).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
A45E	<p>Description</p> <p>Hot-Swap Drive Power Supply failure.</p> <p>Failure Isolation Procedure</p> <p>Visually check the 2 LEDs on every drive power supply in the affected frame. Record the status of the AC and DC LEDs on each drive power supply. Find your symptom in the following list and follow the instructions to resolve the problem.</p> <p>All LEDs are ON</p> <p>This indicates that all the power supplies are powered on and that none of them has detected any internal problem. Ensure the Redundant Drive Power Cable is fully seated at each Fixed Tray, but do NOT unplug the cable if either drive is in use. Remove and reinstall the affected power supply to ensure it is fully seated. If the drive canister adjacent to the power supply is not in use, remove and reinstall the drive canister. If problem persists, replace following FRUs one at a time until resolved:</p> <ul style="list-style-type: none"> • Fixed Tray • Drive Canister • Drive Power Supply • Redundant Drive Power Cable <p>All AC LEDs are ON, but at least one DC LED is OFF</p> <p>If a power supply has its AC LED ON and its DC LED OFF, then it has detected a problem in its DC output. This could be caused by a failing power supply or by an overcurrent in a device receiving power from that power supply. Remove and reinstall the affected power supply to reset it and to ensure it is fully seated. If problem persists, replace FRUs, one at a time, until resolved:</p> <ul style="list-style-type: none"> • Drive Power Supply • Fixed Tray • Redundant Drive Power Cable • Drive Canister <p>A single AC LED is OFF</p> <p>Disconnect and reconnect the bifurcated FCA-to-drive AC power cord from the fixed tray that contains the affected power supply. Do NOT unplug the other connectors on the same line cord. This could cause another drive to lose power. If the problem persists, remove and reinstall Drive Power Supply. If the problem persists, replace FRUs one at a time until resolved:</p> <ul style="list-style-type: none"> • Fixed Tray • Bifurcated FCA-to-drive AC power cord • Drive Power Supply • FCA <p>Two or more AC LEDs are OFF</p> <ol style="list-style-type: none"> 1. Ensure that all 3 circuit breakers on the FCA are ON. Do NOT turn them off while checking them because this could drop power to drives that are in use. 2. Visually check the two 24 V dc power supply LEDs on the FCA. <ul style="list-style-type: none"> • If at least one 24 V dc LED is ON, the FCA is receiving AC power from the customer receptacle. Go to step 3. • If both LEDs are OFF, suspect a customer power problem, a loose or damaged AC line cord, or an FCA failure. 3. Visually determine whether the affected power supplies share a single bifurcated FCA-to-drive AC power cord, or a single column of receptacles on the FCA. If all affected power supplies share a single bifurcated FCA-to-drive AC power cord, check the cable connections and if no problem is found, replace the bifurcated FCA-to-drive AC power cord. 4. If the problem persists and all affected power supplies are cabled to the same column of receptacles on the FCA, replace the FCA.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>A460</p> <p>A461</p>	<p>Description</p> <p>Calibration Sensor Failure.</p> <ul style="list-style-type: none"> • URC=A460, sensor unplugged or blocked when it should not be blocked. • URC=A461, sensor not blocked when it should be blocked. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the calibration sensor (see “Calibration Sensor” on page 555). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558) 4. PDC (see “PDC Card” on page 572).
<p>A470</p> <p>A471</p>	<p>Description</p> <p>X Home Sensor Failure.</p> <ol style="list-style-type: none"> 1. URC=A470, sensor unplugged or blocked when it should not be blocked. 2. URC=A471, sensor not blocked when it should be blocked. <p>Failure Isolation Procedure</p> <p>Look for obstacles or broken wires near the X-Axis home sensor, or a bent or broken sensor flag. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. X- Home Sensor (see “X-Axis Home Sensor” on page 656). 2. MDA (see “Motor Driver Assembly (MDA)” on page 566).
<p>A480</p> <p>A481</p>	<p>Description</p> <p>Y Home Sensor Failure.</p> <ol style="list-style-type: none"> 1. URC=A480, sensor unplugged or blocked when it should not be blocked. 2. URC=A481, sensor not blocked when it should be blocked. <p>Failure Isolation Procedure</p> <p>Look for obstacles or broken wires near the Y-Axis home sensor, a bent or broken sensor flag. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Y-Home Sensor (see “Y-Axis Home Sensor” on page 667). 2. MDA (see “Motor Driver Assembly (MDA)” on page 566).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>A490</p> <p>A491</p> <p>A492</p> <p>A493</p> <p>A494</p> <p>A495</p> <p>A496</p>	<p>Description</p> <p>X Motor Problem:</p> <ul style="list-style-type: none"> • URC=A490, X motor will not move (no encoder pulses). • URC=A491, X motion cannot find a hard stop while moving left. • URC=A492, X motion cannot find a hard stop while moving right. • URC=A493, X motion encountered an unexpected hard stop while moving left. • URC=A494, X motion encountered an unexpected hard stop while moving right. • URC=A495, X motion — excessive force required to move left. • URC=A496, X motion — excessive force required to move right. <p>Failure Isolation Procedure</p> <p>Manually move the accessor right and left to check for any obvious binds. Check the X motor drive belt for any obvious damage. If the URC is A493 ensure that the shipping pin is not preventing the accessor from moving all the way to the home position. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. X-Drive Motor and X-Motor Drive Belt (see “X-Axis Motor/Belt” on page 657). 2. MDA (see “Motor Driver Assembly (MDA)” on page 566).
<p>A497</p>	<p>Description</p> <p>X Motor Lost 37 V dc Power.</p> <p>Failure Isolation Procedure</p> <p>Check the Fuses on the FIC in frame 1. If any fuse is blown, go to “Blown Fuse MAP” on page 468. If no fuse is blown, check for a loose connection in the cabling from the FIC card to the ACC. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. X-Axis Flex Cable (see “X-Axis Flex Cable” on page 653). 2. AXY-to-MDA Cable. 3. FIC-to-XCP Cable. 4. MDA (see “Motor Driver Assembly (MDA)” on page 566). 5. AXY Card. 6. XCP Card.
<p>A498</p>	<p>Description</p> <p>X Motor Driver Failure.</p> <p>URC FRU List</p> <p>Replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566).</p>
<p>A499</p>	<p>Description</p> <p>X-Position Drift Detected During Re-zero.</p> <p>Failure Isolation Procedure</p> <p>Check the X drive belt tension. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <p>Replace the X-Motor Assembly and the X-Motor Drive Belt (see “X-Axis Motor/Belt” on page 657).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>A4A0</p> <p>A4A1</p> <p>A4A2</p> <p>A4A3</p> <p>A4A4</p> <p>A4A5</p> <p>A4A6</p>	<p>Description</p> <p>Y Motor Problem:</p> <ul style="list-style-type: none"> • URC=A4A0, Y motor will not move (no encoder pulses). • URC=A4A1, Y motion cannot find a hard stop while moving up. • URC=A4A2, Y motion cannot find a hard stop while moving down. • URC=A4A3, Y motion encountered an unexpected hard stop while moving up. • URC=A4A4, Y motion encountered an unexpected hard stop while moving down. • URC=A4A5, Y motion — excessive force required to move up. • URC=A4A6, Y motion — excessive force required to move down. <p>Failure Isolation Procedure</p> <p>Manually move the accessor up and down to check for any obvious binds. Check the Y motor drive belt for any obvious damage. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Y-Motor Assembly and Y-Motor Belt (see “Y-Axis Motor/Belt” on page 670). 2. MDA (see “Motor Driver Assembly (MDA)” on page 566).
<p>A4A7</p>	<p>Description</p> <p>Y Motor Lost 37 V dc Power.</p> <p>Failure Isolation Procedure</p> <p>Check the fuses on the FIC in frame 1. If any fuse is blown, go to “Blown Fuse MAP” on page 468. If no fuse is blown, check for a loose connection in the cabling from the FIC card to the ACC. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. X-Axis Flex Cable (see “X-Axis Flex Cable” on page 653). 2. AXY-to-MDA Cable. 3. FIC-to-XCP Cable. 4. MDA (see “Motor Driver Assembly (MDA)” on page 566). 5. AXY Card. 6. XCP Card.
<p>A4A8</p>	<p>Description</p> <p>Y Motor Driver Failure.</p> <p>URC FRU List</p> <p>Replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566).</p>
<p>A4A9</p>	<p>Description</p> <p>Y-Position Drift Detected During Re-zero.</p> <p>Failure Isolation Procedure</p> <p>Check the Y drive belt tension. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <p>Replace the Y-Motor and the Y-Axis Belt (see “Y-Axis Motor/Belt” on page 670).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>A4B0</p> <p>A4B1</p> <p>A4B2</p> <p>A4B3</p> <p>A4B4</p> <p>A4B5</p> <p>A4B6</p>	<p>Description</p> <p>Pivot Motion Problem:</p> <ul style="list-style-type: none"> • URC=A4B0, Pivot motor will not move (no encoder pulses). • URC=A4B1, Pivot motion cannot find a hard stop while pivoting toward door. • URC=A4B2, Pivot motion cannot find a hard stop while pivoting away from door. • URC=A4B3, Pivot motion encountered an unexpected hard stop while pivoting toward door. • URC=A4B4, Pivot motion encountered an unexpected hard stop while pivoting away from door. • URC=A4B5, Pivot motion — excessive force required to pivot toward door. • URC=A4B6, Pivot motion — excessive force required to pivot away from door. <p>Failure Isolation Procedure</p> <p>Manually pivot the accessor forward and back to check for any obvious binds. Check the Pivot motor belt for any obvious damage. If no problem is found replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Pivot Motor Assembly and Belt (see “Pivot Motor and Belt Assembly (New Style)” on page 644). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558). 4. PDC (see “PDC Card” on page 572). 5. Pivot Assembly (see “Pivot Assembly” on page 638).
<p>A4B7</p>	<p>Description</p> <p>Pivot Motor Lost 37 V dc Power.</p> <p>Failure Isolation Procedure</p> <p>Check the Fuses on the FIC in frame 1. If any fuse is blown, go to the “Blown Fuse MAP” on page 468. If no fuse is blown, check for a loose connection in the cabling from the FIC card to the ACC. If no problem is found replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. X-Axis Flex Cable (see “X-Axis Flex Cable” on page 653). 2. Y-Axis Flex Cable (see “Y-Axis Flex Cable” on page 664). 3. FIC-to-XCP Cable. 4. ACC Card (see “Accessor Controller Card (ACC)” on page 558).
<p>A4C0</p>	<p>Description</p> <p>Bar Code Scanner Failure</p> <p>URC FRU List</p> <p>Replace the Bar Code Scanner (see “Bar Code Scanner” on page 554).</p>
<p>A4C1</p>	<p>Description</p> <p>Bar Code Miscompare. A label was read twice with different results.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • Ensure that all bar code labels on tape cartridges and on library components are located correctly and not damaged. • Clean the bar code scanner. <p>URC FRU List</p> <p>If the problem persists, replace the bar code scanner (see “Bar Code Scanner” on page 554).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>A4C2 A4C3 A4C4</p>	<p>Description</p> <p>Bar Code Trigger Failure.</p> <ul style="list-style-type: none"> • URC=A4C2, MDA to ACC cable loopback test failed. • URC=A4C3, ACC cannot trigger the bar code scanner. • URC=A4C4, MDA cannot trigger the bar code scanner. <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • Ensure that the pivot flex cable, Y-flex cable, and AXY to MDA cables are securely connected and are not damaged. • Ensure that the ACC and the MDA are at the same firmware level. If no problem is found replace the following FRUs: <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Bar Code Scanner (see “Bar Code Scanner” on page 554). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. Y-Axis Flex Cable (see “Y-Axis Flex Cable” on page 664). 4. AXY-to-MDA Cable. 5. ACC Card (see “Accessor Controller Card (ACC)” on page 558). 6. MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 7. PDC Card (see “PDC Card” on page 572). 8. AXY Card (see “AXY Card (X-Axis)” on page 560).
<p>A4C5</p>	<p>Description</p> <p>A cartridge bar code label is missing or is unreadable, or the 'empty slot' bar code label (located behind the cartridge slot) is unreadable.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. Obtain the element address of the storage slot where the first failure occurred. To do this, get the SCSI parameter data from the library error log entry. The second group of four hex digits (bytes 2 and 3) contains the element address. 2. Using the element address, refer to Appendix D in the 3584 UltraScalable Tape Library Planning and Operator Guide. If there is a cartridge in the slot, examine its bar code label. If there is NOT a cartridge in the slot, examine the 'empty slot' bar code label in the back of the storage slot. <ul style="list-style-type: none"> • If you identify a problem with a cartridge label, instruct the customer to replace the bar code label. • If you identify a problem with an 'empty slot' bar code label, see page 702 (Label, Bar Code - Empty Cell / Scanner Calibration) to order a replacement label.
<p>A4C6</p>	<p>Description</p> <p>A frame machine type and model or serial number bar code label is unreadable.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. Obtain the Failing Frame number from the library error log entry. 2. Open the front door of the failing frame, and locate the labels, which are affixed to the frame, below the bottom storage slot of columns 1 and 3. Inspect the machine type and model bar code label and the machine serial number bar code label for smudges, dirt, or damage. 3. Clean the dirt or smudge from the label. If a label is damaged, take notice of the machine type and model, and the serial number of the frame. Contact Support for a replacement labels.

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
A4C7	<p>Description</p> <p>Invalid Logical Library Bar Code Label Configuration. While reading logical library bar code labels, an unexpected sequence of labels was encountered.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • Ensure that all logical library bar code labels are installed in a valid sequence and are not damaged. • High gloss labels can produce this failure. <p>Notes:</p> <ol style="list-style-type: none"> 1. If a label is encountered which is out of sequence (perhaps because the preceding label was unreadable) then byte 1 of the SCSI parameter info will contain the logical library number found on the last good label before the sequence problem was encountered. As an example, if the library is being partitioned into 4 logical libraries, and the sequence detected by the bar code scanner jumps from 1 to 3 without finding 2, then byte 1 of the SCSI parameter info will contain 1. If the sequence detected jumps from 2 to 4 without finding 3 then byte 1 of the SCSI parameter info will be 2. 2. After scanning all the logical library labels, if the number of logical libraries determined by scanning column labels is different from the number of logical libraries determined by scanning drive labels, then the second byte of the SCSI parameter info will contain the number of logical libraries determined by scanning column labels and the third byte will contain the number of logical libraries determined by scanning drive labels. <p>If no obvious label sequence problem is found, use one of the following methods of resolving the problem:</p> <ol style="list-style-type: none"> 1. Use Advanced Configuration. <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 2. Replace the labels with clean, photocopied labels (do not use glossy paper), or cover the glossy labels with frosted, cellophane tape. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Logical Library Bar Code Labels. 2. Bar Code Scanner (see “Bar Code Scanner” on page 554).
A4C8	<p>Description</p> <p>Bar code scanner test label is unreadable.</p> <p>Failure Isolation Procedure</p> <p>Visually clean the bar code scanner test label. It is located in Frame 1, on the rear cell wall, just above Drive 1. The label should be clean and not damaged. If the label is dirty, clean it. If the label is damaged, contact your next level of support for a replacement label.</p>
A4CC	<p>Description</p> <p>The library has detected that the frame serial number stored in library VPD does not match the frame serial number bar code label.</p> <p>Failure Isolation Procedure</p> <p>This should only occur if the ACC and the OPC are exchanged at the same time, which should not be done. If possible, reinstall one or both of the original cards since this should correct the problem. If the problem persists, display the Library VPD and record the frame serial number. Examine the frame serial number bar code label (located below column 1). If the serial number does match then it is possible that the bar code scanner misread the label. Ensure that the label is clean and not damaged. If no cause is found then it may be necessary to reconfigure the library to update the VPD. Capture a library dump for possible analysis by IBM Support before you reconfigure the library.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
A4D0	<p>Description</p> <p>Source element unexpectedly empty (status message). No additional sense information.</p> <p>Failure Isolation Procedure</p> <p>Verify that the CE cartridge is installed in the library.</p> <p>Perform an inventory.</p>
A4D1	<p>Description</p> <p>Destination element unexpectedly full (status message).</p> <p>Failure Isolation Procedure</p> <p>Perform an inventory.</p>
A4DC	<p>Description</p> <p>No LTO diagnostic cartridge found in the library.</p> <p>Failure Isolation Procedure</p> <p>Look in the base frame (F1) rear wall, leftmost cartridge storage rack (C01), at the top (R01). If the slot is empty, place a LTO diagnostic cartridge there.</p>
A4DD	<p>Description</p> <p>No DLT diagnostic cartridge found in the library.</p> <p>Failure Isolation Procedure</p> <p>Look in the first Model D42 expansion frame, rear wall, leftmost cartridge storage rack (C01), the top slot, (R01). If the slot is empty, place a DLT diagnostic cartridge in the slot (R01).</p>
A51A A520 A521 A524 A525 A526	<p>Description</p> <p>Wrong or invalid firmware values:</p> <ul style="list-style-type: none"> • URC=A51A, Parameter list length error. • URC=A520, Invalid command operation code. • URC=A521, Invalid element address. • URC=A524, invalid field in CDB (see field pointer). • URC=A525, Logical unit not supported. • URC=A526, Invalid field in parameter list (see field pointer). <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>
A52C	<p>Description</p> <p>Command sequence error.</p> <p>Failure Isolation Procedure</p> <p>This error is reported if the host sends a Move Medium or Exchange Medium command to the library to move a cartridge from a drive when the cartridge is not in the unloaded state at the drive. The host application is supposed to send an Eject command to the drive and wait for it to complete BEFORE sending the Move Medium or Exchange Medium command to the library. If this problem persists, contact your next level of support.</p>
A539	<p>Description</p> <p>Saving parameters not supported.</p> <p>Failure Isolation Procedure</p> <p>The host application is sending invalid commands. Contact your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>A53B</p> <p>A53C</p> <p>A53D</p>	<p>Description</p> <p>The host is attempting to move a cartridge, but the attempt was rejected as invalid:</p> <ul style="list-style-type: none"> • URC=A53B, Specified destination element is already full. • URC=A53C, Specified source element is empty. • URC=A53D, Gripper is already full. <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • For URCs A53B and A53C, have the customer perform an Inventory (also known as Audit or Remap) from the host in order to get the host in sync with the library inventory. • For URC A53D, remove the cartridge from the gripper.
<p>A53E</p>	<p>Description</p> <p>Status only. An attempt was made to import a cartridge from the I/O station. This cartridge was exported from a different logical library. Importing a cartridge that was exported by a different logical library is not allowed.</p>
<p>A53F</p>	<p>Description</p> <p>Status only. An attempt was made to access a drive that is not present or has not been configured.</p>
<p>A540</p>	<p>Description</p> <p>Invalid bits in identify message.</p> <p>Failure Isolation Procedure</p> <p>The control path drive or control port received a SCSI 'Identify' message from the host which contained invalid parameters. If the problem persists, contact your next level of support.</p>
<p>A553</p> <p>A580</p>	<p>Description</p> <p>The host is attempting to move a cartridge, but the attempt was rejected as invalid:</p> <ul style="list-style-type: none"> • URC=A553, A Prevent Media Removal command, prevents the specified move. • URC=A580, Control Unit Mode. <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • For URC A553, have the customer clear the Prevent Media Removal command from the host. • For URC A580, contact your next level of support.
<p>A620</p> <p>A628</p> <p>A629</p> <p>A62A</p>	<p>Description</p> <p>Status Changed:</p> <ul style="list-style-type: none"> • URC=A620, Import or export element accessed. • URC=A628, Not-ready-to-ready transition, media may have changed. • URC=A629, Power on or Reset occurred. • URC=A62A, Mode select parameters were changed by another host. <p>Failure Isolation Procedure</p> <p>No action is necessary. These are only status messages.</p>
<p>A63F</p>	<p>Description</p> <p>Microcode has been changed.</p> <p>Failure Isolation Procedure</p> <p>Not a failure. Status message.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
AACA	<p>Description</p> <p>X or Y motion command specified a destination that exceeds limits. Calibration data is corrupted.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. Verify that the X-axis right end-stop is tight against the right side frame. 2. If this problem is occurring on a new installation, repeat the Configuration procedure to ensure that the X-axis maximum travel position is configured correctly. 3. Perform the Calibration Procedure. Select the Service menu. Select Calibration, Calibrate Library (see “Service Menus” on page 523). 4. If the problem persists, check the two-character display on the ACC, then perform the Configuration and Calibrate Library procedures. 5. If the problem persists, the Y-axis mast may be loose or incorrectly installed. Refer to the Notes in the Replacement Procedure in “Y-Axis Mast Assembly” on page 668. 6. Perform the Calibration Procedure. Select the Service menu. Select Calibration, Calibrate Library (see “Service Menus” on page 523).
AB1B AB43 AB44 AB45 AB47 AB48 AB49 AB4A AB4B	<p>Description</p> <ul style="list-style-type: none"> • URC=AB1B, SCSI Synchronous data transfer error. • URC=AB43, SCSI Message error. • URC=AB44, SCSI Internal target failure. • URC=AB45, SCSI Select or Reselect failure. • URC=AB47, SCSI Parity error. • URC=AB48, SCSI Initiator Detected Error message received. • URC=AB49, SCSI Invalid Message error. • URC=AB4A, SCSI Command Phase error. • URC=AB4B, SCSI Data Phase error. <p>Failure Isolation Procedure</p> <p>Review host error data to determine which control path drive (or control port) reported the error, then isolate and repair the failing SCSI or Fibre Channel component (see “SCSI Bus Problems” on page 514 or “Fibre Channel Problems” on page 522).</p>
AB4E	<p>Description</p> <p>Overlapped commands attempted.</p> <p>Failure Isolation Procedure</p> <p>The host sent another command before the preceding command completed. If the problem persists, contact your next level of support.</p>
ABB1 ABB2	<p>Description</p> <p>Battery failure:</p> <ul style="list-style-type: none"> • URC=ABB1, Battery failure on ACC. • URC=ABB2, Battery failure on OPC. <p>URC FRU List</p> <p>Replace the failing battery. See “Accessor Controller Card (ACC)” on page 558 or “Operator Panel Assembly (OPC)” on page 568</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
ACCA	<p>Description</p> <p>This URC indicates that the library attempted to Call Home (either as the result of someone initiating a Call Home Test or as the result of detecting a problem within the library).</p> <p>Failure Isolation Procedure</p> <p>If you are here because you found that this URC is in a PMH on Retain, then it indicates that someone initiated a Call Home Test. The Call Home Test is typically performed after installing and configuring the Remote Support Facility (library feature codes 2710, 271, or 2712). Contact the CE and report that the Call Home Test successfully opened a Retain PMH. After the CE has been notified, you may close the PMH.</p> <p>If you are at the machine, find the HEC/HECQ (in library sense or an error message on the operator panel) and find the corresponding problem description below.</p> <ul style="list-style-type: none"> <li>• Error=CA80 indicates that the Remote Support Facility was able to successfully Call Home. <li>• Error=CA81 indicates that the Remote Support Facility attempted to Call Home, but was unable to connect to Retain. <li>• Error=CA82 indicates that the Remote Support Facility successfully established a connection to RETAIN, but RETAIN did not open a PMH because the frame 1 serial number is not registered or because it is not covered by IBM warranty or maintenance agreement. <li>• Error=CA83 indicates Call Home failed because it is disabled or not configured. <li>• Error=CA84 indicates the library is unable to establish a connection between the library MCP and the local modem. <li>• Error=CA85 indicates the library is unable to contact the remote modem using the primary phone number. <li>• Error=CA86 indicates the library is unable to contact the remote modem using the secondary phone number. <li>• Error=CA87 indicates the library established a connection to the remote modem but could not log into the ATT Global Network. <li>• Error=CA88 indicates the library logged into the ATT Global Network but could not establish a TCP/IP connection to RETAIN using the primary IP address. <li>• Error=CA89 indicates the library logged into the ATT Global Network but could not establish a TCP/IP connection to RETAIN using the secondary IP address. <li>• Error=CA8A indicates the library established a TCP/IP connection but could not log into RETAIN. <li>• Error=CA8B indicates the library is unable to establish a connection from the library MCP to the local WTI switch. <li>• Error=CA8C indicates the library established a connection to the local WTI switch, but is unable to establish a connection from WTI switch to the local modem. <li>• Error=CA8D indicates the local modem Carrier Detect signal was high before the library attempted to dial the modem. This indicates that either a modem connection was previously established by another modem session which did not hang up, or that there is a problem with the modem or modem setup. <p>Note: Multiple errors may be logged during a single attempt to call home. As an example, a CA85 indicating that the primary phone number didn't work, followed by a CA80 indicating a successful Call Home. The primary phone number didn't work, but since the call home was successful the secondary phone number must have worked.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
ACCB	<p>Description</p> <ul style="list-style-type: none"> • Error=CBCB, Library Firmware download failed or was interrupted. • Error=CBCC, Corrupted Library Firmware was downloaded and rejected. <p>An attempt to load new library firmware failed.</p> <p>Failure Isolation Procedure</p> <p>The library will continue to operate on the existing level of firmware. If you want to load new firmware, try to apply it again. If the problem persists, obtain a new firmware file and attempt to apply it again. If the problem persists, contact your next level of support.</p>
ACCC	<p>Description</p> <p>Library firmware error (see Object ID and Object Error).</p> <p>Failure Isolation Procedure</p> <p>Attempt to obtain a library dump, obtain the object ID and object error codes from the library error logs, then contact your next level of support.</p>
ACCD	<p>Description</p> <ul style="list-style-type: none"> • Error=CBCD, An attempt to update drive code failed. <p>An attempt to load new drive code failed.</p> <p>Failure Isolation Procedure</p> <p>The drive will continue to operate on the existing level of code. You may need to reset the drive before it will function, and before making another attempt to load code. Resetting the drive may be accomplished either by removing/reinstalling the drive canister, or by pressing the drive eject button for 20 seconds. If the problem persists, contact your next level of support.</p>
ACCE	<p>Description</p> <p>An attempt was made to configure additional frames, but the base frame does not have the Capacity Expansion Feature enabled.</p> <p>Failure Isolation Procedure</p> <p>The library will operate, but will only use the rear slots in the base frame. You must enable the Capacity Expansion Feature before you can configure the front slots in the base frame or any additional frames.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B201</p> <p>B202</p> <p>B203</p> <p>B204</p> <p>B205</p> <p>B206</p> <p>B207</p> <p>B208</p> <p>B209</p>	<p>Description</p> <p>Gripper #1 Problem.</p> <ul style="list-style-type: none"> • URC=B201, Gripper #1 will not move — no encoder pulses. • URC=B202, Gripper #1 encountered obstacle while extending. • URC=B203, Gripper #1 encountered obstacle while retracting. • URC=B204, Gripper #1 encountered a high current condition while extending. • URC=B205, Gripper #1 encountered a high current condition while retracting. • URC=B206, Gripper #1 was unable to find a hard stop while extending. • URC=B207, Gripper #1 was unable to find a hard stop while retracting. • URC=B208, Gripper #1 unable to pick cartridge. • URC=B209, Gripper #1 unable to put cartridge. <p>Failure Isolation Procedure</p> <p>Reseat all cable connectors between gripper #1 and the ACC card. If the problem persists, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558). 4. PDC (see “PDC Card” on page 572).
<p>B20A</p>	<p>Description</p> <p>Gripper #1 lost 37 V dc power.</p> <p>Failure Isolation Procedure</p> <p>Check the fuses on the FIC in frame 1. If any fuse is blown, go to the “Blown Fuse MAP” on page 468. If no fuse is blown, check for a loose connection in the cabling from the FIC card to the ACC. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Y-Axis Flex Cable (see “X-Axis Flex Cable” on page 653). 2. X-Axis Flex Cable (see “Y-Axis Flex Cable” on page 664). 3. FIC-to-XCP Cable. 4. ACC (see “Accessor Controller Card (ACC)” on page 558).
<p>B20B</p>	<p>Description</p> <p>Gripper #1 encountered a low current condition while retracting.</p> <p>Failure Isolation Procedure</p> <p>Replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
B20C	<p>Description</p> <p>Gripper #1 cartridge misplaced.</p> <p>Failure Isolation Procedure</p> <p>Look for a cartridge laying in the base of the library.</p> <p>Replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).
B20D	<p>Description</p> <p>Gripper #1 wrong type — does not match configuration.</p> <p>Failure Isolation Procedure</p> <p>If this is a mixed media library, ensure that a LTO gripper is on top and the DLT gripper is located on the bottom of the dual gripper assembly. If not a mixed media library, both grippers should be LTO type.</p> <p>Replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the wrong gripper with the proper one, (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).
B20E B20F	<p>Description</p> <p>Gripper #1 sensor failure.</p> <p>Failure Isolation Procedure</p> <p>Obtain the HEC/HECQ from the Retain Call Home records, host logs, or the library error log. The HEC is byte 18 of the library sense data and the HECQ is byte 19 of the library sense data.</p> <p>Inspect the underside of both cartridge present sensors for component leads that, because of excess length, may be shorting to the gripper housing. To correct this, remove power from the gripper. Without removing the card, carefully trim the excess length.</p> <ul style="list-style-type: none"> – If the HEC/HECQ is 41 81, 41 82, or 41 83, replace Gripper #1 (Upper Gripper). – If the HEC/HECQ is 41 91, 41 92, or 41 93, replace Gripper #2 (Lower Gripper). – If the HEC/HECQ is 41 84, clean dust or debris from the lens on both sensor cards on Gripper #1 (Upper Gripper). – If the HEC/HECQ is 41 94, clean dust or debris from the lens on both sensor cards on Gripper #2 (Lower Gripper). <p>Run Library Verify to clear any errors, and to verify proper gripper operation after cleaning or replacing the gripper.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558). 4. PDC (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B211</p> <p>B212</p> <p>B213</p> <p>B214</p> <p>B215</p> <p>B216</p> <p>B217</p> <p>B218</p> <p>B219</p>	<p>Description</p> <p>Gripper #2 problem.</p> <ul style="list-style-type: none"> • URC=B211, Gripper #2 will not move — no encoder pulses. • URC=B212, Gripper #2 encountered obstacle while extending. • URC=B213, Gripper #2 encountered obstacle while retracting. • URC=B214, Gripper #2 encountered a high current condition while extending. • URC=B215, Gripper #2 encountered a high current condition while retracting. • URC=B216, Gripper #2 was unable to find a hard stop while extending. • URC=B217, Gripper #2 was unable to find a hard stop while retracting. • URC=B218, Gripper #2 unable to pick cartridge. • URC=B219, Gripper #2 unable to put cartridge. <p>Failure Isolation Procedure</p> <p>Reseat all cable connectors between gripper #2 and the ACC card. If the problem persists, replace the following FRUs:</p> <p>Note: To disable the gripper and prevent further errors until the faulty gripper can be replaced, manually retract the gripper fully and then unplug the gripper motor cable. When the door is closed, and the library goes through its rezero, it will see that the gripper won't move and will stop trying to use it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558). 4. PDC (see “PDC Card” on page 572).
<p>B21A</p>	<p>Description</p> <p>Gripper #2 lost 37 V dc power.</p> <p>Failure Isolation Procedure</p> <p>Check the Fuses on the FIC in frame 1. If any fuse is blown, go to the “Blown Fuse MAP” on page 468. If no fuse is blown, check for a loose connection in the cabling from the FIC card to the ACC. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Y-Axis Flex Cable (see “X-Axis Flex Cable” on page 653). 2. X-Axis Flex Cable (see “Y-Axis Flex Cable” on page 664). 3. FIC to XCP Cable. 4. ACC (see “Accessor Controller Card (ACC)” on page 558).
<p>B21B</p>	<p>Description</p> <p>Gripper #2 encountered a low current condition while retracting.</p> <p>Failure Isolation Procedure</p> <p>Replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
B21C	<p>Description</p> <p>Gripper #2 cartridge misplaced.</p> <p>Failure Isolation Procedure</p> <p>Look for a cartridge laying in the base of the library.</p> <p>Replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).
B21D	<p>Description</p> <p>Gripper #2 wrong type — does not match configuration.</p> <p>Failure Isolation Procedure</p> <p>If this is a mixed media library, ensure that a LTO gripper is on top and the DLT gripper is located on the bottom of the dual gripper assembly. If not a mixed media library, both grippers should be LTO type.</p> <p>Replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the wrong gripper with the proper one, (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).
B21E B21F	<p>Description</p> <p>Gripper #2 sensor failure.</p> <p>Failure Isolation Procedure</p> <p>Obtain the HEC/HECQ from the Retain Call Home record, host logs, or the library error log. The HEC is byte 18 of the library sense data, and the HECQ is byte 19 of the library sense data.</p> <p>Inspect the underside of both cartridge present sensors for component leads that, because of excess length, may be shorting to the gripper housing. To correct this, remove power from the gripper. Without removing the card, carefully trim the excess length.</p> <ul style="list-style-type: none"> – If the HEC/HECQ is 41 81, 41 82, or 41 83, replace Gripper #1 (Upper Gripper). – If the HEC/HECQ is 41 91, 41 92, or 41 93, replace Gripper #2 (Lower Gripper). – If the HEC/HECQ is 41 84, clean dust or debris from the lens on both sensor cards on Gripper #1 (Upper Gripper). – If the HEC/HECQ is 41 84, clean dust or debris from the lens on both sensor cards on Gripper #2 (Lower Gripper). <p>After cleaning or replacing the gripper, run Library Verify to ensure proper gripper operation. This also will clear any library code conditions that prevent the library from trying to use a gripper that previously failed.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558). 4. PDC (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B230 B231</p>	<p>Description</p> <p>Cannot open or cannot lock I/O station:</p> <ul style="list-style-type: none"> • URC=B230, Cannot open I/O station (solenoid failure or sensor is not blocked when it should be blocked). • URC=B231, Cannot lock I/O station (solenoid failure or sensor is blocked when it should not be blocked). <p>Failure Isolation Procedure</p> <p>Ensure that the solenoid and sensor connections are tight, and that the sensor flag on the solenoid shaft is aligned with the sensor. If you just installed a new solenoid or cable, ensure that the labels on the cable match the terminal labels on the solenoid. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. I/O Station Door Locked Sensor (see "I/O Station Door Solenoid Sensor" on page 636). 2. I/O Station Door Locked Solenoid (see "I/O Station Door Locked Solenoid" on page 633). 3. Replace the OPC to I/O Station Cable. 4. Replace the OPC (see "Operator Panel Assembly (OPC)" on page 568). 5. Replace the XIO card (see "XIO Card" on page 576).
<p>B238 B239</p>	<p>Description</p> <p>Cannot open or cannot lock bottom I/O station:</p> <ul style="list-style-type: none"> • URC=B238, Cannot open bottom I/O station (solenoid failure or sensor is not blocked when it should be blocked). • URC=B239, Cannot lock bottom I/O station (solenoid failure or sensor is blocked when it should not be blocked). <p>Failure Isolation Procedure</p> <p>Ensure that the solenoid and sensor connections are tight, and that the sensor flag on the solenoid shaft is aligned with the sensor. If you just installed a new solenoid or cable, ensure that the labels on the cable match the terminal labels on the solenoid. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Bottom I/O Station Door Locked Sensor (see "I/O Station Door Solenoid Sensor" on page 636). 2. Bottom I/O Station Door Locked Solenoid (see "I/O Station Door Locked Solenoid" on page 633). 3. Replace the XIO to I/O Station Cable. 4. Replace the XIO Card (see "XIO Card" on page 576).
<p>B23A</p>	<p>Description</p> <p>Bottom I/O station does not match configuration.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the bottom I/O station is a DLT I/O station, and that it has a 'DLT' bar code label located on the rear surface of the I/O station, just below the lowest I/O slot.</p> <p>If the problem persists, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Bottom I/O Station (see "I/O Station, Lower" on page 629). 2. Replace the XIO to I/O Station Cable. 3. Replace the XIO Card (see "XIO Card" on page 576).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B240</p> <p>B241</p>	<p>Description</p> <p>DLT I/O station get or put failure:</p> <ul style="list-style-type: none"> • URC=B340, DLT I/O station will not release cartridge. • URC=B341, DLT I/O station will not accept cartridge. <p>Failure Isolation Procedure</p> <p>Run the library verify test. If the test fails, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. DLT I/O Station Assembly (see “I/O Station, Upper” on page 631). 2. DLT Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. PDC Card (see “PDC Card” on page 572).
<p>B248</p> <p>B249</p>	<p>Description</p> <p>Bottom (DLT) I/O station get or put failure:</p> <ul style="list-style-type: none"> • URC=B248, Bottom I/O station get failure (I/O station won’t release cartridge). • URC=B249, Bottom I/O station put failure (I/O station will not accept cartridge). <p>Failure Isolation Procedure</p> <p>Run the library verify test. If the test fails, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. DLT I/O Station Assembly (see “I/O Station, Upper” on page 631). 2. DLT Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. PDC Card (see “PDC Card” on page 572).
<p>B24E</p>	<p>Description</p> <p>Bottom I/O station (DLT) is full so cartridge export is not possible.</p> <p>Failure Isolation Procedure</p> <p>No repairs are required. Have the operator remove cartridges from the bottom I/O station to allow room for cartridge export.</p>
<p>B24F</p>	<p>Description</p> <p>Top I/O station (DLT) is full so cartridge export is not possible.</p> <p>Failure Isolation Procedure</p> <p>No repairs are required. Have the operator remove cartridges from the I/O station to allow room for cartridge export.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
B250	<p>Description</p> <p>DLT Slot get failure. Slot will not release cartridge.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. To acquire the Element Address corresponding to the failure from the sense data or error log, see “Element Address to Frame, Column, Row Converter” on page 491. 2. If the get failure is in column 7 of an expansion frame, the problem may be caused by an improperly installed tape drive. Check the clearance between tape drive and the failing column 7 storage cell tray. Uninstall (loosen the drive tray screws, back out the drive tray) and reinstall the drive tray to open the space between the tape drive and the storage cell tray. If no problem is found, replace the following FRUs: <p>URC FRU List</p> <ol style="list-style-type: none"> 1. DLT Slot Assembly (see “Storage Slot Section” on page 648). 2. DLT Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. PDC Card (see “PDC Card” on page 572).
B251	<p>Description</p> <p>Slot put failure. Slot will not accept cartridge.</p> <p>Failure Isolation Procedure</p> <p>To acquire the Element Address corresponding to the failure from the sense data or error log, see “Element Address to Frame, Column, Row Converter” on page 491</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. DLT Slot Assembly (see “Storage Slot Section” on page 648). 2. DLT Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. PDC Card (see “PDC Card” on page 572).
B260	<p>Description</p> <p>Calibration encountered a missing fiducial on a column.</p> <p>Failure Isolation Procedure</p> <p>See “Fiducial Missing Problems” on page 485 for a recovery procedure.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B270</p> <p>B271</p>	<p>Description</p> <p>Calibration encountered a missing fiducial on an I/O station:</p> <ul style="list-style-type: none"> • URC=B270, Top I/O station. • URC=B271, Bottom I/O station. <p>Failure Isolation Procedure</p> <p>The I/O station may be out of position. Repair or replace it. Perform the Calibration Procedure. Select the Service menu, then the Calibration menu (see “Service Menus” on page 523).</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. I/O Station (see “I/O Station, Upper” on page 631 and “I/O Station, Lower” on page 629).
<p>B301</p> <p>B302</p> <p>B303</p> <p>B304</p> <p>B305</p> <p>B306</p> <p>B307</p> <p>B308</p> <p>B309</p>	<p>Description</p> <p>Gripper #1 Problem.</p> <ul style="list-style-type: none"> • URC=B301, Gripper #1 will not move — no encoder pulses. • URC=B302, Gripper #1 encountered obstacle while extending. • URC=B303, Gripper #1 encountered obstacle while retracting. • URC=B304, Gripper #1 encountered a high current condition while extending. • URC=B305, Gripper #1 encountered a high current condition while retracting. • URC=B306, Gripper #1 was unable to find a hard stop while extending. • URC=B307, Gripper #1 was unable to find a hard stop while retracting. • URC=B308, Gripper #1 unable to pick cartridge. • URC=B309, Gripper #1 unable to put cartridge. <p>Failure Isolation Procedure</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Before you attempt to resolve a B302 or B303 problem, please get library logs. If the error occurred at a drive, also get a drive dump from that drive. 2. Reseat all cable connectors between gripper #1 and the ACC card. If the problem persists, replace the following FRUs: <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558). 4. PDC (see “PDC Card” on page 572).
<p>B30A</p>	<p>Description</p> <p>Gripper #1 lost 37 V dc power.</p> <p>Failure Isolation Procedure</p> <p>Check the Fuses on the FIC in frame 1. If any fuse is blown, go to the “Blown Fuse MAP” on page 468. If no fuse is blown, check for a loose connection in the cabling from the FIC card to the ACC. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Y-Axis Flex Cable (see “Y-Axis Flex Cable” on page 664). 2. X-Axis Flex Cable (see “X-Axis Flex Cable” on page 653). 3. FIC-to-XCP Cable. 4. ACC (see “Accessor Controller Card (ACC)” on page 558).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
B30B	<p>Description</p> <p>Gripper #1 encountered a low current condition while retracting.</p> <p>Failure Isolation Procedure</p> <p>Replace the following FRUs: URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).
B30C	<p>Description</p> <p>Gripper #1 cartridge misplaced.</p> <p>Failure Isolation Procedure</p> <p>Look for a cartridge laying in the base of the library.</p> <p>Replace the following FRUs: URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).
B30D	<p>Description</p> <p>Gripper #1 wrong type — does not match configuration.</p> <p>Failure Isolation Procedure</p> <p>If this is a mixed media library, ensure that a LTO gripper is on top and the DLT gripper is located on the bottom of the dual gripper assembly. If not a mixed media library, both grippers should be LTO type.</p> <p>Replace the following FRUs: URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the wrong gripper with the proper one, (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B30E</p> <p>B30F</p>	<p>Description</p> <p>Gripper #1 sensor failure.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the gripper sensor-to-PDC cable is connected securely at each gripper sensor and at the PDC card.</p> <p>Obtain the HEC/HECQ from the Retain Call Home record, host logs, or the library error log. The HEC is byte 18 of the library sense data, and the HECQ is byte 19 of the library sense data.</p> <p>Inspect the underside of both cartridge present sensors for component leads that, because of excess length, may be shorting to the gripper housing. To correct this, remove power from the gripper. Without removing the card, carefully trim the excess length.</p> <ul style="list-style-type: none"> – If the HEC/HECQ is 41 81, 41 82, or 41 83, replace Gripper #1 (Upper Gripper). – If the HEC/HECQ is 41 91, 41 92, or 41 93, replace Gripper #2 (Lower Gripper). – If the HEC/HECQ is 41 84, clean dust or debris from the lens on both sensor cards on Gripper #1 (Upper Gripper). – If the HEC/HECQ is 41 94, clean dust or debris from the lens on both sensor cards on Gripper #2 (Lower Gripper). <p>Run Library Verify to clear any errors, and to verify proper gripper operation after cleaning or replacing the gripper.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Gripper Sensor-to-PDC Cable Card. 3. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. ACC (see “Accessor Controller Card (ACC)” on page 558). 5. PDC (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B311</p> <p>B312</p> <p>B313</p> <p>B314</p> <p>B315</p> <p>B316</p> <p>B317</p> <p>B318</p> <p>B319</p>	<p>Description</p> <p>Gripper #2 problem.</p> <ul style="list-style-type: none"> • URC=B311, Gripper #2 will not move — no encoder pulses. • URC=B312, Gripper #2 encountered obstacle while extending. • URC=B313, Gripper #2 encountered obstacle while retracting. • URC=B314, Gripper #2 encountered a high current condition while extending. • URC=B315, Gripper #2 encountered a high current condition while retracting. • URC=B316, Gripper #2 was unable to find a hard stop while extending. • URC=B317, Gripper #2 was unable to find a hard stop while retracting. • URC=B318, Gripper #2 unable to pick cartridge. • URC=B319, Gripper #2 unable to put cartridge. <p>Failure Isolation Procedure</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Before you attempt to resolve a B312 or B313 problem, please get library logs. If the error occurred at a drive, also get a drive dump from that drive. 2. Reseat all cable connectors between gripper #2 and the ACC card. If the problem persists, replace the following FRUs: <p>Note: To disable the gripper and prevent further errors until the faulty gripper can be replaced, manually retract the gripper fully and then unplug the gripper motor cable. When the door is closed, and the library goes through its rezero, it will see that the gripper won't move and will stop trying to use it.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558). 4. PDC (see “PDC Card” on page 572).
<p>B31A</p>	<p>Description</p> <p>Gripper #2 lost 37 V dc power.</p> <p>Failure Isolation Procedure</p> <p>Check the Fuses on the FIC in frame 1. If any fuse is blown, go to the “Blown Fuse MAP” on page 468. If no fuse is blown, check for a loose connection in the cabling from the FIC card to the ACC. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Y-Axis Flex Cable (see “X-Axis Flex Cable” on page 653). 2. X-Axis Flex Cable (see “Y-Axis Flex Cable” on page 664). 3. FIC to XCP Cable. 4. ACC (see “Accessor Controller Card (ACC)” on page 558).
<p>B31B</p>	<p>Description</p> <p>Gripper #2 encountered a low current condition while retracting.</p> <p>Failure Isolation Procedure</p> <p>Replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
B31C	<p>Description</p> <p>Gripper #2 cartridge misplaced.</p> <p>Failure Isolation Procedure</p> <p>Look for a cartridge laying in the base of the library.</p> <p>Replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).
B31D	<p>Description</p> <p>Gripper #2 wrong type — does not match configuration.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the gripper sensor-to-PDC cable is connected securely at each gripper sensor and at the PDC card.</p> <p>If this is a mixed media library, ensure that a LTO gripper is on top and the DLT gripper is located on the bottom of the dual gripper assembly. If not a mixed media library, both grippers should be LTO type.</p> <p>Replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the wrong gripper with the proper one, (see “Gripper Assembly, Single (New Style)” on page 624). 2. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 3. ACC (see “Accessor Controller Card (ACC)” on page 558).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B31E</p> <p>B31F</p>	<p>Description</p> <p>Gripper #2 sensor failure.</p> <p>Failure Isolation Procedure</p> <p>Obtain the HEC/HECQ from the Retain Call Home record, host logs, or the library error log. The HEC is byte 18 of the library sense data, and the HECQ is byte 19 of the library sense data.</p> <p>Inspect the underside of both cartridge present sensors for component leads that, because of excess length, may be shorting to the gripper housing. To correct this, remove power from the gripper. Without removing the card, carefully trim the excess length.</p> <ul style="list-style-type: none"> – If the HEC/HECQ is 41 81, 41 82, or 41 83, replace Gripper #1 (Upper Gripper). – If the HEC/HECQ is 41 91, 41 92, or 41 93, replace Gripper #2 (Lower Gripper). – If the HEC/HECQ is 41 84, clean dust or debris from the lens on both sensor cards on Gripper #1 (Upper Gripper). – If the HEC/HECQ is 41 84, clean dust or debris from the lens on both sensor cards on Gripper #2 (Lower Gripper). <p>After cleaning or replacing the gripper, run Library Verify to ensure proper gripper operation. This also will clear any library code conditions that prevent the library from trying to use a gripper that previously failed.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Replace the failing Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 2. Gripper Sensor-to-PDC Cable Card. 3. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. ACC (see “Accessor Controller Card (ACC)” on page 558). 5. PDC (see “PDC Card” on page 572).
<p>B320</p> <p>B321</p> <p>B322</p>	<p>Description</p> <p>Invalid Config — Gripper related:</p> <ul style="list-style-type: none"> • URC=B320, No gripper is installed for an installed frame (media) type. • URC=B321, Mixed grippers are installed but only one frame (media) type is installed. • URC=B322, Mixed media — DLT gripper 1 with LTO gripper 2. <p>Failure Isolation Procedure</p> <p>Ensure that the grippers that are installed match the media types that are installed. If the library has mixed media (both LTO and DLT), the LTO gripper must be in the top position of the Dual Gripper assembly and the DLT gripper must be in the bottom position. If the library is not mixed media, two LTO grippers should be present. Never should two DLT grippers be installed.</p> <p>If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Gripper Assembly, Single (the one in error) (see “Gripper Assembly, Single (New Style)” on page 624). 2. PDC Card (see “PDC Card” on page 572). 3. Accessor Controller Card (ACC) (see “Accessor Controller Card (ACC)” on page 558). 4. Pivot Flex Cable (see “Pivot Flex Cable” on page 643).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B325</p> <p>B326</p> <p>B327</p>	<p>Description</p> <p>Invalid Config — I/O station related:</p> <ul style="list-style-type: none"> • URC=B325, No I/O is installed for an installed frame (media) type. • URC=B326, An I/O station is installed with no matching frame (media) type. • URC=B327, L-frame 10 cartridge I/O is not the same media type as the L-frame. <p>Failure Isolation Procedure</p> <p>Ensure that the I/O stations installed match the media types that are installed. The L-frame must contain an LTO I/O station, and if the library is mixed media, there must also be a DLT I/O station in the L-frame. If the library is not mixed media, two LTO I/O stations are possible. Never should all I/O stations be for DLT only.</p> <p>If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. I/O Station, Upper (if in error) (see “I/O Station, Upper” on page 631). 2. I/O Station, Lower (if in error) (see “I/O Station, Lower” on page 629). 3. I/O Station signal cable leading to the Operator panel or XIO card. 4. Operator panel (if the upper I/O station is the configuration problem). 5. XIO card (if the lower I/O station is the configuration problem).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
B32D	<p>Description</p> <p>The library has detected that a drive (or Control Port) is installed in a frame that does not support it.</p> <p>Examples::</p> <ul style="list-style-type: none"> • A DLT-8000 drive or a Control Port is installed in a Model L32 or D32. • An LTO drive is installed in a Model D42. <p>Failure Isolation Procedure</p> <p>The Failing Frame/Device field in the sense data specifies the location of the device. Find the device and determine the type (see “Identifying Drive Type” on page 170).</p> <p>If you verify that the device is incompatible with the frame, you must remove it.</p> <ul style="list-style-type: none"> • If the library subsystem supports mixed media (an L32 and at least one D42), the device may have been accidentally installed in the wrong frame. Work with the customer to determine where it should be installed, move it to that position, then reconfigure the library. • If the library subsystem does NOT support mixed media, discuss the problem with the customer to determine how this problem occurred. Perhaps the customer has moved a device from one library subsystem to another without following proper procedures. <p>If the device appears to be compatible with the frame AND the device works properly (except when performing the Library Verify Test), the device may have been manufactured with incorrect Vital Product Data (VPD) - causing the library to misidentify the device. Note that some early canisters were manufactured with incorrect VPD.</p> <p>If the device appears to be compatible with the frame and the device does NOT works properly, consider the device defective and exchange it.</p> <p>Ensure the library microcode version level is at 2400 or higher, or install microcode at a minimum level of 2400. After installing microcode at the 2400 level (or higher), go to the front panel, press MENU, then select Service, Tests/Tools, Tools, Fix Drive/CP VPD.</p> <p>Library microcode version 2400 or higher allows you to correct the Vital Product Data within the device. Thus, if this symptom only occurs when performing the Library Verify test, you do not need to replace the device.</p> <p>URC FRU List</p> <p>If the problem persists, replace the failing device.</p>
B32F	<p>Description</p> <p>Invalid Config — More than one (DLT) Control Port in the same logical library.</p> <p>Failure Isolation Procedure</p> <p>Ensure that there is only one Control Port installed in each DLT logical library. Ask your customer for a break-down of each logical library within the D42 frames, and ensure that only one Control Port is located at each one. Remove any extra Control Ports that are installed.</p> <p>If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <p>Replace the Control Port Assembly, DLT (if causing error) (see “Control Port, SCSI” on page 578).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B330</p> <p>B331</p>	<p>Description</p> <p>Cannot open or cannot lock top I/O station:</p> <ul style="list-style-type: none"> • URC=B330, Cannot open top I/O station (solenoid failure or sensor is not blocked when it should be blocked). • URC=B331, Cannot lock top I/O station (solenoid failure or sensor is blocked when it should not be blocked). <p>Failure Isolation Procedure</p> <p>Ensure that the solenoid and sensor connections are tight, and that the sensor flag on the solenoid shaft is aligned with the sensor. If solenoid connections are reversed, a URC B330 can result. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. I/O Station Door Locked Sensor (see “I/O Station Door Solenoid Sensor” on page 636). 2. I/O Station Door Locked Solenoid (see “I/O Station Door Locked Solenoid” on page 633). 3. Replace the OPC to I/O Station Cable. 4. Replace the OPC (see “Operator Panel Assembly (OPC)” on page 568). 5. Replace the XIO Card (see “XIO Card” on page 576).
<p>B332</p>	<p>Description</p> <p>Top I/O station does not match configuration.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the top I/O station is an LTO I/O station, and that it has an ‘LTO’ bar code label located on the rear surface of the I/O station, just below the lowest I/O slot.</p> <p>Note: Early machines had high-gloss, bar code labels that limited the performance of the bar code scanner. A Field Bill to replace these labels was released but may not have been installed on all machines. If you suspect that a glossy label is causing this problem, replace the labels with clean, photocopied labels (do not use glossy paper), or cover the glossy labels with frosted, cellophane tape. This can reduce the reflectivity of the label, making it possible for the bar code scanner to scan it successfully. Use this technique until the customer can acquire proper label material.</p> <p>If the problem persists, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. I/O Station (see “I/O Station, Upper” on page 631). 2. Replace the OPC to I/O Station Cable. 3. Replace the OPC (see “Operator Panel Assembly (OPC)” on page 568). 4. Replace the XIO Card (see “XIO Card” on page 576).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B338</p> <p>B339</p>	<p>Description</p> <p>Cannot open or cannot lock bottom I/O station:</p> <ul style="list-style-type: none"> • URC=B338, Cannot open bottom I/O station (solenoid failure or sensor is not blocked when it should be blocked). • URC=B339, Cannot lock bottom I/O station (solenoid failure or sensor is blocked when it should not be blocked). <p>Failure Isolation Procedure</p> <p>Ensure that the solenoid and sensor connections are tight, and that the sensor flag on the solenoid shaft is aligned with the sensor. If solenoid connections are reversed, a URC B338 can result. If no problem is found, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Bottom I/O Station Door Locked Sensor (see “I/O Station Door Solenoid Sensor” on page 636). 2. Bottom I/O Station Door Locked Solenoid (see “I/O Station Door Locked Solenoid” on page 633). 3. Replace the XIO to I/O Station Cable. 4. Replace the XIO Card (see “XIO Card” on page 576).
<p>B33A</p>	<p>Description</p> <p>Bottom I/O station does not match configuration.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the bottom I/O station is an LTO I/O station, and that it has a ‘LTO’ bar code label located on the rear surface of the I/O station, just below the lowest I/O slot.</p> <p>If the problem persists, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Bottom I/O Station (see “I/O Station, Lower” on page 629). 2. Replace the XIO to I/O Station Cable. 3. Replace the XIO Card (see “XIO Card” on page 576).
<p>B340</p> <p>B341</p>	<p>Description</p> <p>LTO I/O station get or put failure:</p> <ul style="list-style-type: none"> • URC=B340, LTO I/O station will not release cartridge. • URC=B341, LTO I/O station will not accept cartridge. <p>Failure Isolation Procedure</p> <p>Run the library verify test. If the test fails, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. LTO I/O Station Assembly (see “I/O Station, Upper” on page 631). 2. LTO Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. PDC Card (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>B348 B349</p>	<p>Description</p> <p>Bottom (LTO) I/O station get or put failure:</p> <ul style="list-style-type: none"> • URC=B248, Bottom I/O station get failure (I/O station won't release cartridge). • URC=B249, Bottom I/O station put failure (I/O station will not accept cartridge). <p>Failure Isolation Procedure</p> <p>Run the library verify test. If the test fails, replace the following FRUs:</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. LTO I/O Station Assembly (see "I/O Station, Lower" on page 629). 2. LTO Gripper Assembly (see "Gripper Assembly, Single (New Style)" on page 624). 3. Pivot Flex Cable (see "Pivot Flex Cable" on page 643). 4. X-Axis Motor and Belt (see "X-Axis Motor/Belt" on page 657). 5. Y-Axis Motor and Belt (see "Y-Axis Motor/Belt" on page 670). 6. ACC Card (see "Accessor Controller Card (ACC)" on page 558). 7. MDA Assembly (see "Motor Driver Assembly (MDA)" on page 566). 8. PDC Card (see "PDC Card" on page 572).
<p>B34E</p>	<p>Description</p> <p>Bottom I/O station (LTO) is full so cartridge export is not possible.</p> <p>Failure Isolation Procedure</p> <p>No repairs are required. Have the operator remove cartridges from the bottom I/O station to allow room for cartridge export.</p>
<p>B34F</p>	<p>Description</p> <p>Top I/O station (LTO) is full so cartridge export is not possible.</p> <p>Failure Isolation Procedure</p> <p>No repairs are required. Have the operator remove cartridges from the I/O station to allow room for cartridge export.</p>
<p>B350</p>	<p>Description</p> <p>LTO Slot get failure. Slot will not release cartridge.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. To acquire the Element Address corresponding to the failure from the sense data or error log, see "Element Address to Frame, Column, Row Converter" on page 491. 2. If the get failure is in column 7 of an expansion frame, the problem may be caused by an improperly installed tape drive. Check the clearance between tape drive and the failing column 7 storage cell tray. Uninstall (loosen the drive tray screws, back out the drive tray) and reinstall the drive tray to open the space between the tape drive and the storage cell tray. If no problem is found, replace the following FRUs: <p>URC FRU List</p> <ol style="list-style-type: none"> 1. LTO Slot Assembly (see "Storage Slot Section" on page 648). 2. LTO Gripper Assembly (see "Gripper Assembly, Single (New Style)" on page 624). 3. Pivot Flex Cable (see "Pivot Flex Cable" on page 643). 4. X-Axis Motor and Belt (see "X-Axis Motor/Belt" on page 657). 5. Y-Axis Motor and Belt (see "Y-Axis Motor/Belt" on page 670). 6. ACC Card (see "Accessor Controller Card (ACC)" on page 558). 7. MDA Assembly (see "Motor Driver Assembly (MDA)" on page 566). 8. PDC Card (see "PDC Card" on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
B351	<p>Description</p> <p>Slot put failure. Slot will not accept cartridge.</p> <p>Note: To acquire the Element Address corresponding to the failure from the sense data or error log, see “Element Address to Frame, Column, Row Converter” on page 491.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. LTO Slot Assembly (see “Storage Slot Section” on page 648). 2. LTO Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. PDC Card (see “PDC Card” on page 572).
B360	<p>Description</p> <p>Calibration encountered a missing fiducial on a column.</p> <p>Failure Isolation Procedure</p> <p>See “Fiducial Missing Problems” on page 485 for a recovery procedure.</p>
B370 B371	<p>Description</p> <p>Calibration encountered a missing fiducial on an I/O station:</p> <ul style="list-style-type: none"> • URC=B370, Top I/O station. • URC=B371, Bottom I/O station. <p>Failure Isolation Procedure</p> <p>The I/O station may be out of position. Repair or replace it. Perform the Calibration Procedure. Select the Service menu, then the Calibration menu (see “Service Menus” on page 523).</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. I/O Station (see “I/O Station, Upper” on page 631 and “I/O Station, Lower” on page 629).
C400	<p>Description</p> <p>MCP cannot see a configured drive on feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP if possible since that will affect other drives.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the MCP to drives RS-422 cable. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>C401</p> <p>C402</p> <p>C403</p> <p>C404</p> <p>C410</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=C401, MCP cannot get a response from a configured drive on RS-422. • URC=C402, MCP detected an RS-422 problem with the response from a drive. • URC=C403, MCP detected too many RS-422 retries communicating with a drive. • URC=C404, MCP cannot get a response from the DCC card in a configured drive canister on RS-422. • URC=C410, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
<p>C411</p>	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
<p>C412</p>	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Types” on page 584).</p>
<p>C413</p>	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Types” on page 584).</p>
<p>C414</p>	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
C420	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • The problem can also be caused by a drive bezel that has been knocked out of place, or a drive that is not installed properly. Ensure the drive is mounted properly. If the drive bezel is missing, locate the drive bezel and reinstall it. • When the problem has been corrected, the drive must be recalibrated. At the front panel, select MENU, Service, Calibration, and calibrate the affected drive (see “Service Menu” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. DLT-8000 LVD Drive Canister (see “Drive Types” on page 584).
C431 C433	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=C431, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=C433, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <p>Remove any cartridge that is in the drive. Run Library Verify on the failing drive to see if the problem repeats.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>C432</p> <p>C434</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=C432, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=C434, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
<p>C435</p>	<p>Description</p> <p>Unable to cycle drive door—cartridge may be extending from the drive.</p> <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Types” on page 584).</p>
<p>C436</p>	<p>Description</p> <p>The library has detected that the cooling fan which is located inside a drive canister has failed.</p> <p>Failure Isolation Procedure</p> <p>The Failing Frame/Drive field in the sense data specifies the location of the canister.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 LVD Drive Canister (see “Drive Types” on page 584).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
C500	<p>Description</p> <p>MCP cannot see a configured drive on feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP if possible since that will affect other drives.</p> <p>URC FRU List</p> <p>If the problem persists, replace the following FRUs:</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612 3. If the problem persists, replace the MCP to drives RS-422 cable. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
C501 C502 C503 C504 C510	<p>Description</p> <ul style="list-style-type: none"> • URC=C501, MCP cannot get a response from a configured drive on RS-422. • URC=C502, MCP detected an RS-422 problem with the response from a drive. • URC=C503, MCP detected too many RS-422 retries communicating with a drive. • URC=C504, MCP cannot get a response from the DCC card in a configured drive canister on RS-422. • URC=C510, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
C511	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
C512	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
C513	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Types” on page 584).</p>
C514	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>
C520	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • A drive bezel that has been knocked out of place, or a drive that is not installed properly. Locate the drive bezel and repair or replace it. Perform the Calibration Procedure. Select the Service menu, then the Calibration menu (see “Service Menus” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. DLT-8000 HVD Drive Canister (see “Drive Types” on page 584).
C531 C533	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=C531, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=C533, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <p>Remove any cartridge that is in the drive. Run Library Verify on the failing drive to see if the problem repeats.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>C532</p> <p>C534</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=C532, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=C534, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
<p>C535</p>	<p>Description</p> <p>Unable to cycle drive door—cartridge may be extending from the drive.</p> <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Types” on page 584).
<p>C536</p>	<p>Description</p> <p>The library has detected that the cooling fan which is located inside a drive canister has failed.</p> <p>Failure Isolation Procedure</p> <p>The Failing Frame/Drive field in the sense data specifies the location of the canister.</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the DLT-8000 HVD Drive Canister (see “Drive Types” on page 584).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
C800	<p>Description</p> <p>MCP cannot see a configured drive on feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP if possible since that will affect other drives.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Types” on page 584). 2. If the problem persists, replace the MCP to drives RS-422 cable. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
C801 C802 C803 C810	<p>Description</p> <ul style="list-style-type: none"> • URC=C801, MCP cannot get a response from a configured drive on RS-422. • URC=C802, MCP detected an RS-422 problem with the response from a drive. • URC=C803, MCP detected too many RS-422 retries communicating with a drive. • URC=C810, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. LTO Ultrium-1 LVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
C811	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
C812	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Types” on page 584).</p>
C813	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
C814	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library and drive dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>
C820	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • The problem can also be caused by a drive bezel that has been knocked out of place, or a drive that is not installed properly. Ensure the drive is mounted properly. If the drive bezel is missing, locate the drive bezel and reinstall it. • When the problem has been corrected, the drive must be recalibrated. At the front panel, select MENU, Service, Calibration, and calibrate the affected drive (see “Service Menus” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. LTO Ultrium-1 LVD Drive Tray (see “Drive Types” on page 584).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>C831</p> <p>C833</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=C831, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=C833, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. Remove any cartridge that is in the drive. 2. Inspect the cartridge to determine whether there is any problem with the cartridge shell, cartridge shutter/door, or leader pin which could prevent the cartridge from unloading. Also check for any mis-positioned cartridge label. <ul style="list-style-type: none"> • If the cartridge is damaged or defective, give it to the customer for replacement. • If the cartridge is okay, continue with the next step in this procedure. 3. A spring clip EC is available to reduce the extraction force of the L1 drive. If this spring is not already installed on the drive, order and install it (see the FRU list below). <p>Note: If installing the spring clip EC, it is recommended that you install it on all L1 drives in the tape subsystem.</p> 4. Run Library Verify on the failing drive to see if the problem repeats. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. A spring clip EC is available to reduce the extraction force of LTO Ultrium-1 (L1) drives. If the spring clip EC is not already installed on your drive, see page 703 to order, "Spring Clip Kit, L1, LTO". The kit comes with installation instructions. 2. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see "Drive Types" on page 584). 3. If the problem persists, replace the Gripper Assembly (see "Gripper Assembly, Single (New Style)" on page 624). 4. If the problem persists, replace the Pivot Flex Cable (see "Pivot Flex Cable" on page 643). 5. If the problem persists, replace the X-Axis Motor and Belt (see "X-Axis Motor/Belt" on page 657). 6. If the problem persists, replace the Y-Axis Motor and Belt (see "Y-Axis Motor/Belt" on page 670). 7. If the problem persists, replace the ACC Card (see "Accessor Controller Card (ACC)" on page 558). 8. If the problem persists, replace the MDA Assembly (see "Motor Driver Assembly (MDA)" on page 566). 9. If the problem persists, replace the PDC Card (see "PDC Card" on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>C832</p> <p>C834</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=C832, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=C834, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. See “Drive Problems” on page 481 to determine whether the drive is hung and to remove any cartridge that is in the drive. 2. For drive load failures only, perform the “Drive Load Problems - LTO Only” on page 483. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Tray (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
<p>C900</p>	<p>Description</p> <p>MCP cannot see a configured drive on feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP if possible since that will affect other drives.</p> <p>URC FRU List</p> <p>If the problem persists, replace the following FRUs:</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Types” on page 584). 2. If the problem persists, replace the MCP to drives RS-422 cable. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
<p>C901</p> <p>C902</p> <p>C903</p> <p>C910</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=C901, MCP cannot get a response from a configured drive on RS-422. • URC=C902, MCP detected an RS-422 problem with the response from a drive. • URC=C903, MCP detected too many RS-422 retries communicating with a drive. • URC=C910, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. LTO Ultrium-1 HVD Drive Tray (see “Drive Tray Assembly – LTO SCSI” on page 585). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
C911	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
C912	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Types” on page 584).</p>
C913	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Types” on page 584).</p>
C914	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library and drive dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>
C920	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • The problem can also be caused by a drive bezel that has been knocked out of place, or a drive that is not installed properly. Ensure the drive is mounted properly. If the drive bezel is missing, locate the drive bezel and reinstall it. • When the problem has been corrected, the drive must be recalibrated. At the front panel, select MENU, Service, Calibration, and calibrate the affected drive (see “Service Menus” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. LTO Ultrium-1 HVD Drive Tray (see “Drive Types” on page 584).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>C931</p> <p>C933</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=C931, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=C933, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. Remove any cartridge that is in the drive. 2. Inspect the cartridge to determine whether there is any problem with the cartridge shell, cartridge shutter/door, or leader pin which could prevent the cartridge from unloading. Also check for any mis-positioned cartridge label. <ul style="list-style-type: none"> • If the cartridge is damaged or defective, give it to the customer for replacement. • If the cartridge is okay, continue with the next step in this procedure. 3. A spring clip EC is available to reduce the extraction force of the L1 drive. If this spring is not already installed on the drive, order and install it (see the FRU list below). <p>Note: If installing the spring clip EC, it is recommended that you install it on all L1 drives in the tape subsystem.</p> 4. Run Library Verify on the failing drive to see if the problem repeats. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. A spring clip EC is available to reduce the extraction force of LTO Ultrium-1 (L1) drives. If the spring clip EC is not already installed on your drive, see page 703 to order, "Spring Clip Kit, L1, LTO". The kit comes with installation instructions. 2. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see "Drive Types" on page 584). 3. If the problem persists, replace the Gripper Assembly (see "Gripper Assembly, Single (New Style)" on page 624). 4. If the problem persists, replace the Pivot Flex Cable (see "Pivot Flex Cable" on page 643). 5. If the problem persists, replace the X-Axis Motor and Belt (see "X-Axis Motor/Belt" on page 657). 6. If the problem persists, replace the Y-Axis Motor and Belt (see "Y-Axis Motor/Belt" on page 670). 7. If the problem persists, replace the ACC Card (see "Accessor Controller Card (ACC)" on page 558). 8. If the problem persists, replace the MDA Assembly (see "Motor Driver Assembly (MDA)" on page 566). 9. If the problem persists, replace the PDC Card (see "PDC Card" on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>C932</p> <p>C934</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=C932, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=C934, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. See “Drive Problems” on page 481 to determine whether the drive is hung and to remove any cartridge that is in the drive. 2. For drive load failures only, perform the “Drive Load Problems - LTO Only” on page 483. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
C933	See C931.
C934	See C932.
CA00	<p>Description</p> <p>MCP cannot see a configured drive on the feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP, if possible, since that will affect other drives.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Types” on page 584). 2. If the problem persists, replace the MCP to drives RS-422 cable. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CA01</p> <p>CA02</p> <p>CA03</p> <p>CA10</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=CA01, MCP cannot get a response from a configured drive on RS-422. • URC=CA02, MCP detected an RS-422 problem with the response from a drive. • URC=CA03, MCP detected too many RS-422 retries communicating with a drive. • URC=CA10, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. LTO Ultrium-1 Fibre Drive Tray (see “Drive Types” on page 584). 2. If the problem persists, replace the RS-422 cable from the MCP to the drives. 3. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
<p>CA11</p>	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
<p>CA12</p>	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Types” on page 584).</p>
<p>CA13</p>	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Types” on page 584).</p>
<p>CA14</p>	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library and drive dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
CA20	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • The problem can also be caused by a drive bezel that has been knocked out of place, or a drive that is not installed properly. Ensure the drive is mounted properly. If the drive bezel is missing, locate the drive bezel and reinstall it. • When the problem has been corrected, the drive must be recalibrated. At the front panel, select MENU, Service, Calibration, and calibrate the affected drive (see “Service Menu” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. LTO Ultrium-1 Fibre Drive Tray (see “Drive Types” on page 584).
CA31 CA33	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CA31, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=CA33, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. Remove any cartridge that is in the drive. 2. Inspect the cartridge to determine whether there is any problem with the cartridge shell, cartridge shutter/door, or leader pin which could prevent the cartridge from unloading. Also check for any mis-positioned cartridge label. <ul style="list-style-type: none"> • If the cartridge is damaged or defective, give it to the customer for replacement. • If the cartridge is okay, continue with the next step in this procedure. 3. A spring clip EC is available to reduce the extraction force of the L1 drive. If this spring is not already installed on the drive, order and install it (see the FRU list below). Note: If installing the spring clip EC, it is recommended that you install it on all L1 drives in the tape subsystem. 4. Run Library Verify on the failing drive to see if the problem repeats. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. A spring clip EC is available to reduce the extraction force of LTO Ultrium-1 (L1) drives. If the spring clip EC is not already installed on your drive, see page 703 to order, “Spring Clip Kit, L1, LTO”. The kit comes with installation instructions. 2. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Types” on page 584). 3. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 4. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 5. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 6. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 7. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 8. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 9. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CA32</p> <p>CA34</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CA32, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=CA34, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. See “Drive Problems” on page 481 to determine whether the drive is hung and to remove any cartridge that is in the drive. 2. For drive load failures only, perform the “Drive Load Problems - LTO Only” on page 483. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
CA33	See CA31.
CA34	See CA32.
CB00	<p>Description</p> <p>MCP cannot see a configured drive on feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP if possible since that will affect other drives.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the MCP to drives RS-422 cable. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CB01</p> <p>CB02</p> <p>CB03</p> <p>CB04</p> <p>CB10</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=CB01, MCP cannot get a response from a configured drive on RS-422. • URC=CB02, MCP detected an RS-422 problem with the response from a drive. • URC=CB03, MCP detected too many RS-422 retries communicating with a drive. • URC=CB04, MCP cannot get a response from the DCC card in a configured drive canister on RS-422. • URC=CB10, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
<p>CB11</p>	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
<p>CB12</p>	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).</p>
<p>CB13</p>	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).</p>
<p>CB14</p>	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library and drive dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
CB20	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • The problem can also be caused by a drive bezel that has been knocked out of place, or a drive that is not installed properly. Ensure the drive is mounted properly. If the drive bezel is missing, locate the drive bezel and reinstall it. • When the problem has been corrected, the drive must be recalibrated. At the front panel, select MENU, Service, Calibration, and calibrate the affected drive (see “Service Menu” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).
<p>CB31</p> <p>CB33</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CB31, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=CB33, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. Remove any cartridge that is in the drive. 2. Inspect the cartridge to determine whether there is any problem with the cartridge shell, cartridge shutter/door, or leader pin which could prevent the cartridge from unloading. Also check for any mis-positioned cartridge label. <ul style="list-style-type: none"> • If the cartridge is damaged or defective, give it to the customer for replacement. • If the cartridge is okay, continue with the next step in this procedure. 3. A spring clip EC is available to reduce the extraction force of the L1 drive. If this spring is not already installed on the drive, order and install it (see the FRU list below). <p>Note: If installing the spring clip EC, it is recommended that you install it on all L1 drives in the tape subsystem.</p> 4. Run Library Verify on the failing drive to see if the problem repeats. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. A spring clip EC is available to reduce the extraction force of LTO Ultrium-1 (L1) drives. If the spring clip EC is not already installed on your drive, see page 703 to order, “Spring Clip Kit, L1, LTO”. The kit comes with installation instructions. 2. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 3. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 4. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 5. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 6. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 7. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 8. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 9. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CB32</p> <p>CB34</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CB32, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=CB34, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. See “Drive Problems” on page 481 to determine whether the drive is hung and to remove any cartridge that is in the drive. 2. For drive load failures only, perform the “Drive Load Problems - LTO Only” on page 483. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
CB33	See CB31.
CB34	See CB32.
CB36	<p>Description</p> <p>The library has detected that the cooling fan inside a drive canister has failed.</p> <p>Failure Isolation Procedure</p> <p>The Failing Frame/Device field in the sense data specifies the location of the canister.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 LVD Drive Canister (see “Drive Types” on page 584).</p>
CC00	<p>Description</p> <p>MCP cannot see a configured drive on feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP if possible since that will affect other drives.</p> <p>URC FRU List</p> <p>If the problem persists, replace the following FRUs:</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612) 3. If the problem persists, replace the MCP to drives RS-422 cable. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CC01</p> <p>CC02</p> <p>CC03</p> <p>CC04</p> <p>CC10</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=CC01, MCP cannot get a response from a configured drive on RS-422. • URC=CC02, MCP detected an RS-422 problem with the response from a drive. • URC=CC03, MCP detected too many RS-422 retries communicating with a drive. • URC=CC04, MCP cannot get a response from the DCC card in a configured drive canister on RS-422. • URC=CC10, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
<p>CC11</p>	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
<p>CC12</p>	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Types” on page 584).</p>
<p>CC13</p>	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Tray (see “Drive Types” on page 584).</p>
<p>CC14</p>	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library and drive dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
CC20	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • The problem can also be caused by a drive bezel that has been knocked out of place, or a drive that is not installed properly. Ensure the drive is mounted properly. If the drive bezel is missing, locate the drive bezel and reinstall it. • When the problem has been corrected, the drive must be recalibrated. At the front panel, select MENU, Service, Calibration, and calibrate the affected drive (see “Service Menu” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584).
CC31 CC33	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CC31, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=CC33, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. Remove any cartridge that is in the drive. 2. Inspect the cartridge to determine whether there is any problem with the cartridge shell, cartridge shutter/door, or leader pin which could prevent the cartridge from unloading. Also check for any mis-positioned cartridge label. <ul style="list-style-type: none"> • If the cartridge is damaged or defective, give it to the customer for replacement. • If the cartridge is okay, continue with the next step in this procedure. 3. A spring clip EC is available to reduce the extraction force of the L1 drive. If this spring is not already installed on the drive, order and install it (see the FRU list below). <p>Note: If installing the spring clip EC, it is recommended that you install it on all L1 drives in the tape subsystem.</p> 4. Run Library Verify on the failing drive to see if the problem repeats. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. A spring clip EC is available to reduce the extraction force of LTO Ultrium-1 (L1) drives. If the spring clip EC is not already installed on your drive, see page 703 to order, “Spring Clip Kit, L1, LTO”. The kit comes with installation instructions. 2. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 3. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 4. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 5. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 6. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670) 7. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 8. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 9. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CC32</p> <p>CC34</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CC32, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=CC34, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. See “Drive Problems” on page 481 to determine whether the drive is hung and to remove any cartridge that is in the drive. 2. For drive load failures only, perform the “Drive Load Problems - LTO Only” on page 483. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
CC33	See CC31.
CC34	See CC32.
CC36	<p>Description</p> <p>The library has detected that the cooling fan inside a drive canister has failed.</p> <p>Failure Isolation Procedure</p> <p>The Failing Frame/Device field in the sense data specifies the location of the canister.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 HVD Drive Canister (see “Drive Types” on page 584).</p>
CD00	<p>Description</p> <p>MCP cannot see a configured drive on feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP if possible since that will affect other drives.</p> <p>URC FRU List</p> <p>If the problem persists, replace the following FRUs:</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612) 3. If the problem persists, replace the MCP to drives RS-422 cable. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CD01</p> <p>CD02</p> <p>CD03</p> <p>CD04</p> <p>CD10</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=CD01, MCP cannot get a response from a configured drive on RS-422. • URC=CD02, MCP detected an RS-422 problem with the response from a drive. • URC=CD03, MCP detected too many RS-422 retries communicating with a drive. • URC=CD04, MCP cannot get a response from the DCC card in a configured drive canister on RS-422. • URC=CD10, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
<p>CD11</p>	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
<p>CD12</p>	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Types” on page 584).</p>
<p>CD13</p>	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Tray (see “Drive Types” on page 584).</p>
<p>CD14</p>	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library and drive dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
CD20	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • The problem can also be caused by a drive bezel that has been knocked out of place, or a drive that is not installed properly. Ensure the drive is mounted properly. If the drive bezel is missing, locate the drive bezel and reinstall it. • When the problem has been corrected, the drive must be recalibrated. At the front panel, select MENU, Service, Calibration, and calibrate the affected drive (see “Service Menu” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. LTO Ultrium-1 Fibre Drive Canister (see “Drive Types” on page 584).
CD31 CD33	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CD31, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=CD33, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. Remove any cartridge that is in the drive. 2. Inspect the cartridge to determine whether there is any problem with the cartridge shell, cartridge shutter/door, or leader pin which could prevent the cartridge from unloading. Also check for any mis-positioned cartridge label. <ul style="list-style-type: none"> • If the cartridge is damaged or defective, give it to the customer for replacement. • If the cartridge is okay, continue with the next step in this procedure. 3. A spring clip EC is available to reduce the extraction force of the L1 drive. If this spring is not already installed on the drive, order and install it (see the FRU list below). <p>Note: If installing the spring clip EC, it is recommended that you install it on all L1 drives in the tape subsystem.</p> 4. Run Library Verify on the failing drive to see if the problem repeats. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. A spring clip EC is available to reduce the extraction force of LTO Ultrium-1 (L1) drives. If the spring clip EC is not already installed on your drive, see page 703 to order, “Spring Clip Kit, L1, LTO”. The kit comes with installation instructions. 2. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Canister (see “Drive Types” on page 584). 3. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 4. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 5. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 6. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670) 7. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 8. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 9. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CD32</p> <p>CD34</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CD32, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=CD34, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. See “Drive Problems” on page 481 to determine whether the drive is hung and to remove any cartridge that is in the drive. 2. For drive load failures only, perform the “Drive Load Problems - LTO Only” on page 483. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-1 Fibre Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
CD33	See CD31.
CD34	See CD32.
CD36	<p>Description</p> <p>The library has detected that the cooling fan inside a drive canister has failed.</p> <p>Failure Isolation Procedure</p> <p>The Failing Frame/Device field in the sense data specifies the location of the canister.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-1 Fibre Drive Canister (see “Drive Types” on page 584).</p>
CE00	<p>Description</p> <p>MCP cannot see a configured drive on feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP if possible since that will affect other drives.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the MCP to drives RS-422 cable. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CE01</p> <p>CE02</p> <p>CE03</p> <p>CE04</p> <p>CE10</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=CE01, MCP cannot get a response from a configured drive on RS-422. • URC=CE02, MCP detected an RS-422 problem with the response from a drive. • URC=CE03, MCP detected too many RS-422 retries communicating with a drive. • URC=CE04, MCP cannot get a response from the DCC card in a configured drive canister on RS-422. • URC=CE10, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
<p>CE11</p>	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
<p>CE12</p>	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).</p>
<p>CE13</p>	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).</p>
<p>CE14</p>	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library and drive dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
CE20	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • The problem can also be caused by a drive bezel that has been knocked out of place, or a drive that is not installed properly. Ensure the drive is mounted properly. If the drive bezel is missing, locate the drive bezel and reinstall it. • When the problem has been corrected, the drive must be recalibrated. At the front panel, select MENU, Service, Calibration, and calibrate the affected drive (see “Service Menu” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).
CE31 CE33	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CE31, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=CE33, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <p>Remove any cartridge that is in the drive. Run Library Verify on the failing drive to see if the problem repeats.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CE32</p> <p>CE34</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CE32, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=CE34, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. See “Drive Problems” on page 481 to determine whether the drive is hung and to remove any cartridge that is in the drive. 2. For drive load failures only, perform the “Drive Load Problems - LTO Only” on page 483. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
CE33	See CE31.
CE34	See CE32.
CE36	<p>Description</p> <p>The library has detected that the cooling fan inside a drive canister has failed.</p> <p>Failure Isolation Procedure</p> <p>The Failing Frame/Device field in the sense data specifies the location of the canister.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 LVD Drive Canister (see “Drive Types” on page 584).</p>
CF00	<p>Description</p> <p>MCP cannot see a configured drive on feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP if possible since that will affect other drives.</p> <p>URC FRU List</p> <p>If the problem persists, replace the following FRUs:</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612) 3. If the problem persists, replace the MCP to drives RS-422 cable. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CF01</p> <p>CF02</p> <p>CF03</p> <p>CF04</p> <p>CF10</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=CF01, MCP cannot get a response from a configured drive on RS-422. • URC=CF02, MCP detected an RS-422 problem with the response from a drive. • URC=CF03, MCP detected too many RS-422 retries communicating with a drive. • URC=CF04, MCP cannot get a response from the DCC card in a configured drive canister on RS-422. • URC=CF10, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
<p>CF11</p>	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
<p>CF12</p>	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 HVD Drive Tray (see “Drive Types” on page 584).</p>
<p>CF13</p>	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 HVD Drive Tray (see “Drive Types” on page 584).</p>
<p>CF14</p>	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library and drive dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
CF20	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • The problem can also be caused by a drive bezel that has been knocked out of place, or a drive that is not installed properly. Ensure the drive is mounted properly. If the drive bezel is missing, locate the drive bezel and reinstall it. • When the problem has been corrected, the drive must be recalibrated. At the front panel, select MENU, Service, Calibration, and calibrate the affected drive (see “Service Menu” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584).
CF31 CF33	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CF31, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=CF33, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <p>Remove any cartridge that is in the drive. Run Library Verify on the failing drive to see if the problem repeats.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>CF32</p> <p>CF34</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=CF32, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=CF34, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. See “Drive Problems” on page 481 to determine whether the drive is hung and to remove any cartridge that is in the drive. 2. For drive load failures only, perform the “Drive Load Problems - LTO Only” on page 483. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
CF33	See CF31.
CF34	See CF32.
CF36	<p>Description</p> <p>The library has detected that the cooling fan inside a drive canister has failed.</p> <p>Failure Isolation Procedure</p> <p>The Failing Frame/Device field in the sense data specifies the location of the canister.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 HVD Drive Canister (see “Drive Types” on page 584).</p>
D000	<p>Description</p> <p>MCP cannot see a configured drive on feedback loop.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check for a loose RS-422 cable. Avoid unplugging the RS-422 cable from the MCP if possible since that will affect other drives.</p> <p>URC FRU List</p> <p>If the problem persists, replace the following FRUs:</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 Fibre Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612) 3. If the problem persists, replace the MCP to drives RS-422 cable. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>D001</p> <p>D002</p> <p>D003</p> <p>D004</p> <p>D010</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=D001, MCP cannot get a response from a configured drive on RS-422. • URC=D002, MCP detected an RS-422 problem with the response from a drive. • URC=D003, MCP detected too many RS-422 retries communicating with a drive. • URC=D004, MCP cannot get a response from the DCC card in a configured drive canister on RS-422. • URC=D010, MCP timed out waiting for a drive to complete a command. <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>See “Drive Problems” on page 481 for corrective actions.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 Fibre Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 3. If the problem persists, replace the RS-422 cable from the MCP to the drives. 4. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
<p>D011</p>	<p>Description</p> <p>MCP received an unrecognized message from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, contact your next level of support.</p>
<p>D012</p>	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a drive, ensure that the drive you installed is the same type as the original. If the problem persists, replace the drive. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 Fibre Drive Tray (see “Drive Types” on page 584).</p>
<p>D013</p>	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 Fibre Drive Tray (see “Drive Types” on page 584).</p>
<p>D014</p>	<p>Description</p> <p>MCP received unexpected or invalid status from a drive over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the drive and on the library. If either is downlevel, update the code. If the problem persists, collect library and drive dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
D020	<p>Description</p> <p>Calibration encountered a missing fiducial on a drive. See the Failing Frame and Failing Device in the library error log to know which drive is affected.</p> <p>Failure Isolation Procedure</p> <ul style="list-style-type: none"> • The problem can be caused by dust accumulation in the fiducial hole that is used during drive calibration. Blow or brush the dust from the fiducial hole. • The problem can also be caused by a drive bezel that has been knocked out of place, or a drive that is not installed properly. Ensure the drive is mounted properly. If the drive bezel is missing, locate the drive bezel and reinstall it. • When the problem has been corrected, the drive must be recalibrated. At the front panel, select MENU, Service, Calibration, and calibrate the affected drive (see “Service Menu” on page 523) <p>URC FRU List</p> <ol style="list-style-type: none"> 1. Calibration sensor (see “Calibration Sensor” on page 555). 2. LTO Ultrium-2 Fibre Drive Canister (see “Drive Types” on page 584).
D031 D033	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=D031, Drive unload failure — unable to get a cartridge that is in the unloaded position at the drive. • URC=D033, Drive load failure — unable to extend cartridge to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <p>Remove any cartridge that is in the drive. Run Library Verify on the failing drive to see if the problem repeats.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 Fibre Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>D032</p> <p>D034</p>	<p>Description</p> <p>Drive Load or Unload failure:</p> <ul style="list-style-type: none"> • URC=D032, Drive eject failure — there is no cartridge in the unloaded position at the drive. • URC=D034, Drive load failure — drive loader did not load the cartridge after it was extended to the drive load position. <p>See the failing frame and failing drive fields in the sense data or the library error log to determine which drive is affected.</p> <p>Failure Isolation Procedure</p> <ol style="list-style-type: none"> 1. See “Drive Problems” on page 481 to determine whether the drive is hung and to remove any cartridge that is in the drive. 2. For drive load failures only, perform the “Drive Load Problems - LTO Only” on page 483. <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the LTO Ultrium-2 Fibre Drive Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Gripper Assembly (see “Gripper Assembly, Single (New Style)” on page 624). 3. If the problem persists, replace the Pivot Flex Cable (see “Pivot Flex Cable” on page 643). 4. If the problem persists, replace the X-Axis Motor and Belt (see “X-Axis Motor/Belt” on page 657). 5. If the problem persists, replace the Y-Axis Motor and Belt (see “Y-Axis Motor/Belt” on page 670). 6. If the problem persists, replace the ACC Card (see “Accessor Controller Card (ACC)” on page 558). 7. If the problem persists, replace the MDA Assembly (see “Motor Driver Assembly (MDA)” on page 566). 8. If the problem persists, replace the PDC Card (see “PDC Card” on page 572).
D033	See D031.
D034	See D032.
D036	<p>Description</p> <p>The library has detected that the cooling fan inside a drive canister has failed.</p> <p>Failure Isolation Procedure</p> <p>The Failing Frame/Device field in the sense data specifies the location of the canister.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LTO Ultrium-2 Fibre Drive Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
<p>E000</p> <p>E001</p> <p>E002</p> <p>E003</p> <p>E004</p> <p>E009</p> <p>E010</p> <p>E011</p>	<p>Description</p> <ul style="list-style-type: none"> • URC=E000, MCP cannot see a configured control port on feedback loop. • URC=E001, MCP cannot get a response from a configured control port on RS-422. • URC=E002, MCP detected an RS-422 problem with the response from a control port. • URC=E003, MCP detected too many RS-422 retries communicating with a control port. • URC=E004, MCP cannot get a response from a configured control port DCC on RS-422. • URC=E009, The control port detected an error or timeout in RS-422 communications between the control port and the library MCP. • URC=E010, MCP timed out waiting for a control port to complete a command. • URC=E011, MCP received an unrecognized message from a control port on RS-422. <p>See Failing Frame and Failing Device numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the fixed tray and at the MCP. If the Control Port is not in row 0, avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the Control Port LVD Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612) 3. If the problem persists, and the Control Port is in row 0, replace the RS-422 cable from MCP to Control Port. 4. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 5. If the problem persists, and the Control Port is NOT in row 0, replace the RS-422 cable from the MCP to the drives. 6. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).
<p>E012</p>	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a control port, ensure that the FRU you installed is the same type as the original. If the problem persists, replace the control port. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the Control Port LVD Canister (see “Drive Types” on page 584).</p>
<p>E013</p>	<p>Description</p> <p>MCP attempted to change the control port SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the Control Port LVD Canister (see “Drive Types” on page 584).</p>

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
E014	<p>Description</p> <p>MCP received unexpected or invalid status from a control port over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the control port and on the library. If either is downlevel, update the code. If the problem persists, collect library dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>
E036	<p>Description</p> <p>The library has detected that the cooling fan inside a drive canister has failed. This is a false error. It indicates that the canister VPD is incorrect.</p> <p>Failure Isolation Procedure</p> <p>The Failing Frame/Device field in the sense data specifies the location of the canister.</p> <p>URC FRU List</p> <p>If the problem persists, replace the LVD Control Port Canister (see “Drive Types” on page 584).</p>
E100 E101 E102 E103 E104 E109 E110 E111	<p>Description</p> <ul style="list-style-type: none"> • URC=E100, MCP cannot see a configured control port on feedback loop. • URC=E101, MCP cannot get a response from a configured control port on RS-422. • URC=E102, MCP detected an RS-422 problem with the response from a control port. • URC=E103, MCP detected too many RS-422 retries communicating with a control port. • URC=E104, MCP cannot get a response from a configured control port DCC on RS-422. • URC=E109, The control port detected an error or timeout in RS-422 communications between the control port and the library MCP. • URC=E110, MCP timed out waiting for a control port to complete a command. • URC=E111, MCP received an unrecognized message from a control port on RS-422. <p>See Failing Frame and Failing Device numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>Ensure that the RS-422 cable is plugged securely at the fixed tray and at the MCP. If the Control Port is not in row 0, avoid unplugging the RS-422 cable from the MCP if possible since unplugging it will affect all drives in the frame.</p> <p>URC FRU List</p> <ol style="list-style-type: none"> 1. If the problem persists, replace the Control Port HVD Canister (see “Drive Types” on page 584). 2. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612 3. If the problem persists, and the Control Port is in row 0, replace the RS-422 cable from MCP to Control Port. 4. If the problem persists, replace the Fixed Tray Assembly (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612). 5. If the problem persists, and the Control Port is NOT in row 0, replace the RS-422 cable from the MCP to the drives. 6. If the problem persists, replace the MCP (see “Media Changer Pack (MCP)” on page 564).

Table 43. URC Description with Action and FRUs (continued)

URC	Description of Symptom, Required Action, and FRU
E112	<p>Description</p> <p>MCP detected that drive/canister type does not match what is currently configured.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>If you just replaced a control port, ensure that the FRU you installed is the same type as the original. If the problem persists, replace the control port. If the problem still persists, the library configuration may be incorrect. Reconfigure the library.</p> <p>URC FRU List</p> <p>If the problem persists, replace the Control Port HVD Canister (see “Drive Types” on page 584).</p>
E113	<p>Description</p> <p>MCP attempted to change the drive SCSI ID or FC Loop ID but the drive would not accept the new ID.</p> <p>URC FRU List</p> <p>If the problem persists, replace the Control Port HVD Canister (see “Drive Types” on page 584).</p>
E114	<p>Description</p> <p>MCP received unexpected or invalid status from a control port over RS-422.</p> <p>See Failing Frame and Failing Drive numbers in the sense data or library error log.</p> <p>Failure Isolation Procedure</p> <p>This is usually due to a microcode problem. Check the level of code in the control port and on the library. If either is downlevel, update the code. If the problem persists, collect library dumps, then contact your next level of support. Do not replace any FRUs unless instructed to do so by your next level of support.</p>
E136	<p>Description</p> <p>The library has detected that the cooling fan inside a drive canister has failed. This is a false error. It indicates that the canister VPD is incorrect.</p> <p>Failure Isolation Procedure</p> <p>The Failing Frame/Device field in the sense data specifies the location of the canister.</p> <p>URC FRU List</p> <p>If the problem persists, replace the HVD Control Port Canister (see “Drive Types” on page 584).</p>
FFF6	<p>Description</p> <p>Tape volume statistics logged.</p> <p>Failure Isolation Procedure</p> <p>This is an informational message only. No corrective action is required.</p>
FFFF	<p>Description</p> <p>The library was unable to assign a unique URC to this failure.</p> <p>Failure Isolation Procedure</p> <p>This indicates that the library did not have all the information it needed to assign a more specific URC for this failure. As an example, if a failure occurred which was related to a drive, but the library was unable to determine the drive type, then it could not assign a URC. Perform the following steps:</p> <ol style="list-style-type: none"> 1. Find the HEC/HECQ in the sense data associated with the error. 2. Go to “Library Sense Data to URC Table” on page 170, and obtain the URC. 3. Locate the URC in “URC Description With Action and FRUs” on page 226, and follow the instructions.

LTO Drive Single-Character Display (SCD) Codes

Use Table 45 on page 411 only if no sense data is available. Whenever possible, use sense data or a drive FSC instead of the drive single-character display (SCD) code.

The Ultrium Tape Drive has a single-character display (SCD) which will display a code that can aid in servicing the drive. While the library is active, it can be difficult to see the SCD without opening the library door. An easier way to obtain information about a drive error is to see which drive is reporting an error, then access that drive's error log using the library operator panel. A drive error log may be accessed from the library operator panel, using the **Service** and **Drive Error Logs** menus.

Determine what type of drive you are working with (see notes below) and use Table 44 to cross reference the drive SCD code to a URC. Then, use the URC in "URC Description With Action and FRUs" on page 226 to locate and repair the problem. You can review Table 45 on page 411 to read a brief description of the problem.

Notes:

1. Determine the drive type (LTO Ultrium-1 or LTO Ultrium-2 and LVD/HVD/FC) by referring to the labels on the back of the drive.
2. Drive types may be abbreviated on the labels. L1 indicates an LTO Ultrium-1 drive. L2 indicates an LTO Ultrium-2 drive.
3. Early-production drive tray assemblies did not have labels. Regard these as LTO1 DT LVD drives.

The following abbreviations apply to the URC column:

LTO1 DT LVD. LTO Ultrium-1 drive tray (SCSI Low Voltage Differential)

LTO1 DT HVD. LTO Ultrium-1 drive tray (SCSI High Voltage Differential)

LTO1 DT FC. LTO Ultrium-1 drive tray Fibre Channel

LTO1 DC LVD. LTO Ultrium-1 drive canister (SCSI Low Voltage Differential)

LTO1 DC HVD. LTO Ultrium-1 drive canister (SCSI High Voltage Differential)

LTO1 DC FC. LTO Ultrium-1 drive canister Fibre Channel

LTO2 DC LVD. LTO Ultrium-2 drive canister (SCSI Low Voltage Differential)

LTO2 DC HVD. LTO Ultrium-2 drive canister (SCSI High Voltage Differential)

LTO2 DC FC. LTO Ultrium-2 drive canister Fibre Channel

Table 44. LTO Drive SCD to URC Conversion

SCD Code	URC (LTO1 DT LVD)	URC (LTO1 DT HVD)	URC (LTO1 DT FC)	URC (LTO1 DC LVD)	URC (LTO1 DC HVD)	URC (LTO1 DC FC)	URC (LTO2 DC LVD)	URC (LTO2 DC HVD)	URC (LTO2 DC FC)
0	3000	3400	3800	3C00	4000	4400	4800	4C00	5000
1	3001	3401	3801	3C01	4001	4401	4801	4C01	5001
2	3002	3402	3802	3C02	4002	4402	4802	4C02	5002
3	3003	3403	3803	3C03	4003	4403	4803	4C03	5003
4	3004	3404	3804	3C04	4004	4404	4804	4C04	5004
5	3005	3405	3805	3C05	4005	4405	4805	4C05	5005
6	3006	3406	3806	3C06	4006	4406	4806	4C06	5006
7	3007	3407	3807	3C07	4007	4407	4807	4C07	5007

Table 44. LTO Drive SCD to URC Conversion (continued)

SCD Code	URC (LTO1 DT LVD)	URC (LTO1 DT HVD)	URC (LTO1 DT FC)	URC (LTO1 DC LVD)	URC (LTO1 DC HVD)	URC (LTO1 DC FC)	URC (LTO2 DC LVD)	URC (LTO2 DC HVD)	URC (LTO2 DC FC)
8	3008	3408	3808	3C08	4008	4408	4808	4C08	5008
9	3009	3409	3809	3C09	4009	4409	4809	4C09	5009
A	300A	340A	380A	3C0A	400A	440A	480A	4C0A	500A
C	300C	340C	380C	3C0C	400C	440C	480C	4C0C	500C
D	N/A	N/A	380D	N/A	N/A	440D	480D	4C0D	500D
E	N/A	N/A	380E	N/A	N/A	440E	480E	4C0E	500E
F	N/A	N/A	380F	N/A	N/A	440F	480F	4C0F	500F

Table 45. LTO Drive SCD Codes

SCD Code	Description
0	No Error. Ran successfully.
1	Cooling problem.
2	5V dc power problem. Tape drive detected that externally-supplied power is either approaching the specified voltage limit (drive is still operating) or is outside the specified voltage range (drive is not operating).
3	Tape drive determined that a microcode error occurred.
4	Microcode or tape drive problem. Tape drive determined that a microcode or tape drive hardware failure occurred.
5	Tape drive problem. Tape drive determined that a hardware failure occurred.
6	Tape drive or media error. Tape drive determined that an error occurred, but it cannot isolate the error due to faulty hardware or to the tape cartridge.
7	Media error.
8	Tape drive, SCSI bus or fibre channel error.
9	Tape drive or RS-422 error.
A	Tape drive hardware problem.
C	Tape drive needs to be cleaned.
D	Tape drive determined that another device is using the same Fibre Channel AL_PA (Loop ID).
E	Tape drive received an OFFLINE command from another device on the Fibre Channel Arbitrated Loop.
F	Tape drive determined that there is no light on the Fibre Channel port.

Node Card LED Display Codes

The codes listed in Table 46 are displayed on the node cards (electronic cards located on the CAN bus) LED display in the base frame and all extension frames that contain node cards. These node cards are the ACC, MDA, MCP, and OPC. Not all expansion frames will have all the node cards that are in the base frame.

During Node card POST (power-on self test), a code will flash showing the progress through the test. If POST completes successfully, the display will cycle between 00 and 01 (for the base frame). Expansion frames should flash 00 and xx in the node card LEDs after Node card POST, where xx= the frame number. Each frame will have its own number regardless of whether it has an FCA installed or not.

If a failure occurs during Node card POST, a solid display of a two-digit error code will occur. See Table 46. When an error occurs after completion of the Node card POST, the LED will cycle between the HEC and HECQ codes.

Two-digit error codes also may appear during code load on one of the node cards. When this occurs, see Table 46.

If you have a solid display of a two-digit error code that is not listed in Table 46, call your next level of support.

Table 46. Node Card LED Displays

LED Display	Description	Action
Blank	Node card missing power	Go to "Power Isolation MAP" on page 449.
Flashing 00 then 0x	Normal display with power up following POST. The 0x is the frame number. Cycles between 00 and 0x. Note: Whether a frame has an FCA or not, it will still have a frame number. This number is associated with the frame FIC card which all frames will have.	None
Flashing 00 then 0E or 0F	The node card is updating code.	None
Flashing 00 then 0x	If the wrong frame number flashes within a frame, a problem exists with the FIC electronics between frames.	Checkout the FIC electronics between frames.
Flashing HEC and HECQ codes (20 through DF)	The HEC code stays on longer than the HECQ code.	Go to "Library Sense Data to URC Table" on page 170 to obtain the URC. Use 04 44 00 followed by the error code you received. Then go to "URC Description With Action and FRUs" on page 226 to locate the code and follow the instructions.

Table 46. Node Card LED Displays (continued)

LED Display	Description	Action
F1 followed by 8 separate 2-digit hex numbers, repeating	Microcode on the node card has encountered a critical error. This condition usually prevents the node card from logging an error in the error log and from responding on the CAN.	<ol style="list-style-type: none"> 1. Record the entire sequence of numbers. Each number will be displayed for a set time. If one number appears to be displayed for twice the time, it is probably the same number shown twice. For example, the number might be F1 01 02 03 03 04 05 06 07. The two 03 displays will appear to be one long 03 display. 2. Reset the node card by pressing the reset button on the node card, or by power cycling the library. Note: Do Not power cycle the library unless you are sure that no customer jobs are still running on any of the drives. 3. If the node card completes POST normally, and does not display the F1 error again, verify that all the node cards in the library contain the same level of microcode (go to Main Menu, Vital Product Data, Node Card VPD, use UP/DOWN keys to step through all configured cards). 4. Check to see if the level of library code is the highest level available. See “Display Library Firmware Version” on page 492 for library code version and the Tucson PFE Website to check for code levels. 5. Use CETool to obtain the library logs, see “Creating Library Dump” on page 504. 6. If any node card is at a different level, or if the entire library is downlevel, use CETool to install the latest code (see “Loading Library Microcode” on page 501). 7. Send the library logs and the F1 error code numbers to your Product Field Engineering Support location.
Cycling Fx	Display during POST. As long as numbers continue to change, no error has occurred. These numbers will be in the range of Fn.	None
Solid 0x	Error occurred during POST. The code has probably hung or has gone into a loop.	Cycle power. If problem reoccurs, reload code into the card that is hung with the X'0x.
Solid E9	POST Error or Code update error. Thread exec error (Idle_Diag did not start).	Reload code in the card with the X'E9 display. If problem reoccurs, replace the card that displays this error code.
Solid EA	POST Error or Code update error. Memory Allocation Error	Reload code in the card with the X'EA display. If problem reoccurs, replace the card that displays this error code.
Solid EB	POST Error or Code update error. Semaphore Creation Error	Reload code in the card with the X'EB display. If problem reoccurs, replace the card that displays this error code.
Solid EC	POST Error or Code update error. Memory Pool Creation Error	Reload code in the card with the X'EC display. If problem reoccurs, replace the card that displays this error code.

Table 46. Node Card LED Displays (continued)

LED Display	Description	Action
Solid ED	POST Error or Code update error. Thread Queue Creation Error	Reload code in the card with the X'ED display. If problem reoccurs, replace the card that displays this error code.
Solid EE	POST Error or Code update error. Thread Creation Error	Reload code in the card with the X'EE display. If problem reoccurs, replace the card that displays this error code.
Solid EF	POST Error or Code update error. PROM Programming Error	Reload code in the card with the X'EF display. If problem reoccurs, call your next level of support. If the latest code does not fix the error, replace the card that displays this error code. The hardware may be mimicking a code error.
Solid F0	POST Error or Code update error. Base Interrupt Error	Reload code in the card with the X'F0 display. If problem reoccurs, replace the card that displays this error code.
Solid F1	POST Error or Code update error. Exception Interrupt Error	Reload code in the card with the X'F1 display. If problem reoccurs, replace the card that displays this error code.
Solid F2	POST Error or Code update error. TLB Interrupt Error	Reload code in the card with the X'F2 display. If problem reoccurs, replace the card that displays this error code.
Solid F3	POST Error or Code update error. Unknown Interrupt Error	Reload code in the card with the X'F3 display. If problem reoccurs, replace the card that displays this error code.
Solid F4	POST Error or Code update error. CAN Test Error	Replace the card that displayed this error code.
Solid F5	POST Error or Code update error. FPGA Test Error	Replace the card that displayed this error code.
Solid F6	POST Error or Code update error. Unable to initialize operating system.	Replace the card that displayed this error code.
Solid F7	POST Error or Code update error. NVRAM Test Error	Replace the card that displayed this error code.
Solid F8	POST Error or Code update error. Error Initializing the C Environment.	Replace the card that displayed this error code.
Solid F9	POST Error or Code update error. Error Copying Code to SDRAM	Replace the card that displayed this error code.
Solid FA or FB	POST Error or Code update error. SDRAM Test Error	Replace the card that displayed this error code.
Solid FC	POST Error or Code update error. Processor XY Memory Error	Replace the card that displayed this error code.
Solid FD	POST Error or Code update error. Processor Test Error	Replace the card that displayed this error code.
Solid FE or FF	POST Error or Code update error. Flash PROM Checksum Error	Replace the card that displayed this error code.

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Figure 75 shows the frame control assembly (FCA), which is the power source for the library and drive components.

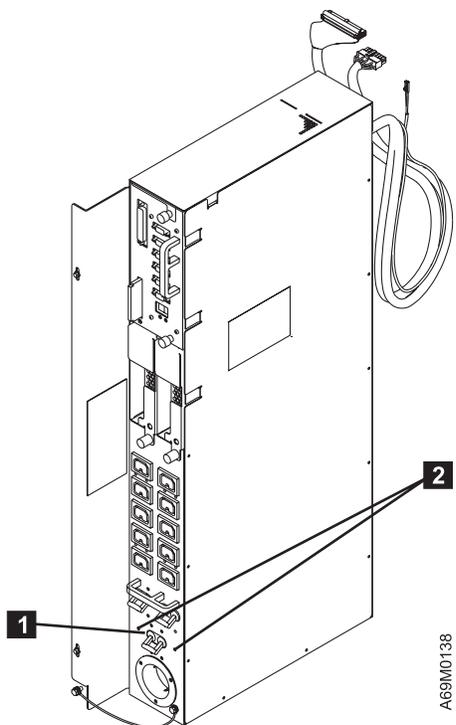


Figure 75. Frame Control Assembly (FCA)

Power and Cooling Specifications

Note: For cable diagrams and FRU block diagrams, refer to “Functional Block and Cable Diagrams” on page 32.

Power and cooling for tape library components are provided by the frame within which the components are housed. Each base frame and expansion frame (that contains drives) has its own frame control assembly (FCA). Each FCA receives power from a customer-supplied outlet, and provides AC power to all tape drives within that frame. The FCA in the base frame (Model L32) contains two 37 V dc power supplies and a Media Changer Pack assembly (MCP). An expansion frame (Model D32 or Model D42) with an FCA will contain no more than one 37 V dc power supply. The FCA is not required in expansion frames without tape drives.

Each frame receives its single-phase power on its own power cord from a customer-supplied outlet. Certain countries require two-phase power.

Be aware that each frame that contains an FCA is protected by a main line circuit breaker (CB) in the FCA. Each FCA must be further protected by a circuit breaker (CB) of the proper rating at the service rail (customer outlet).

Table 47. Power and Cooling Specifications — Per Frame

Power or Cooling Measurement	Range or Value – Base and Expansion Frames	
AC line voltage	200 to 240 Vac (nominal) 180 V ac (minimum) 259 V ac (maximum)	100 to 127 Vac (nominal) 90 V ac (minimum) 137 V ac (maximum)
Line frequency	50 to 60 Hz (with no adjustments)	50 to 60 Hz (with no adjustments)
Nominal power	1.4 kW	1.1 kW
Line current	8.0 A	12.0 A
kVA	1.6 kVA	1.2 kVA
Heat output	4.8 kBtu/hr	3.8 kBtu/hr
Inrush current	200 A (peak for 1/2 cycle) @ 200-240 volts	100 A (peak for 1/2 cycle) @ 100-127 volts

Notes:

1. All power and cooling data is based on the maximum number of 12 drives in any single frame.
2. Currents shown are the maximum for the voltage range; the operating current was measured during the movement of cartridges.

Be aware that each frame that contains an FCA is protected by a main line circuit breaker (CB) in the FCA. Each FCA must be further protected by a circuit breaker (CB) of the proper rating at the service rail (customer outlet).

Power Cord, Plug, and Receptacle Specifications

The appropriate power cord is attached at the factory (based on your destination country code). Chicago, Illinois (U.S.A.) requires feature code 9986. Power cords used in the U.S.A. and Canada are listed by the Underwriter's Laboratories (UL™) and certified by the Canadian Standards Association (CSA™).

The service ratings for all **200 to 240 Vac** plug types follow:

- Maximum voltage: 250 V ac
- Current: 30 A
- Phases: 1
- Wires: 3

Table 48. Specifications for 200 to 240 Vac power cords

Type of Power Cord	Part Number/Feature Code	Type of Receptacle	Type of Connector
4.3 m (14 ft) non-watertight twistlock (in U.S.A. and Canada) See Note	11F0113/9987	NEMA style L6-30R	NEMA style L6-30P
4.3 m (14 ft) (in countries other than the U.S.A. and Canada)	46F6063/None	Per local requirements	Per local requirements
4.3 m (14 ft) watertight (default in the U.S.A. and Canada)	46F4594/Standard	Russellstoll 9R33UOW	Russellstoll 9C33UO
1.8 m (6 ft) watertight (in Chicago, Illinois, U.S.A.)	46F4593/9986	Russellstoll 9R33UOW	Russellstoll 9C33UO
Note: Local electrical building codes may require watertight connections for raised floor installations. For those installations, use IBM part number 46F4594 (or 46F4593 in Chicago).			

The service rating for all **100 to 127 Vac** plug types is as follows:

- Maximum voltage: 125 Vac
- Current: 20A
- Phases: 1
- Wires: 3

Table 49. Specifications for 100 to 127 Vac power cords

Type of Power Cord	Part Number/Feature Code	Type of Service Receptacle	Type of Connector
4.3 m (14 ft) (in North America)	19P5903/9951	NEMA style L5-20R	NEMA style L5-20P
1.8 m (6 ft) (in Chicago)	19P5904/9986	NEMA style L5-20R	NEMA style L5-20P

Library Power Checkout

This procedure assumes that the customer receptacle has the proper AC voltage, and that a line cord is attached to the FCA and to the customer receptacle.

Refer to Figure 76 for the location and sequence of green LEDs on each FIC card as you perform this power-on check.

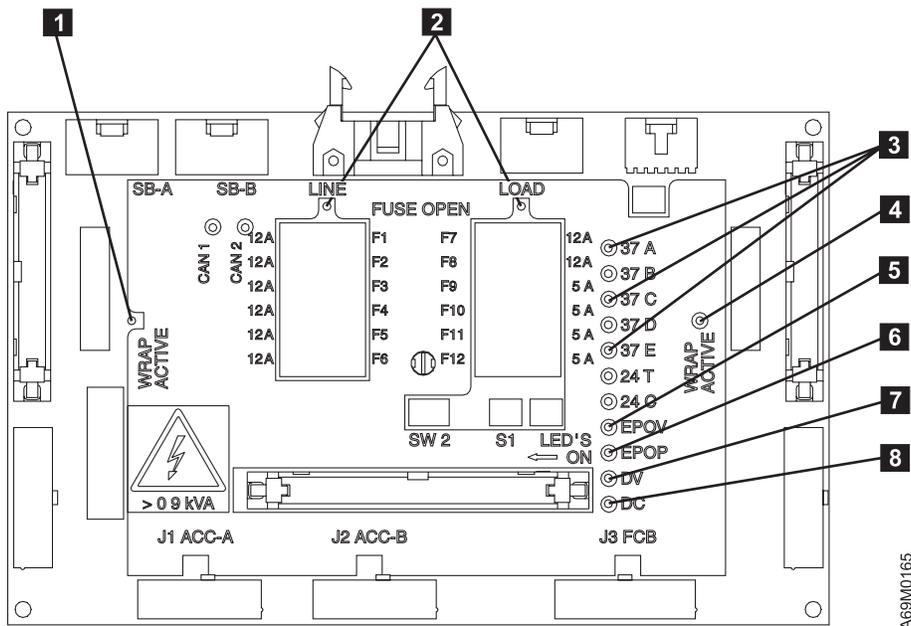


Figure 76. FIC Card Green Power LED Display

1. Set all three FCA circuit protectors (CPs) to OFF, and set the front library power switch to OFF (O).
2. Turn on the Main circuit protector above the line cord in each FCA and observe the green LEDs on each FIC card in each frame.
 - a. LED **5** EPOV, should be lighted on all FIC cards.
 - b. LED **4** Wrap Active, should be lighted on the base frame only.
 - c. LED **1** Wrap Active, should be lighted on the last installed frame.
 - d. If the LEDs fail to light, go to “Power Isolation MAP” on page 449 for failure isolation.
3. Turn on the remaining circuit protectors on each FCA.
4. Power on the library, and observe the following:
 - a. LED **6** EPOP should be lighted on all frames.
 - b. LED **7** DV (door voltage) should be lighted on all frames.
 - c. LED **8** DC (door closed) should be lighted on all frames if the front doors are closed.
 - d. The two-character LEDs on the MCP cards should be lighted. As the MCP runs its power-on self test (POST), the LEDs will display characters. The LEDs will gradually begin to flash 00, then nn (where nn is the frame number). This display will cycle between these two sets of numbers unless an error is detected.
5. After a few seconds, when the MCP has completed its POST, power is applied to the rest of the library, as follows:
 - a. You should hear the relay pick. This is the relay that supplies 110 V ac power to the drives. After a short delay, a long beep will sound when 37 V dc power is applied to buses A, B, and E. The E Bus supplies power to the OPC, which during its POST, causes the long beep sound to start and stop.

- b. LEDs **2** Fuse Open should NOT be lighted on any FIC cards.
- c. LEDs **3** A, C, and E bus power should be lighted on all frames.
- d. If the LEDs fail to light, go to “Power Isolation MAP” on page 449 for failure isolation.
- e. When accessor power is applied (after ACC POST completes), the library will begin to initialize.

Note: The front doors must be closed for the initialization to begin.

- 6. As ac power reaches each tape drive, each drive will run POST tests. As the test progresses, the single character display (SCD) on the front of each drive will cycle through a series of bring-up numbers until the POST concludes.
 - a. If a drive error was detected, an error code will remain on the SCD of the failing drive.
 - b. If the SCD fails to come on, drive power is missing at that drive or the drive has failed. Go to “Power Isolation MAP” on page 449 for failure isolation. If the SCD comes on, then goes blank after POST complete, library power-up was successful.
 - c. If the SCD comes on, then goes blank after POST complete, library power-up was successful.

Chapter 9. Sense

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Library Sense Data

Attention

Go to “Library Sense Data to URC Table” on page 170 to convert sense data to a URC.

Table 50. Library Sense Data

Byte	Bit Number or Name							
	7	6	5	4	3	2	1	0
0	Set data valid (Always 0)	70 - Existing Error 71 - Deferred Error						
1	Reserved							
2	Reserved				Sense Key 0 - No Sense 5 - Illegal Request 1 - Recovered Error 6 - Unit Attention 2 - Not Ready B - Aborted Command 4 - Hardware Error			
3-6	Reserved							
7	Additional Sense Length (n-7) If the sense key is 1 or 4, the additional sense length is 70. For all other errors, the additional sense length is 10.							
8-11	Reserved							

Table 50. Library Sense Data (continued)

Byte	Bit Number or Name							
	7	6	5	4	3	2	1	0
12–13	Additional Sense Code (ASC) — Additional Sense Code Qualifier (ASCQ) Byte 12 Byte 13 ASC ASCQ 00 00 - No additional sense information 04 00 - Not ready - Logical unit is offline (maintenance mode) 04 01 - Not ready - Logical unit is in process of becoming ready 04 03 - Not ready - Manual intervention required 04 83 - Not ready - Library has not been set up (needs configuration and/or calibration) 04 84 - Not ready - I/O Station open 04 85 - Not ready - Door open 1A 00 - Parameter list length error 1B 00 - Synchronous data transfer error 20 00 - Invalid command operation code 21 01 - Invalid element address 24 00 - Invalid field in command descriptor block (CDB) 25 00 - Logical unit not supported 26 00 - Invalid field in parameter list 28 00 - Not ready to ready transition, media may have changed 28 01 - Import or export element accessed 29 00 - Power on, Reset, or Bus device reset occurred 2A 01 - Mode parameters changed 2C 00 - Command sequence error 39 00 - Saving parameters not supported 3B 81 - Element not accessible. Cartridge was exported by another logical library 3B 82 - Element not accessible. Drive not present 3B 0D - Media destination element full 3B 0E - Media source element empty 3B 80 - Media transport element full 3D 00 - Invalid bits in identity message 3F 01 - Microcode has been changed 43 00 - Message error 44 00 - Device reported error (see bytes 18 and 19) 45 00 - Select or reselect failure 47 00 - SCSI parity error 48 00 - Initiator detected error message received 49 00 - Invalid message error 4A 00 - Command phase error 4B 00 - Data phase error 4E 00 - Overlapped commands attempted 53 02 - Media removal prevented 80 00 - CU Mode, vendor-unique							
14	Field Replaceable Unit Code							
15	Sense Key Specific Valid If set to 1, bytes 15, 16, and 17 contain valid data.	C/D If set to 1, there was an illegal parameter in the command description block.	Reserved		BPV If set to 1, the bit pointer field is valid.			Bit Pointer Specifies which bit was invalid.
16–17	(MSB) Field pointer — Specifies which byte was invalid. (LSB)							

Table 50. Library Sense Data (continued)

Byte	Bit Number or Name								
	7	6	5	4	3	2	1	0	
Bytes 18 and 19 contain hardware error code (HEC) and hardware error code qualifier (HECQ).									
18-19	Byte 18 HEC	Byte 19 HECQ							
	21	80 - MCP card internal failure (see frame number)							
	22	80 - OPC card internal failure							
	23	80 - ACC card internal failure							
	24	80 - MDA card Internal Failure							
	25	xx - MCP card in frame xx not responding on CAN bus							
	26	xx - OPC card in frame xx not responding on CAN bus							
	27	xx - ACC card in frame xx not responding on CAN bus							
	28	xx - MDA card in frame xx not responding on CAN bus							
	29	80 - No response from any other card on the CAN bus							
	30	80 - Frame sequencing failure							
	30	81 - Frame not found							
	30	82 - Door interlock frame sensing failure							
	31	80 - FCA cooling fan failure							
	33	81 - 24 V dc PS #1 out of range. Probable failure of 24 V dc PS #1.							
	33	82 - 24 V dc PS #2 out of range. Probable failure of 24 V dc PS #2							
	34	81 - 37 V dc power out of range. Probable failure of 37 V dc as #1							
	34	82 - 37 V dc power out of range. Probable failure of 37 V dc as #2							
	34	91 - 37 V dc PS #1 will not turn on. Probable failure of 37 V dc as #1							
	34	92 - 37 V dc PS #2 will not turn on. Probable failure of 37 V dc as #2							
	34	A1- 37 V dc PS #1 not present. Probably disconnected							
	34	A2- 37 V dc PS #2 not present. Probably disconnected							
	35	81- Drive power supply not present. Probably disconnected							
	35	82- Drive power supply reported an error							
	38	80 - MCP card cannot see a configured drive on RS-422 cable feedback loop							
	38	81 - MCP card cannot get a response from a configured drive on RS-422							
	38	82 - MCP card detected an RS-422 problem. Bad response							
	38	83 - MCP card detected too many retries communicating with drive							
	38	84 - MCP card can't get a response from a configured canister DCC card							
	39	80 - MCP card timed out waiting for a drive to complete a command							
	39	81 - MCP card received unknown message from drive							
	39	82 - MCP card detected that drive/canister type does not match what is currently configured)							
	39	83 - MCP attempted to change the drive SCSI ID or FC Loop ID, but the drive would not accept the new ID							
	40	81 - Gripper #1 will not move. No encoder pulses							
	40	82 - Gripper #1 encountered unexpected hard stop while extending							
	40	83 - Gripper #1 encountered unexpected hard stop while retracting							
	40	84 - Gripper #1 encountered high current condition while extending							
	40	85 - Gripper #1 encountered high current condition while retracting							
	40	86 - Gripper #1 unable to find hard stop while extending							
	40	87 - Gripper #1 unable to find hard stop while retracting							
	40	88 - Gripper #1 unable to get cartridge							
	40	89 - Gripper #1 unable to put cartridge							
(Continued on next page)									

Table 50. Library Sense Data (continued)

Byte	Bit Number or Name								
	7	6	5	4	3	2	1	0	
18–19	Byte 18 HEC	Byte 19 (Continued) HECQ							
40		8A	Gripper #1 lost 37 V dc power						
40		8B	Gripper #1 encountered low current condition while retracting						
40		8C	Gripper #1 lost cartridge						
40		8D	Gripper #1 wrong type. Doesn't match configuration						
40		91	Gripper #2 will not move. No encoder pulses						
40		92	Gripper #2 encountered unexpected hard stop while extending						
40		93	Gripper #2 encountered unexpected hard stop while retracting						
40		94	Gripper #2 encountered high current condition while extending						
40		95	Gripper #2 encountered high current condition while retracting						
40		96	Gripper #2 unable to find hard stop while extending						
40		97	Gripper #2 unable to find hard stop while retracting						
40		98	Gripper #2 unable to get cartridge						
40		99	Gripper #2 unable to put cartridge						
40		9A	Gripper #2 lost 37 V dc power						
40		9B	Gripper #2 encountered low current condition while retracting						
40		9C	Gripper #2 lost cartridge						
40		9D	Gripper #2 wrong type. Doesn't match configuration						
41		81	Gripper #1 sensor hard failure. Sensor blocked when it should not be						
41		82	Gripper #1 sensor hard failure. Sensor not blocked when it should be						
41		83	Gripper #1 sensor marginal						
41		84	Gripper #1 sensor failure. Output out-of-limits I						
41		91	Gripper #2 sensor failure. Sensor blocked when it should not be						
41		92	Gripper #2 sensor failure. Sensor not blocked when it should be						
41		93	Gripper #2 sensor marginal						
41		94	Gripper #2 sensor failure. Output out-of-limits I						
42		80	Calibration sensor failure. Sensor blocked when it should not be						
42		81	Calibration sensor failure. Sensor not blocked when it should be						
43		80	X home sensor failure. Sensor blocked when it should not be						
43		81	X home sensor failure. Unable to find sensor during rezero						
44		80	Y home sensor failure. Sensor blocked when it should not be						
44		81	Y home sensor failure. Unable to find sensor during rezero						
45		80	X motor will not move. No encoder pulses						
45		81	X motion cannot find a hard stop while moving left						
45		82	X motion cannot find a hard stop while moving right						
45		83	X motion encountered an unexpected hard stop while moving left						
45		84	X motion encountered an unexpected hard stop while moving right						
45		85	X motion - excessive force required to move left						
45		86	X motion - excessive force required to move right						
45		87	X motion failed due to loss of 37 V dc						
45		88	X motion failure. Probable motor driver problem						
45		88	X motion failure. Probable motor driver problem						
45		89	X motion failure. Rezero detected positioning drift						
46		80	Y motor won't move. No encoder pulses						
46		81	Y motion cannot find a hard stop while moving up						
46		82	Y motion cannot find a hard stop while moving down						
46		83	Y motion encountered an unexpected hard stop while moving up						
46		84	Y motion encountered an unexpected hard stop while moving down						
46		85	Y motion - excessive force required to move up						
46		86	Y motion - excessive force required to move down						
46		87	Y motion failed due to loss of 37 V dc						
46		88	Y motion failure - probable motor driver problem						
46		89	Y motion failure - rezero detected positioning drift						

(Continued on next page)

Table 50. Library Sense Data (continued)

Byte	Bit Number or Name							
	7	6	5	4	3	2	1	0
18-19	Byte 18 HEC	Byte 19 (Continued) HECQ						
	47	80 - Pivot motor will not move. No encoder pulses						
	47	81 - Pivot motion cannot find a hard stop while pivoting toward door						
	47	82 - Pivot motion cannot find a hard stop while pivoting toward rear						
	47	83 - Pivot motion encountered unexpected hard stop pivoting toward door						
	47	84 - Pivot motion encountered unexpected hard stop pivoting toward rear						
	47	85 - Pivot motion - excessive force required to pivot toward door						
	47	86 - Pivot motion - excessive force required to pivot toward rear						
	47	87 - Pivot motion failed due to loss of 37 V dc						
	5B	80 - Element scan failed (bar code reader failure)						
	5B	81 - Bar code miscompare. Bar code read twice; different results						
	5B	82 - MDA to ACC loopback failed						
	5B	83 - ACC cannot trigger the bar code reader						
	5B	84 - MDA cannot trigger the bar code reader						
	5B	85 - Bar code unreadable. Probable missing or damaged label						
	5B	86 - Frame machine type, model, serial number label unreadable						
	5B	87 - Invalid logical library bar code label configuration						
	5B	88 - Unreadable bar code test label						
	90	80 - Source element unexpectedly empty (status message) see note.						
	94	80 - Destination element unexpectedly full (status message) see note.						
	9C	80 - No LTO diagnostic cartridge found in library						
	9C	81 - No DLT-8000 diagnostic cartridge found in library						
	A0	80 - Invalid config. No gripper installed for an installed frame (media) type						
	A0	81 - Mixed grippers are installed, but only one frame media type is installed						
	A0	82 - Invalid config. Mixed media. DLT-8000 Gripper 1 with LTO Gripper 2						
	A0	85 - Invalid config. No I/O installed for an installed frame (media) type						
	A0	86 - Invalid config. An I/O station is installed with no matching frame (media type)						
	A0	87 - Invalid config. L-frame to cartridge I/O is not the same media type as the L-frame						
	A0	8D - Invalid config - Drive type incompatible with frame type						
	A0	8F - Invalid config. More than one control port in the same logical library						
	B0	80 - Cannot open I/O station (solenoid failure or sensor not blocked when it should be)						
	B0	81 - Cannot lock lower I/O station. Solenoid failure or sensor blocked when it should not be)						
	B0	82 - Upper I/O station type does not match configuration						
	B0	90 - Cannot open lower I/O station. Solenoid failure or sensor blocked when it should not be						
	B0	91 - Cannot lock lower I/O station. Solenoid failure or sensor blocked when it should not be						
	B0	92 - Lower I/O station type does not match configuration						
	B2	82 - I/O station Get failure (I/O station will not release cartridge)						
	B2	88 - I/O station Put failure (I/O station will not accept cartridge)						
	B2	8F - I/O station full						
	B2	92 - Lower I/O station Pick failure. I/O station won't release cartridge						
	B2	98 - Lower I/O station Put failure. I/O station won't accept cartridge						
	B2	9F - Lower I/O station is full so cartridge export is not possible						
	B3	82 - Slot Get failure (slot will not release cartridge)						
	B3	88 - Slot Put failure (slot will not accept cartridge)						
	B4	80 - X/Y motion command outside limits - suspect corrupted calibration (Continued on next page)						

Table 50. Library Sense Data (continued)

Byte	Bit Number or Name							
	7	6	5	4	3	2	1	0
18–19	<p>Byte 18 HEC Byte 19 (Continued) HECQ</p> <p>B5 8x - Calibration encountered a missing fiducial on column x. B6 8x - Calibration encountered a missing fiducial on drive x B7 8x - Calibration encountered a missing fiducial on I/O station x B7 9x - Calibration encountered a missing second fiducial on I/O station x B8 81 - Drive unload failure. Get failure at drive; unable to get a cartridge that is in the unloaded position at the drive B8 82 - Drive eject failure. There is no cartridge in the unloaded position at the drive B8 83 - Drive load failure. Put failure at drive; could not extend cartridge to the drive load position B8 84 - Drive load failure. Put failure at drive; drive loader did not load the cartridge after it was extended to the drive load position) B8 85 - Unable to cycle drive door. Cartridge may be extending from drive B8 86 - Canister cooling fan failure BA 21 - Battery failure on ACC card CA 80 - Call Home successful - information only - not an error CA 81 - Call Home failed - try again CA 82 - Call Home failed - machine not registered with Retain CA CA - Call Home Test performed CB CB - Corrupted Library Firmware was downloaded and rejected CC CC - Library Firmware Error (see Object ID and Object Error) CE CE - Configuration of more than one frame was attempted but L frame does not have Capacity Expansion Feature installed.</p> <p>Note: This sense indicates that the command is considered an operator error. The command was attempted but failed, probably because a cartridge was manually inserted or manually removed.</p>							
20–22	Reserved							
Byte 23 contains the Mechanism Status Bit Map (see 428)								
23	Move capability. If set to 1, the gripper can move.	Last SCSI state	Completed	All Returned	PKR1 Full	PKR2 Full	Reserved	Fail2
24	Control Path Frame				Control Path Device (Drive)			
25	Failing Frame				Failing Device			
26	Tape Alert Flag Number							
27	Reserved				Retry Count			
28	Object ID							
29–30	Object Error Code							
31–34	Reserved							
Byte 35 contains the Source Element Bit Map (see 428)								
35	Byte valid If set to 1, bytes 35–37 are valid.	Error enroute	Cartridge in transport	Cartridge in element	PKR2	Reserved	Reserved	Reserved
36–37	Source element address							
38	Destination element bit map (see byte 35 for bit definition)							

Table 50. Library Sense Data (continued)

Byte	Bit Number or Name							
	7	6	5	4	3	2	1	0
39–40	Destination element address							
41	Secondary source element bit map (see byte 35 for bit definition)							
42–43	Secondary source element address							
44	Second destination element bit map (see byte 35 for bit definition)							
45–46	Second destination element address							
47–77	Reserved							
Note: Bytes 18–63 are only returned when sense key is 1 or 4.								

Notes:

1. Hardware Error Code (HEC) (Byte 18)

The error code determined by fault isolation to indicate the cause of the failure. This indicates an area of the machine, **not a specific FRU number**.

2. Hardware Error Code Qualifier (HECQ) (Byte 19)

This byte is used as a qualifier of the hardware error code. As an example, the HEC might point to an I/O station problem. The HECQ might then indicate whether it was a problem with a specific sensor or the lock solenoid.

3. Mechanism Status Bit Map (Byte 23)

This is the state of the accessor after the termination of any retry or recovery algorithms. This byte is bit-mapped, as shown below, from Most Significant Bit (7) to Least Significant Bit (0).

Bit 7 - Move Capability

A “1” indicates that the accessor is capable of performing movement commands.

Bit 6 - Last SCSI State

A “1” indicates that the accessor is in the same condition as before the execution of the failed command.

Bit 5 - Completed

A “1” indicates that the cartridges were moved and the last command completed successfully.

Bit 4 - All Returned

A “1” indicates that the cartridges were restored to the locations they occupied prior to the previous failed command.

Bit 3 - PKR1 full

A “1” indicates a cartridge is in the first media transport element. The transport was either unexpectedly full, or a cartridge remained in it after an attempt to recover from a failure. If the latter is true, the appropriate Element Bit Map byte will indicate which cartridge is in the transport.

Bit 2 - PKR2 full

A “1” indicates a cartridge is in the second media transport element. The transport was either unexpectedly full, or a cartridge remained in it after an attempt to recover from a failure. If the latter is true, the appropriate Element Bit Map byte will indicate which cartridge is in the transport.

Bit 1 - Reserved

This bit is not currently used.

Bit 0 - Fail2

A “1” indicates the failure occurred on the second move of an EXCHANGE MEDIUM command (from the First Destination Element to the Second Destination Element). A “0” indicates that the failure occurred on the first move (from the Source Element to the First Destination Element).

4. Control Path Frame (Byte 24)

The frame number that passed the SCSI command to the accessor.

5. **Control Path Device (Byte 24)**

The drive number (within the control path frame) of the drive that passed the SCSI command to the accessor.

Note: The Control Path Frame and Control Path Device (Drive) information is logged to record where the command came from, since it may not be a drive that is involved in the actual command. For example, a command might be received from frame 0 drive 1 to load a cartridge into frame 0 drive 2. In some cases, this information will help clarify the exact chain-of-events that lead to the failure.

6. **Failing Frame (Byte 25)**

The frame number of the device that failed.

7. **Failing Device (Byte 25)**

The device number (within the frame) of the device (drive) that failed.

Note: The Failing Frame and Failing Device information is logged to record which device (usually a drive) was involved with the failure. Unlike previous libraries, there is no need to assign a unique HEC to each drive. For example, a failure that occurs while loading or unloading a drive, will cause the HEC/HECQ to indicate the type of failure while the Failing Frame/Failing Device will indicate which drive was involved. In most cases involving load or unload errors, this information also will be in bytes 36–46. One exception is if a parity error is detected on the RS-422 interface while talking to a specific drive.

8. **Tape Alert Flag Number (Byte 26)**

The Tape Alert Flag Number corresponding to an accessor failure.

9. **Retry Count (Byte 27)**

The total number of retry attempts that were performed.

10. **Object ID (Byte 28)**

A number indicating a specific object in the ACC firmware where the error was detected. If the error may have been caused by a firmware problem, this number will allow the firmware team to quickly determine which firmware object detected the problem.

11. **Object Error Code (Byte 29–30)**

A number indicating the specific location in the ACC firmware object where the error was detected. If the error may have been caused by a firmware problem, this number and the Object ID are used to identify the exact location in the firmware at which the problem was detected.

12. **Source Element Bit Map (Byte 35)**

This byte indicates the status of the cartridge that was in the specified Source Element of the Move or Exchange command after the failure or retry, as well as the status of the element itself:

Bit 7 - Valid

A “1” indicates that the values in this byte and the Element Address byte are valid. A zero indicates that the remainder of this byte and the Element Address byte are invalid.

Bit 6 - Error Enroute

An error occurred while the transport mechanism was enroute to this element.

Bit 5 - Cartridge In Transport

After the exhaustion of all recovery algorithms, the posting of a “1” indicates that the cartridge, which was originally in this element, has remained in the transport. If this bit is “1” then bit 3 (PKR2) will indicate whether the cartridge is in PKR1 or PKR2.

Bit 4 - Cartridge In Element

After exhaustion of all recovery algorithms, a “1” indicates the cartridge associated with this move is in this element.

Bit 3 - PKR2

This bit is only valid if Bit 5 (Cartridge in Transport) is “1”. If valid, then a bit of “0” indicates the cartridge from this element is in PKR1, and a bit of “1” indicates the cartridge from this element is in PKR2.

Bit 2 - Reserved

Bit 1 - Reserved

Bit 0 - Reserved

13. Source Element Address (Byte 36–37)

The Source Element Address specified in the Move Medium Exchange command.

14. Destination Element Bit Map (Byte 38)

This byte indicates the status of the element that was the Destination Element of a MOVE MEDIUM (or the First Destination of an EXCHANGE MEDIUM command) after the failure or retry of the command. This byte is bit mapped as described in the “Source Element Bit Map” Byte 35.

15. Destination Element Address (Byte 39–40)

The Element Address the Destination Element Bit Map data refers to.

16. Secondary Source Element Bit Map (Byte 41)

This byte indicates the status of the element that was the source (First Destination Element) of the second stage of an Exchange Medium command after any error recovery attempts have been completed. The “Valid” bit in this byte will only be set during the Exchange Medium command. This byte is bit-mapped, as described in the “Source Element Bit Map” Byte 35.

17. Secondary Source Element Address (Byte 42–43)

The Element Address the First Destination Element (1st Move) Bit Map data refers to.

18. Second Destination Element Bit Map (Byte 44)

This byte indicates the status of the element that was the destination of the second stage an Exchange Medium command after any error recovery attempts have been completed. The “valid” bit in this byte will only be set during the Exchange Medium command. This byte is bit mapped as described in the “Source Element Bit Map” Byte 35.

19. Second Destination Element Address (Byte 45–46)

The Element Address the Second Destination Element Bit Map data is referring to.

Notes:

- a. The library will log 32 bytes for each error log entry:
 - 4 bytes for time stamp
 - 1 byte for the SCSI command op code (byte 0 of the CDB)
 - 8 bytes for SCSI parm data (for example, an exchange command will log bytes 2–9 of the CDB)
 - 19 bytes of accessor sense data.
- b. The Sense key and the Retry Count are each 1/2- byte long, sharing one byte within the library error log.

LTO Tape Drive Sense Data

Attention

Go to “LTO Drive Sense Data to URC Table” on page 189 to convert sense data to a URC.

To use this table, find the FSC (Bytes 16 – 17), look up the URC in “LTO Ultrium-1 Drive FSC to URC Table” on page 215, and go to “URC Description With Action and FRUs” on page 226 for repair directions.

Table 51. LTO Tape Drive Sense Data

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
0	Address valid When set to 1, the info byte field contains a valid logical block address.	Error Code						
1	Segment Number (0)							
2	Filemark	EOM (end of medium)	ILI (Incorrect length indicator)	Reserved	Sense Key	Description		
					0 ---	No sense		
					1 ---	Recovered error		
					2 ---	Not ready		
					3 ---	Media error		
					4 ---	Hardware error		
					5 ---	Illegal request		
					6 ---	Unit attention		
					7 ---	Data protect		
					8 ---	Blank Check		
					9 ---	Reserved		
					A ---	Reserved		
					B ---	Aborted command		
					C ---	Reserved		
					D ---	Volume overflow		
					E ---	Reserved		
					F ---	Reserved		
3	Information byte (most significant byte)							
4	Information byte							
5	Information byte							
6	Information byte (least significant byte)							
7	Additional Sense Length							
8–11	Command specific information							

Table 51. LTO Tape Drive Sense Data (continued)

Byte	Bit Address or Name								
	7	6	5	4	3	2	1	0	
12-13	Additional Sense Code (ASC) Additional Sense Code Qualifier (ASCQ) Byte 12 Byte 13 ASC ASCQ								
	00	00	00 - No additional sense — The flags in the sense data indicate the reason for the command failure						
	00	01	01 - Filemark detected — A Read or Space command terminated early due to an FM. The FM flag is set.						
	00	02	02 - EOM — A Write or Write File Marks command failed because the physical end of tape was encountered, or a Read or Space command encountered EOM. The EOM flag is set						
	00	04	04 - BOM — A space command ended at Beginning of Tape. The EOM bit is also set						
	00	05	05 - EOD — Read or Space command terminated early because End of Data was encountered						
	04	00	00 - Cause not reportable — A cartridge is present in the drive, but it is in the process of being unloaded						
	04	01	01 - Becoming Ready — A media access command was received during a front panel initiated load or an immediate reported load command						
	04	02	02 - Initializing Command Required — A cartridge is present in the drive, but is not logically loaded. A Load command is required						
	04	03	03 - Manual Intervention Required — A cartridge is present in the drive but could not be loaded or unloaded without manual intervention						
	0C	00	00 - Write Error — A Write operation has failed. This is probably due to bad media, but may be hardware related						
	11	00	00 - Unrecovered Read Error — A Read operation failed. This is probably due to bad media, but may be hardware related						
	14	00	00 - Recorded Entity Not Found — A space or Locate command failed because a format violation prevented the target from being found.						
	14	03	03 - End Of Data not found — A Read type operation failed because a format violation related to a missing EOD data set						
	1A	00	00 - Parameter list length error — The amount of parameter data sent is incorrect						
	20	00	00 - Invalid Command Operation Code — The Operation Code in the command was not a valid Operation Code						
	24	00	00 - Invalid field in CDB — An invalid field has been detected in a Command Descriptor Block						
	25	00	00 - LUN not supported — The command was addressed to a non-existent logical unit number						
	26	00	00 - Invalid Field in Parameter List — An invalid field has been detected in the data sent during the data phase						
	27	00	00 - Write Protect — A Write type operation has been requested on a cartridge which has been write protected						
	28	00	00 - Not Ready to Ready Transition — A cartridge has been loaded successfully into the drive and is now ready to be accessed						
	29	00	00 - Reset — The drive has powered on, received a reset signal or a bus device reset signal since the initiator last accessed it						
	2A	01	01 - Mode Parameters Changed — The Mode parameters for the drive have been changed by an initiator other than the one issuing the command						
	30	00	00 - Incompatible Media Installed — A write type operation could not be executed because it is not supported on the cartridge type that is loaded.						
	30	01	01 - Unknown Format — An operation could not be carried out because the cartridge in the drive is of a format not supported by the drive						
	(Continued on next page)								

Table 51. LTO Tape Drive Sense Data (continued)

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
12–13	Additional Sense Code (ASC) — Additional Sense Code Qualifier (ASCQ) (Continued)							
	Byte 12	Byte 13						
	ASC	ASCQ						
30	02	- Incompatible Format — An operation could not be completed because the Logical Format is not correct						
30	03	- Cleaning Cartridge Installed — An operation could not be carried out because the cartridge in the drive is a cleaning cartridge						
30	07	- Cleaning Failure — A cleaning operation was attempted, but could not be completed for some reason						
31	00	- Media format corrupted — Data could not be read because the format on tape is not valid, but is a known format. A failure occurred attempting to write the FID						
37	00	- Rounded parameter — A Mode Select command parameter has been rounded because the drive can not store it with the accuracy of the command.						
3A	00	- Media Not Present — A media access command has been received when there is no cartridge loaded						
3B	00	- Sequential Positioning Error — A command has failed and left the logical position at an unexpected location						
3D	00	- Invalid bits in identify Message — An illegal Identify Message has been received at the drive at the start of a command						
3E	00	- Logical Unit has not Self-Configured — The drive has just powered on and has not completed its self test sequence and can not process commands						
3F	01	- Code Download — The firmware in the drive has just been changed by a Write Buffer command						
40	xx	- Diagnostic failure — A diagnostic test has failed. The xx (ASCQ) is a vendor specific code indicating the failing component.						
43	00	- Message Error — A message could not be sent or received due to excessive transmission errors						
44	00	- Internal target failure — A hardware failure has been detected in the drive that has caused the command to fail						
45	00	- Select/Reset Failure — An attempt to reselect an initiator in order to complete the command has failed						
4B	00	- Data Phase Error — A command could not be completed because too many parity errors occurred during the Data phase						
4E	00	- Overlapped Commands — An initiator selected the drive even though it already had a command outstanding in the drive						
50	00	- Write Append Error — A write type command failed because the point at which to append data was unreadable						
51	00	- Erase failure — An Erase command failed to erase the required area on the media						
52	00	- Cartridge fault — A command could not be completed due to a fault in the tape cartridge						
53	00	- Media Load/Eject Failed — (Sense Key 03) An attempt to load or eject the cartridge failed due to a problem with the cartridge.						
53	00	- Media Load/Eject Failed — (Sense Key 04) An attempt to load or eject the cartridge failed due to a problem with the drive						
53	02	- Media Removal Prevented — An Unload command has failed to eject the cartridge because media removal has been prevented						
5D	00	- Failure Prediction Threshold — Failure Prediction thresholds have been exceeded indicating that a failure may occur soon						
5D	FF	- Failure Prediction False — A Mode Select command has been used to test for Failure Prediction system.						
82	82	- Drive requires cleaning — The drive has detected that a cleaning operation is required to maintain good operation						
82	83	- Bad Code Detected — The data transferred to the drive during a firmware upgrade is corrupt or incompatible with drive hardware						

Table 51. LTO Tape Drive Sense Data (continued)

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
14	FRU code							
15	SKSV	C/D	Reserved		BPV	Bit pointer		
					When set to 1, the bit pointer is valid.			
16–17	SKSV = 0: First Error Fault Symptom Code (FSC). SKSV = 1: Field Pointer							
18–19	First Error Flag Data							
20	Reserved (0)							
21					CLN	Reserved	Reserved	VolValid
22–28	Volume Label							
29	Current Wrap							
30–33	Relative LPOS							
34	SCSI Address							
35	Frame number				Drive number			

The descriptions below serve only as an overview of sense reporting in the tape drive. This tape drive conforms to all sense field reporting as specified in the SCSI standards.

Notes:

1. The Error Code field (Byte 0) is set to 70h to indicate a current error, that is one associated with the most recently received command. It is set to 71h to indicate a deferred error which is not associated with the current command.
2. The segment number (Byte 1) is zero since the Copy, Compare, and Copy and Verify commands are not supported.
3. The File Mark flag (Byte 2, bit 7) is set if a Space, Read, or Verify command did not complete because a file mark was read.
4. The End of Media (EOM) flag (Byte 2, bit 6) is set if a Write or Write File Marks command completed in the early warning area. Spacing into BOM also causes this flag to be set. It is also set on an attempt to read or space past EOD, or if an attempt is made to space into Beginning of Media.
5. The Illegal Length Indicator (ILI) flag (Byte 2, bit 5) is set if a Read or Verify ended because a block was read from tape that did not have the block length requested in the command.
6. The Information Bytes (Bytes 3–5) are only valid if the Valid flag is set. This occurs only for current errors and not for deferred errors.
7. The Field Replaceable Unit field (Byte 14) is set to either zero or to a non-zero, vendor-specific code indicating which part of the drive is suspected of causing the failure.
8. The Clean (CLN) flag (Byte 21, bit 3) is set if the drive needs cleaning and clear otherwise.
9. The Volume Label Fields Valid (VolValid) bit (Byte 21, bit 0) is set if the Volume Label being reported is valid.
10. The Volume Label field (Bytes 22–28) reports the volume label if a cartridge is loaded in the drive and Volume Label Fields Valid is set.

11. The Current Wrap field (Byte 29) reports the physical wrap of the tape. The least significant bit reflects the current physical direction. A 0 means that the current direction is away from the physical beginning of the tape. A 1 means that the current direction is towards the physical beginning of the tape.
12. Relative LPOS fields (Bytes 30–33) reports the current physical position on the tape.
13. SCSI Address field (Byte 34) reports the SCSI Bus Address for the drive. Values returned range from 00h to 0Fh.
14. This field (Byte 35) contains the frame and drive number, passed across the RS-422 serial interface.

DLT-8000 Tape Drive Sense Data

Attention

Go to “DLT-8000 Drive Sense Data to URC Table” on page 208 to convert sense data to a URC.

To use this table, find the FSC (Bytes 16–17), look up the URC in “LTO Ultrium-1 Drive FSC to URC Table” on page 215, and go to “URC Description With Action and FRUs” on page 226 for repair directions.

Table 52. DLT-8000 Tape Drive Sense Data

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
0	Valid	Error Code						
1	Segment Number (0)							
2	Filemark	EOM	ILI	Reserved	Sense Key Description			
3–6	(MSB) Information byte (LSB)							
7	Additional sense length							
8–11	(MSB) Command specific information bytes							

Table 52. DLT-8000 Tape Drive Sense Data (continued)

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
12-13	Additional Sense Code (ASC) — Additional Sense Code Qualifier (ASCQ) (Continued)							
	Byte 12	Byte 13						
	ASC	ASCQ						
	00	00	00 - No additional sense code, or medium error					
	00	01	01 - Unexpected FM encountered					
	00	02	02 - EOM encountered					
	00	04	04 - BOM encountered					
	00	05	05 - EOD encountered					
	00	17	17 - Cleaning requested					
	04	00	00 - Unit not ready, cause nonreportable					
	04	01	01 - Unit not ready, calibration in process					
	04	02	02 - Unit not ready, LOAD command needed					
	04	03	03 - Unit not ready, manual intervention needed					
	08	00	00 - LUN communication failure					
	08	01	01 - LUN communication timeout failure					
	0A	00	00 - Error log overflow					
	0A	80	80 - Error log generated					
	0C	00	00 - WRITE error					
	0C	80	80 - Write SCSI FIFO CRC error					
	11	00	00 - Unrecovered READ error					
	11	08	08 - Unrecovered READ error, incomplete block read					
	11	80	80 - Read SCSI FIFO CRC error					
	11	81	81 - Block port detected EDC error					
	11	82	82 - Block port detected record CRC error					
	14	00	00 - Recorded entity not found					
	15	01	01 - Random mechanical positioning error					
	15	02	02 - Position error detected by read of medium					
	1A	00	00 - Parameter list length error					
	20	00	00 - Illegal opcode					
	21	01	01 - Invalid error address					
	24	00	00 - Invalid CDB field					
	24	81	81 - Invalid mode on WRITE buffer					
	24	82	82 - Media in driver					
	24	84	84 - Insufficient resource					
	24	86	86 - Invalid offset					
	24	87	87 - Invalid size					
	24	89	89 - Image data overlimit					
	24	8B	8B - Image/personality is bad					
	24	8C	8C - Not immediate command					
	24	8D	8D - Bad drive/server image EDC					
	24	8E	8E - Invalid personality for code update					
	24	8F	8F - Bad controller image EDC					
	25	00	00 - Illegal LUN					
	26	00	00 - Parameter list error, invalid field					
	26	01	01 - Parameter list error, parameter not supported					
	26	02	02 - Parameter list error, parameter value invalid					
	27	80	80 - Hardware write protect					
	27	82	82 - Data safety write protect					
	28	00	00 - Not-ready to ready transition					
	29	00	00 - Generic reset occurred - cause undetermined					
	29	01	01 - Power on occurred					
	29	02	02 - SCSI bus reset occurred					
	29	03	03 - Bus device reset occurred					

Table 52. DLT-8000 Tape Drive Sense Data (continued)

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
12-13	Additional Sense Code (ASC) — Additional Sense Code Qualifier (ASCQ) (Continued)							
	Byte 12	Byte 13						
	ASC	ASCQ						
	29	04	- Device internal reset					
	2A	01	- Mode parameters changed					
	2A	02	- Log parameters changed					
	30	00	- Cannot read medium					
	30	02	- Incompatible format					
	30	03	- Unit not ready, incompatible medium (cleaning cartridge) installed					
	37	00	- Rounded parameter					
	37	00	- Rounded parameter					
	38	08	- Repositioning error					
	38	0B	- Repositioning error					
	38	0D	- Medium destination element full					
	38	0E	- Medium source element empty					
	39	00	- Saving parameters not supported					
	3A	00	- Medium not present					
	3A	80	- Medium not present, cartridge missing					
	3B	00	- Sequential positioning error					
	3B	08	- Repositioning error					
	3D	00	- Invalid bits in ID message					
	3F	01	- Microcode has been changed					
	40	80	- Diagnostic/POST failure, ROM EDC error					
	40	81	- Diagnostic/POST failure, RAM failure					
	40	82	- Diagnostic/POST failure, bad drive status					
	40	83	- Diagnostic/POST failure, loader diagnostic failure					
	40	84	- Diagnostic/POST failure, POST soft failure					
	43	00	- Message error					
	44	00	- Internal target failure					
	44	80	- Unexpected selection interrupt					
	44	82	- Command complete sequence failure					
	44	83	- SCSI chip gross error/illegal – command status					
	44	84	- Unexpected/unexplained residue count in transfer register					
	44	85	- Immediate data transfer timeout					
	44	86	- Insufficient CDB bytes					
	44	87	- Disconnect/SDP sequence failed					
	44	88	- Bus DMA transfer timeout					
	44	89	- Internal target failure					
	44	8A	- Overtemperature condition					
	44	C1	- EEROM Copy 1 area bad					
	44	C2	- EEROM Copy 2 area bad					
	44	C3	- Both EEROM copy areas bad					
	45	00	- Select/reselect failure					
	47	00	- SCSI parity error					
	48	00	- IDE message received					
	49	00	- Invalid message error					
	4B	00	- Data phase error					
	4E	00	- Overlapped commands attempted					
	51	00	- ERASE failure					
	53	00	- Unload tape failure					
	53	01	- Invalid element address					
	53	02	- Media removal prevented					
	5A	01	- Operator media removal request					
	5B	01	- Log threshold condition met					

Table 52. DLT-8000 Tape Drive Sense Data (continued)

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
12–13	Additional Sense Code (ASC) — Additional Sense Code Qualifier (ASCQ) (Continued) Byte 12 Byte 13 ASC ASCQ 5B 02 - Log counter at maximum 5D 00 - Failure prediction threshold exceeded 80 00 - Calibration error 80 01 - Cleaning required 80 02 - Cleaning requested 80 03 - Soft error exceeds threshold 81 00 - Directory read error 82 00 - Not allowed if not at BOT 83 00 - Cannot retry read/write data transfer 84 01 - BHC test failed XX YY - XX=Drive revision code, YY=Controller revision code							
14	Subassembly Code (O)							
15	SKSV	C/D	Reserved		BPV	Bit counter		
16–17	(MSB) Field Pointer (LSB)							
18	00 No meaning 01 Reed-Solomon error correction code recovery 02 READ or WRITE block retry (soft error) 03 REPOSITION command aborted 04 Controller has stopped reading 05 No control or data buffers available 06 Target delivered in read ahead 07 Logical EOT encountered, 2 filemarks 08 Command connection dropped 09 Cleared from queue 0A Missing data block - READ only 0B Gap within object (missing block in record) 0C Record on tape larger than requested 0D Compare error 0E Successive blocks missing across objects 0F Drive state not valid for command 10 Drive error 11 Drive communication timeout error 12 Drive unloaded 13 Unable to WRITE - no CRC 14 Block to append to not found 15 Data synchronization error (READ after WRITE not happening) 16 Missing blocks in current entity 17 Drive hardware WROTE protected 18 Reposition-target not found 19 Log gap encountered (blank tape or no data) 1A End of data or filler block encountered 1B Filemark encountered 1C EDC error found by "FEZ" ASIC; FECC RAM bad 1D Beginning of medium encountered 1E EDC error 1F Hard WRITE error - "FEZ" ASIC underrun							

Table 52. DLT-8000 Tape Drive Sense Data (continued)

Byte	Bit Address or Name							
	7	6	5	4	3	2	1	0
18	20	Hard WRITE error - READ sync timeout						
	21	Hard WRITE error - overshoot append						
	22	Hard WRITE error - CRC error						
	23	EDC error found by "FEZ" ASIC; FECC RAM OK						
	24	Timeout on command to medium changer						
	25	Medium changer UART error (overrun)						
	26	Medium changer response length error						
	27	Medium changer detected error						
	28	Invalid source slot						
	29	Invalid destination slot						
	2A	Source slot empty						
	2B	Destination slot full						
	2C	Medium changer motion error						
	2D	Medium changer/drive interface error						
	2E	Medium changer/slot interface error						
	2F	Medium changer mechanical error						
	30	Medium changer hardware error						
	31	Medium changer controller error						
	32	Unrecognized medium changer subcommand						
	33	Medium changer fatal error						
	34	Medium changer is in manual mode						
	35	68020 Detected communication error with servo area						
	36	68020 Detected drive command timeout						
	37	Calibration failure						
	38	Bad tape format						
	80	Clean indicator is off; tape directory status is good						
	81	Clean indicator is on; tape directory status is good						
	82	Clean indicator is off; tape directory status is unknown						
	83	Clean indicator is on; tape directory status is unknown						
	84	Clean indicator is off; a partial tape directory exists and will be rebuilt						
	85	Clean indicator is on; a partial tape directory exists and will be rebuilt on next read/write command						
	86	Clean indicator is off. No tape directory exists. One will be created on next read/write command						
	87	Clean indicator is on. No tape directory exists. One will be created on next read/write command						
19–20	Tape Motion Hours							
21–24	Power On Hours							
25–28	Tape Remaining							
29	Reserved							

The descriptions below serve only as an overview of sense reporting in the tape drive. This tape drive conforms to all sense field reporting as specified in the SCSI standards.

Notes:

1. The Error Code field (Byte 0) is set to 70h to indicate a current error, that is one associated with the most recently received command. It is set to 71h to indicate a deferred error which is not associated with the current command.
2. The segment number (Byte 1) is zero since the Copy, Compare, and Copy and Verify commands are not supported.
3. The File Mark flag (Byte 2, bit 7) is set if a Space, Read, or Verify command did not complete because a file mark was read.

4. The End of Media (EOM) flag (Byte 2, bit 6) is set if a Write or Write File Marks command completed in the early warning area. Spacing into BOM also causes this flag to be set. It is also set on an attempt to read or space past EOD, or if an attempt is made to space into Beginning of Media.
5. The Illegal Length Indicator (ILI) flag (Byte 2, bit 5) is set if a Read or Verify ended because a block was read from tape that did not have the block length requested in the command.
6. The Information Bytes (Bytes 3–5) are only valid if the Valid flag is set. This occurs only for current errors and not for deferred errors.
7. The Field Replaceable Unit field (Byte 14) is set to either zero or to a non-zero, vendor-specific code indicating which part of the drive is suspected of causing the failure.
8. The Clean (CLN) flag (Byte 21, bit 3) is set if the drive needs cleaning and clear otherwise.
9. The Volume Label Fields Valid (VolValid) bit (Byte 21, bit 0) is set if the Volume Label being reported is valid.
10. The Volume Label field (Bytes 22–28) reports the volume label if a cartridge is loaded in the drive and Volume Label Fields Valid is set.
11. The Current Wrap field (Byte 29) reports the physical wrap of the tape. The least significant bit reflects the current physical direction. A 0 means that the current direction is away from the physical beginning of the tape. A 1 means that the current direction is towards the physical beginning of the tape.
12. Relative LPOS fields (Bytes 30–33) reports the current physical position on the tape.
13. SCSI Address field (Byte 34) reports the SCSI Bus Address for the drive. Values returned range from 00h to 0Fh.
14. This field (Byte 35) contains the frame and drive number, passed across the RS-422 serial interface.

CETool Library Error Log Display

The library error log contains up to 1000 32-byte records. Each record contains the following information:

Table 53. CE Tool Library Error Log Display

Byte	Description
0-3	Time Stamp
4	SCSI Op Code (refer to <i>IBM 3584 UltraScalable Tape Library SCSI Reference, GA32-0410</i>)
5-12	SCSI PARM Data (refer to <i>IBM 3584 UltraScalable Tape Library SCSI Reference, GA32-0410</i>)
13	Sense Key/Retry Count
14	Additional Sense Code (ASC)
15	Additional Sense Code Qualifier (ASCQ)
16	FRU
17	Bit Fields
18	Field Pointer LSB
19	Hardware Error Code (HEC)
20	Hardware Error Code Qualifier (HECQ)
21	Mechanism State Bit MAP
22	Calling Frame/Device (identifies control path)
23	Failing Frame/Device (identifies frame and drive)
24	Tape Alert
25	Object ID (code object that detected problem)
26-27	Object Error (location in code object)
28	Source Element Bit MAP
29	First Destination Element Bit MAP
30	Second Source Element Bit MAP
31	Second Destination Element Bit MAP

CETool Error Log Display Example

Figure 77 on page 443 provides an example of a typical screen you will get using CETool to view library error log data. For details on the procedure to gather the library error data, see “Viewing Error Log Entries” on page 505.

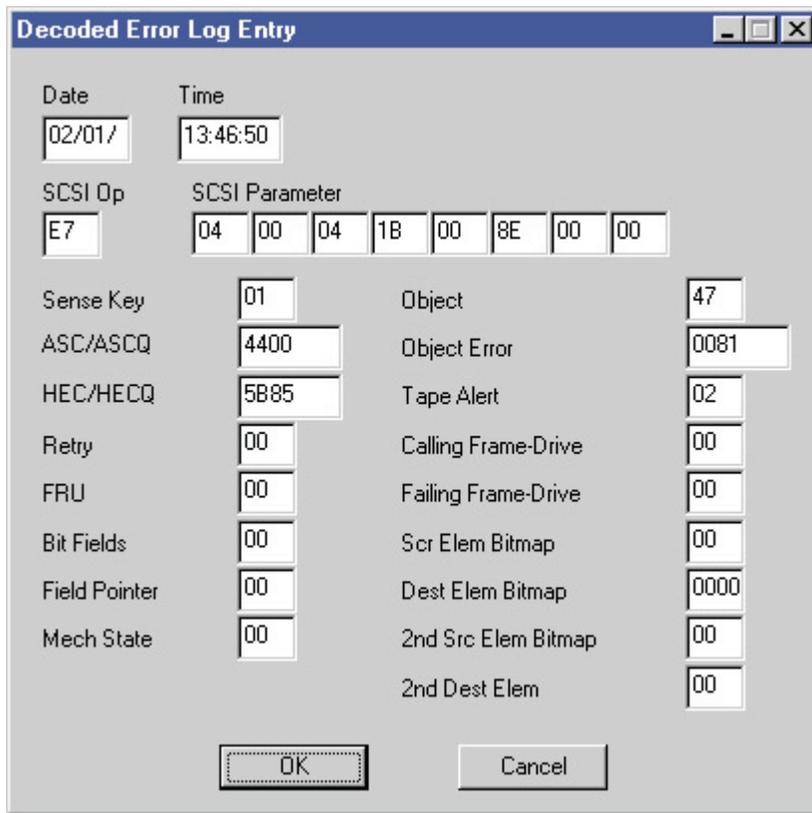


Figure 77. CETool Error Log Display Example

Use Table 54 to determine the SCSI command being executed when the error occurred.

Note: In some cases the SCSI Op code field may not in fact be a command. In this example the error was detected after the front door was opened and closed and the library automatically did an inventory. An Initialize Element Status With Range was the closest command to what really happened. In this case, you cannot determine whether it was an automatic inventory or a host initiated Initialize Element Status With Range command.

Table 54. SCSI Commands

Command in Hexadecimal	Meaning
00	Test unit Ready
01	Rezero Unit
03	Request Sense
07	Initialize Element Status
12	Inquiry
15	Mode Select
16	Reserve Element
17	Release Element
1A	Mode Sense
1C	Receive Diagnostic Results
1D	Send Diagnostic
1E	Prevent Allow Medium Removal

Table 54. SCSI Commands (continued)

2B	Position to Element
3B	Write Buffer
3C	Read Buffer
4C	Log Select
4D	Log Sense
55	Mode Select
5A	Mode Sense
A5	Move Medium
A6	Exchange Medium
B5	Request Volume Element Status
B6	Send Volume Tag
B8	Read Element Status
E7	Initialize Element Status With Range

Notes:

1. In the example given, the SCSI Op code was an E7, Initialize Element Status With Range.
2. Use “Library Sense Data” on page 422 to determine Sense Key, ASC/ASCQ, and HEC/HECQ in your specific case. In this example, the Sense Key was 01, a Recoverable Error, ASC/ASCQ = 4400, Device Reported Error, and HEC/HECQ = 5B85, Bar Code Unreadable.
3. In this example, using the Library Sense Data to URC Table, “Library Sense Data to URC Table” on page 170, the URC = A4C5.
4. You would follow the procedure under URC A4C5. A cartridge bar code label is missing or unreadable, or the “empty slot” bar code label located behind the cartridge slot is unreadable.
5. Obtain the element address of the storage slot where the first failure occurred. To do this, get the SCSI Parameter data from the library error log entry. The second group of 4 hex digits (bytes 2 and 3) contain the element address.
Examine the cartridge label in the slot, and if there is no cartridge in the slot, examine the “empty slot” bar code label in the back of the storage slot.

Locating Physical Position of Failure

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

You may be asked by IBM Support to provide the element address of the storage slot. Use these steps to acquire this information.

1. Obtain the element address of the storage slot where the first failure occurred. To do this, get the **SCSI Parameter data** from the library error log entry.
2. Once you know the element address, use the **Element Address Calculator (123)** to find the slot.
For an **E7** command (Initialize Element Status):
 - The first four hex digits are the starting element address
 - The next four hex digits are the element address of the first bad label
 - The next four hex digits are the number of elements to be scanned

As an example, with sense bytes X'04 00 04 15 00 8E xx xx' ...

- X'04 00' identifies frame 1, column 1, slot 1 (starting element address)
- X'04 15' identifies column 1, slot 28 (first bad label)
- X'00 8E' informs you of 142 scanned elements

For an **A5** command (Move Medium):

- The first four hex digits are the gripper number (typically zero, since the library selects the gripper)
- The next four hex digits are the source element address
- The next four hex digits are the destination element address

For an **A6** command (Exchange Medium), the first eight hex digits are the same as for an A5, but the next four digits show the second destination.

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Power Isolation MAP

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

The Power Isolation MAP consists of multiple sections:

- Power Entry MAP - used to determine whether a failure exists, and if so which of the more detailed MAPs should handle it
- EPO MAP - used to diagnose and repair EPO failures
- MCP MAP - used to diagnose and repair failures that result in a blank two-character display on an MCP node card
- ACC, MDA, or OPC Node Cards Blank MAP - used to diagnose/repair power failures to the ACC, MDA, and OPC cards
- Blown Fuse Map - used to diagnose and replace blown fuses on the 37 V dc power busses
- Circuit Protector MAP

Power Entry MAP

Step001 :

Ensure that the power-on switch is ON.

Is the front panel power indicator ON?

Yes Go to “**Step002**”.

No Go to “EPO MAP” on page 451.

Step002 : *From “Step001” (Yes).*

Visually check the two-character display on the MCP in each installed FCA.

Is the two-character display on every installed MCP active (not blank)?

Yes Go to “**Step003**”.

No Go to “MCP Node Card Display Blank MAP” on page 462.

Step003 : *From “Step002” (Yes).*

Are the two-character displays on every installed MCP flashing X'00–0x' (where X'x' is the frame number)?

Yes Go to “**Step004**”.

No Go to “Node Card LED Display Codes” on page 412.

Step004 : From “**Step003**” on page 449 (Yes).

Visually check the two-character displays on the ACC, MDA, and OPC.

Is the two-character display on each ACC, MDA, and OPC active (not blank)?

Yes Go to “**Step005**”.

No Go to “ACC, MDA, or OPC Node Cards Display Blank MAP” on page 465.

Step005 : From “**Step004**” (Yes).

Visually check the FUSE OPEN indicators **1** and **2** on each FIC card.

Are both of the FUSE OPEN indicators on each card OFF?

Yes Go to “**Step006**”.

No Go to “Blown Fuse MAP” on page 468.

Step006 : From “**Step005**” (Yes).

No power problem has been detected.

Notes:

1. Power problems that affect only motor power are not handled by the power MAPS. These problems result in errors in the Library Error Log. They are handled the same way as any other problem that results in a Library Error Code.
2. Power problems which affect only drive power are not handled by the power MAPS. These problems result in errors in the Library Error Log if the library has tried to access the affected drives. They are handled the same way as any other problem that results in a Library Error Code. These problems may also result in SCSI errors being reported by the Host application, they are handled the same way as any other SCSI problem.
3. If you still suspect a power problem, review the Library Error Log for any power related problem, and review the Host error log for any SCSI failures.

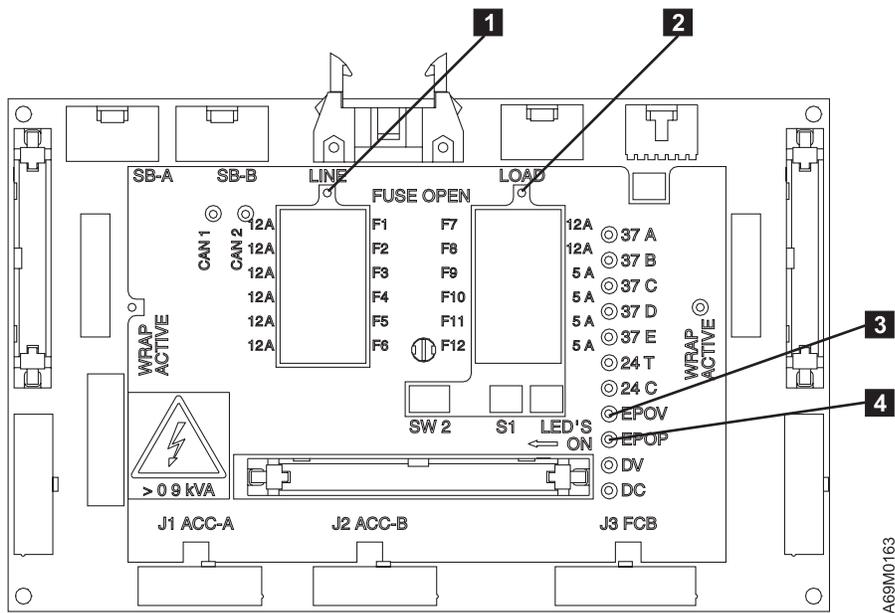


Figure 78. FIC Card Fuse Indicators

EPO MAP

Step001 :

1. Ensure that all three circuit protectors **1** on the back of each installed FCA are ON (see Figure 79 on page 452).

Note: If a circuit protector trips again, go to “Circuit Protector MAP” on page 471.

2. Visually check the two 24 V dc indicators **2** on each installed FCA (see Figure 79 on page 452).

Are both 24 V dc indicator lights on each installed FCA ON?

Yes Go to “**Step002**” on page 452.

No Go to “**Step005**” on page 453.

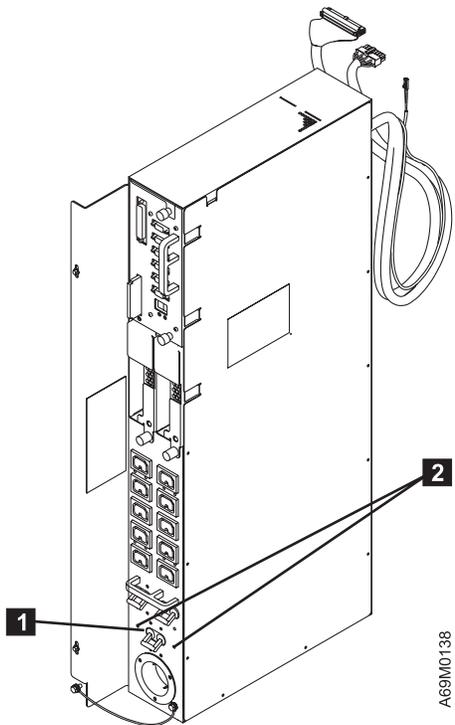


Figure 79. FCA 24 V dc Indicators

Step002 : From “ Step001 ” on page 451 and “ Step005 ” on page 453.

Visually check the EPOV indicator **3** on the FIC card in each frame (see Figure 78 on page 451).

Is the EPOV indicator ON in all frames?

Yes Go to “ **Step003** ”.

No Go to “ **Step006** ” on page 453.

Step003 : From “ Step002 ” (Yes).

Visually check the EPOP indicator **4** on the FIC card in each frame (see Figure 78 on page 451).

Is the EPOP indicator ON in all frames?

Yes Go to “ **Step004** ” on page 453.

No Go to “ **Step007** ” on page 453.

Step004 : From “**Step003**” on page 452 (Yes).

Since the EPOP indicator is on, the EPO circuit is good. The front panel power switch indicator should be ON. Look for any indication that the library is powered on:

Note: If even one of the following examples is true, then the library is powered on.

1. One or more drives is operational.
2. The operator panel is active (not blank).
3. The accessor moves when you open or close the front door.
4. At least one node card (MCP, ACC, MDA, or OPC) has a two-character display that is NOT blank.

Is there any indication that the library is powered on?

Yes Go to “**Step019**” on page 461.

No Contact your next level of support.

Step005 : From “**Step001**” on page 451 (No).

Is at least ONE of the 24 V dc indicator lights on each installed FCA ON?

Yes AC power is present at the FCA but a redundant 24 V dc power supply (part of the FCA FRU) has failed. This is not currently causing a problem, but you should schedule a future service visit to replace the FCA. See “Frame Control Assembly (FCA)” on page 618 to determine the impact FRU replacement will have on availability of the library. Go to “**Step002**” on page 452 and continue as if both 24 V dc indicator lights are on.

No Go to “**Step009**” on page 456.

Step006 : From “**Step002**” on page 452 (No).

To reach this step, at least one 24 V dc indicator is ON, but one or more EPOV indicators is OFF. Ensure the FCA to FIC cables are securely connected in all frames containing an FCA.

Has the problem been resolved?

Yes Return to the procedure that sent you here.

No Go to “**Step007**”.

Step007 : From “**Step003**” on page 452 and “**Step006**” (No).

To reach this step, the EPOV indicator in each frame is ON, but one or more EPOP indicators are OFF.

Verify that the FIC wrap jumpers are installed correctly (see Figure 80 on page 455):

- When viewed from the rear of the library, the right hand wrap jumper (J15) **5** must be installed ONLY on the FIC card in the base frame.
- The left hand wrap jumper (J16) **2** must be installed ONLY on the FIC card in the last expansion frame.
- All the other FIC card wrap jumpers must be disconnected and placed in the STORED position.

Verify the following cable and jumper connections:

- Ensure that the EPO cable in each frame is connected to the FIC card J12 connector **7** and to the pigtail connector coming from the FCA cable (if installed).
- Ensure that the front panel power switch cable is connected to the EPO J22 **8** connector in the base frame.
- Ensure that the EPO switch captive jumpers J22 **11** are installed on the EPO cable in all expansion frames.
- Ensure that the last frame has the captive jumper installed at (J23) **1** at the left end of the EPO cable.
- Ensure that the J23 **6** jumper on the right end of the EPO cable in the base frame is installed.
- Ensure that the J23 EPO **10** connectors in each frame are connected to the adjacent frames.

Has the problem been resolved?

Yes Return to the procedure that sent you here.

No Go to “**Step008**” on page 455.

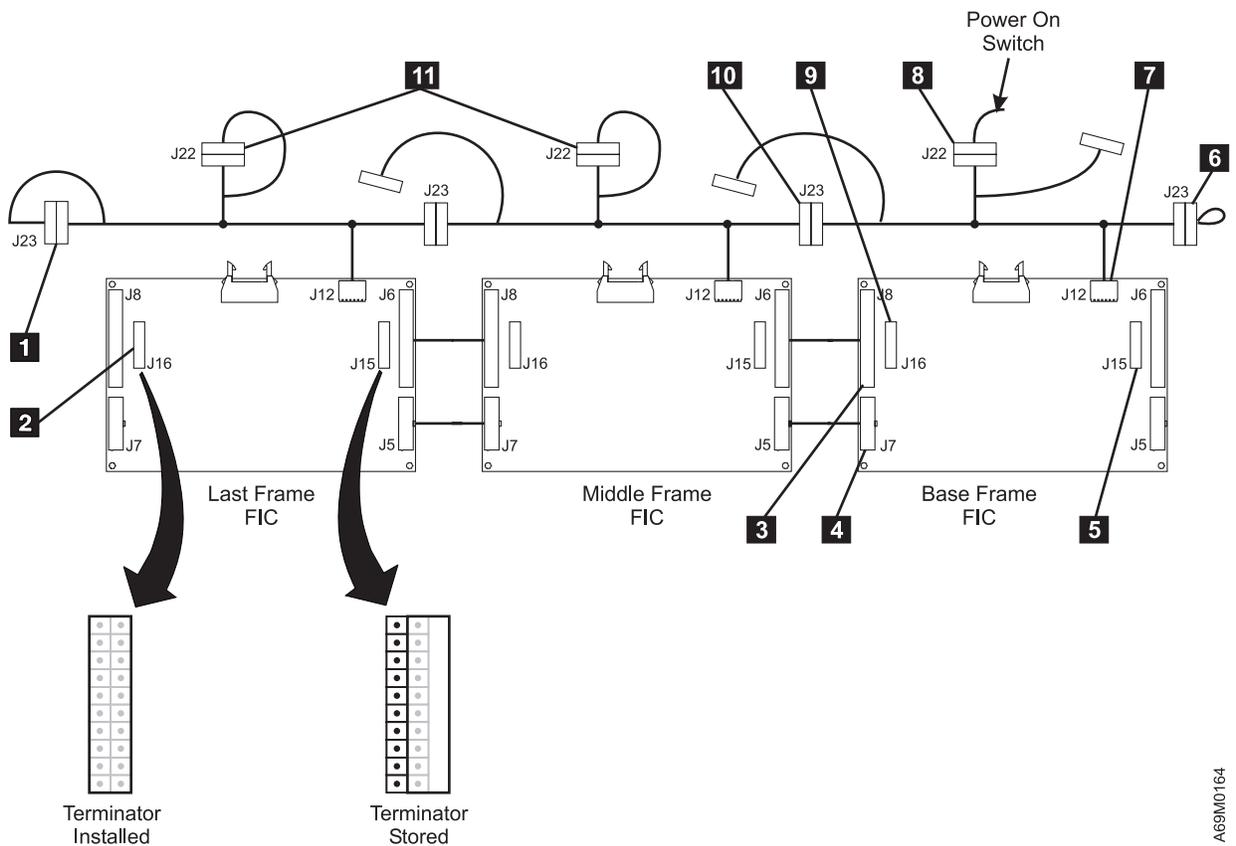


Figure 80. FIC Card Connectors and Jumpers

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Step008 : From “**Step007**” on page 453 (No).

To reach this step, the EPOV indicator in each frame is ON, but one or more EPOP indicators are OFF. All EPO cable connections and wrap jumpers have been verified.

Unplug the front panel power switch cable **8** from the EPO cable in frame 1 and install the captive jumper in its place.

C06 CAUTION:
Do NOT leave the switch bypassed, as this is a safety exposure.

Is the EPOP indicator in frame 1 ON?

Yes Replace the following FRUs:

1. The front panel power switch.
2. The front panel power switch cable.

No Go to “**Step015**” on page 458.

Step009 : *From “**Step005**” on page 453 (No).*

To reach this step, at least one FCA has both 24 V dc indicators OFF.

Perform the following steps for the FCA that has both 24 V dc indicators OFF.

Note: If more than one FCA has both 24 V dc indicators OFF, repeat that the following steps for each of the affected FCAs.

1. Ensure that the AC voltage at the customer receptacle is within the specified range (see “Branch Circuit CB Switched On Check” on page 163.
2. Disconnect both ends of the AC power cord and perform a continuity check to ensure that the AC power cord is good.
3. If the continuity check indicates a problem with the AC power cord, replace it.
4. Ensure that the AC power cord is connected at the customer receptacle and at the FCA.

Has the problem been resolved?

Yes Return to the procedure that sent you here.

No Go to “**Step010**”.

Step010 : *From “**Step009**” (No).*

To reach this step, at least one FCA has both 24 V dc indicators OFF, and the customer power receptacle and AC power cord are good.

1. Turn OFF the main circuit protector on the affected FCA.
2. Disconnect the FCA to FIC cable for the affected FCAs.
3. Turn ON the main circuit protector on the affected FCA.

Is at least one 24 V dc indicator on each installed FCA ON?

Yes Go to “**Step011**” on page 457.

No Go to “**Step014**” on page 458.

Step011 : From “ Step010 ” on page 456 (Yes).

There appears to be a problem external to the FCA that is overloading the 24 V dc power supplies in the FCA. Use the following procedure to isolate the cause of the problem.

1. Turn OFF the main circuit protector on the affected FCA.
2. Disconnect all cables from the FIC in the affected frame.
3. Reconnect the FCA to FIC cable.
4. Turn ON the main circuit protector on the affected FCA.

Is at least one 24 V dc indicator on the affected FCA ON?

Yes Go to “ **Step012** ”.

No Go to “ **Step013** ”.

Step012 : From “ Step011 ” (Yes).

The problem appears to be external to the FIC. Use the following procedure to isolate the cause of the problem.

1. Turn OFF the main circuit protector on the affected FCA.
2. Reconnect one of the cables previously removed from the FIC card.

Note: Keep track of which cable you reconnected. You may repeat this step and need to know which cable you connected last.

3. Turn ON the main circuit protector on the affected FCA.

Is at least one 24 V dc indicator on the affected FCA ON?

Yes You have not yet found the failure. Repeat this step.

No The failure has been isolated to the cable you just reconnected. Use the following FRU list:

1. The most recently reconnected cable may be defective (shorted, grounded).
2. An electrical component attached to the cable may be (shorted, grounded).

Note: You may be able to further isolate the failure by unplugging components from the cable to see if the failure is caused by the cable or by one of the components attached to the cable.

3. If all FRUs have been isolated or replaced, and the problem has not been resolved, contact your next level of support.

Step013 : From “ Step011 ” (No).

The problem appears to be caused by a failing FIC.

1. Turn OFF the main circuit protector on the affected FCA.

2. Exchange the FIC card.
3. Turn ON the main circuit protector on the affected FCA.

Is at least one 24 V dc indicator on the affected FCA ON?

Yes The problem has been resolved. Perform the following:

1. Turn OFF the main circuit protector.
2. Reconnect all remaining cables to the FIC card.
3. Turn ON the main circuit protector.
4. Return to the procedure that sent you here.

No Contact your next level of support.

Step014 : From “**Step010**” on page 456 (No).

The problem appears to be caused by a failing FCA.

1. Turn OFF the main circuit protector on the affected FCA.
2. Exchange the FCA.
3. Reconnect any cables previously disconnected.
4. Turn ON the main circuit protector on the affected FCA.

Has the problem been resolved?

Yes Return to the procedure that sent you here.

No Contact your next level of support.

Step015 : From “**Step008**” on page 455 (No).

Is at least one expansion frame installed?

Yes Go to “**Step016**”.

No Go to “**Step018**” on page 460.

Step016 : From “**Step015**” (Yes).

The following procedure will help you isolate the problem by cabling the subsystem EPO, signal, and power cable as if you were working with a single frame. This is necessary to reduce the number of possible FRUs required to fix the problem.

1. Turn off the front panel power switch.
2. Turn off the main circuit protector on each installed FCA.

3. Refer to Figure 81. Unplug the signal cable from the J8 connector **3** on the left side (as viewed from the rear) of the FIC card in frame 1.
4. Unplug the power cable from the J7 connector **4** on the left side of the FIC card in frame 1.
5. Unplug the frame 2 EPO cable (J23 connector **10**) from the left side of the frame 1 EPO cable.
6. Install the tethered jumper on the left end of the frame 1 EPO cable **10**.
7. Install the wrap jumper block (J16) **9** on the left side of the FIC card in frame 1.

Note: The wrap jumper block may currently be in the STORED position (on one row of pins). If the wrap jumper block is not in the STORED position you will need to use the wrap jumper block from the left side (J16) of the FIC card in the last frame in the subsystem.

8. Turn on the main circuit protector on the FCA in frame 1.

Is the frame 1 EPOV indicator ON?

Yes Go to “**Step017**”.

No Go to “**Step018**” on page 460.

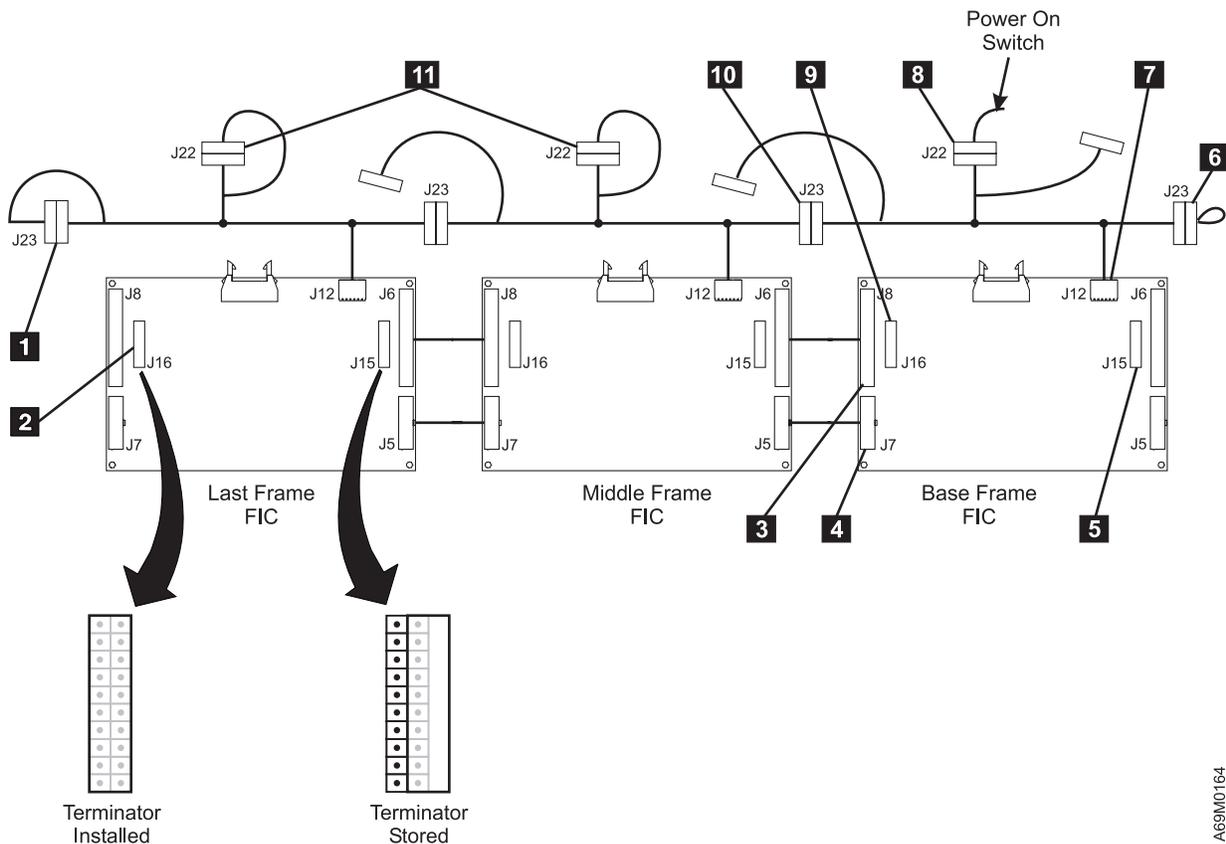


Figure 81. Placement of FIC Card when Emulating a Single Frame

Step017 : From “**Step016**” on page 458 (Yes).

The failure is located in a frame that you have bypassed. Continue the process of isolating the failure until you determine which frame is causing the failure.

1. Recable the library, adding one frame.

Notes:

- a. Ensure that only one wrap jumper (J16) is installed on the FIC card at the left end expansion frame, and that only one wrap jumper (J15) is installed on the FIC card at the right end (base frame) of the frames you have cabled together.
All other wrap jumpers should be in the STORED position.
 - b. Ensure that the tethered jumper is installed on the left end of the EPO cable (J23) in the last frame you have cabled together.
2. Turn on the main circuit protector in each FCA that is not bypassed.

Is the EPOV indicator in frame 1 ON?

Yes If some frames are still bypassed, repeat this step adding another frame. If all frames have been added, the problem has been resolved. The problem was probably a loose connection. Return to the procedure that sent you here.

No The problem is caused by a part in the last frame you added. Replace the following FRUs until the problem is resolved.

1. EPO cable
2. FIC-to-FIC signal cable
3. FIC-to-FIC power cable
4. FIC card

If all FRUs have been replaced and the problem has not been resolved, contact your next level of support.

Step018 : From “Step016” on page 458 (No).

Replace the following FRUs:

1. FIC card in frame 1.
2. FCA in frame 1.

Has the problem been resolved?

Yes Return to the procedure that sent you here.

No Contact your next level of support. The problem appears to be a bad front panel power switch indicator or J22-to-UEPO switch and LED cable.

This is not currently causing a problem. You should schedule a future service visit to replace the front panel power switch assembly and the J22-to-UEPO switch and LED cable. See Power Switch Replacement on page “Power Switch and Cable Assembly” on page 646 to determine what impact replacement will have on availability of the library. If you have any other indication of a power problem, go to “Power Isolation MAP” on page 449 and answer the questions as if the front panel power indicator is ON. If you have no other indication of a power problem, return to the procedure that sent you here.

Step019 : *From “**Step004**” on page 453 (Yes).*

Is the front panel power indicator ON?

Yes No EPO problem has been found, return to the procedure which sent you here.

No The problem appears to be a bad front panel power switch indicator or J22-to-UEPO switch and LED cable.

This is not currently causing a problem, but you should schedule a future service visit to replace the front panel power switch assembly and the J22-to-UEPO switch and LED cable. See “Power Switch and Cable Assembly” on page 646 to determine what impact replacement will have on availability of the library. If you have any other indication of a power problem, go to “Power Isolation MAP” on page 449 and answer the questions as if the front panel power indicator is ON. If you have no other indication of a power problem, return to the procedure that sent you here.

MCP Node Card Display Blank MAP

Step001 : To be here, the front panel power indicator is ON, but one or more MCPs has a blank two-character display.

Note: If more than one MCP has a blank two-character display, start by troubleshooting the problem in the lowest numbered frame that contains an affected MCP. When one has been repaired, if more problems exist, return here to troubleshoot the next problem.

1. Refer to Figure 79 on page 452. Ensure that all three circuit protectors **1** on the FCA in the affected frame are ON.

Note: If a circuit protector trips again, go to “Circuit Protector MAP” on page 471.

2. Visually check the two 24 V dc indicators **2** on the FCA in the affected frame.

Are both 24 V dc indicators ON?

Yes Go to “**Step002**”.

No Go to “EPO MAP” on page 451.

Step002 : From “**Step001**” (Yes).

Refer to Figure 82 on page 464. Visually check the EPOV and EPOP indicators **3** and **4** on the FIC in the affected frame.

Are the EPOV and EPOP indicators both ON?

Yes Go to “**Step003**”.

No Go to “EPO MAP” on page 451.

Step003 : From “**Step002**” (Yes).

To reach this point the following conditions are true:

- AC power to the FCA is ON.
 - At least one 24 V dc power supply in the FCA is ON.
 - The EPOV and EPOP indicators on the FIC card are ON.
1. Loosen the two MCP retaining screws.
 2. Remove the MCP.
 3. Visually check the connectors on the back of the MCP for bent or damaged pins.
 4. Visually check the mating connectors in the FCA for bent or damaged pins.
 5. Reinstall the MCP.
 6. Tighten the two MCP retaining screws.

Is the MCP two-character display still blank?

Yes Go to “**Step004**”.

No Return to the procedure that sent you here.

Step004 : From “**Step003**” on page 462 (Yes).

Ensure that the FCA-to-FIC cable is connected securely.

Attention: If the library has only one FCA, and if one or more drives are in use, then unplugging the FCA to FIC cable will drop power to the drives.

Ensure that you do NOT disconnect the FCA to FIC cable, unless instructed to do so.

Is the MCP two-character display still blank?

Yes Go to “**Step005**”.

No Return to the procedure that sent you here.

Step005 : From “**Step004**” (Yes).

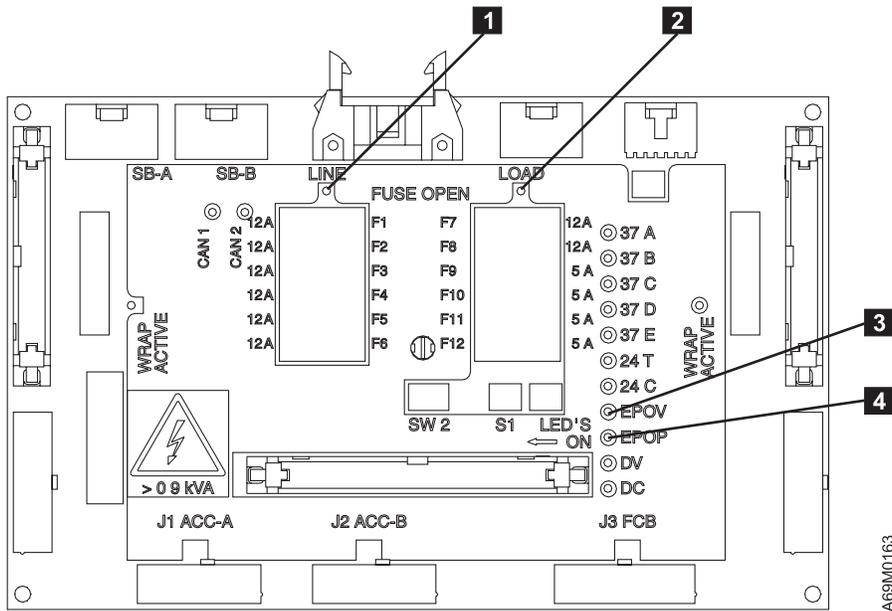
Replace the following FRUs, one at a time, until the problem is resolved.

1. MCP (see “Media Changer Pack (MCP)” on page 564).
2. FCA (see “Frame Control Assembly (FCA)” on page 618) to determine what impact replacement will have on availability of the library.
3. FIC (see “FIC Card” on page 562) to determine what impact replacement will have on availability of the library.

Has the problem been resolved?

Yes Return to the procedure that sent you here.

No Contact your next level of support.



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Figure 82. FIC Card EPOV and EPOP Indicators

ACC, MDA, or OPC Node Cards Display Blank MAP

Step001 : This procedure assumes that the library power ON indicator is ON, the MCPs are flashing error codes, and that all of the FCAs 24 V dc indicators are ON. If this is not true, go to “Power Isolation MAP” on page 449.

Note: Only one 24 V dc indicator on any FCA is required to operate the library.

Is the OPC node card two-character display blank?

Yes Go to “**Step009**” on page 467.

No Go to “**Step002**”.

Step002 : From “**Step001**” (No).

Is the ACC node card two-character display blank?

Yes Go to “**Step006**” on page 466.

No Go to “**Step003**”.

Step003 : From “**Step002**” (No).

Is the MDA node card two-character display blank?

Yes Go to “**Step005**”.

No Go to “**Step004**”.

Step004 : From “**Step003**” (No).

If you are at this step, none of the node card two-character displays are blank. Return to the procedure that sent you here.

Step005 : From “**Step003**” (Yes).

The MDA node card two-character display is blank, the ACC and OPC node cards two-character displays are Not blank. Replace the following FRUs:

1. AXY card (see “AXY Card (X-Axis)” on page 560).
2. MDA assembly (see “Motor Driver Assembly (MDA)” on page 566).

3. Cable, AXY to MDA.

Step006 : From “**Step002**” on page 465 (Yes).

The ACC node card two-character display is blank, but the OPC node card two-character display is NOT blank.

Is the MDA node card two-character display blank also?

Yes Go to “**Step008**”.

No Go to “**Step007**”.

Step007 : From “**Step006**” (No).

The ACC node card two-character display is blank but the MDA node card two-character display is Not blank.

1. Ensure that the XCP to ACC cable (Y-Axis Flex cable) is plugged in correctly at both ends.
2. Replace the following FRUs:
 - a. Cable, Y-Axis flex
 - b. ACC card (see “Accessor Controller Card (ACC)” on page 558)
 - c. AXY card (see “AXY Card (X-Axis)” on page 560)

Step008 : From “**Step006**” (Yes).

The ACC node card two-character display is blank and the MDA node card two-character display is also blank. The OPC card is NOT blank.

Note: This condition can be caused by the operator selecting “Prepare the Accessor for Service” on the FRU replacement menu. To clear this condition, select “Finish for Accessor Service” on the FRU replacement menu.

1. Check the 37 V dc power fuse “C” on the base frame FIC card. If the fuse is blown, replace the fuse. If the fuse blows again, go to “Blown Fuse MAP” on page 468.
2. Ensure that the FIC to XCP cable is plugged in correctly at both ends.
3. Ensure that the AXY to XCP cable (X-Axis Flex cable) is plugged in correctly at both ends.
4. Replace the following FRUs.
 - a. Cable, X-Axis flex
 - b. Cable, FIC to XCP
 - c. FIC card (see “FIC Card” on page 562)
 - d. AXY card (see “AXY Card (X-Axis)” on page 560)
 - e. XCP card (see “XCP Card” on page 574)

- f. MCP assembly (only if this is a single MCP library) (see “Media Changer Pack (MCP)” on page 564)
- g. FCA assembly (only if this is a single FCA library) (see “Frame Control Assembly (FCA)” on page 618)

Step009 : *From “**Step001**” on page 465 (Yes).*

The OPC node card two-character display is blank.

1. Check the 37 V dc power fuse “E” on the base frame FIC card. If the fuse is blown, replace the fuse. If the fuse blows again, go to “Blown Fuse MAP” on page 468.
2. Ensure that the FIC to OPC cable is plugged in correctly at both ends.
3. Replace the following FRUs.
 - a. OPC card (see “Operator Panel Assembly (OPC)” on page 568)
 - b. FIC card in the base frame (see “FIC Card” on page 562)
 - c. FIC card to OPC cable
 - d. MCP assembly (only if this is a single MCP library) (see “Media Changer Pack (MCP)” on page 564)
 - e. FCA assembly (only if this is a single FCA library) (see “Frame Control Assembly (FCA)” on page 618)

Blown Fuse MAP

To be here, the following conditions are true:

- The front panel power indicator is ON.
- The MCP two-character displays are NOT blank and are flashing the correct frame numbers.
- One or more fuse indicators on the FIC cards is ON.

Step001 :

Replace the blown fuse.

Note: The fuses located in the bottom position on each bank of fuses are spare fuses (one 12A and one 5A).

Did the fuse blow again?

Yes Go to “ **Step003** ”.

No Go to “ **Step002** ”.

Step002 : From “ **Step001** ” (No).

The problem has probably been fixed. If this fuse blows intermittently, go to “ **Step003** ”.

Step003 : From “ **Step002** ” (Yes).

Each FIC card has two banks of fuses (LOAD side, and LINE side).

1. If the LINE side fuse blows, the power bus short is to the left (as viewed from the rear) of this FIC card.
2. If the LOAD side fuse blows, the power bus short is on this FIC card or the external circuits powered from this FIC card.

Did the LOAD side fuse blow?

Yes Go to “ **Step007** ” on page 469.

No Go to “ **Step004** ”.

Step004 : From “ **Step003** ” (No).

1. The LINE side fuse continues to blow.

2. Disconnect the J7 power connector to the FIC card in the next frame, if any.

Note: If there is not another frame, then replace the FIC card in this frame (see “FIC Card” on page 562).

3. Replace the fuse again.

Did the fuse blow again?

Yes Go to “**Step006**”.

No Go to “**Step005**”.

Step005 : From “**Step004**” on page 468 (No).

1. The fuse did not blow again.
2. If you replace the FIC card in the previous step, the problem is fixed. Return to the procedure that sent you here, or go to “End of Call” on page 489.
3. If you did not replace a FIC card in the previous step, you disconnected the power cable to the next frame. The short to ground is in the interframe power cable or the next frame FIC card.

Has the problem been resolved?

Yes Replug any cables removed and return to the procedure that sent you here.

No Replug any cables removed and contact your next level of support.

Step006 : From “**Step004**” on page 468 (Yes).

1. The fuse has blown again.
2. Replace the FIC card in the blown fuse frame.

Has the problem been resolved?

Yes Replug any cables removed and return to the procedure that sent you here.

No Replug any cables removed and contact your next level of support.

Step007 : From “**Step003**” on page 468 (Yes).

1. The LOAD side fuse has blown again.

Note: See Figure 10 on page 32 which shows how the various components are cabled to the FIC card. Use this diagram to help diagnose your problem in the following steps.

2. Disconnect the following connectors from the FIC card:

- a. J1 - FIC card to XCP card
 - b. J8 - FIC card to J6 in the next frame
 - c. J11 - FIC card to OPC card
3. Replace the fuse again.

Did the LOAD side fuse blow again?

- Yes** Replace the FIC card. If the problem is corrected, replug any cables removed, and go to procedure that sent you here. If the problem is not corrected, call your next level of support.
- No** Reconnect the cables one at a time. When the fuse blows again, the last cable connected is the path to the shorted circuitry. Continue to disconnect and reconnect cables until the shorted circuitry is determined. After the problem is isolated to a FRU and the FRU is replaced, replug any cables that were removed. Return to the procedure that sent you here, or go to “End of Call” on page 489.

Circuit Protector MAP

To be here, a circuit protector is tripping (will not stay closed).

Step001 :

There are three circuit protectors (CP) on each FCA. The two smaller CPs, provide ac power to the drives and the larger CP provides ac power to the entire library.

Did one of the two smaller circuit protectors trip?

Yes Go to “**Step003**”.

No Go to “**Step002**”.

Step002 : *From “Step001” (No).*

To be here, the main power circuit protector for the library is tripping.

Remove the 37 V dc power supplies in this FCA. Close the main circuit protector again.

Did the circuit protector trip again?

Yes The short is in the FCA; replace the FCA (see “Frame Control Assembly (FCA)” on page 618).

No One of the 37 V dc power supplies is shorted, replace the defective supply (see “Power Supply, 37 V dc” on page 645).

Step003 : *From “Step002” (Yes).*

One of the two small circuit protectors is tripping. Unplug the drive power cables from the outlets above the tripping circuit protector.

Did the circuit protector trip again?

Yes The short is in the FCA, replace the FCA (see “Frame Control Assembly (FCA)” on page 618).

No The short is in one of the drives or cables. Plug the drive cables back into the FCA power receptacles one at a time. When the failing drive or cable is plugged into the FCA, the circuit protector should trip again. Replace the failing drive or cable.

LTO Drive Standalone Diagnostic Functions

Please note!

- Do NOT use these procedures for normal maintenance. Use these procedures only when instructed to do so by IBM Support.
- Maintenance functions cannot be performed concurrently with read or write operations. While in maintenance mode, the drive will **not** accept host commands over the SCSI bus or the fibre channel. The drive **will** accept RS-422 commands.

1. The drive must be varied offline at the host.
2. On the operator panel, press the [PAUSE] button.
3. Open the front door of the frame where the drive is located.
4. Make sure that no cartridge is in the drive.
5. Press the [UNLOAD] button 3 times within one second. The SCD should change to '0.' If an SCD other than '0' appears or continues to display, wait a few seconds and try again. The status light becomes solid amber, which indicates that the drive is in maintenance mode.
6. The function codes from which you can choose (1 through U) are listed on the next pages. Choose the drive function code that you want to run.
7. Continue to press and release the [UNLOAD] button until the function code that you want appears in the single-character display. If you go past the desired code, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
8. Press and hold the [UNLOAD] button for 3 seconds. The drive performs the function that you selected.
 - a. If a cartridge is required, C displays. You will have 60 seconds to load a cartridge.

Note: After 60 seconds, the drive will exit maintenance mode. If this occurs, you will have to start again with maintenance mode, and reselect the function.

- b. If you load a write protected or otherwise invalid cartridge, a 7 displays, the drive unloads the cartridge and exits maintenance mode.
- c. If the function completes successfully, any cartridge that is in the drive is ejected, 0 temporarily displays, and the drive exits maintenance mode.

Note:

- Certain diagnostics loop may need to be terminated. To terminate a looping diagnostic but not exit maintenance mode, press and hold the [UNLOAD] button for five seconds. The drive will complete the current iteration of the test that is running and will remain in maintenance mode.
 - To terminate maintenance mode, press and hold the [UNLOAD] button for ten seconds. 0 temporarily displays, the drive will complete the test that is running and will exit maintenance mode.
- d. If the function fails, the status light flashes amber, an error code displays, and the drive exits maintenance mode. To correct the error condition, see "LTO Drive Single-Character Display (SCD) Codes" on page 410.

Attention: When running any function that has you insert a cartridge, and especially if you have inserted an FMR tape cartridge, DO NOT power cycle the drive until the cartridge has been removed.

- e. To reset an error, cycle power to the Ultrium Tape Drive.

Note: To cycle power, disconnect the tape drive power cord (at the drive), then reconnect the tape drive power cord.

Function Code 1 - Run Tape Drive Diagnostics

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the tape drive to run the following self tests:

- Electrical
- Motors
- Write data flow
- Loop-write-read
- Sensors

The drive runs comprehensive functions. This diagnostic takes approximately 20 minutes to run.

Attention: Insert only a scratch data cartridge for this test. Data on the cartridge will be overwritten.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval, press the unload button 3 times. The status light becomes solid amber, which indicates that the drive is in maintenance mode.

Note: If a cartridge is in the drive, the cartridge will eject the first time that you press the [UNLOAD] button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **1** appears in the single-character display. If you go past **1**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, the drive runs diagnostics for approximately 90 seconds, then **C** flashes. When **C** flashes, the drive is waiting for a cartridge.
5. Insert a scratch data cartridge within the next 60 seconds, to prevent the drive from exiting maintenance mode. After you insert the cartridge, **1** flashes.

Note: Each loop takes approximately 15 minutes to run

- If the diagnostics complete successfully, they will loop and begin again. To halt the diagnostic, press the [UNLOAD] button within the first 20 minutes of the test otherwise the diagnostic will run another 20 minutes. The diagnostic will continue to the end of its loop and then stop. The drive then displays 0, rewinds and unloads the cartridge, and exits maintenance mode.
- If the diagnostics fail, the status light flashes amber and an error code displays. The drive unloads the tape cartridge and exits maintenance mode. To resolve the error, locate the error code in “LTO Drive Single-Character Display (SCD) Codes” on page 410.

Function Code 2 - Update Tape Drive Firmware From FMR Tape

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to load updated firmware from a field microcode replacement (FMR) tape.

Attention: Do **not** power off while loading code.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval press the [UNLOAD] button three times. The status light becomes solid amber indicating that the drive is in maintenance mode.

Note: If a cartridge is in the drive, the drive will eject the first time you press the [UNLOAD] button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **2** appears in the single-character display. If you go past **2**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, **C** flashes. This indicates that the drive is waiting for a cartridge. Insert the FMR tape cartridge within 60 seconds or the drive will exit maintenance mode). After you insert the cartridge, **2** flashes and the drive loads the updated firmware from the FMR tape into its erasable programmable read-only memory (EPROM) area
 - If the update completes successfully, the drive rewinds and unloads the FMR tape and resets itself. The drive is ready to use the new firmware.
 - If an error is detected, the drive displays an error code, unloads the tape cartridge, and exits maintenance mode. To resolve the error, see “LTO Drive Single-Character Display (SCD) Codes” on page 410.

Function Code 3 - Create FMR Tape

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to copy its field microcode replacement (FMR) data to a scratch data cartridge.

Attention: If you select this function, the drive will overwrite existing data on the scratch data cartridge.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval press the [UNLOAD] button three times. The status light becomes solid amber indicating that the drive is in maintenance mode.

Note: If a cartridge is in the drive, the drive will eject the cartridge the first time you press the [UNLOAD] button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **3** appears in the single-character display. If you go past **3**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, **C** flashes. This indicates that the drive is waiting for a cartridge.
5. Within 60 seconds, insert a scratch data cartridge that is not write protected (or the drive exits maintenance mode). After you insert the cartridge, **3** flashes, and the drive copies the FMR data to the scratch data cartridge.
 - If the drive creates the FMR tape successfully, **0** displays. The drive rewinds the tape, unloads the new FMR tape, and exits maintenance mode.

- If an error is detected, the drive displays an error code, unloads the tape cartridge, and exits maintenance mode. To resolve the error, see “LTO Drive Single-Character Display (SCD) Codes” on page 410.

Function Code 4 - Force Drive Dump

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to perform a dump (save a microcode trace). The microcode trace can only be analyzed by IBM.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval press the [UNLOAD] button three times. The status light becomes solid amber indicating that the drive is in maintenance mode.

Note: If a cartridge is in the drive, the drive will eject the cartridge the first time that you press the [UNLOAD] button. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **4** appears in the single-character display. If you go past **4**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, **4** displays, followed by **0**. The single-character display then goes blank, and the drive exits maintenance mode.

Note: You also can perform this operation when the drive is in normal operating mode by pressing and holding the [UNLOAD] button for 20 seconds.

Function Code 5 - Copy the Drive Dump To Tape (At Beginning of Tape)

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to copy data from a drive dump (captured in Function 4) to the beginning of a scratch data cartridge

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval press the [UNLOAD] button three times. The status light becomes solid amber indicating that the drive is in maintenance mode.

Note: If a cartridge is in the drive, the drive will eject the cartridge the first time that you press the [UNLOAD] button. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **5** appears in the single-character display. If you go past **5**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.

4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, **C** flashes, which indicates that the drive is waiting for a cartridge. Insert a scratch data cartridge that is not write-protected, within 60 seconds, or the drive will exit maintenance mode. After you insert the cartridge, **5** flashes and the drive writes the dump data to the tape, at the beginning of the tape. When the function is complete, the drive rewinds, unloads the tape, and exits maintenance mode.

Function Code 6 - Run SCSI Wrap Test

Please note!

To perform a SCSI Wrap Test, see “SCSI Wrap Test – LTO Only” on page 486. or “Smart SCSI Wrap Tool” on page 487

Function Code 6 - Run Fibre Wrap Test

Please note!

- To perform a Fibre Channel Wrap Test, see “Fibre Channel Wrap Test – LTO only” on page 488.
- A fibre wrap plug and duplex adapter (P/N 19P0242) are required for this procedure.

Function Code 8 - Convert FMR Tape To Scratch Tape

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to erase the field microcode replacement (FMR) data on a scratch data cartridge and rewrite the cartridge memory on the tape. This turns the cartridge into a valid scratch data cartridge.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval, press the unload button 3 times. The status light becomes solid amber, which indicates that the drive is in maintenance mode.

Note: If a cartridge is in the drive it will eject the first time that you press the [UNLOAD] button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **8** appears in the single-character display. If you go past **8**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, **C** flashes, which indicates that the drive is waiting for a cartridge. Insert the FMR cartridge within 60 seconds or the drive will exit maintenance mode. After you insert the cartridge, **8** flashes, the drive erases the firmware on the tape, then rewrites the header in the cartridge memory to change the cartridge to a valid scratch data cartridge.
 - If the operation is successful, the drive displays **0**, rewinds and ejects the newly converted scratch data cartridge, and exits maintenance mode.
 - If an error is detected, the drive displays an error code, unloads the tape cartridge, and exits maintenance mode. To resolve the error, see “LTO Drive Single-Character Display (SCD) Codes” on page 410.

Function Code 9 - Display Error Code Log

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to display the last 10 error codes, one at a time. The codes are chronologically ordered, that is, the most recent is presented first and the oldest (tenth) is presented last.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval, press the unload button 3 times. The status light becomes solid amber, which indicates that the drive is in maintenance mode.

Note: If a cartridge is in the drive it will eject the first time that you press the [UNLOAD] button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **9** appears in the single-character display. If you go past **9**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, press the [UNLOAD] button to view the most recent error code. Press the [UNLOAD] button again to view successive error codes. If you press the [UNLOAD] button for three seconds after the tenth error code displays, **0** displays (if there are no errors in the log), and the drive exits maintenance mode.

Function Code A - Clear Error Code Log

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to erase the contents of the error code log.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval, press the unload button 3 times. The status light becomes solid amber, which indicates that the drive is in maintenance mode.

Note: If a cartridge is in the drive it will eject the first time that you press the [UNLOAD] button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **A** appears in the single-character display. If you go past **A**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, the drive erases all errors from the error code log, displays **0**, then exits maintenance mode.

Function Code C - Insert Cartridge Into Tape Drive

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

This function cannot be selected by itself. It relates to other maintenance functions (such as Run Tape Diagnostics or Create FMR Tape) that require an FMR tape cartridge or scratch tape cartridge that is not write-protected to be inserted.

Function Code E - Test Cartridge and Media

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to perform a Write/Read test (on the edge bands) to ensure that the magnetic tape in a suspect cartridge is acceptable. This test takes approximately 10 minutes to run.

Attention: Data on the suspect tape will be overwritten.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval, press the unload button 3 times. The status light becomes solid amber, which indicates that the drive is in maintenance mode.

Note: If a cartridge is in the drive it will eject the first time that you press the [UNLOAD] button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **E** appears in the single-character display. If you go past **E**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, **C** flashes, which indicates that the drive is waiting for a cartridge. Insert the suspect customer scratch data cartridge within 60 seconds or the drive will exit maintenance mode. After you insert the cartridge, **E** flashes.
 - If no error is detected, the test will loop and begin again. To halt the diagnostic, press the **Unload** button. The diagnostic will continue to the end of its loop and stop. The drive then displays **0**, rewinds and unloads the cartridge, and exits maintenance mode.
 - If an error is detected, the drive displays an error code, unloads the tape cartridge, and exits maintenance mode. To resolve the error, see “LTO Drive Single-Character Display (SCD) Codes” on page 410.

Function Code F - Fast Read/Write Test

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to perform tests to ensure that the drive can read from and write to tape. This diagnostic performs fewer tests than the Run Tape Drive Diagnostics test (Function Code 1). This test takes approximately three minutes to run. The Fast Read/Write Test is not as comprehensive a test and is not recommended for isolating errors between the drive and the media.

Attention: Data on the suspect tape will be overwritten.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval, press the unload button 3 times. The status light becomes solid amber, which indicates that the drive is in maintenance mode.

Note: If a cartridge is in the drive it will eject the first time that you press the [UNLOAD] button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **F** appears in the single-character display. If you go past **F**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, **C** flashes, which indicates that the drive is waiting for a cartridge. Insert the insert the suspect customer tape cartridge within 60 seconds or the drive will exit maintenance mode. After you insert the cartridge, **F** flashes.
 - If no error is detected, the test will loop and begin again. To halt the diagnostic, press the [UNLOAD] button. The diagnostic will continue to the end of its loop and stop. The drive then displays **0**, rewinds and unloads the tape cartridge, and exits maintenance mode.
 - If an error is detected, the drive displays an error code, unloads the tape cartridge, and exits maintenance mode. To resolve the error, see “LTO Drive Single-Character Display (SCD) Codes” on page 410.

Function Code H - Test Head

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to perform the Head Resistance Measurements test and a Write/Read test (on the center of the tape). The drive runs these tests to ensure that the drive head and tape carriage mechanics are working correctly. This test takes approximately 10 minutes to run.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval, press the unload button 3 times. The status light becomes solid amber, which indicates that the drive is in maintenance mode.

Note: If a cartridge is in the drive it will eject the first time that you press the [UNLOAD] button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **h** appears in the single-character display. If you go past **h**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To select the function, press and hold the [UNLOAD] button for three seconds. After you select the function, **C** flashes, which indicates that the drive is waiting for a cartridge. Insert a scratch data cartridge within 60 seconds or the drive will exit maintenance mode. After you insert the cartridge, **h** flashes.

- If no error is detected, the test will loop and begin again. To halt the diagnostic, press the [UNLOAD] button. The diagnostic will continue to the end of its loop and stop. The drive then displays **0**, rewinds and unloads the tape cartridge, and exits maintenance mode.
- If an error is detected, the drive displays an error code, unloads the tape cartridge, and exits maintenance mode. To resolve the error, see “LTO Drive Single-Character Display (SCD) Codes” on page 410.

Function Code P - Post Error Reporting (PER)

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to report deferred check conditions to the host. Deferred check condition is a method to report recovered (temporary) errors to the host. Recovered errors (sense key =1 error per SCSI architecture) will result in more traffic on a SCSI interface and more errors in the error recording facility of your hosts.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval, press the unload button 3 times. The status light becomes solid amber, which indicates that the drive is in maintenance mode.

Note: If a cartridge is in the drive it will eject the first time that you press the [UNLOAD] button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **P** appears in the single-character display. If you go past **P**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To perform the function that you selected, press and hold the [UNLOAD] button for three seconds. The drive enables the PER function, displays **0** for three seconds, and exits maintenance mode.

Function Code U - Undo Post Error Reporting

Please note!

Do NOT use this procedure for normal maintenance. Use this procedure only when instructed to do so by IBM Support.

Causes the drive to turn off post error reporting. Deferred check conditions are not reported to the host.

1. Ensure that no cartridge is in the drive.
2. Within a 1-second interval, press the unload button 3 times. The status light becomes solid amber, which indicates that the drive is in maintenance mode.

Note: If a cartridge is in the drive it will eject the first time that you press the **Unload** button. The drive will not be placed in maintenance mode. To continue placing the drive in maintenance mode, perform the preceding step.

3. Continue to press and release the [UNLOAD] button until **U** appears in the single-character display. If you go past **U**, continue to press and release the [UNLOAD] button as the display cycles through the codes again.
4. To perform the function that you selected, press and hold the [UNLOAD] button for three seconds. The drive disables the PER function, displays **0** for three seconds, and exits maintenance mode.

Drive Problems

Use this procedure to correct these drive problems:

- Problems communicating with the drive over the RS-422
- Drive hangs
- Stuck tape

You may have URCs that point to a specific drive type. If the problem is with an Ultrium LTO tape drive, go to “Drive Problem - LTO Only”. If the problem is with a DLT 8000 Tape System, go to “Drive Problem – DLT-8000 Only” on page 482.

Drive Problem - LTO Only

1. Ensure that the library to drive RS-422 cable is securely connected at the drive and at the MCP. Do **not** unplug the RS-422 cable from the MCP, since that will affect other drives.
2. Determine whether the problem still exists. At the front panel of the library, select **[MENU]**, **Library Status**, and **Drive Status**. Look for a **CommFail** as an indication of a problem.
 - If the failing drive is not responding, go to step 3.
 - If the failing drive is responding to the library over the RS-422 connection (that is, it does not show CommFail), then the failure is intermittent. This usually indicates a microcode problem. Capture a library dump, then attempt to capture a drive dump for possible analysis by IBM Support (see “CETool Procedures” on page 500). Do **not** replace the drive unless instructed to do so by your next level of support. Go to step 6 on page 482.
3. Verify that the drive is powered on.
 - a. Ensure that the drive power cable is connected at both ends.
 - b. Ensure that the circuit breakers on the FCA are ON (not tripped). Do **not** turn off any circuit breakers on the FCA. This would affect other drives, and will erase any dump information currently stored in the failing drive.
 - c. Verify that the drive fan is running by holding a piece of paper next to the fan grill in the rear of the drive tray. If the fan is running it will cause the paper to flutter.
 - d. Verify that the customer is not using the library.
 - e. To access the front of the drive, pause the library, and open the front door. Look for any indication of power on the drive bezel indicators. If any indicators on the drive bezel are on, then power is good. Go to step 4. If the status indicator LED is dark and the Single Character Display (SCD) is blank, replace the drive tray assembly. If this corrects the problem, go to step 6 on page 482.
 - f. If the failure continues, replace the drive power cable. If this corrects the problem, go to step 6 on page 482. If replacing the drive power cable does **not** correct the problem, contact your next level of support.
4. Check for a microcode problem, indicated by a ‘hung’ drive.
 - a. Press and hold the **[EJECT]** button for a full 20 seconds to force the drive to reset itself. The SCD will start changing when the drive resets. Release the **[EJECT]** button.
 - b. Attempt to collect a drive dump (see “CETool Procedures” on page 500). If you are unable to collect a dump using CETool, ignore the failure.
 - c. If the drive is empty (or has a tape in the ejected position), go to step 5 on page 482. If there is a cartridge in the drive, press the eject button for 1 second.

Note: After resetting the drive with a tape loaded, an error recovery procedure in the drive is automatically invoked. This error recovery procedure will very slowly rewind the tape to the beginning. Depending on the position of the tape at the time of the failure, this slow rewind may take up to 20 minutes. So, if the tape did not eject, do **not** power cycle the drive. Wait 20 minutes, then press the eject button for 1 second. The tape should now eject. If the tape ejects go to step 5 on page 482.

- d. If there is still a tape in the drive, go to “Manually Removing Cartridge” on page 672 to remove the tape, then replace the drive. After replacing the drive, go to step 6.
5. Determine if the problem persists. From the Activity screen, select **[MENU]**, **Library Status**, and **Drive Status**. Look for a **CommFail** as an indication of a problem.
 - a. If CommFail did not appear, the drive responded to the library, and the RS-422 connection is active. Go to step 6.
 - b. If CommFail did not appear, the drive is not responding. Replace the drive tray assembly (see “Drive Tray Assembly – LTO Fibre” on page 587) or the drive canister assembly (see “Drive Canister Assembly – LTO SCSI Hot Swap” on page 592). Display the drive VPD again to verify operation.
 - c. If the problem persists, replace the MCP-to-drive RS-422 cable and the MCP (see “Media Changer Pack (MCP)” on page 564). Display the drive status to verify that the problem has been corrected.
 - d. Manually load the CE cartridge into the failing drive. If the cartridge loads, the drive does not have a hang condition. Press the eject button to unload the CE cartridge, and go to step 8.
6. Run Library Verify Test to test the drive (see “Library Verify Test” on page 507). Use the option **One Drive**. When prompted about the Read/Write Test, select **Yes**.
7. If you obtained a drive dump, contact your next level of support to determine if this dump will be helpful to them. Ask them to forward the dump to the product PFEs. Analyzing this dump can reveal if this is a new problem or one for which a fix already exists.
8. Go to “End of Call” on page 489.

Drive Problem – DLT-8000 Only

1. Ensure that the library to drive RS-422 cable is securely connected at the drive and at the MCP. Do **not** unplug the RS-422 cable from the MCP, since that will affect other drives.
2. Determine whether the problem still exists. At the front panel of the library, select **[MENU]**, **Library Status**, and **Drive VPD**. Look for a **CommFail** as an indication of a problem.
 - If the failing drive is not responding, go to step 3.
 - If the failing drive is responding to the library over the RS-422 connection (that is, it shows VPD data), then the failure is intermittent. This usually indicates a microcode problem. Do **not** replace the drive unless instructed to do so by your next level of support. Go to step 7 on page 483.
3. Verify that the drive is powered on.
 - a. Ensure that the drive power cable is connected at both ends.
 - b. Ensure that the circuit breakers on the FCA are ON (not tripped). Do **not** turn off any circuit breakers on the FCA. This would affect other drives, and will erase any dump information currently stored in the failing drive.
 - c. Verify that the drive fan is running by holding a piece of paper next to the fan grill in the rear of the drive tray. If the fan is running it will cause the paper to flutter.
 - d. Verify that the customer is not using the library.
 - e. To access the front of the drive, pause the library, and open the front door. Look for any indication of power on the drive bezel indicators. If any indicators on the drive bezel are on, then power is good. Go to step 4. If the status indicator LEDs are dark, replace the drive canister assembly. If this corrects the problem, go to step 7 on page 483.
 - f. If the failure continues, replace the drive power cable. If this corrects the problem, go to step 7 on page 483. If replacing the drive power cable does **not** correct the problem, contact your next level of support.
4. If the drive is empty (or has a tape in the ejected position), go to step 6 on page 483. If there is a cartridge in the drive, press the eject button for 1 second.
5. If there is still a tape in the drive, go to “Manually Removing Cartridge” on page 672 to remove the tape, then replace the drive. After replacing the drive, go to step 7 on page 483.

6. Determine if the problem persists. From the Activity screen, select **[MENU]**, **Library Status**, and **Drive VPD**. Look for a **CommFail** as an indication of a problem.
 - a. If VPD data appears, the drive responded to the library, and the RS-422 connection is active. Go to step 7.
 - b. If VPD data did not appear, the drive is not responding. Replace the drive canister assembly (see “Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590). Display the drive VPD again to verify operation.
 - c. If the problem persists, replace the MCP-to-drive RS-422 cable and the MCP (see “Media Changer Pack (MCP)” on page 564). Display the drive VPD to verify that the problem has been corrected.
 - d. Manually load the CE cartridge into the failing drive. If the cartridge loads, the drive does not have a hang condition. Press the eject button to unload the CE cartridge, and go to step 8.
7. Run Library Verify Test to test the drive (see “Library Verify Test” on page 507). Use the option **One Drive**. When prompted about the Read/Write Test, select **Yes**.
8. Go to “End of Call” on page 489.

Drive Load Problems - LTO Only

1. Locate the cartridge involved with the failure (see “Locating Physical Position of Failure” on page 444).

Note: Typically the cartridge has been returned to its home storage cell, so you will be looking for the source element address.
2. Record the source element address for the suspect cartridge.
3. Use the front panel of the library to move the cartridge from its home storage cell to the I/O station (**[Menu]**, **Manual Operations**, **Move Cartridge, By Element Address**).
4. Inspect the cartridge to determine whether there is any problem with the cartridge shell, cartridge shutter/door, or leader pin which could prevent the cartridge from loading into a drive.
 - If the cartridge is damaged or defective, give it to the customer for replacement.
 - If the cartridge is okay, continue with the next step in this procedure.
5. Pause the library.
6. Open the front door of the frame containing the affected drive.
7. Attempt to manually load the cartridge into the affected drive.
 - If the cartridge loads okay then the problem is intermittent.
 - If the cartridge hits an obstruction before it is fully inserted into the drive then either the cartridge is defective/damaged, or the drive has a problem.
8. To isolate between the cartridge and the drive, attempt to load the diagnostic cartridge into the drive.
 - If the diagnostic cartridge loads then the problem was caused by the cartridge.
 - If the diagnostic cartridge doesn't load then the problem was caused by the drive.
9. Close the front door of the library.

If you have determined that the cartridge is okay, put the cartridge into the I/O station and use the front panel of move the cartridge back to its original storage cell.

Ethernet Problems

1. Ensure that the library code is at the latest available level to ensure you have all available Ethernet-related firmware fixes.

Note: The library firmware version is displayed at the top of the operator panel Activity screen. To find the latest library code version see “Loading Library Microcode” on page 501.
2. Use of Certified Category 5 Ethernet cables (the cable must say Category 5 on the jacket, and the connectors must be factory installed) is recommended. If the customer is NOT using Certified Category 5 Ethernet cables then cable lengths must be reduced.

3. The Ethernet cable from the customer Ethernet gateway to the library must be wired 'straight-through' and NOT 'cross-over'. Each pin at one end of the cable should be wired to the same pin at the other end.
4. If possible, configure the Ethernet connection to 10 Mb/s to avoid potential problems which may occur if running at 100 Mb/s. If the library code version is 2250 or higher, go to the front panel of the library, press **MENU**, then select **Settings, Network, Ethernet, Change Settings**, and **Set Speed to 10 Half Duplex**. On earlier versions of library code the customer Ethernet gateway can be used to configure the Ethernet speed.
5. Verify that the Ethernet settings are correct for the customer network. If the customer network uses DHCP then the library Ethernet Settings must be set to DHCP. If the customer network does NOT use DHCP then the library Ethernet Settings must be set to Manual and the IP Address and Subnet mask must be manually entered.
6. Verify that the two code images on the MCP are at the same code version. Go to the front panel of the library, press **[MENU]**, then select **Vital Product Data**, and **Node Card VPD**. Use the UP button to scroll until the Medium Changer Pack (MCP) in frame 1 is displayed. Verify that the 'Firmware Version' and 'Web Version' are the same. If they are different, load the latest code onto the library to correct the problem.
7. If you have completed the steps above and are still unable to connect to the library, replace the MCP (see "Media Changer Pack (MCP)" on page 564).

FCA Cooling Fan Problems

Use this procedure to diagnose an FCA Cooling Fan problem. Before beginning this procedure, locate the failing frame number in the sense data or in the library error log.

This failure can be caused by loss of all 37 V dc power due to an overcurrent.

Visually check the 2-character displays on the ACC, MDA, and OPC node cards to verify that at least one of these node cards is powered on.

Note: If at least one of these node cards is powered on, then 37 V dc is present in the library. If all the node cards are powered off, the most likely cause is an overcurrent which caused all the 37 V dc power supplies to shut down.

If at least one of the ACC, MDA, or OPC node cards has power, the likely cause of this error is a failure of the FCA Cooling Fan. Follow these steps to isolate the cause.

1. Open the front door. You will be instructed to close the front door in step 10 on page 485.
2. Ensure that the library is powered on.
3. Visually check the Fuse Open indicators on the FIC of the failing frame. Replace any open fuses.
4. Remove and re-install each 37 V dc Power Supply in the failing frame.
5. Press the RESET button on the MCP in the failing frame. The RESET button is located at the bottom of the MCP.
6. While the MCP is performing its POST, the 2-character display will count from FF down to E0. When POST is complete, the 2-character display will alternate between 00 and the frame number, or an error code will display. If an error code displays, go to "Library Sense Data to URC Table" on page 170.
7. Visually check the 37 V dc power bus indicators on the FIC in the failing frame. If at least one bus has power, then continue. If all buses do NOT have power, go to the "Power Isolation MAP" on page 449.
8. Wait for as long as five minutes for 31 80 to display on the MCP 2-character display. If 31 80 displays, the most likely cause of this URC is a faulty FCA Cooling Fan.
9. Visually check the 2-character displays on the ACC, MDA, and the OPC node cards to determine that they are powered on.

- a. If the 2-character displays on the ACC, MDA, and the OPC node cards indicate that these cards are powered on, go to step 10
- b. If the 2-character displays on the ACC, MDA, and the OPC node cards are blank, the 37 V dc power to these node cards has failed. Isolate the failure by disconnecting one node at a time and restarting this procedure at step 3 on page 484.

Note: Do NOT hot-plug the ACC or MDA, and do NOT hot plug the OPC if the library has a lower I/O Station installed.

- c. Disconnect the FIC-to-OPC cable from the FIC. Repeat steps 3 on page 484 through 9 on page 484. If the ACC and the MDA 2-character displays indicate that these node cards are powered up, the failure is in the FIC-to-OPC cable, the OPC, or an I/O Station cable or component connected to the OPC. If the ACC and MDA 2-character displays are still blank, reconnect the FIC-to-OPC cable and isolate the next component.
- d. Disconnect the two AXY-to-MDA cables from the AXY. Repeat steps 3 on page 484 through 9 on page 484. If the OPC and ACC 2-character displays indicate that these node cards are powered up, the failure is in the AXY-to-MDA cables or the MDA. If the OPC and ACC 2-character displays are still blank, reconnect the AXY-to-MDA cables, and isolate the next component.
- e. Disconnect the Y-axis cable from the ACC. Repeat steps 3 on page 484 through 9 on page 484. If the OPC and MDA 2-character displays are still blank, reconnect the Y-axis cable to the ACC, and isolate the next component.
- f. Disconnect the FIC-to-XCP cable from FIC connector J1 in frame 1. Repeat steps 3 on page 484 through 9 on page 484. If the OPC display is still blank, reconnect the FIC-to-XCP cable to the FIC, and call your next level of support.

10. Close the front doors and observe the 2-character display on the ACC, MDA, and OPC cards.

Note: If you cannot see a 2-digit display, open the front door, read the value in the 2-digit display, and reclose the door.

11. Replace the failing FCA (see “Frame Control Assembly (FCA)” on page 618).
12. Replace the failing 37 V dc Power Supply (see “Power Supply, 37 V dc” on page 645).

Fiducial Missing Problems

Calibration encountered a missing fiducial on a column. Use this procedure to diagnose a fiducial-missing problem.

Determine in which frame and column the failure occurred. To do this, find the error in the library sense data (view the library error log). The Failing Frame number indicates the frame where the failure occurred. The HECQ indicates the column where the error occurred.

If the failure occurred in column 5 or 7 of frame 1 (model Lx2), or in column 9 of any other frame (model Dx2), perform the following “Check Configuration” procedure. If the failure occurred in any other location, perform the following “Check Top Cap” on page 486 procedure.

Check Configuration

It is possible that a configuration problem is causing the library to look for the fiducial in the wrong location. It is critical that you determine whether the configuration is accurate before you continue.

1. At the library front panel, press **MENU**, then select **SETTINGS, CONFIGURATION**, and **DISPLAY CONFIGURATION**.
2. Find the number of cells in the affected frame (if the library contains more than 1 frame, select **DETAIL** and scroll to the affected frame).
3. Determine whether the configuration has the correct number of cells in the affected frame.
Frame 1 (model L32) must have the following number of cells:

- 141 or 281 cells if 1 - 4 drives are installed
- 113 or 253 cells if 5 - 8 drives are installed
- 87 or 227 cells if 9 - 12 drives are installed

URC B260 only – Frame 2 or higher (model D42) must have the following number of cells:

- 358 cells if 0 drives are installed
- 344 cells if 1 - 4 drives are installed
- 331 cells if 5 - 8 drives are installed
- 322 cells if 9 - 12 drives are installed

URC B360 only – Frame 2 or higher (model D32) must have the following number of cells:

- 440 cells if 0 drives are installed
- 423 cells if 1 - 4 drives are installed
- 409 cells if 5 - 8 drives are installed
- 396 cells if 9 - 12 drives are installed

4. If the configuration shows the correct number of cells in the affected frame, go to the “Check Top Cap” procedure below. If the configuration does NOT show the correct number of cells in the affected frame then the calibration failure is the result of the configuration problem - the library is looking in the wrong location for the fiducial. Use the following steps to correct the configuration.
5. Ensure that all cartridges in the affected column have valid bar code labels. If there are any cartridges that do not have bar code labels, or if the cartridges have glossy bar code labels, remove the cartridges from the affected column.

Note: When configuring the library, the bar code scanner is used at specific locations in the 'drive' columns to determine whether cells are present. If cells are present then the bar code scanner should read either valid cartridge bar code labels or empty cell bar code labels. If it is unable to read a bar code label during configuration then the library assumes there are no cells in that location.

6. Run Configuration, then check to see if the number of cells is now correct.
 - If the number of cells is now correct, the problem has been resolved. To recalibrate the affected frame (or the entire library if you have installed any new frames, drives, or cells), perform the Calibration Procedure by selecting the **Service** menu, then the **Calibration** menu (see “Service Menus” on page 523).
 - If the number of cells is still NOT correct, there is a problem reading the bar code labels in the affected column. Visually check the empty cell bar code labels (located in the rear of the empty cells). If the labels show any sign of debris or damage, clean or replace the labels. If you are certain that the labels are readable, replace the bar code scanner FRU. Repeat this procedure (“Check Configuration” on page 485) to correct the configuration.

Check Top Cap

The problem is probably a slot top cap that has been knocked out of place. Locate the affected top cap (which contains the fiducial), and repair or replace it. Perform the Calibration Procedure by selecting the **Service** menu, then the **Calibration** menu (see “Service Menus” on page 523). If the problem persists replace the Calibration sensor (see “Calibration Sensor” on page 555) then perform the calibration procedure.

SCSI Wrap Test – LTO Only

1. All drives attached to the SCSI bus for the drive to be tested, must be varied offline to run this test.
2. Remove the SCSI cables from the back of the drive tray.

3. Install the appropriate SCSI wrap plug onto one of the SCSI connectors and install the appropriate terminator onto the other SCSI connector of the drive tray.
4. On the **Activity** screen, select **[MENU]**.
5. On the **Main Menu** screen, select **Service**.
6. On the **Service** screen, select **Drives**.
7. Select the drive to be tested, then select the **SCSI/FC Wrap Test**. Follow the instructions on the screen until the test has been completed.
8. Swap the SCSI wrap plug and the SCSI terminator, then rerun the test.

Note: This is necessary to test both SCSI ports.

9. When testing is complete, press **[BACK]** until you return to the **Activity** screen.
10. Be sure to reconnect the customer SCSI cables that were previously disconnected.
11. Return to the procedure that sent you here; otherwise go to “End of Call” on page 489.

Smart SCSI Wrap Tool

The Smart SCSI Wrap Tool (SSWT) allows you to test the SCSI connection to any SCSI device in a 3584 hot-swap canister. It acts as a SCSI host, sending simple commands to the device, so it does not require any action at the library front panel. The SSWT has no internal power source; it derives SCSI Term Power from the SCSI bus.

Note: If you are connecting the SSWT to a drive canister, or to an HVD drive tray, then you can also test host cables up to 25 meters reliably. But if you are connected to an LVD drive tray then using a long host cable may cause the test to fail. The reason is that drive canisters and HVD drive trays include either an LVD-LVD redriver or an HVD-LVD/SE converter which boosts the SCSI bus TermPwr voltage. LVD drive trays don't have an integrated LVD-LVD redriver card to boost TermPwr - the only TermPwr available is provided by the drive 'brick'. TermPwr provided by the drive 'brick' is at a slightly lower voltage than that provided by a redriver or converter. The SSWT runs on TermPwr voltage from the SCSI bus, so if the TermPwr voltage is marginal then a longer cable may introduce enough voltage drop to prevent the SSWT from functioning properly. Note: Some LVD drive trays were manufactured with drive jumper settings that do not apply TermPwr to the SCSI bus. These LVD drive trays will function in normal use, but since any type of SCSI Wrap Test requires TermPwr, the wrap test may fail. So if you see SCSI Wrap Test failures on an LVD drive tray do not replace the drive tray unless it also fails in host operation.

To use the SSWT, perform the following procedure:

1. Remove all cables from the SCSI connectors on the fixed tray.
2. Install the appropriate SCSI terminator on one connector of the fixed tray. The connectors are wired together so they are interchangeable.
3. Locate the SSWT and cable.

Note: The cable is a SCSI (VHDCI to VHDCI drive-to-drive) 0.3 m (1 ft) cable, P/N 19P3332.

4. Connect the cable to the SSWT and to the fixed tray.
5. While observing the two LEDs on the SSWT, momentarily press the SSWT **Reset** button.
6. A single pulse of the green LED indicates that an LVD bus is sensed. A single pulse of the yellow LED indicates that an HVD bus is sensed.
7. Most often, after a delay of approximately 10 seconds, one LED will remain on and the other LED will blink. If the green LED remains on steady, the test passed. If the yellow LED remains on steady, an error occurred. Decode the LED codes using the table below. Note that blink codes will repeat. There is a 'long' ON to indicate the start of a sequence. So, if you see a 'long' ON followed by 3 'short' ONs, this indicates a 3. If you see a 'long' ON followed by a pause and another 'long' ON, this indicates a zero.

Table 55. Smart SCSI Wrap Tool LED Decoding

Green LED	Yellow LED	Description
Off	Off	No Term Power - No connection to a canister, or the canister is not providing term power. Verify the connection to the canister. If connections appear good replace the canister and/or the fixed tray.
On Steady	Blinking	The test passed. The yellow LED is blinking the SCSI ID of the device.
Blinking '1'	On Steady	Error: No response from any SCSI device. Replace the canister and/or the fixed tray.
Blinking '2'	On Steady	Error: Multiple devices responded. If you have multiple canisters daisy-chained you must disconnect the cables and test one canister at a time. If you have only one canister connected then the canister is responding on multiple SCSI IDs - replace the canister.
Blinking '3'	On Steady	Error: Communications problem with the canister. If the canister is HVD verify that the appropriate terminator is installed and rerun the test. If the failure persists, replace the canister and/or the fixed tray.
Blinking '4'	On Steady	Error: LVD canister detected wrong or missing terminator.

Fibre Channel Wrap Test – LTO only

Attention: Notify the customer that the devices on the fibre channel must be varied offline before this test can be performed

Notes:

1. If the LTO fibre drive is connected to a hub, the other fibre drives on the hub must be quiesced before performing the fibre channel wrap test.
2. At the completion of the wrap test, and after reconnecting the fibre cable, the other drives on the hub may be put back into operation.
3. Some fibre devices, such as switches and hubs, require an IML to re-establish communications after a device is power-cycled or added.
 1. Quiesce all activity (stop all traffic) on the drives.
 2. Remove the cartridge from any drive you will be servicing.
 3. Unplug the fibre channel cable connector from the back of the fibre drive to be tested.
 4. Install the fibre wrap plug onto the drive port.
 5. On the **Activity** screen, select [MENU].
 6. On the **Main Menu** screen, select **Service**.
 7. From the **Service** screen, select **Tests, Diagnostics**, then **drives**.
 8. On the **drives** screen, select the drive you want to test.
 9. Select the drive to be tested, then select the **SCSI/FC Wrap Test**, and press [Enter].
 - a. If the wrap test fails, a URC will display. Go to Chapter 2, “Start”, on page 49 to isolate the problem.
 - b. If the wrap test is successful, continue with this procedure.
10. Perform a wrap test from the fibre cable to the bulkhead connector:
 - a. Disconnect the fibre cable from the bulkhead.
 - b. Plug the Fibre Wrap Duplex Adapter (P/N 19P0913) into the end of the cable.
 - c. Plug the Fibre Wrap Tool into the other end of the cable.
11. When testing is complete, press **Back** until you return to the **Activity** screen.
12. Run the wrap test again.

- a. If the wrap test fails, replace the fibre cable from the drive to the patch panel.
- b. If the wrap test passes, continue with this procedure.

Note: The LTO fibre can be ordered with several lengths of fibre cable, up to 61 m (200 ft).

13. Plug the fibre cable to the patch panel or attach fibre channel device.
14. Install the wrap plug at the end of the cable.
15. Run the Wrap Test. This will test the device and all the cabling.
 - a. If the wrap test fails, replace the fibre cable from the drive to the patch panel.
 - b. If the wrap test passes, continue with this procedure.

Notes:

- The tests can be looped at any time.
 - The wrap test can only be run on cable lengths up to 250 m (820.2 ft). For cable lengths greater than 250 m (820.2 ft), test the cable by using a fibre cable tool kit. Contact your Support Center for information about the test and to locate tools.
16. The problem is at the host. The drive and cable are good. Refer to the documentation for the host.
 17. Remove the wrap plug and fibre wrap duplex adapter, and restore the fibre channel.
 18. Return to the procedure that sent you here; otherwise go to “End of Call”.

End of Call

1. If any cartridges were removed from the library, give them to the customer.
2. Close all doors.
3. Reinstall all communications cables and terminators removed during repair.
4. Record your activity in Chapter 12, “History”, on page 689.
5. Return the library to the customer.

Display Library VPD (Model and Serial Number)

To display the library **Model** and **Serial** number, perform the following:

1. At the **Activity** screen, press [MENU]
2. At the **Main Menu** screen, select **Service**, and press [Enter].
3. At the **Service** screen, select **Vital Product Data**, and press [Enter].
4. At the **Vital Product Data Menu** screen, select **Library VPD**, and press [Enter]. The following screen displays.

```
Library VPD           Panel 0301

Frame 1:
Machine Type:       3584
Model:              L32
Serial:             1300001

[BACK] [ UP ] [DOWN]
```

Display Drive VPD (Drive Type and Microcode Level)

To display the drive type and microcode level, perform the following:

1. At the **Activity** screen, press [MENU].
2. At the **Main Menu** screen, select **Service**, and press [Enter].
3. At the **Service** screen, select **Vital Product Data**, and press [Enter].
4. At the **Vital Product Data Menu** screen, select **Drive VPD**, and press [Enter]. The following screen displays the drive type and the microcode level.

```
Drive VPD           Panel 0310

Key: [F=Frame, R=Row]

[F1,R01] ULT3580-TD1 v1234
[F1,R02] ULT3580-TD1 v1234
[F1,R03] ULT3580-TD1 v1234
[F1,R04] ULT3580-TD1 v1234
[F1,R05] ULT3580-TD1 v1234
[F1,R06] ULT3580-TD1 v1234
[F1,R07] ULT3580-TD1 v1234
[F1,R08] ULT3580-TD1 v1234
[F1,R09] ULT3580-TD1 v1234
[F1,R10] ULT3580-TD1 v1234

[BACK] [ UP ] [DOWN]
```

Display Node Card VPD (Microcode Level)

To display the Node Card **Serial Number** and microcode (firmware) level, perform the following:

1. At the **Activity** screen press [MENU].
2. At the **Main Menu** screen, select **Service**, and press [Enter].
3. At the **Service** screen, select **Vital Product Data**, and press [Enter].
4. At the **Vital Product Data Menu** screen, select **Node Card VPD**, and press [Enter]. The following screen displays the serial number and the microcode level.

```
Node Card VPD          Panel 0320

Frame 1:
  Accessor Controller Card

Part Number:          1234567
Serial Number:        YN100002W123
Firmware Version:     0130

[BACK] [ UP ] [DOWN]
```

5. To view the VPD for the MDA, MCP, and OPC cards, press [DOWN]. Continue to press [DOWN] to view the VPD for node cards in other frames.

Display Error Logs

There are two error log functions:

- **Library Error Logs**
This log records approximately 1000 error codes.
- **Drive Error Logs**
This log records the last ten error codes.

The error logs can be displayed from both the customer functions and the maintenance mode functions.

To display the **Error Logs**, perform the following:

1. At the **Activity** screen, press [MENU].
2. At the **Main Menu** screen, select **Service**, and press [Enter].
3. At the **Service** screen, select **Library or Drive Error Logs**, and press [Enter].
4. At the **Library or Drive Error Logs** screen, make your selection, and press [Enter]. Follow the screen instructions to obtain the error log data that you are looking for.

Element Address to Frame, Column, Row Converter

This procedure allows you to acquire from the sense data or error log, the element address corresponding to a library failure.

To display the **Element Addresses**, perform the following:

1. At the **Activity** screen, press [MENU].
2. At the **Main Menu** screen, select **Service**, and press [Enter].
3. At the **Service** screen, select **Test/Tools**, and press [Enter].
4. At the **Test/Tools** screen, select **Tools**, and press [Enter].

5. At the **Tools** screen, select **EA to FCR Converter**, and press **[Enter]**. Use the UP/DOWN arrows to scroll through all the valid Element Addresses and display the corresponding Frame, Column, Row.

Display Library Firmware Version

Refer to the upper left corner of the Activity Screen (Panel 0001) for the library microcode (firmware) version. You also could display the Node Card VPD (see “Display Node Card VPD (Microcode Level)” on page 491).

Firmware Update Procedures

To update microcode (firmware), see one of the following procedures:

- To update the library or drive microcode using your laptop and the CETool program, see “CETool Procedures” on page 500.
- To update the library or drive microcode from an RS/6000, see “Updating Microcode from RS/6000 by Using TAPEUTIL”.
- To update the drive microcode from a Sun host, see “Updating Drive Microcode from Sun System” on page 495.
- To update a library node card from another node card in the same library, see “Updating Device Microcode from Another Device in the Same Library” on page 498.
- To update a drive from another drive in the same library, see “Updating Device Microcode from Another Device in the Same Library” on page 498.

Updating Microcode from RS/6000 by Using TAPEUTIL

You may require assistance from the customer during this process.

This procedure downloads microcode to the tape drive from a file, via the SCSI bus or FC. The file should have been previously downloaded into a directory on the RS/6000. A suggested directory is “tmp”. The Microcode Load utility supports the IBM 3584 Ultrium tape drive.

1. Verify that the drive is unloaded. Using the operator panel, select **Menu**, **Library Status**, and **Drive Status**.
2. Verify that the drive is not in use by another host. Have the customer vary the drive offline.
3. Start the tape utility program by typing **tapeutil** at the prompt.
4. Select Tape Drive Service Aids from the menu by selecting **Tape Drive Service Aids** option, and pressing **[Enter]**.
5. Select **Microcode load** from the following panel, then press **[Enter]**.

```
IBM Tape Device Service Aid Menu                                700000

Select One of the Service Aids to be performed

Force Microcode Dump
  Perform a microcode dump of the system. The dump is stored in
  the device.
  After the dump is performed it must be read using Read Dump.
Read Dump
  Transfer a dump from the tape device to a host file, diskette or
  a tape cartridge.
Microcode load
  Download microcode from host file or diskette to tape device via
  SCSI bus.
Error Log Analysis
  Analyze system error log for device.
F3=Cancel                                                    F10=Exit
```

6. Select a **Device**, and press **[Enter]**

```

IBM Tape Device Selection Menu.                               900000

Select One of the devices listed below.

NAME          LOCATION      TYPE

rmt0          40-58-00-1,0  IBM 3584 Ultrium Tape Drive
rmt2          00-05-01-10  IBM 3584 Ultrium Tape Drive
rmt3          00-05-01-30  IBM 3584 Ultrium Tape Drive
smc0          40-58-00-1,1  IBM 3584 Library Medium Changer
FC-->rmt7     20-58-01     IBM 3584 Ultrium Tape Drive (FCP)
FC-->smc3     20-58-01     IBM 3584 Library Medium Changer (FCP)

F3=Cancel      F7=Commit      F10=Exit

```

- Enter the **path** and **filename** and press **F7=Commit**.
 Enter the filename **./xxxxx_xxxx.yy** in the source field where xxxxxx_xxxx.yy is the filename and extension of the microcode file to be loaded. For example, type **/010505_1550.ro**.
Important: Be sure to select the proper code file for the type of drive to be updated.
 - 3584 SCSI = yymmdd_xxxx.ro
 - 3584 FC = yymmdd_xxxx.FC.ro

You must press **F7=Commit** after entering the filename.

```

Prompting for Srce File for Operation on rmt3 located at 00-05-01-30
                                                                B00000

Please enter the following fields...

Enter Filename:                                               /dev/rfd0 +/-

F1=Help          F2=Refresh        F3=Cancel        F4=List
F5=Reset         F7=Commit         F10=Exit

```

- While the microcode load takes place, the display shows:

```

"Operation running, please stand by"

```

The drive display shows the loading status messages at the bottom of the display.

- When the microcode load completes, the initiator display shows:

```

Operation completed successfully!

```

The drive performs a soft power-on reset (restart the code).

- Press **F10** to exit the microcode load.
- Press **q** to quit tapeutil.
- You must have root authority to do the following step.

13. Update the VPD data in the host RS/6000 by unconfiguring the device (**Example: `rmdev -l rmt3`**) and reconfiguring the device (**Example: `mkdev -l rmt3`**).
14. Update the account FMR cartridge. See “Function Code 2 - Update Tape Drive Firmware From FMR Tape” on page 473.
15. Have the customer vary the drive online to the using application (for example, TSM) with the **update drive** command.

Updating Drive Microcode from Sun System

Attention

Unless you are very familiar with this procedure, IBM recommends that you use the “CETool Procedures” on page 500.

You may require assistance from the customer during this process.

This procedure downloads microcode to the drive from a file on the host.

1. Verify that the drive is offline and unloaded.
2. Type **volcheck**, and press Return. The system prompt appears.
3. Start the tape utility program by typing **`/opt/stdutil/tapesrv`**.

```

+-----+
|                SERVICE UTILITY                |
|          IBM SCSI Tape Device Driver for SunOS          |
+-----+
1: Select Tape Device           5: Force Dump
2: Query Device Type           6: Store Dump
3: Query Serial Number         7: Download Code
4: Format Cartridge            Q: End Service Utility

Enter Selection:

```

4. Select **1: Select Tape Device** from the Service Utility menu, and press **Return**.
5. The following prompt is returned. If **0st** is the correct device, press **Return**. Otherwise, type the path and the correct device.

```

Enter the tape device special file
[/dev/rmt/0st]:

```

You will receive the following acknowledgment:

```

*** Tape device /dev/rmt/0st opened successfully.

```

6. Select **7: Download Code** from the Service Utility menu, and press **Return**.
7. The following prompt is returned. Enter the path and filename.

```

Enter code filepath [/vol/dev/aliases/floppy0]:

```

8. While the microcode load takes place, the initiator display shows:

```

*** Downloading ##### bytes at offset #####

```

- When the microcode load completes, the display indicates:

```
*** Code downloaded successfully (##### bytes)
```

The drive will perform a soft power-on reset.

Note: A message should appear if an error occurs. Whether successful or not, **the drive will be reset** by the device microcode. To verify that the load occurred as expected, refer to “Display Drive VPD (Drive Type and Microcode Level)” on page 490.

- Type **q**, and press **Return** to quit the Service Utility.

Updating Drive Microcode Using NTUtil

The following procedure describes how to update the drive microcode over the SCSI bus, using NTUtil:

- If you have not already done so, install the IBM Ultrium Device Driver. If you are using a software application that utilizes a different device driver, you will need to stop that device driver, then start the IBM Ultrium NT Device Driver. See Installing the IBM Ultrium NT Device Driver topic in the device driver document for the details on how to perform the task.
- Open a DOS window. At the command prompt type **ntutil** to start NTUtil. The following screen appears:

```
Command Prompt - ntutil
NTUtil - Copyright (c) 1997-2000 IBM Corporation

Main Menu:
Microsoft Window NT 4.0 version

1. Manual tests
2. Batch test
3. Exit ntutil

Enter selection:
```

- Type **1**, and press Enter. The following NTUtil main menu appears:

```
Command Prompt - ntutil
32: forward space filemark          33: unload
34: reverse space filemark          35: load
36: forward space record(s)         37: return error
38: reverse space record              39: test unit ready
43: set media parms                  44: set dev parms(compression)
46: get device information           47: restore data
48: get medium information           49: inquiry
50: poll registered devices
53: space EOD                        54: display message
=====
70: system command
=====
80: Force Dump                      81: Read Dump
82: Update MicroCode                83: Log Sense
84: Get Last Sense                  85: Get Version
86: Associative/Persistent WProtect 87: Read/Write Test
88: List registered devices          89: Get MTDevice Info
=====
99: return to main menu
=====
enter selection
```

A scroll bar appears along the right edge of the window, allowing you to scroll up to the top of the menu. If no scroll bar appears, right click in Title Bar portion of the window (top of the window, usually

dark blue in color), then left click on **Properties** to bring up the "**Command Prompt**" **Properties** window. Click on the **Layout** tab and adjust the Window Size Width and Height numbers until scroll bars appear.

4. Ensure that the firmware image file to be downloaded to the drive has the correct naming convention. It should be one to eight characters, with a file extension of **x.fmr** to **xxxxxxx.fmr**. Ensure that the image file resides in the same directory from which the NT Util is started.
5. Enter **20** to open both the drive and media changer
6. Enter **82** (for 82: Update MicroCode) at the NTUtil selection prompt. A screen appears that prompts you to enter the microcode image name. Only enter the characters and not the ".fmr" file extension:
7. After pressing the **Enter** or **Return** key, the following screen will display, and the status light located on the bezel or faceplate of the drive will flash amber. As the NTUtil screen instructs, do not touch the drive until the firmware load has completed.

```
Command Prompt - ntutil
enter selection: 82
Enter microcode imagename (1 to 8 characters). or return to
Image size = 1048576
Transferring 65536 image bytes. total bytes = 65536
Transferring 65536 image bytes. total bytes = 131072
Transferring 65536 image bytes. total bytes = 196608
Transferring 65536 image bytes. total bytes = 262144
Transferring 65536 image bytes. total bytes = 327680
Transferring 65536 image bytes. total bytes = 393216
Transferring 65536 image bytes. total bytes = 458752
Transferring 65536 image bytes. total bytes = 524288
Transferring 65536 image bytes. total bytes = 589824
Transferring 65536 image bytes. total bytes = 655360
Transferring 65536 image bytes. total bytes = 720896
Transferring 65536 image bytes. total bytes = 786432
Transferring 65536 image bytes. total bytes = 851968
Transferring 65536 image bytes. total bytes = 917504
Transferring 65536 image bytes. total bytes = 983040
Transferring 65536 image bytes. total bytes = 1048576
Waiting for tape device to write flash-prom
Do not touch drive until complete
Note: This will take awhile (Avg 45 seconds)
```

8. After the firmware load completes, the drive Status Light will be solid green and the following message on the NTUtil screen will appear:

```
Transferring 65536 image bytes. total bytes = 917504
Transferring 65536 image bytes. total bytes = 983040
Transferring 65536 image bytes. total bytes = 1048576
Waiting for tape device to write flash-prom
Do not touch drive until complete
Note: This will take awhile (Avg 45 seconds)
Microcode updated. please exit NTutil and reboot the drive.

analyze() called with rc 1 err 0(ERROR_SUCCESS) data 0
Total elapsed time in seconds = 684.00
```

The "rc 1 err 0 (ERROR_SUCCESS)" message displays after a successful download. An instruction appears above this message to exit NTUtil and reboot the drive.

Note: Failure to reboot (turn power off, then back on) the drive could render the drive non-functional in certain conditions.

9. If you are using a software application that utilizes a different device driver, you will need to stop the IBM Ultrium NT Device Driver, then start those being used by your software application (see Setting the IBM Drivers to Manual Startup Mode in the device driver document).

Updating Device Microcode from Another Device in the Same Library

The following screens will guide you through the procedures to update the library or drive microcode:

1. At the **Activity** screen, select [MENU].
2. At the **Main Menu** screen, select **Service**.
3. At the **Service** screen, **Firmware Update**.
4. The following screen is displayed.

```
Firmware Update          Panel 1300
```

```
Update Drive from a Drive
Synchronize Node Cards
Enable Features
```

```
[BACK] [ UP ] [DOWN] [ENTER]
```

Select the desired option, and press [Enter]. Go to the selected item listed below, and follow the directions:

- If **Update Drive from a Drive** is selected, a menu displays a list of all drives and allows you to select the source drive. Next, you will be asked to select "Update All Drives" or "Update One Drive." After you select the source drive and target drives, the source drive will read the FMR image and write it to the target drives.

Note: It may take as long as 20 minutes to read the FMR image from the source drive and write it to the destination drives.

- If **Synchronize Node Cards** is selected, the microcode determines which node card has the highest microcode level and will update any downlevel node cards to that level.
- If **Enable Features** is selected, you will be able to enable or disable features. Only one feature, the Capacity Expansion Feature, is available. A password is required, and can be obtained from the ship group information, if the feature was ordered. Any future features that become available will be accessible through a menu that will:
 - Display a list of features
 - Provide information about whether each feature is enabled or disabled
 - Allow you to enter a password

Updating DLT-8000 Drive Microcode from FUP (FMR) Tape

The following screens will guide you through the procedures to update the DLT-8000 drive microcode using the library operator panel. The DLT-8000 term "FUP" is equivalent to the LTO term "FMR."

1. At the **Activity** screen, select [MENU].
2. At the **Main Menu** screen, select **Service**.
3. At the **Service** screen, **Firmware Update**.
4. The following screen is displayed.

```
Firmware Update          Panel 1300
```

```
Update Drive from a Drive
Synchronize Node Cards
Enable Features
Update DLT drive from tape
Update CPort from CPort
```

```
[BACK] [ UP ] [DOWN] [ENTER]
```

5. Select "Update DLT drive from tape" option, and press **[Enter]**. Follow the directions given to select the appropriate frame and DLT-8000 drive.
6. When the update is complete, remove the DLT-8000 FUP (FMR) tape from the lower I/O station.

CETool Procedures

A program entitled CETool.exe is available to the customer engineer. This program allows the attachment of a PC to the MCP node card. It allows you to do perform operations like to update library or drive microcode, request drive or library dumps, or configure Call Home. . The program is a single executable file that is compatible with most Windows 95/98/NT/2000 workstations.

FMR tapes typically are not used on this product. It is considerably faster and less expensive to use CETool than to order an FMR tape.

Attention

Before using this program, verify that the Serial Port settings on your computer are compatible with the program. From the Windows desktop, select My Computer, open the Control Panel Folder, and open the System folder. Select the Device Manager tab, click on Ports, and select the Communications Port you plan to use (Comm1, 2, 3, or 4). Click on the Port Settings tab, and ensure that the following settings are enabled: Bits per second = 115200, Data bits = 8, Parity = None, Stop Bits = 1, Flow Control = None.

Downloading and Installing CETool

Follow this procedure to download and install the CETool.

1. Using a Web Browser, go to the intranet site
<http://snj1nt02.sanjose.ibm.com/tape/tapetec.nsf/>

Click on the "3584 Tape Library" link, and download the latest level of library and drive microcode. If you do not have the latest version of the CETool.exe program installed on your PC, download it also.

Note: Record for later use the file name and the location to where you saved it.

2. Set up a Short Cut (and icon on your Windows desktop) that you can click to run the program.
 - a. From the Windows desktop, select My Computer.
 - b. Select drive C: (or the drive onto which you downloaded the program), then find the folder to which you downloaded the file.
 - c. Right click on CETool.exe. A pulldown menu appears.
 - d. Select Create Shortcut. This creates a CETool shortcut in the same folder to which you downloaded the file.
 - e. Right click on this shortcut, hold down the right mouse button, drag it to the Windows desktop, and release the right mouse button.
 - f. Select Move Here. You now have a CETool shortcut on your desktop.
3. Using serial cable P/N 19P1061, connect the PC serial port to the MCP J1 connector.

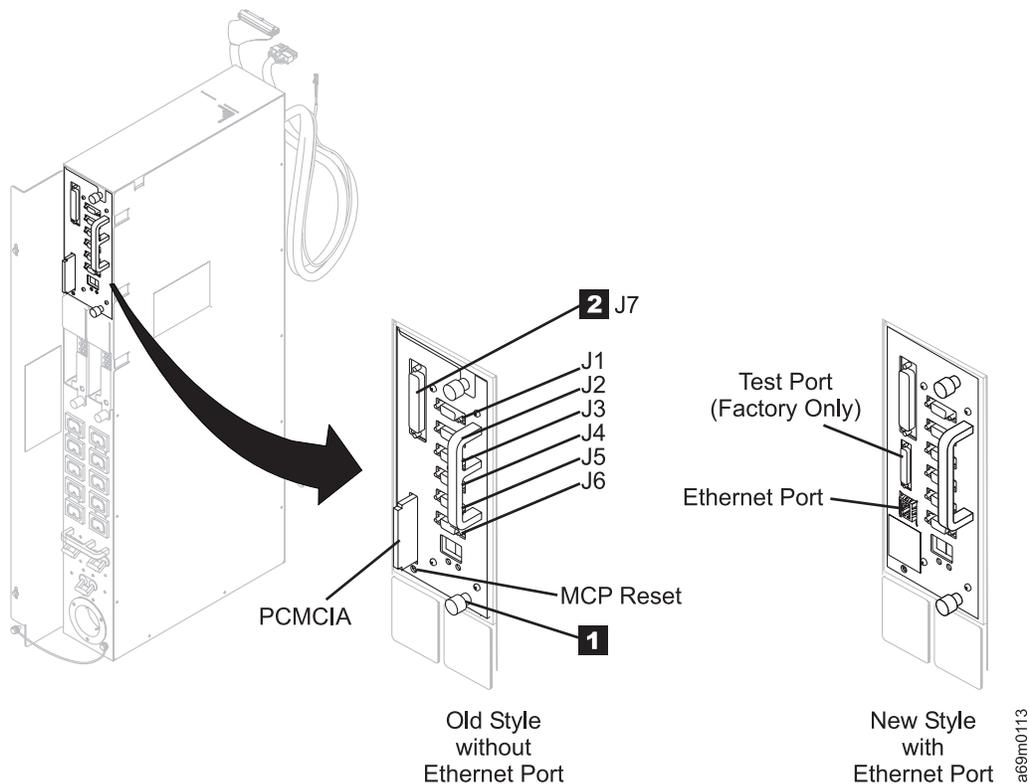


Figure 83. CETool J1 Connector

Note: When updating **library** microcode, you can connect to the J1 connector of **any** MCP on libraries with multiple MCPs. On libraries with multiple MCPs, you can connect to the J1 connector on any MCP, though you typically would connect it to the MCP in the base frame.

4. Start the CETool by double-clicking its icon.
5. Left click on **Setup, COMM Properties**, and set the COMM port number to match your PC COMM port.
6. Perform one of the following:
 - If you are updating library microcode, go to “Loading Library Microcode”.
 - If you are updating drive microcode, go to “Loading LTO Drive Microcode” on page 502.
 - If you are updating control port microcode, go to “Loading Control Port Microcode” on page 504.
 - If you want a library dump, go to “Creating Library Dump” on page 504.
 - If you want a drive dump, go to “Creating Drive Dump” on page 505.

Loading Library Microcode

Follow this procedure to download library microcode.

Note: Before you begin this procedure, ensure that you have the latest level of library microcode.

Required library firmware and drive code can be downloaded from the following websites.

For IBM service personnel with access to the Internal PFE website:

<http://snj1nt02.sanjose.ibm.com/tape/tapetec.nsf/>

For non-IBM personnel (and those without access to the IBM intranet) the following external website provides code and support for 3584:

<http://ssddom02.storage.ibm.com/techsup/webnav.nsf/support/3584>

1. Notify the customer that the library must be varied offline before this procedure can be performed.
2. Before downloading library microcode, [PAUSE] the library, then open the front door to ensure that the customer is not using the library.
3. Start the CETool program (see “Downloading and Installing CETool” on page 500).
4. Left click on **Load Code** in the CETool library window.
5. At the Select Code Image window, select the library microcode file you want to load, and left click on OPEN.
6. Verify the microcode level, and left click on **YES**.
7. The library microcode load is now started. When the microcode load is complete, the PC will display a 'download complete' message on the screen.

Notes:

- a. The process of transferring library microcode to all node cards may take as long as 10 minutes. While the microcode is being transferred, the receiving node cards will display 0x 0E and the transmitting node card will display 0x 0F (the x is the frame number).
- b. The operator panel displays **Updating Library Firmware**.
8. After the microcode is loaded into all of the node cards, the node cards will perform a POST. A series of numbers will display on each node card during the POST.
9. Left click on **Quit** to end the CETool procedure.
10. At the front panel of the library, select [MENU], **Vital Product Data**, and **Node Card VPD**. Verify that each node card is now at the level you downloaded.
11. Close the front door, and return to the procedure that sent you here.

Loading LTO Drive Microcode

Notes:

1. Before you begin this procedure, ensure that you have the latest level of drive microcode. Required library firmware and drive code can be downloaded from the following websites.

For IBM service personnel with access to the Internal PFE website:

<http://snj1nt02.sanjose.ibm.com/tape/tapetec.nsf/>

For non-IBM personnel (and those without access to the IBM intranet) the following external website provides code and support for 3584:

<http://ssddom02.storage.ibm.com/techsup/webnav.nsf/support/3584>

2. If you are copying drive microcode to a control port drive, the library will be unavailable to the host using the control path until the microcode update is complete.

Follow this procedure to download drive microcode.

1. Ensure that all the drives are empty.
2. Ensure that the host is NOT using the library.
3. Ensure that all SCSI drives are properly SCSI-terminated.
4. Ensure that all library front doors are closed.
5. Put the library in PAUSE mode so the accessor will move to the bottom left corner of the library. This will allow you to use the accessor position as an indicator that the download process has completed.
6. Start the CETool (see “Downloading and Installing CETool” on page 500).
7. Use the front panel of the library to display the drive VPD. This will ensure that all drives show the correct level of code.
8. Left click on **Load Code** in the CETool Drive window.

9. Select the frame in which the drive to be updated is located. If you wish to load drive microcode to all drives, select **All Drives**. If you load microcode to all drives, proceed to step 11, otherwise proceed to the next step.

Note: If the library contains a mixture of drive types then only drives that match the downloadable file will be updated.

10. Select the drive you want to update, then left click on **OK**.
11. At the Select Code Image window, select the file, and double click on **Drive Code (*.ro)**. You should now see the drive microcode file listed.

Note: The drive code images for LTO SCSI and LTO fibre are different. Ensure you download the correct image for the type of drive your are updating. If you load microcode to all drives, CETool will load the microcode level that you selected to each drive of that type (SCSI or fibre).

12. Select the drive microcode file you want to load, and left click on **OPEN**.

Note:

- Do not power cycle the drives or perform any other operations to the drives, including viewing drive VPD. These actions will halt the code update process, and require you to begin again.
- The CETool will display a "Downloading Drive Code" progress indicator that takes approximately 3 minutes to complete.
The CETool will display the message "File Transfer Complete - please wait for drive to program flash and reboot." This verifies that the code image was successfully transferred from the CETool to the MCP. Notice the time. The new progress indicator is based **ONLY** on estimated time, not on actual progress.
In a library with many drives, the progress indicator on CETool can show completion before the process is actually complete.
- Estimated times are listed in Table 56. When the update process is complete, the drive will reset itself and send a configuration request to the library. The library will respond by moving the accessor in front of the drive to calibrate it.

Table 56. Code Update Times

Frame and Number of Drives	Approximate Time (Minutes)
Frame 1 - One Drive	9
Frame 2 - One Drive	14
Frame 1- Four Drives	10
Frame 2 - Four Drives	14
Frame 1- Eight Drives	18
Frame 2 - Eight Drives	22
Frame 1- Twelve Drives	26
Frame 2- Twelve Drives	30

The process is complete when all drives that are being updated have been calibrated. This only occurs if the level of code in the drive has changed.

- If you load the same level of code that was previously in the drive, the drive may not reset itself, and no calibration will occur.
13. Return to the procedure that sent you here.

Loading Control Port Microcode

Note:

Follow this procedure to download control port microcode.

Notes:

1. Before you begin this procedure, ensure that you have the latest level of control port microcode. Required library firmware and drive code can be downloaded from the following websites. For IBM service personnel with access to the Internal PFE website:
<http://snj1nt02.sanjose.ibm.com/tape/tapetec.nsf/>

For non-IBM personnel (and those without access to the IBM intranet) the following external website provides code and support for 3584:
<http://ssddom02.storage.ibm.com/techsup/webnav.nsf/support/3584>
2. If you are copying control port microcode to a control port, the library will be unavailable to the host using the control port until the microcode update is complete.
 1. Ensure that the host is NOT using the library.
 2. Ensure that all SCSI drives on the same bus as the control port are properly terminated.
 3. Ensure that all library front doors are closed.
 4. Start the CETool (see "Downloading and Installing CETool" on page 500).
 5. Use the front panel of the library to display the control port VPD. This will ensure that the control port shows the correct level of code.
 6. Left click on **Load Code** in the CETool drive window.
 7. Select the frame in which the control port to be updated is located.
 8. Select the control port you want to update, then left click on **OK**.
 9. At the Select Code Image window, select the file you want to load, and click on **Control Port Code (*.ro)**.
 10. Select the control port microcode file you want to load, and left click on **OPEN**.

Note:

- Do not power cycle the control port or library or perform any other operations to the DLT-8000 drives. These actions will halt the code update process, and will require you to begin again.
 - The CETool displays a "Downloading Control Port Code" progress indicator. The CETool displays the message "File Transfer Complete - please wait for control port to program flash and reboot."
This verifies that the code image was successfully transferred from the CETool to the MCP. The new progress indicator is based ONLY on estimated time, not on actual progress.
 - When the code load is complete, exit CETool procedure.
11. Use the front panel of the library to display the control port VPD. Rechecking the VPD will ensure that the control port shows the correct level of code.
 12. Return to the procedure that sent you here.

Creating Library Dump

Follow this procedure to create a library dump.

1. Start the CETool program (see "Downloading and Installing CETool" on page 500).
2. Left click on **Get Logs** in the CETool library window.
3. At the Enter Log Batch Name screen, enter the machine serial number and date (YYMMDD). Left click on **OK**.

4. When the dump is completed, left click on **Quit** to end the CETool procedure.

Creating Drive Dump

Notes:

1. The drive must not be in use at the time you collect the drive dump. Stated another way, the host application must not be reading or writing to the drive while you collect the dump.
2. This procedure is not available for DLT-8000 drives.

Follow this procedure to create a drive dump.

1. Start the CETool program (see “Downloading and Installing CETool” on page 500).
2. Left click on **Get Logs** in the CETool drive window.
3. At the Enter Log Batch Name screen, enter the machine serial number and date (YYMMDD). Left click on **OK**.
4. When the dump is completed, left click on **Quit** to end the CETool procedure.

Viewing Error Log Entries

Follow this procedure to view error log entries using CETool.

1. Start the CETool program (see “Downloading and Installing CETool” on page 500).
2. With the CETool window open, left click on **Commands**.
3. Left click on **View Error Log**.
4. When the Open screen appears, highlight the log file you want to display, and left click **Open**.

Note: You cannot use this function to view an Event Log or a Servolog.

5. The resulting screen will display the errors in the log. The last non-zero entry is the most recent error.
6. Double click on the error log entry you wish to display.
7. The error log selected will look similar to Figure 84 on page 506.
8. For details on how to analyze the data in this screen, see “CETool Error Log Display Example” on page 442.

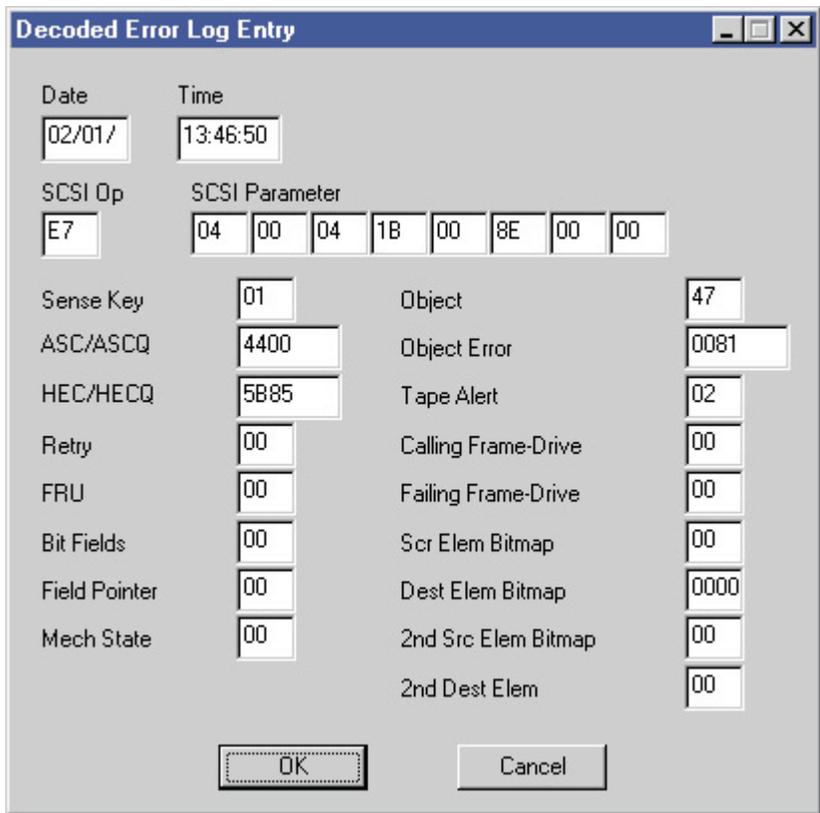


Figure 84. Error Log Screen Example

Library Verify Test

Library Verify will ensure that the library and selected drives are operating correctly, without the need for host interaction. While Library Verify **does not verify the SCSI connection** between the drives and the host, most other areas of the library are verified. If a failure is detected, an appropriate error code is displayed. Library Verify is run from the library operator panel.

1. There are several options available when running Library Verify:
 - Verify the library, but select **no drives**. If you are servicing the accessor, you will usually select **no drives**. If **no drives** is selected, the customer can continue to use the entire library.
 - Verify the library and only **one drive** (see note). If you are servicing a drive, you will usually select **one drive**. If **one drive** is selected, the customer can use everything except the selected drive.
 - Verify the library and **all drives** (see note). If you have just installed the machine, you will usually select **all drives**. If **all drives** is selected, the customer cannot use the library.

Note: If you are verifying one or all drives, you have the option to verify read/write capability.

2. Ask the customer to use their host application to unload and put away any cartridges that are located in the drives that you will be selecting.

Notes:

- a. If a failure makes it impossible to unload and put away a cartridge from the host, you may need to remove the cartridge manually before you test a drive, refer to “Manually Removing Cartridge” on page 672.
 - b. Do not use the customer’s data cartridges for this test. Use only the Diagnostic Cartridge. This is a normal scratch tape cartridge, except that the bar code label identifies it as the diagnostic cartridge.
3. At the **Activity** screen, press [MENU].
 4. At the **Main Menu** screen, select **Service**, and press[Enter].
 5. At the **Service** screen, select **Library Verify**, and press [Enter].
 6. You are given the choice to test **no drives**, **one drive**, or **all drives**. Make your choice, and press [Enter].
 - If you are servicing a drive, you will usually select **one drive**. If **one drive** is selected, the customer can use everything except the selected drive.
 - If you are servicing the accessor, you will usually select **no drives**. If **no drives** is selected, the customer can continue to use the entire library.
 - If you have just installed the machine, you will usually select **all drives**. If **all drives** is selected, the customer cannot use the library.
 7. Follow the instructions on the screen.

Allow Library Verify to complete before proceeding. Library Verify can take as long as 10 minutes to run the Read Write test on a single drive, and longer when testing multiple drives. Do not assume that the test has failed unless you see no sign of activity, such as no operator panel activity or accessor movement for 10 minutes. If Library Verify fails and no message is posted, attempt to capture the library logs (see) and contact Support.

Note: If you are running **all drives** and you get a failure in a non-critical area (such as one drive), you may wish to continue testing the rest of the library and repair that drive later.

8. If Library Verify **failed**, do the following:
 - a. If you have a **library error code**, go to “Library Sense Data to URC Table” on page 170. Use 04 44 00 and the Error Code to determine the URC. Go to “URC Description With Action and FRUs” on page 226, and follow the instructions.
 - b. If you have a **drive error code**, locate the FSC in “LTO Ultrium-1 Drive FSC to URC Table” on page 215, and perform the action suggested in “URC Description With Action and FRUs” on page 226.

9. If the Library Verify test **did not fail**, the machine may be operating correctly. If you feel that there is still a problem, do one of the following:
 - a. Try rerunning Library Verify.
 - b. Review the logs and other error data.
 - c. If you cannot resolve the problem, call your next level of support.
10. If the Library Verify Test does not fail, return to the procedure that sent you here or go to “End of Call” on page 489.

Call Home Facility Configuration

Gathering Call Home Configuration Data

The following data will be necessary before you can complete Call Home facility configuration using the CETool. For necessary configuration data listed below, call your nearest 3584 Support Center for inputs. When you talk with the support center, provide to them the country, region/state/province, and city where the library is installed. If you cannot determine this information, call the support center for assistance. The support center can provide you with the appropriate configuration information for your country, region/state/province, and city. Write these inputs into Table 57. for future reference. Numbers already recorded in the **Entry** column are the recommended values. Blank entries in the table are location or customer specific.

Record your customer location information and the information provided by your support center in Table 57 for future reference.

Table 57. Call Home Configuration Data

Configuration Item	Example	Your Entry
Your Customer's Location		
ISO Country Code	US	_____
Region/State/Province	AZ (Arizona)	_____
Location/City	Tucson	_____
Call Home Options		
Uncheck Disable Call Home	N/A	N/A
Threshold Timeout Minutes	1440	1440
Account	IBM	_____
User ID	TAPE	_____
Password	password	_____
Primary Phone #	94610205	_____
Primary IP Address	123.456.789.01	_____
Secondary Phone #	98371005	_____
Secondary IP Address	123.456.789.02	_____
Customer Info		
Company Name	XYZ Corp	_____
Contact Phone #	8005551234	_____
Offshift Phone #	8005555678	_____

Notes:

1. Hyphens '-' in phone numbers are depicted in these notes to provide clarity. There is no hyphen available on your telephone.

2. Since there are two numbers listed for Tucson, use the first number as primary and the second number as secondary. For locations with only a single entry, you may use a nearby location, use a distant location requiring a toll call, or leave this field blank.
3. If a phone number is a local call, leave off the area code. For example, for a machine located in Tucson, AZ, the numbers listed are local calls, so record 461-0205 as the primary number and 547-0678 as the secondary number. If a phone number is NOT a local call, you must use '1-' followed by the area code, then the number. If the machine is located near Tucson but outside the Tucson local calling area, the primary number is 1-520-461-0205 and the secondary number is 1-520-547-0678.
4. If the phone line used for the Call Home modem requires a dial-out prefix (such as dialing a '9' before the phone number), include this prefix with the phone number. For example, in Tucson, AZ, if you must dial 9 for an outside line, record 9-461-0205 as the primary number and 9-547-0678 as the secondary number.
5. Before you use these phone numbers to configure Call Home, if possible you should attempt to call them with a telephone to ensure the number and dial-out prefix are correct. If you can not place a call using a normal telephone, the modem will not be able to place the call either. If a modem picks up on the other end of the phone, you will hear a modem beep which indicates your call did reach the modem. This indicates that the phone number you have selected is working. Hang up the phone.
6. In some areas, after dialing a dial-out prefix such as '9', there is a short delay before you get a dial tone. In this case you need to add a 'W' to the dial-out prefix to force the modem to wait for a dial tone before dialing the rest of the phone number. In the example of a machine in Tucson, AZ, the primary number would be 9W-461-0205 and the secondary number would be 9W-547-0678.
7. The 3584 Remote Support Facility (Call Home) defaults to Tone dialing. The following modifiers can be added within the phone number specified during the Call Home Configuration.

Table 58. Call Home Phone Number Modifiers for Dial Tone

Phone Number Modifier	Description	Usage Notes
P	Pulse Dial	When using the modem on a phone system requiring Pulse dialing, enter phone number 1234567 as P1234567
T	Tone Dial	Not required. The 3584 defaults to Tone dialing.
W	Wait for Dial Tone	When using the modem on a phone system that requires waiting for another dial tone before dialing additional numbers, insert a W in the phone number at the place where you must wait. For example, if you dial 123 and wait for a dial tone, then dial 456789, you can enter the phone number as 123 W 456789.
, (comma)	Delay for 2 seconds before dialing next digit	When using the modem on a phone system that requires a brief pause before dialing additional numbers, insert a , (comma) in the phone number at the place where you must pause. For example, if you dial 123 and pause, then dial 456789, enter the phone number as 123,456789. The pause is approximately 2 seconds. For a longer pause, enter more than one comma.

8. Configuring a modem may require different phone number dial-prefixes in some areas. If you are unable to determine a working primary phone number for Call Home, contact your next level of support for assistance.

Using CETool to Configure for Call Home

Follow this procedure to configure the library for Call Home.

Note: If you have not collected the necessary data to configure Call Home using CETool, see “Gathering Call Home Configuration Data” on page 508 before continuing with this procedure.

1. Start the CETool program (see “Downloading and Installing CETool” on page 500 for the procedure to download and configure CETool on your service laptop computer.
2. Double click the CETool icon on your desktop.
3. When the CETool screen displays, click on the **Configure Remote Service** button. Figure 85 will display.
4. Refer to Table 57 on page 508 and select items from the table to insert into the Remote Serviceability Configuration screen.

The screenshot shows a window titled "Remote Serviceability Configuration" with a close button in the top right corner. The window is divided into several sections:

- Call Home Options:** Includes a checkbox for "Disable Call Home", a "Threshold Timeout" field set to 1440 Minutes, and input fields for "Account" (IBM), "User ID" (TAPE), and "Password" (password).
- Customer Info:** Includes a "Company Name" field (XYZ Corp), "Contact Phone #" (8005551234), and "Offshift Phone #" (8005555678).
- WTI Switch Options:** Includes a checked checkbox for "WTI Switch Installed" and a "Library Switch Port #" field set to 2 (with a range of 2-16).
- Call In Options:** Includes a "Disable Call In" checkbox, an "Enable Call In for" field (minutes), and input fields for "Call In Number" and "Call In Password".

At the bottom of the window are "Submit" and "Cancel" buttons. A vertical label "a69m0011" is visible on the right side of the window.

Figure 85. Remote Serviceability Configuration

5. When the **Remote Serviceability Configuration** screen displays, enter the requested information, then click on the **Submit** button.

Note: More information about the fields on this screen is available below.

Remote Serviceability Configuration screen details

- In the **Call Home Options** window, enter the following information:
 - The **Disable Call Home** checkbox should only be checked if the subsystem is NOT connected to a modem and phone line for use by the Remote Support facility.
 - The **Threshold Timeout** field should be set to 1440.

Note: This is the time in minutes that must pass before the machine will call a second time if a specific error is occurring repeatedly. 1440 is 24 hours, so if a specific error occurs repeatedly, the machine will call home a second time after 24 hours, and again every 24 hours until the problem is resolved.

- The **Account** field should be set to the ACCOUNT as specified in the TAPEGRP.LIST file or as defined by your support group.

Note: For example, for a library in the United States, set the **Account** field to 'urus'.

- The **USER ID** field should be set to the USER ID as specified in the TAPEGRP.LIST file or as defined by your support group.

Note: For example, for a machine in the United States, set the **USER ID** field to ‘tapeus’

- The **Password** field depends on whether the PASSWORD field in the TAPEGRP.LIST file is blank. If a non-blank password is specified in the TAPEGRP.LIST file, enter it into the **Password** field. If a blank password is specified in the TAPEGRP.LIST file then enter ‘dummy’ into the **Password** field.
- In the **Primary** window, enter the following information:
 - The **Phone #** field should be set to the primary phone number which you recorded earlier in this procedure.

Note: Do not enter dashes in the phone number. For example, if the phone number is 9–1–520–461–0205, enter 915204610205.

- The **IP Address** field should be set to IP Address of the primary Retain server for your location, which you recorded earlier in this procedure.
- In the **Secondary** window, enter the following information:
 - The **Secondary #** field should be set to the secondary phone number which you recorded earlier in this procedure.

Note: If there is no secondary (alternate) phone number available, you may leave this field and the following fields blank.

Do not enter dashes in the phone number.

- The **IP Address** field should be set to the IP Address of the secondary Retain server for your location, which you recorded earlier in this procedure.

In the **Customer Info** window, enter the following information:

- Customer’s company name
- Area code and phone number that can be used to contact the customer during normal business hours.
- Area code and phone number that can be used to contact the customer outside of normal business hours.

This ends the configuration procedure.

Library Configuration

Notes:

1. By default, the library subsystem is configured as one logical library. If necessary, the subsystem can be configured as multiple logical libraries. The maximum number of logical libraries is the number of drives, although IBM recommends at least two drives per logical library.
2. If you have made a change to the configuration of the library subsystem, and if the library is connected to a SAN, it may be necessary to reset various components of the SAN so they will recognize the changes. As an example, a 2108 SAN Data Gateway may need to be reset or IPLed to recognize that new devices have been added.

For more detailed information about configuration, see the *IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584*, GA32-0408).

1. If the customer wants to define multiple logical libraries, ask whether they want to install logical library bar code labels or whether they need to use **Advanced Configuration**.

Note: Most customers will use logical library bar code labels. However, if the customer needs to configure logical libraries in ways that cannot be accomplished using logical library bar code labels, they can use Advanced Configuration. As an example, for a customer who needs to

define logical libraries that are smaller than one column (or smaller than two columns if the Capacity Expansion Feature is enabled), you must use Advanced Configuration.

2. If the customer wants to use logical library bar code labels, open the front doors, install the logical library bar code labels as required by the customer, then close the front doors.

Note: Logical library bar code labels can be installed at the top of each column on the rear (drive side) of the library, and on the bezel of each drive. As an example, if the customer wants to split an L32 that contains four drives into two logical libraries, you can install the following logical library bar code labels:

- Logical Library 1 bar code labels at the top of columns 1 and 3, and on the bezels of drives 1 and 2.
- Logical Library 2 bar code labels at the top of columns 5 and 7, and on the bezels of drives 3 and 4.

3. At the **Activity** screen, press [MENU].
4. At the **Main Menu** screen, using the [DOWN] button, select **Settings**, and press [ENTER].
5. At the **Settings** screen, select **Configuration**, and press [ENTER].
6. At the **Configuration** screen, select **Configure Library** if the customer used logical library bar code labels, or select **Advanced Configuration**, and press [ENTER].
7. Follow the instructions on the screens to complete the configuration.

Note: When the configuration has been completed, the library will be calibrated automatically, if necessary.

Attention: When the library displays the physical configuration information, review it carefully. If the physical configuration information is incorrect, do NOT accept the configuration. As an example, if the physical configuration shows the wrong number of cells or drives in a frame, you must NOT accept the configuration. As long as you do not accept the configuration the 'old' configuration will remain in effect. But, if you accept an invalid configuration, it can lead to other problems, such as calibration failures or inventory failures.

Protecting ESD-Sensitive Parts

Attention: Follow these guidelines to prevent damage to ESD-sensitive circuits:

- Keep ESD-sensitive parts in a grounded, metal case, if possible.
- Keep the ESD-sensitive part in its original shipping container until you are ready to install the part.
- Make the least-possible movement to minimize static electricity.
- Touch the metal frame of the machine to discharge static electricity in your body just before touching an ESD-sensitive part you are installing into or removing from the machine or from the antistatic container. Additionally, consider touching the antistatic container to the frame. Maintain physical contact with the machine while plugging the part.

Note: Cables might connect to logic cards or boards that are ESD-sensitive. Use care when working with connectors.

- Your body can build up a 2000-volt static charge from you walking across carpet or handling plastics. As little as 800 volts can weaken or destroy a junction of a CMOS module on a logic card. The resultant failure may not appear for several days.
- To avoid creating a static buildup, do not shuffle your feet on carpet or touch Styrofoam or plastic objects while you are holding an ESD-sensitive part. If you are handling a part while you are away from the machine (for example, at a desk), touch the antistatic bag to a metal screw on an electrical outlet cover or a light switch cover.
- Hold the ESD-sensitive part by the edges, being mindful not to touch any components, pins, or connectors.

Use the correct tool when removing a plug-in module.

If possible, keep one hand on the frame when inserting or removing a logic card.

- Do not place an ESD-sensitive part on anything that can provide a discharge path from your body through the ESD-sensitive part.

If you need to set aside an ESD-sensitive part, place it into or on top of the anti-static package in which it was shipped.

- Prevent ESD-sensitive parts from being touched by other persons. Reinstall machine covers when you are not working on the machine.
- Use care when working with ESD-sensitive parts when the humidity is low, as low humidity increases static potential.

Using ESD Kit

The ESD kit contains a wrist band that, when worn by you, can eliminate the static potential that can damage a card.

1. Power off the library before you put on the ESD wrist band.
2. Connect the wrist band to an unpainted, frame-ground point of the machine.
3. Remove the ESD wrist band when working on any part of the machine that has power switched on.
4. Do not put the ESD mat near any electrical circuit that is powered on.

The internal resistance (1 megohm) in the ESD cable limits the current if it touches a high voltage source.

5. Do not put the ESD mat near a grounded surface. Ground the ESD mat only through the ESD cable. The ESD cable supplies a high resistance to ground for your safety. If the ESD mat touches a grounded surface, the high resistance in the ESD cable is bypassed, which causes the ESD mat not to work correctly.

SCSI Bus Problems

If this is a new installation, or the customer has updated their host hardware or software, verify that the SCSI device driver is installed properly. Refer to device driver documentation.

The procedure for fixing SCSI bus errors varies, depending on whether the error is solid (consistent) or intermittent, and whether your configuration contains single or multiple drives on the affected SCSI bus. In addition, the procedures for isolating LTO type SCSI problems and DLT-8000 type SCSI problems are different enough to require separate procedures for each type. See Table 59 for a list of procedures for various error types.

Attention

In the following procedures you need to know the frame and row numbers of the failing drives. The customer may provide this information or you may need to trace the SCSI cables from the host to the drives.

Table 59. SCSI Bus Problems

For Error Type....	See...
Solid Error – One LTO Drive	“Solid Error – One LTO Drive on the SCSI Bus”
Solid Error – Multiple LTO Drives	“Solid Error – Multiple LTO Drives on the SCSI Bus” on page 515
Solid Error – One DLT-8000 Drive	“Solid Error – One DLT-8000 Drive on the SCSI Bus” on page 517
Solid Error – Multiple DLT-8000 Drives	“Solid Error – Multiple DLT-8000 Drives on the SCSI Bus” on page 518
Intermittent Error – One Drive on the SCSI Bus	“Intermittent Error – One Drive on the SCSI Bus” on page 519
Intermittent Error – Multiple Drives on the SCSI Bus	“Intermittent Error – Multiple Drives on the SCSI Bus” on page 520

Solid Error – One LTO Drive on the SCSI Bus

1. Ensure that the power is on to the LTO drive:
 - a. Ensure that the library is powered on. If the library power switch is on but the power indicator is off, go to “Power Isolation MAP” on page 449.
 - b. Ensure that all the circuit protectors on the FCA (in the frame containing the failing drive) are on.
 - c. Ensure that the MCP two-character display (in the frame containing the drive) is alternating 00 and frame number (see “Node Card LED Display Codes” on page 412).
 - d. Ensure that the drive power cord is plugged in (at the FCA and the drive tray or canister).
2. Determine if the drive is experiencing a hang condition.
 - a. If a tape cartridge is in the drive, press the unload button. If the cartridge ejects, the drive does not have a hang condition, go to step 5 on page 515. If the cartridge does not eject, go to step 3.
 - b. Manually load the LTO diagnostic cartridge into the failing drive. If the cartridge loads, the drive does not have a hang condition. Press the unload button to unload the LTO diagnostic cartridge, and go to step 5 on page 515.
3. Press and hold the unload button for 20 seconds. The drive will save a dump and go into a reboot, which allows communication to the drive. Do not cycle power (power on and power off) or you will lose the dump contents.

4. Obtain a drive dump (see “Creating Drive Dump” on page 505). Contact your next level of support to determine if they can use this dump. Go to “End of Call” on page 489.
5. Ensure that the SCSI cables are plugged in and tightened.
6. Ensure that the drive SCSI address is the same as the SCSI address being used by the host system. From the operator panel, select **[MENU], Settings, SCSI IDs**. View the SCSI ID for the affected drive. If the SCSI ID is different than expected, you must either change the drive SCSI ID or reconfigure the host.
7. If this is a drive **tray** model, run the SCSI wrap test (see “SCSI Wrap Test – LTO Only” on page 486). If this is a drive **canister** model, go to “Smart SCSI Wrap Tool” on page 487.

Note: The “Smart SCSI Wrap Tool” is available to test the SCSI circuitry of both the LTO and DLT-8000 drives. This tool speeds-up and enhances the ability to isolate SCSI bus problems, and will handle the case where multiple SCSI devices are set to the same SCSI ID. This tool can display the SCSI ID of any drive or control port in a canister.

- a. If the test fails, replace the following:

On Drive Tray Models

- Drive tray including the internal Y cable (refer to “Drive Types” on page 584)
- SCSI terminator
- Drive power cable

On Hot Swap Models

- Drive canister assembly (refer to “Drive Types” on page 584)
 - Fixed tray assembly (contains the drive power supply)
 - SCSI terminator
 - Drive power cable
- b. If the test runs successfully, replace the following:
 - SCSI terminator
 - SCSI host to drive cable
 - Interposer (if installed)

If the failure still exists, it probably is caused by the host system hardware or software. Refer to the service documentation for the host system.

Solid Error – Multiple LTO Drives on the SCSI Bus

Attention

Only one HVD drive is allowed on each SCSI bus when attached to an AS/400 host.

1. Ensure that the power is on to the drives:
 - a. Ensure that the library is powered on (O). If the library is powered on but the library power indicator is off, go to “Power Isolation MAP” on page 449.
 - b. Ensure that all the circuit protectors on the FCA (in the frame containing the failing drives) are on.
 - c. Ensure that the MCP two-character display (in the frame containing the drives) is alternating 00 and frame number (see “Node Card LED Display Codes” on page 412).
 - d. Ensure that the power cords are plugged into all of the drives (at the FCA and the drive tray or canister).
2. Ensure that the SCSI cables are plugged in and tightened.

3. Ensure that the drive SCSI addresses are the same as the SCSI addresses being used by the host system. From the operator panel, select **[MENU]**, **Settings**, **SCSI IDs**. View the SCSI IDs for the affected drives. If the SCSI IDs are different than expected, you must either change the drive SCSI IDs or reconfigure the host.
4. If only one drive is failing on this SCSI bus, go to step 5. If more than one drive is failing on this SCSI bus, go to step 6.
5. Replace the following FRUs:

On Drive Tray Models

- a. Drive tray (refer to “Drive Types” on page 584)
- b. Drive power cable

On Hot Swap Models

- a. Drive canister assembly (refer to “Drive Types” on page 584)
- b. Fixed tray assembly (contains the drive power supply)
- c. Drive power cable

If the problem is corrected, return to the procedure that sent you here or go to “End of Call” on page 489. If the failure still exists, go to step 6.

6. Ensure that the SCSI cable from the host system to the first drive is connected.
7. Disconnect the drive-to-drive SCSI cable from the first drive and replace with the terminator.
8. Run a utility (such as tapeutil) to determine whether you can communicate with the first drive.
 - If you cannot communicate with the drive, and this is a drive **tray** model, run the SCSI wrap test (see). If this is a drive **canister** model, go to . If the SCSI wrap test runs successfully, replace the following:
 - SCSI terminator
 - SCSI host-to-drive cable
 - Interposer (if installed)
 - Drive-to-drive SCSI cable (except for the first drive)

If the failure still exists, it probably is caused by the host system hardware or software, refer to the service documentation for the host system.

- If the SCSI wrap test fails or the Smart SCSI wrap tool does not correct the problem, replace the following:

On Drive Tray Models

- Drive tray including the internal Y cable (refer to “Drive Types” on page 584)
- SCSI terminator
- Drive power cable

On Hot Swap Models

- Drive canister assembly (refer to “Drive Types” on page 584)
- Fixed tray assembly (contains the drive power supply)
- SCSI terminator
- Drive power cable

If the problem still exists, contact your next level of support.

- If the error does not occur, reconnect one drive at a time back to the SCSI bus, and repeat step 8 for each drive.

Note: Ensure that the SCSI terminator is always on the last drive on the failing SCSI bus.

Solid Error – One DLT-8000 Drive on the SCSI Bus

1. Ensure that the power is on to the DLT-8000 drive and to the control port:
 - a. Ensure that the library is powered on. If the library power switch is on but the power indicator is off, go to “Power Isolation MAP” on page 449.
 - b. Ensure that all the circuit protectors on the FCA (in the frame containing the drive) are on.
 - c. Ensure that the MCP two-character display (in the frame containing the drive) is alternating between 00 and the frame number (see “Node Card LED Display Codes” on page 412).
 - d. Ensure that the drive power cord is plugged in (at the FCA and the fixed canister assembly).
 - e. Ensure that the control port cord is plugged in.
 - f. Ensure that the control port power cord is plugged in.
2. Determine if the drive is experiencing a hang condition
 - a. If a tape cartridge is in the drive, press unload. If the cartridge ejects, the drive does not have a hang condition, go to step 5. If the cartridge does not eject, go to step 3.
 - b. Manually load a DLT-8000 diagnostic cartridge into the failing drive. If the cartridge loads, the drive does not have a hang condition. Press the unload button to unload the diagnostic cartridge, and go to step 5.
3. Power the failing DLT-8000 drive and control port off, then on, by removing and reinstalling the ac power connection to each fixed tray assembly.

Note: Due to redundant dc power, you may have to remove more than one ac power cord to remove power from the drive and control port. When the LEDs on the back of the drive and control port go off, power has been removed successfully.

If the control port canister or DLT-8000 drive canister fails to power on, replace the following:

- a. Fixed tray (contains the drive/control port power supply), (see “Fixed Tray Assembly - All Hot Swap Canister Models” on page 612).
- b. Drive/control port power cable.

If the control port canister and DLT-8000 drive canister both power on, wait two minutes, then press the drive unload button. If the drive will not unload, replace the:

- a. DLT-8000 drive canister (if the drive cannot unload the tape cartridge). (See “Drive Types” on page 584.)
 - b. Control port canister (see “Prepare for Control Port Replacement” on page 537)
 - c. Host-to-control port canister SCSI cable
 - d. Control port-to-DLT-8000 drive SCSI cable
 - e. SCSI terminator
 - f. SCSI interposer, if used
4. Go to “End of Call” on page 489.
 5. Ensure that the SCSI cables are plugged in and tightened.
 6. Ensure that the DLT-8000 drive and Control Port SCSI addresses are the same as the SCSI addresses being used by the host system. From the operator panel, select **[MENU]**, **Settings**, **SCSI/LOOP IDs**. View the SCSI ID for the affected drive and control port. If the SCSI ID is different than expected, you must either change the DLT-8000 drive or Control Port SCSI ID or reconfigure the host.

Note: The “Smart SCSI Wrap Tool” is available to test the SCSI circuitry of both the LTO and DLT-8000 drives. This tool speeds-up and enhances the ability to isolate SCSI bus problems, and will handle the case where multiple SCSI devices are set to the same SCSI ID. This tool can display the SCSI ID of any drive or control port in a canister.

7. Replace the following FRUs, one at a time until the problem is fixed:
 - Drive canister (refer to “Drive Types” on page 584)
 - Drive fixed tray (contains the drive power supply)
 - SCSI terminator
 - Drive power cable
 - a. If the drive still fails, replace the following:
 - Control port assembly (refer to “Prepare for Control Port Replacement” on page 537)
 - Control port fixed tray (contains the control port power supply)
 - SCSI cable from the host to the control port assembly
 - SCSI cable between the control port assembly’s fixed tray and the drive canister’s fixed tray
 - Control port power cable
 - Interposer (if installed)
 - b. If the failure still exists, it probably is caused by the host system hardware or software. Refer to the service documentation for the host system.

Solid Error – Multiple DLT-8000 Drives on the SCSI Bus

Attention

Only one HVD drive is allowed on each SCSI bus when attached to an AS/400 host.

1. Ensure that the power is on to the drives and the control ports:
 - a. Ensure that the library is powered on (O). If the library is powered on but the library power indicator is off, go to “Power Isolation MAP” on page 449.
 - b. Ensure that all the circuit protectors on the FCA (in the frame containing the failing drives) are on.
 - c. Ensure that the MCP two-character display (in the frame containing the drives) is alternating 00 and frame number (see “Node Card LED Display Codes” on page 412).
 - d. Ensure that the power cords are plugged into all of the drives and the control ports (at the FCA and the drive canister’s fixed tray assembly).
2. Ensure that the SCSI cables are plugged in and tightened.
3. Ensure that the drive and Control Port SCSI addresses are the same as the SCSI addresses being used by the host system. From the operator panel, select **[MENU], Settings, SCSI/LOOP IDs**. View the SCSI IDs for the affected drives and control port. If the SCSI IDs are different than expected, you must either change the drive or Control Port SCSI IDs or reconfigure the host.

Note: The “Smart SCSI Wrap Tool” is available to test the SCSI circuitry of both the LTO and DLT-8000 drives. This tool speeds-up and enhances the ability to isolate SCSI bus problems, and will handle the case where multiple SCSI devices are set to the same SCSI ID. This tool can display the SCSI ID of any drive or control port in a canister.

4. If only one drive is failing on this SCSI bus, go to step 5. If more than one drive is failing on this SCSI bus, go to step 6.
5. Replace the following FRUs:
 - a. Drive canister assembly (refer to “Drive Types” on page 584)
 - b. Fixed tray assembly of the failing drive (contains the drive power supply)
 - c. Drive power cable

If the problem is corrected, return to the procedure that sent you here or go to “End of Call” on page 489. If the failure still exists, go to step 6.

6. Ensure that the SCSI cable from the host system to the first drive is connected.
7. Disconnect the drive-to-drive SCSI cable from the first drive and replace with the terminator.

8. Run a utility (such as tapeutil) to determine whether you can communicate with the first drive.
 - If you cannot communicate with the drive, replace the following:
 - Control port canister assembly (see “Prepare for Control Port Replacement” on page 537)
 - Drive canister assembly (see “Drive Types” on page 584)
 - Fixed tray assembly (contains the drive/control port dc power supply)
 - SCSI terminator
 - SCSI host-to-control port cable
 - SCSI control port-to-drive cable
 - Interposer (if installed)

If the failure still exists, it probably is caused by the host system hardware or software, refer to the service documentation for the host system.

- If the error does not occur, reconnect one drive at a time back to the SCSI bus and repeat step 8 for each drive.

Note: Ensure that the SCSI terminator is always on the last drive on the failing SCSI bus.

Intermittent Error – One Drive on the SCSI Bus

1. Ensure that the latest level microcode is installed on the drive (to display drive microcode level, see “Vital Product Data (VPD) Menu” on page 531). See and the web site at URL for the latest level of microcode. Update the microcode level, if necessary.

Required library firmware and drive code can be downloaded from the following websites.

For IBM service personnel with access to the Internal PFE website:

<http://snj1nt02.sanjose.ibm.com/tape/tapetec.nsf/>

For non-IBM personnel (and those without access to the IBM intranet) the following external website provides code and support for 3584:

<http://ssddom02.storage.ibm.com/techsup/webnav.nsf/support/3584>

2. Check host error logs to determine if a specific cartridge is causing the problem. Replace the cartridge that is listed as being faulty.
3. If the problem still exists, replace the following FRUs:

For LTO Drive Tray Installations

- a. SCSI terminator
- b. SCSI host cable
- c. Drive tray, including the internal Y cable or (see “Drive Types” on page 584)
- d. Drive power cable

For LTO Drive Canister Hot Swap Installations

- a. SCSI terminator
- b. SCSI host cable
- c. Drive canister assembly (see “Drive Types” on page 584)
- d. Fixed tray assembly (contains the drive dc power supply)
- e. Drive power cable

For DLT-8000 Drive Canister Hot Swap Installations

- a. SCSI terminator
- b. SCSI host-to-control port cable
- c. SCSI control port-to-drive cable

- d. Drive canister assembly (see “Drive Types” on page 584)
- e. Drive’s Fixed tray assembly (contains the drive power supply)
- f. Control port assembly
- g. Control port assembly’s fixed tray assembly (contains the control port assembly power supply)
- h. Drive power cable

If the failure still exists, it probably is caused by the host system hardware or software. Refer to the service documentation for the host system.

Intermittent Error – Multiple Drives on the SCSI Bus

Attention

Only one HVD drive is allowed on each SCSI bus when the library is attached to an AS/400 host.

1. Ensure that the latest level microcode is installed on the drives (to display drive microcode level, see “Vital Product Data (VPD) Menu” on page 531). See and the web site at URL for the latest level of microcode. Update the microcode level, if necessary.
Required library firmware and drive code can be downloaded from the following websites.
For IBM service personnel with access to the Internal PFE website:
<http://snj1nt02.sanjose.ibm.com/tape/tapetec.nsf/>

For non-IBM personnel (and those without access to the IBM intranet) the following external website provides code and support for 3584:
<http://ssddom02.storage.ibm.com/techsup/webnav.nsf/support/3584>
2. Check host error logs to determine if a specific cartridge is causing the problem. Replace any cartridge that has been isolated.
3. If the problem still exists, replace the following FRUs:

For LTO Drive Tray Installations

- a. SCSI terminator
- b. SCSI host cable
- c. SCSI drive-to-drive cables
- d. Drive tray, including the internal Y cable (refer to “Drive Types” on page 584)
- e. Drive power cables

For LTO Drive Canister Hot Swap Installations

- a. SCSI terminator
- b. SCSI host cable
- c. SCSI drive-to-drive cables
- d. Drive canister assembly (refer to “Drive Types” on page 584)
- e. Fixed tray assembly (contains the drive dc power supply)
- f. Drive power cables

For DLT-8000 Drive Canister Hot Swap Installations

- a. SCSI terminator
- b. SCSI host cable
- c. SCSI drive-to-drive cables
- d. Drive canister assembly (refer to “Drive Types” on page 584)
- e. Fixed tray assembly (contains the drive dc power supply)

- f. Control port assembly (see “Drive Types” on page 584).
- g. Control port assembly’s fixed tray assembly
- h. Drive power cables

If the failure still exists, it probably is caused by the host system hardware or software. Refer to the service documentation for the host system.

Fibre Channel Problems

Use the “Solid Error – Fibre Channel” procedure or the “Intermittent Error – Fibre Channel” procedure to correct a fibre channel problem.

Attention: Notify the customer that the devices on the fibre channel must be varied offline before this problem determination procedure can be performed. You need to understand whether the problem is with the drive, drive cable, or the device to which the cable is attached. Use switch, hub, or other fibre product service guides as appropriate. Refer to *IBM 3584 UltraScalable Tape Library, Planning and Operator Guide* to verify that the configuration and software levels are supported.

Note: Ensure that all the fibre channel cables are installed correctly.

Solid Error – Fibre Channel

1. Ensure that the drive is powered on.
2. Ensure that the Operator Fibre Channel address is set correctly.
3. Ensure that the drive is seeing light and is communicating.
4. Ensure that all of the fibre channel cables are installed correctly.
5. Run the fibre channel wrap test (see “Fibre Channel Wrap Test – LTO only” on page 488).
 - a. If the fibre channel wrap test fails, replace the Ultrium fibre drive.
 - b. If the fibre channel wrap test runs successfully, test the fibre cable. See “Fibre Channel Wrap Test – LTO only” on page 488. If the wrap test fails, replace the fibre cable.
6. If the fibre wrap test runs successfully on the drive and on the cable, inform the customer that the fault is probably with the host hardware or software.
7. When the problem is corrected (or determined to be a host problem), restore all of the fibre channel cables to their correct position, then return to the procedure that sent you here, or go to “End of Call” on page 489.

Intermittent Error – Fibre Channel

1. Verify the following:
 - a. The maximum cable length has not been exceeded
 - b. Configuration and software levels are supported. Refer to the *IBM 3584 Planning and Operator Guide, GA32-0408*.
 - c. All fibre cables are installed correctly
2. Gather all possible error information, including the errors reported by the drive to the host. Refer to Message Section for details. For example, if the drive is attached to a RS/6000, run `tapeutil`. Select option 9, Error Log Analysis.
3. Refer to other fibre product documentation to isolate which part of the storage area network (SAN) is experiencing problems. Verify SAN configurations are correct, such as switch zoning for drive sharing.

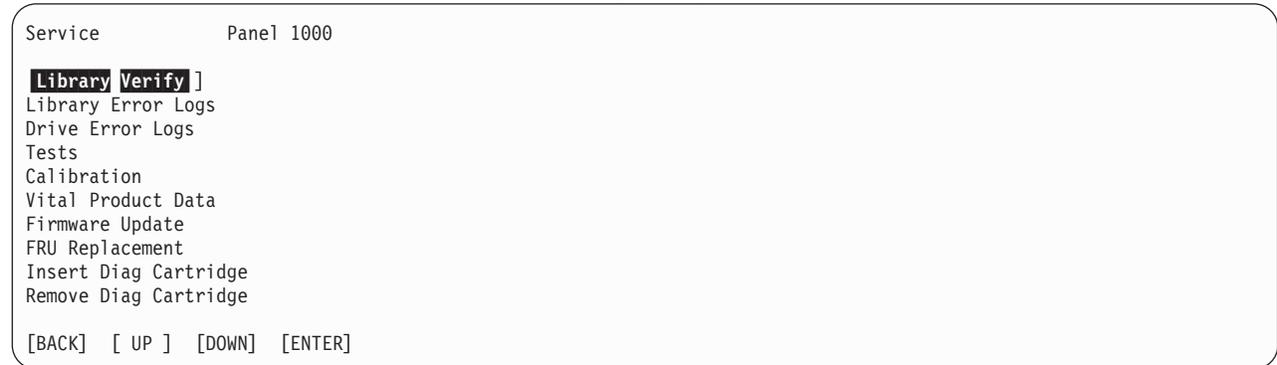
Note: If you have made a change to the configuration of the library subsystem, and if the library is connected to an SAN, it may be necessary to reset various components of the SAN so they will recognize the changes. As an example, a 2108 SAN Data Gateway may need to be reset or IPLed to recognize that new devices have been added.

4. Start a device driver trace to capture more information. For example, if you are using the AIX Tape Device driver, type `atrc` to start the trace (see “Fibre Channel Device Drivers” on page 155 for information on the various drivers).
5. On the next failure, get a drive dump. Be prepared to provide a dump, if requested by your Support Center for analysis.

Service Menus

To get to the **Service** screen Panel 1000, perform the following:

1. At the **Activity** screen, press **[MENU]**.
2. At the **Main Menu** screen, select **Service**, and press **[ENTER]**.



Press **[UP]** or **[DOWN]** to scroll through the Service screens and to locate one of the items in the following list. Press **[ENTER]** to highlight that item and to make that item active.

- If you selected **Library Verify**, go to “Library Verify Test” on page 507.
- If you selected **Library Error Logs**, go to Panel 1050, “Library Error Logs Menu”.
- If you selected **Drive Error Logs**, go to Panel 1060 “Drive Error Logs Menu” on page 525.
- If you selected **Tests**, go to Panel 1100, “Tests Menu” on page 526.
- If you selected **Calibration**, go to Panel 1200, “Library Calibration” on page 530.
- If you selected **Vital Product Data**, go to Panel 0300, “Vital Product Data (VPD) Menu” on page 531.
- If you selected **Firmware Update**, go to Panel 1300, .
- If you selected **FRU Replacement**, go to “Service Procedures” on page 535.
- If you selected **Insert Diag Cartridge**, the message “Insert Diagnostic Cartridge into I/O Station. Do you want to continue?” displays. In response to the user pressing **[YES]**, the microcode will locate the I/O station for the diagnostic cartridge and move it to a reserved place within the library. Messages are displayed to keep the user informed. If no diagnostic cartridge was found in the I/O Station, the user is notified and returned to this menu.
- If you selected **Remove Diag Cartridge**, the message “Do you really want to remove the diagnostic cartridge?” is displayed. A user who presses **[NO]** is returned to this menu. If the user presses **[YES]** in response to the question, the microcode will scan the inventory to verify that a diagnostic cartridge is present. If a cartridge is found, it will be ejected into the I/O station. Messages are displayed to keep the user informed as to the operation. If no cartridge was found in the inventory, the user is notified and returned to this menu.

Library Error Logs Menu



If the user presses **[ENTER]**, another panel will display, as follows:

- If **Error Detail** is selected, a list will be built from the library error log, listing all logged Errors, sorted by time stamp with the most recent error first. The user is taken to Panel 1051, “Library Error Detail” on page 524.

- If **Error/Usage Counts** is selected, Panel 1052 displays, “Error/Usage Counts”.

The user may scroll using the [UP] and [DOWN] buttons.

Library Error Detail

```

Library Error Detail      Panel 1051

Date:                    2001 06 30
Time:                    19:33:10
Command:                 Move Media
SK/ASC/ASCQ:             04 44 00
HEC/HECQ/MSB:           B8 81 8C
SEB/Source:              80 0085
DEB/Dest:                A0 0032
Cartridge:               VOL001L1
Obj#/ObjErr:            1234/56
Frame/Drive:            F1, R02

Log 0027 of 0027

[BACK] [ UP ] [DOWN]

```

If the user presses [UP] or [DOWN], the previous or next error will be displayed. The user may scroll through the selections using the [UP] and [DOWN] buttons.

- SK=byte 2 of the SCSI sense data (see Chapter 9, “Sense”, on page 421)
- ASC=byte 12
- ASCQ=byte 13
- HEC=byte 18
- HECQ=byte 19
- MSB=byte 23
- SEB=byte 35
- Source=bytes 36–37
- DEB=byte 38
- Destination=bytes 39–40

To decode the SK, ASC, ASCQ, HEC, HECQ, and obtain a URC, see “Library Sense Data to URC Table” on page 170.

Error/Usage Counts

```

Error/Usage Counts      1052

Accessor 1:      Usage      Errors
Pivots:          0000002    0000
Gripper 1:
  Gets:          0003024    0005
  Puts:          0003026    0001
Gripper 2:
  Gets:          0000001    0000
  Puts:          0000001    0000
  Scans:         0000010    0001

[BACK]

```

Drive Error Logs Menu

Drive Error Logs Panel 1060

Key: [F=Frame, R=Row]

Drive [F1,R3]

Drive Error Detail

Drive SCSI Detail
Usage/Error Counts

[BACK] [UP] [DOWN] [ENTER]

If the user presses **[ENTER]**, Panel 0210 will display to allow you to select the drive.

- If **Drive Error Detail** is selected, a list of all entries in the drive Engineering Log displays, sorted by time stamp. The most recent error is listed first. At Panel 1062, go to “Drive Error Detail”.
- If **Drive SCSI Detail** is selected, a list of all entries in the drive SCSI Log displays, sorted by time stamp. The most recent error is listed first. At Panel 1063, go to “Drive SCSI Detail Menu” on page 526.
- If **Usage/Error Counts** is selected, Panel 1064 displays, showing usage and error counts. See “Drive Usage/Errors” on page 526.

The user may scroll through the selections using the [UP] and [DOWN] buttons.

Drive Error Detail

Drive Error Detail Panel 1062

Key: [F=Frame, R=Row]

Drive [F1,R3]

Log Entry n

Date/Time:	2001 06 30	19:33:10
Error Code:	37	
1st FSC:	8340: 1234	
2nd FSC:	8750:5678	
Cartridge:	VOL001L1	
EC Level:	C14028	
HW Level:	10002001	

[BACK] [UP] [DOWN]

Notes:

1. Before you reach this panel, you should have selected a drive. The data shown is extracted from that selected drive. In the example, the numbers in **BOLD** are the drive Error Code SCD **7** and the FSC **1234**.
2. When this publication was released, the date/time shows only which error occurred first, and the number of hours between errors. A future microcode release will synchronize the library with the drive clocks, thus providing more meaningful date/time information.
3. When this publication was released, the cartridge identifier was the internal serial number of the cartridge. The identifier is used only to show whether repeated errors occurred on the same or multiple cartridges. A future microcode release will allow the bar code label information to appear in the display.

Note: If the user presses [UP] or [DOWN], the display will show the next or previous error with the information shown.

For error summary table, see “LTO Ultrium-1 Drive FSC to URC Table” on page 215.

Drive SCSI Detail Menu

```
Drive Error Detail      Panel 1063
KEY: [F=Frame, R=Row]
Drive [F1,R3]         Log Entry n
Date/Time:            2001 06 30   19:33:10
Cartridge:            VOL001L1
Command:              C7
Parameters:           010203040506070809
Sense Key:            04
ASC:                  44
ASCQ:                 00
[BACK] [ UP ] [DOWN]
```

Note: Before you reach this panel, you should have selected a drive. The data shown is extracted from that selected drive (drive SCSI log).

If you press [UP] or [DOWN], the display will show the next or previous error with the information shown.

To decode the SK, ASC, ASCQ, and to obtain a URC, see “Drive Sense Data to URC Tables” on page 188.

Drive Usage/Errors

```
Drive Usage/Errors     Panel 1064
Key: [F=Frame, R=Row]
Drive [F1,R1]:
Library                Statistics:
                       Usage:
  Loads:                0003024
  Unloads:              0003024
Drive                  Statistics:
                       Usage:
  Loads:                0002024
  Unloads:              0000001
  MB Written:           0000001
  MB Read:              0000001
  Cleanings:           0000000
[BACK] [ UP ] [DOWN]
```

Tests Menu

```
Tests                  Panel 1100
Library Verify
Diagnostics
Exercisers
[BACK] [ UP ] [DOWN] [ENTER]
```

If you press [ENTER], the next panel will reflect the item selected, as follows:

- If you select **Library Verify**, the library verify test will be run. See “Library Verify Test” on page 507 for details of the test.
- If you select **Diagnostics**, panel 1110 “Diagnostics Menu” on page 527 displays.

- If you select **Exercisers**, panel 1120 “Exercisers Menu” on page 530 displays.

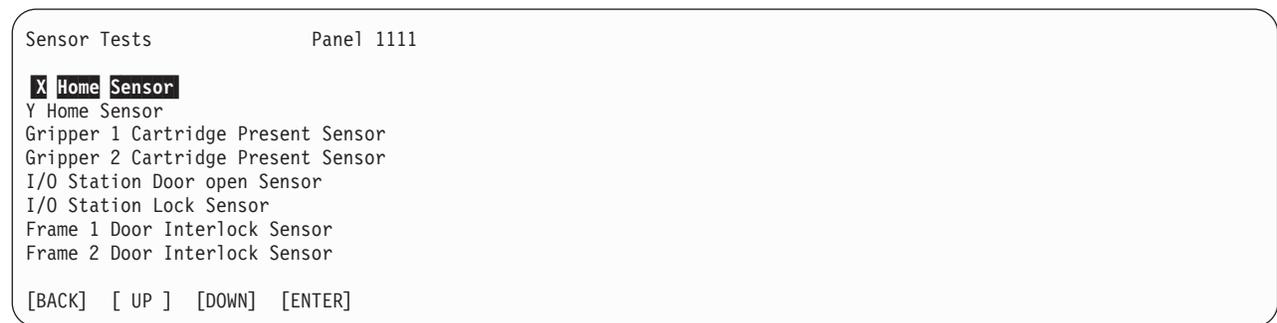
Diagnostics Menu



If you press **[ENTER]**, the next panel will reflect the item selected, as follows:

- Select **Sensors** to display panel 1111 “Sensor Menu”.
- Select **Motors & Solenoids** to display panel 1112 “Motor & Solenoid Tests Menu”.
- Select **Motor Encoders** to display panel 1114 “Encoder Tests Menu” on page 528.
- Select **Drives** to display panel 0210. This selection will allow you to select a drive; panel 1113 “Drive Tests Menu” on page 528 displays.

Sensor Menu



If you press **[ENTER]**, the next panel will reflect the item selected, as follows:

- If a sensor test is selected, display panel 1116 will show the particular test being run and the current status of the test. See “Sensor Status” on page 529. The test will run continuously until you press the **[BACK]** button.
- A “Frame n Door Interlock Sensor” entry will be listed for each frame located in the library.

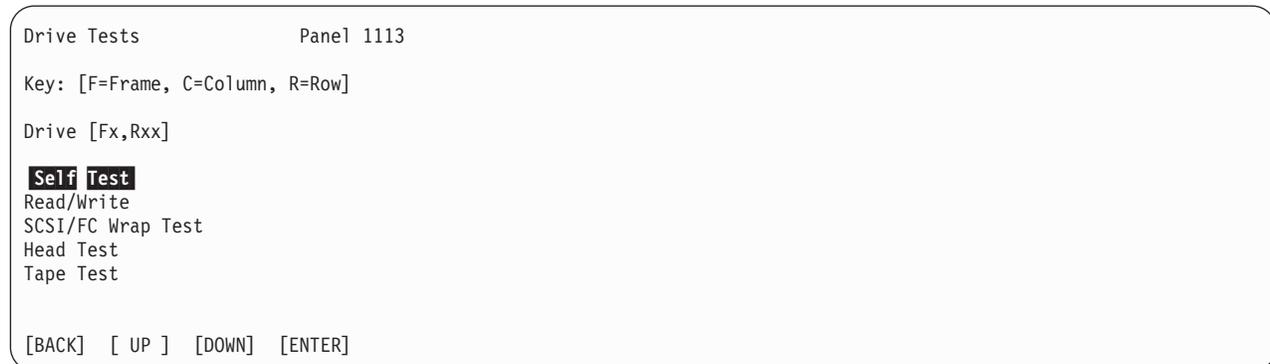
Motor & Solenoid Tests Menu



If you press **[ENTER]**, the next panel will reflect the item selected as follows:

- **Motor Test** – Will first verify the presence of 37 V dc. If the voltage is not available, a message displays. If the voltage is available, panel 1118 “Motor Test” on page 529 displays.
- **Solenoid Test** – The results of a solenoid test display on panel 1119, “Solenoid Test” on page 529.

Drive Tests Menu

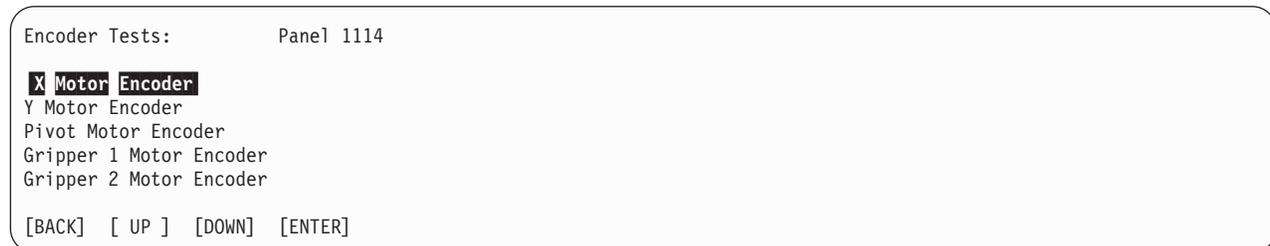


You should have selected a drive to be tested before you reached this menu.

Press **[ENTER]**, and select one of the panels below. The results for each test will be reported as successful or reported with an Error Code.

- **Self Test** – The drive will be told to run its self test (similar to POST but without having to power off the drive).
- **Read/Write Test** – The library will move a Diagnostic Cartridge from its storage position to the drive, and will instruct the drive to run its read/write test. An activity messages will display during the operations. Results will be reported at the end of the test. The library will unload and store the cartridge. If an error occurs while loading or unloading the cartridge, the error will be reported.
- **SCSI/FC Wrap Test** – You are instructed to install the SCSI Wrap Test Plug or the Smart SCSI Wrap Tool before the test begins. See “SCSI Bus Problems” on page 514 for more details.
- **Head Test** – Will move a test cartridge from its storage position to the drive, and instruct the drive to run a Head Test. An activity messages will display during the operations. Results will be reported at the end of the test. The library will unload and store the cartridge, and will report any error that occurs while loading or unloading the cartridge
- **Tape Test** – The library will request that a specific scratch tape that needs to be tested is placed in I/O slot 1. This cartridge will be moved to a specific drive, and the library will instruct the drive to run its Tape Test (which checks out the media by writing on the outer edges of the tape, then reading it back). An activity messages will be displayed during operation. Results will be reported at the end of the test. The library will unload and store the cartridge. An error that occurs during cartridge loading or unloading will be reported.

Encoder Tests Menu



Use the **[UP]** and **[DOWN]** buttons to select the encoder you wish to test. When you press **[ENTER]**, the selected encoder test displays on panel 1117. The encoder tach count displays as it changes. The test will run continuously until you press **[BACK]**. See “Encoder Status” on page 529.

Sensor Status

Sensor Status: Panel 1116

Sensor name will be displayed here.

Sensor Status: BLOCKED

[BACK]

This screen will show “BLOCKED” if the sensor is blocked, or “OPEN” if the sensor is not blocked.

Encoder Status

Encoder Status: Panel 1117

Encoder name will be displayed here.

Encoder Tach Count: 1043

[BACK]

This panel displays with the appropriate text string to indicate the tach count and the status of a motor encoder.

Motor Test

Motor Test Panel 1118

(A text string passed in from the microcode will be displayed)

Use the UP and DOWN button to run the motor in both directions.

[BACK] [UP] [DOWN]

Press the [UP] or [DOWN] button to run the motor in the direction you requested. Press [BACK] to stop the motor test.

Solenoid Test

Solenoid Test Panel 1119

(A text string passed in from the microcode will be displayed)

Use the ACTIVATE button to activate the solenoid.

[BACK] [ACTIVATE]

The solenoid will pick once, each time you press the [ACTIVATE] button. Press the [ACTIVATE] button to activate the solenoid.

Exercisers Menu

Exercisers Panel 1120

Cycle X
Cycle Y
Cycle Pivot
Cycle Gripper 1
Cycle Gripper 2
Cycle X/Y Pivot
Cycle Both Grippers

[BACK] [UP] [DOWN] [ENTER]

Press **[ENTER]** to go to the next panel. Panel 1121, “Exerciser Running” displays. This continuously cycles the motor for the full length of travel until you press **[BACK]** to stop the test. The cycle count is updated on the screen.

Note: The Cycle X/Y/Pivot exerciser will perform random X, Y, and Pivot motions until you press **[BACK]**. The Cycle Both Grippers exerciser will alternately cycle gripper 1, then cycle gripper 2, until you press **[BACK]**.

.

Exerciser Running

Exerciser Running... Panel 1121

Text string stating which exerciser is running

Exerciser Cycle Count: nn

[BACK]

The Exerciser Cycle Count is a measure of the number of cycles that have been completed.

Library Calibration

Use the Calibration menu to calibrate the library.

Calibration Panel 1200

Calibrate Library
Calibrate Frame
Calibrate I/O Station

[BACK] [UP] [DOWN] [ENTER]

Press **[ENTER]**, and go to the menu corresponding to the highlighted selection:

- **Calibrate Library** – A confirmation screen displays. Press **[ENTER]** to start a calibration of the entire library. A time duration will be displayed, and at the end of the calibration, a completion message will appear. When the completion message is displayed, pressing **[ENTER]** will return the user to this menu. Pressing **[BACK]** will return the user to this menu.
- **Calibrate Frame** – Panel 0007 displays. This panel allows you to select a frame. A confirmation screen displays. Press **[ENTER]**. The selected frame will begin to calibrate. A time duration displays. At the end of the frame calibration, a completion message appears. When the completion message displays, press **[ENTER]** to return to this menu. Press **[BACK]** to return the user to this menu.
- **Calibrate I/O Station** – A confirmation screen displays. Press **[ENTER]** to start the calibration of the I/O station. A time duration displays. A completion message appears at the end of the calibration.

Vital Product Data (VPD) Menu

Vital Product Data Menu Panel 0300

Library VPD

Drive VPD
Node Card VPD

[BACK] [UP] [DOWN] [ENTER]

Use the [UP] and [DOWN] buttons to scroll through the selections. Press **[ENTER]**, and the panel for the selected item appears, as follows:

- If **Library VPD** is selected, go to “Library VPD”.
- If **Drive VPD** is selected, go to “Drive VPD”.
- If **Node Card VPD** is selected, go to “Node Card VPD” on page 532.

Library VPD

Library VPD Panel 0301

Frame 1:
Machine Type: 3584
Model: L12
Serial: 1300001

[BACK] [UP] [DOWN]

Use the [UP] and [DOWN] buttons to scroll through the frame numbers.

Drive VPD

Drive VPD Panel 0310

Key: [F=Frame, R=Row]

[F1,R01] ULT3580-TD1 v1234
[F1,R02] ULT3580-TD1 v1234
[F1,R03] ULT3580-TD1 v1234
[F1,R04] ULT3580-TD1 v1234
[F1,R05] ULT3580-TD1 v1234
[F1,R06] ULT3580-TD1 v1234
[F1,R07] ULT3580-TD1 v1234
[F1,R08] ULT3580-TD1 v1234
[F1,R09] ULT3580-TD1 v1234
[F1,R10] ULT3580-TD1 v1234

[BACK] [UP] [DOWN]

Use the [UP] and [DOWN] buttons to scroll through the frame and drive numbers.

Note: A “Please wait...” message (using Panel 0011) displays for a few seconds. The drive type/model and firmware version information is being gathered from the drives.

Node Card VPD

Node Card VPD Panel 0320

Frame 1:

 Accessor Controller Card

 Part Number: 1234567

 Serial Number: YN100002W123

 Firmware Version: 1000

[BACK] [UP] [DOWN]

You can review vital product data about the node cards. Scroll up or down through each card in the displayed frame using the [UP] and [DOWN] buttons. When all the cards have displayed, the next frame will be displayed. The frames and cards display, as follows:

- Frame 1, Accessor Controller Card (ACC), Motor Driver Assembly (MDA), Media Changer Pack (MCP) and Operator Panel Assembly (OPC)
- Frame 2–6, Media Changer Pack (MCP) (if installed)

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Service Procedures

You can exchange a failing library FRU without taking the entire library offline.

Preparation

1. Put the library unit that you will be working on “offline” to all the host initiators. You may need to have the customer perform this task. Inform the customer that the library will be made not-ready.
2. At the Operator Panel **Activity** screen:
 - a. Press **Menu**.
 - b. At the **Main MENU** screen, select **Service**.
 - c. At the **Service** menu screen, select **FRU Replacement**.
 - d. At the **FRU Replacement** menu screen, select one of the following:
 - **Prepare for Drive Replacement** (see “Prepare for Drive Replacement”)
 - **Finish Drive Replacement** (see “Finish Drive Replacement”)
 - **Prepare for Accessor Service** (see “Prepare for Accessor Service” on page 536)
 - **Finish Accessor Service** (see “Finish Accessor Service” on page 536)
 - **Prepare for FCA Replacement** (see “Prepare for FCA Replacement” on page 536)
 - **Finish FCA Replacement** (see “Finish FCA Replacement” on page 536)
 - **Prepare for FIC Replacement** (see “Prepare for FIC Replacement” on page 536)
 - **Finish FIC Replacement** (see “Finish FIC Replacement” on page 537)
 - **Prepare for CPort Replacement** (see “Prepare for Control Port Replacement” on page 537)
 - **Finish CPort Replacement** (see “Finish Control Port Replacement” on page 537)
3. Follow the instructions on the screens.

Prepare for Drive Replacement

1. Making this selection allows the microcode to perform the following activities:
 - The microcode displays a screen to allow drive and frame selection.
 - The microcode puts the drive offline to the host.
 - If there is a cartridge in the drive, the microcode will try to remove it.
 - The microcode displays a message that the drive has been prepared for replacement.
2. You now can remove the drive.

Finish Drive Replacement

1. Making this selection allows the microcode (code) to perform the following activities:
 - The code ensures that the drive is present.
 - The code uses the RS-422 to configure the drive.
 - The code ensures that the drive is offline to the host through the rest of this procedure.
 - The code gets the drive serial number.
 - The code updates the drive VPD.
 - The code determines the drive code level.
 - The code determines the highest code level in the other drives.
 - The code does a single-drive calibration.
 - The code moves the CE diagnostic cartridge into the drive.
 - The code performs a read/write self-test.
 - The code moves the CE diagnostic cartridge back into its storage slot.
 - The code notifies you that the drive is ready to be put back “online” to the host.

2. Return to the procedure that sent you here, or go to “End of Call” on page 489.

Prepare for Accessor Service

This option will make the accessor not-ready to the host.

1. If possible, the microcode will move the accessor into the base frame, then remove power to the accessor motors and circuitry.
2. The microcode displays a wait message that states the device has been prepared for service.
3. You can open the library front door and perform the necessary service.
4. For ease of service, raise the dual gripper assembly about halfway up the Y-axis mast assembly and secure it by inserting a hex wrench or screwdriver through the Y-axis mast access hole.

Attention: After completing these steps, ensure you remove the hex wrench or screwdriver, and lower the dual gripper assembly **before you close the library front door**. When the library detects that the front door has been closed for 10 seconds, and it verifies that no other door is opened, it will try to become operational. Close the door only when you are ready for the library to begin normal operation.

Finish Accessor Service

1. From the Display screen, press **Enter**.
2. The OPC card communicates with the ACC card (if it cannot communicate, it will display an error code).
 - If the ACC or MDA card firmware is at a lower level than the firmware on the OPC card, the microcode will automatically update the firmware on the ACC/MDA cards to the level of the OPC card. If a new ACC/MDA card firmware is at a higher level than the firmware on the OPC a message will display notifying you of this fact.
 - The library microcode will perform a rezero, followed by a calibration.
3. Return to the procedure that sent you here, or go to “End of Call” on page 489.

Prepare for FCA Replacement

If the library has only a single FCA, the entire library must be powered off (O). The following steps occur if multiple FCAs are available.

1. The microcode displays a screen allowing you to select the failing FCA.
 - If possible, the microcode will ensure that all drives in the failing frame are not in use.
 - If possible, the microcode puts all drives in the failing frame offline to the host.
 - If there are cartridges in the drives, the microcode attempts to put them away, if possible.
2. The microcode will display a message that all drives are offline to the host.

Finish FCA Replacement

1. When FCA power is turned ON, the MCP microcode will perform its normal POST. The drives will remain offline.
2. The microcode displays a message to you that all drives in this frame are offline to the host. You can place the drives online or you can run library verify on the offline drives.
3. Place the drives “online”.
4. Return to the procedure that sent you here, or go to “End of Call” on page 489.

Prepare for FIC Replacement

1. The microcode will display a message which informs you that continuing with this procedure will deactivate the operator panel.
2. If you select to continue, the microcode makes the accessor not-ready to all hosts.
3. The microcode instructs all MCPs to power OFF all 37 V dc power supplies.

4. The service representative should now verify that the 37 V dc power indicators are OFF on all FIC cards (A, B, C, D, E, busses). If the power is not OFF, the service representative should remove 37 V dc power supplies until all 37 V dc power indicators are OFF.
5. Replace the failing FIC card (see “FIC Card” on page 562).

Finish FIC Replacement

1. Reinstall any 37 V dc power supplies removed.
2. Manually reset the MCP in the base frame (for reset button location, see Figure 97 on page 565).
3. The OPC card communicates with the all node cards (if it can not communicate, it then displays an error code).

Note: If a node card can not communicate, you may have a problem with:

- The frame counting circuitry on the FIC card
 - FIC card cabling
 - FIC card wrap terminator jumpers
4. The microcode now asks you to open the front doors on all frames. The microcode waits until you press [CONTINUE].
 5. The microcode verifies that all front doors are open.
 6. The microcode asks you to close the front doors on all frames. The microcode waits until you press [CONTINUE].
 7. The microcode verifies that all front doors are closed.
 8. The microcode will allow you to put the accessor back “online”.

Note: Do not put the library back online if you intend to run Library Verify.

9. Return to the procedure that sent you here, or go to “End of Call” on page 489.

Prepare for Control Port Replacement

1. The microcode displays a screen to allow control port and frame selection.
2. The microcode puts the control port offline to the host and displays a message that the control port has been prepared for replacement.

Note: Concurrent maintenance of a control port drive may require a logical library to be offline.

3. You now can remove the control port (see “Control Port, SCSI” on page 578).

Finish Control Port Replacement

1. Making this selection allows the microcode (code) to perform the following activities:
 - The code ensures that the control port is present.
 - The code ensures that the control port is offline to the host through the rest of this procedure.
 - The code gets the control port serial number.
 - The code updates the control port VPD.
 - The code determines the control port code level.
 - The code determines the highest code level in the other control ports.
 - The code notifies you that the control port is ready to be put back “online” to the host.
2. Return to the procedure that sent you here, or go to “End of Call” on page 489.

Check Procedures

Bar Code Label

Before you begin...

The bar code scanner contains a Class II laser.

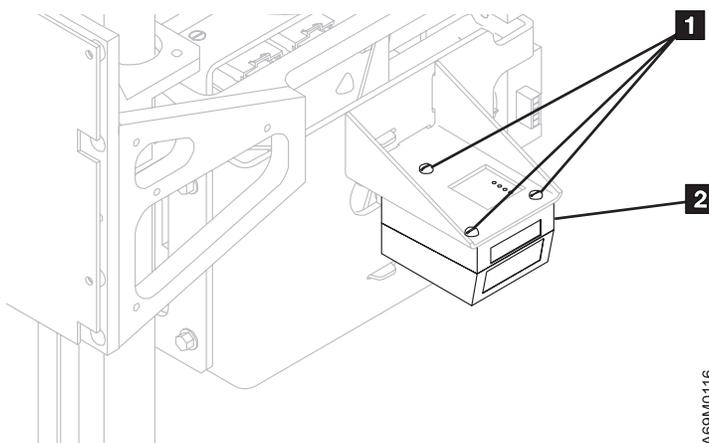


Class II

C04 CAUTION:
Because of laser radiation, do not stare into the beam.

Each data and cleaning cartridge used by the tape library is identified by a volume serial number (VOLSER) and is identified with a bar code that appears on a label that is placed on the tape cartridge. See *IBM TotalStorage UltraScalable Tape Library, Planning and Operator Guide 3584, GA32-0408*, for bar code requirements.

1. At the operator panel **Activity** screen, press [PAUSE].
2. When the library message indicates that the pause is activated, open the front door.
3. Check the cartridge labels for folds, missing pieces, tears or any extraneous markings, including smears or smudges along the length of the label.
4. If the labels are dirty or marked, clean the labels.
5. If a cartridge label needs to be replaced, the customer can order a kit containing enough replacement labels for 10 cartridges.
6. Clean the window of the bar code scanner **2**, using a lint-free cloth moistened with water. Two or three passes over the window area should clean the sensor.
7. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



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Figure 86. Bar Code Scanner Window

Bar Code Scanner

Before you begin...

The bar code scanner contains a Class II laser.



Class II

C04 CAUTION:
Because of laser radiation, do not stare into the beam.

FRU List

- 80% Bar Code Labels
- 15% “Bar Code Scanner” on page 554
- 3% “Pivot Flex Cable” on page 643
- 2% “Y-Axis Flex Cable” on page 664

1. Perform “Library Verify Test” on page 507, with **no drives** selected.
 - a. If library verify runs with no errors, go to step 2.
 - b. If library verify fails, go to Chapter 2, “Start”, on page 49, and correct the problem.
2. Perform an inventory of the library or selected frames. This also provides a very good checkout of the bar code scanner. To perform an inventory:
 - a. On the **Activity** screen, press **Menu**.
 - b. On the **Main Menu** screen, select **Manual Operations**.
 - c. On the **Manual Operations** screen, select **Inventory**, and follow the instructions on the screens.
3. When the inventory is complete, run Cartridge Location:
 - a. On the **Activity** screen, press **Menu**.
 - b. On the **Main Menu** screen, select **Manual Operations**.
 - c. On the **Manual Operations** screen, select **Move Cartridge**.
 - d. Press **Back**.
 - e. Check for blank VOLSERS.
4. If you are having problems with specific cartridges:
 - a. Insert the problem cartridges into the I/O station.
 - b. Open and close the I/O station door. The library will scan the I/O station.
 - c. On the **Activity** screen, press **Menu**.
 - d. On the **Main Menu** screen, select **Library Status**.
 - e. On the **Library Status** screen, select **I/O Station Status**, and check for blank or incorrect VOLSERS.
5. For the Bar Code Scanner replacement procedure, see “Bar Code Scanner” on page 554.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

Cables

Before you begin...

Attention: Use correct electrostatic discharge (ESD) procedures when working in areas sensitive to ESD. See “Protecting ESD-Sensitive Parts” on page 512.

See “Functional Block and Cable Diagrams” on page 32.

1. Inform the customer that you will be servicing the library.
2. Use Table 60 and “Service Procedures” on page 535 to prepare the library for service.
3. Open the doors and remove any necessary covers or shields.
4. Disconnect both ends of the cable that you are checking.

Note: Observe which connectors the cable was connected to, and its orientation before removal.

5. Inspect the connectors for broken, bent, or dirty pins and contacts.
6. Inspect the cable for worn or broken wires.
7. If tests indicate that the cable is defective, exchange the defective cable.
8. If no problems are found, reseal the cable connectors and test the library again.
9. Use the proper procedure to return the library from service, depending on which procedure you used in the table below.
10. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

Table 60. Cable Service Procedures

Cable Description	Service Procedure
Bifurcated Power Cord (Y-Power cord to drives)	Drive Procedure
Cable, EPO	To remove any EPO cable, the entire library must be powered off (O).
Cable, FIC-to-Door Safety Switch	Accessor Procedure
Cable, FIC-to-FIC Power	FIC Procedure
Cable, FIC-to-FIC Signal	FIC Procedure
Cable, FIC-to-OPC Card	Accessor Procedure
Cable, FIC-to-XCP	Accessor Procedure
Cable, Gripper Cartridge Sensors-to-PDC Card	Accessor Procedure
Cable, I/O Station-to-OPC	Accessor Procedure
Cable, MDA-to-AXY	Accessor Procedure
Cable, MDA-to-Home Sensor	Accessor Procedure
Cable, Pivot Flex	Accessor Procedure
Cable, SCSI Drive-to-Drive	The Host must stop using this SCSI cable addresses.
Cable, SCSI-to-Host	The Host must stop using this SCSI cable addresses.
Cable, X-Axis Flex	Accessor Procedure
Cable, Y-Axis Flex	Accessor Procedure
FCA Power Cord	FCA Procedure
FCA (RS-422) to Drives (12)	FCA Procedure

Drive Canister LED Display

Before you begin...

Attention: Use correct electrostatic discharge (ESD) procedures when working in areas sensitive to ESD. See “Protecting ESD-Sensitive Parts” on page 512.

See “Functional Block and Cable Diagrams” on page 32.

Each hot-swap drive canister and control port canister has a row of LEDs at the rear of the device. Figure 87 depicts the layout of the LEDs, and Figure 87 highlights the information you can learn from the LEDs. You can determine at a glance if a device is functioning correctly. If you determine that a service check points to a problem, consult with your customer before disrupting the job stream.

1. This service check may be performed without interrupting the customer job stream.
2. See Figure 87. View the LEDs on the rear of the canister. Locate the meanings of the LEDs in Table 61. The LEDs will mean something different for LTO SCSI, DLT SCSI, and LTO fibre drives.

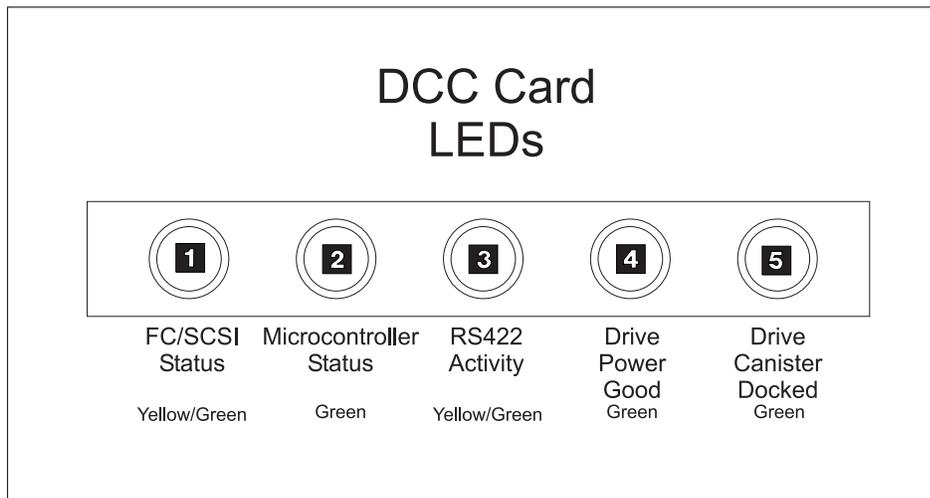


Figure 87. Drive Canister LED Displays

3. If problems are found with a drive or control port, consult with your customer before continuing repair.
4. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

Table 61. Canister LED Assignments

LED	LED Name	Meaning
LTO SCSI		
1	FC/SCSI Status	<ul style="list-style-type: none"> • Green: FC/SCSI Activity. • Yellow: FC/SCSI on but not active.
2	Microcontroller Status	<ul style="list-style-type: none"> • Blinks Green during Power-Up. • Solid Green when up and running.
3	RS-422 Activity	Blinks Yellow/Green when activity on bus.

Table 61. Canister LED Assignments (continued)

LED	LED Name	Meaning
LTO SCSI		
4	Drive Power Good	<ul style="list-style-type: none"> • Solid Green; drive power is good. • No LED; may have power problem or may be controlled by DCC card.
5	Drive Canister Docked	<ul style="list-style-type: none"> • Solid Green; canister is properly plugged. • No LED; reseal canister.
DLT SCSI		
1	FC/SCSI Status	<ul style="list-style-type: none"> • Green: SCSI Activity. • Yellow: SCSI on but not active.
2	Microcontroller Status	<ul style="list-style-type: none"> • Blinks Green during Power-Up. • Solid Green when up and running.
3	RS-422 Activity	Not used.
4	Drive Power Good	<ul style="list-style-type: none"> • Solid Green; drive power is good. • No LED; may have power problem or may be controlled by DCC card.
5	Drive Canister Docked	<ul style="list-style-type: none"> • Solid Green; canister is properly plugged. • No LED; reseal canister.
LTO Fibre		
1	FC/SCSI Status (See Note below)	<ul style="list-style-type: none"> • No LED - No light and No LIP • Yellow - Light and No LIP • Green - Light and LIP
2	Microcontroller Status	<ul style="list-style-type: none"> • Blinks Green during Power-Up. • Solid Green when up and running.
3	RS-422 Activity	Blinks Yellow/Green when activity on bus.
4	Drive Power Good	<ul style="list-style-type: none"> • Solid Green; drive power is good. • No LED; may have power problem or may be controlled by DCC card.
5	Drive Canister Docked	<ul style="list-style-type: none"> • Solid Green; canister is properly plugged. • No LED; reseal canister.
<p>Note: "LIP" is an acronym for "loop initiated primitive." When installing LTO Ultrium-2 Fibre drives, the LED may turn Green as soon as the drive is installed in the power tray. This is a drive code problem that occurs only with LTO Ultrium-2 drives, and will be fixed in an upcoming drive code release. Do not change any FRUs to resolve this problem unless you are working on a Fibre Channel connectivity problem and the Fibre Channel Wrap Test fails.</p>		

37 V DC Power Supply

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

FRU List

- 51% “Power Supply, 37 V dc” on page 645.
- 49% FCA

There are two 37 V dc power supplies located within the base frame (Model L32) FCA. There may be one 37 V dc power supply in the FCA of an expansion frame (Model D32 or D42).

Not all expansion frames will contain an FCA. Usually, if no drives are installed in an expansion frame, no FCA will be installed.

- Only one 37 V dc power supply is required to run the library.
- The base frame FCA contains two 37 V dc power supplies. If both supplies are working properly, the library will power on both supplies.
- If an expansion frame FCA contains a 37 V dc power supply, the library will power on the two supplies in the base frame and the power supply in the expansion frame.
- If more than three 37 V dc power supplies are available, the library will power on only three of the available supplies.
- If one of the three supplies fails, and there are additional supplies, the library will turn on one of the additional supplies.
- The supplies are designed to be “hot pluggable” (replaceable with the library running) in case one fails.

See Figure 88 on page 545 for the location of these supplies.

1. If the customer is still using the library (at least one 37 V dc power supply is functional), you **MUST NOT** remove the functioning supply in the following steps.
2. If only one supply seems to be defective, unplug the supply then plug the supply back in. As soon as the power supply is unplugged, the MCP will flash 34 xx. The MCP in the FCA that you are working on will power on the supply and check the power supply output. If the power supply is **NOT** functional, the MCP will post an error to the Error Log and flash error code 34 xx. If the library code is 3060 or higher it will go back to normal 00 frame-number display as soon as the power supply has been checked out and found to be good. But if the library code is lower than 3060 then the 34 xx won't clear from the MCP two-character display until you reset the MCP - whether or not the power supply is good.
If the power supply is functional, and the library does not have three supplies On, the MCP will leave the power supply On. If the power supply is functional, and the library does have three supplies On, the MCP will turn the power supply Off.
The green LED indicates that AC power is applied to the power supply. The yellow LED indicates that the power supply is not supplying DC. Note that a yellow LED does not necessarily indicate a problem. Never attempt to fix a problem with redundant power supplies unless the problem results in 34xx errors in the library error log.
LED indicator info for redundant 37 Vdc power supplies that are **not being used** (typically applies to subsystems with more than 3 power supplies):
 - If there is only a single power supply in the FCA (typical case for the model D32), then the power supply LEDs will be off. If you unplug the power supply for a minute and then reinstall it, the green LED will turn on for one minute while the power supply is being tested, then it will turn off. The yellow LED will turn on briefly when the power supply is turned on for testing, and again when it is turned off after testing has completed.

- If there are two power supplies in the FCA (typical case for the model L32), and if one of the power supplies is being used, then the unused power supply will have both the green and yellow LEDs turned on. If you unplug the unused power supply for a minute and then reinstall it, the green LED will turn on for one minute while the power supply is being tested, then the green LED will remain on and the yellow LED will turn on.

Note: The reason these two cases are different is that the AC input power to both power supply bays in the FCA is tied together - the library code must either turn on AC power to both power supply bays or turn off AC power to both power supply bays. If there is only a single power supply in the FCA then the library code disables a power supply by turning off its AC power. But if there are two power supplies in the FCA, and one of them is being used, the unused power supply must have AC power applied (green LED). But the library code disables the output from the unused power supply, causing the yellow LED to turn on.

3. If both 37 V dc power supplies have failed, suspect the FCA.
4. Try swapping the two power supplies with each other. If the failure moves, suspect the 37 V dc power supply.
5. If the 37 V dc power supply failure remains in the original position after swapping the supplies, suspect the FCA.

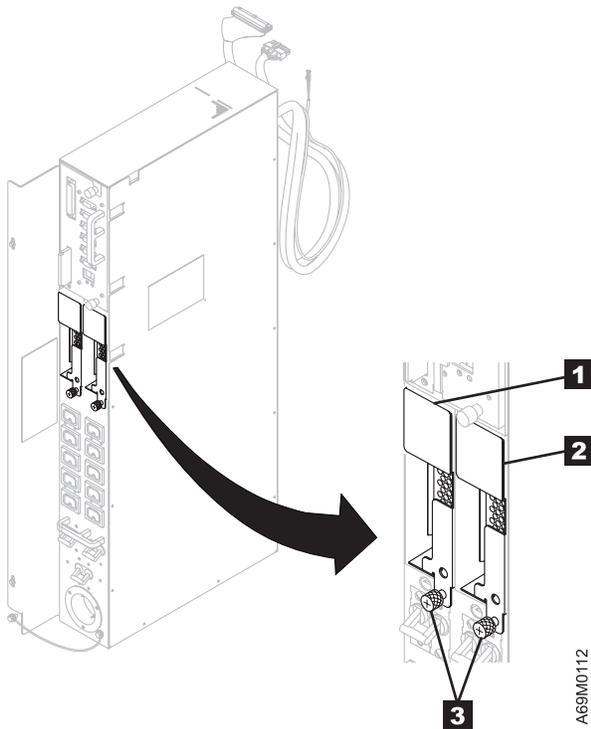


Figure 88. 37 V dc Power Supply Locations

Gripper Assembly

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

FRU List

- 94% "Gripper Assembly, Single (New Style)" on page 624
- 6% "Pivot Flex Cable" on page 643

The bar code scanner contains a Class II laser.



Class II

C04 CAUTION:
Because of laser radiation, do not stare into the beam.

1. At the operator panel **Activity** screen, press [PAUSE].
2. When the library message indicates that the pause is activated, open the front door.
3. Observe the gripper as you manually move it in and out of its housing using the gripper belt. Check the gripper belt for wear and tension.
4. Close the front door and run library verify with NO drives selected (see "Library Verify Test" on page 507). Observe the operation of the gripper assembly as it gets and puts cartridges.
5. Return to the procedure that sent you here; otherwise, go to "End of Call" on page 489.

Logical Library Label

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

FRU List

- 60% Logical Library Label
- 40% Label Holder

Note: Early machines (libraries shipped before March, 2001) may contain labels that are too glossy to be read by the bar code reader. Labels should have a matte (flat) finish. If you encounter this problem, do not replace the bar code reader. Contact IBM Support for a set of replacement labels. You can replace the labels with clean, photocopied labels (do not use glossy paper), or you can cover the glossy labels with frosted, cellophane tape. This can reduce the reflectivity of the label, making it possible for the bar code scanner to scan it successfully. Use this technique until the customer can acquire proper label material.

The customer may use logical library bar code labels to designate the physical breakout of logical libraries. Each IBM TotalStorage UltraScalable Tape Library 3584 comes with one sheet of 18 labels for each of five logical libraries and six holders for logical library labels. A sample label and holder are shown in Figure 89.

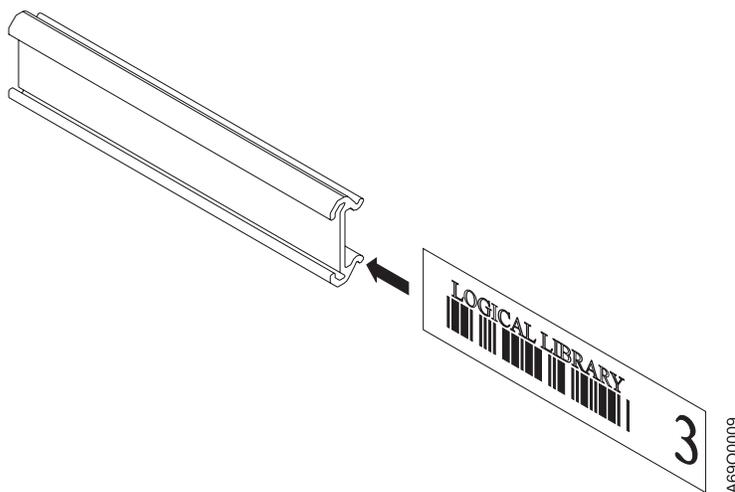


Figure 89. Sample Label and Holder

Label Check

1. At the operator panel **Activity** screen, press [PAUSE].
2. When the library message indicates that the pause is activated, open the front door.
3. Check the logical library labels **1** and **2** for folds, missing pieces, tears or any extraneous markings, including smears or smudges along the length of the label (see Figure 90 on page 549).
4. If the labels are dirty or marked, clean the labels.
5. If a label needs to be replaced, see Chapter 14, “Parts Catalog”, on page 697 for the part number.
6. If the labels are not damaged or dirty, clean the bar code scanner window with a lint-free cloth moistened with water. Two or three wipes over the window area should clean the sensor. For bar code scanner location, see “Bar Code Scanner” on page 554.

7. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

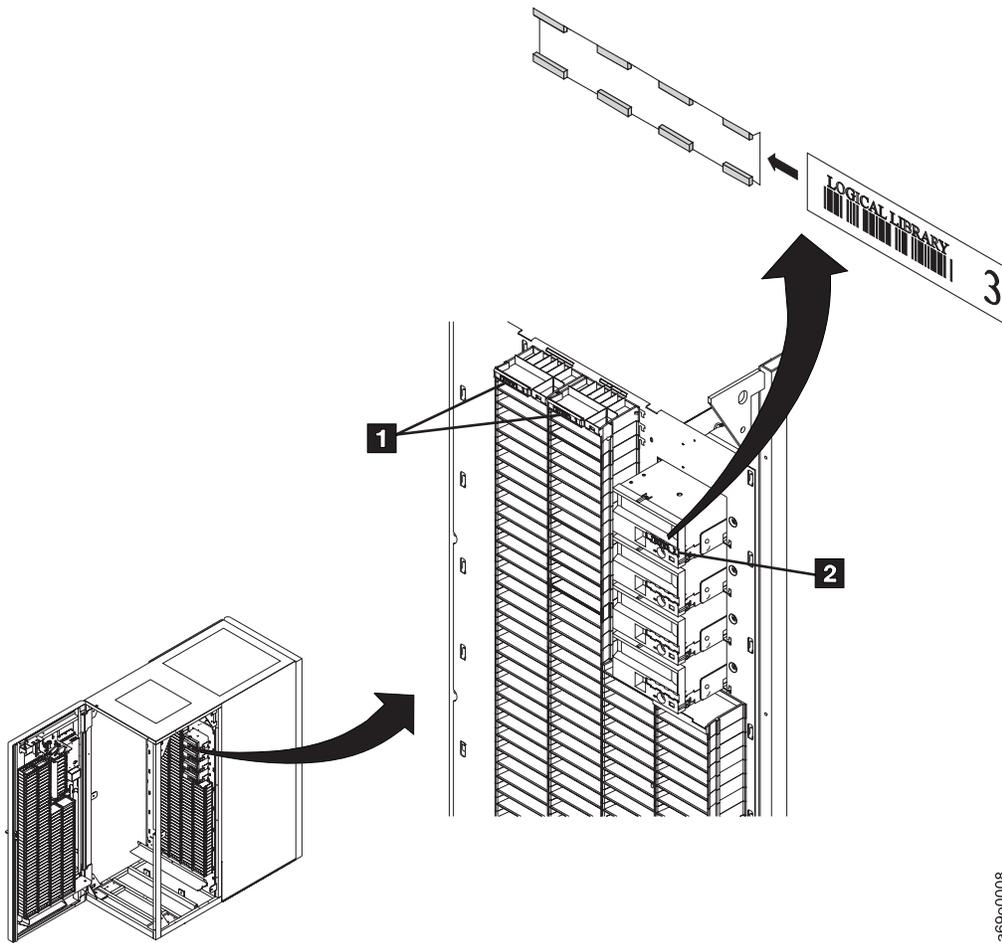


Figure 90. Sample Label and Holder Placement

80000099a

Pivot Assembly

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

FRU List

- 50% "Pivot Belt (Old Style)" on page 640
- 20% "Pivot Motor and Belt Assembly (New Style)" on page 644
- 20% "Pivot Flex Cable" on page 643
- 5% "Pivot Detent Arm and Spring" on page 642
- 4% "Pivot Assembly" on page 638
- 1% Bumper, Pivot (see Assembly 5, Item 1D in Chapter 14, "Parts Catalog", on page 697)

1. Prepare the accessor for servicing (see "Service Procedures" on page 535).
2. Check the pivot flex cable for wear or damage.
3. Check for loose or damaged connectors.
4. Check the pivot belt for wear and tension. The belt tension is correct if light finger pressure (in the center of the belt between the two pulleys) deflects the belt 3 to 5 mm (1/8 to 3/16 in.).
5. Operate the pivot assembly manually and ensure that it works smoothly without binding.
6. If you find a problem, use the FRU list at the beginning of this check. Exchange FRUs one at a time.
7. Close the front door.
8. Complete the accessor servicing (see "Service Procedures" on page 535).
9. Perform the "Library Verify Test" on page 507.
10. Return to the procedure that sent you here; otherwise, go to "End of Call" on page 489.

X-Axis Assembly

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

FRU List

- 35% X-Axis Belt
- 30% X-Axis Motor
- 18% "X-Axis Flex Cable" on page 653
- 15% "X-Axis Rail Assembly" on page 662
- 2% "X-Axis Home Sensor" on page 656

1. Prepare the accessor for servicing (see "Service Procedures" on page 535).
2. Check the X-axis motor belt for wear and tension. The belt tension is correct if light finger pressure (in the center of the belt between the two pulleys) deflects the belt 3 to 5 mm (1/8 to 3/16 in.).
3. Manually move the X-axis assembly back and forth over the X-rails while checking for binding conditions. Check for defective pinion shaft bearings by using feel and sound.
4. Check the X-axis flex cable for wear or damage.
5. If you find a problem, use the FRU list at the beginning of this check. Exchange FRUs one at a time.
6. Close the front door.
7. Complete the accessor servicing (see "Service Procedures" on page 535).
8. Perform the "Library Verify Test" on page 507.
9. Return to the procedure that sent you here; otherwise, go to "End of Call" on page 489.

Y-Axis Assembly

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU..

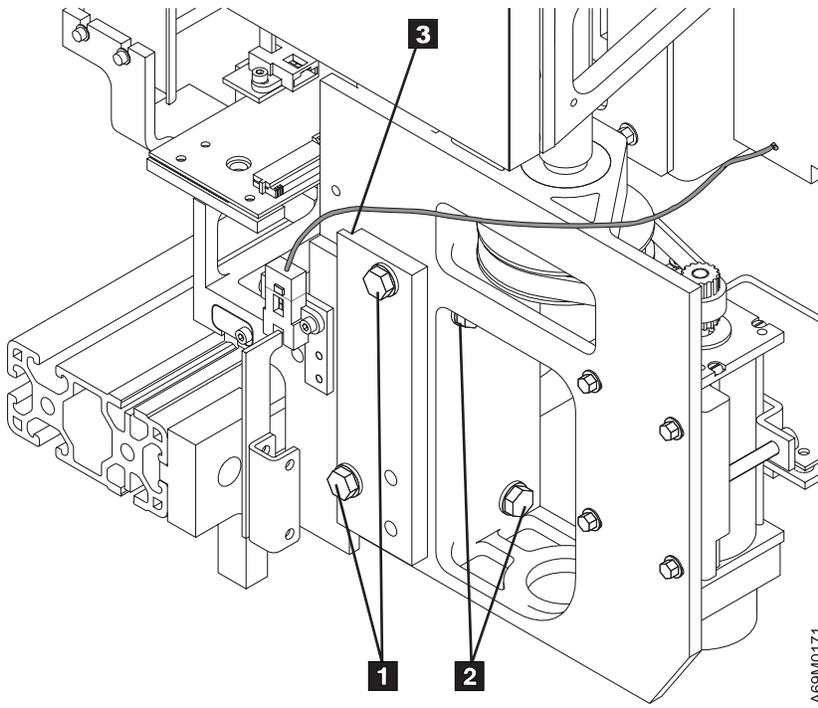
FRU List

- 35% Y-Axis Belt
- 30% Y-Axis Motor
- 18% “Y-Axis Flex Cable” on page 664
- 13% “Y-Axis Mast Assembly” on page 668
- 2% “Y-Axis Guide Rollers” on page 666
- 2% “Y-Axis Home Sensor” on page 667

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Check the Y-axis urethane rollers for wear. Ensure that the tension spring is not broken.
3. Check the Y-axis motor belt for wear and tension. The belt tension is correct if light finger pressure (in the center of the belt between the two pulleys) deflects the belt 3 to 5 mm (1/8 to 3/16 in.).
4. Manually move the pivot assembly up and down the Y-axis mast while checking for binding conditions.
 - a. Lift the accessor assembly up the Y-axis lead screw.
 - b. Ensure that no binds exist in the upper Y-bearing or the lower Y-bearing.
 - c. If either bearing has become unseated, use a soft mallet (plastic or rubber) to tap it back into place.
5. Check the Y-axis flex cable for wear or damage.
6. Check the screws to ensure they are tight. The bolts and screws that secure the Y-axis mast assembly to the X-axis carrier must be tightened in the correct sequence.

Attention: The Y-axis mast will be deformed if the screws **1** are over tightened.

 - a. Snug, but do not tighten the four screws.
 - b. Carefully tighten the two screws on the left side **1**.
 - c. Tighten the two bolts on the front **2**.
7. If you find a problem, use the FRU list at the beginning of this check. Exchange FRUs one at a time.
8. Close the front door.
9. Complete the accessor servicing (see “Service Procedures” on page 535).
10. Perform the “Library Verify Test” on page 507.
11. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



A6SM0171

Figure 91. Y-Axis Mast – Bolts

Removal and Replacement Procedures

Bar Code Scanner

Before you begin...

The bar code scanner contains a Class II laser.



Class II

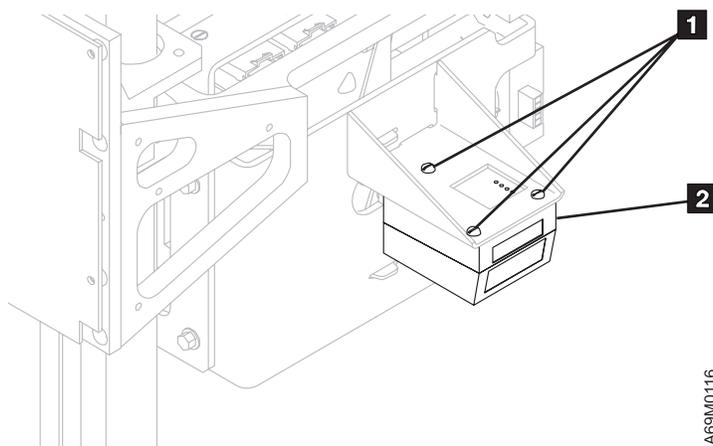
If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the screws **1** that hold the bar code scanner assembly to the dual gripper assembly housing.
3. Disconnect the cable that connect the bar code scanner to the PDC.
4. Remove bar code scanner **2**.

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Complete the accessor servicing (see “Service Procedures” on page 535).
4. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
5. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



AG9M0116

Figure 92. Bar Code Scanner

Calibration Sensor

Before you begin...

The bar code scanner contains a Class II laser.



Class II

C04 CAUTION:
Because of laser radiation, do not stare into the beam.

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the upper gripper assembly, see “Gripper Assembly, Single (New Style)” on page 624.
3. Turn the upper gripper assembly **1** on its side to expose the calibration sensor **2**.
4. Disconnect the connector **4**.
5. Remove the two screws **3** holding the calibration sensor to the upper gripper housing.
6. Remove the calibration sensor assembly.

Note: This FRU is factory-adjusted. The complete assembly must be replaced.

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Complete the accessor servicing (see “Service Procedures” on page 535).
4. Perform a library calibration (see “Library Calibration” on page 530).
5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

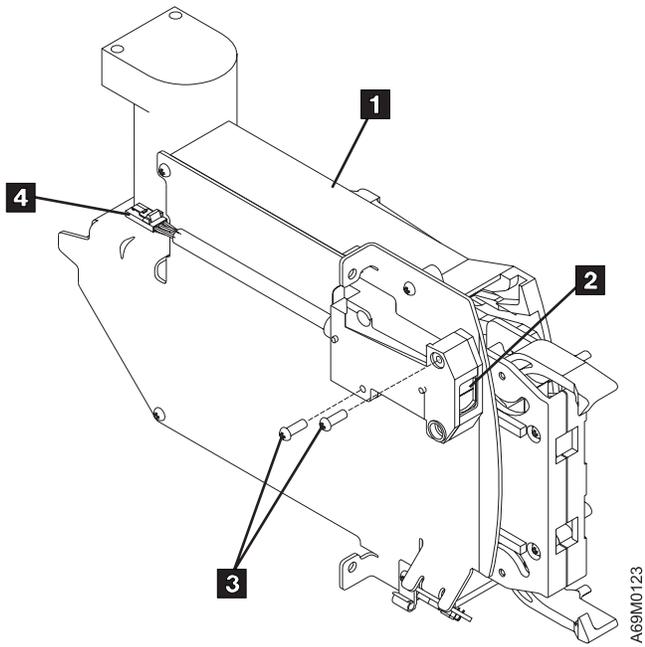


Figure 93. Calibration Sensor

Cards

Accessor Controller Card (ACC)

Before you begin...

- If you exchange a FRU and the problem is not corrected, reinstall the original FRU.
- The ACC is **not** a hot-pluggable FRU.

Notes:

1. Do not exchange both the OPC card and the ACC card in the same operation. Exchange one card, then if the problem persists reinstall the original card before exchanging the other card. This is necessary to avoid loss of all configuration settings and library VPD.
2. Step 3 applies **only** if you are replacing the Lithium battery.

Removal Procedure

1. Prepare the accessor for servicing (see "Service Procedures" on page 535).
2. Move the X-axis assembly to a convenient position, then raise the lift mechanism and support the mechanism by inserting a hex wrench or screwdriver into the Y-axis access hole located halfway up the assembly.
3. If you are **only** replacing the Lithium battery, make note of how it is installed. Then take a small-bladed screwdriver to carefully pry the old battery out. Install the new battery by carefully inserting one edge, then pressing the battery firmly in place. Continue with the **Replacement Procedure**.
4. Remove the ACC card cover **1** by unsnapping it from the card (see Figure 94 on page 559).
5. Remove the following cables from the ACC card:
 - **2** Y-Axis flex cable
 - **3** Pivot motor power cable
 - **4** Pivot motor encoder cable
 - **5** Pivot flex cable
6. Remove the screws **6** to remove the ACC card **7**.

Replacement Procedure

1. Reverse the removal procedure.
2. Ensure that the hex wrench or screwdriver inserted into the Y-axis access hole is removed.
3. Close the front door.
4. Finish accessor service (see "Service Procedures" on page 535).
5. If the new ACC firmware is at a lower level than the MCP, the firmware in the ACC will be updated automatically. The ACC 2-character display will flash 0E 0x or 0F 0x while microcode is being synchronized. Wait for this process to complete before you continue.

In most cases, NVRAM data (Configuration, Calibration, and Vital Product Data) will be automatically restored from the OPC. This process may take up to 15 minutes. If the operator panel displays a "Run Config" message you should NOT configure the library. If the "Run Config" message does not go away within 15 minutes, perform the following procedure to force a restore of the Configuration and Vital Product Data:

- a. Open the front door of the library.
- b. Reset the ACC by pushing the ACC card RESET button.

Note: When you reset the ACC it will momentarily stop responding to CAN messages from the other node cards. This may result in 27 01 on the other node card two-character displays, and in an 'unable to communicate' message on the operator panel. These errors are expected and should be ignored unless they persist for more than 5 minutes.

- c. Close the front door of the library.
 - d. Wait up to 15 minutes for the library to restore the Configuration and Vital Product Data before you continue.
6. Perform the "Library Verify Test" on page 507, using the **no drives** selection.
 7. Return to the procedure that sent you here; otherwise, go to "End of Call" on page 489.

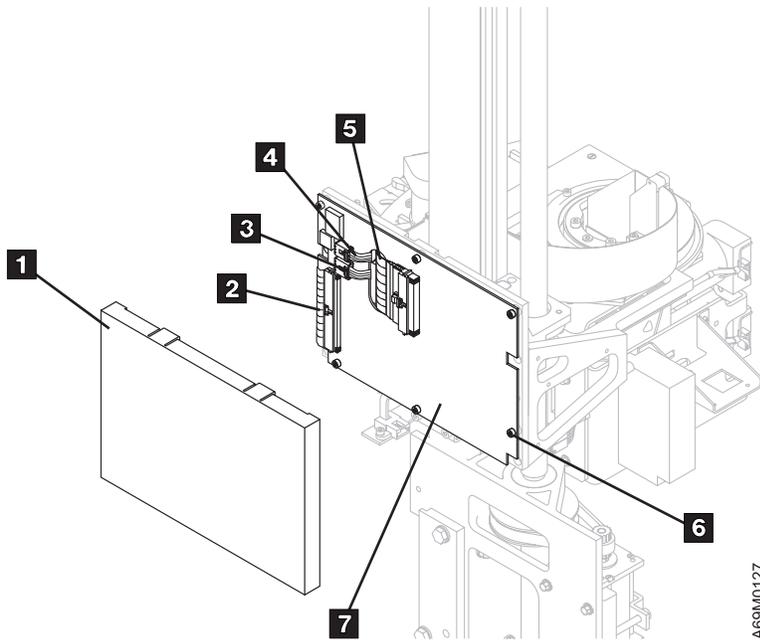


Figure 94. ACC Card

AXY Card (X-Axis)

Before you begin...

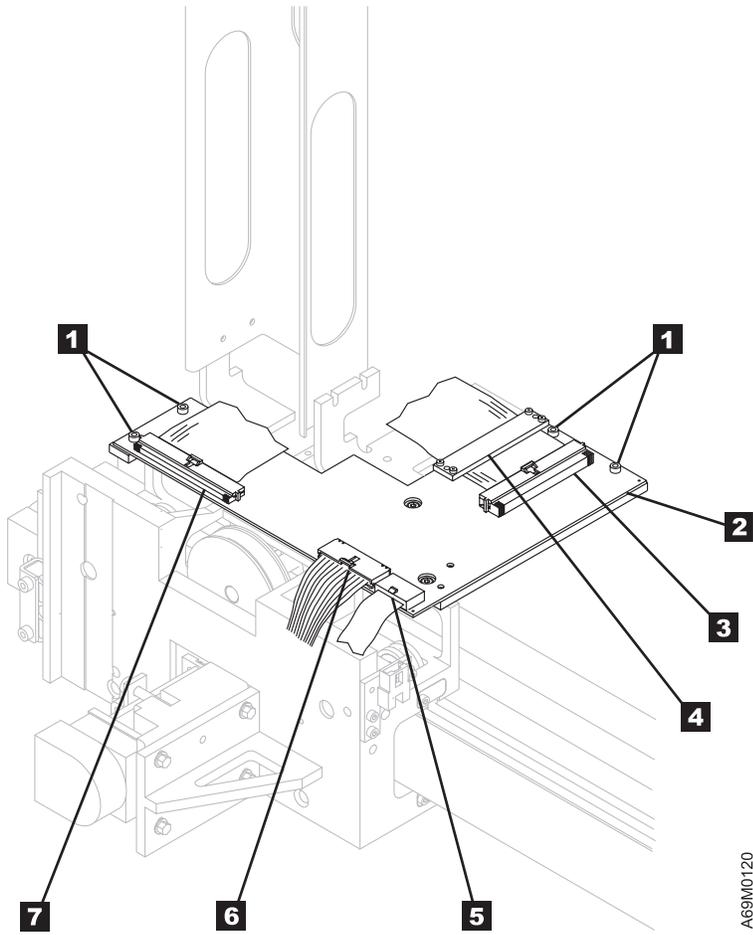
If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Move the X-axis assembly to a convenient position, then raise the lift mechanism. To support the mechanism, insert a hex wrench or screwdriver into the Y-axis mast access hole located halfway up the assembly.
3. Remove the X-axis cable trough cover (see **1** on Figure 41 on page 100).
4. Refer to Figure 95 on page 561 and locate the AXY card **2**, which is mounted on the X-axis assembly.
5. Locate the flat cable clamp **4**. Remove the two center screws that secure the clamp to the AXY card and in turn to the X-axis. Remove the four screws that secure the clamp to the flat cable.
6. Remove the four cables **3** through **7**.
7. Remove the four screws **1** (two shown).
8. Remove the AXY card.

Replacement Procedure

1. Reverse the removal procedure.
2. Ensure that the hex wrench or screwdriver inserted into the Y-axis access hole is removed.
3. Close the front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



A69M0120

Figure 95. AXY Card

FIC Card

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Note: The FIC card (frame interconnect card) is located on the upper, back wall to the right of the drive trays, as viewed from the rear of any frame.

Note: For more details on FIC card connectors, see Figure 10 on page 32.

Removal Procedure

1. Perform the procedure in “Prepare for FIC Replacement” on page 536.
2. Refer to Figure 96 on page 563 and, ensure that jumpers **1** and **4** are installed on each end of the EPO cable.
3. If you are going to replace a cable, refer to Figure 96 on page 563 and Table 62 on page 563. Replace the cable.
4. From the rear of the frame that contains the FIC card you want to replace, remove the cables that are plugged into that FIC card. Table 62 on page 563 shows which connectors are used and where each cable goes.

Note: Not all FIC card connector positions are used in all frame configurations.

5. Remove the center screw that holds the black FIC card overlay to the FIC card.
6. The FIC card is secured by four silver-colored standoffs. Use a pliers to squeeze each standoff as you carefully remove the FIC card.

FIC Card Jumper Settings

Following are the initial jumper and switch settings when the FIC card is replaced. For more detail on FIC card connectors, see Figure 10 on page 32.

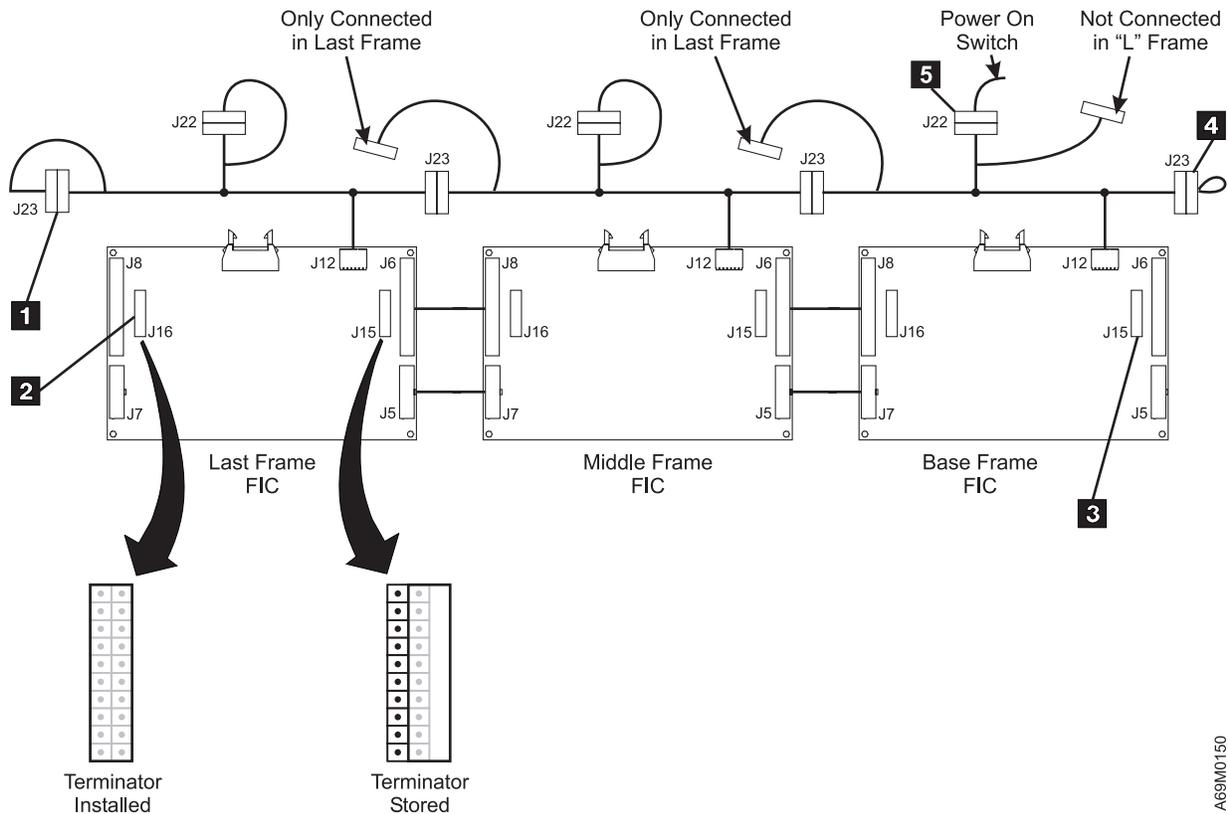
The jumpers, J15 and J16, should be set as follows:

- If the FIC is in the first frame (L Frame), J15 should be jumpered.
- If the FIC is in the last frame, J16 should be jumpered.
- If the FIC card is in a frame between the first and last frame, J15 and J16 should not be jumpered.
- If the library is a single frame library, both J15 and J16 should be jumpered.

Switches S1 and SW2 settings are not critical and can be set to any position. SW4 (LEDs On Switch) should be left in the ON position so that the LEDs will display for service and troubleshooting purposes.

Replacement Procedure

1. Reverse the removal procedure.
2. Go to “Finish FIC Replacement” on page 537.
3. Ensure that all MCPs are flashing the correct frame number on their character display.
4. Close the rear doors.
5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



AG9M0150

Figure 96. FIC Card Power Cable Tethered Jumper

Table 62. FIC Card Connector/Cable Connections

Connector #	Cable Information
J1	FIC to XCP card (base frame only)
J2	Not used
J3	FIC to FCA (MCP power)
J4	FIC to FCA (MCP signal)
J5	FIC to FIC Power (expansion frames only)
J6	FIC to FIC Signal (expansion frames only)
J7	FIC to FIC Power (connects to next frame J5 connector)
J8	FIC to FIC Signal (connects to next frame J6 connector)
J9	Not used
J10	Not used
J11	To J1 on OPC card on operator panel (base frame only)
J12	FIC to UEPO cable
J13	Not used
J14	Front door switch
J15	Terminator (base frame only)
J16	Terminator (last frame in the string)

Media Changer Pack (MCP)

Before you begin...

- **If you exchange a FRU and the problem is not corrected, reinstall the original FRU.**
- The MCP is a hot-pluggable FRU.
- A failing Media Changer Pack (MCP) can be exchanged without the need to take the drives offline.
- **Do Not** use “Prepare for Accessor Service” on page 536 and “Finish Accessor Service” on page 536 procedures.

Note: Do not exchange two different node cards in the same operation. Exchange one card, then if the problem persists reinstall the original card before exchanging the other card.

Removal Procedure

1. If your library has only one MCP, inform the customer that you will be making the accessor non-ready. Go to step 3.
2. If your library has more than one MCP, inform the customer that you will be taking offline any control path drives or control ports in this frame.

Note: Concurrent maintenance of a control port drive may require a logical library to be offline.

3. Refer to Figure 97 on page 565 and loosen the two knurled screws **1** that hold the MCP to the FCA.
4. Slide the MCP out about 50 mm (2.0 in.).
5. Remove all cables from the MCP.
 - RS-422 connector **2** at J7
 - RS-422 connector at J3 (control port only)
 - CE cable at J1 (if cable is present)
 - Modem at J6 (if installed)
 - Ethernet (on new style MCP)
6. Remove the MCP from the FCA.

Replacement Procedure

1. Reverse the removal procedure.
2. MCP POST will run automatically after the new MCP is plugged in.
3. When post is complete the MCP display will begin flashing 00 0x (where x=frame number).
4. If the new MCP firmware is at a lower level than the rest of the node cards, the firmware in the MCP will be updated automatically. The MCP 2-character display will flash 0E 0x or 0F 0x while microcode is being synchronized. Wait for this process to complete before you continue.
5. If you replace an 'old style' MCP (with a PCMCIA slot) with a 'new style' MCP (with an Ethernet port), or if there is only one 'new style' MCP in the library, you must use CETool to update the library microcode on all nodes to the latest available level before you return the machine to the customer. Wait until the automatic update is complete before you use the CETool to update the library to the latest available level. You can determine that an automatic update is in process by observing the two-character display on the MCP. If the information in the display alternates between 0F and the frame number or 0E and the frame number, a microcode update is in progress.
6. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
7. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

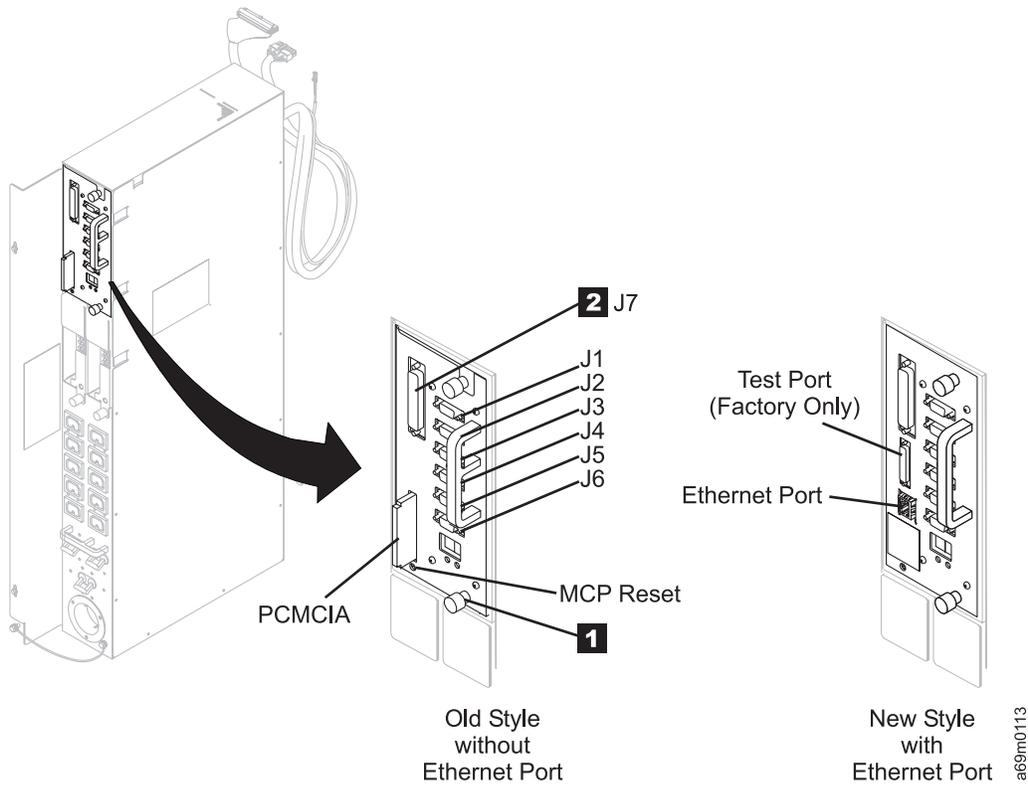


Figure 97. Media Changer Pack

Motor Driver Assembly (MDA)

Before you begin...

- **If you exchange a FRU and the problem is not corrected, reinstall the original FRU.**
- The MDA is **not** a hot-pluggable FRU.

Note: The motor driver assembly (MDA) is mounted on the bottom of the accessor, and contains the dynamic brake card, the XY controller, and the XY motor amps. The MDA controls X and Y motor movement, dynamic braking, and other motor controls. The entire MDA is a FRU and cannot be broken down any further to individual components.

Note: Do not exchange two different node cards in the same operation. Exchange one card, then if the problem persists reinstall the original card before exchanging the other card.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Raise the dual gripper assembly up the Y-axis mast and insert a hex wrench or screwdriver through the Y-axis mast access hole.
3. The MDA is located on the Y-axis assembly, near the bottom of the assembly. Refer to Figure 99 on page 567, and loosen the four screws **1** to remove the cover. **Note:** The new style MDA has only two screws on each side of the cover.
4. Refer to Figure 98 on page 567 and remove five cables **1** through **5**, attached to the MDA.

Note: Remove only those cables that leave the MDA. You need not remove cables that go from one area of the MDA to another. The new assembly will contain those cables.

5. Refer to Figure 99 on page 567. Remove bolt **2** and bolt **3** to remove the MDA from the Y-axis assembly.

Replacement Procedure

1. Reverse the removal procedure.
2. Ensure that the hex wrench or screwdriver inserted into the Y-axis access hole is removed.
3. Close the front door.
4. Finish accessor service (see “Service Procedures” on page 535).
5. If the new MDA firmware is at a lower level than the rest of the node cards, the firmware in the MDA will be updated automatically. The MDA 2-Character display will flash 0E 0x or 0F 0x while microcode is being synchronized. Wait for this process to complete before you continue.
6. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
7. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

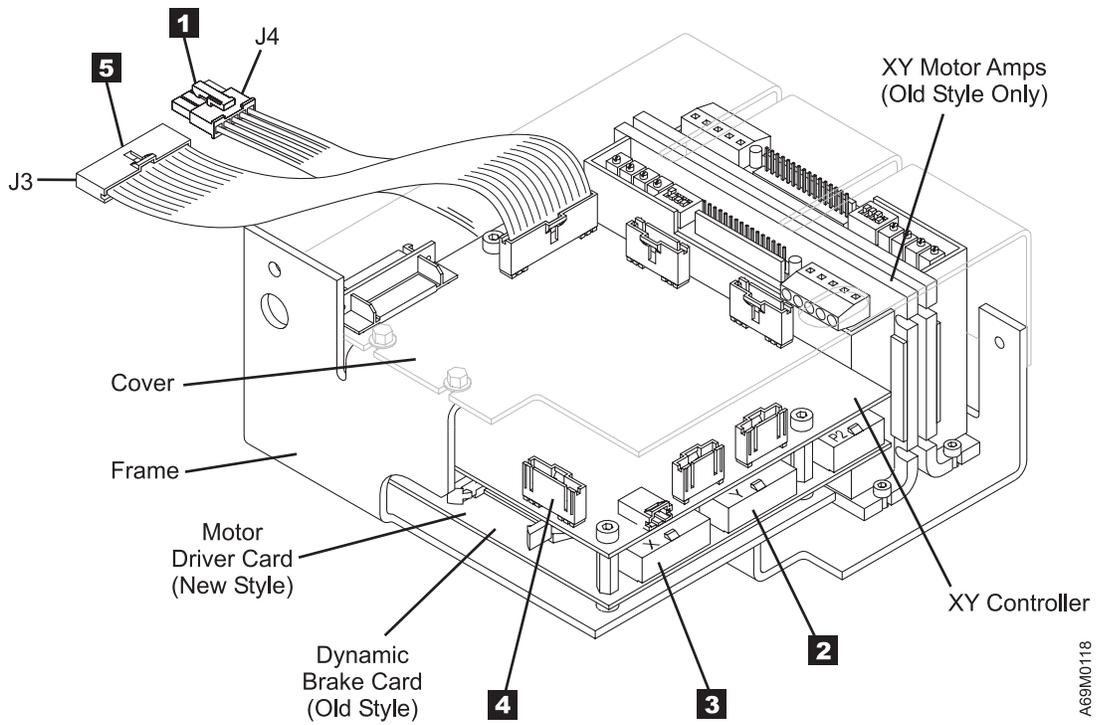


Figure 98. MDA Cabling. (Shown from front, with phantom view of cover, for clarity)

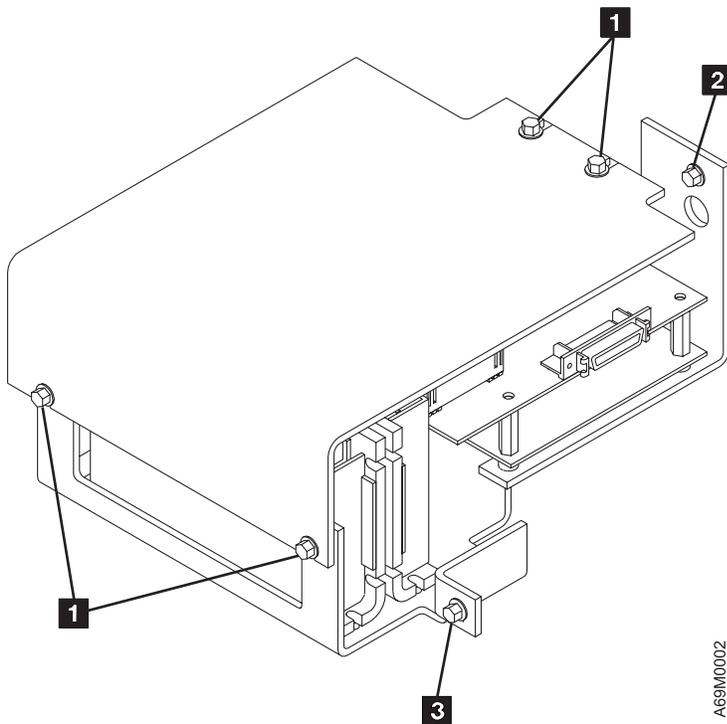


Figure 99. Motor Driver Assembly (MDA). (Shown with cover installed)

Operator Panel Assembly (OPC)

Before you begin...

Attention: Use correct ESD procedures when working in areas sensitive to electrostatic discharge (ESD). Refer to “Protecting ESD-Sensitive Parts” on page 512.

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Note:

- The OPC card is integral to the operator panel assembly. You must replace the operator panel assembly to replace the OPC card.
- Do not exchange both the OPC card and the ACC card in the same operation. Exchange one card, then if the problem persists reinstall the original card before exchanging the other card. This is necessary to avoid loss of all configuration settings and library VPD.
- The later style operator panels have a pot **9** to adjust the contrast of the display screen.
- Step 6 applies **only** if you are replacing the Lithium battery.

Removal Procedure

The operator panel assembly consists of the OPC card, LCD display and touchscreen assembly, bezel, and internal cables. The operator panel assembly can be exchanged without taking the drives offline. The library accessor must be taken offline, however, because you will open the front door.

1. Inform your customer that you need to make the accessor not-ready (offline) for service.
2. If the operator panel is working, press the PAUSE button and wait for the **The library is now paused** message to display.
3. If the operator panel is not working, ask your customer to vary the accessor offline from the host.
4. After the library accessor is offline, open the front door.
5. Refer to Figure 100 on page 570 and remove the connector **1** at the top of the Operator Panel. This cable goes to the FIC card and must be removed before you unplug other cables as part of the removal/replace procedure.
6. If you are **only** replacing the Lithium battery, make note of how it is installed. Then take a small-bladed screwdriver to carefully pry the old battery out. Install the new battery by carefully inserting one edge, then pressing the battery firmly in place. Continue with the **Replacement Procedure**.
7. Remove three screws **4** from the power switch **5**.
8. Disconnect the connector to the power indicator inside of the power switch box. Remove the power switch **5** and allow it to rest on its cable **7**.
9. Remove two knurled screws **2**.
10. While holding the cover assembly **3** with one hand, and the operator panel assembly **6** with the other hand (from the front of the door), remove the rear panel **3**.

Note: Only one of the two cables **1**, which is still connected, is preventing the operator panel from falling free.

11. Remove the remaining cable **1** located on the left side but near the top of the operator panel assembly **6**.
12. Remove the operator panel assembly.

Replacement Procedure

1. Reverse the removal procedure.

- Note:** Be sure to plug the top cable **1** which supplies power from the FIC card **last**.
2. If the new OPC firmware is at a lower level than the rest of the node cards, the firmware in the OPC will be updated automatically. The OPC 2-character display will flash 0E 0x or 0F 0x while microcode is being synchronized. Wait for this process to complete before you continue.
 3. The later style operator panels have a pot **9** to adjust the contrast of the display screen.
 4. Close the front door.
 5. The library will perform a rezero, then a calibration.
 6. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
 7. Make the library **Ready** to the host.
 8. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

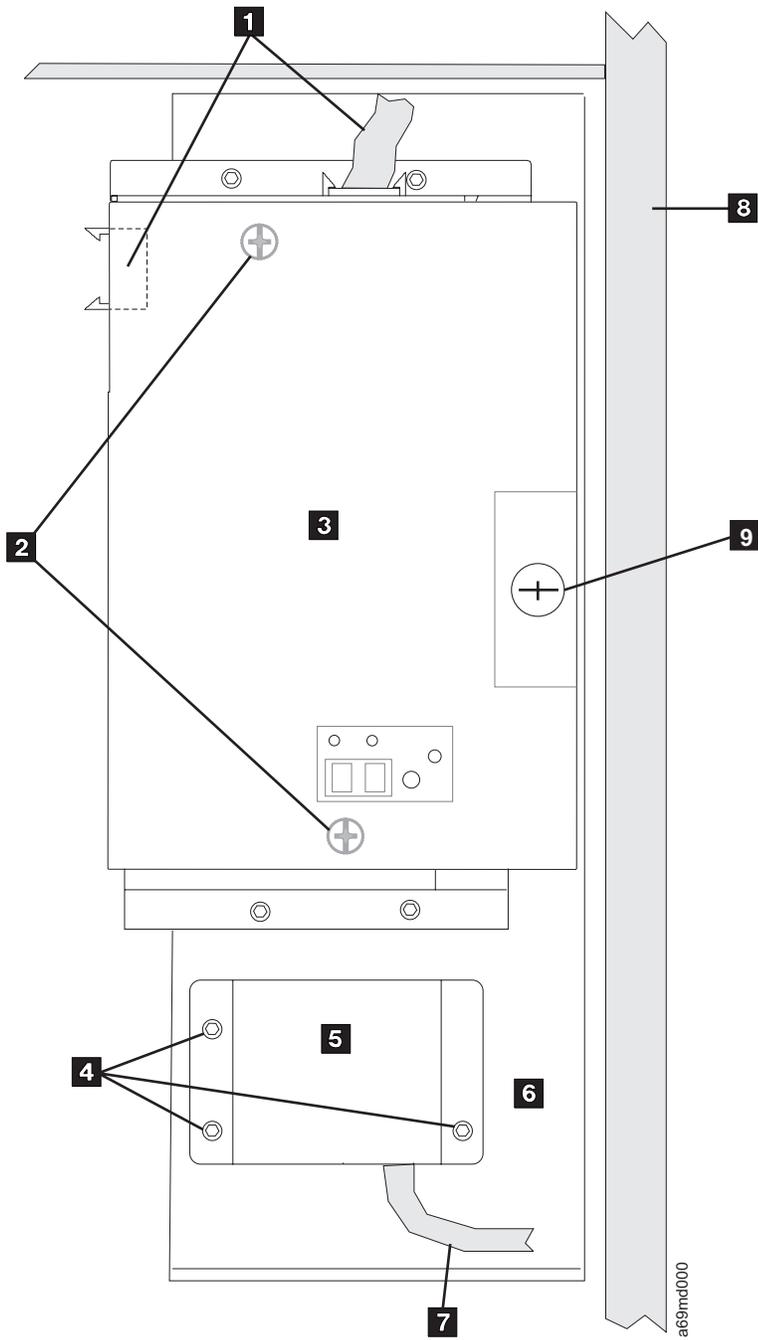


Figure 100. Operator Panel. (Viewed from rear of front door)

PDC Card

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Turn the gripper assembly to a convenient position.
3. Remove the dual gripper assembly. See “Gripper Assembly, Dual” on page 622, then return here.
4. Remove the upper gripper assembly. See “Gripper Assembly, Single (New Style)” on page 624, then return here.
5. Refer to Figure 101 to remove any remaining cables on the PDC card.
6. Refer to Figure 102 on page 573, and remove five screws **2**.
7. Remove the PDC card **1**.

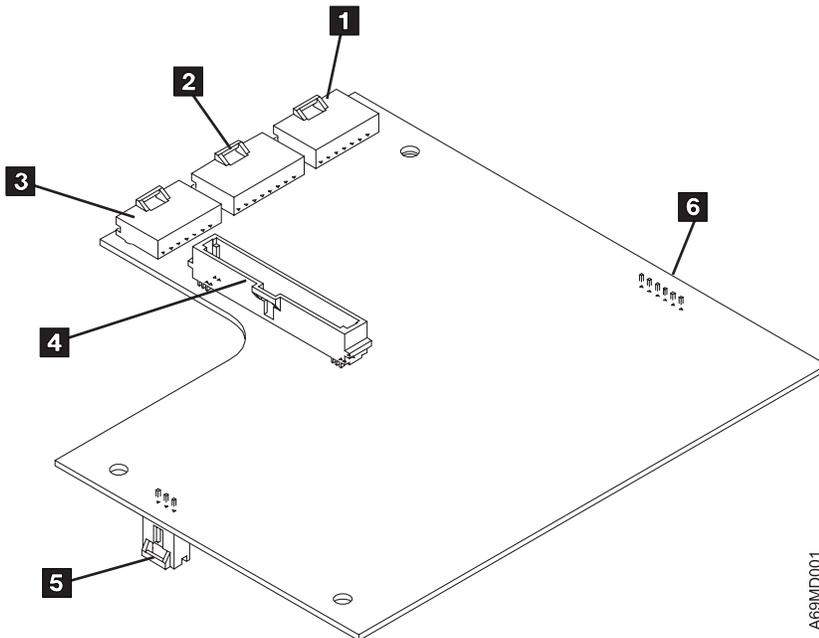


Figure 101. PDC Card Cables

A69MD001

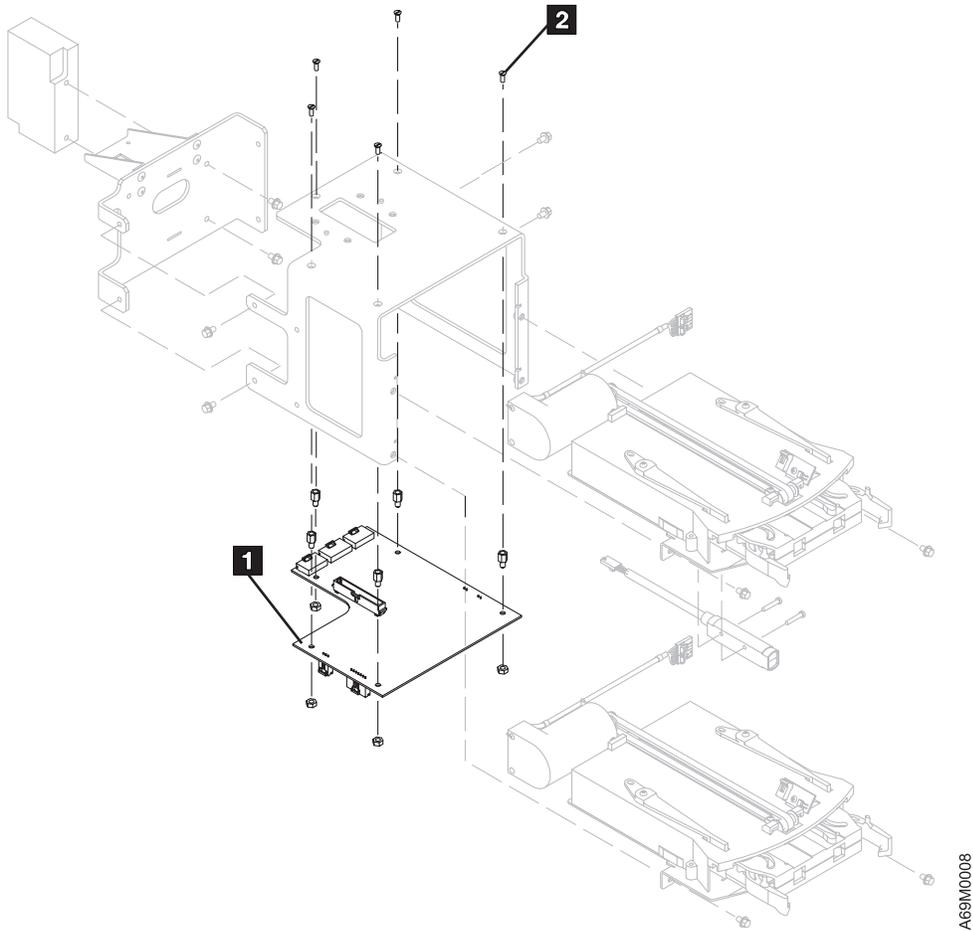


Figure 102. PDC Card

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Complete the accessor servicing (see “Service Procedures” on page 535).
4. Wait until library inventory completes, then continue at the next step
5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

XCP Card

Before you begin...

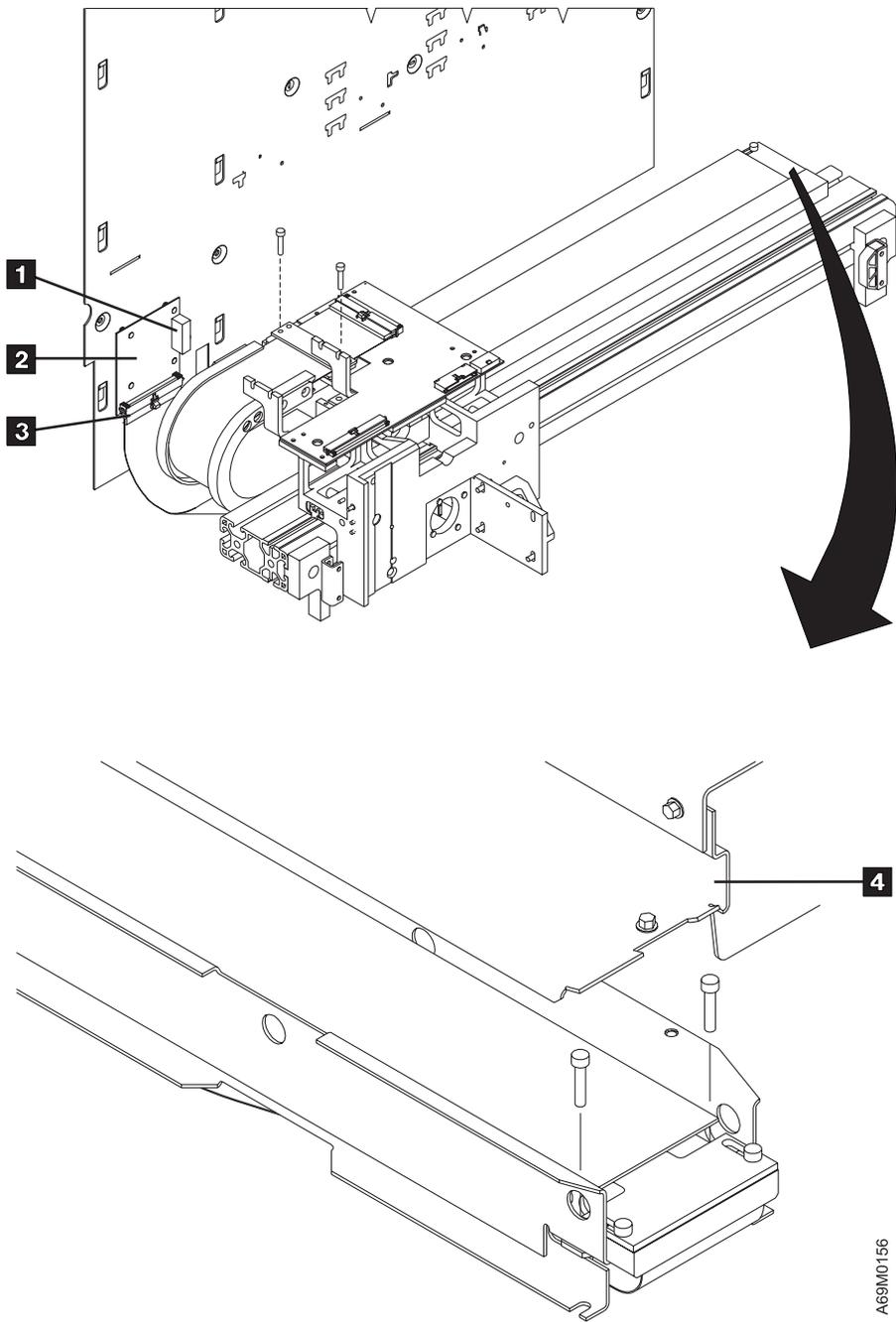
If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Open the front door of the base frame.
3. Move the accessor out of the way.
4. Remove the cable trough cover **4**.
5. Disconnect the cables **1** and **3** from the XCP card **2**.
6. Remove the XCP card **2**.

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Complete the accessor servicing (see “Service Procedures” on page 535).
4. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
5. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



A69M0156

Figure 103. XCP Card

XIO Card

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Note: This FRU is required only if your library has multiple I/O stations.

When working with the XIO card, always remove the operator panel assembly cable first or attach it last to prevent damaging the operator panel (see item 1 in Figure 100 on page 570).

Removal Procedure

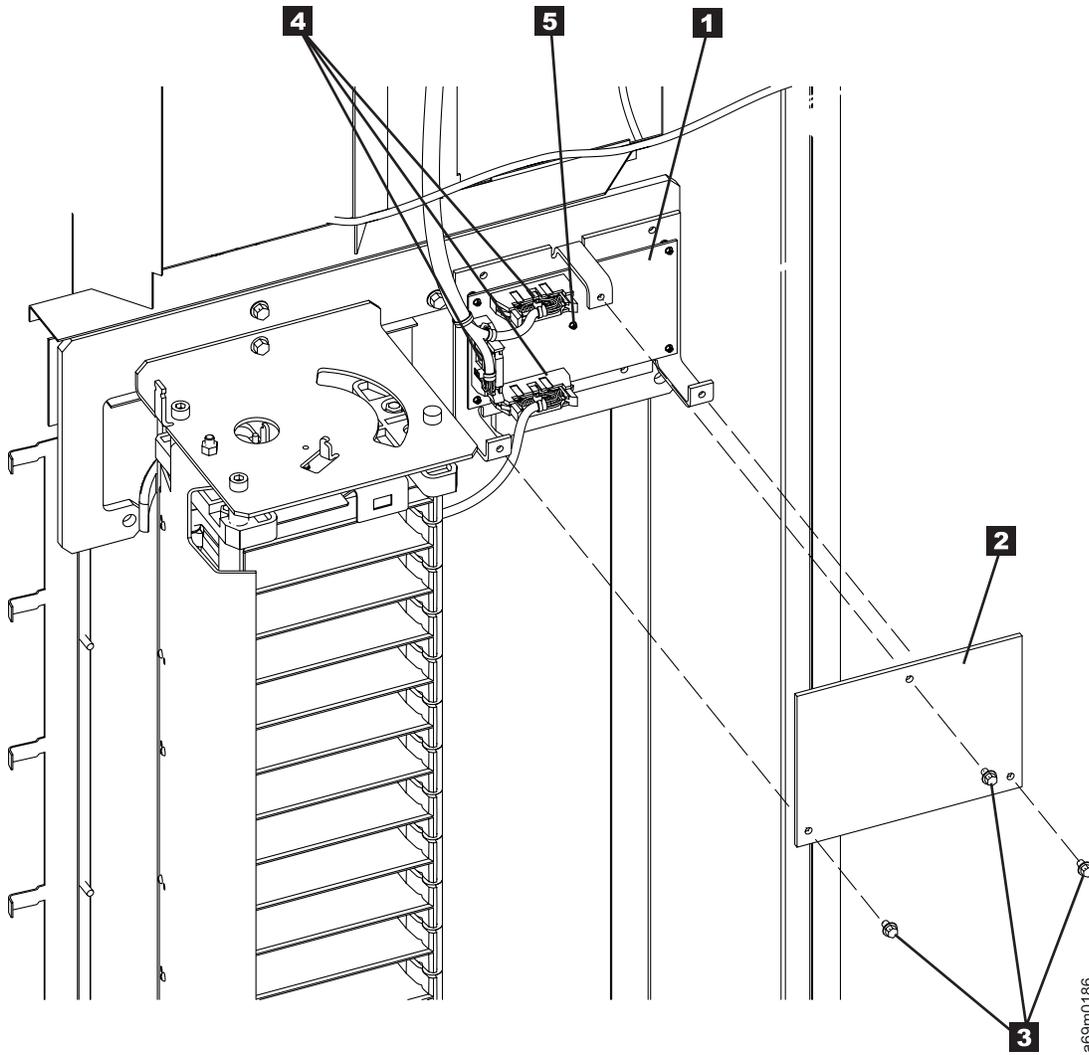
1. Open the door of the base frame (L32).
2. From the back side of the base frame front door, disconnect the cable from the operator panel assembly (see item 1 in Figure 100 on page 570).
3. Remove the three screws **3** to remove the plastic cover **2**.
4. Remove the operator panel assembly cable.
5. Disconnect the three cables **4** from the XIO card **1**.
6. Lift the XIO card **1** off the pins to remove it from the door.

Replacement Procedure

Note:

When reattaching cables to the XIO card, ensure you reconnect the cable from the operator panel assembly to the XIO card last (see item 1 in Figure 100 on page 570).

1. Reverse the removal procedure, noting the following:
 - The cable from the bottom of the lower I/O station connects to the lower connector of the XIO card.
 - The cable from the top of the upper I/O station connects to the middle connector of the XIO card.
 - The cable from the operator panel connects to the top connector of the XIO card.
2. Reconnect all XIO cables and connectors.
3. Reconnect the operator panel cable.
4. Close the front door.
5. Perform an I/O station calibration (see “Library Calibration” on page 530).
6. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
7. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



a69m0186

Figure 104. XIO Card

Control Port, SCSI

Before you begin...
If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Notify the customer that you will be taking a drive or drives out of operation. Ask the customer to vary offline all the drives on the same SCSI bus for the control port canister you are replacing.

Note: Concurrent maintenance of a control port drive may require a logical library to be offline.

2. Prepare the control port for replacement (see “Service Procedures” on page 535).
3. Open the rear door of the frame containing the control port canister.
4. Refer to Figure 105. Use your fingers to push up on the locking lever **1** from the underside of the control port canister until it unlatches.
5. While holding the locking lever up, grasp the control port canister handle **2**. Firmly pull back on the handle enough to disengage the control port canister.
6. Use your other hand to support the control port canister from the underside, as you remove the control port canister from the fixed tray assembly.

Replacement Procedure

The replacement procedure is the reverse of the removal procedure.

1. Carefully slide the new control port canister into the fixed tray assembly.
2. Hold up the locking lever **1** to ensure the tabs on both sides of the lever will clear the frame.
3. Grasp the control port canister handle **2**, and carefully but firmly push the control port into position. Ensure that the connectors correctly align and fully engage with the fixed tray connectors.
4. Lower the locking lever **1** until it snaps into place.

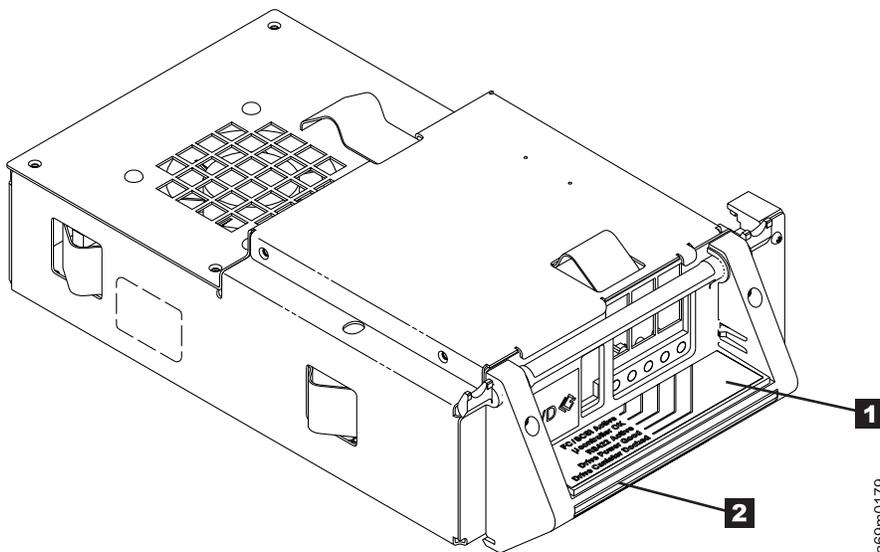


Figure 105. Control Port – SCSI

5. After installing a replacement control port canister, wait at least 3 minutes before continuing. This will ensure that the library has time to automatically configure the control port.

6. Complete the control port replacement (see “Service Procedures” on page 535).
7. At the completion of the tests, inform your customer that the drive may be placed “online” to the host for this control port.

Covers, Right and Left End

Removal Procedure

1. At the operator panel **Activity** screen, press [PAUSE].
2. When the library message indicates that the pause is activated, open the front door of the right or left frame.
3. Remove the screws holding the end cover to the frame.
4. Remove the end cover **1** by lifting up the cover.

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

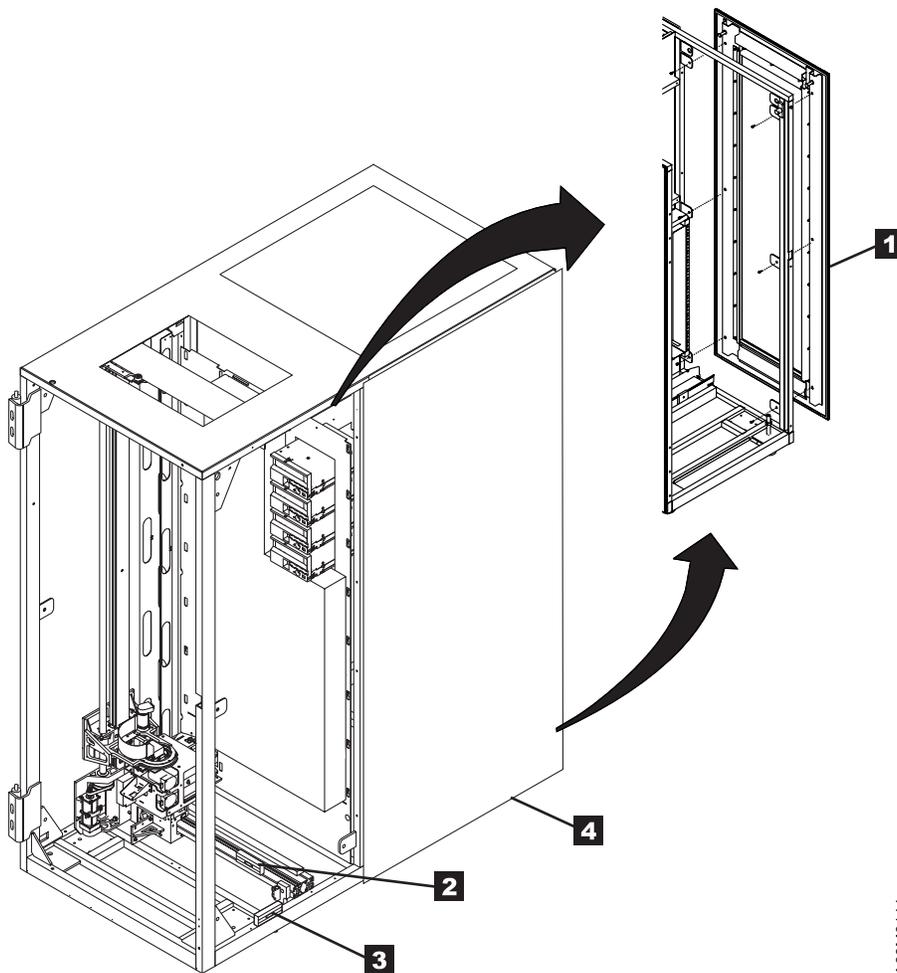


Figure 106. End Cover

A69M0144

Door Interlock Switch and Actuator

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Locate the door interlock actuator assembly **2** on the inside of the front door.
3. Remove the screws **3** that secure the door interlock actuator assembly to the front door.
4. Locate the door interlock switch assembly **4** and its two holding screws **5**.
5. Disconnect the door interlock cable at the J14 connector on the FIC card.
6. Remove the screws and the interlock switch assembly.

Replacement Procedure

1. Reverse the removal procedure.
2. When replacing this assembly it must be adjusted so that the actuator **1** enters the door interlock switch assembly fully, without binds or interference. Tighten the holding screws **3** so that the door closes easily without any binds or interference with the door interlock switch assembly.
3. Close the front door.
4. Complete accessor servicing (see “Service Procedures” on page 535).
5. Ensure that the door interlock is working (detects when the door has been opened). This may require adjustment of the door interlock actuator.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

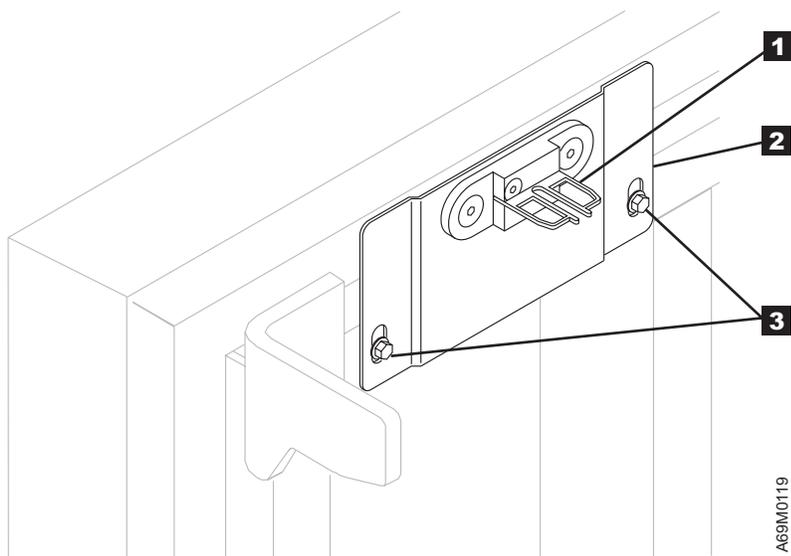


Figure 107. Door Interlock Actuator

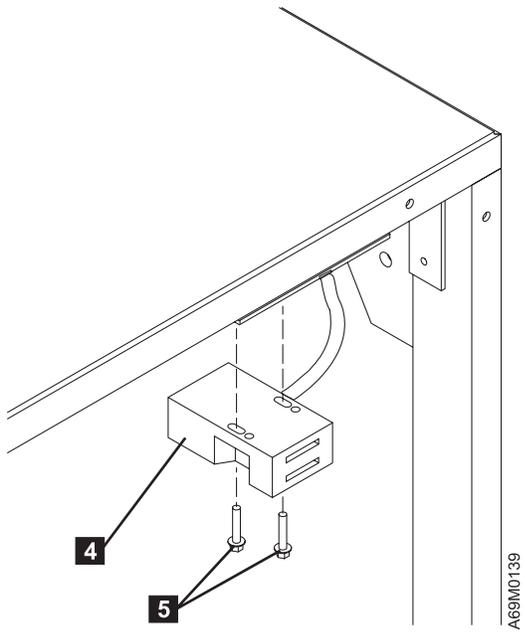


Figure 108. Door Interlock Switch

Drive Types

Table 63 lists the combinations of replacement procedures that the service representative may encounter. In most cases, the failing FRU will be replaced by a similar FRU. In a few cases, an older drive tray assembly may be replaced by newer “hot swap” drive hardware. Eight combinations of procedures are listed in the table. Follow the procedure that best fits your particular situation.

Table 63. Drive Type Replacement Procedures

Current Drive Type	Replacement Drive Type	Use Procedure
Drive Tray Assembly — LTO SCSI	Same	“Drive Tray Assembly – LTO SCSI” on page 585
Drive Tray Assembly — LTO Fibre	Same	“Drive Tray Assembly – LTO Fibre” on page 587
Drive Canister Assembly — DLT SCSI Hot Swap	Same	“Drive Canister Assembly – DLT-8000 SCSI Hot Swap” on page 590
Drive Canister Assembly — LTO SCSI Hot Swap	Same	“Drive Canister Assembly – LTO SCSI Hot Swap” on page 592
Drive Canister Assembly — LTO Fibre Hot Swap	Same	“Drive Canister Assembly – LTO Fibre Hot Swap” on page 594
Drive Tray Assembly — LTO SCSI	LTO SCSI Hot Swap	“LTO SCSI Tray to LTO SCSI Hot Swap Canister” on page 598
Drive Tray Assembly — LTO Fibre	LTO Fibre Hot Swap	“LTO Fibre Tray to LTO Fibre Hot Swap Canister” on page 605
Fixed Tray Assembly — All Hot Swap Models	Fixed Tray Assembly — All Hot Swap Models	“Fixed Tray Assembly - All Hot Swap Canister Models” on page 612

Drive Tray Assembly – LTO SCSI

Before you begin...

- **If you exchange a FRU and the problem is not corrected, reinstall the original FRU.**
- If there is a cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679.

Removal Procedure

Note: When updating an LTO drive, be aware of the following:

- If the drive that is being replaced is a control path drive, all host communications with the library through the affected control path drive (but not host communications with other drives in the library) will be disabled until the drive replacement (which may include automatically updating the drive microcode from another drive) has been completed.
 - If an automatic drive-microcode update must read drive microcode from a control path drive (because the only available drive is a control path or because a control path drive has a higher level of microcode than any other drive in the library) the host will be unable to perform control path functions using that control path drive until the automatic drive microcode update has completed.
1. Notify the customer that you will be taking a drive or drives out of operation. Ask the customer to vary offline all the drives on the same SCSI bus.
 2. Prepare for drive replacement (see “Service Procedures” on page 535).
 3. Open the rear door in the frame containing the drive.
 4. Refer to Figure 109 on page 586. Unplug the AC power cable **1** from the back of the drive tray.

Note: Do not unplug the power cord at the FCA, as two drives are powered from this cord.

5. Unplug the RS-422 cable **2** from the back of the drive tray.
6. Unplug the SCSI cables (and terminator, if installed) from the back of the drive tray.
7. Loosen the screws **3**.
8. Remove the drive tray.
9. If there is a stuck cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679. If not, complete the drive replacement.

Replacement Procedure

1. The replacement procedure is the reverse of the removal procedure.

Attention:

- When connecting cables, connect the power cable last.
- Ensure the drive tray is completely seated at both tabs before tightening the screws. Each tab should be flush to the frame. To prevent deforming the tabs, ensure the drive tray is not skewed before you begin to tighten the screws. If the tabs are bent because the drive tray is skewed, the gripper assembly cannot pick a cartridge.

Note:

- If a logical library label holder is attached to the old drive, remove it and install it on the new drive.
- The drive safety flaps must **NOT** be removed when installing the drives. The safety flaps will pivot out of the way when the drive is installed.

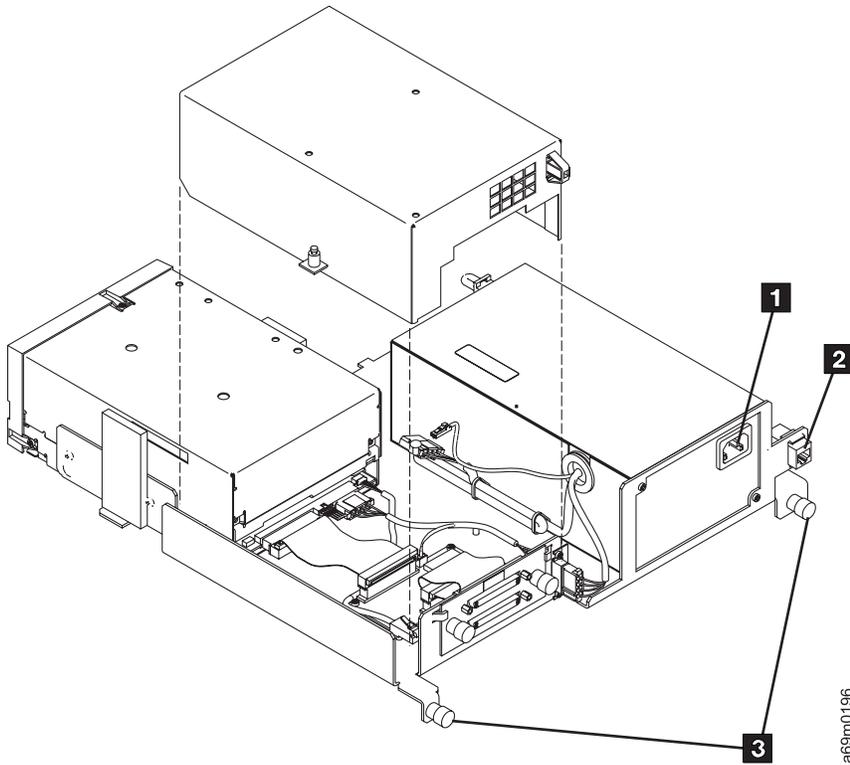


Figure 109. SCSI Drive Tray Assembly – Rear View

2. After installing a replacement drive canister, wait at least 3 minutes before continuing. This will ensure that the library has time to automatically configure and calibrate the drive.

Note: The drive microcode update may take as long as 20 minutes. Wait until the screen indicates that the update is complete or that an error has occurred.

3. Finish drive replacement (see “Service Procedures” on page 535).
4. At the **Activity** screen, press **Menu**.
5. At the **Main Menu** screen, select **Vital Product Data**. Press **Enter**.
6. At the **Vital Product Data** screen, select **Drive VPD**. View the drive microcode version for all drives in the library.
7. If the microcode in the drive you replaced is correct, continue at the next step. If the drive microcode is downlevel on the drive you replaced, update the drive microcode using CETool see “CETool Procedures” on page 500.
8. **Note:** If the drive is connected to an eServer iSeries (AS/400) host, then you must IPL the host IOP before it will recognize the replacement drive.
9. At the completion of the tests, inform your customer that the drive may be placed “online” to the host.

Drive Tray Assembly – LTO Fibre

C05 CAUTION:
These products comply with the performance standards set by the U.S.A. Code of Federal Regulations (CFR) and IEC825 for a Class 1 Laser Product.

Before you begin...

- **If you exchange a FRU and the problem is not corrected, reinstall the original FRU.**
- If there is a cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679.

Removal Procedure

Note: When updating an LTO drive, be aware of the following:

- If the drive that is being replaced is a control path drive, all host communications with the library through the affected control path drive (but not host communications with other drives in the library) will be disabled until the drive replacement (which may include automatically updating the drive microcode from another drive) has been completed.
 - If an automatic drive-microcode update must read drive microcode from a control path drive (because the only available drive is a control path or because a control path drive has a higher level of microcode than any other drive in the library) the host will be unable to perform control path functions using that control path drive until the automatic drive microcode update has completed.
1. Notify the customer that you will be taking a drive out of operation. Ask the customer to vary the drive offline.
 2. Prepare for drive replacement (see “Service Procedures” on page 535).
 3. Open the rear door in the frame containing the drive.
 4. Refer to Figure 110 on page 588. Unplug the AC power cable **1** from the back of the drive tray.

Note: Do not unplug the power cord at the FCA, as two drives are powered from this cord.

5. Unplug the RS-422 cable **2** from the back of the drive tray.
6. Unplug the fibre cable **4**.
7. Loosen the screws **3**, and remove the drive tray from the library.
8. If there is a stuck cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679. If not, complete the drive replacement.

Replacement Procedure

CAUTION:

Do not plug in the host fibre cable until after the “Finish Drive Replacement” process is complete, and the drive has had its code updated, finished its POST, and Library Verify completed. If not, a temporary incorrect Loop ID and/or World Wide Node Name may result.

1. The replacement procedure is the reverse of the removal procedure.

Attention:

- When connecting cables, connect the power cable last.
- Ensure the drive tray is completely seated at both tabs before tightening the screws. Each tab should be flush to the frame. To prevent deforming the tabs, ensure the drive tray is not skewed before you begin to tighten the screws. If the tabs are bent because the drive tray is skewed, the gripper assembly cannot pick a cartridge.

Note:

- If a logical library label holder is attached to the old drive, remove it and install it on the new drive.
- The drive safety flaps must **NOT** be removed when installing the drives. The safety flaps will pivot up out of the way when the drive is installed.
- If you are copying drive microcode either **to** or **from** a control port drive, the drive and its entire logical library string of drives will be unavailable to the library until the microcode update is complete.

Note: Concurrent maintenance of a control port drive may require a logical library to be offline.

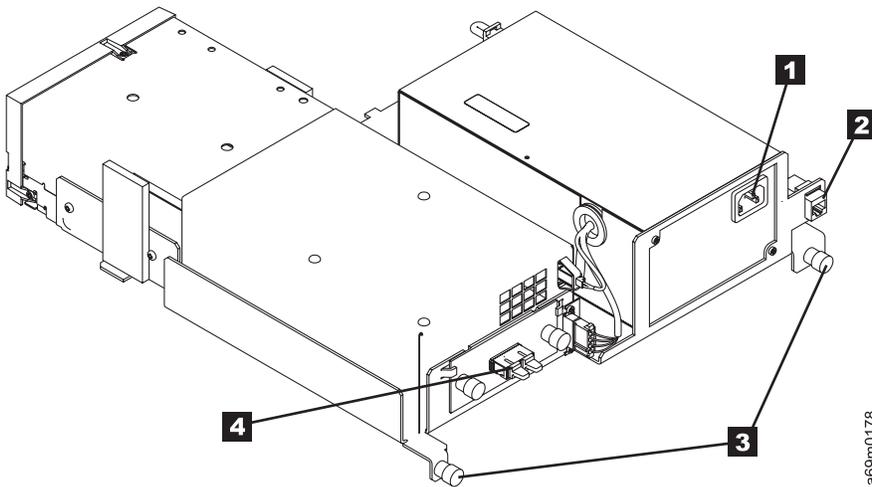


Figure 110. Drive Tray Assembly – LTO Fibre

2. After installing a replacement drive canister, wait at least 3 minutes before continuing. This will ensure that the library has time to automatically configure and calibrate the drive.

Note: The drive microcode update may take as long as 20 minutes. Wait until the screen indicates that the update is complete or that an error has occurred.

3. Finish drive replacement (see “Service Procedures” on page 535).
4. At the **Activity** screen, press **Menu**.
5. At the **Main Menu** screen, select **Vital Product Data**. Press **Enter**.
6. At the **Vital Product Data** screen, select **Drive VPD**. View the drive microcode version for all drives in the library.
7. If the microcode in the drive you replaced is correct, continue at the next step. If the drive microcode is downlevel on the drive you replaced, update the drive microcode using CETool see “CETool Procedures” on page 500.
8. **Note:** If the drive is connected to an eServer iSeries (AS/400) host, then you must IPL the host IOP before it will recognize the replacement drive.

9. At the completion of the tests, inform your customer that the drive may be placed “online” to the host.

Drive Canister Assembly – DLT-8000 SCSI Hot Swap

Before you begin...

- If you exchange a FRU and the problem is not corrected, reinstall the original FRU.
- If there is a cartridge in the drive, go to “From a DLT-8000 Drive” on page 676.

Removal Procedure

1. Notify the customer that you will be taking a drive or drives out of operation. Ask the customer to vary offline all the drives on the same SCSI bus.
2. Prepare for drive replacement (see “Service Procedures” on page 535).
3. Open the rear door of the frame containing the drive canister.
4. Refer to Figure 111 on page 591. Use your fingers to push up on the locking lever **2** from the underside of the drive canister until it unlatches.
5. While holding the locking lever up, grasp the drive canister handle **3**. Firmly pull back on the handle enough to disengage the drive canister.
6. Use your other hand to support the drive canister from the underside, as you remove the drive canister.
7. If there is a stuck cartridge in the drive, go to “From a DLT-8000 Drive” on page 676. If not, complete the drive replacement.

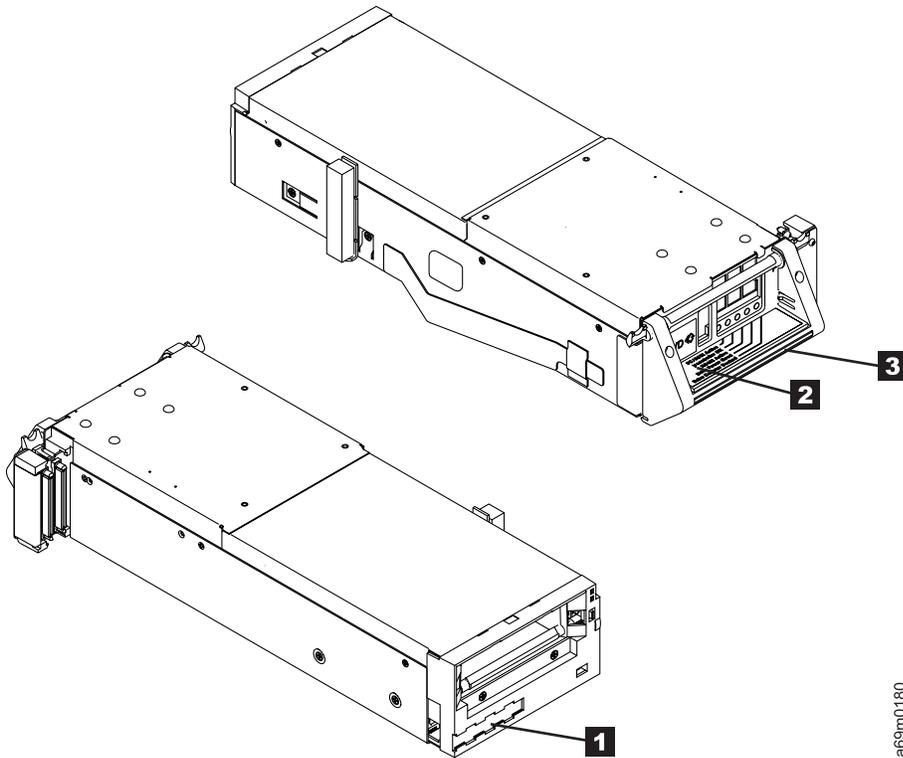
Replacement Procedure

Note:

- If a logical library label **1** is attached to the old drive, remove it from the old drive and attach it to the new drive.
- The drive safety flaps must **not** be removed when installing the drive. The safety flaps will pivot up, out of the path when the drive is installed.

The replacement procedure is the reverse of the removal procedure.

1. Carefully slide the drive canister into the fixed tray assembly.
2. Hold the locking lever **2** up to ensure the tabs on both sides of the lever will clear the frame.
3. Grasp the drive canister handle **3**, and carefully but firmly push the drive into position. Ensure that the connectors to the right correctly align and fully engage with the fixed tray connectors.
4. Lower the locking lever **2** until it snaps into place.



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Figure 111. Drive Tray Canister – DLT-8000 SCSI Hot Swap

5. Refer to “Drive Canister LED Display” on page 541 for canister LED displays.
6. After installing a replacement drive canister, wait at least 3 minutes before continuing. This will ensure that the library has time to automatically configure and calibrate the drive.
7. Finish drive replacement (see “Service Procedures” on page 535).
8. At the **Activity** screen, press **Menu**.
9. At the **Main Menu** screen, select **Vital Product Data**. Press **Enter**.
10. At the **Vital Product Data** screen, select **Drive VPD**. View the drive microcode version for all drives in the library.
11. If the microcode in the drive you replaced is correct, continue at the next step. There is only one level of DLT-8000 microcode supported at this time v0253. If the drive microcode is downlevel contact the support center for a “FUP” tape. This cartridge is equivalent to the LTO term “FMR” see “Updating DLT-8000 Drive Microcode from FUP (FMR) Tape” on page 498.

Note: The CETool can not be used to update DLT-8000 drives.

12. At the completion of the tests, inform your customer that the drive may be placed “online” to the host.

Drive Canister Assembly – LTO SCSI Hot Swap

Before you begin...

- **If you exchange a FRU and the problem is not corrected, reinstall the original FRU.**
- If there is a cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679.

Removal Procedure

Note: When updating an LTO drive, be aware of the following:

- If the drive that is being replaced is a control path drive, all host communications with the library through the affected control path drive (but not host communications with other drives in the library) will be disabled until the drive replacement (which may include automatically updating the drive microcode from another drive) has been completed.
 - If an automatic drive-microcode update must read drive microcode from a control path drive (because the only available drive is a control path or because a control path drive has a higher level of microcode than any other drive in the library) the host will be unable to perform control path functions using that control path drive until the automatic drive microcode update has completed.
1. Notify the customer that you will be taking a drive or drives out of operation. Ask the customer to vary offline all the drives on the SCSI bus.
 2. Prepare for drive replacement (see “Service Procedures” on page 535).
 3. Open the rear door of the frame containing the drive.
 4. While holding up the locking lever **2**, grasp the drive canister handle **3**. Firmly pull back on the handle enough to disengage the drive canister.
 5. Use your other hand to support the drive canister from the underside, as you remove the drive canister from the fixed tray assembly.
 6. If there is a stuck cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679. If not, complete the drive replacement.

Replacement Procedure

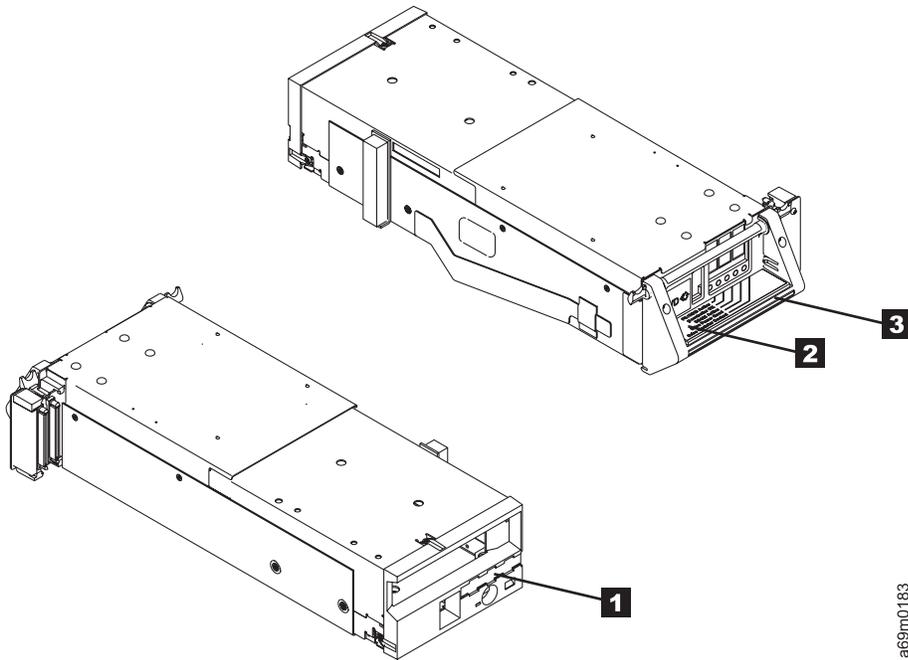
Note:

- If a logical library label **1** is attached to the old drive, remove it from the old drive and attach it to the new drive.
- The drive safety flaps must **not** be removed when installing the drive. The safety flaps will pivot up, out of the path when the drive is installed.
- If you are copying drive microcode either **to** or **from** a control port drive, the drive and its entire logical library string of drives will be unavailable to the library until the microcode update is complete.

Note: Concurrent maintenance of a control port drive may require a logical library to be offline.

The replacement procedure is the reverse of the removal procedure.

1. Carefully slide the drive canister into the fixed tray assembly.
2. Hold the locking lever **2** up to ensure the tabs on both sides of the lever will clear the frame.
3. Grasp the drive canister handle **3**, and carefully but firmly push the drive into position. Ensure that the connectors to the right correctly align and fully engage with the fixed tray connectors.
4. Lower the locking lever **2** until it snaps into place.



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Figure 112. Drive Canister Assembly– LTO SCSI Hot Swap

5. Refer to “Drive Canister LED Display” on page 541 for canister LED displays.
6. After installing a replacement drive canister, wait at least 3 minutes before continuing. This will ensure that the library has time to automatically configure and calibrate the drive.

Note: The drive microcode update may take as long as 20 minutes. Wait until the screen indicates that the update is complete or that an error has occurred.

7. Finish drive replacement (see “Service Procedures” on page 535).
8. At the **Activity** screen, press **Menu**.
9. At the **Main Menu** screen, select **Vital Product Data**. Press **Enter**.
10. At the **Vital Product Data** screen, select **Drive VPD**. View the drive microcode version for all drives in the library.
11. If the microcode in the drive you replaced is correct, continue at the next step. If the drive microcode is downlevel on the drive you replaced, update the drive microcode using CETool see “CETool Procedures” on page 500.
12. **Note:** If the drive is connected to an eServer iSeries (AS/400) host, then you must IPL the host IOP before it will recognize the replacement drive.
13. At the completion of the tests, inform your customer that the drive may be placed “online” to the host.

Drive Canister Assembly – LTO Fibre Hot Swap

Before you begin...

- **If you exchange a FRU and the problem is not corrected, reinstall the original FRU.**
- If there is a cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679.

Removal Procedure

Note: When updating an LTO drive, be aware of the following:

- If the drive that is being replaced is a control path drive, all host communications with the library through the affected control path drive (but not host communications with other drives in the library) will be disabled until the drive replacement (which may include automatically updating the drive microcode from another drive) has been completed.
 - If an automatic drive-microcode update must read drive microcode from a control path drive (because the only available drive is a control path or because a control path drive has a higher level of microcode than any other drive in the library) the host will be unable to perform control path functions using that control path drive until the automatic drive microcode update has completed.
1. Notify the customer that you will be taking a drive or drives out of operation. Ask the customer to vary offline the drive.
 2. Prepare for drive replacement (see “Service Procedures” on page 535).
 3. Open the rear door of the frame containing the drive.
 4. Refer to Figure 113 on page 595. Unplug the fibre cable **4**.
 5. While holding up the locking lever **2**, grasp the drive canister handle **3**. Firmly pull back on the handle enough to disengage the drive canister.
 6. Use your other hand to support the drive canister from the underside, as you remove the drive canister from the fixed tray assembly.
 7. If there is a stuck cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679. If not, complete the drive replacement.

Replacement Procedure

CAUTION:

Do not plug in the host fibre cable until after the “Finish Drive Replacement” process is complete, and the drive has had its code updated, finished its POST, and Library Verify completed. If not, a temporary incorrect Loop ID and/or World Wide Node Name may result.

Note:

- If a logical library label **1** is attached to the old drive, remove it from the old drive and attach it to the new drive.
- The drive safety flaps must **not** be removed when installing the drive. The safety flaps will pivot up, out of the path when the drive is installed.
- If you are copying drive microcode either **to** or **from** a control port drive, the drive and its entire logical library string of drives will be unavailable to the library until the microcode update is complete.

Note: Concurrent maintenance of a control port drive may require a logical library to be offline.

The replacement procedure is the reverse of the removal procedure.

1. Carefully slide the drive canister into the fixed tray assembly.
2. Hold the locking lever **2** up to ensure the tabs on both sides of the lever will clear the frame.
3. Grasp the drive canister handle **3**, and carefully but firmly push the drive into position. Ensure that the connectors to the right correctly align and fully engage with the fixed tray connectors.
4. Lower the locking lever **2** until it snaps into place.
5. Replug the fibre cable.

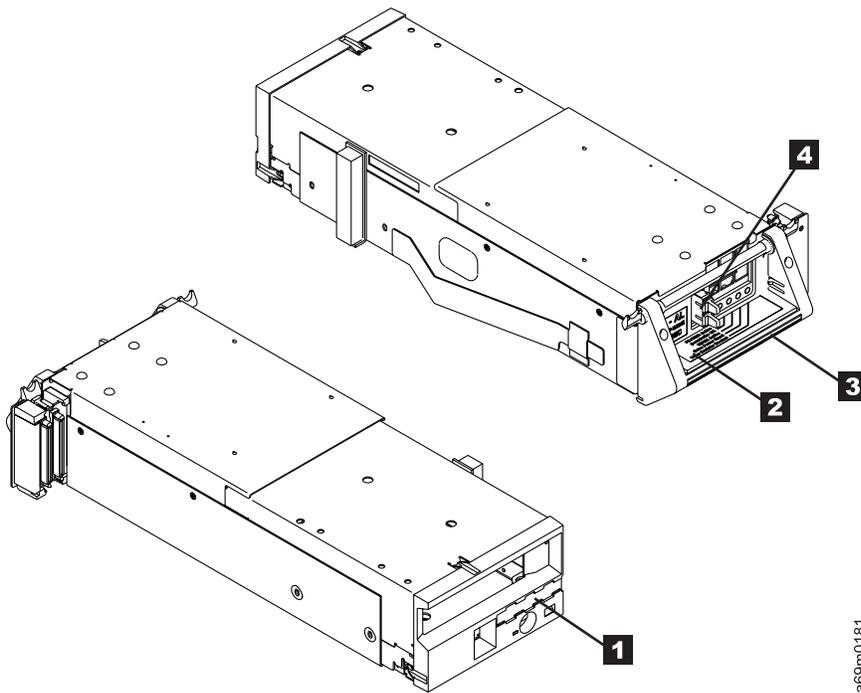


Figure 113. Drive Canister Assembly– LTO Fibre Hot Swap

6. Refer to “Drive Canister LED Display” on page 541 for canister LED displays.

Note: When installing LTO Ultrium-2 Fibre drives, the LED may turn Green as soon as the drive is installed in the power tray. This is a drive code problem that occurs only with LTO Ultrium-2 drives, and will be fixed in an upcoming drive code release. Do not change any FRUs to resolve this problem unless you are working on a Fibre Channel connectivity problem and the Fibre Channel Wrap Test fails.

7. After installing a replacement drive canister, wait at least 3 minutes before continuing. This will ensure that the library has time to automatically configure and calibrate the drive.

Note: The drive microcode update may take as long as 20 minutes. Wait until the screen indicates that the update is complete or that an error has occurred.

8. Finish drive replacement (see “Service Procedures” on page 535).
9. At the **Activity** screen, press **Menu**.
10. At the **Main Menu** screen, select **Vital Product Data**. Press **Enter**.
11. At the **Vital Product Data** screen, select **Drive VPD**. View the drive microcode version for all drives in the library.
12. If the microcode in the drive you replaced is correct, continue at the next step. If the drive microcode is downlevel on the drive you replaced, update the drive microcode using CETool see “CETool Procedures” on page 500.

13. **Note:** If the drive is connected to an eServer iSeries (AS/400) host, then you must IPL the host IOP before it will recognize the replacement drive.
14. At the completion of the tests, inform your customer that the drive may be placed “online” to the host.

Power Supply (LTO/DLT/Control Port), Redundant – Hot Swap

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

Note: One redundant power supply provides power to two drives. The power supply can be removed and replaced without affecting drive operation.

1. Open the rear door of the frame containing the power supply.
2. Use your thumb and index finger to pinch together the locking arms **1** of the power supply.
3. Pivot outward the entire locking arm assembly **2** to release it from the fixed tray assembly.
4. Grasp the locking arm and firmly pull it back enough to release it from the fixed tray assembly.
5. Use your other hand to support the end of the power supply as you remove the power supply canister **3** from the fixed tray assembly **4**.

Replacement Procedure

The replacement procedure is the reverse of the removal procedure.

1. Carefully slide the power supply canister **3** into the fixed tray assembly **4**.

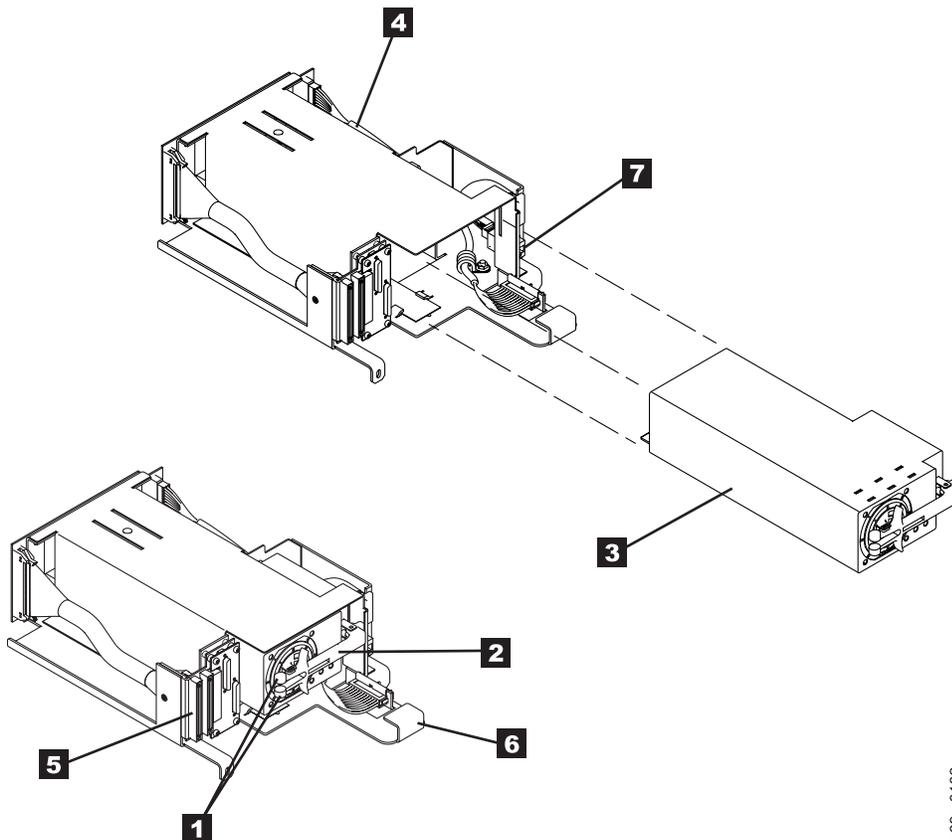


Figure 114. Redundant Power Supply – Hot Swap

2. Pinch together the locking arms **1** and slide in the power supply **3**, as you use the locking arm assembly **2** as a lever to move the power supply canister **3** into the locked position.

LTO SCSI Tray to LTO SCSI Hot Swap Canister

Before you begin...

- **If you exchange a FRU and the problem is not corrected, reinstall the original FRU.**
- If there is a cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679.

Removal Procedure

Note: When updating an LTO drive, be aware of the following:

- If the drive that is being replaced is a control path drive, all host communications with the library through the affected control path drive (but not host communications with other drives in the library) will be disabled until the drive replacement (which may include automatically updating the drive microcode from another drive) has been completed.
- If an automatic drive-microcode update must read drive microcode from a control path drive (because the only available drive is a control path or because a control path drive has a higher level of microcode than any other drive in the library) the host will be unable to perform control path functions using that control path drive until the automatic drive microcode update has completed.

| **A conversion kit is now available.** See Chapter 14. Parts Catalog for “Tray-to-Canister” FRU kit part numbers. The following parts are included in the kit:

- | • LTO hot swap drive canister (LVD or HVD, same type you are replacing)
 - | • Power Tray Assembly (with power supply)
 - | • Two VHCDI-to-HD68 interposer cables (to connect new drive VHCDI SCSI connectors to existing HD68 SCSI bus)
 - | • Redundant drive power supply power cable (only used if this new drive is being installed above or below an existing hot-swap drive assembly that is currently **not** connected to an existing redundant drive power supply power cable.
 - | • SCSI Terminator
 - | • Install Instructions
- | • Ensure that you have the latest drive microcode file available in case you need to update the drive after you install it. See “Downloading and Installing CETool” on page 500 for assistance in obtaining drive code.
 1. Notify the customer that you will be taking a drive or drives out of operation. Ask the customer to vary all the drives on the same SCSI bus offline, and to quiesce the bus.
 2. Prepare for drive replacement (see “Service Procedures” on page 535).
 3. Open the rear door in the frame containing the drive.
 4. Unplug the AC power cable **1** from the back of the drive tray.

Note: Do not unplug the power cord at the FCA, as two drives are powered from this cord.

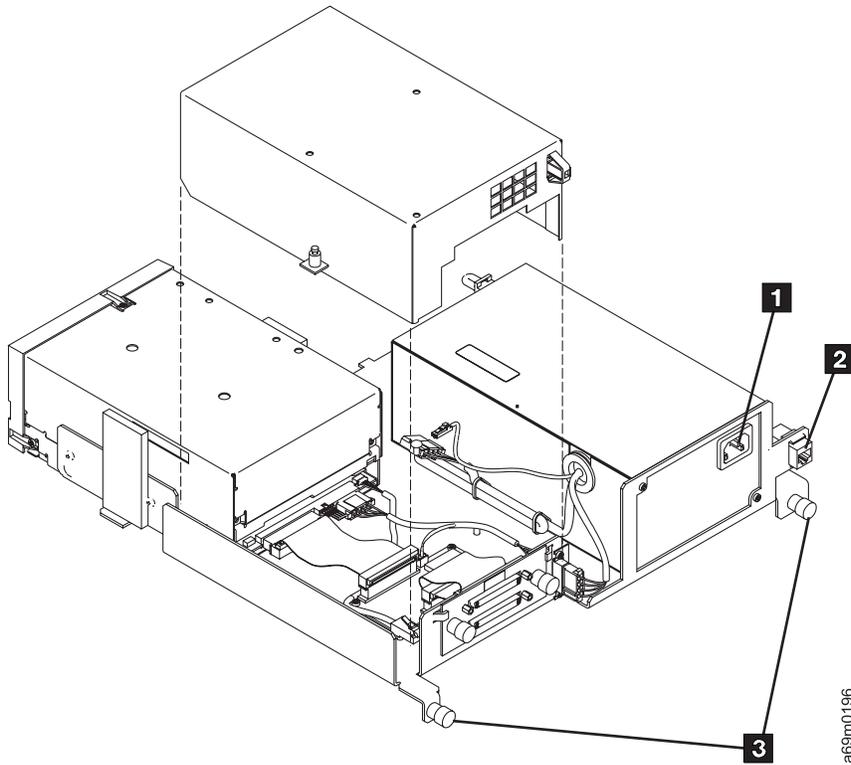


Figure 115. Unplugging AC Power Cables

5. Unplug the RS-422 cable **2** from the back of the drive tray.
6. Unplug the SCSI cables (and terminator, if installed) from the back of the drive tray.
7. Loosen the screws **3** to remove the drive tray.
8. If there is a stuck cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679. If not, complete the drive replacement.

Replacement Procedure

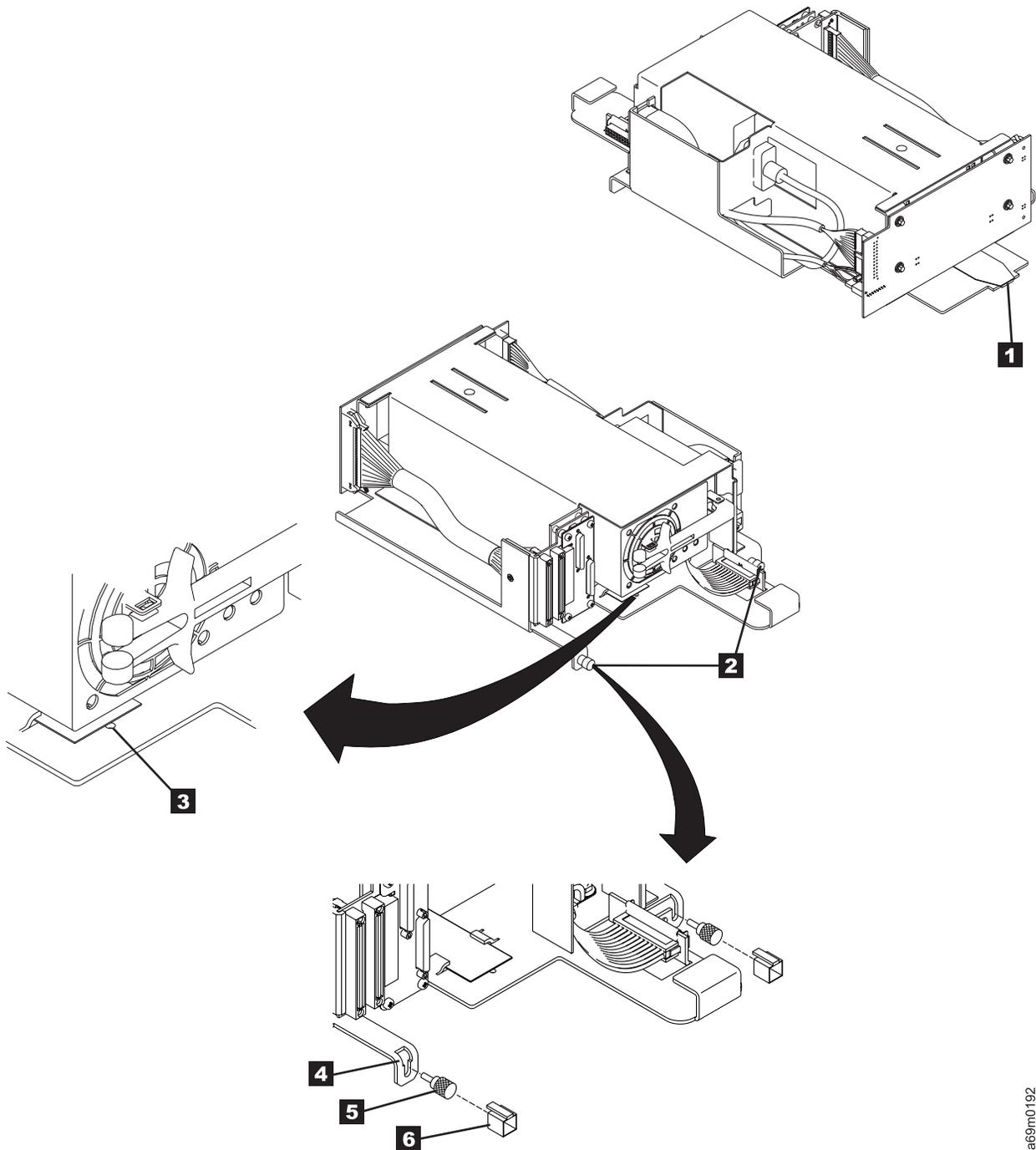
Note: If you are copying drive microcode either **to** or **from** a control port drive, the drive and its entire logical library string of drives will be unavailable to the library until the microcode update is complete.

Note: Concurrent maintenance of a control port drive may require a logical library to be offline.

Installing the Fixed Tray

1. Slide in the fixed drive tray assembly, keeping it toward the right side. Ensure the front locating tab **1** on the tray assembly slides securely into the front slot in the frame (see Figure 116 on page 600).

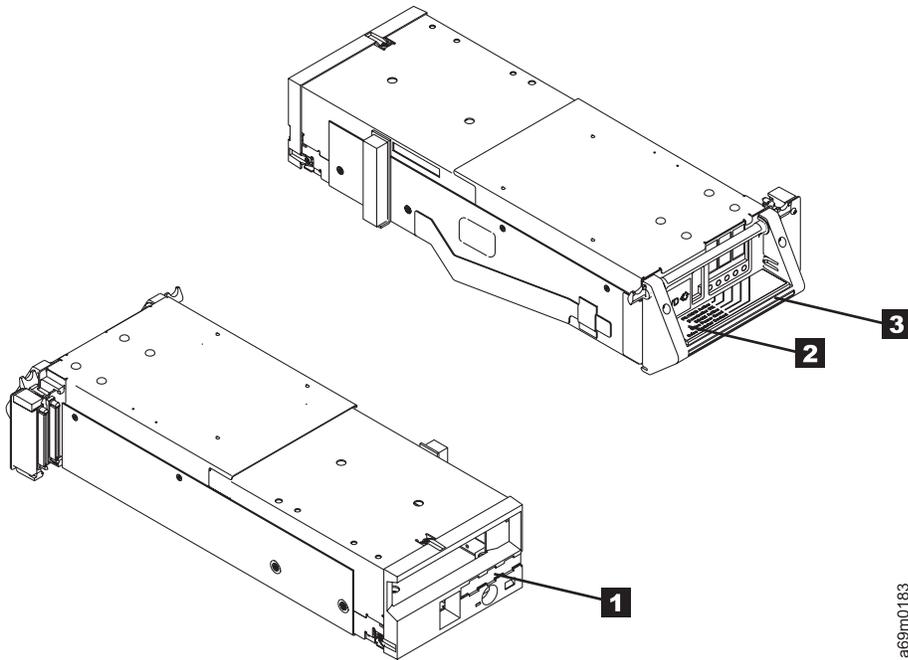
Note: As the front locating tab seats into the slot in the frame, the indicator slide will move to partially cover the indicator hole **3**. If you see the indicator slide move toward the indicator hole (partially covering it), then the locating tab is positioned in the slot. If the indicator slide does **not** move, slide the front of the fixed tray assembly left or right until the locating tab slides into the slot.



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Figure 116. Fixed Tray

2. Tighten both thumbscrews **2** to be **fingertight only**. Do not overtighten these screws.
3. If your fixed tray has notches **4** near the thumbscrews, secure the tray with two knurled thumbscrews **5**. Slide the thumbscrew caps **6** over the screws until the tab slides all the way into the notch.



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Figure 117. LTO SCSI Drive Canister

Installing the Drive Canister

Note:

- If a logical library label **1** is installed on the old drive, remove it and install it on the new drive.
 - The drive safety flaps must NOT be removed when installing the drives. The safety flaps will pivot up out of the way when the drive is installed.
4. Carefully slide the drive canister into the left side of the fixed tray assembly (see Figure 118 on page 602).
 5. Hold the locking lever **2** **up** to ensure the tabs on both sides of the lever will clear the frame.
 6. Grasp the drive canister handle **3**, and carefully but firmly push the drive into position. Ensure the connectors to the right correctly align and fully engage with the fixed tray connectors.
 7. Lower the locking lever **2** until it snaps in place.

Installing the Hot Swap Power Supply

- Pivot locking arm assembly **2** outward.

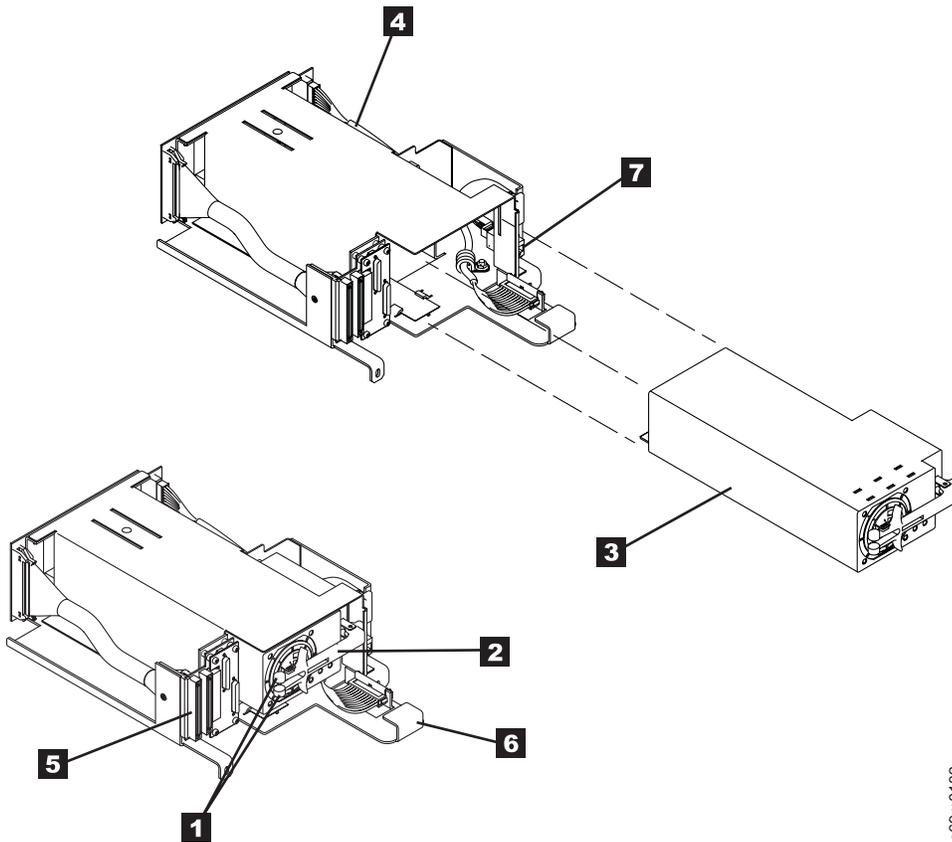
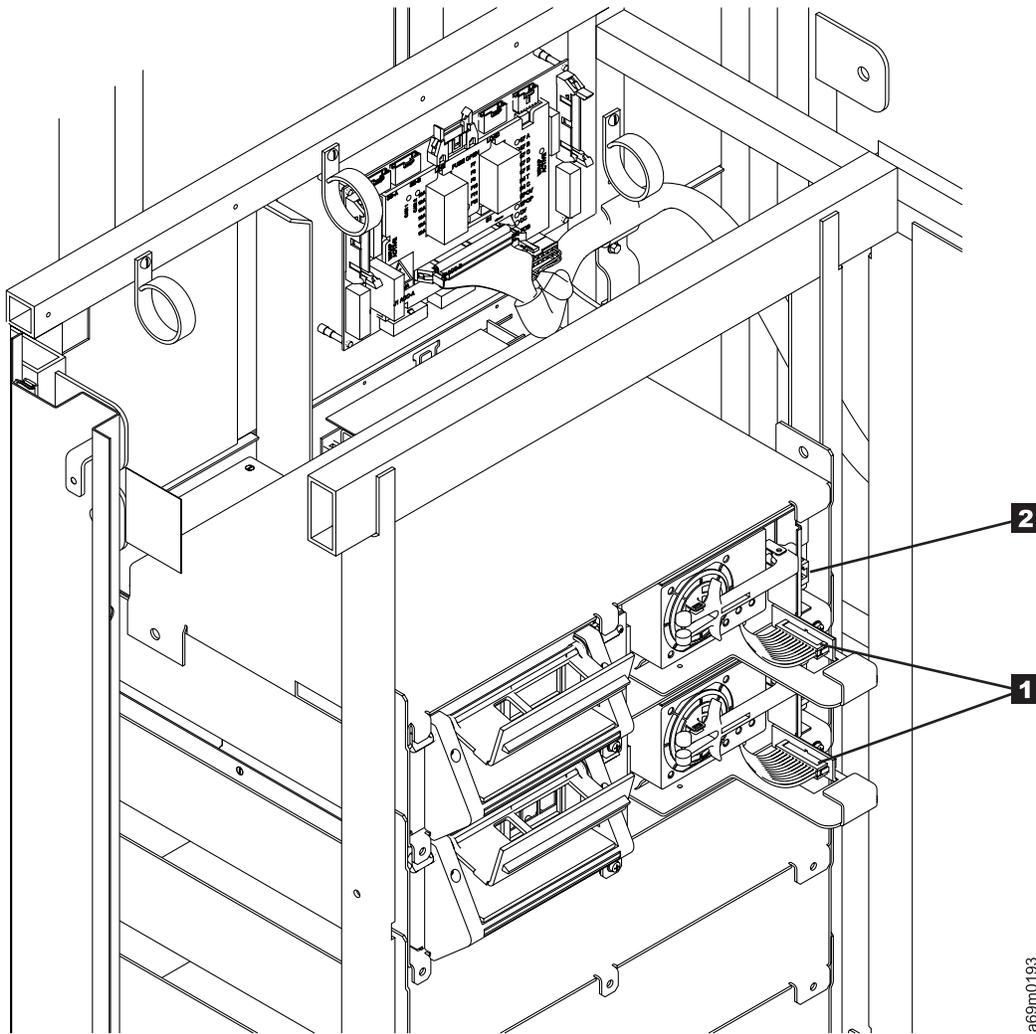


Figure 118. Hot Swap Power Supply

- Firmly slide the power supply **3** into the fixed tray assembly.
- Swing the locking arm to the left while you pinch the two locking tabs **1** together, securing the arm in place.

Installing Interposers and SCSI Cables

- Install a SCSI VHCDI-to-HD68 interposer cable on each SCSI receptacle **5**, and tighten the screws.
- Re-install the existing SCSI cables (or terminator, if this was the end of the SCSI bus) to the interposer cables just installed, and tighten the thumbscrews securely. Route the SCSI cables onto the strain-relief bracket **6** to provide support.
- Reconnect the RS-422 connector **7** on the right side of the new fixed tray assembly.



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Figure 119. Cables and Power Cord

14. If there is another hot swap drive in a position adjacent to this newly-installed drive, install a Redundant Power Supply power cable between the two hot swap drive trays **1**, as shown.

Note: A special, 3-connector, redundant power cable is used for the control port in Row 0. The connector labeled **0** must connect to the fixed tray in Row 0.

15. Reconnect the bifurcated power cord on the right side **2** of the new fixed tray assembly.
16. After applying power to a drive canister, wait at least 3 minutes before continuing. This will ensure that the library has time to automatically configure and calibrate the drive.

Note: The drive microcode update may take as long as 20 minutes. Wait until the screen indicates that the update is complete or that an error has occurred.

17. Finish drive replacement (see “Service Procedures” on page 535).
18. At the **Activity** screen, press **Menu**.
19. At the **Main Menu** screen, select **Vital Product Data**. Press **Enter**.
20. At the **Vital Product Data** screen, select **Drive VPD**. View the drive microcode version for all drives in the library.

21. If the microcode in the drive you replaced is correct, continue at the next step. If the drive microcode is downlevel on the drive you replaced, update the drive microcode using CETool see “CETool Procedures” on page 500.
22. **Note:** If the drive is connected to an eServer iSeries (AS/400) host, then you must IPL the host IOP before it will recognize the replacement drive.
23. At the completion of the tests, inform your customer that the drive may be placed “online” to the host.
24. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

LTO Fibre Tray to LTO Fibre Hot Swap Canister

Before you begin...

- **If you exchange a FRU and the problem is not corrected, reinstall the original FRU.**
- If there is a cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679.

Removal Procedure

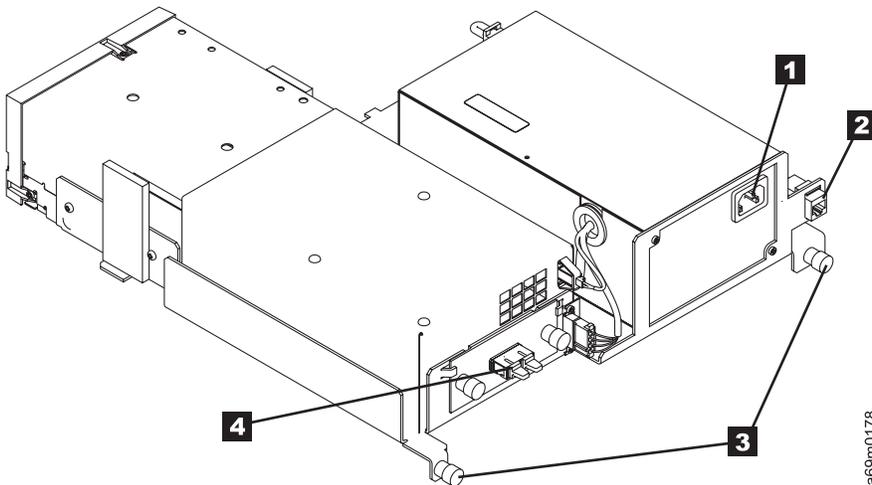
Note: When updating an LTO drive, be aware of the following:

- If the drive that is being replaced is a control path drive, all host communications with the library through the affected control path drive (but not host communications with other drives in the library) will be disabled until the drive replacement (which may include automatically updating the drive microcode from another drive) has been completed.
- If an automatic drive-microcode update must read drive microcode from a control path drive (because the only available drive is a control path or because a control path drive has a higher level of microcode than any other drive in the library) the host will be unable to perform control path functions using that control path drive until the automatic drive microcode update has completed.

| **A conversion kit is now available.** See Chapter 14. Parts Catalog for “Tray-to-Canister” FRU kit part numbers. The following parts are included in the kit:

- | • LTO hot swap fibre drive canister
 - | • Power Tray Assembly (with power supply)
 - | • Redundant drive power supply power cable (only used if this new drive is being installed above or below an existing hot-swap drive assembly that is currently **not** connected to an existing redundant drive power supply power cable.
 - | • Install Instructions
 - | • New LTO fibre hot-swap drive microcode (if this is the first and only LTO fibre hot-swap drive in your library). Ensure you have the latest drive microcode installed on the new hot-swap drive canister. You can obtain the new microcode from the PFE website, and you can download the new microcode by using the CETool procedure.
1. Notify the customer that you will be taking a drive or drives out of operation. Ask the customer to vary offline all the drives on the same fibre hub.
 2. Prepare for drive replacement (see “Service Procedures” on page 535).
 3. Open the rear door in the frame containing the drive.
 4. Unplug the AC power cable **1** from the back of the drive tray.

Note: Do not unplug the power cord at the FCA, as two drives are powered from this cord.



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Figure 120. Drive Tray Assembly—LTO Fibre

5. Unplug the RS-422 cable **2** from the back of the drive tray.
6. Unplug the fibre cable **4**.
7. Loosen the screws **3** to remove the drive tray.
8. If there is a stuck cartridge in the drive, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679. If not, complete the drive replacement.

Replacement Procedure

CAUTION:

Do not plug in the host fibre cable until after the “Finish Drive Replacement” process is complete, and the drive has had its code updated, finished its POST, and Library Verify completed. If not, a temporary incorrect Loop ID and/or World Wide Node Name may result.

Note: Concurrent maintenance of a control port drive may require a logical library to be offline.

Installing the Fixed Tray

1. Slide in the fixed tray assembly, keeping it toward the right side. Ensure the front locating tab **1** on the tray assembly slides securely into the front slot in the frame.

Note: As the front locating tab seats into the slot in the frame, the indicator slide will move to partially cover the indicator hole **3**. If you see the indicator slide move toward the indicator hole (partially covering it), then the locating tab is positioned in the slot. If the indicator slide does **not** move, slide the front of the fixed tray assembly left or right until the locating tab slides into the slot.

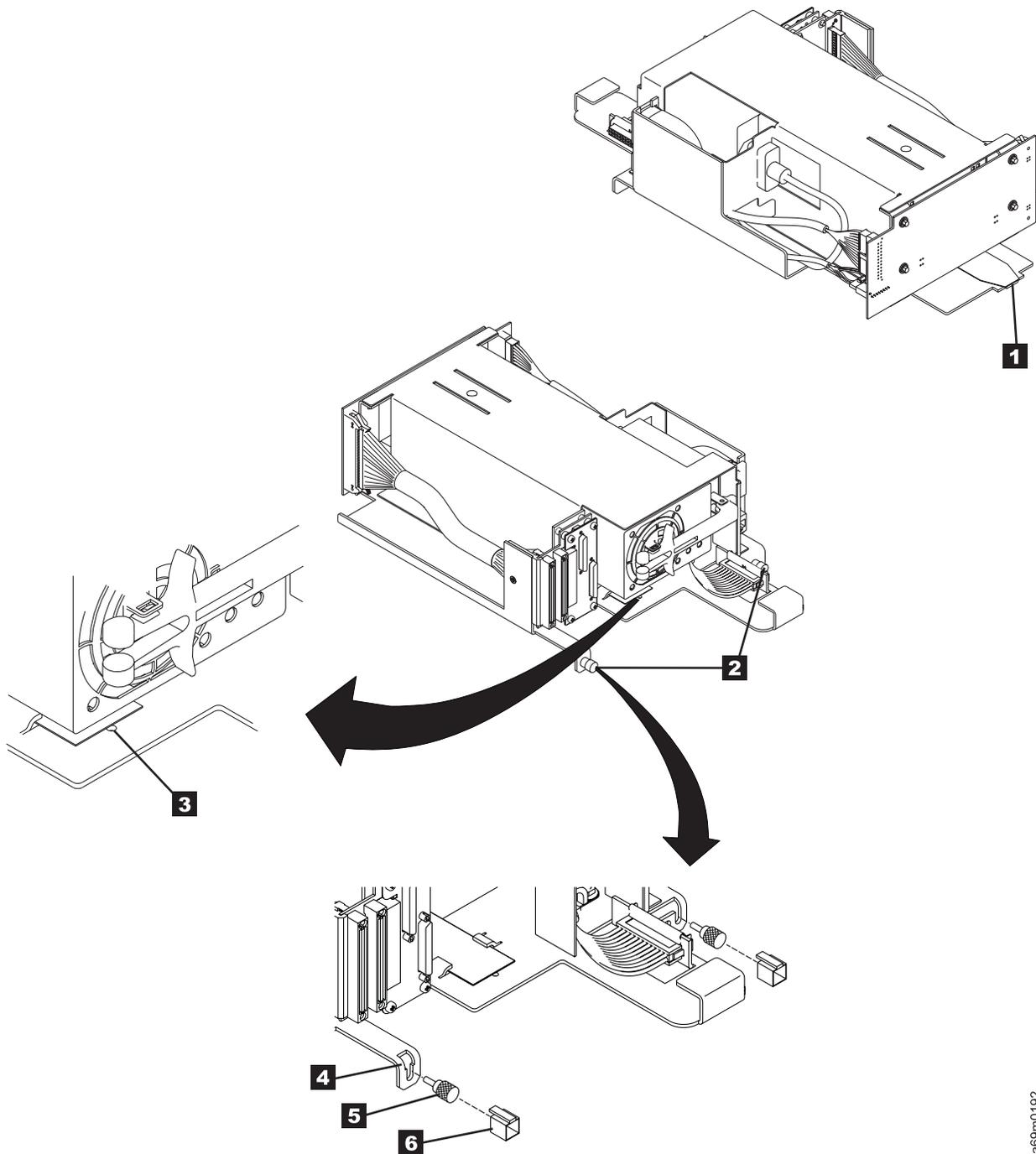


Figure 121. Fixed Tray

2. Tighten both thumbscrews **2** to be **fingertight only**. Do not overtighten these screws.
3. If your fixed tray has notches **4** near the thumbscrews, secure the tray with two knurled thumbscrews **5**. Slide the thumbscrew caps **6** over the screws until the tab slides all the way into the notch.

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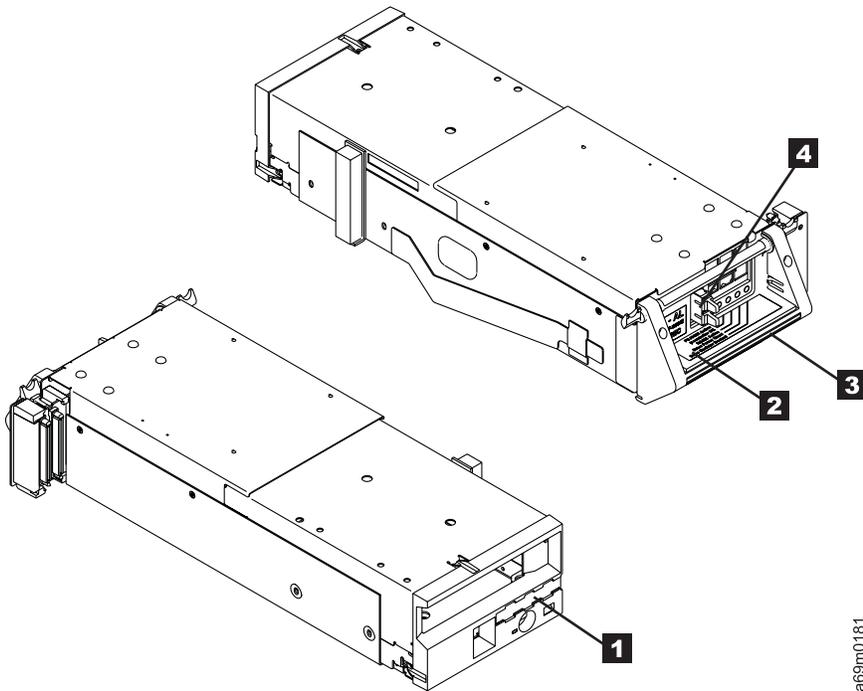


Figure 122. LTO Fibre Drive Canister

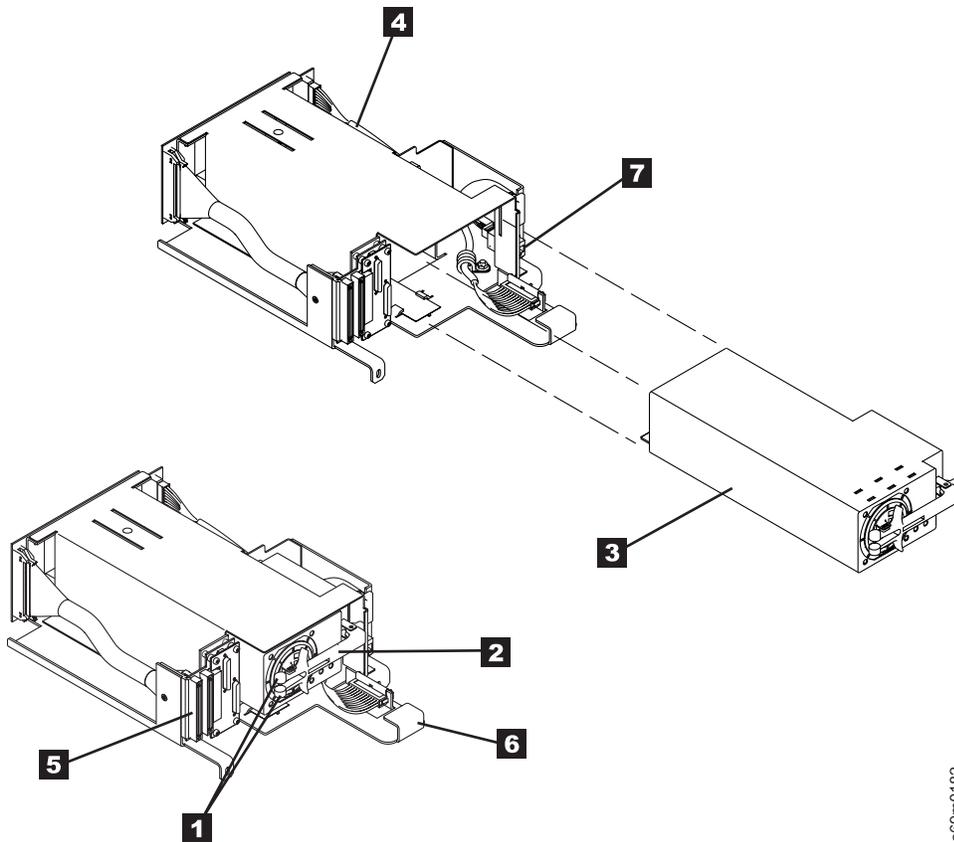
Installing the Drive Canister

Note:

- If a logical library label **1** is installed on the old drive, remove it and install it on the new drive (see Figure 122).
 - The drive safety flaps must NOT be removed when installing the drives. The safety flaps will pivot up out of the way when the drive is installed.
4. Carefully slide the drive canister into the left side of the fixed tray assembly.
 5. Hold the locking lever **2** **up** to ensure the tabs on both sides of the lever will clear the frame (see Figure 122).
 6. Grasp the drive canister handle **3**, and carefully but firmly push the drive into position. Ensure the connectors to the right correctly align and fully engage with the fixed tray connectors.
 7. Lower the locking lever **2** until it snaps in place.

Installing the Hot Swap Power Supply

8. Pivot locking arm assembly **2** outward (see Figure 123 on page 609).



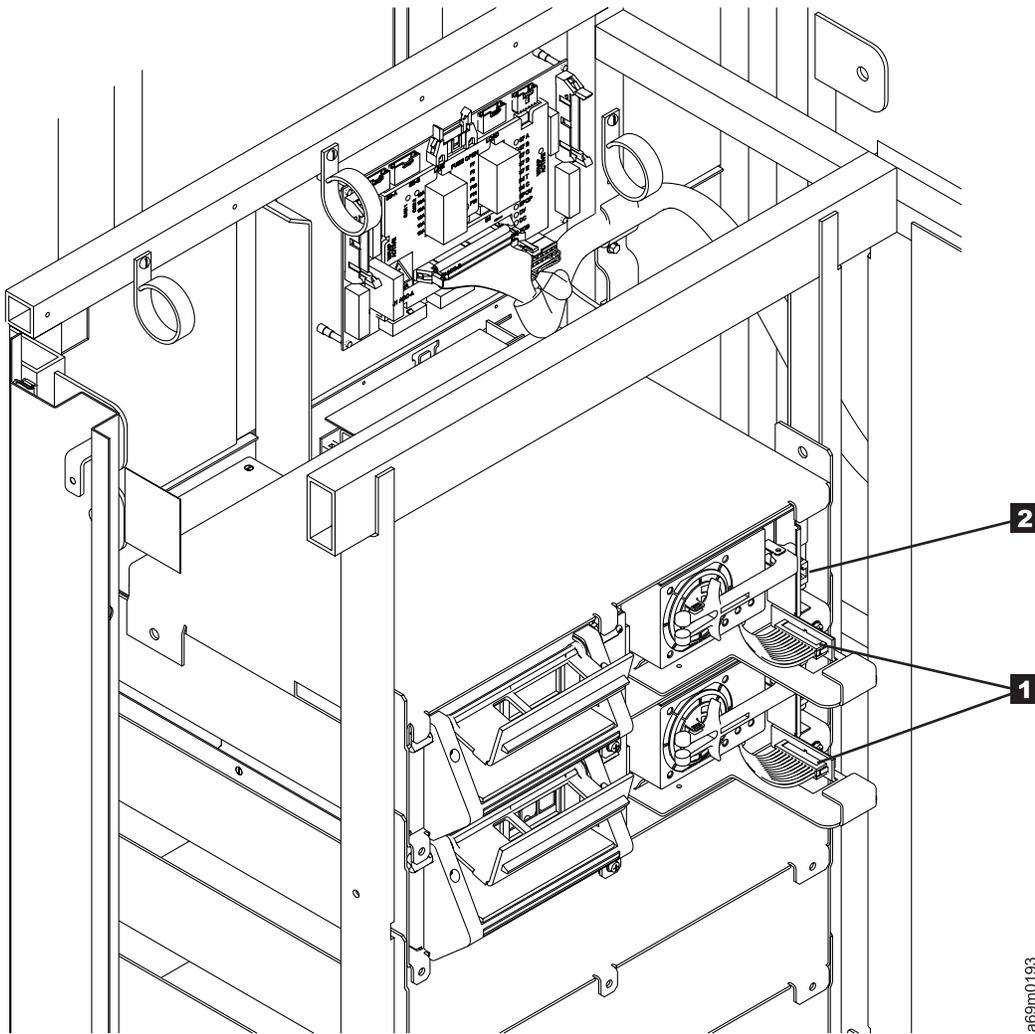
a69m0182

Figure 123. Hot Swap Power Supply

9. Firmly slide the power supply **3** into the fixed tray assembly.
10. Swing the locking arm to the left while you pinch the two locking tabs **1** together, securing the arm in place.

Installing Cables

11. Reconnect the fibre cable **4** (see Figure 122 on page 608).
12. Reconnect the RS-422 connector **7** on the right side of the fixed tray assembly (see Figure 123).



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Figure 124. Cables and Power Cord

13. If there is another hot-swap drive in a position adjacent to this newly-installed drive, install a Redundant Power Supply power cable between the two hot-swap drive trays **1**, as shown (see Figure 124).
14. Reconnect the bifurcated power cord on the right side **2** of the new fixed tray assembly.
15. After applying power to a drive canister, wait at least 3 minutes before continuing. This will ensure that the library has time to automatically configure and calibrate the drive.

Note: The drive microcode update may take as long as 20 minutes. Wait until the screen indicates that the update is complete or that an error has occurred.

16. Finish drive replacement (see “Service Procedures” on page 535).
17. At the **Activity** screen, press **Menu**.
18. At the **Main Menu** screen, select **Vital Product Data**. Press **Enter**.
19. At the **Vital Product Data** screen, select **Drive VPD**. View the drive microcode version for all drives in the library.
20. If the microcode in the drive you replaced is correct, continue at the next step. If the drive microcode is downlevel on the drive you replaced, update the drive microcode using CETool see “CETool Procedures” on page 500.
21. At the completion of the tests, inform your customer that the drive may be placed “online” to the host.

22. **Note:** If the drive is connected to an eServer iSeries (AS/400) host, then you must IPL the host IOP before it will recognize the replacement drive.
23. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

Fixed Tray Assembly - All Hot Swap Canister Models

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

You will need the following parts for this procedure:

- Hot swap fixed tray assembly (without drive or power supply)
 - Removed hot swap power supply from old fixed tray to be reused
 - Removed redundant drive power supply power cable to be reused
1. Notify the customer that you will be taking a drive or drives out of operation. Ask the customer to vary offline all the drives on the same SCSI bus or fibre channel for LTO or DLT-8000 drives.
 2. Prepare the drive for replacement (see “Service Procedures” on page 535).
 3. Open the rear door in the frame containing the drive. Unplug the AC power cable from the back of the drive tray (see **1** in Figure 109 on page 586).

Note: Do not unplug the power cord at the FCA, as two drives are powered from this cord.

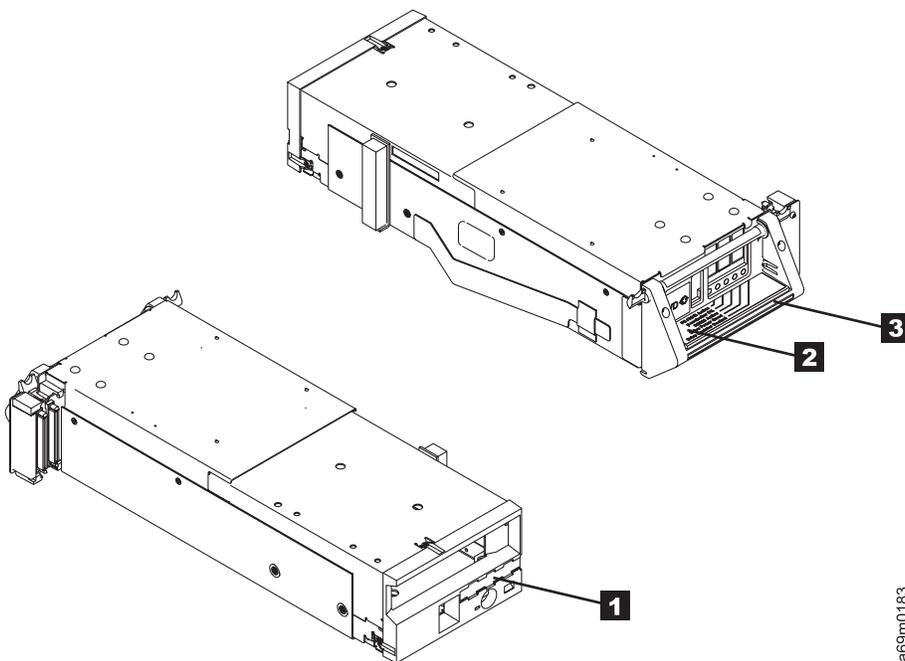


Figure 125. Drive Canister

4. While holding up the locking lever **2**, grasp the drive canister handle **3**. Firmly pull back on the handle enough to disengage the drive canister (see Figure 125).
5. Remove the hot swap power supply by pinching the locking tabs **1** together, and pivot the locking arm **2** outward (see Figure 126 on page 613).

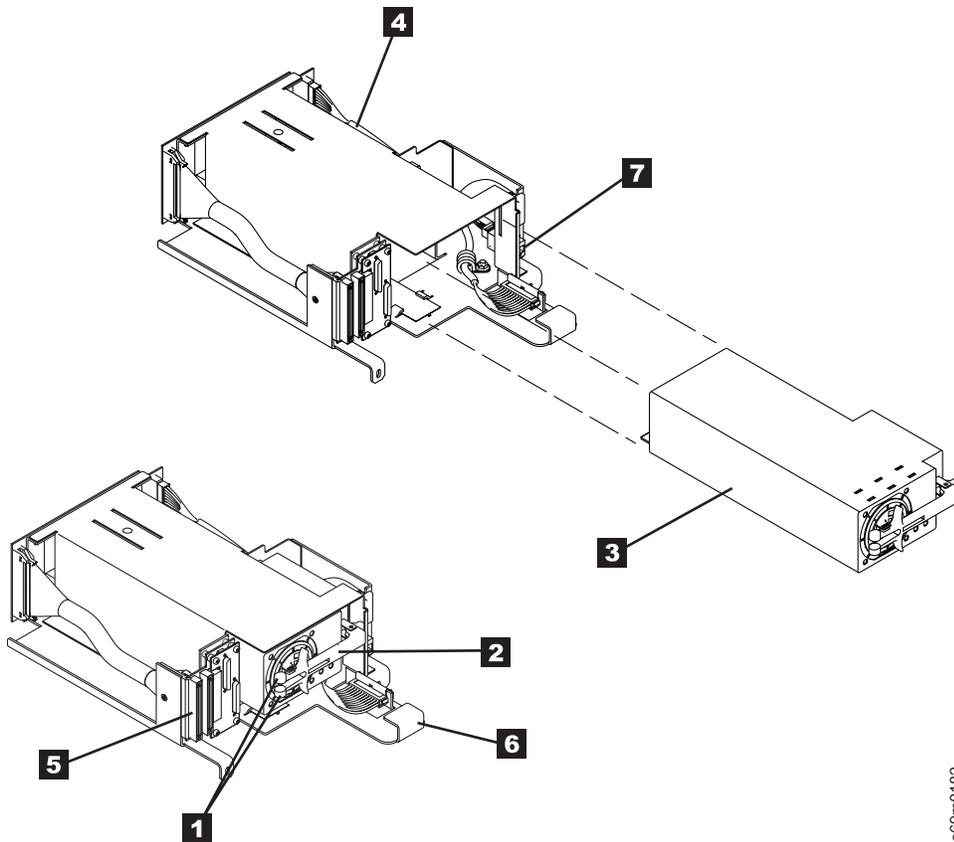


Figure 126. Hot Swap Power Supply

6. Use the locking arm to remove the power supply.
7. Unplug the SCSI cables (and terminator, if installed) or fibre channel cables.
8. Disconnect the RS-422 and power cable from the fixed tray assembly.
9. Refer to Figure 127 on page 614. Slide both thumbscrew locks **6** (if present) to the rear and remove them. Then loosen both thumbscrews **2** on the fixed tray assembly and slide it out of the machine.

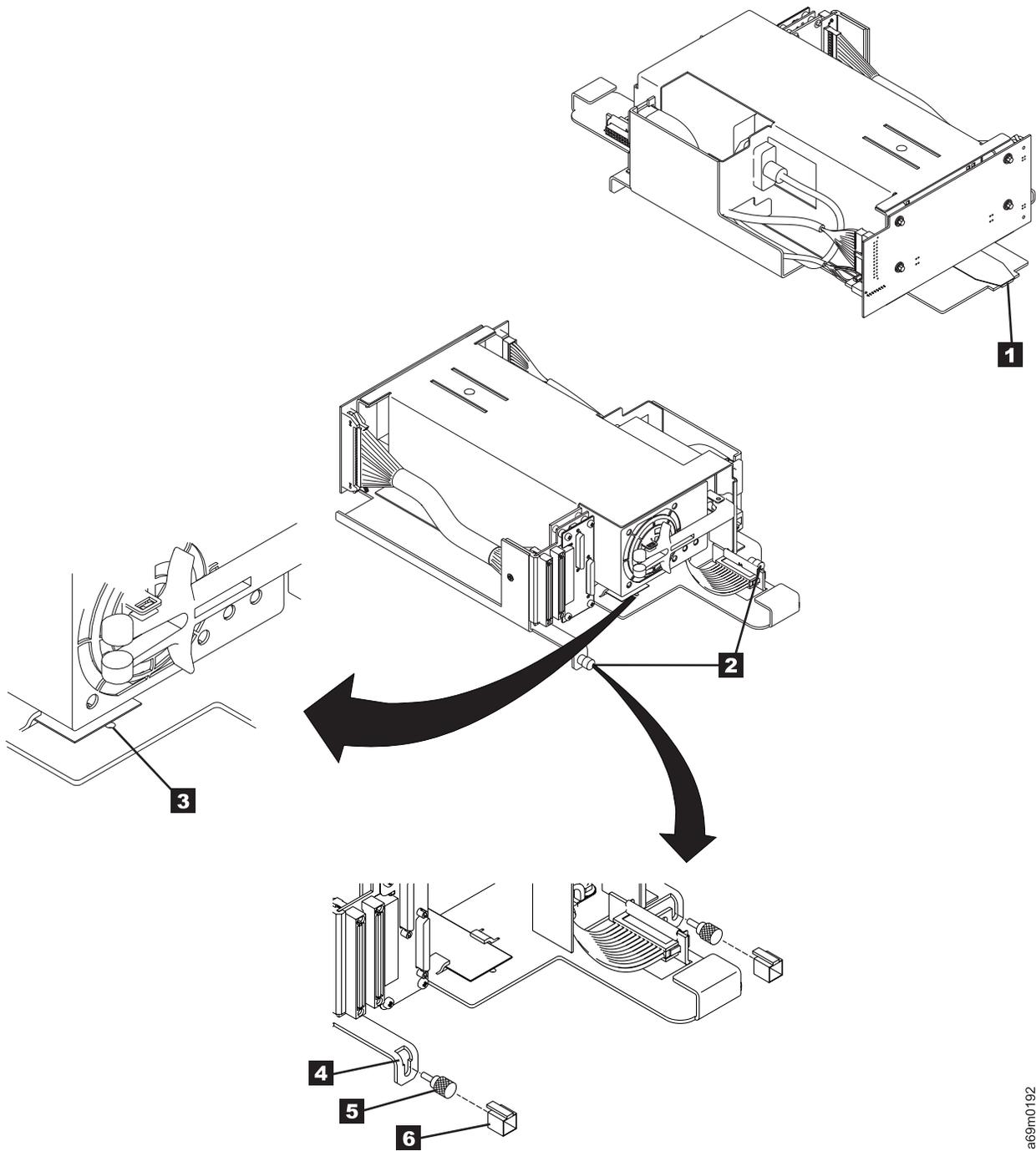
Replacement Procedure

The replacement procedure is the reverse of the removal procedure.

Installing the Fixed Tray

1. Slide in the fixed ray assembly, keeping it toward the right side. Ensure the front locating tab **1** on the tray assembly slides securely into the front slot in the frame (see Figure 127 on page 614).

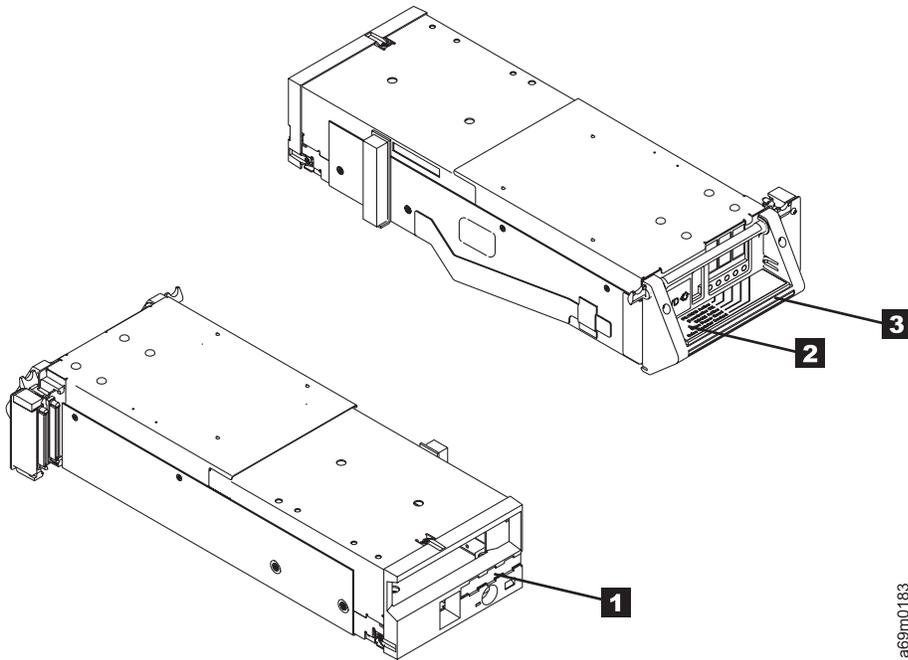
Note: As the front locating tab seats into the slot in the frame, the indicator slide will move to partially cover the indicator hole **3**. If you see the indicator slide move toward the indicator hole (partially covering it), then the locating tab is positioned in the slot. If the indicator slide does not move, slide the front of the fixed tray assembly left or right until the locating tab slides into the slot.



a69m0192

Figure 127. Fixed Tray

2. Tighten both thumbscrews **2** to be **fingertight, only**. Do not overtighten these screws.
3. If your fixed tray has notches **4** near the thumbscrews, secure the tray with two knurled thumbscrews **5**. Slide the thumbscrew caps **6** over the screws until the tab slides all the way into the notch.



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Figure 128. Drive Canister

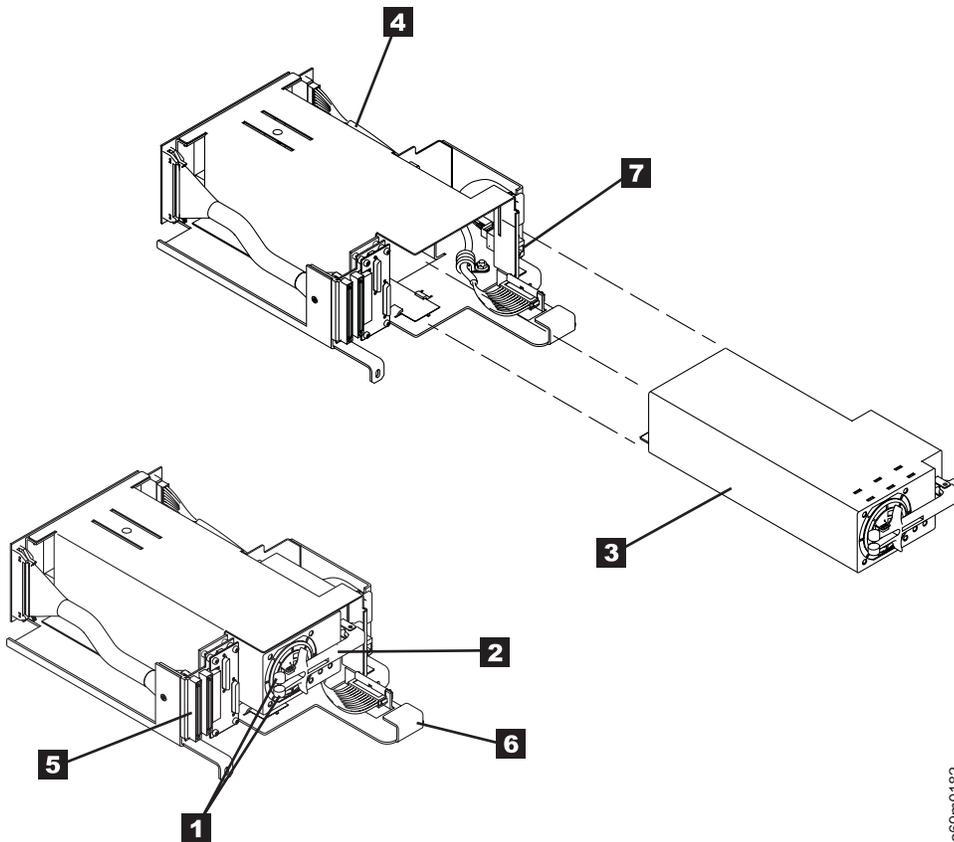
Installing the Drive Canister

Note:

- If a logical library label **1** is installed on the old drive, remove it and install it on the new drive.
 - The drive safety flaps must NOT be removed when installing the drives. The safety flaps will pivot up out of the way when the drive is installed.
4. Carefully slide the drive canister into the left side of the fixed tray assembly (see Figure 128).
 5. Hold the locking lever **2** up to ensure the tabs on both sides of the lever will clear the frame.
 6. Grasp the drive canister handle **3**, and carefully but firmly push the drive into position. Ensure the connectors to the right correctly align and fully engage with the fixed tray connectors.
 7. Lower the locking lever **2** until it snaps in place.

Installing the Hot Swap Power Supply

8. Pivot locking arm assembly **2** outward (see Figure 129 on page 616).



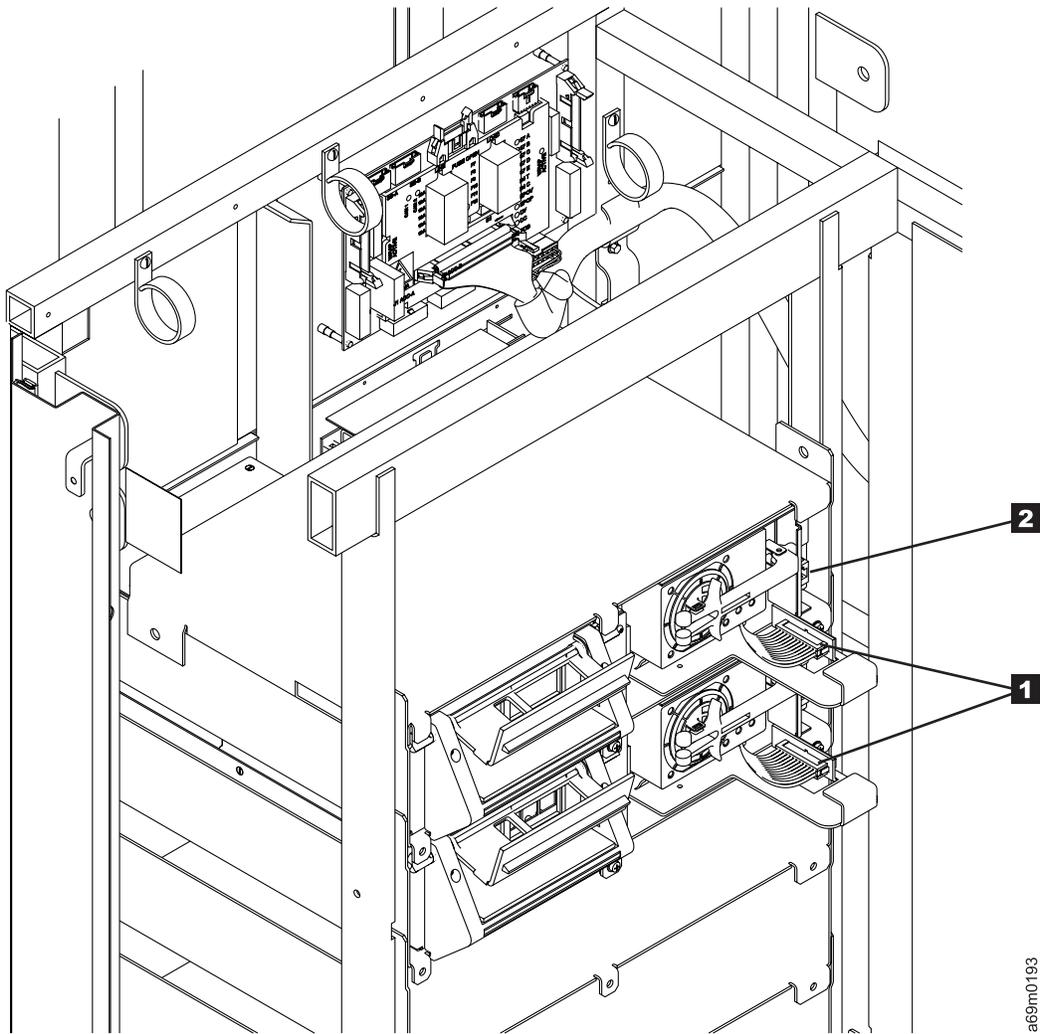
a69m0182

Figure 129. Hot Swap Power Supply

9. Firmly slide the power supply **3** into the fixed tray assembly.
10. Swing the locking arm to the left while you pinch the two locking tabs **1** together, securing the arm in place.

Installing Cables

11. Reinstall the SCSI or fibre channel cables that were removed earlier (see Figure 130 on page 617).
12. If this is a SCSI installation, re-install any terminator or interposer removed earlier.
13. Reroute all cables into their appropriate strain-relief brackets to provide support.
14. Reconnect the RS-422 connector **7** on the right side of the new fixed tray assembly.



a69m0193

Figure 130. Cables and Power Cord

15. If there is another hot swap drive in a position adjacent to this newly-installed drive, install a Redundant Power Supply power cable between the two hot swap drive trays **1**, as shown.
16. Reconnect the bifurcated power cord on the right side **2** of the new fixed tray assembly.
17. Refer to “Drive Canister LED Display” on page 541 for canister LED displays.
18. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

Frame Control Assembly (FCA)

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Replacement of a failed frame control assembly (FCA) requires taking out of service all drives in the frame that contains the failed FCA. The accessor can remain operational provided there is more than one FCA in the library. If the library only has a single FCA, then the entire library must be powered off (O) during FCA replacement.

Note: This procedure assumes that the 37 V dc power supplies and MCP assembly will be removed from the failed FCA and reinstalled in the new FCA. For this reason, there is no concern about the level of firmware or the VPD data within the MCP.

Removal Procedure

1. If your library has only one FCA, then the entire library must be powered off (O). If your library has more than one FCA, ask the customer to use the host application to unload cartridges from the drives, then vary offline the drives and accessor in the failing FCA.
2. Prepare for FCA replacement (see “Service Procedures” on page 535).
3. Power off (O) the FCA main circuit protector.
4. Power off (O) the FCA at the customer power source.

Note: If your customer has FC 1901 installed (Dual AC Line Cords), then power off **both** of the customer’s power sources before proceeding.

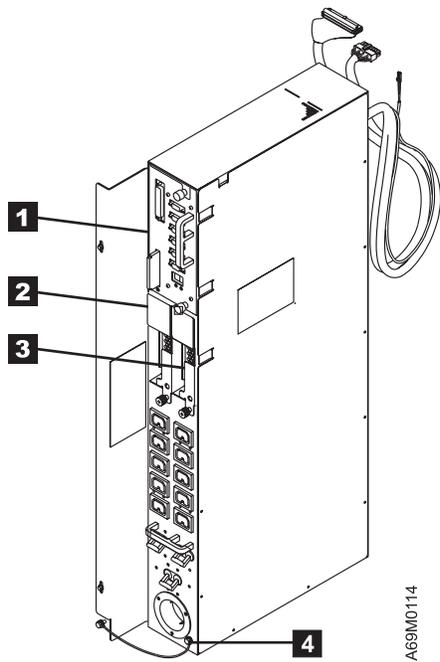
5. Disconnect the power cable located at the bottom of the FCA.
6. Disconnect the power and signal cables connecting the FCA to the FIC card and EPO cable.
7. Disconnect ground jumper **4** at the FCA.
8. Remove the power cables (from the FCA end) that go to the drives.
9. Loosen and remove the two knurled screws to remove the MCP Assembly **1**.
10. Remove the one or two 37 V dc power supplies **2** and **3** from the FCA.

Note: Later version libraries have only two 37V power supplies in the entire library – one in the L32 base frame, and another in the Dxx frame. Your library could have either one or two 37 V dc power supplies located in the base frame, and only one 37 V dc power supply in the FCA of an expansion frame unless FC 1902 (Redundant 37V DC Power Supply) is installed.

11. Remove the two screws securing the FCA to the machine frame.
12. Carefully remove the FCA from the frame.

Replacement Procedure

1. Reverse the removal procedure.
2. Complete FCA replacement (see “Service Procedures” on page 535).
3. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



A69M0114

Figure 131. Frame Control Assembly

Dual AC Line Cords and Power Distribution Unit (PDU)

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Replacement of a failed Power Distribution Unit (PDU) on libraries with the Dual ac Line Cord feature installed (FC 1901), requires taking out of service all drives in the frame that contains the failed PDU assembly. The accessor can remain operational provided there is more than one FCA in the library. If the library only has a single FCA, then the entire library must be powered off (O) during the PDU replacement in the affected FCA.

Removal Procedure

1. If your library has only one FCA, then the entire library must be powered off (O). If your library has more than one FCA, ask the customer to use the host application to unload cartridges from the drives, then vary offline the drives and accessor in the failing FCA.
2. Prepare for FCA replacement (see “Service Procedures” on page 535).
3. Power off (O) the FCA main circuit protector.
4. Power off (O) the FCA at the customer power source. With FC 1901 installed (Dual AC Line Cords), power off **both** of the customer’s power sources before proceeding.
5. See Figure 132 on page 621.
6. Open both power cord cable clamps **3** and unplug the MAIN and BACKUP power cords **4**. (Be sure to label which one is which).
7. Open the PDU-to-FCA cable clamp **1**, and disconnect the power cord **6** from the POWER OUT #1 position.
8. Remove screw **2** and slide the PDU/bracket assembly out of the frame.

Replacement Procedure

1. Reverse the removal procedure.
2. Complete FCA replacement (see “Service Procedures” on page 535).
3. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

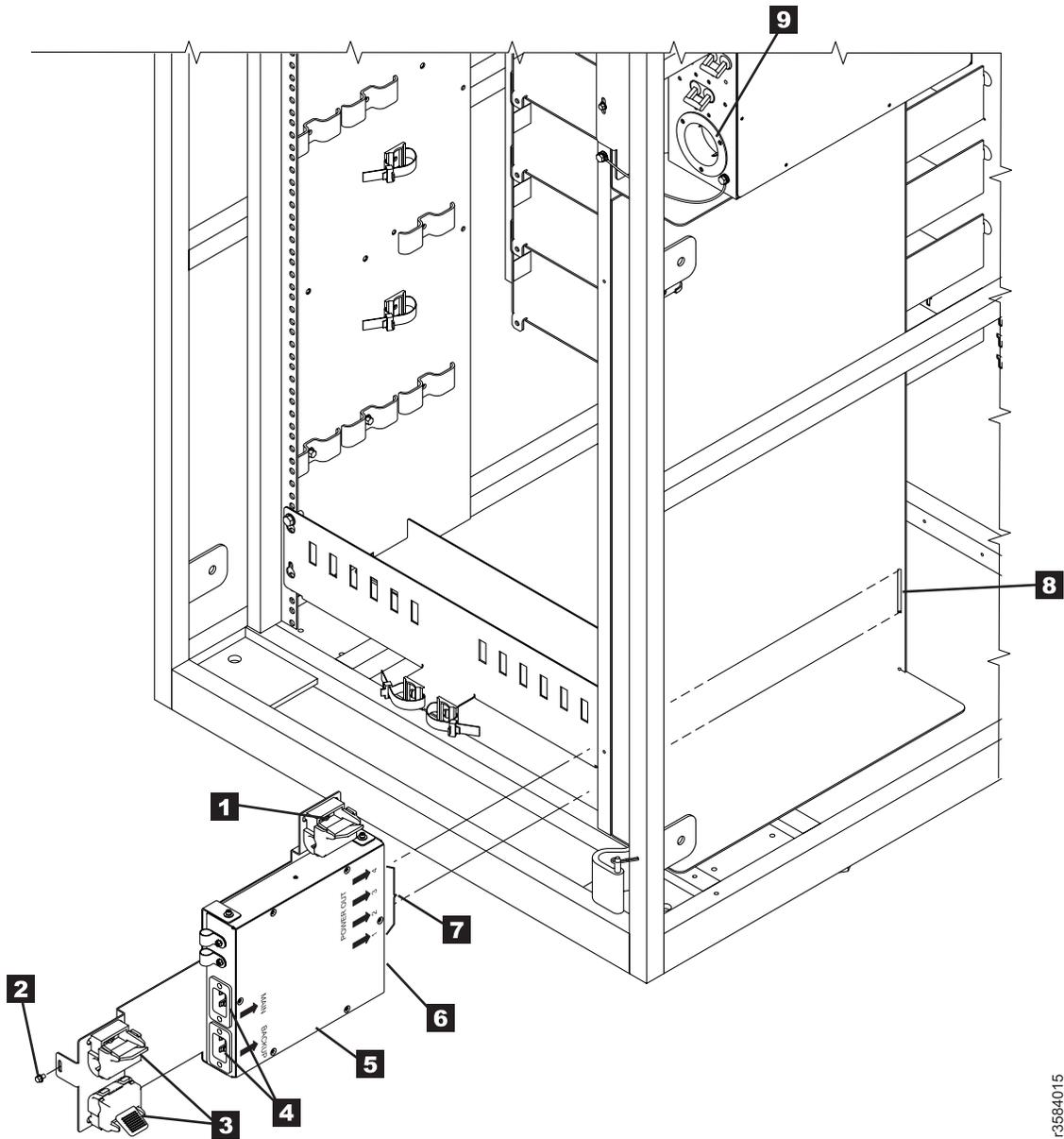


Figure 132. Power Distribution Unit

r3584015

Gripper Assembly, Dual

Before you begin...

The bar code scanner contains a Class II laser.



Class II

C04 CAUTION:
Because of laser radiation, do not stare into the beam.

Attention: Use correct electrostatic discharge (ESD) procedures when working in areas sensitive to ESD. See “Protecting ESD-Sensitive Parts” on page 512).

Note:

- You can remove one gripper assembly without removing the dual gripper assembly. See “Gripper Assembly, Single (New Style)” on page 624.
- Your library may contain two LTO grippers or one LTO gripper and one DLT-8000 gripper. An LTO gripper always must be located on the top.
- The LTO gripper assembly is shown in this procedure. The removal of a DLT-8000 gripper is similar.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Refer to Figure 133 on page 623. Remove the two screws **1**, and unplug the cable between the pivot assembly and the PDC card.

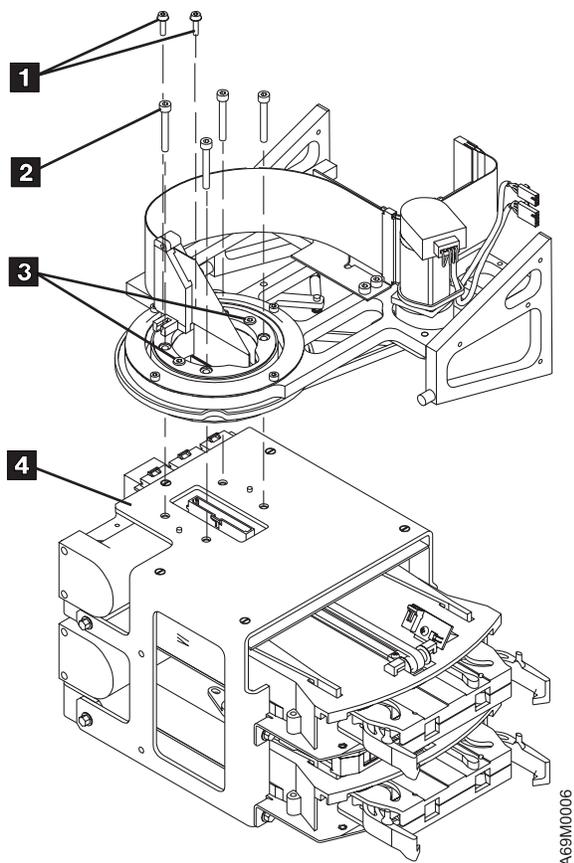
Note:

- The cable connector has a locking tab. Press IN on the tab and gently rock the connector to remove it.
 - In the next step, the dual gripper assembly will fall free when you remove the four screws **2**.
3. The dual gripper assembly will fall free as you remove the four screws **2**. To prevent damage, firmly grasp the dual gripper assembly as you remove the four screws **2**, to free and remove the dual gripper assembly **4** from the pivot assembly.

Note: Do not loosen or remove the two screws **3**.

Replacement Procedure

1. Reverse the removal procedures.
2. Close the front door.
3. Complete the accessor servicing (see “Service Procedures” on page 535).
4. Perform a library calibration (see “Library Calibration” on page 530).
5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



A6SM0006

Figure 133. Dual Gripper Assembly

Gripper Assembly, Single (New Style)

Before you begin...

The bar code scanner contains a Class II laser.



Class II

C04 CAUTION:
Because of laser radiation, do not stare into the beam.

Attention: Use correct electrostatic discharge (ESD) procedures when working in areas sensitive to ESD. See “Protecting ESD-Sensitive Parts” on page 512).

Notes:

1. The LTO gripper assembly is shown in this procedure. The removal of a DLT-8000 (called DLT in this procedure) gripper is the same.
2. A DLT gripper can only be installed in the lower position.

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

If your library has the old style gripper (refer to Figure 135 on page 628), and you are replacing it with another old style gripper, use the procedure at “Gripper Assembly, Single (Old Style)” on page 627. If your library has the new style gripper (refer to Figure 134 on page 626), continue with this procedure.

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Loosen the two screws **1** that hold the left **2** and right **3** gripper mounting blocks that hold the gripper assembly to the dual gripper assembly housing.
3. Rotate the left gripper mounting block **2** counterclockwise.
4. Rotate the right gripper mounting block **3** clockwise.
5. If this is the upper gripper assembly, unplug the calibration sensor cable from the PDC and remove and set aside the sensor **6** from the old gripper. It will be re-installed later.
6. Unplug the cable from the single gripper assembly motor to the PDC.
7. Partially slide out the single gripper from the dual gripper assembly.

Note: In the next step, release the cartridge present sensor cables from the cable clamps. Do **not** pull on the wires to disconnect the cartridge present sensor connectors.

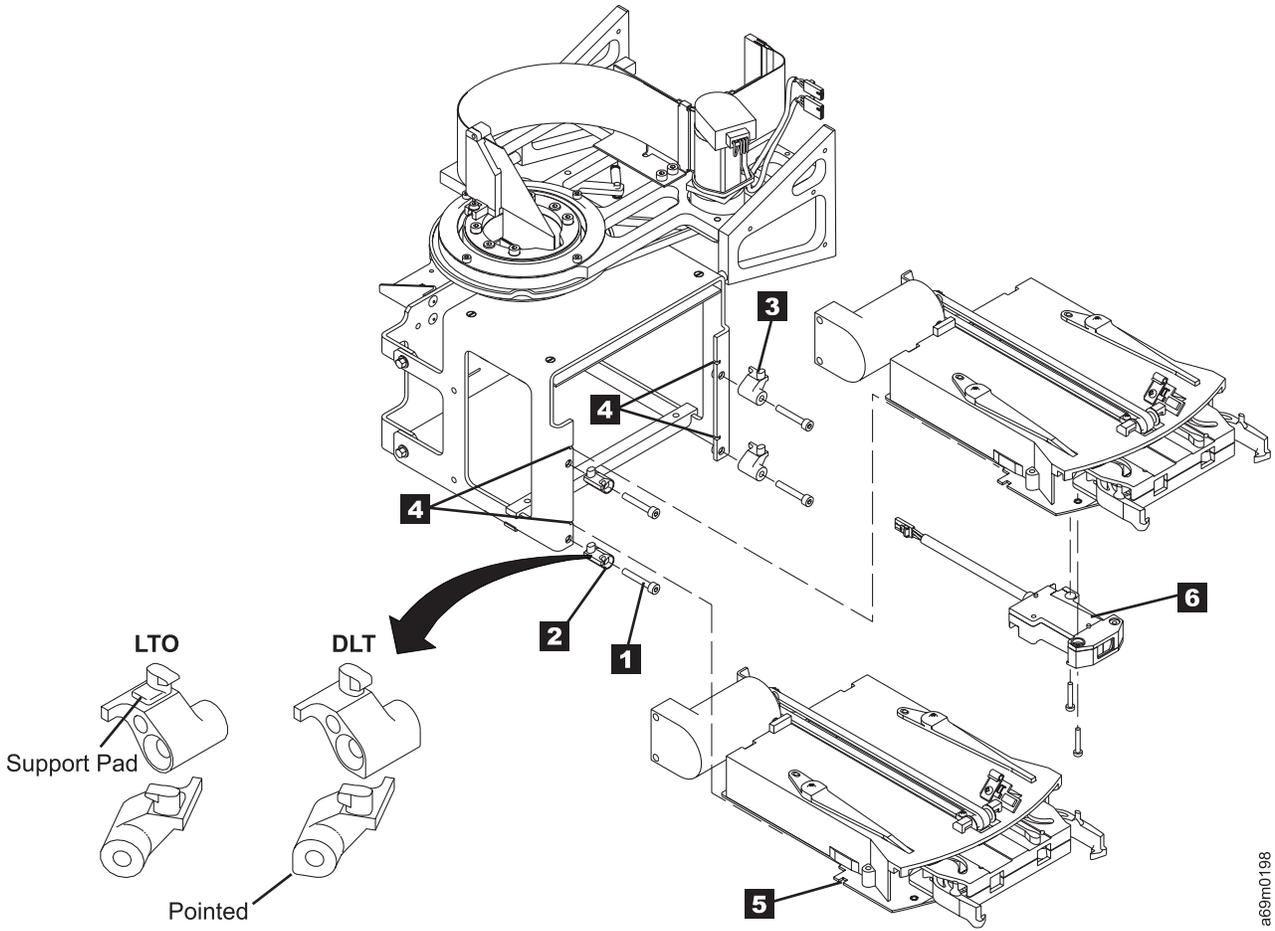
8. Unplug the cartridge present sensor connectors from the single gripper assembly.
9. Remove the single gripper assembly. You will need to tilt the gripper assembly slightly and hold the cables out of the way to remove the gripper assembly out the front of the dual gripper assembly.

Replacement Procedure

Note:

- A pair of gripper mounting blocks for LTO is different than a pair of mounting blocks for DLT.

- Each set of blocks (for LTO and DLT) is designed to be used on either side of the gripper.
 - To ensure you install the correct mounting blocks, Figure 134 on page 626 depicts the following differences between the LTO and the DLT mounting blocks:
 - The LTO mounting block has a molded-in pad.
 - The DLT mounting block has a pointed mount.
1. If the upper gripper is being replaced, re-install the calibration sensor **6** on the new gripper assembly. The right mounting block **3** must have the tab (the line from the item number **3** points to the tab) facing outward. The left mounting block **2** must have the tab facing inward.
 2. Install the new gripper. Ensure the tab on the back of the gripper goes into the slot at the rear of the gripper housing assembly, and the lower gripper plate **5** slides in the slots on either side of the housing **4**.
 3. Rotate counterclockwise and tightly hold the **right** mounting block **3** against the gripper plate **5** as you securely tighten the screw **1**.
 4. Rotate clockwise and tightly hold the **left** mounting block **2** against the gripper plate **5** as you securely tighten the screw **1**.
 5. Reconnect the connectors for the gripper motor, cartridge present sensors, and if this is the upper gripper assembly, the calibration sensor.
 6. Ensure that the cables are not exposed to damage from other library components.
 7. Close the front door.
 8. Complete the accessor servicing (see “Service Procedures” on page 535).
 9. Perform a library calibration (see “Library Calibration” on page 530).
 10. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
 11. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



a69m0198

Figure 134. Single Gripper Assembly (New Style)

Gripper Assembly, Single (Old Style)

Before you begin...

The bar code scanner contains a Class II laser.



Class II

C04 CAUTION:
Because of laser radiation, do not stare into the beam.

Attention: Use correct electrostatic discharge (ESD) procedures when working in areas sensitive to ESD. See “Protecting ESD-Sensitive Parts” on page 512).

Note: The LTO gripper assembly is shown in this procedure. The removal of a DLT-8000 gripper is the same.

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

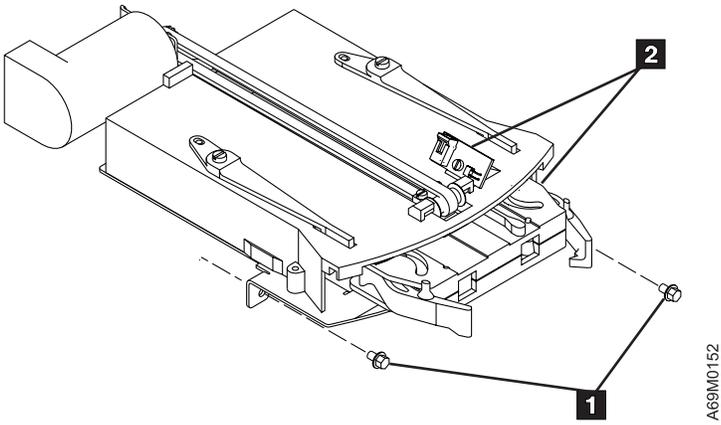
1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the two screws **1** holding the gripper assembly to the dual gripper assembly housing.
3. If this is the upper gripper assembly, unplug the calibration sensor cable from the PDC and remove the sensor from the old gripper.
4. Unplug the cable from the single gripper assembly motor to the PDC.
5. Partially slide out the single gripper from the dual gripper assembly.

Note: In the next step, release the cartridge present sensor cables from the cable clamps. Do **not** pull on the wires to disconnect the cartridge present sensor connectors.

6. Unplug the cartridge present sensor connectors **2** from the single gripper assembly.
7. Remove the single gripper assembly. You will need to tilt the gripper assembly slightly and hold cables out of the way to remove the gripper assembly out the front of the dual gripper assembly.

Replacement Procedure

1. If the upper gripper is being replaced, re-install the calibration sensor on the new gripper assembly.
2. Reverse the removal procedures.
3. Close the front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Perform a library calibration (see “Library Calibration” on page 530).
6. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
7. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



A69M0152

Figure 135. Single Gripper Assembly (Old Style)

I/O Station, Lower

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

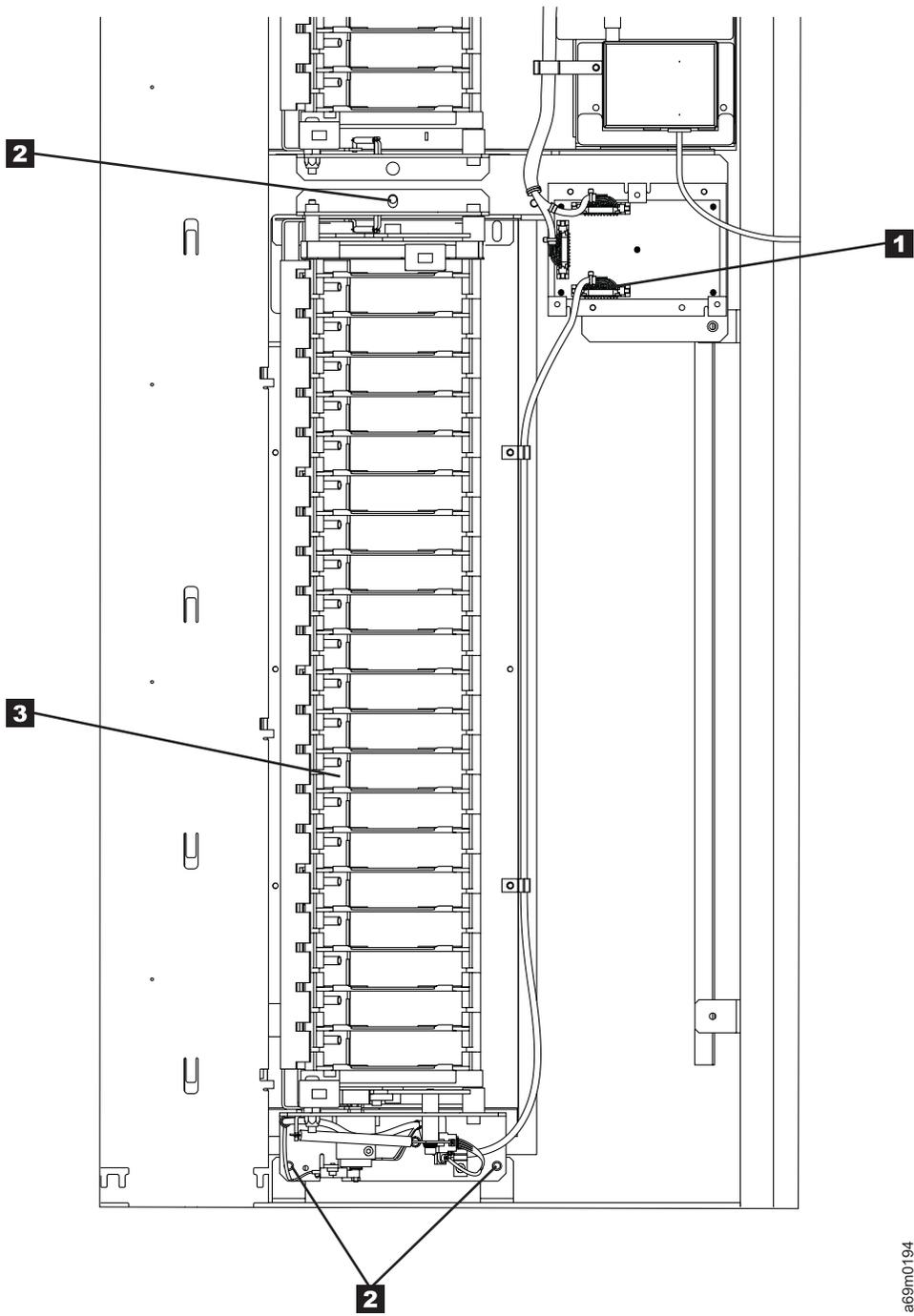
1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Refer to Figure 100 on page 570 and remove the connector **1** at the top of the Operator Panel. This cable goes to the FIC card and must be removed before you unplug other cables as part of the removal/replace procedure.
3. See Figure 136 on page 630. Remove the plastic shield that covers the XIO card.
4. Disconnect the cable **1** that leads to the XIO card.
5. Remove the mounting screws **2** to remove the lower I/O station **3** from the base frame front door.

Notes:

1. With a single I/O station, the I/O station cable directly connects to the operator panel card.
2. With multiple I/O stations, both I/O stations connect to the XIO card, and the XIO card is cabled to the operator panel card (OPC).

Replacement Procedure

1. Reverse the removal procedure.
2. Open and close the I/O station several times to ensure that there is no interference between the front door and the I/O station. Ensure there is no binding.
3. Close the base frame front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Perform an I/O station calibration (see “Library Calibration” on page 530).
6. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
7. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



a69m0194

Figure 136. I/O Station, Lower

I/O Station, Upper

Before you begin...

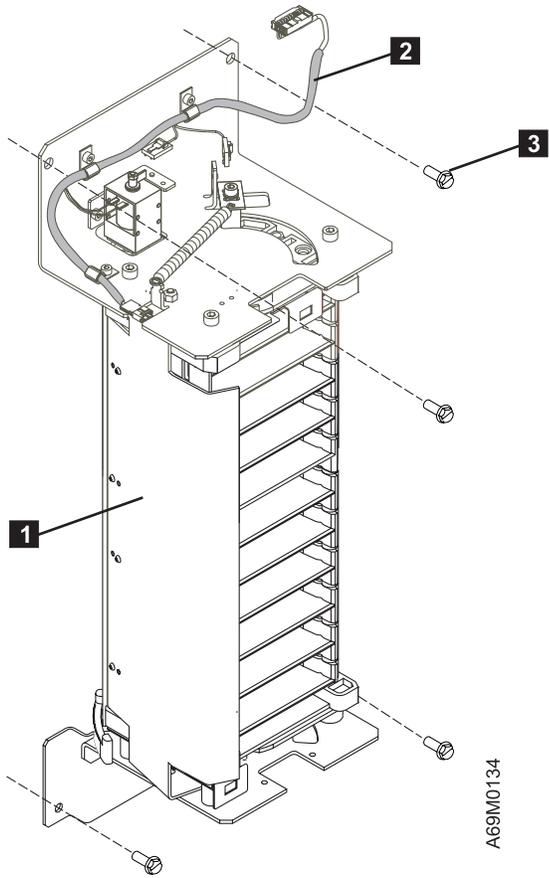
If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Refer to Figure 100 on page 570 and remove the connector **1** at the top of the Operator Panel. This cable goes to the FIC card and must be removed before you unplug other cables as part of the removal/replace procedure.
3. Disconnect the I/O station cable **2** that leads to either the operator panel assembly or the XIO card.
4. Remove the four mounting screws **3** to remove the I/O station **1** from the front door.

Replacement Procedure

1. Reverse the removal procedure.
2. Open and close the I/O station several times to ensure that there is no interference between the front door and the I/O station. Ensure there is no binding.
3. Close the front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Perform an I/O station calibration (see “Library Calibration” on page 530).
6. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
7. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



A69M0134

Figure 137. I/O Station

I/O Station Door Locked Solenoid

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

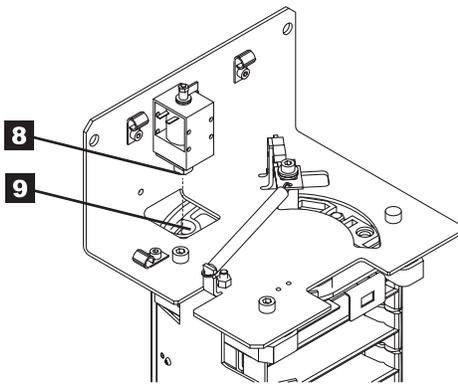
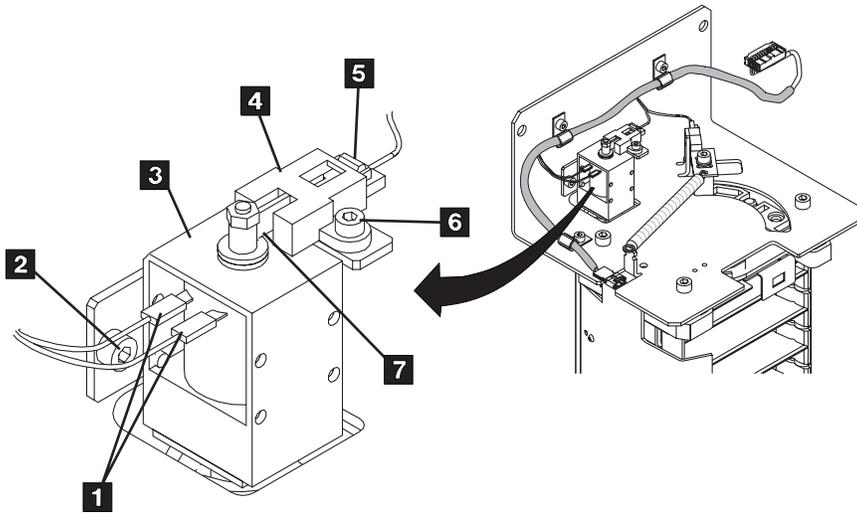
1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Refer to Figure 100 on page 570 and remove the connector **1** at the top of the Operator Panel. This cable goes to the FIC card and must be removed before you unplug other cables as part of the removal/replace procedure.
3. Refer to Figure 138 on page 634. Remove the screw **6** that holds the Door Locked sensor **4** to the Door Solenoid mounting bracket. It will hang loose for now, and will be reinstalled later.

Note: When you replace these wires, make sure that they are put back the same way they were removed. The wires should be marked with numbers that match the connectors that they go on.

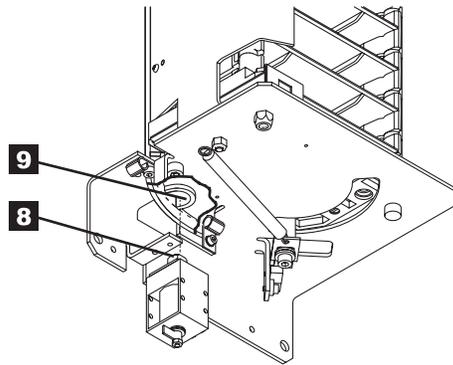
4. Remove the two twisted-pair wire connectors **1** (a pair of yellow and a pair of black) from the solenoid **3**.
5. Remove the two screws **2** holding the door locked solenoid bracket to the front door to remove this assembly.

Replacement Procedure

1. Reverse the removal procedure.
2. Ensure that the I/O station door locked solenoid flag **7** will move within the slot of the I/O station door locked sensor **4** when the solenoid is active (door locked). To check, close the I/O station door and manually move the solenoid flag **down**, simulating a locked position. Also, ensure the solenoid locking plunger **8** fits into the locking cavity **9** without binding. Return the solenoid flag to the **up** position. It should detent into the locked sensor slot without making contact with the sensor. Adjust the sensor, as needed.
3. Close the front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



Upper I/O



Lower I/O

A69MD011

Figure 138. I/O Station Locked Solenoid

I/O Station Door Sensor

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Refer to Figure 100 on page 570 and remove the connector **1** at the top of the Operator Panel. This cable goes to the FIC card and must be removed before you unplug other cables as part of the removal/replace procedure.
3. Remove the connector to the I/O door closed sensor **3**.
4. Remove the screw **4** to remove the sensor **2**.

Replacement Procedure

1. Reverse the removal procedure.
2. Adjust the sensor **2** so that the flag **1** is positioned midway in the sensor slot, and does not contact the sensor when the door is closed.
3. Close the front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

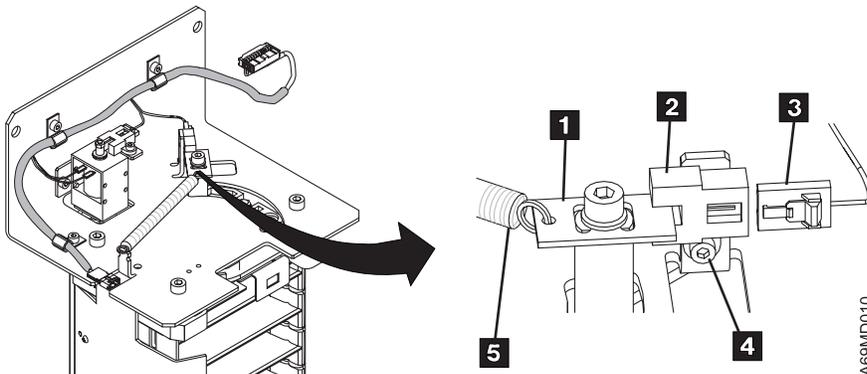


Figure 139. I/O Station Door Sensor

I/O Station Door Solenoid Sensor

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Refer to Figure 100 on page 570 and remove the connector **1** at the top of the Operator Panel. This cable goes to the FIC card and must be removed before you unplug other cables as part of the removal/replace procedure.
3. Remove the connector **5** from the I/O door sensor **4**.
4. Remove the screw **6** to remove the sensor **4**.

Replacement Procedure

1. Reverse the removal procedure.
2. Adjust the sensor so that the flag **7** is positioned midway in the sensor slot, and does not contact the sensor when the door is locked.
3. Close the front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Perform the “Library Verify Test” on page 507, with **no drives** selected.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

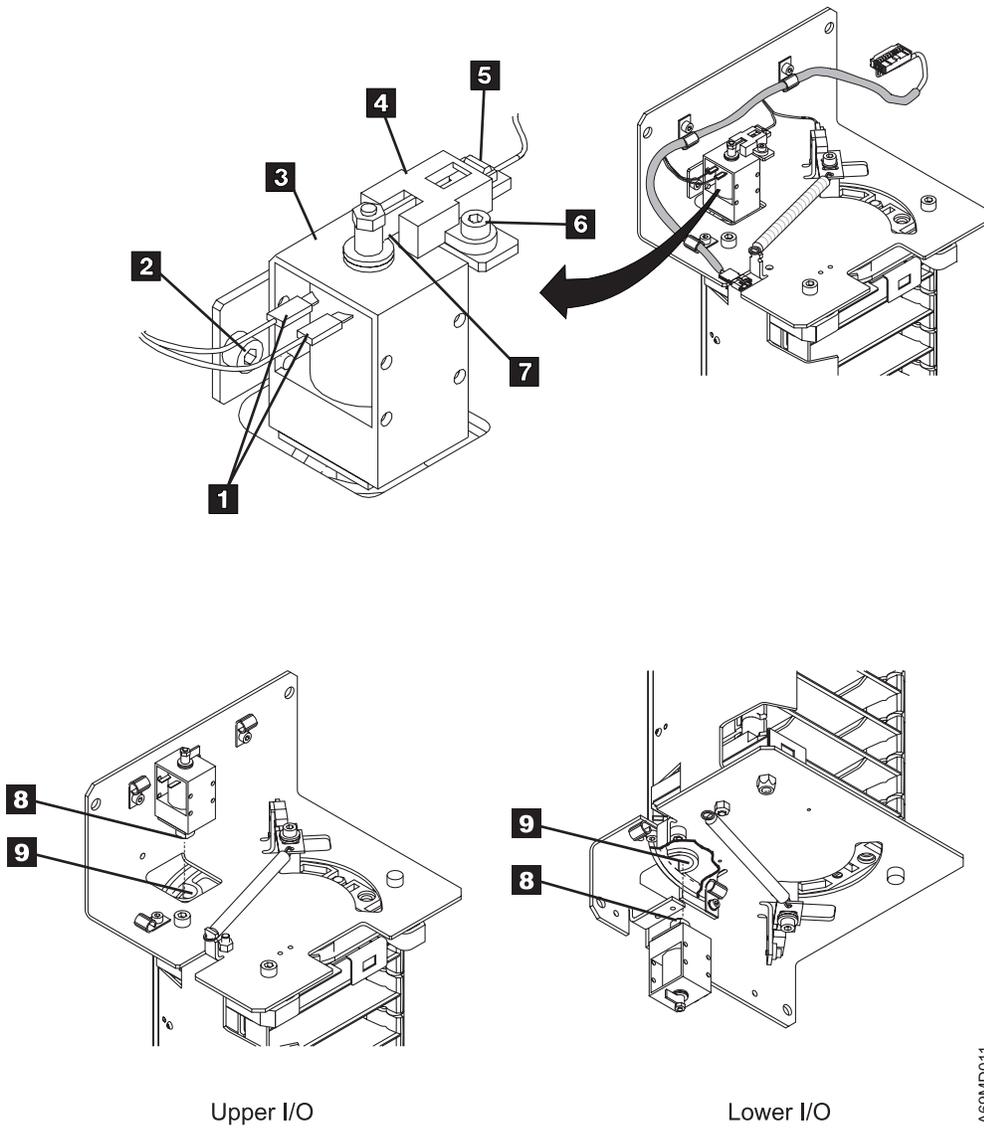


Figure 140. I/O Station Door Solenoid Sensor

A69MD011

Pivot Assembly

Before you begin...
If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the dual gripper assembly. Refer to “Gripper Assembly, Dual” on page 622.
3. Unplug the cables from the pivot assembly at the ACC card.
4. Remove the two screws to remove the Y-axis flex cable from the pivot assembly.

Note: In the next step, when removing screws **2**, hold the pivot assembly to prevent it from falling free.

5. Remove the screws **2** to remove the pivot assembly **1** from the Y-axis assembly.

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Complete the accessor servicing (see “Service Procedures” on page 535).
4. Perform the “Library Verify Test” on page 507.
5. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

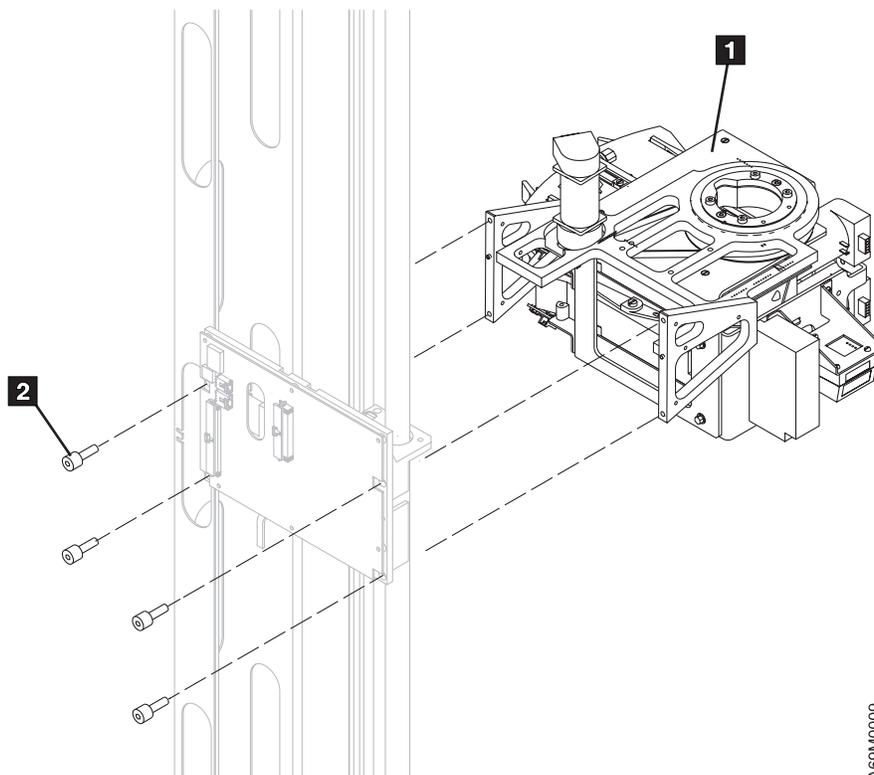


Figure 141. Pivot Assembly

A69M0009

Pivot Belt (Old Style)

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Note: New style pivot motor assemblies include a captured pivot belt. These older style pivot motors and belts are separate FRUs.

Removal Procedure

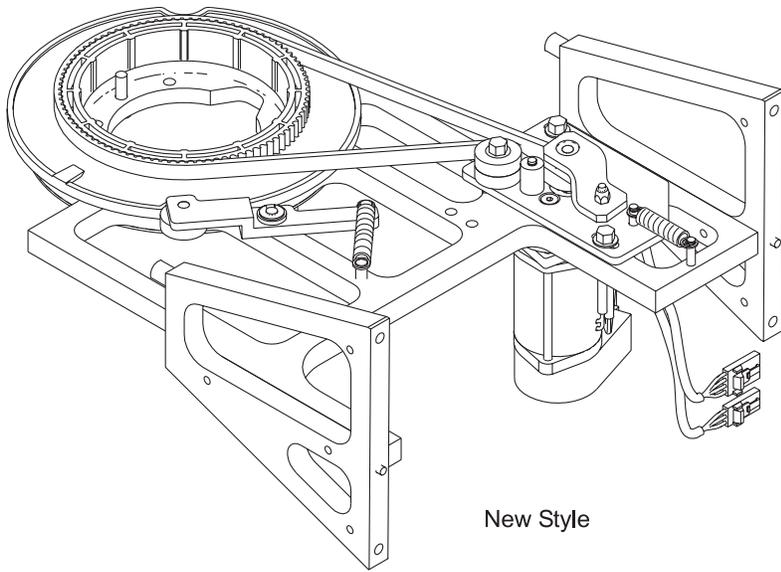
1. If you have the new style pivot motor with a captured belt, go to “Pivot Motor and Belt Assembly (New Style)” on page 644.
2. Prepare the accessor for servicing (see “Service Procedures” on page 535).
3. Remove the Dual Gripper Assembly (see “Gripper Assembly, Dual” on page 622).
4. Disconnect the motor cable connector at the ACC card.
5. Remove the belt tension spring **3**.
6. Loosen belt tension plate screws **2**.
7. Remove the pivot belt **1**.

Replacement Procedure

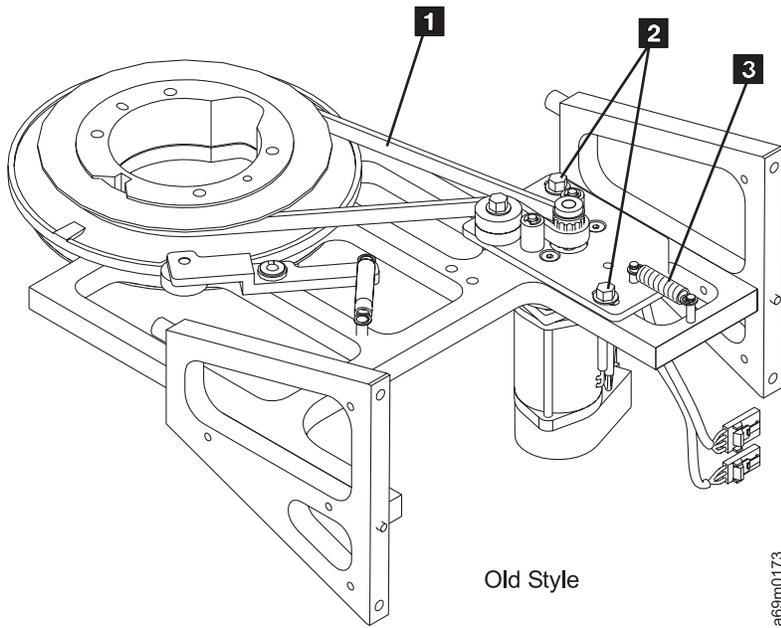
1. Reverse the removal procedure.

Note: Install the spring **3**, then tighten the screws **2**.

2. Close the front door.
3. Complete the accessor servicing (see “Service Procedures” on page 535).
4. Perform the “Library Verify Test” on page 507.
5. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



New Style



Old Style

a69m0173

Figure 142. Pivot Belt – Old Style. (Both styles are viewed from bottom)

Pivot Detent Arm and Spring

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the Dual Gripper Assembly (see “Gripper Assembly, Dual” on page 622).
3. Remove the detent arm spring **3**.
4. Remove the detent arm C-clip **2**.
5. Remove the detent arm **1**.

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Complete the accessor servicing (see “Service Procedures” on page 535).
4. Perform the “Library Verify Test” on page 507.
5. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

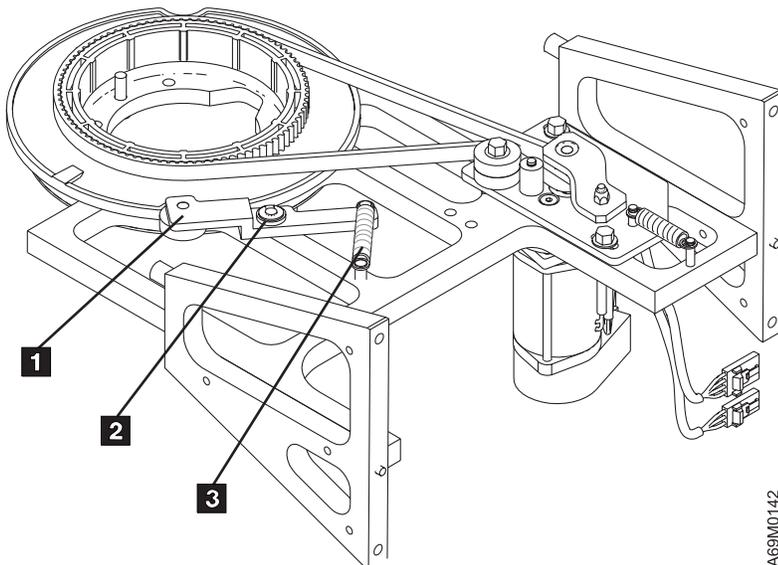


Figure 143. Pivot Detent Arm and Spring. (New style - viewed from bottom)

Pivot Flex Cable

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the two screws **1** to disconnect the cable connector from the pivot assembly.

Note: The cable connector has a locking tab.

3. Disconnect the cable connector from the ACC card.
4. Remove two screws **2** to remove the pivot flex cable.

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Complete the accessor servicing (see “Service Procedures” on page 535).
4. Perform the “Library Verify Test” on page 507.
5. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

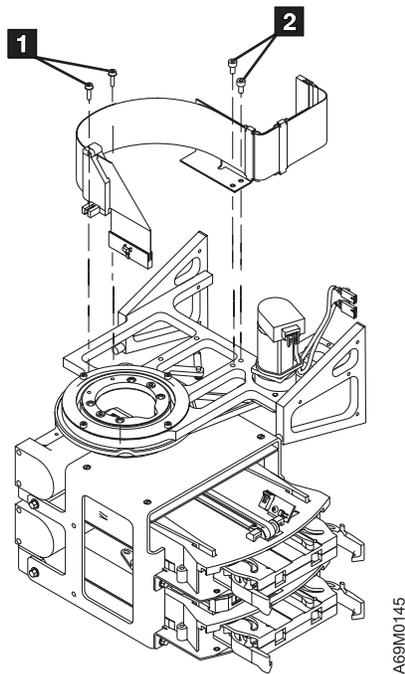


Figure 144. Pivot Flex Cable

Pivot Motor and Belt Assembly (New Style)

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Note: This newer style pivot motor assembly, which is more common, includes a captured pivot belt. Old style pivot motors and belts are separate FRUs. To replace an old style pivot belt, see "Pivot Belt (Old Style)" on page 640.

Removal Procedure

1. Prepare the accessor for servicing (see "Service Procedures" on page 535).
2. Remove the Dual Gripper Assembly. Refer to "Gripper Assembly, Dual" on page 622.
3. Disconnect the motor cable connector at the ACC card.
4. Remove the belt tension spring **2**.
5. Loosen belt tension plate screws **1**.
6. Remove the belt from around the pivot cam, and remove the pivot motor and belt assembly **3**.

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Complete the accessor servicing (see "Service Procedures" on page 535).
4. Perform the "Library Verify Test" on page 507.
5. Return to the procedure that sent you here; otherwise, go to "End of Call" on page 489.

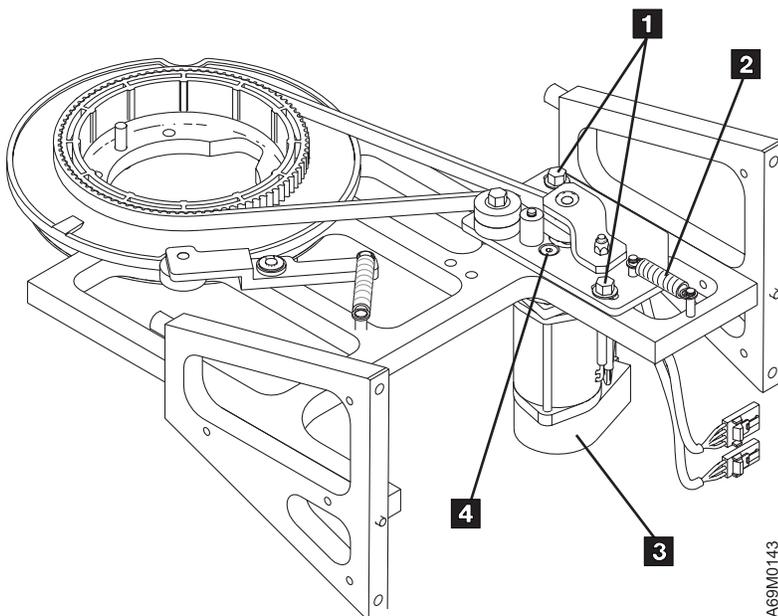


Figure 145. Pivot Motor and Belt (New Style). (Viewed from bottom)

Power Supply, 37 V dc

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Attention: Before you continue, see “37 V DC Power Supply” on page 544 for important information on how library firmware controls turning on and off 37V DC power supplies.

The 37 V dc power supply supplies DC voltages to the library and is located within the frame control assembly (FCA). The 37 V dc supplies are 'hot pluggable.'

Removal Procedure

1. If you have at least one good 37 V dc power supply, you can remove any failing supply without affecting the library operations (hot pluggable).
2. Loosen the knurled screw **3** that secures the failing 37 V dc power supply **1** (PS#1) or **2** (PS#2).
3. Pull the 37 V dc power supply out of the FCA.

Replacement Procedure

1. Reverse the removal procedure.
2. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

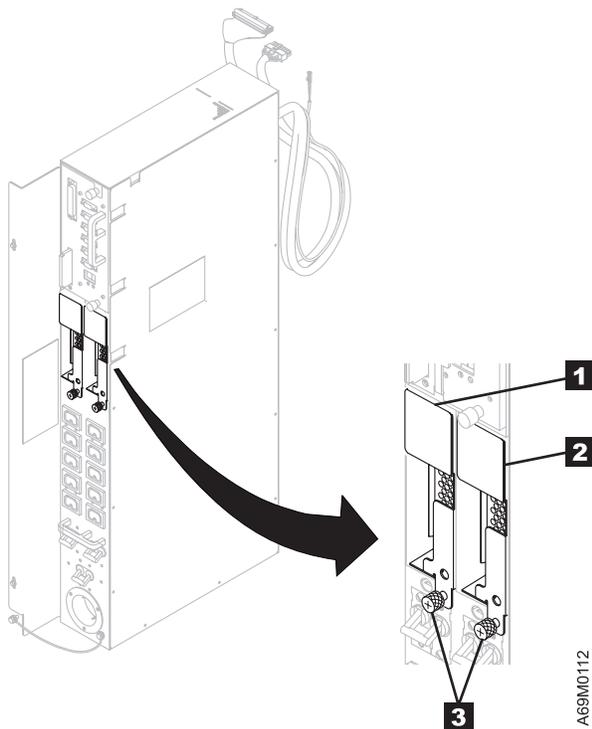


Figure 146. 37 V dc Power Supply

Power Switch and Cable Assembly

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Ask the customer to vary the library offline to **ALL** attached controllers and hosts.
2. Power off (O) the library.

Note: With a failure of the power switch, it is likely that library power is already off. Ensure that the switch is in the **off** or **O** position.

3. Open the front and rear doors.
4. Refer to Figure 147. Disconnect cable connector J22 **5** (in the base frame) that leads to the back of the power switch **7** on Figure 148 on page 647.
5. Remove the cable from the clamps.
6. Refer to Figure 148 on page 647 to remove the three mounting screws **4**.
7. Remove the power switch **5**.

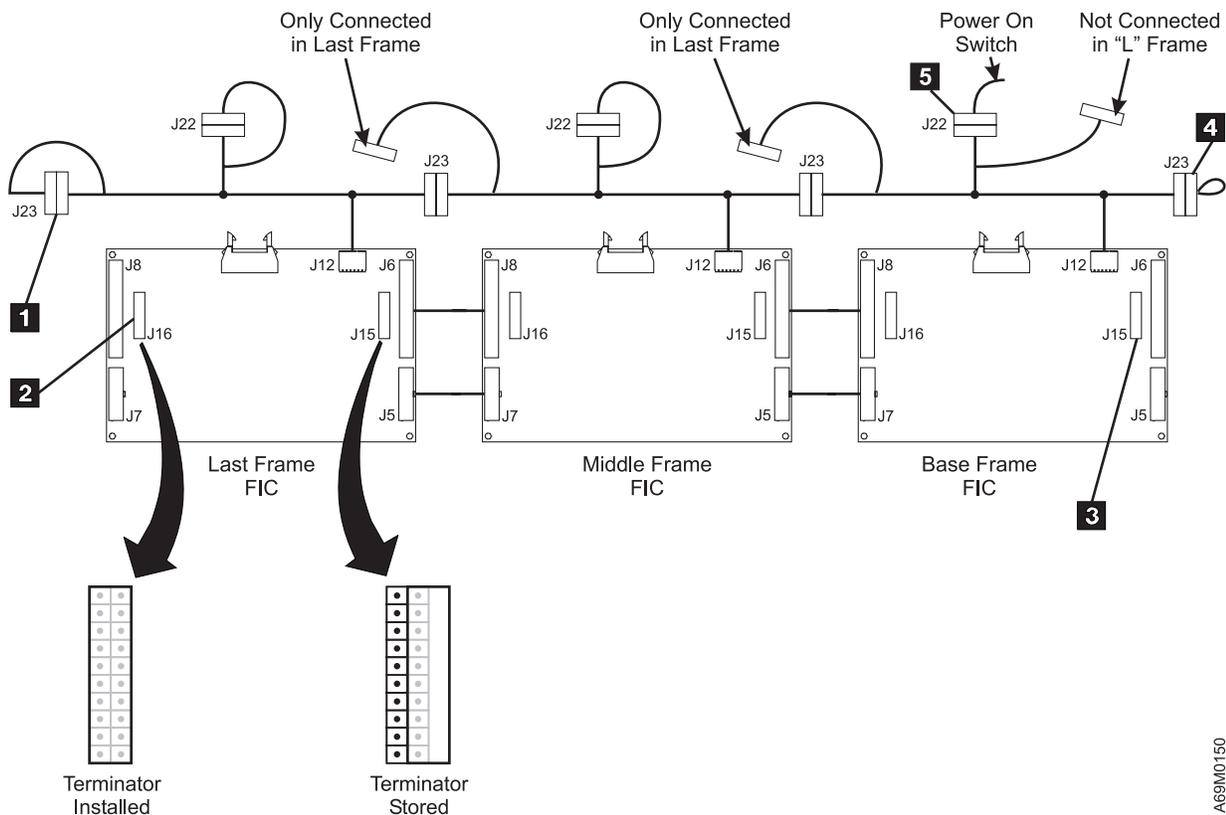


Figure 147. Frame Interconnect Cables

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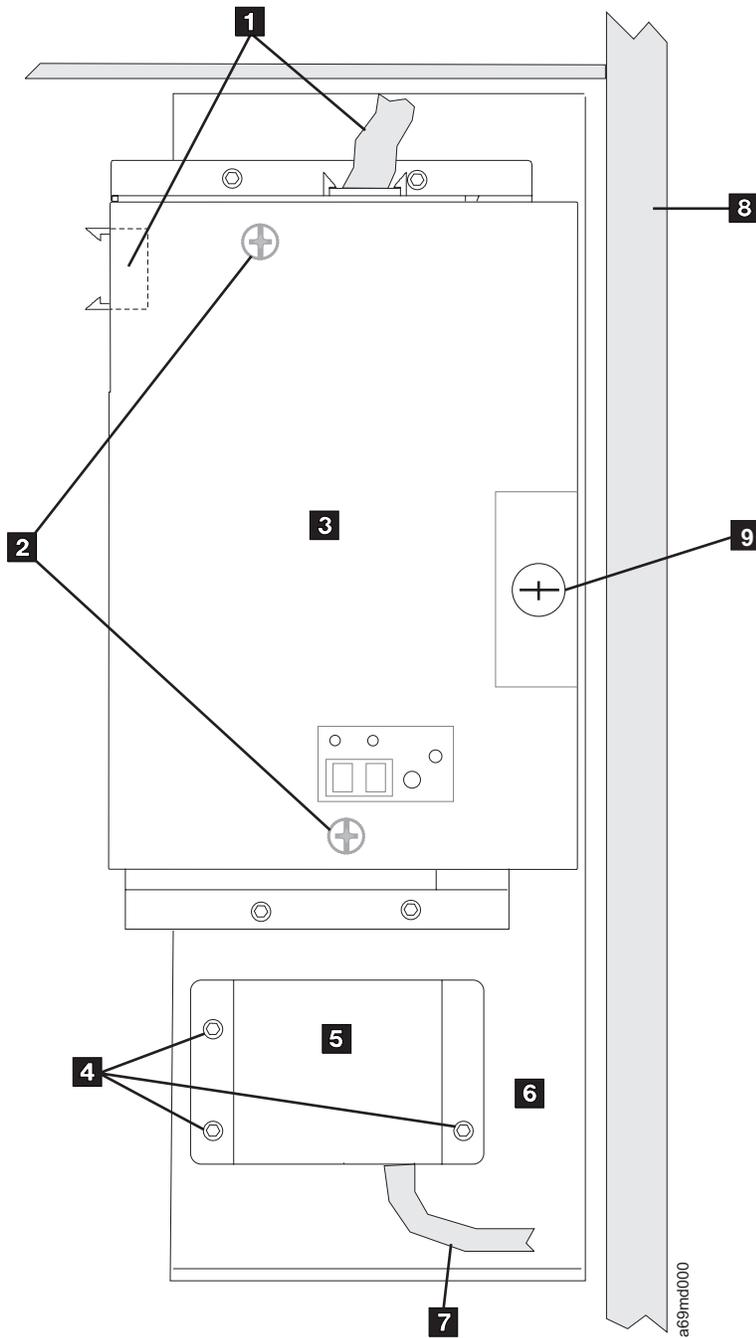


Figure 148. Power Switch and Cable Assembly. (Viewed from rear of operator panel)

Replacement Procedure

1. Reverse the removal procedure.
2. Power on (I) the library.
3. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

Storage Slot Section

Before you begin...

Customer's Cartridges: If a customer's cartridge must be removed, inform the customer. If possible, use the host software to eject the cartridges through the I/O station.

If manual cartridge removal is necessary, refer to "From a Storage Slot" on page 673.

Give the cartridges to the customer, and when the repair procedure is complete, have the customer insert the cartridges through the I/O Station.

Removal Procedure

1. Prepare the accessor for servicing (see "Service Procedures" on page 535).
2. Remove the cartridges from the storage slot sections that are to be removed and give them to the customer.
3. Refer to Figure 149 on page 649 for the pictorial of a top cell tray **3** and a cartridge cell tray **2**. Each tray is held in place by two tabs **4** on the rear of each tray and by holes in the rear frame firewall **1**. The spring **5** and the foam pad **6** at the top of the top cell tray applies pressure on the entire cell tray row to keep them in place during normal operation. The portions of Figure 149 on page 649 marked Front View and Rear View show how the spring must be installed to retain tension on the top tray.
4. **LTO Cells Only**
If the top cell tray **3** needs to be changed, lift up the spring **5** about 4.8 mm (3/16 in.), taking tension off the spring. Remove the foam pad **6**. Lift the top cell so that its two tabs clear the holding slots in the frame firewall enough to be removed. Gently pull forward to remove the tray.
5. **DLT Cells Only**
 - a. If the top cell tray **3** needs to be changed, place your left hand over the spring **7** to keep it in place while placing a medium-size screwdriver **8** under the spring, as shown.
 - b. Pull up on the screwdriver handle to disengage the spring from the frame firewall. Remove the spring **7** and the foam pad **6**.
 - c. Lift the top cell so that its two tabs clear the holding slots in the frame firewall. Gently pull forward to remove the tray.
6. **LTO or DLT Cells**
If a cartridge cell tray **2** needs to be changed, remove the top cell tray, and set it aside for now. Next, remove all of the cartridge cell trays above the damaged cartridge cell, one at a time, working from the top to the bottom. Finally, remove the damaged cartridge cell tray **2**.

Replacement Procedure

1. Reverse the removal procedure.
2. Slide the new storage section into position until it locks into place.
3. If customer cartridges were removed, give the cartridges to the customer, and when this procedure is complete, have the customer insert the cartridges through the I/O Station.
4. Close the front door.
5. Complete the accessor servicing (see "Service Procedures" on page 535).
6. Perform the calibration procedure on the frame you worked on (see "Service Menus" on page 523).
7. Perform the "Library Verify Test" on page 507, using the **no drives** selection.
8. Return to the procedure that sent you here; otherwise, go to "End of Call" on page 489.

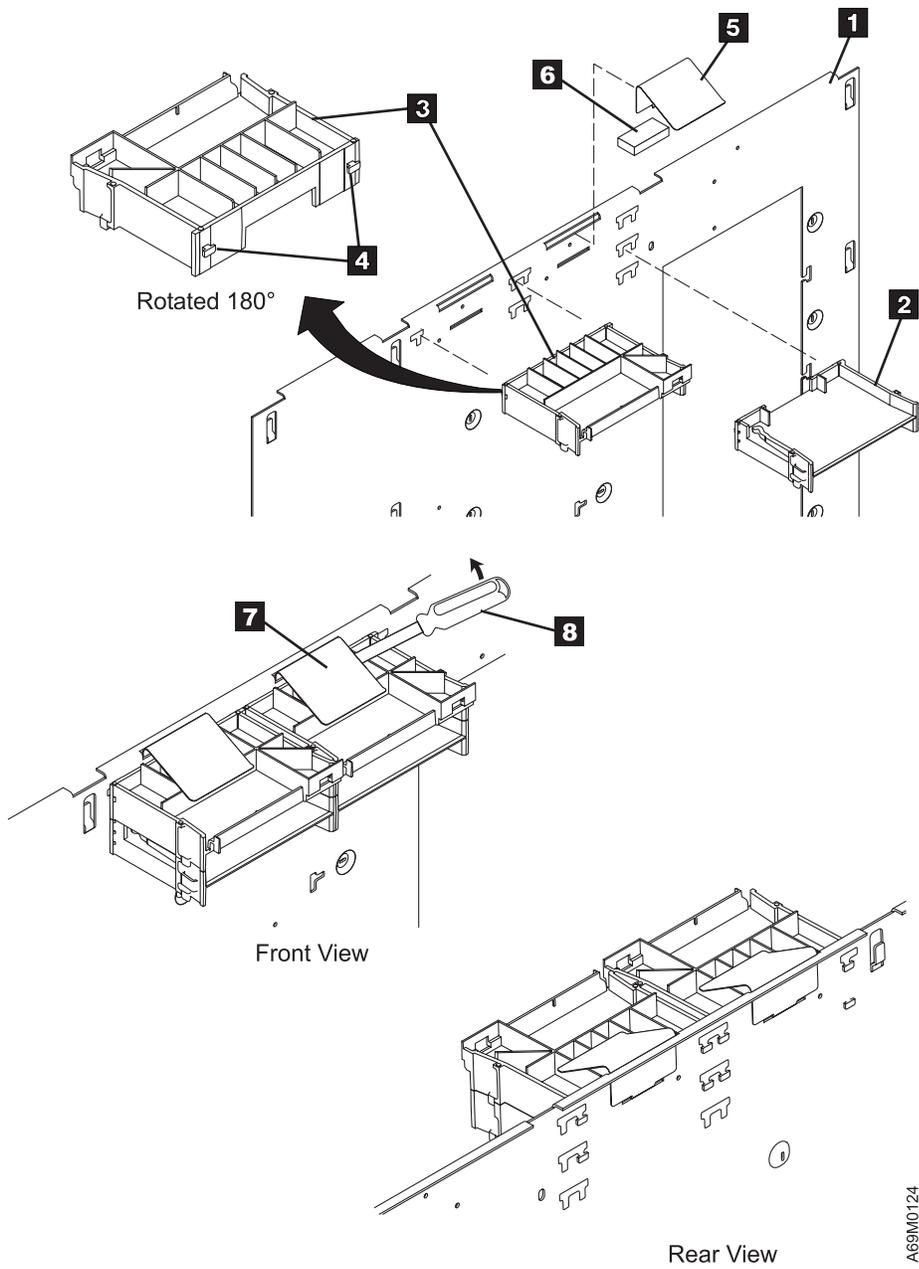


Figure 149. Top Cell Tray and Cartridge Cell Tray

X-Axis Assembly

Before you begin...
If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

Please allow approximately 1.5 hours to complete this procedure.

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the Y-axis mast assembly (see “Y-Axis Mast Assembly” on page 668).
3. Refer to Figure 150 on page 651. Remove the screws **3** , and move the AXY card and Y-axis cable trough out of the way.
4. Remove the right side door (the right end window panel).
5. Remove the right side X-axis bumper and bracket assembly **4** .
6. Slide the X-axis assembly to the right — off the end of the X-axis rail.

Replacement Procedure

Note: The new X-axis assembly FRU comes installed on an L-frame X rail. This rail is provided for shipping purposes only. Slide the new X-axis assembly **off** this shipping rail. The shipping rail will not be installed in the library.

1. Install the X-axis assembly onto the X-axis rails.
Attention: When sliding the X-axis assembly onto the X-rail use a screwdriver to lift the (four) felt wiper pads **5** as they slide onto the guide rods on the top and bottom surfaces of the X-rail. If you do not guide the felt wipers they will be damaged, leading to corrosion of the rail rods.
2. Move the X-axis assembly back and forth to ensure that the assembly does not bind anywhere along the X-axis rail.
3. Reverse the rest of the removal procedure.
4. Close the front door.
5. Complete the accessor servicing (see “Service Procedures” on page 535).
6. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
7. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

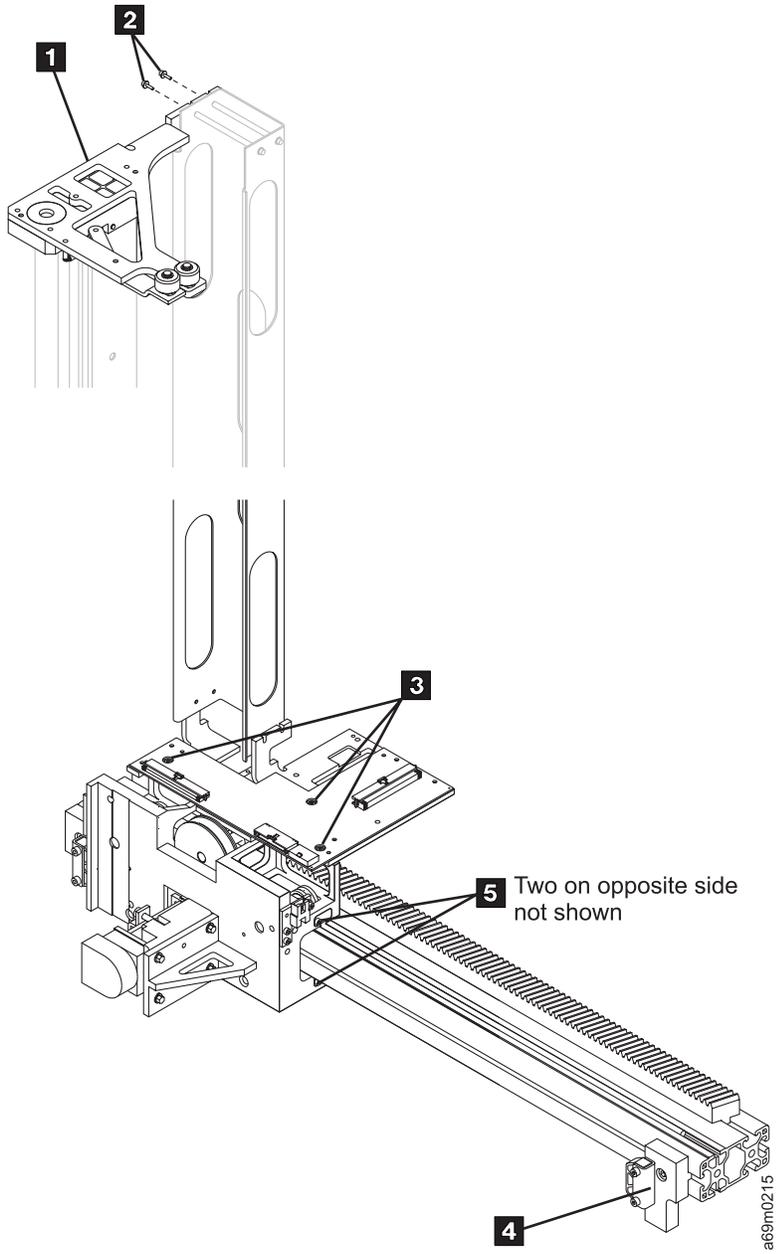


Figure 150. X-Axis Assembly

X-Axis Bumper

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. At the operator panel **Activity** screen, press [PAUSE].
2. When the library message indicates that the pause is activated, open the front door.
3. Remove the two screws **1** to remove the bumper **2**.

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

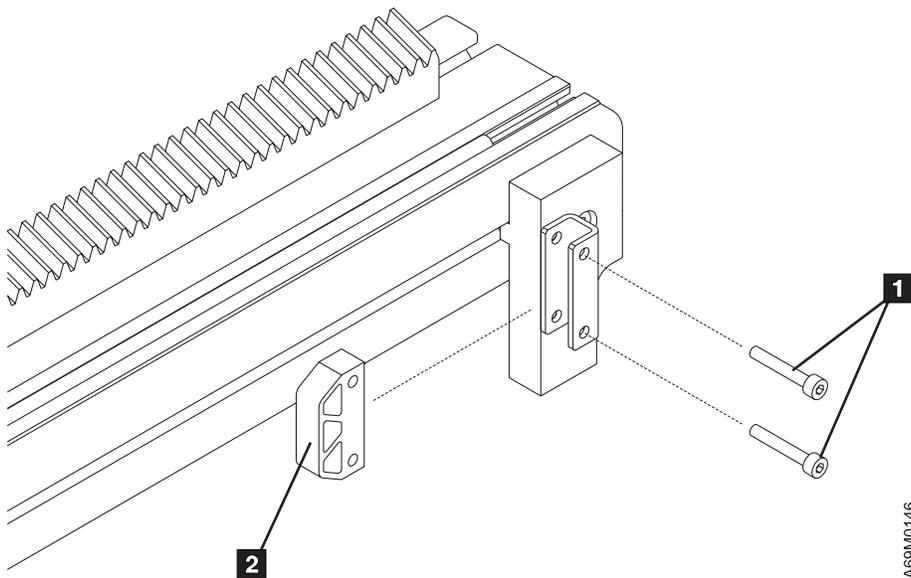


Figure 151. X-Axis Bumper

X-Axis Flex Cable

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. There are four X-axis flex cables available:

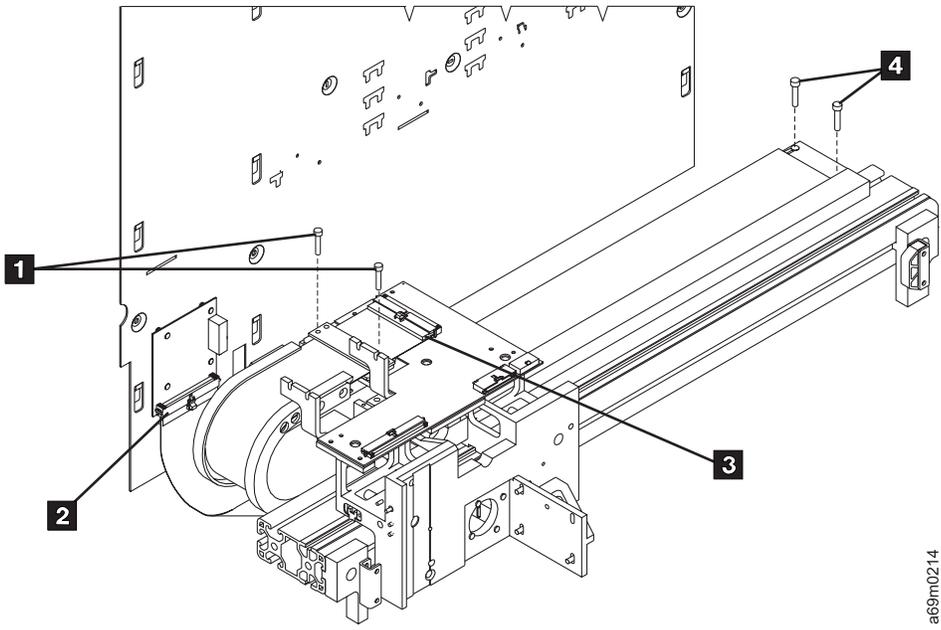
- 1–2 frames
- 3–6 frames (see notes)
- 7–10 frames (see notes)
- 11–16 frames (see notes)

Notes:

- a. Libraries with 5 to 10 frames can also use the 7 to 10 frame cable.
- b. Libraries with 8 to 16 frames can also use the 11 to 16 frame cable.

Refer to the cable list in Table 74 on page 699 or “Assembly 7: Miscellaneous Cables and Tools” on page 726 in Chapter 14, “Parts Catalog”, on page 697 for the correct cable for your machine configuration. Also see step 54 on page 96 for information on OLD and NEW style cables.

2. Prepare the accessor for servicing (see “Service Procedures” on page 535).
3. Remove the trough covers on either side of the mid point where the X-cable is mounted. In a single frame library, there is only one trough cover to remove.
4. Remove the trough cover in the L32 to gain access to the XCP card on the left-hand side. In a single frame library, this cover is already removed.
5. Refer to Figure 152 on page 654
6. Move the accessor to the left of where the X-cable mid point is mounted at the base of the frame, and remove two screws **4** that secure the X-cable mid point to the bottom frame.
7. Pivot the grippers to the front. Remove two screws **1** and unplug the X-cable from the AXY card **3**.
8. Unplug the X-cable from the XCP card **2** in the L32. The cable has a retention clip that must be depressed to disconnect the cable.
9. Remove the X-cable from the right-hand side.



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Figure 152. X-Axis Cable Removal

Replacement Procedure

1. Reverse the removal procedure. Use care when aligning the X-axis cable connectors to avoid bending the pins.

Note: There are OLD style and NEW style track cables. If you are replacing an OLD with an OLD, or a NEW with a NEW, continue with this replacement procedure. If you are placing an OLD with a NEW, see step 54 on page 96 in the Install section for information on installing the NEW style track cable. Then return here to continue with the replacement procedure.

2. Move the X-axis back and forth to ensure that the cable moves smoothly without binds or interference anywhere along the X-axis rail.
3. Close the front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

X-Axis Home Sensor

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Disconnect the X-axis home sensor cable **1**.
3. Remove the X-axis home sensor holding screw **2** to remove the sensor **3**.

Replacement Procedure

1. Reverse the removal procedure.
2. Close the front door.
3. Complete the accessor servicing (see “Service Procedures” on page 535).
4. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
5. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

X-Axis Motor/Belt

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the MDA (see “Motor Driver Assembly (MDA)” on page 566).
3. Refer to Figure 154 on page 658. Remove the four screws **4** to remove the motor and its mounting bracket.
4. Refer to Figure 153 on page 658. Remove the two screws **2** to remove the bracket **1**.
5. Remove the X-axis motor **3** from the mounting and from the X-axis belt.
6. Remove the X-axis belt by working the belt past the pinion shaft pulley.

Note: To save time, consider cutting away the old belt **only** if you are confident that:

- The belt you are removing is defective, **and**
- The belt you are about to install is the correct belt for the Replacement

Replacement Procedure

1. Reverse the removal procedure. Inspect the belt for wear before putting a new motor into the X-axis assembly.

Early Style: without automatic belt tensioner

2. Adjust the X-axis belt tension by pulling the X-axis motor away from the X-axis pinion shaft.
The belt tension is correct if light finger pressure (in the center of the belt between the two pulleys) deflects the belt 3 to 5 mm (1/8 to 3/16 in.).
3. Adjust the X-axis belt tension by pulling the motor away from the X-axis drive shaft.
The belt tension is correct when light finger pressure applied to the center of the belt **1**, between the two pulleys, deflects the belt 3 to 5 mm (1/8 to 3/16 in.).

Later Style: with automatic belt tensioner

4. See Figure 155 on page 659. Push on the X-motor **1** to compress the spring-loaded belt tensioner **2**.
5. Work the belt onto the X-motor pulley and release the motor. X-axis belt tension is automatically set.

Either Style: with or without automatic belt tensioner

6. Close the front door.
7. Complete the accessor servicing (see “Service Procedures” on page 535).
8. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
9. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

Note: Because of insufficient access, you may not be able to check the pulley adjustment using your finger. From the right side, slide an end wrench into the channel (shown at **5** in Figure 154 on page 658), between the X-axis casting and the front of the X-axis rail. Use the end wrench to press on the belt. Observe the travel of the end wrench to determine if belt tension is correct.

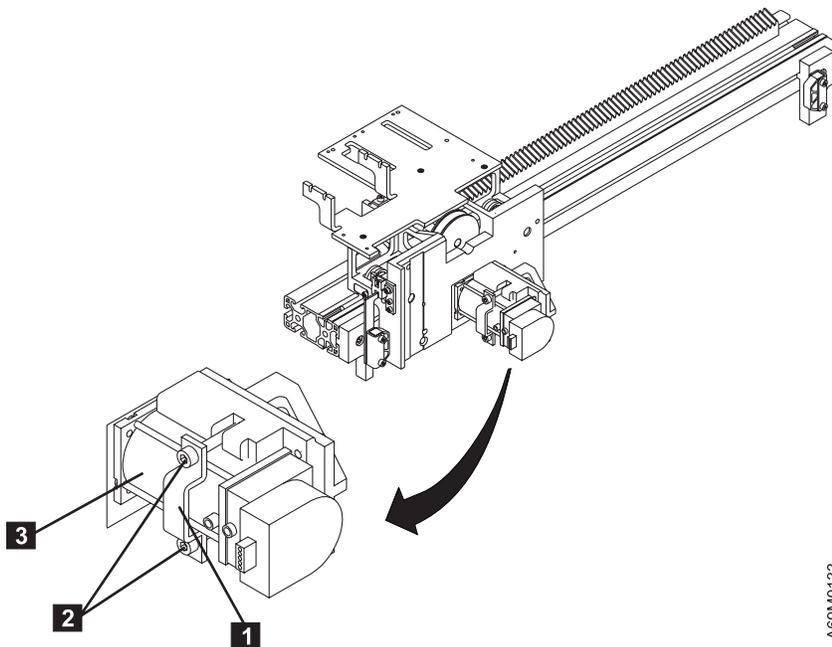


Figure 153. X-Axis Motor

A69M0133

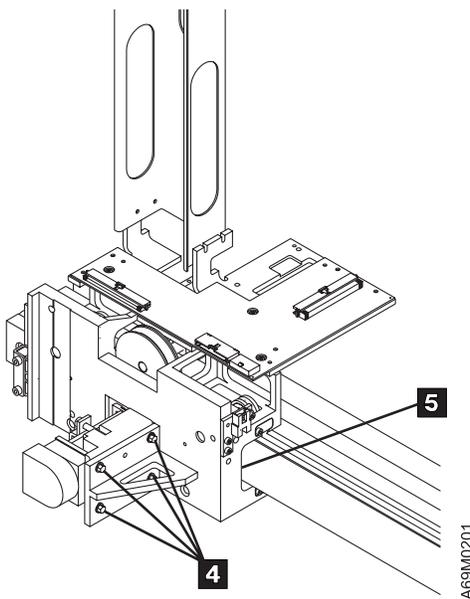


Figure 154. X-Axis Assembly (Motor) – Early Style

A69M0201

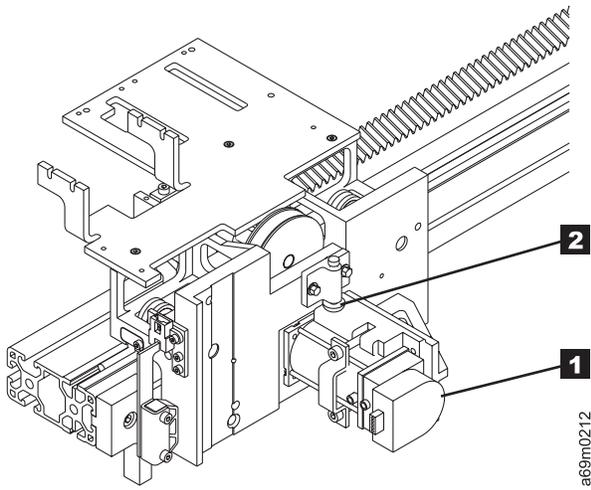


Figure 155. X-Axis Assembly – Later Style

X-Axis Pinion Shaft

Before you begin...

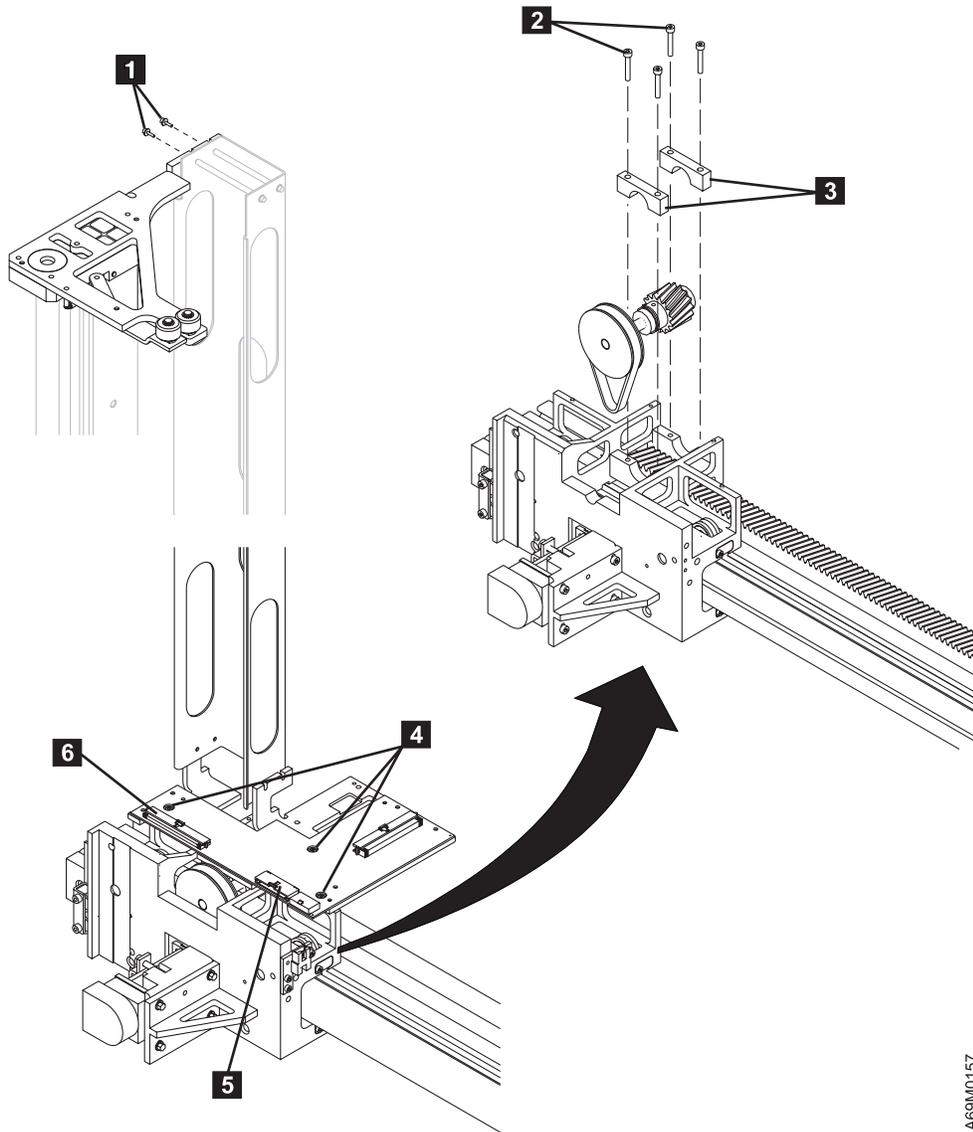
If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Raise the dual gripper assembly about halfway up the Y-axis mast assembly and secure it in place by inserting a hex wrench or screwdriver through the Y-axis access hole.
3. Remove the Y-axis trough holding screws **1** (see Figure 156 on page 661).
4. Disconnect the Y-axis cable connector **6**.
5. Disconnect cable connectors **5**.
6. Remove the AXY card holding screws **4**.
7. Slide the X-axis assembly out from under the AXY card.
8. Remove four screws **2** to remove the holding brackets **3**.
9. Remove the pinion shaft.

Replacement Procedure

1. Inspect the belt for wear before putting in the new pinion shaft assembly. Replace the belt if necessary.
2. Reverse the removal procedure.
3. Adjust the X-axis motor belt tension by pulling the motor away from the X-axis pinion shaft.
The belt tension is correct if light finger pressure (in the center of the belt between the two pulleys) deflects the belt 3 to 5 mm (1/8 to 3/16 in.).
4. Ensure that the hex wrench or screwdriver inserted into the Y-axis access hole is removed.
5. Close the front door.
6. Complete the accessor servicing (see “Service Procedures” on page 535).
7. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
8. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



A69M0157

Figure 156. X-Axis Pinion Shaft

X-Axis Rail Assembly

Removal Procedure

Please allow approximately 1.0 hour to complete this procedure.

Removing the X-Axis Rail Assembly from a Single-Frame (L32) Library

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the left side cover of the base unit.
3. Remove the X-axis flex cable clamp screws, and disconnect the X-axis flex cable **2** from the AXY card **1**.
4. Remove the X-axis left bumper **8**.
5. Remove the X-axis right bumper **4**.
6. Slide the cartridge accessor assembly off the X-axis rail assembly, and set it aside.
7. Remove the screws **3** to remove the X-axis rail assembly.

Removing the X-Axis Rail Assembly from a Multi-Frame Library

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Push the cartridge accessor to the left or the right end of the library depending on the location of the rail to be replaced.
3. Remove the appropriate frame end cover.
4. Start at the end of the library that has the end cover removed. Loosen the screws **3** of each X-axis rail assembly up to, but not including the rail to be replaced.
5. Loosen the set screws **6** in the long T-nuts (front and back) in the rail that is being replaced.
6. Slide the loosened rail assemblies away from the rail to be removed until the long T-nuts are clear of the rail to be removed.

Note: Use a screwdriver or bar to gently separate the rail assemblies.

7. Loosen the set screws **6** in the long T-nuts (front and back) on the other end of the rail that is being replaced (not required if this is the base frame).
8. Remove the screws **3** and remove the X-axis rail assembly.

Replacement Procedure

1. Remove the rods **7** from the old rail assembly.
2. Install the new rail assembly into the frame and install the holding screws **3**. Slide the rail towards the previous frame. Tighten the T-nuts **6** just slightly.
3. Put the rack alignment tool **5** on the junction of the two gear racks.
4. Tap the tool on the racks until the tool is fully seated in the gear teeth on both X-rail assemblies. Ensure no gap exists between the tool teeth and the rail teeth.
5. Tighten the short T-nuts **3** in the expansion frame.
6. While holding downward pressure on the X-rail, tighten the setscrews on each of the long T-nuts **6**.
7. Reinstall the rods **7** from the old rail into the new rail.
8. Press the shafts in place with the bearing shaft clamp tool. **Ensure the bearing shafts are tight from end-to-end.** The bearing shafts fit tightly in the X-rails, so start on the left side and clamp the shafts in place about every 50 mm (2 in.), to the fully-seated position.
If the bearing shafts do not seat fully, adjust the bearing shaft clamp tool.
9. Repeat steps 3 through 6 until all rails are aligned and tightened.
10. If this is a single frame library, when you are sliding the X-axis assembly back onto the rails, lift the four wiper pads **9** with a screwdriver.

11. Move the cartridge accessor across the junction of the X-rail. If you can feel any binds, correct the alignment before continuing.
12. Reverse the removal procedure. If the rail was installed correctly, the Y-mast should still be vertical with respect to the new X-axis rail. You can verify this if necessary, but if any adjustments are made, **ensure** the Y-mast is still vertical in the adjacent frames as well.
13. Close the front door.
14. Complete the accessor servicing (see “Service Procedures” on page 535).
15. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
16. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

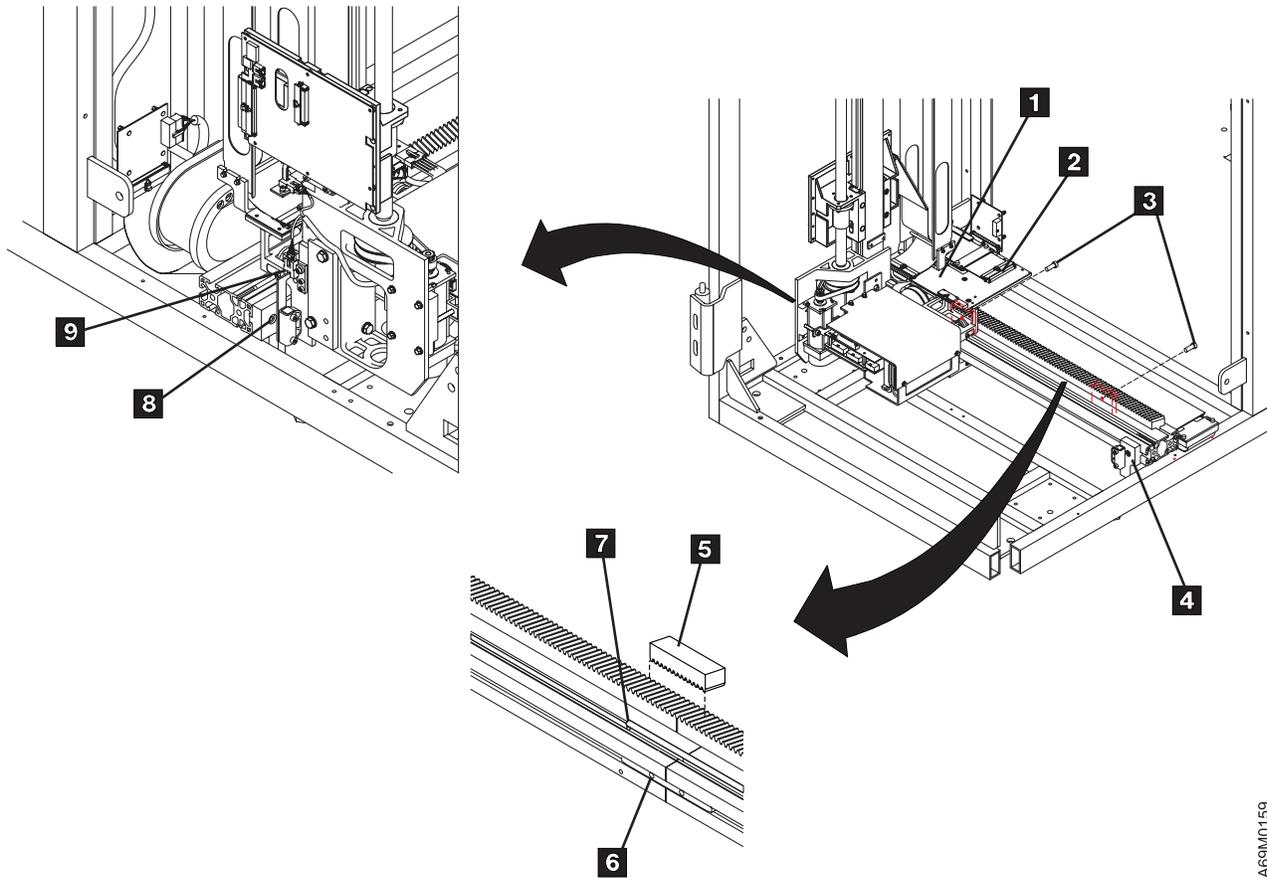


Figure 157. X-Axis Rail Assembly

A69M0159

Y-Axis Flex Cable

The Y-axis mast assembly does not have to be removed to replace the Y-axis flex cable.

Before you begin...

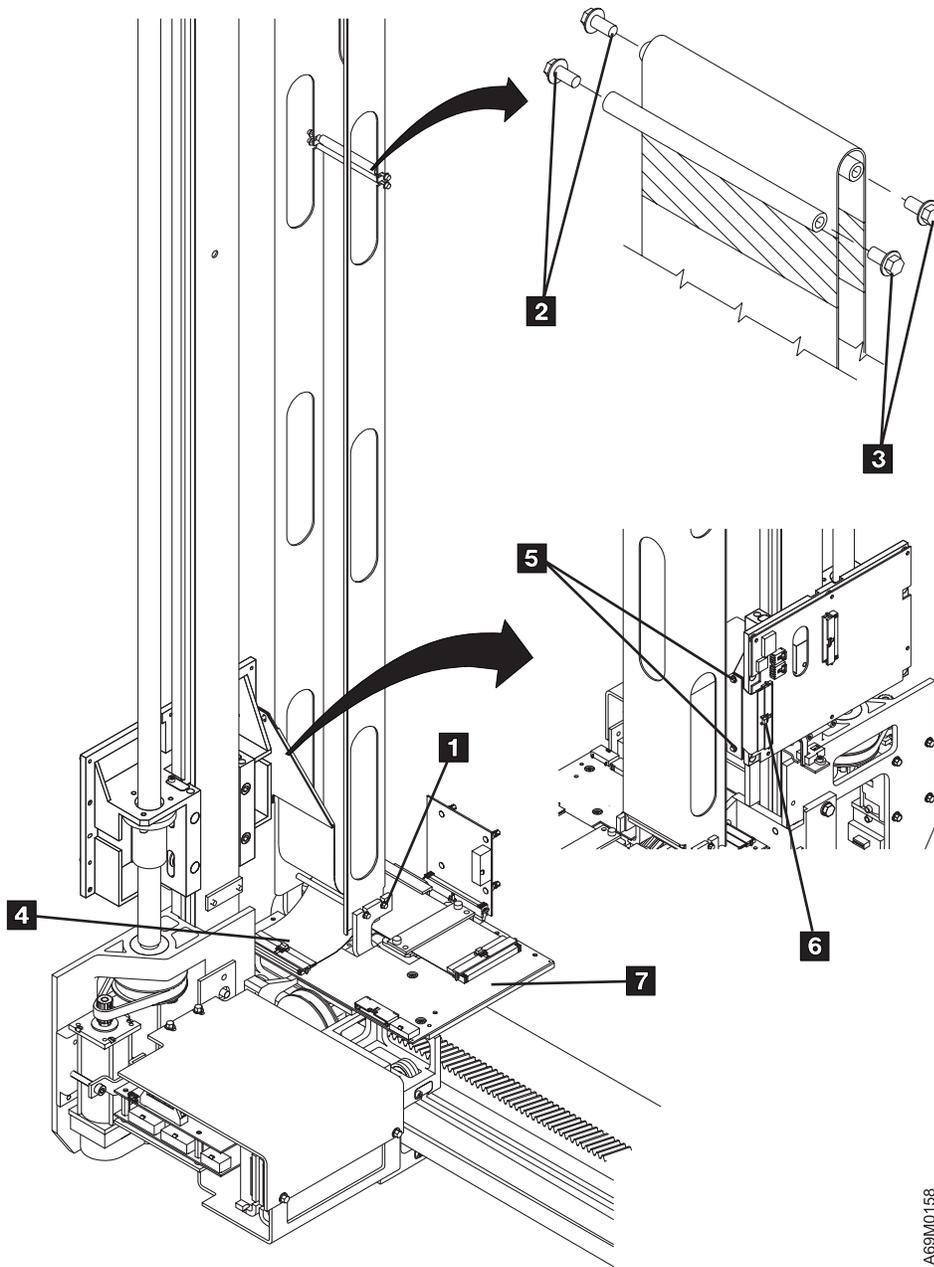
If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the cable assembly screws **5** at the ACC card.
3. Disconnect the cable **6** from the ACC card.
4. Disconnect the cable **4** from the AXY card **7**.
5. Loosen the screws **1**, and slide the cable out of the trough.
6. Loosen the screws **2** and **3**, and slide the cable out of the trough.
7. Remove the Y-axis flex cable.

Replacement Procedure

1. Reverse the removal procedure.
2. Move the Y-axis assembly up and down to ensure that the assembly does not bind and that the cable moves smoothly without binds or interference anywhere along the Y-axis.
3. Close the front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



A69M0158

Figure 158. Y-Axis Flex Cable

Y-Axis Guide Rollers

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Remove the right side cover (see “Covers, Right and Left End” on page 580).
3. Remove the right X-axis bumper assembly.
4. Move the accessor off of the X rails enough to access the top of the Y-axis rollers.

Note: DO NOT run the X-axis assembly completely off the X rails.

5. Remove the C-clip from the roller you want to replace, and remove the roller.

Replacement Procedure

1. When moving the X-axis assembly onto the X rails, use a screwdriver to compress the felt wipers on the X-axis assembly.
2. The replacement procedure is the reverse of the removal procedure.
3. Close the front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

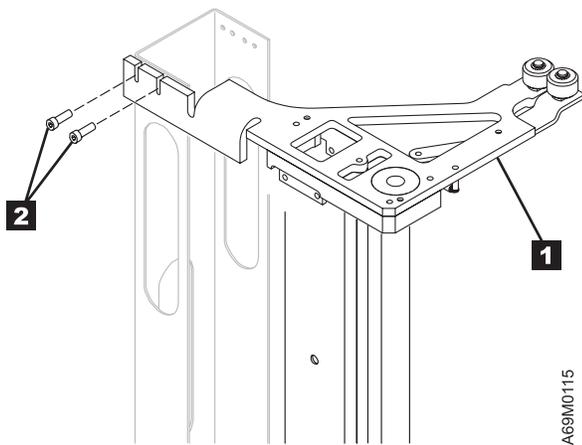


Figure 159. Y-Axis Guide Roller, Urethane

Y-Axis Home Sensor

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Move the X-axis assembly to a convenient position, then raise the lift mechanism, and support the mechanism by inserting a hex wrench or screwdriver inserted into the Y-axis access hole (located halfway up the assembly). The home sensor is activated by a small tab located just below the ACC card. The sensor rides up and down with the dual gripper and pivot assemblies.
3. Disconnect the Y-axis home sensor cable.
4. Remove the Y-axis home sensor screw **2** to remove the sensor **1**.

Replacement Procedure

1. Reverse the removal procedure.
2. Ensure that the hex wrench or screwdriver inserted into the Y-axis access hole is removed.
3. Close the front door.
4. Complete the accessor servicing (see “Service Procedures” on page 535).
5. Invoke the X-Y Axis Sensor Test to ensure that the new sensor works correctly.
6. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
7. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

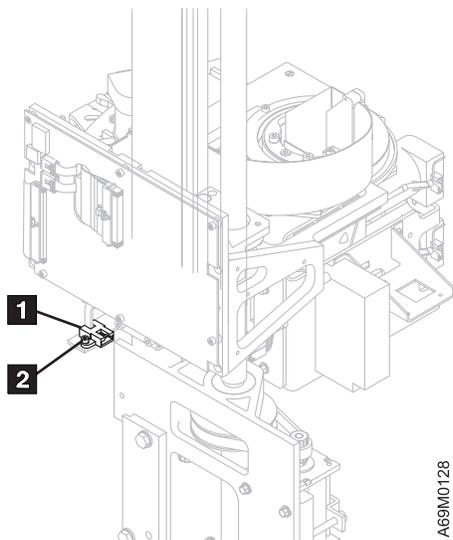


Figure 160. Y-Axis Home Sensor

Y-Axis Mast Assembly

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

Please allow approximately 1.0 hour to complete this procedure.

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. If you are replacing the Y-axis mast assembly, remove the following:

Note: If you are removing the Y-axis mast assembly but NOT replacing it, the following FRUs do NOT have to be removed.

- a. Remove the dual gripper assembly (see “Gripper Assembly, Dual” on page 622).
 - b. Remove the pivot assembly (see “Pivot Assembly” on page 638).
 - c. Remove the ACC card (see “Accessor Controller Card (ACC)” on page 558).
3. If you are not replacing the Y-axis mast assembly, you may still want to remove the dual gripper assembly to lighten the weight of the assembly.
 4. Remove the MDA (see “Motor Driver Assembly (MDA)” on page 566).
 5. If you have not removed the pivot assembly or the ACC card, remove the screws holding the Y-axis flex cable to the pivot assembly, and unplug the cable from the ACC card.
 6. Refer to Figure 161 on page 669 and remove the screws **2** holding the top portion of the Y-axis mast assembly **1** to the top rail assembly.
 7. Refer to Figure 162 on page 669. Loosen the two screws **1** on the left side of the Y-axis mast assembly (see Figure 162 on page 669).
 8. Remove the two bolts and washers **2** that secure the bottom of the Y-axis mast assembly to the X-axis carrier.

Note: Grasp the Y-axis mast assembly as you remove the two bolts, to prevent the Y-axis mast assembly from falling.

Replacement Procedure

1. Reverse the removal procedure.

Attention: The Y-axis mast will be deformed if the screws **1** are over tightened.

Notes:

- a. The bolts and screws that secure the Y-axis mast assembly to the X-axis carrier must be tightened in the correct sequence.
 - b. Snug, but do not tighten the four screws. Ensure the lip on the stiffener plate **3** is pushed back firmly against the accessor.
 - c. Tighten the front screws **2** just enough to pull the mast against the accessor.
 - d. Tighten the side screws **1** sequentially top and bottom. Now firmly tighten all screws. Verify the mast is straight.
2. Close the front door.
 3. Complete the accessor service (see “Service Procedures” on page 535).
 4. Perform a library calibration (see “Library Calibration” on page 530).
 5. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
 6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

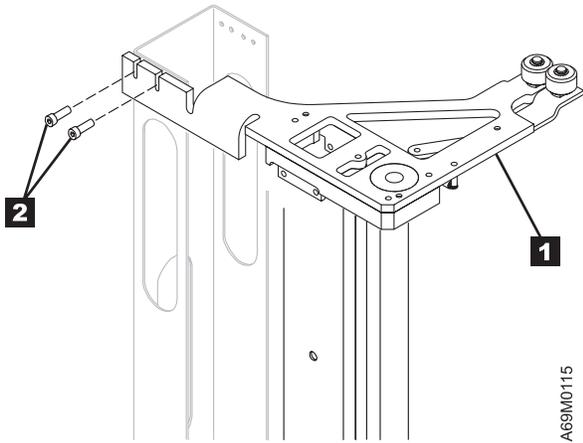


Figure 161. Y-Axis Mast – Top

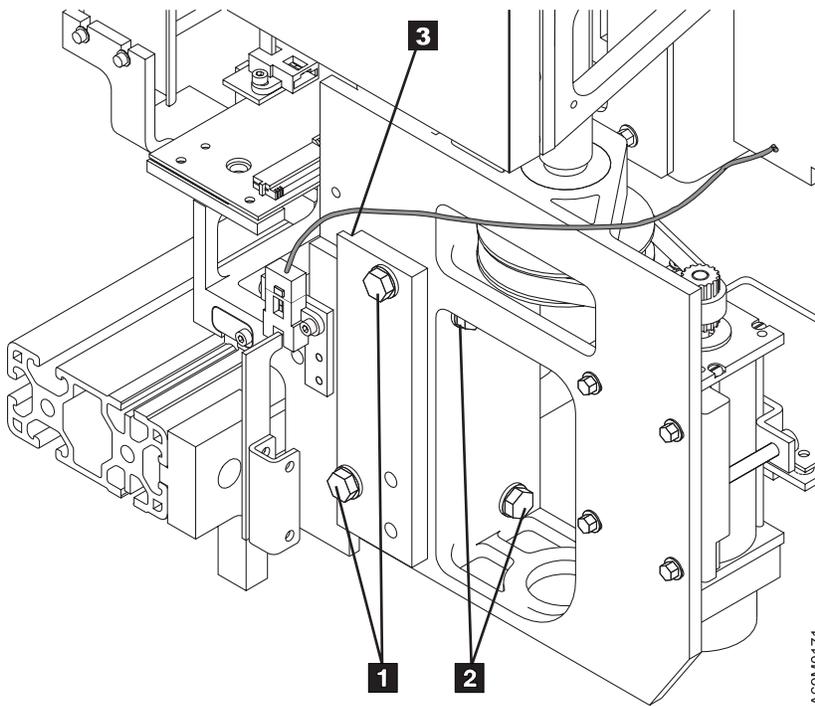


Figure 162. Y-Axis Mast – Bottom

Y-Axis Motor/Belt

Before you begin...

If you exchange a FRU and the problem is not corrected, reinstall the original FRU.

Removal Procedure

1. Prepare the accessor for servicing (see “Service Procedures” on page 535).
2. Move the X-axis assembly to a convenient position. Raise the lift mechanism to be above the Y-axis access hole located halfway up the assembly. Insert a hex wrench or screwdriver into the access hole to support the mechanism.
3. Remove the MDA (see “Motor Driver Assembly (MDA)” on page 566).
4. Refer to Figure 163 on page 671.
5. Remove the screws **4**, from motor mount on the Y-axis assembly.
6. Remove the belt **1** and the bracket **3**.
7. Remove the Y-axis motor **2**.

Replacement Procedure

1. Reverse the removal procedure.

Note: Whenever you replace the motor, you should also replace the belt.

Early Style: without automatic belt tensioner

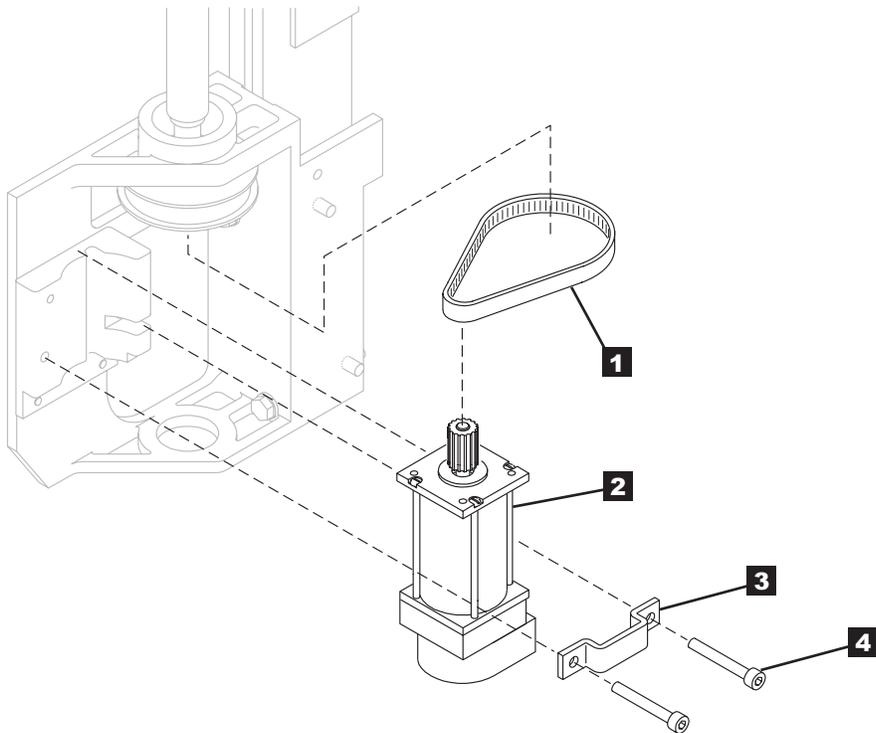
2. Adjust the Y-axis belt tension by pulling the motor away from the Y-axis drive shaft.
The belt tension is correct when light finger pressure applied to the center of the belt **1**, between the two pulleys, deflects the belt 3 to 5 mm (1/8 to 3/16 in.).

Later Style: with automatic belt tensioner

3. See Figure 164 on page 671. Push on the motor **1** to compress the spring-loaded belt tensioner **2**.
4. Work the belt onto the Y-motor pulley and release the motor. Y-axis belt tension is automatically set.

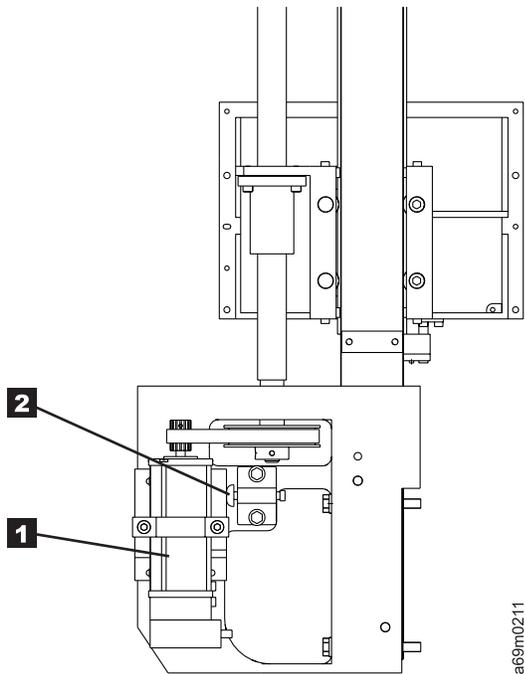
Either Style: with or without automatic belt tensioner

5. Ensure that you remove the hex wrench or screwdriver that you inserted into the Y-axis access hole.
6. Close the front door.
7. Complete the accessor servicing (see “Service Procedures” on page 535).
8. Perform a library calibration (see “Library Calibration” on page 530).
9. Perform the “Library Verify Test” on page 507, using the **no drives** selection.
10. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.



A69M0117

Figure 163. Y-Axis Motor



a69m0211

Figure 164. Y-Axis Motor Belt Tensioner (Later Style)

Manually Removing Cartridge

- To remove a stuck cartridge from the I/O station, go to “From the I/O Station”.
- To remove a stuck cartridge from a storage slot, go to “From a Storage Slot” on page 673.
- To remove a cartridge from a drive, go to “From an LTO Drive” on page 674 or “From a DLT-8000 Drive” on page 676.
- To remove a cartridge from the gripper, go to “From a Dual Gripper Assembly” on page 684.

From the I/O Station

Before you begin... Customer's Cartridges

If a customer's cartridge must be removed, inform the customer.

Give the cartridge to the customer, and when the procedure is complete, have the customer reinstall the cartridge through the I/O station.

This procedure assumes that the I/O Station door is locked and the customer is unable to remove cartridges.

1. At the operator panel **Activity** screen, press [PAUSE].
2. When the library message indicates that the pause is activated, open the front door.
3. Remove the cartridge from the interior side of the I/O station, and close the door.
4. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

From a Storage Slot

Before you begin...

If a customer's cartridge must be removed, inform the customer.

Give the cartridge to the customer, and when the procedure is complete, have the customer reinstall the cartridge through the I/O station.

1. Prepare the accessor for servicing (see "Service Procedures" on page 535).
2. If the cartridge is partially in the gripper and partially in a storage slot, continue with step 3; otherwise, go to step 6.
3. Try to slide the cartridge all the way into the gripper.
If you can move the cartridge into the gripper, go to "From a Dual Gripper Assembly" on page 684 and remove the cartridge from the gripper, then return here to step 7.
4. If you cannot move the cartridge into the gripper, slide the cartridge into the storage slot.
5. Move the lift assembly to a suitable position for service.
6. Remove the cartridge from the storage slot and give it to the customer.
7. Check the storage slot for contamination, wear, or damage.
8. Compare the suspected slot with a good slot by inserting and removing the diagnostic tape cartridge. If a slot is damaged, you should notice a difference.
9. If the storage slot is defective, replace it (see "Storage Slot Section" on page 648).
10. If you did not determine why the library could not successfully insert or remove the cartridge, and you did not exchange a FRU, perform the library calibration procedure to ensure that the gripper is properly aligned with the slots.
11. If you manually removed any cartridges, give them to the customer.
12. Close the front door.
13. Complete the accessor servicing (see "Service Procedures" on page 535).
14. Perform the "Library Verify Test" on page 507, using the **no drives** selection.
15. Return to the procedure that sent you here; otherwise, go to "End of Call" on page 489.

From an LTO Drive

Before you begin...

If a customer's cartridge must be removed, inform the customer.

In this procedure, you will remove a stuck tape cartridge, and visually check for any damage to the tape or the leader pin. If the inspection finds a problem, and it can't be resolved, the cartridges should be considered bad. However, if there is no obvious damage, give the cartridge to the customer.

Unless the you determine that the drive is damaged, it can be re-installed (if removed) and the drive read / write test run to verify operations before returning the drive to the customer.

1. Prepare for drive replacement (see "Service Procedures" on page 535).
2. Open the front door. If the cartridge is partially in the gripper and in the drive, continue at step 6 on page 675. If the cartridge is in the drive, continue with the next step.
3. Verify that the drive is powered on.
 - a. Ensure that the drive power cable is connected at both ends.
 - b. Ensure that the circuit breakers on the FCA are ON (not tripped). Do **not** turn off any circuit breakers on the FCA. This would affect other drives, and will erase any dump information currently stored in the failing drive.
 - c. Verify that the drive fan is running by holding a piece of paper next to the fan grill in the rear of the drive tray. If the fan is running it will cause the paper to flutter.
 - d. Verify that the customer is not using the library.
 - e. To access the front of the drive, open the front door. Look for any indication of power on the drive bezel indicators. If any indicators on the drive bezel are on, then power is good. Go to step 5. If the status indicator LED is dark and the Single Character Display (SCD) is blank, replace the drive tray assembly. If this corrects the problem, go to step 10 on page 675.

Note: The SCSI bus for this particular drive should be quiesced before continuing with this procedure.

- f. If the failure continues, replace the drive power cable. If this corrects the problem, go to step 10 on page 675. If replacing the drive power cable does **not** correct the problem, contact your next level of support.
4. Press and release the drive unload button **2**, and wait two minutes. If the cartridge unloads, remove it, and go to step 11 on page 675 in this procedure. If the cartridge does not unload, proceed to the next step.
5. Check for a microcode problem, indicated by a 'hung' drive.
 - a. Press and hold the [EJECT] button for a full 10 seconds to force the drive to reset itself. The SCD will start changing when the drive resets. Release the [EJECT] button.
 - b. Attempt to collect a drive dump (see "CETool Procedures" on page 500). If you are unable to collect a dump using CETool, ignore the failure.
 - c. If you obtained a drive dump, contact your next level of support to determine if this dump will be helpful to them. Ask them to forward the dump to the product PFES. Analyzing this dump can reveal if this is a new problem or one for which a fix already exists.
 - d. If the drive is empty (or has a tape in the ejected position), go to step 11 on page 675. If there is a cartridge in the drive, press the eject button for 1 second.

Note: After resetting the drive with a tape loaded, an error recovery procedure in the drive is automatically invoked. This error recovery procedure will very slowly rewind the tape to the beginning. Depending on the position of the tape at the time of the failure, this slow rewind

- may take as long as 20 minutes. So, if the tape did not eject, do **not** power cycle the drive. Wait 20 minutes, then press the eject button for 1 second. The tape should now eject. If the tape ejects go to 5e.
- e. If the cartridge does not unload, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679.
 6. Try to slide the cartridge all the way into the gripper.

If you can move the cartridge into the gripper, go to “From a Dual Gripper Assembly” on page 684, remove the cartridge from the gripper, then return to step 11 in this procedure.

If you cannot move the cartridge into the gripper, slide the cartridge into the drive and continue with the next step.
 7. Move the lift and gripper assembly away from the drive.
 8. Push the drive unload button **2**. If the cartridge unloads, go to step 11. If the cartridge does not unload, go to “From an LTO Drive When Cartridge is Stuck in Loader” on page 679.
 9. Finish Drive Replacement (see “Service Procedures” on page 535).
 10. Run Library Verify Test to test the drive (see “Library Verify Test” on page 507). Use the option **One Drive**. When prompted about the Read/Write Test, select **Yes**.
 11. If you manually removed any cartridges, give them to the customer. Advise the customer to install the cartridges using the I/O station.
 12. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

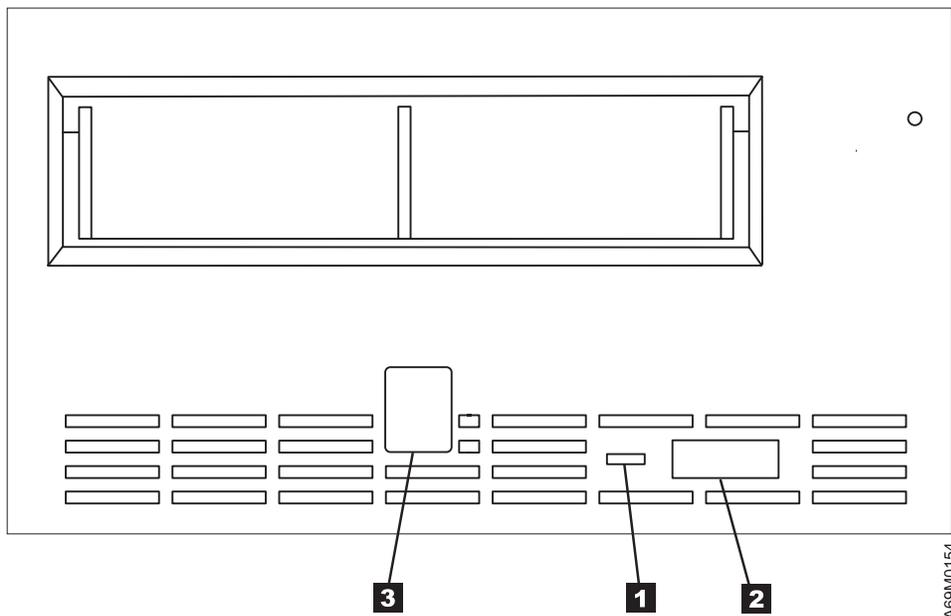


Figure 165. LTO Drive – Front View

From a DLT-8000 Drive

Before you begin...

If a customer's cartridge must be removed, inform the customer.

In this procedure, you will remove a stuck tape cartridge, and visually check for any damage to the tape or the drive tape leader. If there is no obvious damage, you will give the cartridge to the customer, and ask the customer to copy the data from the tape to another cartridge. The customer should discard this potentially-damaged cartridge after transferring the data.

Note: A stuck cartridge should be thoroughly inspected for any damage. If no damage is found, the cartridge can be returned to the library.

1. Verify that the customer is not using the library.
2. Open the front door. If the cartridge is partially in the gripper and in the drive, use the gripper belt to feed the cartridge back into the gripper. Remove the cartridge and give it to the customer. If the cartridge is in the drive or is still being held by the drive in the unload position, continue with the next step.
3. Press and release the drive unload button and wait two minutes.
If the cartridge unloads, remove it and give it to the customer. If the cartridge does not unload (or is not released by the drive), proceed to the next step. You may need to use your hand to physically assist or accept the cartridge as it is ejected.
4. Press the eject button. The cartridge should do a slow rewind. After the rewind is complete, press the eject button again. The cartridge should now eject.
 - a. If the cartridge ejects, remove the cartridge, give it to the customer, and go to step 18 on page 677.
 - b. If the cartridge does **not** eject, continue at the next step.
5. Open the rear door.
6. Remove the tape drive (see "Drive Canister Assembly – DLT-8000 SCSI Hot Swap" on page 590).
7. Refer to Figure 166 on page 677. Remove the six screws **1**, and carefully remove the canister lid **2**. The fan is attached to the canister lid and the cable from the fan is attached to the drive canister.
8. Rotate the canister lid and lay the canister lid next to the drive canister.
9. Open the cable clamp inside the drive canister.
10. Detach the fan cable plug J7 **3** from the DCC card.

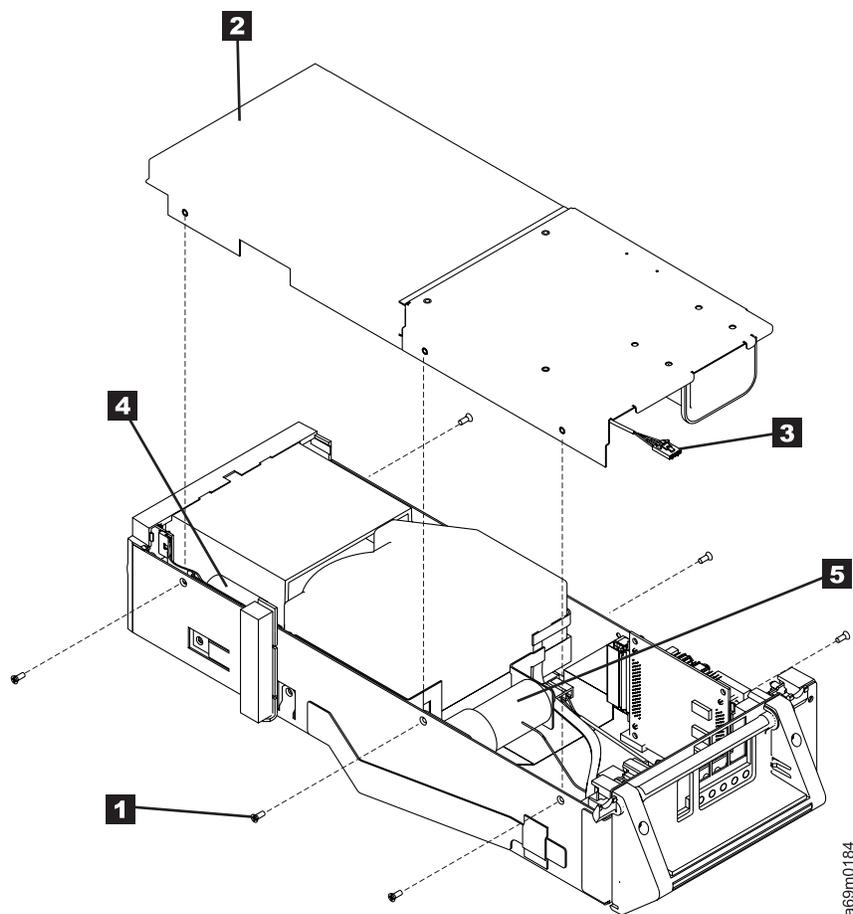


Figure 166. Manually Ejecting DLT-8000 Tape Cartridge from Drive

11. Position the tape drive with the bezel on the tape-load end pointed toward you. If the cartridge is in the ejected position, but will not release from the drive, continue with this procedure at 13.
12. Insert a crosspoint screwdriver into the hole in the bottom of the drive, located in the center of the tape cartridge. Rotate the screwdriver counterclockwise (as viewed from the top) until all the tape is driven out of the drive and is driven inside the tape cartridge.
13. Depress and hold the plunger of the solenoid **4** in the picked position.
14. While holding the solenoid in the picked position, turn the finger wheel on the load motor **5** until the eject mechanism drives the tape cartridge out of the drive. You will rotate the finger wheel counterclockwise to eject the tape cartridge.
15. Go to “Detached DLT Leader Service Check” on page 678 to check for a detached leader, then return here.
16. After the tape cartridge is removed from the tape drive, reassemble the tape drive reversing the steps back to step 5 on page 676, then return here.
17. If the failure continues, replace the drive.
18. Visually check for any damage to the tape or the leader pin. If there is no obvious damage, give the cartridge to the customer. Ask the customer to copy the data from the tape cartridge to another tape cartridge, and ask them to discard this potentially-damaged cartridge.

Note: A stuck cartridge should be thoroughly inspected for any damage. If no damage is found, the cartridge can be returned to the library.

19. Run Library Verify (see “Library Verify Test” on page 507).
20. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

Detached DLT Leader Service Check

1. If the drive has not been removed from the library, do so by performing steps 1 on page 676 through 10 on page 676 in topic “From a DLT-8000 Drive” on page 676.
2. See Figure 167. Look inside the cartridge loader to see if the drive tape leader is correctly hooked into the link assembly. If it is, return to the procedure that sent you here. If it is visible, but detached from the link assembly, continue at the next step.
3. From the top of the drive just behind the cartridge slot, use a screwdriver at **1** to move the link assembly toward the rear of the drive as shown. The link is under spring tension and must be held in place for the next step.
4. With the link assembly retracted, reach into the cartridge loader with a finger or non-metallic blunt instrument (like a plastic pen) and hold the drive tape leader **2** towards the back while you slowly release the link assembly. It should re-attach itself as shown in the figure.
5. If the drive tape leader has retracted, or is broken, perform the drive leader replacement procedure (refer to the procedure that is supplied with the Leader Replacement Kit, DLT-8000 Drive (see Assembly 7 of Chapter 14, “Parts Catalog”, on page 697).

Note: The Leader Replacement Kit applies to a DLT drive already removed from a library. Use the appropriate steps in the previous section to first remove the drive from the library before replacing the drive tape leader.

6. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

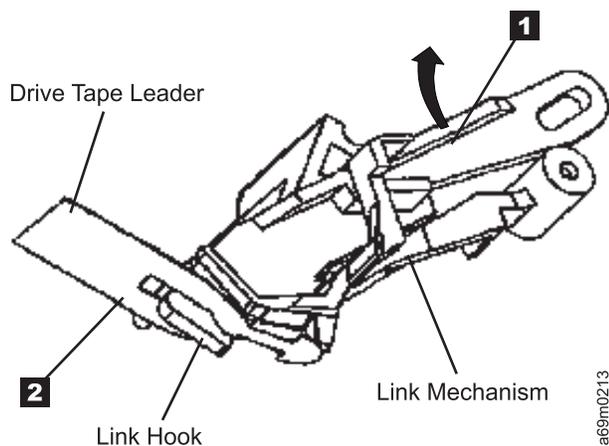


Figure 167. DLT-8000 Drive Tape Leader

From an LTO Drive When Cartridge is Stuck in Loader

Before you begin...

If problem-determination procedures identify the Ultrium Tape Drive as the source of a problem, replace the entire unit. Do not attempt to open the drive for repairs. Opening the Ultrium Tape Drive and attempting a repair **other than manually removing a tape cartridge** will void the drive warranty.

Attention:

- If a tape cartridge becomes stuck in the drive and must be manually removed by opening up the drive, visually check for damage to the leader and leader pin in the tape cartridge. If the leader is damaged it must be repaired using a Leader Pin Replacement Kit before attempting to recover the data from the cartridge. If there is no other visible damage to the tape, give the cartridge to the customer.
- **DO NOT** use a power screwdriver to perform this procedure, as it could destroy the tape.
- Unless you determine that the drive is damaged, it can be re-installed (if removed) and the drive read / write test run to verify operations before returning the drive to the customer.

Please allow approximately 1 hour for this procedure.

Follow this procedure to manually remove a tape cartridge.

1. Remove the drive tray assembly. See “Drive Tray Assembly – LTO SCSI” on page 585 or “Drive Tray Assembly – LTO Fibre” on page 587.

Note: When running “Prepare for Drive Replacement,” you may get a message that the library is “Unable to unload the drive(s).” Ignore the error and continue with the rest of this procedure.

2. Place the drive tray on a nonslip work surface.
3. If you have not already removed the fan cover, refer to Figure 109 on page 586 for the procedure. Loosen the captive screws **6**, and remove the fan cover **5** at the rear of the drive.
4. Remove the drive from the drive tray assembly by unplugging the SCSI, power, and RS-422 cables from the rear of the drive.
5. Remove the four drive mounting screws **4** (see Figure 168 on page 680).
6. Remove the three screws and washers **1** to remove the bezel **2**.
7. Remove the four screws and washers **3** to remove the top cover from the drive.

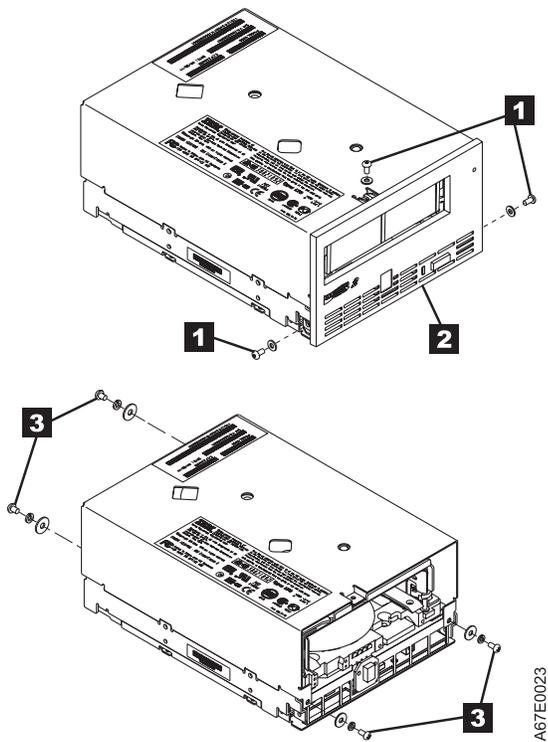


Figure 168. Removing Drive Top Cover

Attention: To avoid contamination and damage caused by electrostatic discharge (ESD), never touch the head or the electronic components within the tape drive.

8. Position the drive with the front facing you, then tilt the drive on its left side (see Figure 169 on page 681).
9. Locate the access hole **1** at the bottom of the drive, (see Figure 169 on page 681) and the advance screw within the hole. The advance screw is attached to the supply reel motor.

Attention: In step 10, rotate the advance screw clockwise only, not counterclockwise. A counterclockwise motion would damage the tape.

10. Insert a 2.5 mm hex wrench into the access hole **1**, and rotate the advance screw clockwise. The tape rewinds inside the cartridge, from the take-up reel **2** to the supply reel **3**. As it rewinds onto the supply reel, ensure the tape stays taut by gently pressing your finger against the take-up reel. Stop rotating the screw when you feel resistance. The tape has been rewound as far as it can go.

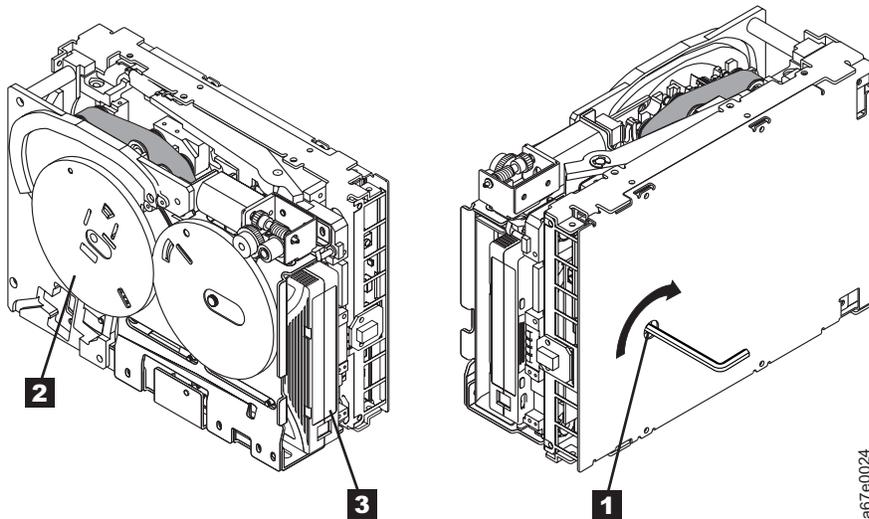


Figure 169. Rewinding Tape from Take-up Reel to Cartridge Supply Reel. Rotate the advance screw **clockwise** only.

11. Locate the loader motor gear **1** (see Figure 170). While applying just enough clockwise torque to the advance screw **1** (see Figure 169) to keep the tape tight, rotate the loader motor gear in the unload direction (see arrow **1** in Figure 170). The rotation of the loader motor gear causes the leader-pin block **2** to move from the take-up reel towards the supply reel. When the leader-pin block reaches the cartridge, it should disengage from the leader pin, then rotate away from the cartridge:
 - a. If the leader pin disengages from the leader-pin block **2**, rotate the hex wrench clockwise to rewind the tape until the leader pin snaps into the retaining clips in the cartridge. Remove the hex wrench and go to step 15 on page 682.
 - b. If the leader pin does not disengage, go to step 12 on page 682.

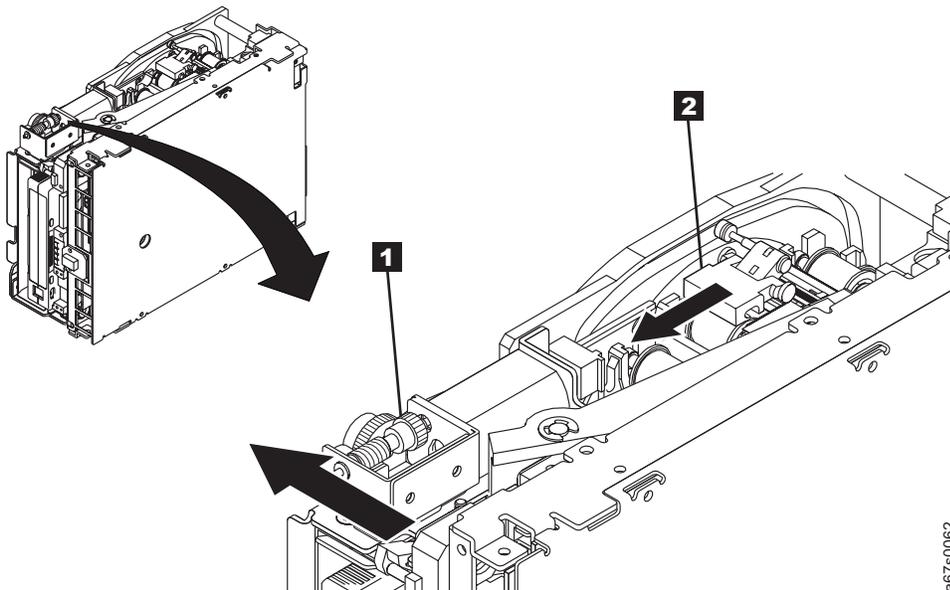


Figure 170. Moving Leader-Pin Block from Take-up Reel to Supply Reel. When the leader-pin block reaches the cartridge, it disengages the leader pin, then rotates away from the cartridge.

Attention: In the next step, do not allow the leader-pin block **2** to touch the head. Damage can result to the head.

12. Being careful not to allow the leader-pin block to contact and damage the head, use clean, needle-nose pliers to grasp the end of the leader pin, if necessary. Pull the leader pin out of the leader-pin block so that you can grip it with your fingers (see **1** in Figure 171).
13. Use your fingers to keep the tape taut, as you rotate the hex wrench **2** **clockwise** to wind the excess tape into the cartridge. Guide the leader pin toward the cartridge, and drop it inside the cartridge door. Ensure that no tape is left outside of the cartridge.
14. Remove the hex wrench.

Note: Do not attempt to seat the leader pin into the cartridge clips. This will interfere with the motion of the leader pin block.

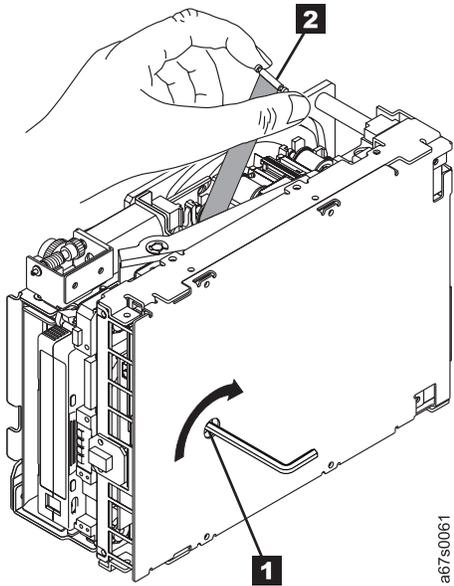


Figure 171. Rewinding Leader Pin into Tape Cartridge

15. Manually rotate the loader motor gear (see **1** in Figure 172 on page 683) in the unload direction until the leader pin block **2** reaches the last roller **3**.
16. To prevent the leader pin block from jamming, press down on the linkage of the leader block **4** to force up the hinged section of the block.
17. While manually rotating the loader motor gear in the unload direction, guide the end of the leader pin block **5** into the block guide **6**.
18. Continue to rotate the loader motor gear counterclockwise until you feel resistance, and the cartridge rises and ejects.
19. Remove the stuck tape cartridge, and visually check for any damage to the tape or the leader pin. If there is no obvious damage, give the cartridge to the customer. Ask the customer to copy the data from the tape to another cartridge, and ask them to discard this potentially-damaged cartridge.

Note: A stuck cartridge should be thoroughly inspected for any damage. If no damage is found, the cartridge can be returned to the library.

20. Unless you determine that the drive is damaged, it can be re-installed (if removed) and the drive read / write test run to verify operations before returning the drive to the customer.
21. Return to the procedure that sent you here; otherwise, go to “End of Call” on page 489.

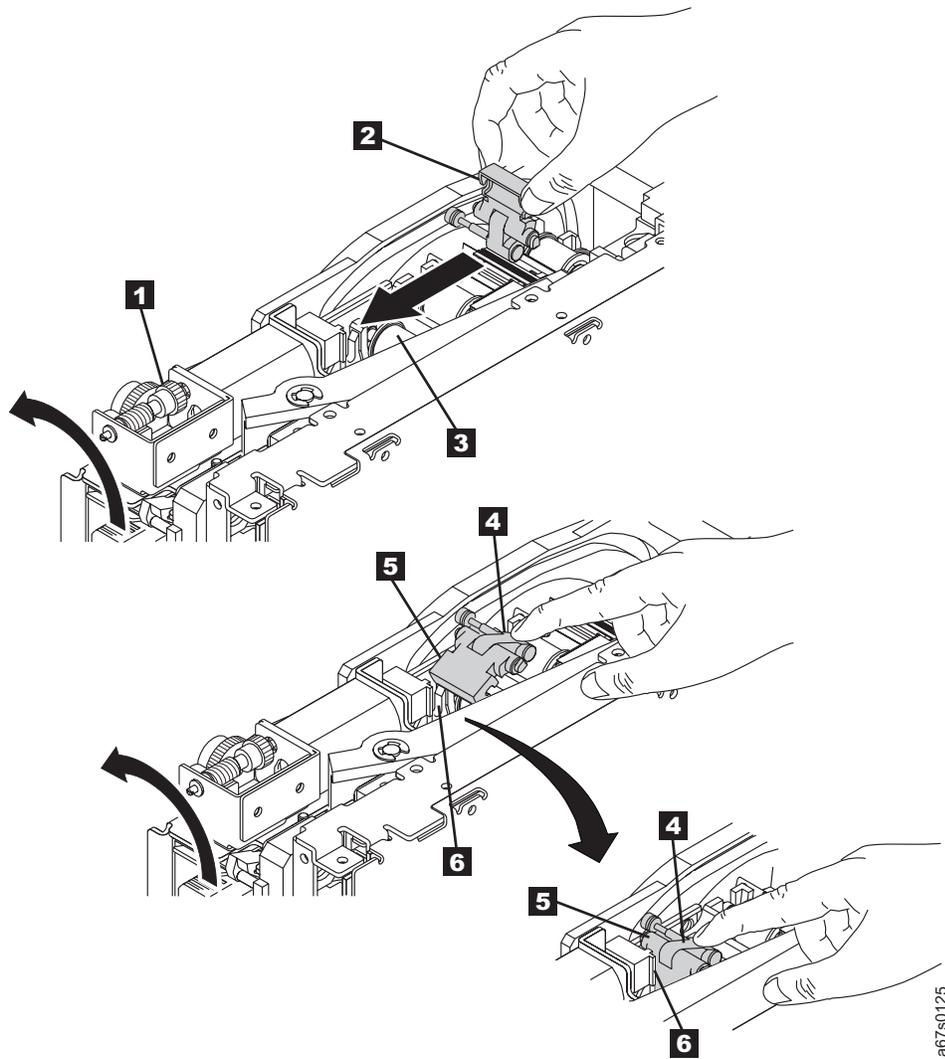


Figure 172. Guiding Leader Pin into Tape Cartridge

ac7s0125

From a Dual Gripper Assembly

Before you begin...

Consider a cartridge that is stuck between the gripper and the I/O station, a storage slot, or a drive to be in the I/O station, the storage slot, or the drive, **not in the gripper**.

If a customer's cartridge must be removed, inform the customer.

Give the cartridge to the customer. When the procedure is complete, have the customer insert the cartridge through the I/O station.

1. Prepare the accessor for service (see).
2. Open the door nearest the gripper.
3. Move the Y-axis on the rail until it is at a convenient position for you to remove the cartridge.
4. Rotate the gripper assembly until the cartridge is facing you.
5. Refer to Figure 173 on page 685 and move belt **3** in a direction toward the gripper exit while manually guiding the cartridge **4** toward you.
6. Remove the cartridge from the gripper **2**.
7. If you manually removed any cartridges, give them to the customer.
8. Close the front door.
9. Complete the accessor servicing (see).
10. Perform the "Library Verify Test" on page 507.
11. Return to the procedure that sent you here; otherwise, go to "End of Call" on page 489.

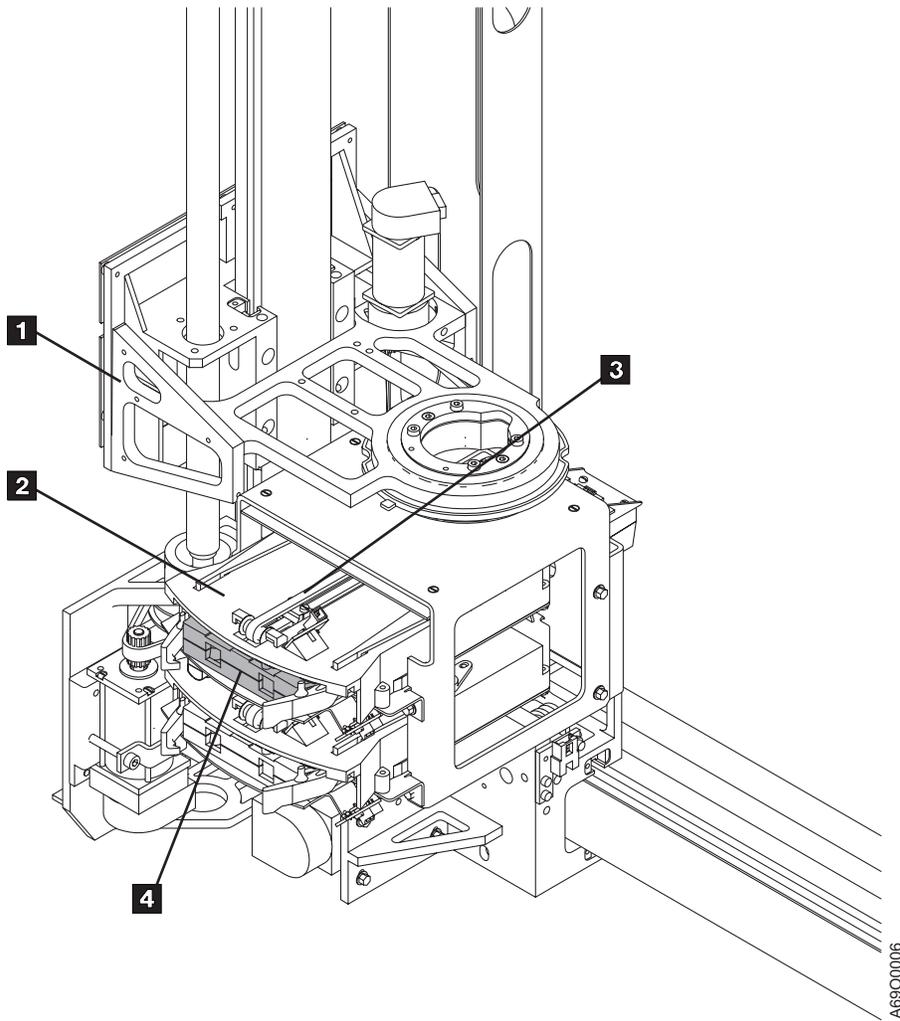


Figure 173. Manually Removing Cartridge from Dual Gripper Assembly

Preventive Maintenance (PM)

Notes:

1. Wash your hands after applying any lubricants to avoid any possible adverse reaction to one of the lubricants. For more information, refer to the material safety data sheet for each lubricant .
2. Use a mild, detergent solution to clean the external surfaces of the library. Do not use abrasives, solvents, or alcohol-based cleaners.

Supplies needed:

- P/N 0223980 - IBM Lubricant #6
- Lint-free cloth

Note: See Chapter 14, “Parts Catalog”, on page 697 for the part number of the following parts:

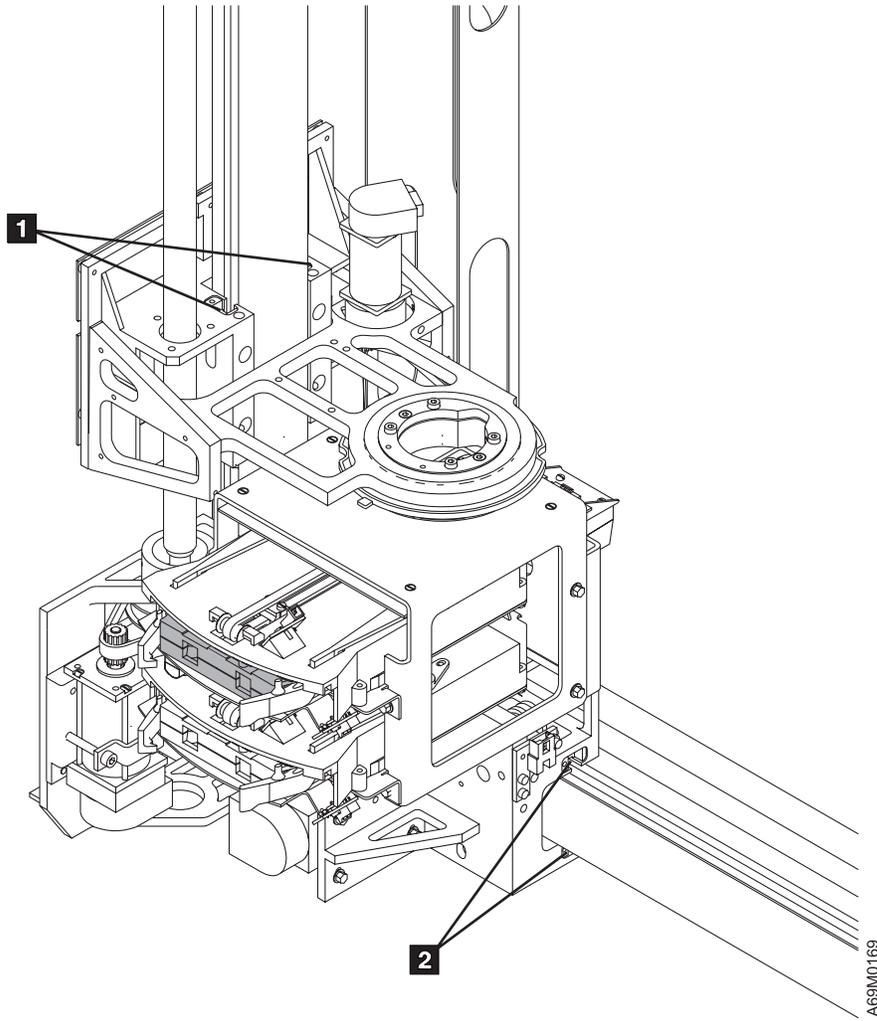
- Pivot Belt
- Y-Axis Drive Belt
- X-Axis Drive Belt

Perform the following procedure once a year (or every 500,000 meters of Y-axis travel) during a scheduled service call.

Note: To determine Y-axis travel, from the Main Menu, select Usage Statistics, then select Accessor Usage.

1. Lubricate the two wiper pads **1** on the top Y-axis (shown) and two on the bottom (not shown), using IBM Lubricant #6 (see Figure 174 on page 687).
2. Lubricate the two wiper pads **2** on each side of the X-axis (four, total), using IBM Lubricant #6.
3. Put a few drops of IBM Lubricant #6 on a cloth and wipe the top and bottom X-rail rods and the front and back Y-rail rods.
4. Inspect and, if indicated, replace the pivot belt, X-axis drive belt, and Y-axis drive belt. Refer to the procedures in this chapter.
5. Record the date and Y-axis meters traveled for this PM.

Date	Meters Traveled
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____



A69M0169

Figure 174. Lubrication Points

Chapter 13. Metric Conversion Tables

Use this section to convert values between the metric and the US standards. To convert other values that are not shown in the tables:

- From millimeters to inches, multiply millimeters by 0.03937 (Table 65)
- From millimeters to feet, multiply millimeters by 0.00328
- From centimeters to inches, multiply centimeters by 0.3937
- From centimeters to feet, multiply centimeters by 0.0328
- From meters to inches, multiply meters by 39.37
- From meters to feet, multiply meters by 3.2808 (Table 66 on page 694)
- From inches to millimeters, multiply inches by 25.4
- From inches to centimeters, multiply inches by 2.54 (Table 67 on page 694)
- From inches to meters, multiply inches by 0.0254
- From feet to millimeters, multiply feet by 304.801
- From feet to centimeters, multiply feet by 30.48 (Table 67 on page 694)
- From feet to meters, multiply feet by 0.3048 (Table 68 on page 694)
- From millimeters to centimeters, multiply millimeters by 0.10
- From centimeters to millimeters, multiply centimeters by 10.0
- From kilograms to pounds, multiply kilograms by 2.2046 (Table 69 on page 695)
- From pounds to kilograms, multiply pounds by 0.45359 (Table 70 on page 695)
- From Celsius to Fahrenheit, multiply degrees by 1.8, and add 32 (Table 71 on page 695)
- From Fahrenheit to Celsius, subtract 32, and multiply by .555 (Table 72 on page 696)

Table 65. Millimeters to Inches Conversion

MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.
1	0.039	11	0.433	21	0.827	31	1.220	41	1.614
2	0.078	12	0.472	22	0.866	32	1.259	42	1.653
3	0.118	13	0.512	23	0.905	33	1.299	43	1.693
4	0.157	14	0.551	24	0.945	34	1.338	44	1.732
5	0.196	15	0.590	25	0.984	35	1.378	45	1.771
6	0.236	16	0.629	26	1.024	36	1.417	46	1.811
7	0.275	17	0.669	27	1.063	37	1.456	47	1.850
8	0.315	18	0.708	28	1.102	38	1.496	48	1.889
9	0.354	19	0.748	29	1.142	39	1.535	49	1.929
10	0.3937	20	0.787	30	1.180	40	1.575	50	1.968

Table 66. Meters to Feet Conversion

M	FT	M	FT.	M	FT.	M	FT.
1	3.28	11	36.09	21	68.9	35	114.83
2	6.56	12	39.37	22	72.2	40	131.23
3	9.84	13	42.65	23	75.4	45	147.63
4	13.12	14	45.93	24	78.7	50	164.04
5	16.40	15	49.21	25	82	60	196.85
6	19.68	16	52.49	26	85.3	75	246.06
7	22.96	17	55.77	27	88.6	100	328.08
8	26.25	18	59.05	28	91.9	200	656.16
9	29.52	19	62.34	29	95.1	500	1640
10	32.81	20	65.61	30	98.42	1000	3280

Table 67. Inches/Feet to Centimeters Conversion. For millimeters, after converting inches to centimeters, move the decimal point one place to the right; so 1.0 in. = 25.4 mm. For meters, after converting inches to centimeters, move the decimal point two places to the left; so 48 in. = 1.2 m.

IN.(FT)	CM	IN.(FT)	CM	IN.(FT)	CM	IN.(FT)	CM
1	2.54	13	33.02	25	63.50	48(4)	121.92
2	5.08	14	35.56	26	66.04	60(5)	152.4(
3	7.62	15	38.10	27	68.58	72(6)	182.88
4	10.16	16	40.64	28	71.12	84(7)	213.36
5	14.34	17	43.18	29	73.66	96(8)	243.84
6	15.24	18	45.72	30	76.20	100(8.3)	254
7	17.78	19	48.26	31	78.74	108(9)	274.32
8	20.32	20	50.80	32	81.28	120(10)	304.8
9	22.86	21	53.34	33	83.82	132(11)	335.28
10	25.40	22	55.88	34	86.36	144(12)	365.76
11	27.94	23	58.42	35	88.90	156(13)	396.24
12(1)	30.48	24(2)	60.96	36(3)	91.44	168(14)	426.72

Table 68. Feet to Meters Conversion

FT	M	FT	M	FT	M	FT	M	FT	M
1	0.30	11	3.3	21	6.4	31	9.4	41	12.5
2	0.60	12	3.6	22	6.7	32	9.7	42	12.8
3	0.91	13	3.9	23	7.0	33	10	43	13.1
4	1.2	14	4.3	24	7.3	34	10.4	44	13.4
5	1.5	15	4.6	25	7.6	35	10.7	45	13.7
6	1.8	16	4.9	26	7.9	36	10.9	50	15.2
7	2.1	17	5.2	27	8.2	37	11.3	100	30.5
8	2.4	18	5.5	28	2.4	38	11.6	200	60.9
9	2.7	19	5.8	29	8.8	39	86	500	152.4
10	3.04	20	6.1	30	9.1	40	88	1000	304.8

Table 69. Kilograms to Pounds Conversion

KG	LB	KG	LB	KG	LB	KG	LB	KG	LB
1	2.2	11	24.3	21	46.3	31	68.3	45	99.2
2	4.4	12	26.5	22	48.5	32	70.5	50	110.2
3	6.6	13	28.6	23	50.7	33	72.7	75	165.3
4	8.8	14	30.8	24	52.9	34	74.9	100	220.5
5	11.0	15	33.0	25	55.1	35	77.2	200	440.9
6	13.2	16	35.3	26	66.1	36	79.4	250	551
7	15.4	17	37.5	27	77.2	37	81.6	500	1102
8	17.6	18	39.7	28	88.2	38	83.8	1000	2205
9	19.8	19	41.9	29	99.2	39	86	2000	4409
10	22.0	20	44.0	30	110.2	40	88.1	5000	11023

Table 70. Pounds to Kilograms Conversion

LB	KG	LB	KG	LB	KG	LB	KG
1	0.45	11	4.9	21	9.5	35	15.9
2	0.9	12	5.4	22	9.9	40	18.1
3	1.4	13	5.9	23	10.4	45	20.4
4	1.8	14	6.3	24	10.9	50	22.7
5	2.3	15	6.8	25	10.9	75	34.0
6	2.7	16	7.2	26	11.8	100	45.4
7	3.2	17	7.7	27	12.2	250	113.4
8	3.6	18	8.2	28	12.7	500	226.8
9	4.1	19	8.6	29	13.1	1000	453.6
10	4.5	20	9.1	30	13.6	2000	907.2

Table 71. Celsius to Fahrenheit Conversion

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-40	-40	9	48.2	19	66.2	29	84	39	102.2
0	32	10	50	20	68	30	86	40	104
1	33.8	11	51.8	21	69.8	31	87.8	41	105.8
2	35.6	12	53.6	22	71.6	32	89.6	42	107.6
3	37.4	13	55.4	23	73.4	33	91.4	43	109.4
4	39.2	14	57.2	24	75.2	34	93.2	44	111.2
5	41	15	59	25	77	35	95	45	113
6	42.8	16	60.8	26	79	36	96.8	50	122
7	44.6	17	62.6	27	81	37	98.6	100	212
8	46.4	18	64.4	28	82	38	100.4	180	356

Table 72. Fahrenheit to Celsius Conversion

°F	°C	°F	°C	°F	°C	°F	°C
-40	-40	40	4.4	80	26.6	105	40.5
-30	-34.4	45	7.2	85	29.4	110	43.3
-20	-28.9	50	10	90	32.2	115	46.1
-10	-23.3	55	12.8	95	35	120	48.8
0	-17.7	60	15.5	98.6	36.96	125	51.6
10	-12.2	65	18.3	100	37.7	130	54.4
20	-6.7	68	20	101	38.3	135	57.2
30	-1.1	70	21.1	102	38.9	140	60
32	0	72	22.2	103	39.4	212	100
35	1.7	75	23.9	104	40	355	179.2

Table 73. Mathematical Power to Common Term Conversion (American System)

Prefix Term	Equivalent (American) Ordinal Number	Mathematical Power
yotta	septillion	10^{24}
zetta	sextillion	10^{21}
exa	quintillion	10^{18}
peta	quadrillion	10^{15}
tera	trillion	10^{12}
giga	billion	10^9
mega	million	10^6
kilo	thousand	10^3
—	—	10
milli	thousandth	10^{-3}
micro	millionth	10^{-6}
nano	billionth	10^{-9}
pico	trillionth	10^{-12}

Chapter 14. Parts Catalog

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How to Use This Parts Catalog

- **SIMILAR ASSEMBLIES:** If two assemblies contain a majority of identical parts, they are broken down on the same list. Common parts are shown by one index number. Parts peculiar to one or the other of the assemblies are listed separately and identified by description.
- **AR:** (As Required) in the Units column indicates the quantity of the part is used as required.
- **NP:** (Non-Procurable) in the Units column indicates that the part is non-procurable and that the individual parts or the next higher assembly should be ordered.
- **NR:** (Not Recommended) in the Units column indicates that the part is procurable but not recommended for field replacement, and that the next higher assembly should be ordered.
- **R:** (Restricted) in the Units column indicates the part has a restricted availability.
- **INDENTURE:** The indenture is marked by a series of dots located before the parts description. The indenture indicates the relationship of a part to the next higher assembly. For example:

Indenture	Relationship of Parts (Description Column)
(No dots)	MAIN ASSEMBLY
(One dot)	• Detail parts of a main assembly
(One dot)	• Subassembly of the main assembly
(Two dots)	•• Detail part of a one-dot subassembly
(Two dots)	•• Subassembly of a one-dot subassembly
(Three dots)	••• Detail part of a two-dot subassembly

Assembly 1: Cover Assembly (Sample)

Asm-Index	Part Number	Units	Description
1-	2512667	1	Cover Assembly, Rear, Red
-	2512668	1	Cover Assembly, Rear, Yellow
-	2512669	1	Cover Assembly, Rear, Blue
-	2512670	1	Cover Assembly, Rear, Gray
-	2513714	1	Cover Assembly, Rear, White
			For next higher assembly, see 1-2 on page 15
-1	5373637	1	• Seal, Top
-2	5356429	2	• Clip, Retaining
-3	2513013	3	• Liner, Cover
-4	5373727	1	• Seal, Left Side
-5	5356429	3	• Clip, Retaining
-6	513668	2	• Catch, Cover
-7	81693	4	• Screw, Mach Bind Hd- 6-32, X 0.375 in.
-8	1847630	R	• Finger Stock Assembly
-9	1847602	NR	•• Channel, Finger Stock
-10	1847604	NR	•• Finger Stock, 2.0 in.
-11	5373639	AR	• Seal, Bottom
-12	5356429	2	• Clip, Retaining
-13		NP	• Cover, Rear (Without paint)

Table 74. Alphabetic Listing of Parts

Part Name	Part Number	Assembly Number Location
Adapter, Fibre Duplex (SC-SC)	19P0242	7
Adapter, Fibre Optic Bulkhead (SC-SC)	19P0913	7
Adapter, LC-LC	19P5424	7
Battery, Lithium (3 V dc)	35L0901	1
Belt, Gripper	35L0283	6
Belt, Pivot (old style)	5L0277	5
Belt, X-Axis	34G9629	3
Blocks, DLT Gripper Mounting	19P4457	6
Blocks, LTO Gripper Mounting	19P4454	6
Bracket, Frame-to-Frame	05H7832	1
Bracket, Operator Panel	35L0554	1
Bumper	61G9841	3, 4
Bumper, Door	94F6813	2
Bumper, Pivot	34G9352	5
Cable, AXY-to-XYC	34L3629	7
Cable, EPO	35L1209	7
Cable, Fibre Channel (SC-SC) [5 m (16.4 ft)]	03K9202	7
Cable, Fibre Channel (SC-SC) [13 m (42.7 ft)]	54G3386	7
Cable, Fibre Channel (SC-SC) [25 m (81 ft)]	03K9204	7
Cable, Fibre Channel (SC-SC) [61 m (200 ft)]	54G3390	7
Cable, Fibre Channel (LC-SC) [7 m (23 ft)]	11P3895	7
Cable, Fibre Channel (LC-SC) [13 m (43 ft)]	11P3896	7
Cable, Fibre Channel (LC-SC) [22 m (72 ft)]	11P3897	7
Cable, Fibre Channel (LC-SC) [61 m (200 ft)]	11P3900	7
Cable, Fibre Channel (LC-LC) [5 m (16.4 ft)]	19K1252	7
Cable, Fibre Channel (LC-LC) [13 m (43 ft)]	11P3880	7
Cable, Fibre Channel (LC-LC) [25 m (81 ft)]	19K1253	7
Cable, Fibre Channel (LC-LC) [61 m (200 ft)]	11P3884	7
Cable, Fibre Drive-to-Bulkhead SC-SC [2 m (6 ft)]	11P2227	7
Cable, Fibre Drive-to-Bulkhead LC-LC [2 m (6 ft)]	11P3878	7
Cable, FIC J1-to-XCP	08L9700	7
Cable, FIC J12-to-UEPO Switch and LED	08L9695	7
Cable, FIC-to-FIC Power	08L9698	7
Cable, FIC-to-FIC Signal	08L9699	7
Cable, FIC-to-OPC Card	08L9697	7
Cable, Gripper Cartridge, Sensors-to-PDC Card	35L1350	7
Cable, HD68-to-HD68 0.5 m (2 ft) SCSI	19P0051	7
Cable, HD68-to-HD68 5 m (16.5 ft) SCSI	19P0052	7

Table 74. Alphabetic Listing of Parts (continued)

	Cable, HD68-to-HD68 10 m (32.8 ft) SCSI	19P0053	7
	Cable, HD68-to-HD68 18 m (59 ft) SCSI	19P0097	7
	Cable, HD68-to-HD68 25 m (82 ft) SCSI	19P0054	7
	Cable, I/O Station (for Single I/O Station)	35L1006	2
	Cable, I/O Station (used when Lower I/O Station is installed)	19P1762	2
	Cable, I/O Station 1 to XIO Card	19P1762	7
	Cable, I/O Station 2 to XIO Card	19P1763	7
	Cable, Jumper, EPO (L32 frame only)	19P0556	7
	Cable, Lower I/O Station to XIO Card	19P1762	1
	Cable, Modem, 9-Pin to 25-Pin (for Remote Switch)	05H3352	7
	Cable, OPC J7-to-I/O Station (for Single Station I/O)	35L1006	7
	Cable, Operator Panel to XIO Card	19P1764	7
	Cable, Pivot Flex	35L0212	7
	Cable, Redundant EPO	35L1209	7
	Cable, Redundant Power (CPort Drive-Drive) (DLT only)	19P3026	7
	Cable, Redundant Power (N+1)	19P1223	7
	Cable, 15.2 m (50 ft), RS-232 Null Modem — Library to Switch (DB9F-to-DB9F)	19P4693	7
	Cable, 15.2 m (50 ft), RS-232 —Library or Switch to Modem (DB9F-to-DB25M)	19P4692	7
	Cable, RS-232 Serial 9-Pin to 9-Pin (male and female) (CE tool)	19P1061	7
	Cable, RS-422, CE Test	19P1077	7
	Cable, RS-422 Interface, MCP-to-Drives	19P0055	7
	Cable, SCSI Host Interface (VHDCI to VHDCI) 4.5 m (14.8 ft)	19P2499	7
	Cable, SCSI Host Interface (VHDCI to VHDCI) 10 m (32.8 ft)	19P0881	7
	Cable, SCSI Host Interface (VHDCI to VHDCI) 20 m (66 ft)	19P1904	7
	Cable, SCSI Host Interface (VHDCI to VHDCI) 25 m (82 ft)	19P2500	7
	Cable, SCSI (VHDCI to VHDCI, Daisy Chain, or Drive-to-Drive) 0.3 m (1 ft)	19P3332	7
	Cable, Serial 9-Pin to 9-Pin for Remote Switch (female-to-female)	19P1001	7
	Cable, VHDCI-to-HD68 10 m (32.8 ft) SCSI	19P0048	7
	Cable, VHDCI-to-HD68 20 m (65.6 ft) SCSI	19P0049	7
	Cable, VHDCI-to-HD68 25 m (82 ft) SCSI	35L1977	7
	Cable, VHDCI-to-HD68 4.5 m (14.8 ft) SCSI	19P0050	7
	Cable, VHDCI-to-HD68 0.3 m (1 ft) SCSI Cable/Interposer	19P0482	7
	Cable, VHDCI-to-VHDCI 10 m (32.8 ft) SCSI	09L0881	7
I	Cable, X-Axis Flex (1 or 2 frames)	19P5789	7
I	Cable, X-Axis Flex (3 to 6 frames)	19P5788	7
I	Cable, X-Axis Flex (7 to 14 frames)	19P6036	7
I	Cable, X-Axis Flex (8 to 16 frames)	19P6035	7
	Cable, XYC-to-Home Sensor	34L3625	7
	Cable, Y-Axis Flex	61G9685	7

Table 74. Alphabetic Listing of Parts (continued)

	Card, ACC	19P0495	1
	Card, AXY	35L0007	1
	Card, FIC	35L1207	1
	Card, PDC	35L0822	6
	Card, XCP	35L0832	1
	Card, XIO	19P3544	1
	Cartridge, CE Diagnostic, DLT-8000	19P4074	7
	Cartridge, CE Diagnostic, LTO (L1 & L2)	19P0405	7
	Cartridge, Cleaning, DLT-8000	19P3835	7
	Cartridge, Universal Cleaning, LTO (L1 & L2)	35L2086	7
	Caster, Machine	31L7521	1
	Clamp, Bar Support Mounting	19P3665	6
	Clamp, Door Mounting, LTO	94F6807	2
	Control Port, DLT HVD (SCSI)	19P5574	1
	Control Port, DLT LVD (SCSI)	19P5573	1
	Cord, Bifurcated FCA-to-Drive Power	09L5361	7
	Cord, Line, 1.8 m (6 ft) Chicago (water tight)	46F4593	7
	Cord, Line, 4.3 m (14 ft) U.S.A. and World Trade (250 V ac, 30A, twistlock)	11F0113	7
	Cord, Line, 4.3 m (14 ft) U.S.A. and World Trade (water tight)	46F4594	7
	Cord, Line, World Trade (hardwired)	46F6063	7
I	Cord, Line, 4.3M (14 ft) 220V Watertight Connector (with FC 1901)	86F2646	7
I	Cord, Line, 4.3M (14 ft) 220V NON-Watertight Connector (with FC 1901)	14F1550	7
I	Cord, Line, 4.3M (14 ft) 110V Line Cord (with FC 1901)	12J5117	7
I	Cord, Line, 1.8M (6 ft) 220V Watertight Connector (Chicago) (with FC 1901)	86F2645	7
I	Cord, Line, 1.8M (6 ft) 110V Non-Watertight Connector (Chicago) (with FC 1901)	12J5115	7
I	Cord, Line, 4.3M (14 ft) 220V NON-Connector (with FC 1901, WTC ONLY)	36L8823	7
I	Cord, Power, PDU-to-FCA (with FC 1901)	18P7979	7
	Cover, Cable Trough, X-Axis D32	35L0185	1
	Cover, Cable Trough, X-Axis L32	35L0192	1
I	Liner, Trough	05H7979	1
	Damper, Door	61G9923	1
	Detent Arm Assembly	34G9360	5
	Drive Canister, DLT HVD (SCSI)	19P3617	1
	Drive Canister, DLT LVD (SCSI)	19P3615	1
	Drive Canister, LTO Ultrium-1 (L1) (Fibre)	19P3623	1
	Drive Canister, LTO Ultrium-1 (L1) HVD (SCSI)	19P3621	1
	Drive Canister, LTO Ultrium-1 (L1) LVD (SCSI)	19P3619	1
	Drive Canister, LTO Ultrium-2 (L2) (Fibre)	18P6510	1
	Drive Canister, LTO Ultrium-2 (L2) HVD (SCSI)	18P6508	1
	Drive Canister, LTO Ultrium-2 (L2) LVD (SCSI)	18P6506	1

Table 74. Alphabetic Listing of Parts (continued)

	Drive Tray, LTO Ultrium-1 (L1) Fibre Channel	19P2498	1
	Drive Tray, LTO Ultrium-1 (L1) HVD	19P4713	1
	Drive Tray, LTO Ultrium-1 (L1) LVD	19P4711	1
I	Drive Tray-to-Canister Kit, LTO Ultrium-1 (L1) LVD	18P7354	1
I	Drive Tray-to-Canister Kit, LTO Ultrium-1 (L1) HVD	18P7355	1
I	Drive Tray-to-Canister Kit, LTO Ultrium-1 (L1) Fibre Channel	18P7356	1
	FCA (220V only)	35L0121	1
	FCA (110V or 220V)	35L2092	1
	Power Distribution Unit (PDU) used with FC 1901	09N9669	1
	Fixed Tray	19P5572	1
	Fuse, 12 A	35L1255	1
	Fuse, 5 A	35L1254	1
	Gripper Assembly, DLT	19P4462	6
	Gripper Assembly FRU Kit, LTO	19P4463	6
	Gripper/Pivot Assembly	NP	1, 5, 6
	Holder, Logical Library Label	19P0325	1
	I/O Station, Lower (18 Cartridge), DLT-8000	19P4468	1
	I/O Station, Lower (20 Cartridge), LTO	19P4470	1
	I/O Station, Upper (10 Cartridge), LTO	19P5576	2
	Jackscrew, Leveling	35L0401	1
	Key, Front Door	61G9923	1
	Key, Rear Door	62G1580	1
	Label, Caution, Current Leakage	50G1043	1
	Label, Caution, Power Cord	05H1825	1
	Label, Logical Library Barcode	19P0035	1
	Label, Bar Code - Empty Cell / Scanner Calibration	19P0476	1
	Latch, Front Door	61G9923	1
	Latch, Rear Door	62G1557	1
	Leader Replacement Kit (DLT-8000 Drive)	09L5319	7
I	Media Changer Pack (MCP), with Ethernet support (L32) for IBM Specialist (formerly StorWatch)	19P5350	1
I	Media Changer Pack (MCP), without Ethernet support (Dxx frames only)	19P0496	1
	Motor Driver Assembly (MDA)	19P5067	1
	Motor/Tach Assembly, Gripper	35L0287	5
	Motor/Tach Assembly, Pivot (old style)	35L0274	5
	Motor, X-Axis	35L0244	3
	Motor, Y-Axis	35L0306	4
	Nut, Leveling Jackscrew	50G0401	1
I	Operator Panel Assembly	19P5354	1
	Overlay, FIC Card	35L0494	1
	Pad, Carpet	05H7004	1

Table 74. Alphabetic Listing of Parts (continued)

Pad, Leveling Jackscrew	05H2179	1
Pinion Shaft Assembly	35L0240	3
Power Supply (used with DLT, Control Port, or LTO)	37L0311	1
Power Supply, 37 V dc	08L9691	1
Relocation Kit <ul style="list-style-type: none"> • Main Component • X-Y Picker Anchor • LTO Packing Kit (one per drive if drive removal label is present in your L32 or D32) • D32/D42 Only - Foam Bumpers and Cable Ties 	<ul style="list-style-type: none"> • 7334847 • 05H1869 • 7354441 • 7354056 	7
Rod, X-Axis Bearing Way (base frame only)	34G9620	3
Rod, X-Axis Bearing Way (expansion frame only)	05H8105	3
Roller, Guide (urethane)	34G9599	4
Scanner, Bar Code	19P0493	1
Sensor, Calibration	35L1766	6
Sensor, Door or Solenoid	05H8407	2, 4
Sensor, Home, X-Axis	05H8407	3
Sensor, I/O Door Closed/Locked	05H8407	1
Sensor, RCP3 Cartridge Present	35L0828	6
Sensor, TCP3 Cartridge Present	35L0830	6
Solenoid, Door Locked	94F6802	2
Spacer Bar	19P3664	6
Spring (X-axis, only)	34G9363	4
Spring (X-axis and Y-axis)	61G9699	3, 4
Spring Clip, Storage Cell Tray	19P0254	1
Spring, Detent Arm	34G9363	5
Spring, Door	35L1491	2
Spring, Toggle Stop, LTO	35L0778	2
Spring Clip Kit, L1, LTO	18P7835	2
Solenoid, I/O	94F6802	1
Switch, Door Interlock	35L1725	1
Switch, Power On	35L0560	1
Terminator, Inline SCSI	19P0378	7
Terminator, HD68 SCSI HVD	61G8324	7
Terminator, HD68 SCSI LVD/SE	09L5067	7
Terminator, VHDCI (HVD)	09L0877	7
Terminator, VHDCI (LVD)	34L3926	7
Tray, Storage Cell (LTO)	35L0170	1
Tray, (LTO) Top Cap	35L0180	1
Tray, (DLT) Storage Cell (with tabs)	19P1907	1
Tray, (DLT) Storage Cell (without tabs)	19P1908	1
Tray, (DLT) Top Cap	19P1909	1

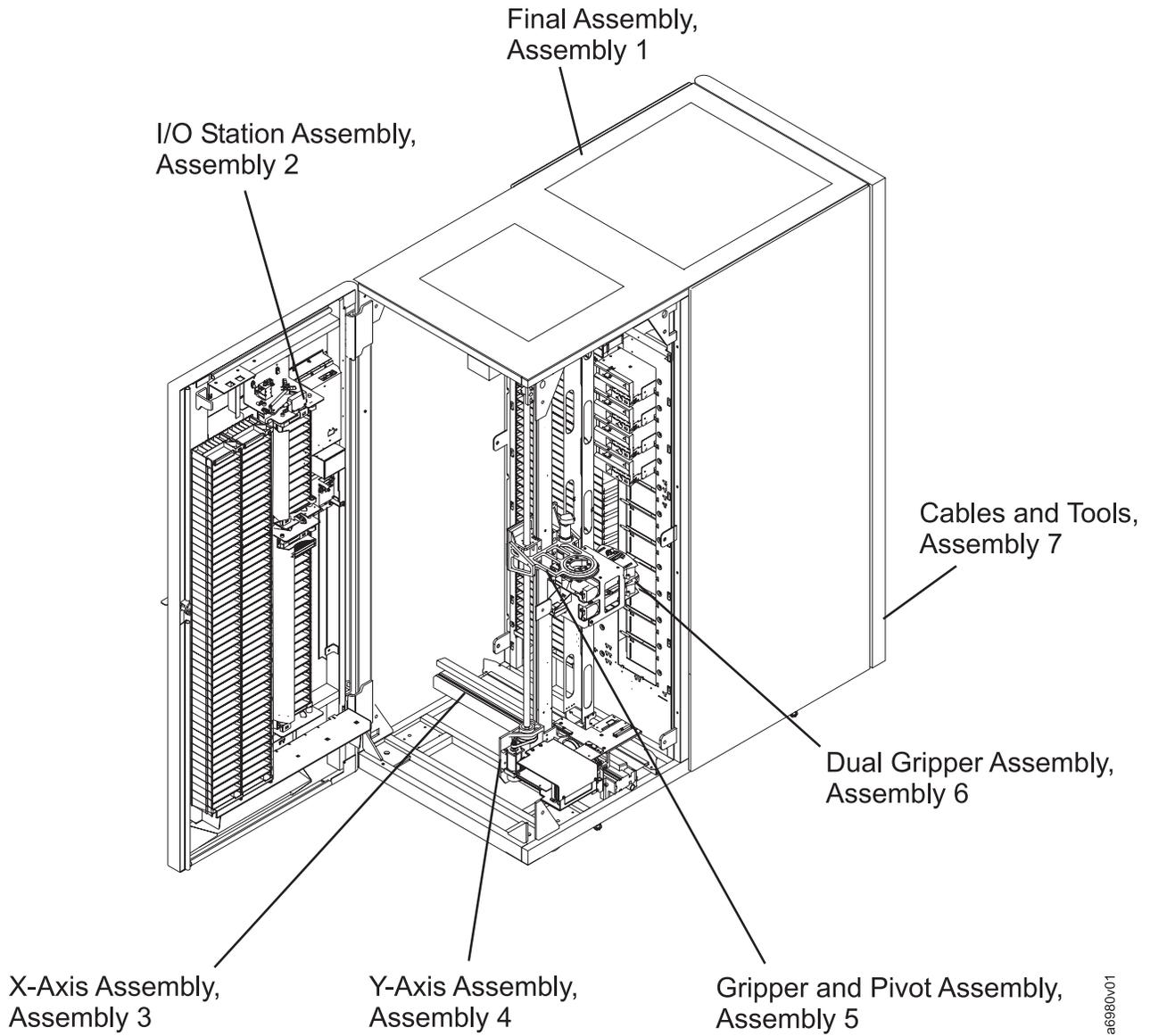
Table 74. Alphabetic Listing of Parts (continued)

	Wiper	61G9696	3, 4
I	Wrap Plug, HVD SCSI (Trays Only)	19P1213	7
I	Wrap Plug, LVD SCSI (Trays Only)	19P0481	7
	Wrap Plug, RS-422	19P0519	7
	Wrap Tool, Smart SCSI	19P4280	7
	Wrap Plug, Fibre (SC)	08L9459	7
	Wrap Plug, Fibre (LC)	11P3847	7
	X-Axis Assembly	35L0237	1, 4
	XCP Card	35L0832	1
	X-Rail Assembly, D-Frame	34G9611	3
	X-Rail Assembly, L-Frame	35L0467	3
	X-Rail, Upper (D32)	35L0169	1
	Y-Axis Assembly	35L0238	1, 4

Assemblies List

Dual Gripper Assembly	724
Final Assembly, L32/D32/D42	708
Gripper and Pivot Assembly	722
Miscellaneous Cables and Tools	726
Upper I/O Station Assembly	716
X-Axis Assembly	718
Y-Axis Assembly	720

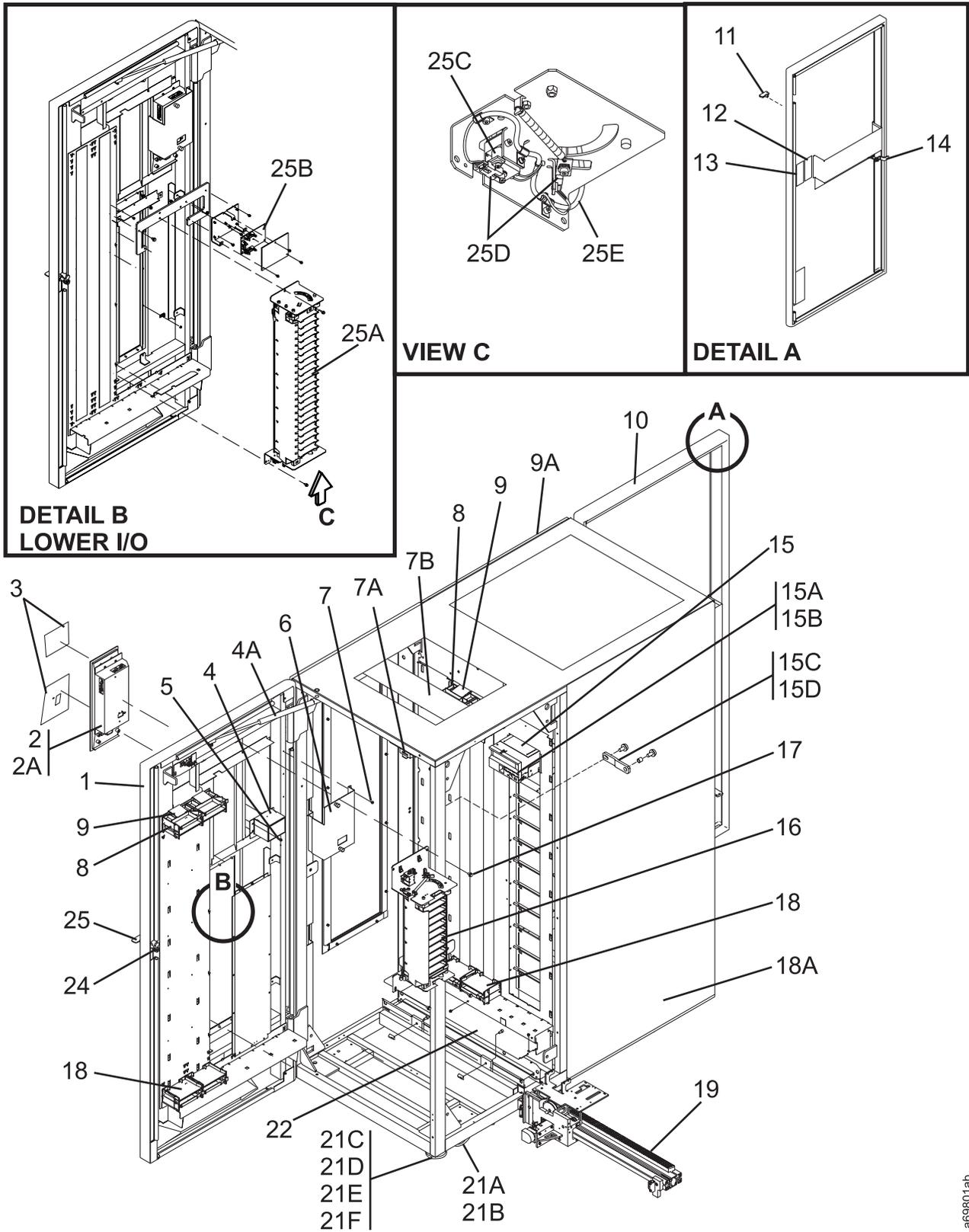
Visual Index I Model L32/D32



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Catalog Section

Assembly 1: Final Assembly, L32/D32/D42



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Assembly 1: (continued)

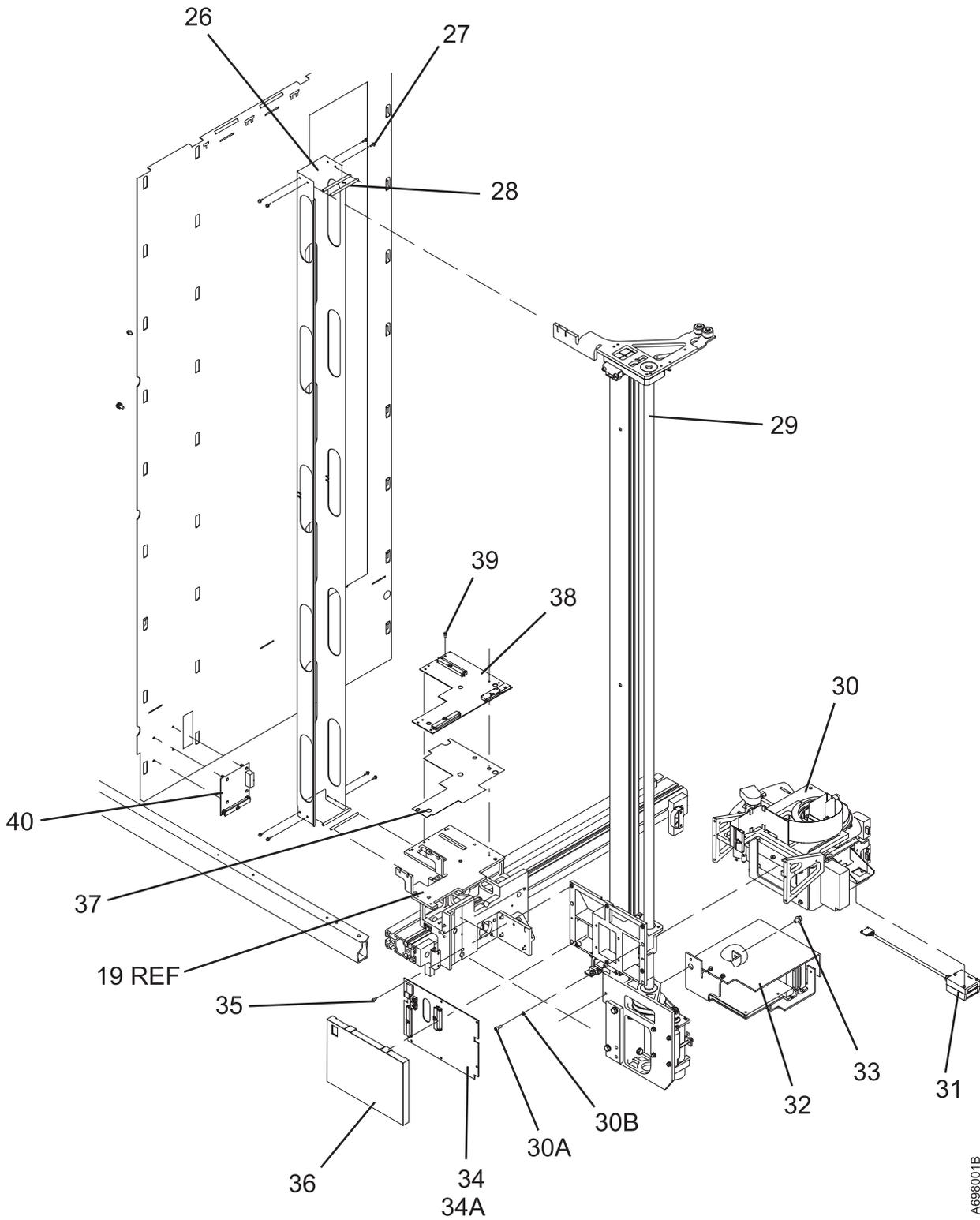
Asm-Index	Part Number	Units	Description
1-		NP	Final Assembly, L32/D32/D42 (Sheet 1 of 3)
-1		NP	• Door, Front
-2	19P5354	1	• Operator Panel Assembly
-2A	35L0901	1	• Battery, Lithium (3 V dc) (used on OPC)
-3		NP	• Label, Operator Panel
-4	35L0560	1	• Switch, Power On
-4A	61G9923	AR	• Damper, Door
-4A	61G9924	AR	• Ball Stud
-4A	35L0410	AR	• Ball Stud Nut
-5	1624764	3	• Screw, Flng Hd Hex, M4 X 6 mm
-6	35L0554	NP	• Bracket, Operator Panel
-7	1624764	3	• Screw, Flng Hd Hex, M4 X 6 mm
-7A	35L1725	AR	• Switch, Door Interlock
-7B	35L0169	AR	• Upper X-Rail (L32)
-7B	35L0182	AR	• Upper X-Rail (D32) (not shown)
-8	35L0180	AR	• Storage Cell Tray, Top (LTO)
-8	19P1909	AR	• Storage Cell Tray, Top (DLT)
-9	19P0254	NP	• Spring Clip, Storage Cell Tray (LTO and DLT)
-9A		NP	• Cover, Rear Side
-10		NP	• Door, Rear
-11	62G1580	1	• Key, Rear Door
-12	05H1825	1	• Label, Caution, Power Cord
-13	50G1043	1	• Label, Caution, Current Leakage
-14	62G1557	1	• Latch, Rear Door
-15		AR	• Drive Tray For detail breakdown, see item 48.
-15A	19P0325	AR	• Holder, Logical Library Label
-15B	19P0035	AR	• Barcode Label, Logical Library (sheet of all IDs)
I -15B	19P0476	AR	• Label, Bar Code - Empty Cell / Scanner Calibration
-15C	05H7832	AR	• Bracket, Frame-to-Frame
-15D	1624790	AR	• Screw, M6 x 12 mm
-16	19P2527	1	• I/O Station, Upper (10 Cartridge), LTO For detail breakdown, see "Assembly 2: Upper I/O Station Assembly" on page 716.
-17	1624788	4	• Screw, Flng Hd Hex, M6 X 8 mm
-18	35L0170	AR	• Tray, Storage Cell (LTO)
-18	35L0180	AR	• Tray, (LTO) Top Cap
-18	19P1907	AR	• Tray, (DLT) Storage Cell (with tabs)
-18	19P1908	AR	• Tray, (DLT) Storage Cell (without tabs)
-18	19P1909	AR	• Tray, (DLT) Top Cap
-18A		NP	• Cover, Rear Side
-18A		NP	• Cover, Rear Side
-19	35L0237	1	• X-Axis Assembly For detail breakdown, see "Assembly 3: X-Axis Assembly" on page 718.
-21A	31L7521	AR	• Caster, Machine
-21B	1621832	NP	• Screw, M6 x 16 (with washers)
-21C	35L0401	AR	• Jackscrew, Leveling
-21D	50G0401	AR	• Nut, Leveling Jackscrew
-21E	05H2179	AR	• Pad, Leveling Jackscrew
-21F	05H7004	AR	• Pad, Carpet
-22	35L0192	NP	• Cover, Cable Trough, X-Axis L32
-22	35L0185	NP	• Cover, Cable Trough, X-Axis D32
-22	05H7979	NP	• Liner, Trough

Assembly 1: (continued)

Asm-Index	Part Number	Units	Description
-24	61G9923	1	• Latch, Front Door
-25	61G9870	1	• Key, Front Door
-25A	19P4470	1	• I/O Station, Lower (20 Cartridge), LTO
-25A	19P4468	1	• I/O Station, Lower (18 Cartridge), DLT-8000
-25B	19P3544	1	• Card, XIO
-25C	94F6802	1	• Solenoid, I/O
-25D	05H8407	1	• Sensor, I/O Door Closed/Locked
-25E	19P1762	1	• Cable, Lower I/O Station to XIO Card

Assembly 1: (continued)

Assembly 1: (continued)

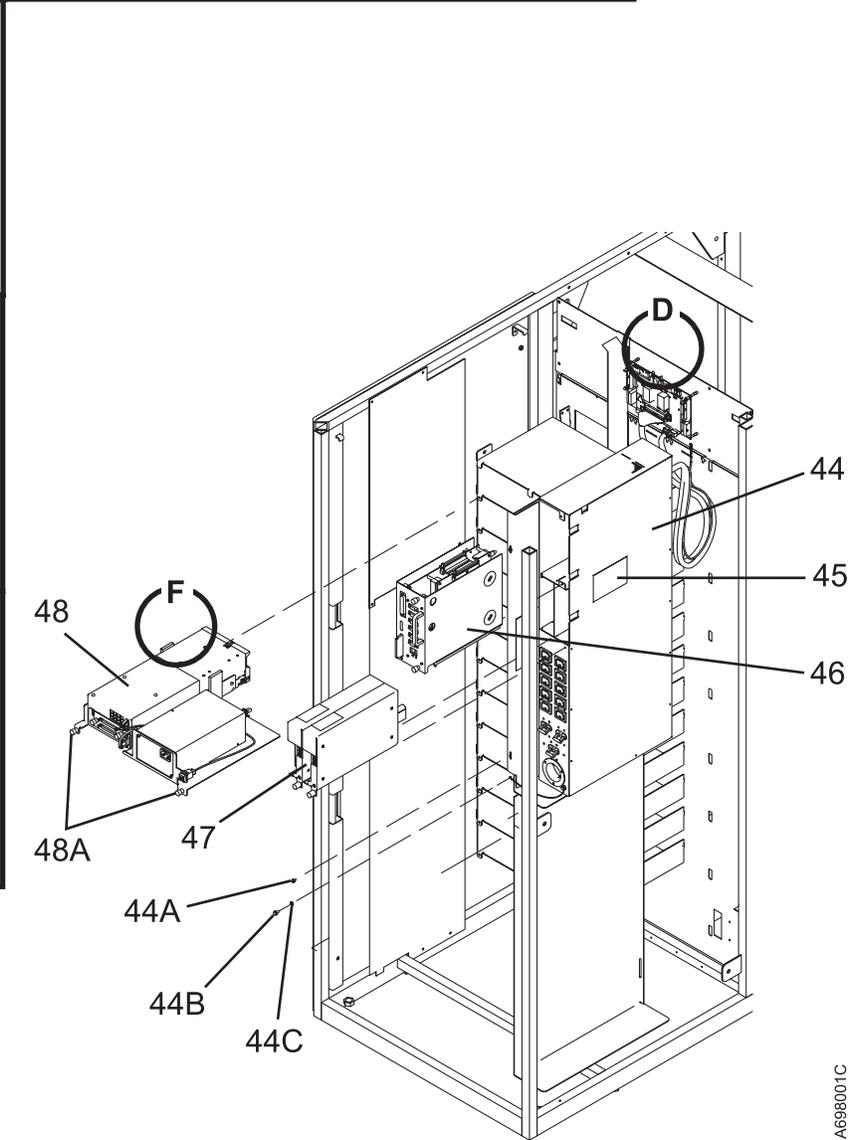
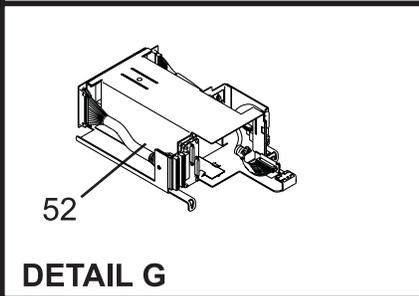
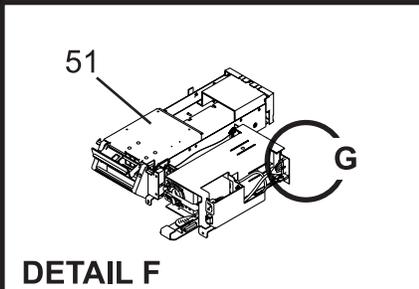
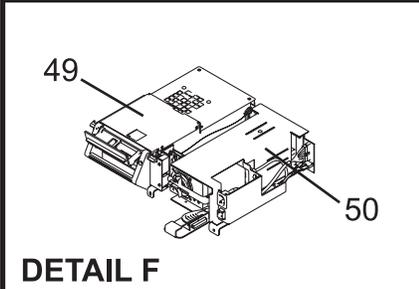
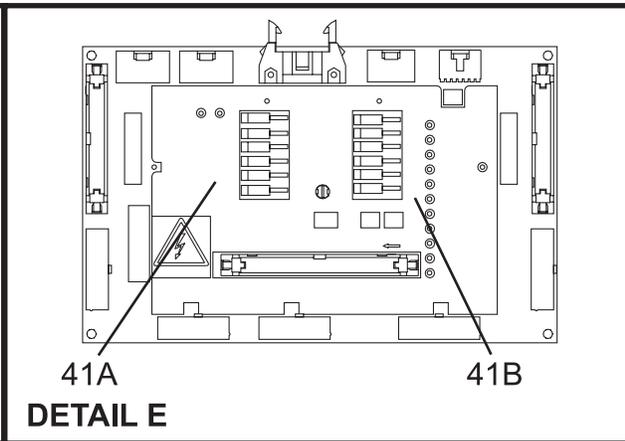
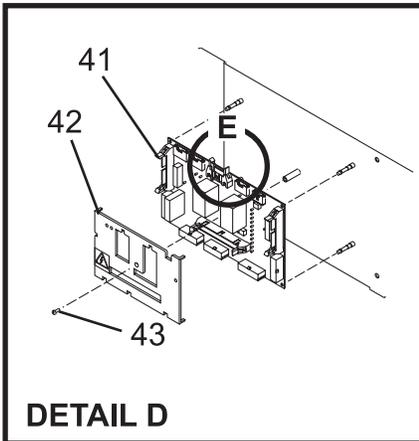


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Assembly 1: (continued)

Asm-Index	Part Number	Units	Description
1-		NP	Final Assembly, L32/D32/D42 (Sheet 2 of 3)
-26		NP	• Channel, Y-Cable
-27		NP	• Screw, Flng Hd Hex, M3 X 8 mm
-28		NP	• Spacer, Channel, Y-Cable
-29	35L0238	1	• Y-Axis Assembly For detail breakdown, see "Assembly 4: Y-Axis Assembly" on page 720
-30		NP	• Gripper/Pivot Assembly For detail breakdown, see "Assembly 5: Gripper and Pivot Assembly" on page 722
-30A		NP	• Screw, Soc Hd Hex, M4 X 10 mm
-30B		NP	• Lockwasher, M4
-31	19P0493	1	• Scanner, Bar Code Calibration Label PN follows
-31X	19P0476	AR	• Scanner Barcode Label Calibration Strip (L32 Frame above Drive 1)
-32	19P5067	1	• Motor Driver Assembly (MDA)
-33		NP	• Screw, Flng Hd Hex, M5 X 8 mm
-34	19P0495	1	• Card, ACC
-34A	35L0901	1	• Battery, Lithium (3 V dc) (Used on ACC)
-35		NP	• Screw, Soc Hd Hex, M3 X 6 mm
-36		NP	• Cover, ACC Card
-37		NP	• Insulator, AXY Card
-38	35L0007	AR	• Card, AXY
-39		8	• Screw, Flng Hd Hex, M3 X 6 mm
-40	35L0832	1	• Card, XCP

Assembly 1: (continued)

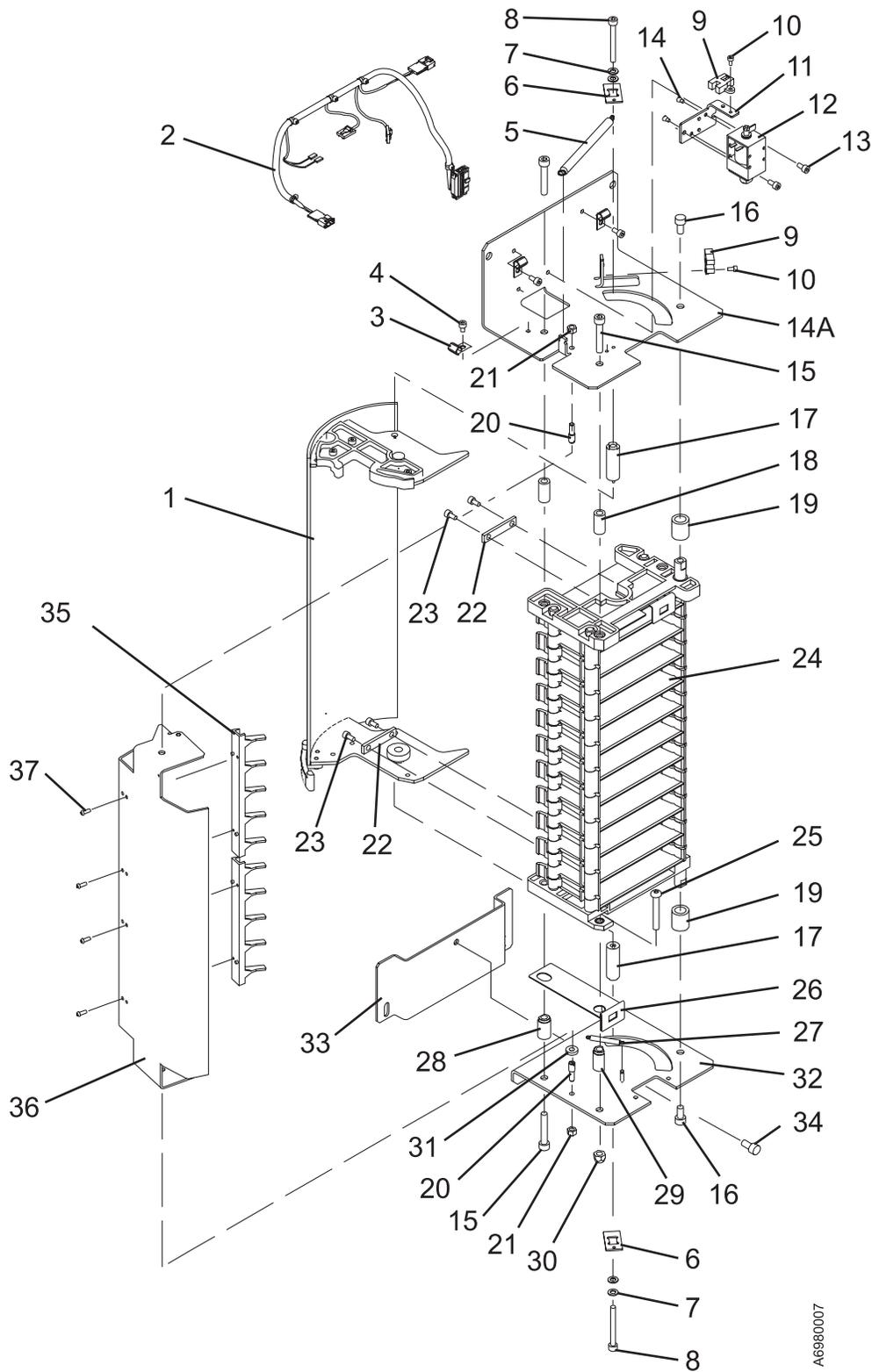


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Assembly 1: (continued)

Asm-Index	Part Number	Units	Description
1-		NP	Final Assembly, L32/D32/D42 (Sheet 3 of 3)
-41	35L1207	1	• Card, FIC
-41A	35L1255	8	• Fuse, 12 A (Used in all 6 positions of fuse block F2, and the top 2 positions of fuse block F1)
-41B	35L1254	4	• Fuse, 5 A (Used in bottom 4 positions of fuse block F1)
-42	35L0494		• Overlay, FIC Card
-43		4	• Screw, Slotted Pan Hd, M3 X 8 mm
-44	35L0121	1	• FCA (220V only)
-44	35L2092	1	• FCA (110V or 220V) (Without MCP and 37 V power supplies)
I -44	09N9669	1	• Power Distribution Unit (PDU) Only used on frames with FC 1901 (Dual AC Line Cords)
-44A		4	• Screw, Flng Hd Hex, M4 X 6 mm
-44B		2	• Screw, Washer Hd Thd Form, M5 X 10 mm
-44C		1	• Lockwasher, Ext Tooth, 4.3 ID X 8 mm OD
-45		NP	• Label, FCA
-46	19P5350	1	• Media Changer Pack (MCP) with Ethernet support (L32) for IBM Specialist (formerly StorWatch)
I -46	19P0496	1	• Media Changer Pack (MCP) without Ethernet support (Dxx frames only)
-47	08L9691	AR	• Power Supply, 37 V dc
-48	19P2498	AR	• Drive Tray, LTO Ultrium-1 (L1) Fibre Channel
-48	19P4713	AR	• Drive Tray, LTO Ultrium-1 (L1) HVD
-48	19P4711	AR	• Drive Tray, LTO Ultrium-1 (L1) LVD
-48A	19P4641	2	• Thumbscrew
-49	19P5574	AR	• Control Port, DLT HVD (SCSI)
-49	19P5573	AR	• Control Port, DLT LVD (SCSI)
-50	37L0311	AR	• Power Supply (Used with DLT, Control Port, or LTO)
-51	19P3617	AR	• Drive Canister, DLT HVD (SCSI)
-51	19P3615	AR	• Drive Canister, DLT LVD (SCSI)
-51	19P3623	AR	• Drive Canister, LTO Ultrium-1 (L1) (Fibre)
-51	19P3621	AR	• Drive Canister, LTO Ultrium-1 (L1) HVD (SCSI)
-51	19P3619	AR	• Drive Canister, LTO Ultrium-1 (L1) LVD (SCSI)
-51	18P6510	AR	• Drive Canister, LTO Ultrium-2 (L2) (Fibre)
-51	18P6508	AR	• Drive Canister, LTO Ultrium-2 (L2) HVD (SCSI)
-51	18P6506	AR	• Drive Canister, LTO Ultrium-2 (L2) LVD (SCSI)
I -51	18P7354	AR	• Drive Kit (Tray-to-Canister), LTO Ultrium-1 (L1) LVD (SCSI) (Drive Canister LVD, Power Tray Asm with power supply, HD68-to-VHCDI interposer cable (2x), Redundant Pwr Cable, SCSI Terminator, Instructions)
I -51	18P7355	AR	• Drive Kit (Tray-to-Canister), LTO Ultrium-1 (L1) HVD (SCSI) (Drive Canister HVD, Power Tray Asm with power supply, HD68-to-VHCDI interposer cable (2x), Redundant Pwr Cable, SCSI Terminator, Instructions)
I -51	18P7356	AR	• Drive Kit (Tray-to-Canister), LTO Ultrium-1 (L1) (Fibre) (Drive Canister FIBRE, Power Tray Asm with power supply, Redundant Pwr Cable, Instructions)
-52	19P5572	AR	• Fixed Tray (Without Hot Swap Power Supply or Drive Canister)

Assembly 2: Upper I/O Station Assembly

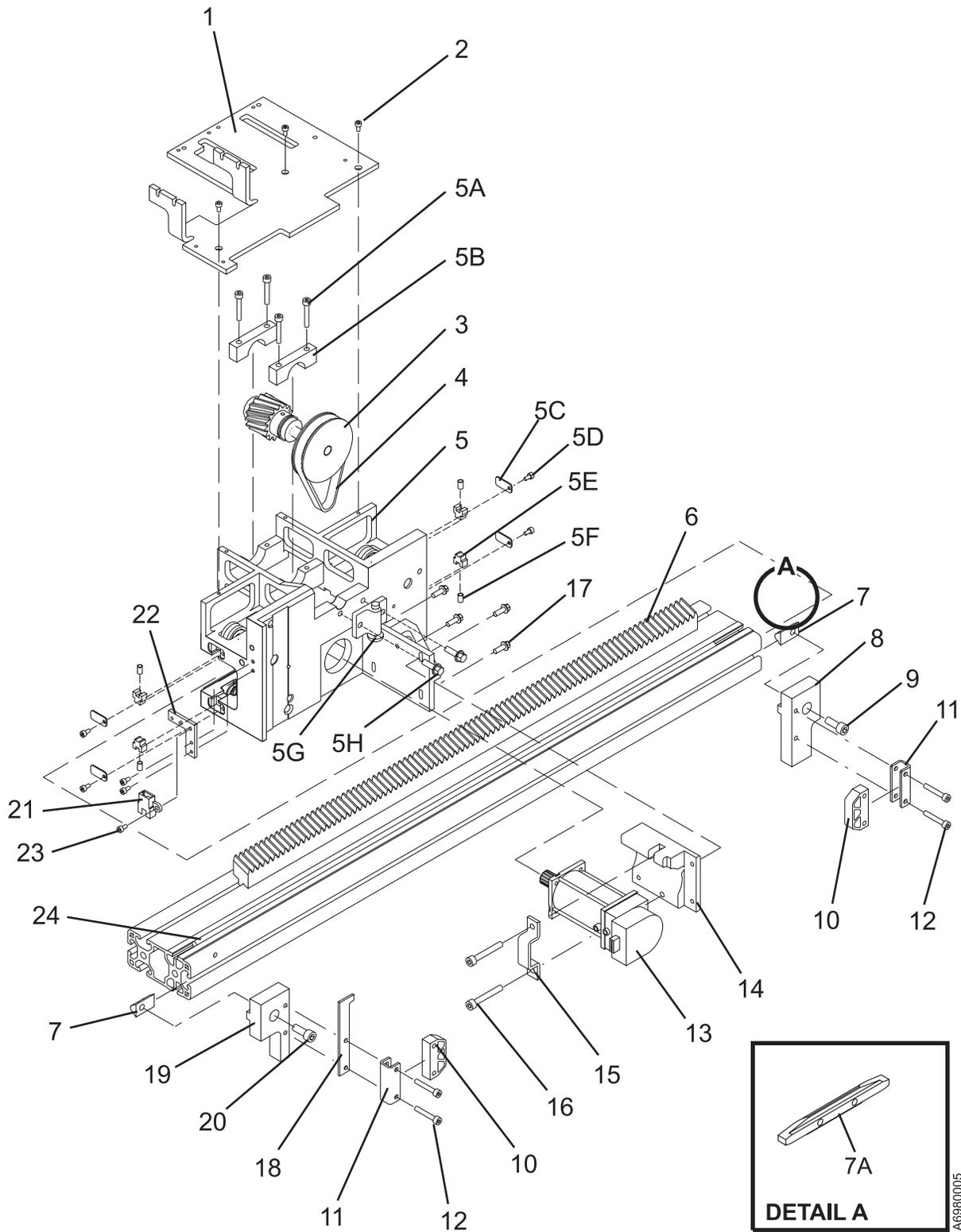


A6980007

Assembly 2: (continued)

Asm-Index	Part Number	Units	Description
2-	19P5576	1	Upper I/O Station Assembly (10 Cartridge) LTO For next higher assembly, see 1-16 on page 709
-1		NP	• Door Assembly
-2	35L1006	1	• Cable, I/O Station (used with Single I/O Station)
-2	19P1762	1	• Cable, I/O Station (used when Lower I/O Station is installed)
-3		NP	• P-Clamp, Cable Mounting
-4		NP	• Screw, Soc Hd Cap, M4 X 8 mm
-5	35L1491	1	• Spring, Door
-6		NP	• Flag, Door Sensor
-7		NP	• Washer, Flat, M5
-8		NP	• Screw, Soc Hd Cap, M5 X 45 mm
-9	05H8407	2	• Sensor, Door or Solenoid
-10		NP	• Screw, Soc Hd Cap, M3 X 8 mm
-11		NP	• Bracket, Solenoid Mounting
-12	94F6802	1	• Solenoid, Door Locked
-13		NP	• Screw, Soc Hd Cap, M4 X 8 mm
-14		NP	• Screw, Slotted Flat Hd, M3 X 6 mm
-14A		NP	• Bracket, Upper Mounting
-15		NP	• Screw, Soc Hd Cap, M6 X 35 mm
-16		NP	• Screw, Soc Hd Cap, M6 X 12 mm
-17		NP	• Spacer, Door Flag
-18		NP	• Spacer, Bracket/Cells
-19	94F6813	2	• Bumper, Door
-20		NP	• Pin, Toggle
-21		NP	• Nut, Hex, M5
-22	94F6807	2	• Clamp, Door Mounting, LTO
-23		NP	• Screw, Soc Hd Cap, M4 X 8 mm
-24		NP	• I/O Cells, 10-Cartridge (LTO)
-25		NP	• Screw, Button Hd, M6 X 40 mm
-26		NP	• Bracket, Lower Fiducial
-27	35L0778	1	• Spring, Toggle Stop, LTO
-28		NP	• Spacer, Shoulder
-29		NP	• Spacer, Flat
-30		NP	• Locknut, M6
-31		NP	• Washer
-32		NP	• Bracket, Lower Mounting
-33		NP	• Bracket, Bottom Adapter
-34		NP	• Screw, Soc Hd Cap, M6 X 12 mm
-35		NP	• Fingers, Toggle
-36		NP	• Bracket, Toggle Stop
-37		NP	• Screw, M3 X 8 mm

Assembly 3: X-Axis Assembly

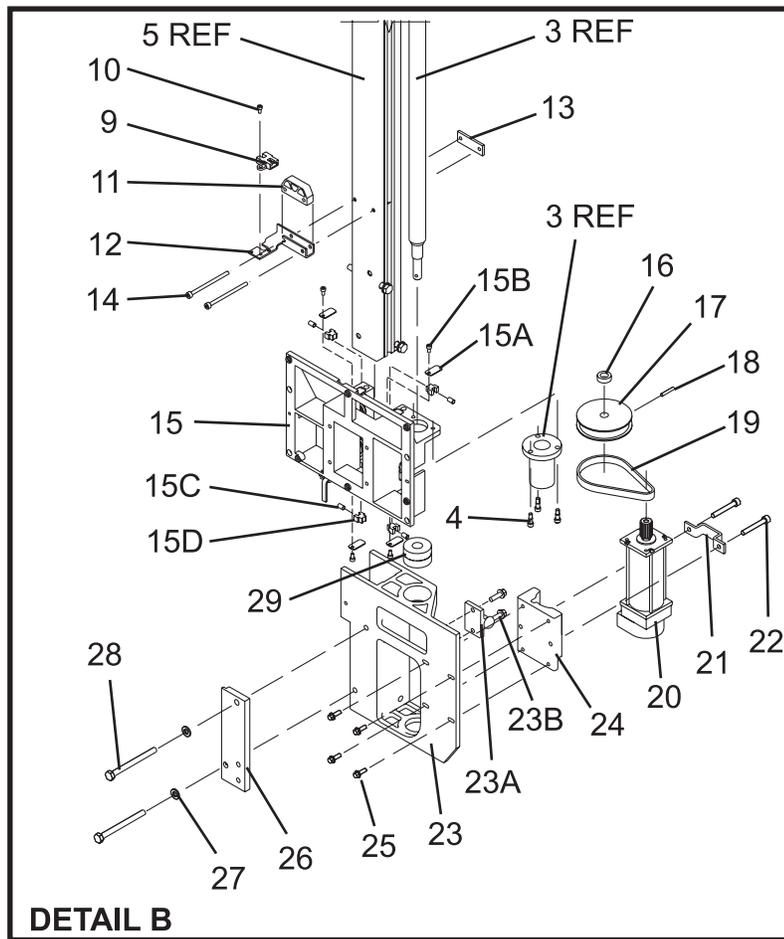
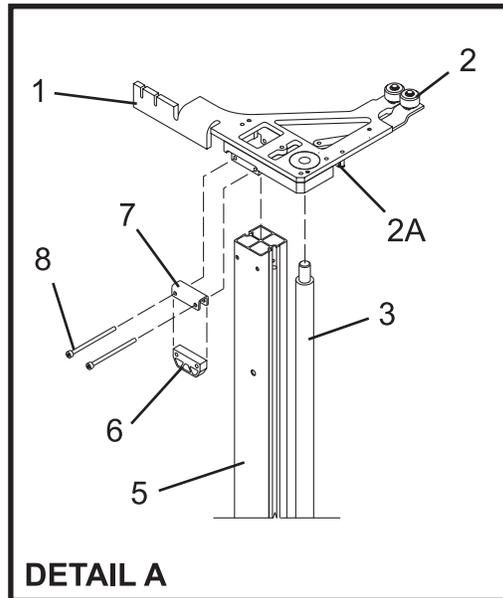
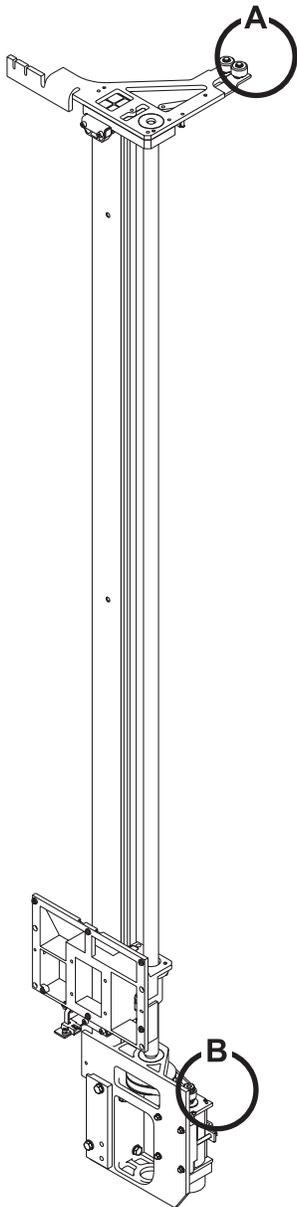


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Assembly 3: (continued)

Asm-Index	Part Number	Units	Description
3-		NP	X-Axis Assembly For next higher assembly, see 1-19 on page 709
-1		NP	• Plate, Card Support
-2	50G0108	6	• Screw, Soc Hd Cap, M3 X 6 mm
-3	35L0240	1	• Pinion Shaft Assembly
-4	34G9629	1	• Belt, X-Axis
-5		NP	• X-Axis Bearing Assembly
-5A		NP	• • Block
-5B		NP	• • Screw, Soc Hd Cap, M4 X 25 mm
-5C		NP	• • Plate
-5D		NP	• • Screw
-5E	61G9696	4	• • Wiper
-5F	61G9699	4	• • Spring
-5G		NP	• • Tensioner, Spring
-5H		NP	• • Screw, Hex Flat Head, M5 X 16
-6	35L0467	1	• X-Rail Assembly, L-Frame
-6	34G9611	1	• X-Rail Assembly, D-Frame
-7	34G9647	2	• T-Nut, Short, M6
-7A	34G9644	1	• T-Nut, Long, M6
-8		NP	• Block, EOT Mounting (Right)
-9		NP	• Screw, Soc Hd Cap, M6 X 16 mm
-10	61G9841	AR	• Bumper
-11		NP	• Bracket
-12		NP	• Screw, Flat Hd Cap, M4 X 25 mm
-13	35L0244	1	• Motor, X-Axis
-14		NP	• Bracket, Motor Mounting
-15		NP	• Clamp, Motor
-16		NP	• Screw, Soc Hd Cap, M5 X 35 mm
-17		NP	• Screw, Flng Hd Hex, M4 X 12 mm
-18		NP	• Bracket, EOT Flag
-19		NP	• Block, EOT Mounting (Left)
-20		NP	• Screw, Soc Hd Cap, M6 X 16 mm
-21	05H8407	1	• Sensor, Home, X-Axis
-22		NP	• Bracket, Sensor
-23		NP	• Screw, Soc Hd Cap, M3 X 6 mm
-24	34G9620	2	• Rod, X-Axis Bearing Way (Used on Base Frame only)
-24	05H8105	2	• Rod, X-Axis Bearing Way (Used on Expansion Frames only)

Assembly 4: Y-Axis Assembly

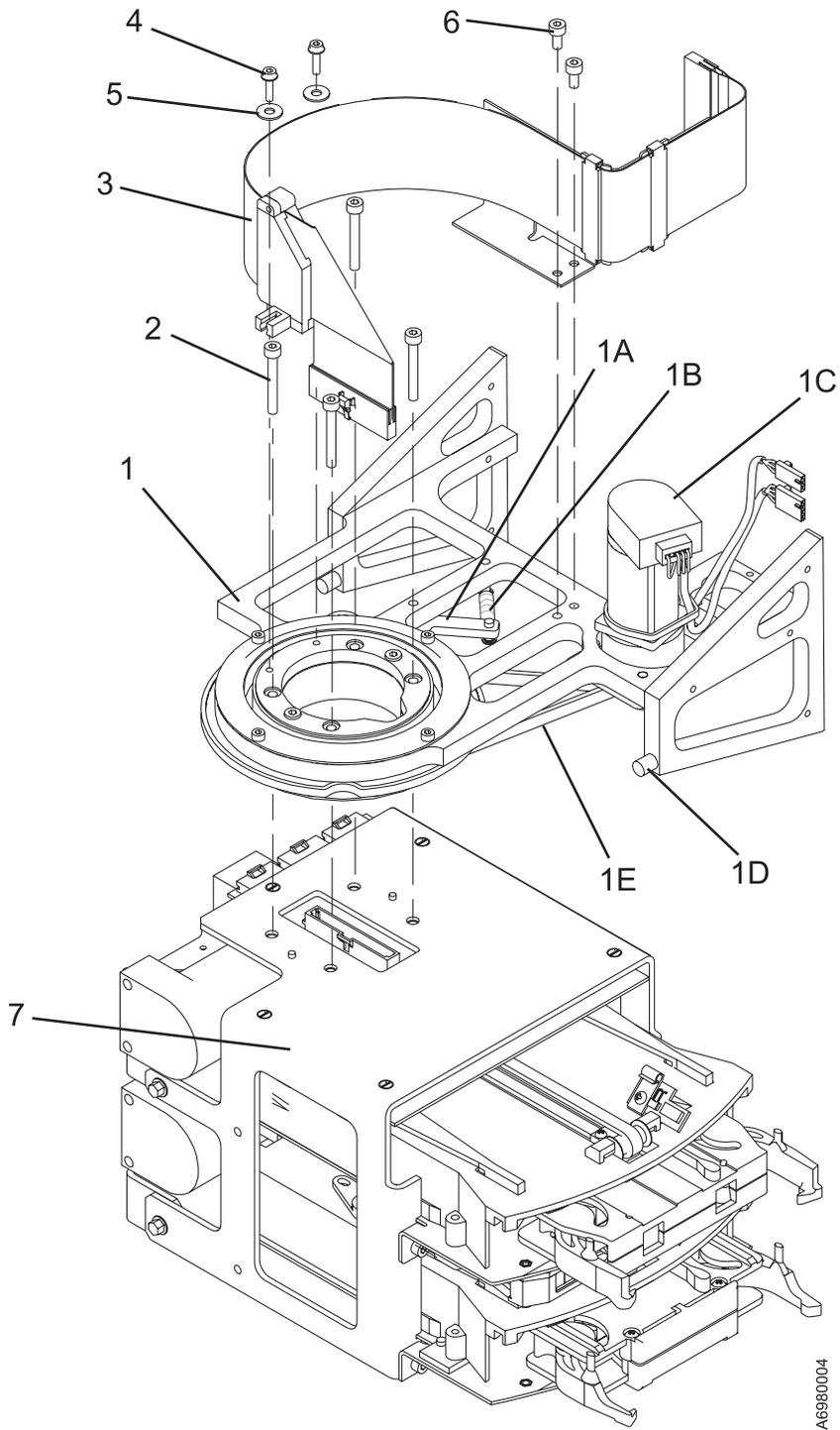


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Assembly 4: (continued)

Asm-Index	Part Number	Units	Description
4-	35L0238	1	Y-Axis Assembly For next higher assembly, see 1-29 on page 713
-1		NP	• Y-Axis Guide Assembly
-2	34G9599	2	• Roller, Guide (Urethane)
-2A	34G9363	1	• Spring
-3		NP	• Lead Screw and Bearing Nut
-4		NP	• Screw, Shoulder
-5		NP	• Y-Rail Assembly
-6	61G9841	1	• Bumper
-7		NP	• Bracket, Y-Bumper
-8		NP	• Screw, Soc Hd Cap, M4 X 65 mm
-9	05H8407	1	• Sensor
-10		NP	• Screw, Soc Hd Cap, M3 X 6 mm
-11	61G9841	1	• Bumper
-12		NP	• Bracket, Y-Bumper/Sensor Mount
-13		NP	• Nut Plate, Bumper/Sensor Bracket
-14		NP	• Screw, Soc Hd Cap, M4 X 60 mm
-15		NP	• Y-Bearing Assembly
-15A		NP	• Plate
-15B		NP	• Screw
-15C	61G9699	4	• Spring
-15D	61G9696	4	• Wiper
-16		NP	• Spacer, Lead Screw
-17		NP	• Pulley, 60 Groove
-18		NP	• Roll Pin, Diameter 3.2 mm Dia. X 19 mm
-19	34G9629	1	• Belt, Y-Axis
-20	35L0306	1	• Motor, Y-Axis
-21		NP	• Clamp, Y-Axis Motor Mount
-22		NP	• Screw, Soc Hd Cap, M5 X 35 mm
-23		NP	• Block, Y-Mounting
-23A		NP	• Tensioner, Spring
-23B		NP	• Screw, Hex Flat Head, M5 X 16
-24		NP	• Block, Y-Motor Mount
-25		NP	• Screw, Flng Hd Hex, M4 X 12 mm
-26		NP	• Bracket, Y-Axis Mounting
-27		NP	• Washer, Flat, M6
-28		NP	• Screw, Hex Hd Cap, M6 X 70 mm
-29		NP	• Y-Bearing

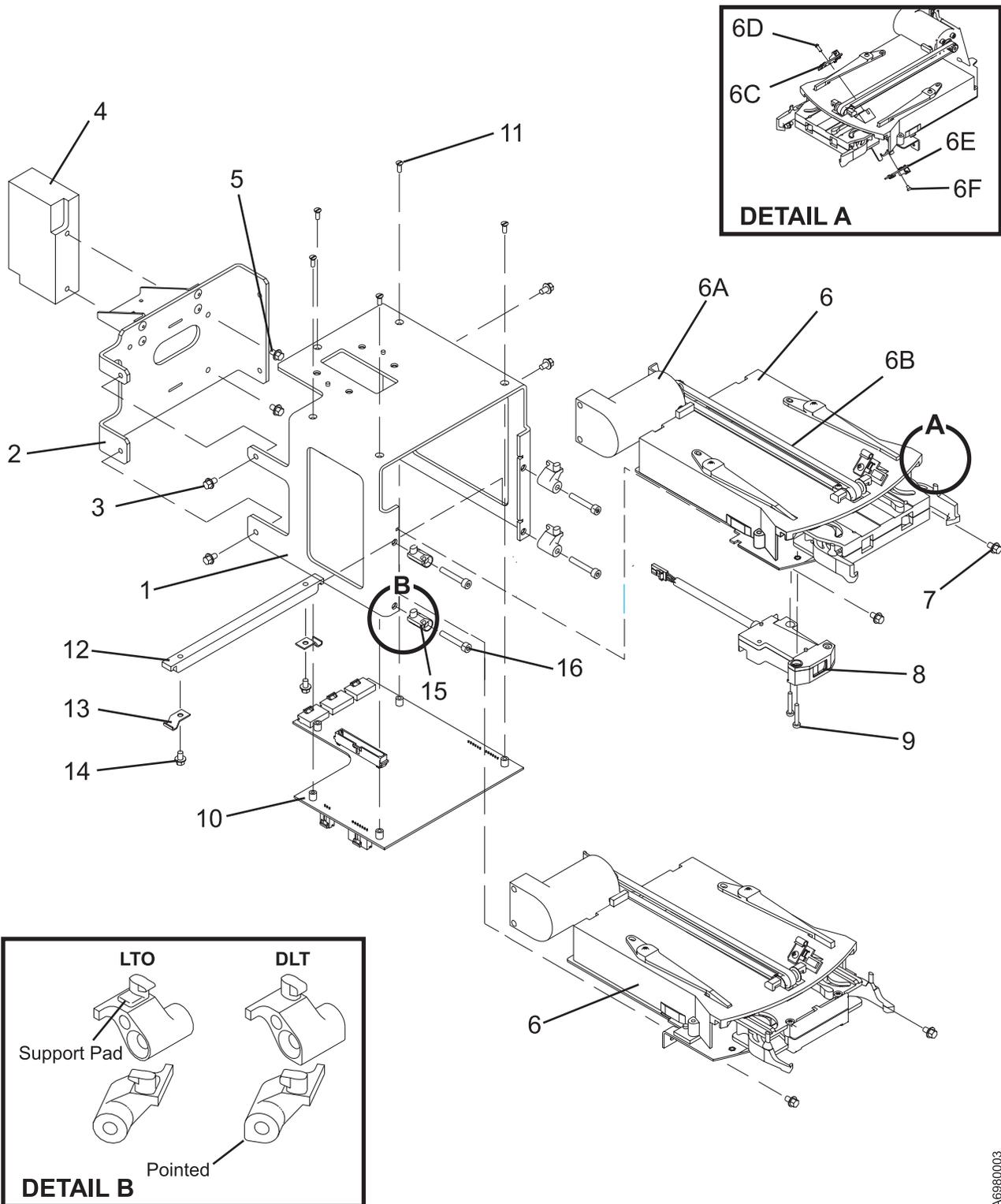
Assembly 5: Gripper and Pivot Assembly



Assembly 5: (continued)

Asm-Index	Part Number	Units	Description
5-		NP	Gripper and Pivot Assembly For next higher assembly, see 1-30 on page 713
-1	35L1784	1	• Pivot Assembly
-1A	34G9360	1	• • Detent Arm Assembly
-1B	34G9363	1	• • Spring, Detent Arm
-1C	35L0274	1	• • Motor/Tach Assembly, Pivot (old style)
-1D	34G9352	2	• • Bumper, Pivot
-1E	35L0277	1	• • Belt, Pivot (old style)
-1E	19P0745	1	• • Pivot Motor and Belt Assembly (new style with captive pivot belt)
-2		NP	• Screw, Soc Hd Cap, M4 X 30 mm
-3	35L0212	1	• Cable, Pivot Flex
-4		NP	• Screw, Soc Hd Cap, M3 X 12 mm
-5		NP	• Washer, Flat, M3
-6		NP	• Screw, Soc Hd Cap, M4 X 8 mm
-7		NP	• Dual Gripper Assembly For detail breakdown, see "Assembly 6: Dual Gripper Assembly" on page 724

Assembly 6: Dual Gripper Assembly



AG980003

Assembly 6: (continued)

Asm- Index	Part Number	Units	Description
6-		NP	Dual Gripper Assembly For next higher assembly, see 5-7 on page 723
-1		NP	• Bracket, Gripper Pivot Mount
-2		NP	• Bracket, Bar Code Scanner Support
-3		NP	• Screw, Flng Hd Hex, M4 X 6 mm
-4		NP	• Block, Counterbalance
-5		NP	• Screw, Flng Hd Hex, M4 X 6 mm
-6	19P4463	AR	• Gripper Assembly, FRU Kit LTO (always located on top when mixed with DLT gripper; also can be on bottom in all LTO library)
-6	19P4462	AR	• Gripper Assembly, DLT (always located on bottom, and only used with mixed media)
-6A	35L0287	NP	• • Motor-Tach Assembly, Gripper
-6B	35L0283	NP	• • Belt, Gripper
-6C	35L0828	NP	• • Sensor, RCP3 Cartridge Present
-6D		NP	• • Screw, Self Tapping Pan Hd, M3.5
-6E	35L0830	NP	• • Sensor, TCP3 Cartridge Present
-6F		NP	• • Screw, Cheese Hd, M3 X 4 mm
-7		NP	• Screw, Flng Hd Hex, M4 X 6 mm
-8	35L1766	1	• Sensor, Calibration
-9		NP	• Screw, Pan Hd, M3 X 8 mm
-10	35L0822	1	• Card, PDC
-11		NP	• Screw, Slotted, M3 X 8 mm
-12	19P3664	1	• Spacer Bar
-13	19P3665	2	• Clamp, Bar Support Mounting
-14	1624764	2	• Screw, Hex Flng Hd Cap M4 X 6 mm Long
-15	19P4454	4	• Blocks, LTO Gripper Mounting (with support pad)
-15	19P4457	2	• Blocks, DLT Gripper Mounting (pointed)
-16	1621490	4	• Screw, Soc Hd Cap, M4 X 25 mm Long

Assembly 7: Miscellaneous Cables and Tools

Asm-Index	Part Number	Units	Description
7-		NP	Miscellaneous Cables and Tools
-		AR	• Relocation Kit
-	7334847	1	• • Main Component (includes corner beads, sealing kit, stretch wrap, tape)
-	05H1869	1	• • X-Y Picker Anchor (use this to secure X-Y Picker)
-	7354441	AR	• • LTO Packing Kit (1 per drive in each logical library)
-	7354056	AR	• • D32, D42 Only - Foam Bumpers and Cable Ties (to fasten to the locating pins)
-	19P0913	AR	• Adapter, Fibre Bulkhead (SC-SC)
-	19P5424	AR	• Adapter, Fibre Bulkhead (LC-LC)
-	11P1373	AR	• Interposer, Fibre SC-LC
-	34L3629	AR	• Cable, AXY-to-MDA
-	35L1209	AR	• Cable, EPO
-	11P2227	AR	• Cable, SC-SC Fibre Drive-to-Bulkhead [(2m) (6.6 ft)]
-	11P3878	AR	• Cable, LC-LC Fibre Drive-to-Bulkhead [(2m) (6.6 ft)]
-	03K9202	AR	• Cable, SC-SC Fibre Channel [5 m (16.4 ft)]
-	54G3386	AR	• Cable, SC-SC Fibre Channel [13 m (43 ft)]
-	03K9204	AR	• Cable, SC-SC Fibre Channel [25 m (81 ft)]
-	54G3390	AR	• Cable, SC-SC Fibre Channel [61 m (200 ft)]
-	11P3895	AR	• Cable, LC-SC Fibre Channel 7 m (23 ft)
-	11P3896	AR	• Cable, LC-SC Fibre Channel 13 m (43 ft)
-	11P3897	AR	• Cable, LC-SC Fibre Channel 22 m (72 ft)
-	11P3900	AR	• Cable, LC-SC Fibre Channel 61 m (200 ft)
-	19K1252	AR	• Cable, LC-LC Fibre Channel 5 m (16.4 ft)
-	11P3880	AR	• Cable, LC-LC Fibre Channel 13 m (43 ft)
-	19K1253	AR	• Cable, LC-LC Fibre Channel 25 m (81 ft)
-	11P3884	AR	• Cable, LC-LC Fibre Channel 61 m (200 ft)
-	08L9700	AR	• Cable, FIC J1-to-XPC
-	08L9695	AR	• Cable, FIC J12-to-UEPO Switch and LED
-	08L9698	AR	• Cable, FIC-to-FIC Power
-	08L9699	AR	• Cable, FIC-to-FIC Signal
-	08L9697	AR	• Cable, FIC-to-OPC Card
-	35L1350	AR	• Cable, Sensors-to-PDC Card Gripper
-	19P0051	AR	• Cable, HD68-to-HD68 0.5 m (2 ft) SCSI
-	19P0052	AR	• Cable, HD68-to-HD68 5 m (16.5 ft) SCSI
-	19P0053	AR	• Cable, HD68-to-HD68 10 m (32.8 ft) SCSI
-	19P0097	AR	• Cable, HD68-to-HD68 18 m (59 ft) SCSI
-	19P0054	AR	• Cable, HD68-to-HD68 25 m (82 ft) SCSI
-	35L1006	AR	• Cable, I/O Station-to-OPC Card J7 (only for machines without two I/O stations)
-	19P1762	AR	• Cable, I/O Station 1 to XIO Card (only for machines with two I/O stations)
-	19P1763	AR	• Cable, I/O Station 2 to XIO Card (only for machines with two I/O stations)
-	19P0556	AR	• Cable, EPO Jumper, (L32 frame only)
-	35L1006	AR	• Cable, OPC J7-to-I/O Station (for single station I/O)
-	19P1764	AR	• Cable, Operator Panel to XIO Card
-	35L0212	AR	• Cable, Pivot Flex
-	19P3026	AR	• Cable, Redundant Power (control port drive-to-drive) DLT only
-	35L1209	AR	• Cable, Redundant EPO
-	19P1223	AR	• Cable, Redundant Power (N+1)
-	19P4692	AR	• Cable, 15.2 m (50 ft), RS-232 —Library or Switch to Modem (DB9F-to-DB25M)
-	19P4693	AR	• Cable, 15.2 m (50 ft), RS-232 Null Modem — Library to Switch (DB9F-to-DB9F)
-	19P1061	AR	• Cable, RS-232 Serial 9-Pin to 9-Pin (male-to-female) (CE tool)
-	19P1077	AR	• Cable, Control Port Position 0 RS-422 to MCP J3

Assembly 7: (continued)

Asm-Index	Part Number	Units	Description
-	19P0055	AR	• Cable, RS-422 Interface, MCP-to-Drives
-	19P3332	AR	• Cable, SCSI (VHDCI-to-VHDCI, daisy chain, or drive-to-drive) 0.3 m (1 ft)
-	19P2499	AR	• Cable, SCSI Host Interface (VHDCI to VHDCI) 4.5 m (14.8 ft)
-	09L0881	AR	• Cable, SCSI Host Interface (VHDCI to VHDCI) 10 m (32.8 ft)
-	19P1904	AR	• Cable, SCSI Host Interface (VHDCI to VHDCI) 20 m (66 ft)
-	19P2500	AR	• Cable, SCSI Host Interface (VHDCI to VHDCI) 25 m (82 ft)
-	19P1001	AR	• Cable, Serial 9-Pin to 9-Pin for Remote Switch (female-to-female)
-	19P0482	AR	• Cable, VHDCI-to-HD68 0.3 m (1 ft) SCSI Cable/Interposer
-	19P0050	AR	• Cable, VHDCI-to-HD68 4.5 m (14.8 ft) SCSI
-	19P0048	AR	• Cable, VHDCI-to-HD68 10 m (32.8 ft) SCSI
-	19P0049	AR	• Cable, VHDCI-to-HD68 20 m (65.6 ft) SCSI
-	35L1977	AR	• Cable, VHDCI-to-HD68 25 m (82 ft) SCSI
-	09L0881	AR	• Cable, VHDCI-to-VHDCI 10 m (32.8 ft) SCSI
	19P5789	AR	• Cable, X-Axis Flex (1 to 2 frames)
	19P5788	AR	• Cable, X-Axis Flex (3 to 6 frames)
	19P6036	AR	• Cable, X-Axis Flex (7 to 14 frames)
	19P6035	AR	• Cable, X-Axis Flex (8 to 16 frames)
-	61G9685	AR	• Cable, Y-Axis Flex
-	34L3625	AR	• Cable, XYC-to-Home Sensor
-	19P4074	AR	• Cartridge, CE Diagnostic, DLT-8000
-	19P0405	AR	• Cartridge, CE Diagnostic, LTO
-	19P3835	AR	• Cartridge, Cleaning, DLT-8000
-	35L2086	AR	• Cartridge, Universal Cleaning, LTO (L1 & L2)
-	09L5361	AR	• Cord, Bifurcated FCA-to-Drive Power
-	11F0113	AR	• Cord, Line, 4.3 m (14 ft) U.S.A. and World Trade (250 V ac, 30A, twistlock)
-	46F4594	AR	• Cord, Line, 4.3 m (14 ft) U.S.A. and World Trade (250 V ac, water tight)
-	46F4593	AR	• Cord, Line, 1.8 m (6 ft) Chicago (250 V ac, water tight)
-	46F6063	AR	• Cord, Line, World Trade (hardwired)
	86F2646	AR	• Cord, Line, 4.3M (14 ft) 220V Watertight Connector (with FC 1901)
	14F1550	AR	• Cord, Line, 4.3M (14 ft) 220V NON-Watertight Connector (with FC 1901)
	12J5117	AR	• Cord, Line, 4.3M (14 ft) 110V Line Cord (with FC 1901)
	86F2645	AR	• Cord, Line, 1.8M (6 ft) 220V Watertight Connector (Chicago) (with FC 1901)
	12J5115	AR	• Cord, Line, 1.8M (6 ft) 110V Non-Watertight Connector (Chicago) (with FC 1901)
	36L8823	AR	• Cord, Line, 4.3M (14 ft) 220V NON-Connector with (FC 1901)
	18P7979	AR	• Cord, Power, PDU-to-FCA (with FC 1901)
-	73G5518	AR	• ESD Kit
	18P7835	AR	• Spring Clip Kit, L1, LTO
-	19P0378	AR	• Terminator, Inline SCSI
-	61G8324	AR	• Terminator, HD68 HVD SCSI
-	34L3926	AR	• Terminator, VHDCI (LVD)
-	09L5067	AR	• Terminator, HD68 LVD/SE SCSI
-	09L0877	AR	• Terminator, VHDCI (HVD)
-	1159519	AR	• Tie, Cable
-	19P1213	AR	• Wrap Plug, HVD SCSI
-	19P0481	AR	• Wrap Plug, LVD SCSI
-	19P0519	AR	• Wrap Plug, RS-422
-	19P4280	AR	• Wrap Tool, Smart SCSI
-	08L9459	AR	• Wrap Plug, Fibre (SC)
-	11P3847	AR	• Wrap Plug, Fibre (LC)

Part Number Index

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taiemi

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求採取某些適當的對策。

taicmi

Regulatory Approvals

The library systems are designed to meet the following:

Safety

- UL1950
- CUL950
- EN60950

Emissions

- FCC Class A
- CISPR 22 Class A

Immunity

- EN50082-1

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Glossary

Definitions of Terms and Acronyms

Some cross-references are used in this glossary.

Contrast with

This refers to a term that has an opposed or substantively different meaning.

Synonym for

This indicates that the term has the same meaning as a preferred term, which is defined elsewhere in the glossary.

Synonymous with

This highlights that you are using the preferred term, and points backward to a less-desirable term that is used elsewhere in this glossary.

If you do not find the term you are looking for, refer to the *IBM Dictionary of Computing*, ZC20-1699.

A

ACC. Accessor control card

AIX. Advanced Interactive Executive. IBM's implementation of the UNIX operating system. The RS/6000 system, among others, runs the AIX operating system.

ANSI. American National Standards Institute

ASC. Additional sense code

ASCII. American National Standard Code for Information Interchange. A 7-bit coded character set (8 bits, including parity check) that consists of control characters and graphic characters

ASCQ. Additional sense code qualifier

asynchronous. Pertains to two or more processes that do not depend upon the occurrence of specific events such as common timing signals

attention notice. A notice in a publication that informs you of a risk to a program, device, system, or data. Contrast with *caution notice* and *danger notice*.

AXY. Accessor XY axis card. This card controls accessor X-Y movements.

B

backhitch. Magnetic tape that makes a slight backward motion just prior to moving forward

base frame. The first frame in a multiple string of frames, or the one and only frame in a one-frame library. The base frame contains the accessor, frame control assembly, storage cells, tape drives, I/O station, and operator panel. The 3584 Model L32 is a base frame.

beginning of tape (BOT). The location on a magnetic tape that indicates the start of the permissible recording area

BHC. Block hardware code

bit. (1) Either of the digits 0 or 1 when used in the binary numeration system. (2) **Binary digit**

BMA. Brushless motor amp; there is one each for the X and Y axis. These are located on the MDA.

BOM. Beginning of media block hardware code

BOT. *Beginning of tape*

BPV. Bit pointer valid

byte. Eight adjacent binary bits

C

Call Home. Communication with a data processing facility through a data link. Synonymous with *remote access*.

CAN. Controller area network

CARR. Abbreviation of (acronym for) the Checks, Adjustments, Removal, and Replacement chapter of this *MI*

caution notice. A notice in a publication that informs you of a personal risk. Contrast with *attention notice* and *danger notice*

CB. Circuit breaker

CDB. Command descriptor block

CDPOP. Card populated

CE. *Customer engineer*

CIO. Cartridge input/output

control path. Logical path into the library through which a server sends standard SCSI Media Changer commands to control the logical library

CP. Circuit protector

CPort. Shortened term for control port, as it is often seen in menus

customer engineer (CE). IBM person who services your IBM equipment. Synonymous with *service representative*

cycle power. To power off, then immediately power on a device such as a tape drive or a library. Occasionally this method is used as a way to reset some function or to reset the microcode.

D

daisy chaining. The practice of directly connecting a device to a similar device, thus bypassing a connection to a switch, host, or another dissimilar device. This is not allowed with a fibre channel connection.

danger notice. A notice in a publication that directs you to the possibility of a potentially lethal condition. Contrast with *attention notice* and *caution notice*.

DBC. Dynamic brake card, located on the MDA

DCC. Driver control card, which is contained in the DLT-8000 control port or drive

diagnostic cartridge. This is a normal scratch tape cartridge except that the bar code label identifies it as the diagnostic cartridge

direct access storage device (DASD). A storage device in which the access time is independent of the location of the data

DLT. Digital linear tape (DEC™ technology)

DRAM. Dynamic random access memory

DT. Drive tray

E

EEROM. Electrically erasable read only memory

EOD. End of dataelectrically erasable read only memory

EOM. End of media

EOT. End of tape

EPO. Emergency power off

EPOV. Emergency power off voltage

EPROM. Erasable programmable read-only memory

error log. A dataset or file in a product or system where error information is stored for later access

ESCON. Enterprise Systems Connection - A set of IBM products and services that provides a dynamically connected environment within an enterprise. The ESCON channel connection allows the library to communicate directly with a system.

ESD. Electrostatic discharge

exa. Prefix for 'quintillion' (10¹⁸)

expansion frame. The second frame (or any subsequent frame) which is an expansion of the *base frame*. This frame contains storage cells, optional frame control assembly, and optional tape drives. This term only applies to multiple frame libraries. The 3584 Model D32 or D42 is an expansion frame.

F

FC. (1) Fibre channel. (2) Feature code

FCA. Frame control assembly which contains the MCC, redundant 37 V dc power supplies, and tape drive AC voltage source

FCAL. Fibre cable arbitrated loop

FIC. Frame interconnect card; the communication link between frames on a multiple frame library

fiducial. A standard for reference

field replaceable unit (FRU). An assembly that is replaced in its entirety at the customer's location when any one of its components fails

firmware. Synonym for *microcode*

FM. File mark

FMR tape. Field microcode replacement tape

FRU. See *field replaceable unit*

FSC. Fault symptom code

FUP tape. Firmware update. DLT-8000 term that is similar to IBM's *FMR*

G

GB. Gigabyte (one billion bytes)

giga. Prefix for 'billion' (10⁹)

gripper assembly (dual). The assembly that moves on the Y-axis, includes two grippers, the bar code

scanner, and calibration sensor. Each gripper (two per pivot assembly) gets and puts cartridges. Formerly referred to as “picker”

H

HEC. Hardware error code

HECQ. Hardware error code qualifier

hot pluggable. Synonym for *hot pluggable*

hot swap. Describes the capability of a component to be replaced while the library is powered on and running

HVD. High voltage differential

I

ILI. Incorrect length indicator

IML. Initial microprogram load

interposer. The part used to convert a 68-pin connector to a 50-pin D-shell connector

I/O. Input/output

I/O Station. The assembly that provides inputting and outputting of tape cartridges into the library

iSCSI. Internet small-computer system interface

K

KB. Kilobyte (one thousand bytes)

kilo. Prefix for 'thousand' (10^3)

L

LAN. Local area network

LCD. Liquid crystal display

LED. Light emitting diode

LIP. Loop initiated primitive

LSB. Least significant bit

LTO. Linear tape open

LTO-CM. Linear tape open cartridge memory

LUN. Logical unit number

LVD. Low voltage differential

M

MAP. Maintenance analysis procedure

MAQ. Maintenance agreement qualification

MB. Megabyte (one million bytes)

MCP. Media changer pack, which controls the drive-to-library communications, as well as other external communications

MDA. Motor driver assembly, which is mounted on the accessor

mega. Prefix for 'million' (10^6)

MI (or MIs). (1) Maintenance Information. (2) A generic term for a maintenance document

micro. Prefix for 'millionth of' (10^{-6})

microcode. (1) Synonymous with firmware. (2) One or more micro instructions (3) A code representing the instructions of an instruction set, implemented in a part of storage that is not program-addressable (4) To design, write, and test one or more micro instructions

milli. Prefix for 'thousandth of' (10^{-3})

mixed media. Describes the presence of both LTO media and DLT-8000 media in the same library

mm. Millimeter; 1 mm equals 0.39 in.

MSB. Most significant bit

MSBF. Mean swaps between failures

MTBF. Mean time between failures

MTTR. Mean time to recovery

N

nano. Prefix for 'billionth of' (10^{-9})

NAS. Network attached storage. A standalone storage system that can bridge with a SAN, to make data stored on NAS servers appear as if it is stored on a single, ordinary file server

non-recoverable error. An error condition that does not allow the continued execution of a program or job

NVM. Non-volatile memory

NVRAM. Non-volatile random access memory

NVS. Non-volatile storage

N+1. Industry term for a concept that indicates that a machine has the **Number** of power supplies you need, **plus 1** more for redundancy

O

offline. Pertains to the operation of a functional unit without the continual control of a computer

online. Pertains to the operation of a functional unit that is under the continual control of a computer

OPC. Operator panel controller card

P

PCMCIA. Personal Computer Memory Card International Association

PDC card. The interface card from the gripper assembly to the ACC. Located on the gripper assembly

PER. Post error reporting

peta. Prefix for 'quadrillion' (10^{15})

pico. Prefix for 'trillionth of' (10^{-12})

PM. Preventive maintenance

P/N. Part number

POR. Power on reset

POST. Power-on self test. A series of diagnostic tests that run automatically when a device is powered on

power cycle. To power off, then power on a device such as a tape drive or a library. Occasionally this method is used as a way to reset some function or to reset the microcode.

PROM. Programmable read-only memory

PTF. Program temporary fix

Q

quiesce. (1) Describes a condition you create for the library that prevents any communications or traffic to occur into or out of a drive or the library. (2) To end a process by allowing operations to complete normally. (3) To request that a node stop sending synchronous-flow messages.

R

RAM. Random access memory

recording density. The number of bits in a single linear track measured per unit of length of the recording medium

recoverable error. An error condition that allows continued execution of a program

remote access. Communication with a data processing facility through a data link. Synonym for *Call Home*.

RISC. Reduced instruction set computing. A type of microprocessor design that focuses on rapid and efficient processing of a relatively small set of instructions

ROM. Read-only memory

RPQ. Request for price quotation

RS-422. A communications network between the tape drives and the MCP

S

SAN. Storage area network

SCD. Single-character display

SCSI. Small computer system interface

service representative. Synonym for *customer engineer (CE)*

SIM. Service information message

sled. Synonym for *drive tray*

Smart SCSI wrap tool. Wrap tool that can detect and become the type of wrap tool (LTO or DLT) that is needed for the line to which you have attached it.

SRAM. Static random access memory (RAM). A form of semiconductor memory (RAM). Static RAM storage is based on the flip-flop logic circuit which retains the information stored in it as long as there is enough power to run the device. A static RAM chip can store only about one-fourth as much data as a dynamic RAM chip of the same complexity, but static RAM does not require refreshing and is usually faster than dynamic RAM. Static RAM is more expensive and is usually reserved for use in cache.

SSR. (1) Subsystem service representative. (2) Service support representative. (3) Synonym for customer engineer.

synch. Synchronous, synchronize. Occurring with a regular or predictable time relationship

T

tachometer, tach. A device that emits or senses pulses which are used to measure or check speed

TB. Terabyte (one trillion bytes)

TCP/IP. Transmission Control Protocol/Internet Protocol. A communication protocol standard for transmitting data over networks with internet uses

tera. Prefix for 'trillion' (10^{12})

TLB. Translation lookaside buffer

U

URC. Unit reference code

V

VHDCI. Very high density Centronics interface

VOLSER. Volume serial number

VPD. Vital product data

W

WORM. Write once, read many

X

XCP. A card that provides communications between the FIC and the AXU

XYC. XY controller card and cable, located within the MDA

Y

yotta. Prefix for 'septillion' (10^{24})

Z

zetta. Prefix for 'sextillion' (10^{21})

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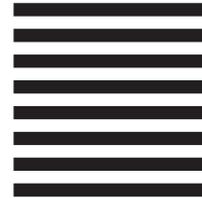
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