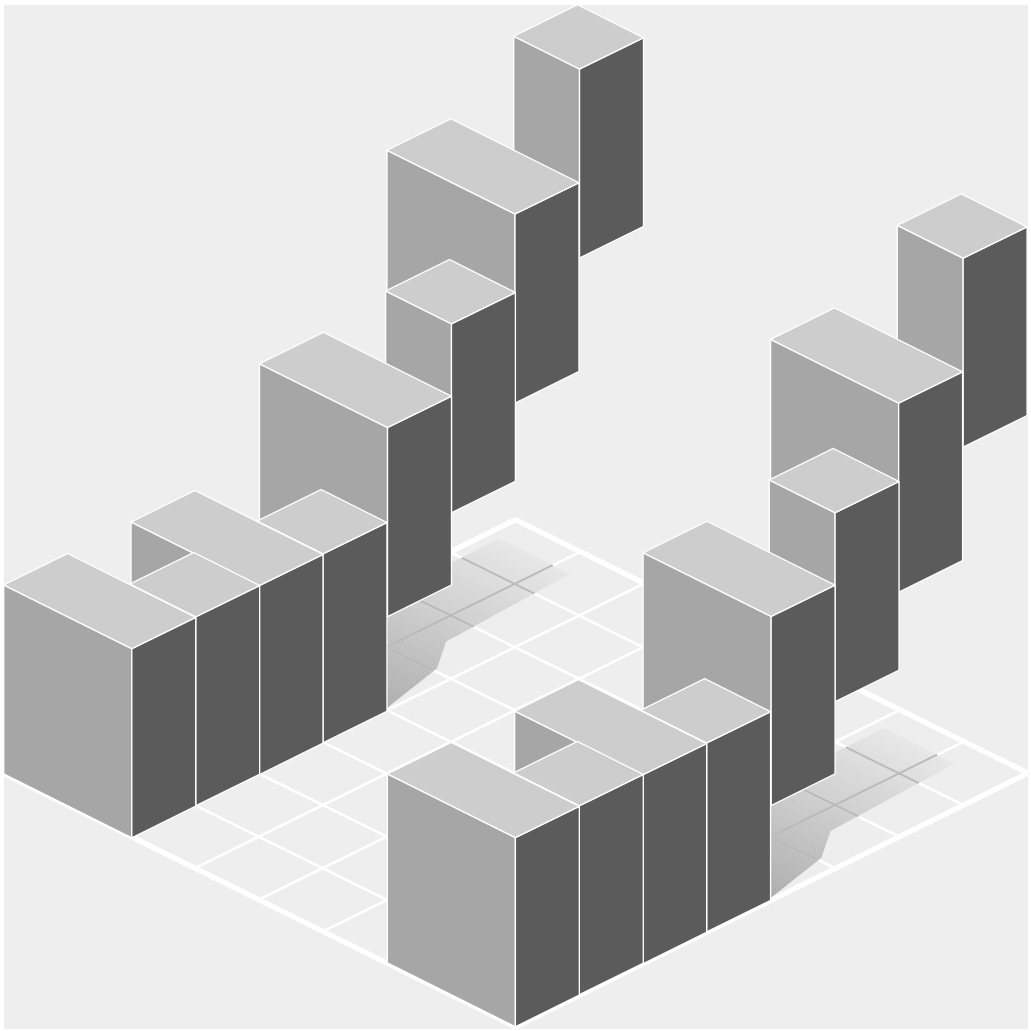
IBM

IBM Magstar 3494 Tape Library

Maintenance Information



IBM

IBM Magstar 3494 Tape Library

Maintenance Information

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| **Ninth Edition (August 1999)**

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Using This Manual

This manual is intended for service representatives who repair the IBM* 3494.

Where to Start

Always start your service actions at page START-1.

Attention: When performing any service action on the 3494, follow the directions given in the Start section or on the library manager display. This ensures that you use the correct remove, replace, or repair procedure, including the correct power on/off procedure, for this machine. Failure to follow these instructions can cause damage to the machine and loss of customer data.

Related Information

For additional information about the IBM 3494 Tape Library Dataserver, see:

- *IBM 3494 Tape Library Dataserver Introduction and Planning Guide*, GA32-0279
- *IBM 3494 Tape Library Dataserver Operator's Guide*, GA32-0280
- *IBM 3494 Tape Library Dataserver Parts Catalog*, part number 05H7349
- *IBM 3494 Model B16 Virtual Tape Server Maintenance Information* , part number 05H8126
- *IBM Magstar 3494 Model B18 Virtual Tape Server Maintenance Information* , part number 05H8664
- *IBM 3494 Tape Library Dataserver Maintenance Information Safety Translations*, SA37-0271
- *IBM 3494 Tape Library Dataserver User's Guide: Library Control Device Driver for VSE/ESA*, GC35-0176
- *IBM Online Library Omnibus Edition Hardware Collection*, SK2T-5843

For additional information about the StorageSmart solutions that use the 3494 library, see:

- *IBM 3466 Storage Manager Introduction and Planning Guide*, GA32-0374
- *IBM 3466 Storage Manager Start Up Guide*, GA32-0373
- *IBM 3466 Storage Manager Maintenance Information*, part number 05H8106
- *IBM Magstar Virtual Tape Server Maintenance Information*, part number 05H8126

For additional information about the IBM 3490E Magnetic Tape Subsystems, see:

- *IBM System/370 Installation Manual—Physical Planning,* GC22-7004
- *Environmental Record Editing and Printing (EREP) Program User's Guide and Reference*, GC28-1378
- *Care and Handling of the IBM Magnetic Tape Cartridge*, GA32-0047
- *Tape and Cartridge Requirements for the IBM Magnetic Tape Cartridge*, GA32-0048
- *Tape and Cartridge Requirements for the IBM Enhanced Capacity Magnetic Tape Cartridge*, GA32-0216
- *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Introduction*, GA32-0217
- *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Operator's Guide,* GA32-0218

- *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Hardware Reference*, GA32-0219
- *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Planning and Migration Guide*, GC35-0219
- *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Maintenance Information*, SA37-0299
- *IBM 3490E Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Parts Catalog*, S132-0031
- *IBM 3490E Tape Subsystem Models F00, F01, F11, F1A Installation, Planning, and Operator's Guide,* GA32-0378
- *IBM 3490E Tape Subsystem Models F00, F01, F11, F1A Hardware Reference*, GA32-0379
- *IBM 3490E Tape Subsystem Model F01, F11, F1A Maintenance Information*, part number 05H3145

For additional information about the IBM 3590 High Performance Tape Subsystem, see:

- *IBM 3590 High Performance Tape Subsystem Introduction and Planning Guide*, GA32-0329
- *IBM 3590 High Performance Tape Subsystem User's Guide,* GA32-0330
- *IBM 3590 High Performance Tape Subsystem Hardware Reference*, GA32-0331
- *IBM 3590 Tape Subsystem Axx Controller Models Maintenance Information*, part number 05H9206
- *IBM 3590 Tape Subsystem Models B11 and B1A Maintenance Information*, part number 05H9018

AIX*

For additional information about the AIX subsystems and software, see:

- *AIX/ESA* System Planning Guide*, GC23-3061
- *AIX/ESA Diagnosis Guide*, SC23-3079
- *AIX/ESA Device Driver Developer's Guide*, SC23-3085
- *AIX Parallel and ESCON Channel Tape Attachment/6000 Installation and User's Guide*, GA32-0311
- *AIX Version 3.2 for RISC System/6000* Installation Guide*, SC23-2341
- *AIX Version 3.2 for RISC System/6000 General Concepts and Procedures*, GC23-2202

AS/400*

For additional information about the AS/400 subsystems and software, see:

- *IBM 3494 Tape Library Dataserver User's Guide: Media Library Device Driver for Application System/400**, GC35-0153
- *Application System/400 Service: Service Function User's Guide*, ZZ25-9557
- *Application System/400 System Operations: Common Tasks*, GA21-9573
- *Application System/400 Physical Planning Guide V2.30*, GA41-0001
- *Application System/400 Physical Planning Guide and Reference*, GA41-9571
- *Application System/400 Control Language Reference*, SC41-0030
- *Application System/400 Security Reference*, SC41-8083

RISC System/6000

For additional information about the RISC System/6000 subsystems and software, see:

- *RISC System/6000 AIX Getting Started*, GC23-2521
- *RISC System/6000 Getting Started: Managing RISC System/6000*, GC23-2378
- *RISC System/6000 Problem Solving Guide*, SC23-2204
- *RISC System/6000 System Overview*, GC23-2406
- *RISC System/6000 Planning for System Installation*, GC23-2407

PS/ValuePoint*

For additional information about the library manager, see:

- *PS/ValuePoint Model 6384 User's Guide Package*, S71G-4123. This package contains:
  - *PS/ValuePoint User's Handbook Models 6382 and 6384*
  - *PS/ValuePoint Installing Options Model 6384*
  - *PS/ValuePoint Solving Problems Models 6382, 6384, and 6387*
- *PS/ValuePoint Hardware Maintenance Manual*, S61G-1423
- *PS/ValuePoint Technical Information Manual Types 6381/Si, 6382/S, 6384, 6384/D, and 6387/T*, S71G-1873

7585 Industrial Computer

For additional information about the library manager, see:

- *7585 Industrial Computer Information: Installation, Operation, Hardware Maintenance*, S06H-2298

7588 Industrial Computer

For additional information about the library manager, see:

- *7588 Industrial Computer Information, Installation, Operation, Hardware Maintenance*, S76H-4349

Additional

For information about related systems and software, see:

- *IBM BTLS Version 1 Release*, SC26-7016
- *Environmental Record Editing and Printing (EREP) Program User's Guide and Reference*, GC28-1378
- *DFSMS/MVS* Version 1 Release 1: General Information*, GC26-4900
- *DFSMS/MVS Version 1 Release 1: Object Access Method Planning, Installation, and Storage Administration Guide for Tape Libraries*, SC26-3051
- *DFSMS/MVS Version 1 Release 1: Implementing and Customizing DFSMShsm**, SH21-1078
- *DFSMS/MVS Version 1 Release 1: Object Access Method Application Programmer's Reference*, SC26-4917
- *DFSMS/MVS Version 1 Release 1: Guide and Master Index*, GC26-4904
- *JES3 Command Reference*, SC23-0063

- *Multiple Virtual Storage/Enterprise System Architecture Library Guide for System Product*, GC28-1601
- *MVS/ESA Storage Management Library: Storage Management Reader's Guide*, GC26-3122
- *MVS/ESA Planning: Installation and Migration for MVS/ESA System Product Version 4*, GC28-1077
- *MVS/ESA Conversion Notebook for MVS/ESA System Product Version 4*, GC28-1608
- *MVS/ESA System Management Facilities*, GC28-1628
- *MVS/ESA System Commands*, GC28-1826
- *Virtual Machine/Enterprise System Architecture Library Guide and Master Index*, GC24-5518
- *Virtual Machine/Enterprise System Architecture Library Guide and Master Index for System/370*, GC24-5436
- *Virtual Machine/Enterprise System Architecture General Information*, GC24-5550
- *VM/ESA*: DFSMS/VM* FL221 Installation and Customization*, SC26-4704

Introduction

Subsystem Overview

The 3494 automates the retrieval, storage, and control of Cartridge System Tapes, Enhanced Capacity Cartridge System Tapes, and IBM 3590 high performance tape cartridges. When used with supporting software and appropriate tape subsystems, cartridges can be mounted and demounted on tape devices without operator intervention.

The 3494 tape library must include at least one tape subsystem. The Cartridge System Tape (CST) and the Enhanced Capacity Cartridge System Tape (ECCST) can be intermixed in the 3494 if a 3490E tape subsystem is installed. In addition, 3590 high performance tape cartridges can be stored if a 3590 tape subsystem is installed.

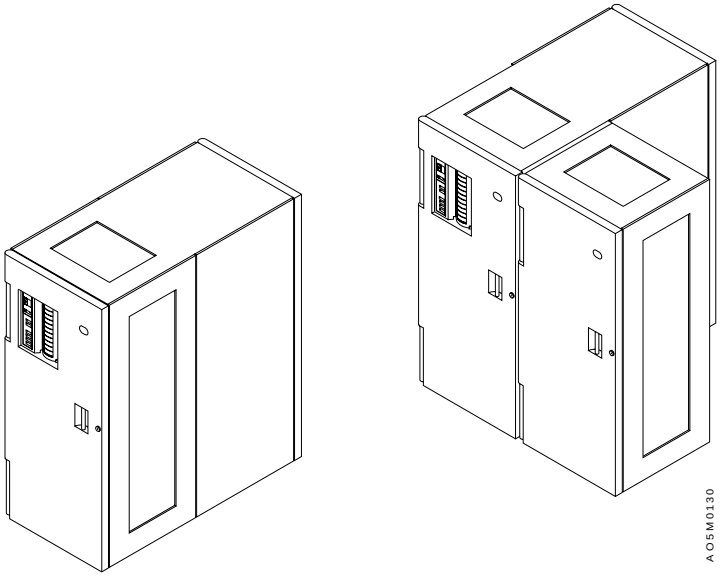

Figure 1. IBM Magstar 3494 Tape Library

A 3494 configuration can contain a maximum of 16 library frames, 2 service bay frames and 2 Model B18 virtual tape server units. The 3494 library consists of a library control unit frame and up to fifteen expansion frames. The 3494 library control unit frame contains library manager A, cartridge accessor A, and cartridge storage, and may contain a tape subsystem.

The 3494 library expansion frames are available in three types: Model D1x drive unit frame, Model S10 storage unit frame, and Model B16 virtual tape server frame. The drive unit expansion frame can contain a tape subsystem and cartridge storage. The storage unit expansion frame only contains cartridge storage. The Model B16 virtual tape server frame contains the virtual tape server controller, the DASD subsystem, and cartridge storage.

The Model B18 virtual tape server contains the virtual tape server controller and the DASD subsystem. This is a standalone unit that is not physically attached to the library but must be located within 14 meters from the associated library Model D12 frame.

The 3494 service bay frames are available in two types: left and right. The left service bay is installed on the left end of the library and is used to store cartridge accessor A when it requires service and/or is in standby mode. The right service bay is installed on the right end of the library and is used to store cartridge accessor B when it requires service and/or is in standby mode. The right service bay also contains library manager B.

The 3494 can be configured for 160 to 6240 cartridges and one to sixteen tape control units with up to 62 tape drives. A high-capacity output or input/output facility can be configured to have 10 to 200 reserved storage cells and a 10 or 30 cartridge convenience I/O station feature can be installed.

Functional Description

The 3494 is a self-contained, fully enclosed product that can be installed on a solid or a raised floor. Figure 2 shows a typical configuration of the 3494 Tape Library Dataserver with a library control unit frame with the ten cartridge convenience input/output station feature **1**, an optional drive unit frame **2**, and an optional storage unit frame **3**.

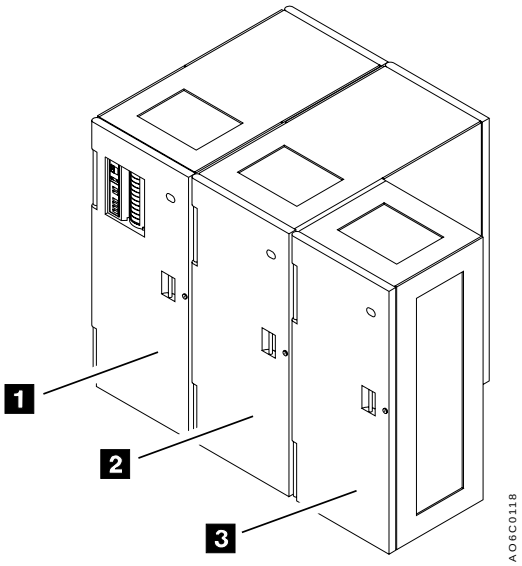

Figure 2. Typical 3494 Configuration

The cartridge accessor moves cartridges between storage cells, tape subsystems, and the input/output areas. A picker with a pivot assembly and one or two grippers, each containing a reach assembly and a grip assembly, is used to get/put the cartridges in a cell or feed slot. A bar-code reader on the cartridge accessor identifies the cartridge or cell in front of the gripper. A calibration sensor is used to identify the physical elements in the 3494 and to teach the physical coordinates of the elements during the installation.

The optional Convenience Input/Output Station allows cartridges to be added or removed from the 3494 without interrupting the operation of the library. The customer can specify a variable sized high-capacity output or input/output facility at installation time to support ejecting or inserting cartridges.

Notes:

1. Specifying the high-capacity output or input/output station reduces the number of available cartridge storage cells in the 3494.
2. Using the high-capacity output or input/output station requires interrupting library operations for a short time.

If the Convenience Input/Output Station feature is not installed and the high-capacity output facility is not specified, one cartridge cell in the 3494 is reserved for output operations. Reserving only one cell in a 3494 allows the maximum amount of storage for the installation that has low requirements for output operations. Any unassigned cell can be used for input operations.

The 3494 allows emulation of a cartridge loader by assigning a specified category of cartridges to a specific drive for the automatic mounting and demounting of cartridges without host intervention.

In addition, the 3494 allows transient cartridges to be moved from the convenience input/output station directly to a specified drive without host intervention through the use of the Mount from Input Station function. This function allows the devices inside the library to be used for cartridges that do not reside in the library (standalone operation). Cartridges mounted in this manner do not require any machine readable external labels.

The cartridge storage cells, cartridge accessor, and tape subsystem are accessed by opening the door on the front of the 3494 frame in which the component is found. Maintenance activity and manual mode operation are performed by using these doors if the high availability option is not installed. If the high availability option is installed, maintenance activity on the broken accessor is performed in the accessor's service bay while the library continues to operate using the other accessor.

Some requests issued from the host result in cartridge movement in the library. The primary requests issued are for mounting and demounting cartridges to and from the tape devices and for inserting and ejecting volumes to or from the library. Two methods of host/library communications are supported:

- Requests are sent to the library using the channel attachments of the tape subsystem. The 3494 provides status and other information to the host through the tape subsystem.
- Requests are sent directly to the 3494 using an RS-232 or LAN interface from a direct attached host. The 3494 provides status and other information directly to the host through this interface.

In either case, all tape requests and responses are sent to the tape subsystem through the channel attachment.

The host has no record of the physical location of a volume in the library. The physical location is managed exclusively by the library. Each volume has a machine and operator-readable external label to identify a volume in the library during initial inventory and any time a volume is added to the library. The library stores the physical location of the volume in an inventory database based on the cartridge volser. All host requests for operations involving movement or use of a volume need only reference the volser for the library to perform the request.

In addition to requesting movement of cartridges in the library, the host can obtain status, performance, configuration information, and information about the cartridges stored in the 3494.

Magstar Virtual Tape Server: When the Magstar Virtual Tape Server is integrated with the 3494 Tape Library Dataserver, automatic utilization of the full capacity of 3590 high performance tape cartridges is achieved for S/390 and ES/9000 MVS hosts by stacking virtual volumes end to end on the 3590 cartridge. The virtual tape server looks like a 3490E tape subsystem with its associated tape media to the host software. This virtualization of both the tape device and the storage media to the host allows for transparent utilization of the capabilities of the Magstar 3590 tape technology.

The Magstar Virtual Tape Server subsystem uses virtual tape devices for all interaction with host software. Although virtual devices are only embodied in licensed code in the Magstar Virtual Tape Server subsystem, they show the functional characteristics of a 3490 Enhanced Capability tape device. To the host operating system and application programs, a virtual device looks like a physical tape device.

The difference between a virtual tape device of the Magstar Virtual Tape Server subsystem and a real 3490E device is that the data written to or read from the virtual device resides on a virtual volume in the tape volume cache (not on a physical volume mounted on a physical device). Tape operations that are gated by physical movement of tape will see significant improvements in performance.

The functionality of the 3490E integrated cartridge loader is also included in the virtual device's capability. All virtual devices indicate that they have a cartridge loader. Each virtual device can be associated with a pool of scratch volumes that will allow fast mount access for scratch mounts. The active status of the cartridge loader depends on the availability of scratch volumes in the assigned pool.

The Magstar Virtual Tape Server subsystem uses virtual volumes for all interaction with host software. Virtual volumes reside in the tape volume cache and show the characteristics of a Cartridge System Tape. The tape volume cache consists of a high performance array of DASD and control software. Virtual volumes are held in the tape volume cache when they are being used by the host system. Outboard storage management software manages which virtual volumes are in the tape volume cache and the movement of data between the tape volume cache and physical 3590 devices.

When a virtual volume is moved from the tape volume cache to a 3590 cartridge, the process is called a destage and the volume becomes a logical volume. When a logical volume is moved from a 3590 cartridge to the tape volume cache, the process is called a stage and the volume becomes a virtual volume again.

Functional Units

The 3494 consists of the following functional units:

- Tape Subsystem
- Library manager
- Cartridge storage
- Cartridge accessor
- Convenience input/output station
- High-capacity output or input/output facility
- Virtual tape server

Tape Subsystem: The following tape subsystems are supported in the 3494:

- IBM 3490E Model C1A or C2A
- IBM 3490E Model F1A standalone
- IBM 3490E Model F1A with FC 3000 control unit
- IBM 3590 Model B1A and E1A standalone
- IBM 3590 Model B1A or E1A with Model A00, A50, or A60 control unit

The 3490E and 3590 tape subsystems can be intermixed in a library, but they can not share the same cartridges.

Attention: Do not attempt to load a 3490 CST or ECCST cartridge in a 3590 high performance tape drive or vice versa.

IBM 3490E Model C1A/C2A

The 3494 supports the 3490E Models C1A and C2A. Each Model C1A and C2A has its own integrated control unit with a 2MB dynamic buffer. Model C1A has 1 tape drive and Model C2A has 2 tape drives. The 3490E Models C1A and C2A can read cartridges written by other 3480 and 3490 base models. Automatic cartridge loaders are not supported.

Existing 3490E Cxx models already installed can be converted to 3490E Models C1A and C2A in the field.

Data is written by using 18 tracks in one direction, and then written by using the other 18 tracks in the other direction to the physical beginning of the tape. This positions full-capacity cartridges near the load point to virtually eliminate the rewind operation.

Improved Data Recording Capability (IDRC), a unique implementation of a compaction algorithm, and data blocking are standard on 3490E Models C1A and C2A. IDRC can increase storage capacity significantly when compared to the 3480 Tape Subsystems without this capability, depending on the characteristics of the data and the operating environment.

The Enhanced Capacity Cartridge System Tape contains double the capacity of the Cartridge System Tape. The combination of the 36-track write capability, the Enhanced Capacity Cartridge System Tape, and the IDRC can result in improving the effective cartridge capacity up to 12 times when compared to a Cartridge System Tape without IDRC written in 18-track format.

To address high-performance needs, a Performance Enhancement feature enhances the Models C1A and C2A buffer performance and uses enhanced microcode for ESCON channels to achieve up to 9MB per second instantaneous data rate. Models C1A and C2A can attach up to 2 channels and can intermix ESCON, parallel, and SCSI attachments.

The 3490E Model CxA tape drives must be serviced from the front of the 3494. The library must be paused or in manual mode operation while the door is open to remove/service a drive.

IBM 3490E Model F1A

The 3490E Model F1A tape subsystem replaces the 3490E Model CxA tape subsystem used in the 3494. One or two 3490E Model F1A tape drive units may be installed in a 3494 Model L10 or D10.

The 3490E Model F1A tape subsystem contains a single tape drive equipped with a two-ported differential Fast/Wide SCSI-2 interface. Attachment of two parallel and/or ESCON interfaces is supported through the feature code 3000 control unit.

Standard features of the 3490E Model F1A tape drive are 18-track read and 36-track read/write, 3480 and 3490 tape interchange, and Improved Data Recording Capability (IDRC). IDRC provides up to 2.4GB of capacity per tape cartridge.

The 3490 Model F1A tape subsystem is designed to be serviced from the rear of the 3494. If there is another operating tape drive in the library, the 3494 can continue to operate in Auto mode while a failing 3490E Model F1A tape drive is repaired and tested.

IBM Magstar 3590

| The 3494 supports the IBM Magstar 3590 Model B1A and E1A High Performance Tape Subsystem with or without the IBM 3590 Model A00, A50, or A60 Tape Control Unit. The 3590 Automatic Cartridge Facility is not supported.

| The 3590 Model B1A and E1A is a single tape drive with its own integrated tape controller with a dynamic buffer. All data communication is processed either through SCSI attachments to the tape subsystem or through ESCON if a control unit is part of the subsystem.

| The 3590 uses the IBM 3590 High Performance Cartridge Tape and the IBM 3590 Extended High Performance Cartridge Tape (when available). This media is not compatible with the IBM Cartridge System Tape or the IBM Enhanced Capacity Cartridge System Tape used by the 3490E tape subsystem.

| The 3590 has a bidirectional read/write head. In the 3590 Model B1A, data is recorded on 128 tracks in a serpentine fashion with auto-blocking and data compaction. The 3590 Model E1A doubles the capacity with 256 track bidirectional recording, auto-blocking, and data compaction. The 3590 Model E1A can read data written by a 3590 Model B1A, but data written by the 3590 Model E1A can be read only by a 3590 Model E1A.

The 3590 tape drives are designed to be serviced from the rear of the 3494. If there is another operating 3590 tape drive in the library, the 3494 can continue to operate in Auto mode while a failing 3590 tape drive is repaired and tested.

The 3590 tape subsystem significantly enhances the maximum capacity of the 3494 library while allowing full concurrent maintenance of the tape subsystem with automatic library operation.

Library Manager: The library manager controls all of the operations in the 3494, including the interactions between the 3494 and operators. The library manager hardware consists of a system unit, a display, a keyboard with pointing device, and hardware to support communication with the other units in the 3494.

The library manager display is shut off by the operating system software when there is no activity by the operator for 15 minutes. This "snooze" function is provided to conserve power and to increase the reliability of the display hardware. If the library is powered on and the display is off, the operator can press any key on the keyboard to activate the display.

Note: The **Alt** key will also activate the OS/2 icon menu. If this key is used, press **Esc** to clear the display and return to the library manager operator menu.

The library manager is used for error recovery, for service, and for displaying operational status. It is also used by the operator when the 3494 is in manual mode. A remote console feature may be installed on the library manager to allow remote control of the library.

If a remote console has control, the keyboard and pointing device are not active on the library manager. Control must be returned to the library manager before the library manager display can be activated and the library manager used for service. You can press the **Alt+T** key combination on the library manager keyboard or terminate the session from the remote console to return control to the library manager. Refer to the *IBM 3494 Tape Library Dataserver Operator's Guide* for complete instructions.

During normal operations, the controls on the operator panel are sufficient to operate the 3494. The operator panel is located on the front of the control unit frame.

The library manager creates and maintains the 3494 configuration, the physical location of the cartridge accessor, the inventory of cartridges, and the status of the tape drives. The database resides on the hard drive in the system unit. A backup copy is maintained if the Library Manager Dual Hard Drive feature is installed or the Model HA1 is installed.

Cartridge Storage: The 3494 contains customer cartridge storage cells in all the attached frames except service bays. In addition to storage cells, the Model Lxx and Dxx frames may contain a tape subsystem. The Model Lxx control unit frame must be the first frame in the library. See “Cartridge Storage Configurations” on page INTRO-19 for details.

Storage Cell Numbering

Figure 4 shows the coordinates for the storage cells.

The wall number can be from 1 to 32 (for the largest configuration). Only the library frame (L1x, D1x, B16, or S10) walls are numbered in a dual accessor configuration starting with the L1x frame. The service bay walls are designated A1, A2 and B1, B2 as shown.

The columns are letters A–E in each frame, except for the Model Lxx control unit frame. The rows are numbered from top to bottom.

For example, address 7 B 39 is:

- In the rear of the Model B16 frame.
- In row B.
- The cartridge above the bottom cartridge (39 of 40)

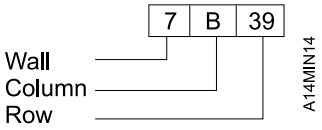

Figure 3. Cell Address Example

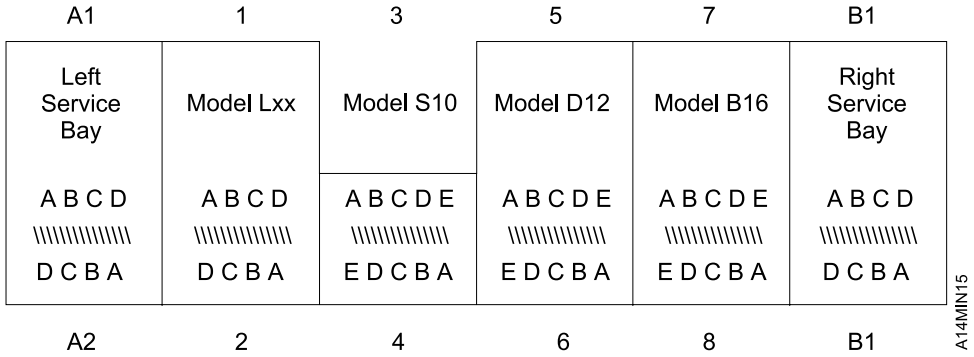

Figure 4. Top View of Tape Library

Reserved Storage Cells
The following storage cells are reserved:

Cell	Description
1A1	Gripper error recovery (1A3 if dual gripper is installed)
1A2	Gripper error recovery (only used if Model HA1 is installed; 1A4 if dual gripper is installed)
1A19	2nd CE cartridge (only in libraries with both 3490E and 3590 drives. Not used if Model HA1 is installed.)
1A20	CE cartridge (not used if Model HA1 is installed)
2A1	If the Convenience Input/Output Station feature is not installed and the high-capacity facility is not defined, 1 cell is reserved by the 3494 to eject a cartridge. (2A3 if dual gripper is installed)

Notes:

1. When the Dual Gripper feature is installed, the top two rows, 1 and 2, and the bottom two rows, 39 and 40, are not used.
2. Refer to Figure 282 on page INST-120 for the CE cartridge locations by library configuration.

Cartridge Accessor: The cartridge accessor identifies and moves cartridges between the storage cells, devices, and input/output facilities. The cartridge accessor has:

- A picker assembly for mounting one or two cartridge grippers and the bar-code reader. The picker assembly can rotate 180°.
- A cartridge gripper for picking and placing cartridges in a storage cell, a tape transport, or an input/output station.
- A bar-code reader for reading the external labels on the cartridges. The bar-code reader is used during the inventory process. It is also used when an operator door is opened to determine if any cartridges have been added to or removed from the library or if any cartridges have been moved within the library.
- An X-axis drive for moving the picker assembly the length of the rails in the library.
- A Y-axis drive for moving the picker assembly up and down in the library.

Convenience Input/Output Station: The 3494 can have a Convenience Input/Output Station feature installed for inserting or ejecting tape cartridges without interrupting the normal automated operations.

A library can have one convenience I/O station installed on the control unit door. Two different sizes are available, 10 cartridge and 30 cartridge. The 30 cartridge version is functionally equivalent to the 10 cartridge I/O station except it has two doors, one providing access to 10 I/O cells and the other providing access to 20 I/O cells.

Note: If the dual gripper feature is installed and gripper 1 fails, the top 2 cells in the convenience I/O station cannot be used until gripper 1 is repaired.

The operator panel indicates whether the I/O station is being used as an output station or an input station.

High-Capacity Output or Input/Output Facility: Two different types of high-capacity cartridge handling facilities may be defined: high-capacity output facility or high-capacity input/output facility. Only one high-capacity cartridge handling facility can be defined in the library.

The high-capacity output facility reserves a section of the cartridge storage area on the control unit frame door (wall 2) for ejecting cartridges. The size of the selected area can be 10, 20, 40, 80, or full door of storage cells. If the dual gripper is installed, the usable area is 10, 20, 36, 72, or full door of storage cells.

The high-capacity input/output facility reserves an area on an inside wall in expansion frames so that both inserts (input) or ejects (output) can be performed. A storage unit frame can be configured to use the upper storage rack (100 cells w/o dual gripper) or whole wall (200 cells w/o dual gripper) as input/output cells. A drive unit frame can only be configured to use the whole wall (50 - 135 cells depending on the model and drive configuration).

Cartridge cells allocated to the high-capacity area are not available for normal cartridge storage. The operator puts the 3494 in pause mode when unloading or loading this section of storage.

If the customer wants to configure a high-capacity output or input/output station, select the option after you select **Teach new configuration** during a new library install. If the customer decides not to use the option later or wants to move the high-capacity area, select the **Teach current configuration** option. If the high-capacity area is moved, an inventory update operation must be forced on the frame that previously contained the high-capacity output or input/output station to make the cells available for storage.

Note: Do not manually move the cartridges if you change the location of the high capacity I/O area for the customer. The LM will automatically take care of the cartridges if you are at LM code level 514 or higher.

Virtual Tape Server: The Magstar Virtual Tape Server, integrated into the 3494 Tape Library, provides for a higher utilization of 3590 tape technology than enabled by current tape controller concepts. It provides the improvement in utilization without impacting current operating system or third-party software. The subsystem combines the random access and high performance characteristics of DASD with outboard hierarchical storage management and virtual tape devices to provide significant reductions in the number of physical cartridges, devices, and automated libraries needed to store the customer tape data. The key concepts for the virtual tape server subsystem are:

- Emulation of 3490-type tape devices
- Tape volume cache
- Storage management of the tape volume cache
- Maintaining data fragments from migrated volumes
- Fast response for non-specific mount requests

A Magstar 3494 tape library can be configured with up to two virtual tape servers as follows:

- One 3494 Model B16 Virtual Tape Server.
- One 3494 Model B18 Virtual Tape Server.
- One 3494 Model B16 and one Model B18 Virtual Tape Server.
- Two 3494 Model B18 Virtual Tape Servers.

Emulation of 3490-Type Tape Devices

From a host perspective, the Model B16 VTS subsystem looks like two 3490E control units, each with 16 tape devices. The Model B18 VTS subsystem looks like two or four 3490E control units, each with 16 tape devices. Each emulated device is called a virtual tape device. The subsystem handles all 3490 tape commands. Emulating a 3490-type tape device eliminates the need for host software changes to support the 3590-type tape device. There is no direct relationship between a virtual tape device and a real 3590 tape device.

Data is written and read as if it is stored on a real Cartridge System Tape or an Enhanced Capacity Cartridge System Tape. However, within the subsystem, data is stored on DASD. All tape read and write commands are translated to read and write data records from or to DASD. Tape marks are stored as special records on the DASD as well. Volumes residing on the DASD are called virtual volumes.

The amount of data stored on a virtual volume is variable up to a maximum as determined by the media type selected. Two media types are supported (standard Cartridge System Tape and Enhanced Capacity Cartridge System Tape), and they can hold up to 400MB or 800MB of customer data, respectively.

All host interactions with data in a Virtual Tape Server subsystem are through virtual volumes and associated virtual tape devices; there is no direct access to the data on a physical cartridge or device.

Tape Volume Cache

The size of the DASD can be made large enough so that more virtual volumes can be retained in it than just the ones currently associated with the virtual devices. After an application closes a virtual volume, if it was modified, a copy of it is made by the storage management software in the subsystem onto a physical tape. The virtual volume remains available on the DASD until the space it occupies is needed to satisfy another mount request. Leaving the virtual volume in the DASD allows for fast access to it during a subsequent request for the volume. The DASD and the management of that space to keep volumes available after they are closed is called the tape volume cache. The performance for mounting of a volume that is in the tape volume cache is quicker than if a real physical volume is mounted. The DASD, in effect, caches your tape volumes and provides for fast access.

Storage Management of the Tape Volume Cache

Storage management software in the subsystem manages the contents of the tape volume cache. Virtual tape volumes are migrated from the tape volume cache to physical tape when they are no longer needed for fast access and recalled from tape to the tape volume cache when they are again requested to be mounted. The storage management software stacks multiple migrated files onto a 3590 tape, thereby utilizing its storage capacity.

Maintaining Data Fragments from Migrated Volumes

When a virtual tape volume is no longer needed in the tape volume cache, the data it represents is not completely removed. A fragment of the data is kept on DASD. The data fragment includes information about the migrated virtual volume so that it can be recalled and it also includes the first several records from the last use of the volume. Normally, the first few records on a tape contain a tape volume label, and enough data records are maintained to contain an IBM standard tape label plus any unique user label records.

Fast Response for Non-specific Mount Requests

When a non-specific mount is requested, the customer application is going to write data from the beginning of tape, overwriting any existing data on the tape. Within a Virtual Tape Server subsystem, a non-specific mount request is satisfied by accessing the data fragment in the tape volume cache associated with the virtual volume selected by the library manager to satisfy the request. No recall of the data from the previous usage of the volume is performed because the fragment contains the label information needed by the host tape management software to validate the use of the volume for a non-specific mount request. The subsystem signals the host that the mount is complete when the fragment is accessed. The result is a very low mount response time because no physical movement or mounting of a cartridge is involved.

Key Library Manager Functions

A Virtual Tape Server subsystem must be installed in an IBM library because the physical assets used by the subsystem are managed by the library manager in the library. The physical assets include the 3590 tape devices and the 3590 cartridges used for stacking logical volumes. The library manager provides several other key functions involving a Virtual Tape Server subsystem. These functions include:

- Logical library partitioning
- Operator interface
- Logical volume inventory

Logical Library Partitioning

To support the product requirement that a Virtual Tape Server subsystem can coexist with current 3490 and native 3590 subsystems in the same library, the library manager partitions the physical library into logical libraries. This must be done because a Virtual Tape Server subsystem presents the image of 3490-type tape devices, and yet cannot read or write a real 3490 cartridge. By placing a Virtual Tape Server subsystem in its own logical library, host software will not be able to attempt to allocate a Virtual Tape Server device for a real 3490 mount and vice versa.

A logical library can contain either of the following:

- A single Virtual Tape Server subsystem
- A current 3490 or native 3590 subsystem

Each logical library will have its own unique library sequence number and will look like a separate physical library to the hosts attached to the subsystems in that partition.

Operator Interface

The library manager console is used to perform the setup, management, and status functions needed to support a Virtual Tape Server subsystem.

Logical Volume Inventory

The data base in the library manager is expanded to handle the large number of logical volumes that a Virtual Tape Server subsystem uses. There are also new operator functions that allow you to add logical volumes by specifying a volume serial number range through the library manager console.

High Availability Option

The high availability option adds a second library manager to the 3494 library to improve system availability in the event of a library manager failure and adds a second accessor so the library can continue to operate in Auto mode in the event of an accessor failure. The library may continue to operate in Auto mode while a failed accessor is being serviced. This option also minimizes library down time for installing library manager code emergency fixes.

The library manager in the 3494 Model Lxx unit is designated as Library Manager A and the library manager in the Right Service Bay unit is designated as Library Manager B. The left accessor in the library is designated as Accessor A and the right accessor is designated as Accessor B.

With dual library managers, one library manager is designated Active and the other Standby. The library managers communicate with each other, with the tape or VTS control units, with direct attach hosts, and with the dual accessors. See Figure 5 on page INTRO-15 for an overview of the dual library manager/accessor configuration. In this configuration, an accessor may be controlled by either Library Manager A or by Library Manager B using the primary or alternate link. Database information is shared between the active and standby library managers so that in the event of a failure of the active unit, the standby unit can take control of the library. To the host(s) a library manager failure appears as though the library failed and went through a rapid recovery procedure. The active library manager command queue is not maintained on the standby library manager; therefore, host jobs may abend and require restart.

The library Operator Panel and Convenience I/O (if installed) are switched to the Active Library Manager. Serial Port B on each library manager, normally used to communicate to the barcode reader, is multiplexed to also communicate with the Non-Volatile Random Access Memory (NVRAM) used to maintain the library status in the event of a power failure.

The accessor manager code and associated control cards for Accessor A physically reside in Library Manager A's industrial computer. Likewise, the code and controls for Accessor B reside in Library Manager B's industrial computer. If LM A is active and is using Accessor B as the active accessor, the accessor commands are sent across the primary (or alternate) link to the accessor manager code for Accessor B in LM B and Accessor Manager B manipulates the appropriate controls to move the accessor. The error logs in LM A contain the error information for Accessor A and the error logs in LM B contain the error logs for Accessor B. Therefore, service on each accessor can only be performed using it's associated library manager, i.e. Accessor A is serviced using LM A and Accessor B is serviced using LM B.

The library manager used to service an accessor can be either the Active or Standby Library Manager, but it must be functional. In the event of a double failure (i.e. the LM failed before it's failed accessor was repaired) the LM must be repaired before the accessor can be repaired using the guided service procedures.

Most accessor FRU's can be replaced/repaired while the other accessor is operating, but some FRUs in the dual accessor control paths require special consideration as follows:

DSW2 The Dual Switch Card DSW2 located in the L1x frame has controls for both accessors so the library can not run without the card installed and functional. Before removing the card, the library should be powered off using the Unit Power switch on the Operator panel.

UEP2 The Unit Emergency Power Card UEP2 located in the L1x frame controls PCC AC power for all frames so the library can not run without the card installed and functional. Before removing the card, the library should be powered off using the Unit Power switch on the Operator panel.

DBF2 The Dual B Frame Card DBF2 located in the right service bay has controls for both accessors so the library can not run without the card installed; however, the card can be replaced without removing library AC power. To replace the card, the library should be placed in Pause mode and the local DC power supplies should be turned off. After the card is replaced, the library can be put back into Auto mode before the local DC power is turned back on.

SEQ3 The PCC Sequencer Card SEQ3 in each D1x or B16 frame contains few components and the library should continue to operate in the event of a failure. However, the library must be powered down using the Unit Power switch on the Operator panel before replacing any of the SEQ3 cards.

| **MIC4** The Machine Interface Control Card MIC4 for each accessor can be removed without removing library AC power; however, the library should be placed in Pause mode and the local DC power supplies should be turned off before removing the card. After removing the card, the library can be put back into Auto mode to continue running with the other accessor.

PMX The Port Mixing Card PMX located in the left service bay frame dots the ARTIC interface lines for the two library managers. It does not have any components other than connectors, but in the event that it must be replaced, the library must be offline.

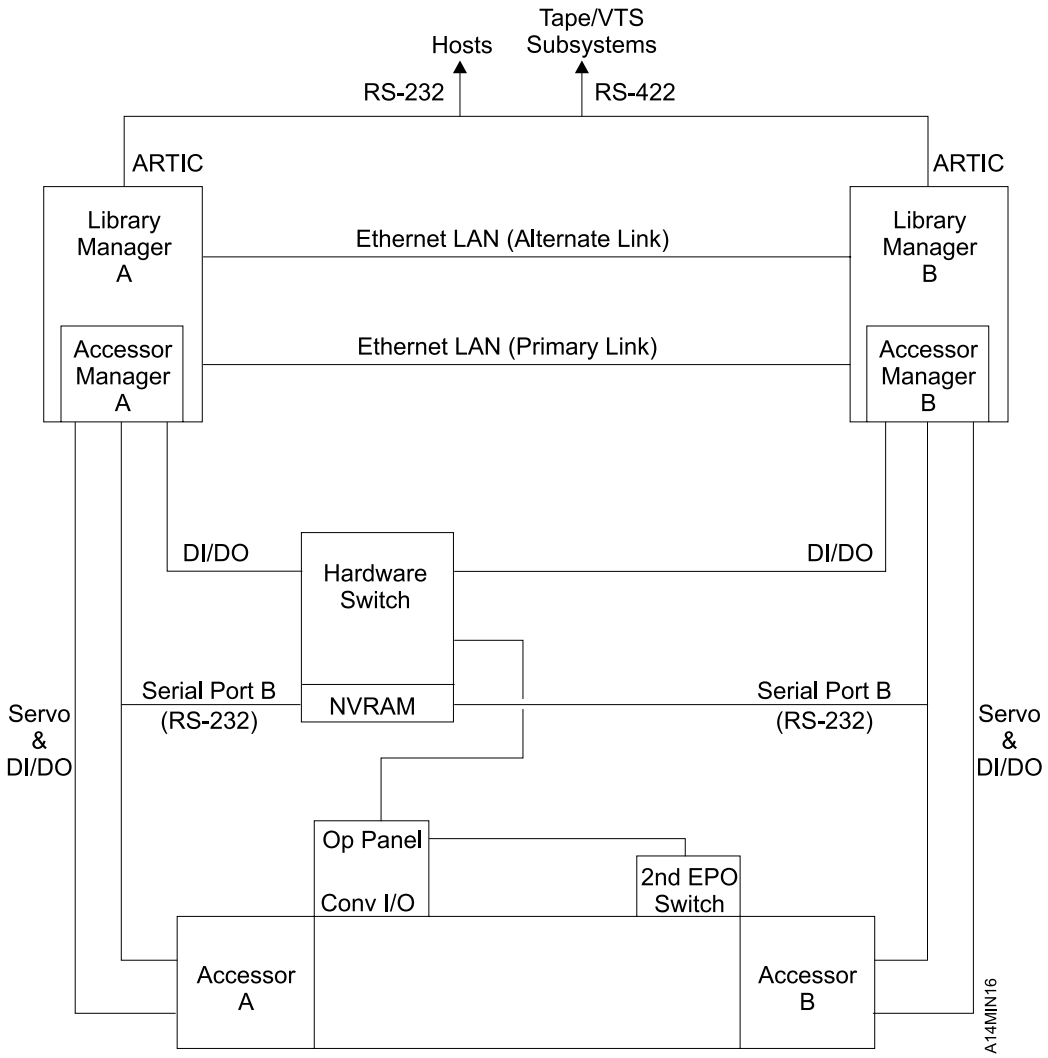

Figure 5. Dual Library Manager/Accessor Overview

Host Attachment

Two types of host attachments are provided for the 3494 library:

- Channel-attached hosts
- Direct-attached hosts

Figure 6 shows the host connection options supported for the 3494 library.

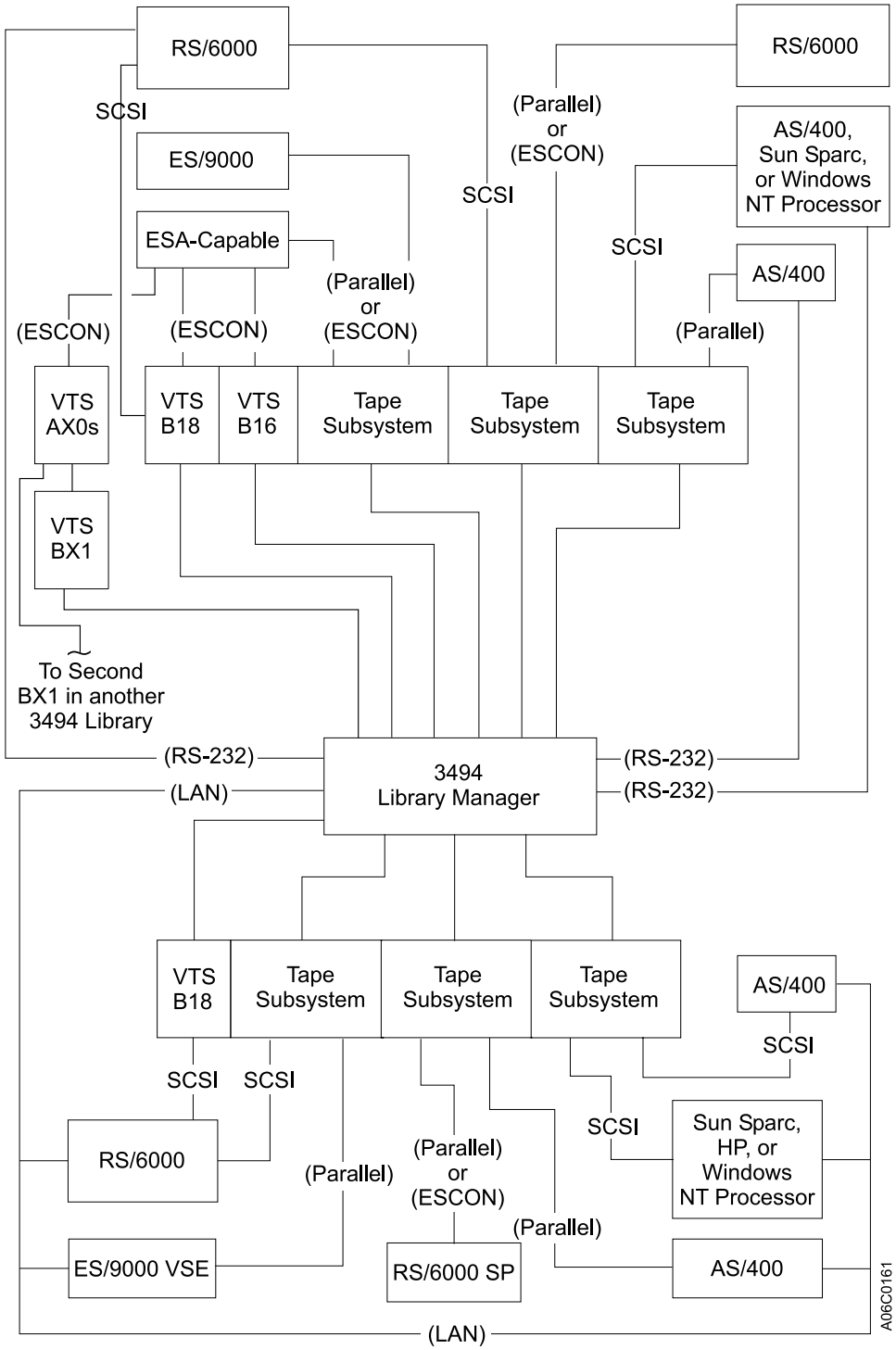

Figure 6. Host Connections

Channel-Attached Hosts Channel-attached host processors attach to the 3494 through the tape control unit in the 3494 by using either parallel or ESCON channel adapters. A separate channel or communication link to the library manager from each host is not required because the tape subsystems pass commands to the library manager through an RS-422 attachment.**:** When the 3494 is attached through ESCON or parallel adapters, all host attachments that support the tape subsystem also support the 3494. Host requests for operations, status, and other information can use any available device address configured for the tape subsystems in the 3494.

Direct-Attached Hosts When the host is attached directly to the 3494, an RS-232 or LAN (local area network) attachment is provided to allow communication from the library manager to the host. In this configuration, all normal tape subsystem commands and responses are transmitted through the tape subsystem attachments while the 3494 commands and responses are transmitted through the host RS-232 or LAN attachments. Library device drivers are provided with each direct-attached host feature for the 3494.

Tape Subsystem: 3490E Models C1A and C2A attach up to 2 channels and can intermix ESCON, small computer system interface (SCSI), and parallel adapters. The 3490 Model F1A attaches through a two-ported SCSI-2 interface or, if installed with a control unit, attaches up to 2 parallel and/or ESCON interfaces. The 3590 attaches through a two-ported SCSI-2 or UltraSCSI interface or, if installed with a tape control unit, attaches up to 4 ESCON interfaces.

Parallel channel connected 3490E subsystems can be installed up to 122 m (400 ft) from the processor in most environments. However, when the subsystem is attached to a RISC System/6000, the distance limit is 61 meters (200 feet).

ESCON-connected 3490E or 3590 subsystems can be installed up to 23 kilometers (14 miles) from the host.

SCSI-connected 3490E subsystems can be installed up to 18 meters (59 feet) from the host. The 3590 uses a 2 byte wide differential cable that conforms to the SCSI-3 standard and can be installed up to 25 meters (82 feet) from the host.

Tape Cartridge

The 3494 automates the storage and movement of tape cartridges. Both the Cartridge System Tape and the Enhanced Capacity Cartridge System Tape are supported if a 3490E tape subsystem is installed. If a 3590 tape subsystem is installed, the IBM 3590 High Performance Cartridge Tape and the Extended High Performance Cartridge Tape (when available) are also supported.

Attention: Do not attempt to load a 3490 CST or ECCST cartridge in a 3590 high performance tape drive or vice versa.

Each cartridge in the 3494 must have an external label that is operator and machine readable to identify the volume serial number (volser). The external label for the 3494 contains up to six characters for the volser. A volser can be from 1 up to 6 characters, with blanks padded on the right for a volser with fewer than 6 characters. They can be uppercase A–Z and numerics 0–9.

A separate single character label may be used to identify the cartridge *type*. The cartridge type is 1 character that follows the volser label. A (1) is used to identify the original Cartridge System Tape cartridge, an (E) is used to identify an Enhanced Capacity Cartridge System Tape cartridge, a (J) is used to identify a 3590 High Performance Cartridge Tape, and a (K) is used to identify a 3590 Extended High Performance Cartridge Tape (when available). The cartridges are not required to have the cartridge type label if only one cartridge type is in the library. If the cartridge does not have a cartridge type label, the default type (set during library teach) is assigned. In a mixed media library, it is recommended that the media type label be used on all cartridges in the library. If this is not possible or practical, a media type default can be set for a range of VOLSER's. This feature is available under the **Commands** pull-down on the operator action bar.

The external labels on the cartridges identify the cartridges to the 3494. Some software requires that the internal volser is the same as the external label on the physical volumes.

Cleaner cartridges must also have operator- and machine-readable external labels to identify each volume.

Refer to the *IBM 3494 Operator's Guide* for more information concerning the cartridges and labels.

Cartridge Storage Configurations

The 3494 has expandable configurations. For example, the 3494 can hold 160 to 6240 cartridges. The storage capacity is determined by the number of frames, if an optional Convenience Input/Output station feature is installed, and the high-capacity output area configuration. The 3494 can have a maximum of 16 library frames and 2 service bays. All configurations must include 1 library control unit frame. Configurations of the optional frames can include drive, storage, or virtual tape server units up to a total of 15 expansion frames. When the high availability option is installed, 2 service bays (one on each end of the library) are included. Also, the configuration can include 1 convenience input/output station in the library control unit frame.

Note: Refer to the *3494 Introduction and Planning Guide* for more information about the configuration rules and restrictions.

The 3494 contains customer cartridge storage cells in each frame except service bays. For example, the storage unit frame contains storage cells for 400 cartridges. In addition to storage cells, the library control unit frame and each drive unit frame may contain a tape subsystem.

Library Control Unit Frame

The library control unit frame contains an optional tape subsystem (if installed), library manager A, cartridge accessor A, the optional Convenience Input/Output Station feature (if installed), and cartridge storage cells. See “Cartridge Accessor” on page INTRO-10 and “Convenience Input/Output Station” on page INTRO-10 for details. A 3494 configuration always includes 1 library control unit frame.

The library control unit frame is available in 3 models depending on the tape subsystem installed:

- Model L10

  The 3494 Model L10 frame contains or allows installation of a 3490E Model C1A, C2A, or F1A tape subsystem.

- Model L12

  The 3494 Model L12 frame contains or allows installation of one to two 3590 Model B1A or E1A tape subsystems.

- Model L14

  The 3494 Model L14 frame contains or allows installation of a 3590 Model A00, A50, or A60 tape controller and one to two 3590 Model B1A or E1A tape subsystems.

Drive Unit Frame

The drive unit frame contains a tape subsystem and cartridge storage cells.

The drive unit frame is available in 3 models depending on the tape subsystem installed:

- Model D10

  The 3494 Model D10 frame contains or allows installation of a 3490E Model C1A, C2A, F1A tape subsystem.

- Model D12

  The 3494 Model D12 frame contains or allows installation of up to six 3590 Model B1A or E1A tape subsystems.

- Model D14

  The 3494 Model D14 frame contains or allows installation of a 3590 Model A00, A50, A60 tape controller and up to four 3590 Model B1A or E1A tape subsystems.

Storage Unit Frame

The storage unit frame is available in one model, Model S10, and contains 400 cartridge storage cells. This model has been dropped from marketing support.

Virtual Tape Server

The virtual tape server is available in two models, Model B16 and Model B18. The 3494 B16 library expansion frame contains the virtual tape server controller, DASD arrays, and cartridge storage. The Model B18 is a standalone unit that contains the virtual tape server controller and the DASD arrays.

Cartridge Capacity

Figure 7 shows the cartridge capacity of each frame.

Figure 7. IBM 3494 Cartridge Capacity

Frame	Cartridge Capacity	Tape Supported
Control unit:		
Model L10	160, 210, or 240	3490E CxA/F1A
Model L12	160, 210, or 240	3590 B1A/E1A
Model L14	160, 210, or 240	3590 Axx/B1A/E1A
Drive unit:		
Model D10	300	3490E CxA/F1A
Model D12, 0 drives	400	3590 B1A/E1A
Model D12, 1-2 drives	335	3590 B1A/E1A
Model D12, 3-4 drives	290	3590 B1A/E1A
Model D12, 5-6 drives	250	3590 B1A/E1A
Model D14, 0 drives	400	3590 Axx/B1A/E1A
Model D14, 1-2 drives	345	3590 Axx/B1A/E1A
Model D14, 3-4 drives	305	3590 Axx/B1A/E1A
Storage unit, Model S10	400	—
Virtual tape server:		
Model B16	400	—
Model B18	—	—

Notes:

1. An optional Convenience Input/Output Station feature reduces the cartridge capacity of the control unit by 30 cartridges or 80 cartridges depending on the option installed.
2. One cell is reserved for ejecting cartridges if the optional Convenience Input/Output Station feature is not installed and the high-capacity output facility is not defined.
3. In single accessor libraries, one cell is reserved for service if the library has only one type of tape subsystem (3490E or 3590). If both types are used in a library, two cells are reserved for service. In a dual accessor library, the CE cells are in the service bays.
4. One cell is reserved for error-recovery operations for each accessor in the library.
5. The optional Dual Gripper feature reduces the cartridge capacity by 10 percent on each frame.

Service Bay

The high availability option, 3494 Model HA1, provides two frames, the Left Service Bay and the Right Service Bay. The Left Service Bay is used to store and/or service the left accessor. The Right Service Bay is used to store and/or service the right accessor and Library Manager B. There are no cartridge storage cells in either service bay.

Tape Drive Configurations

The allowable physical tape drive configurations for the 3494 are shown in Figure 8 for each 3494 frame model.

The 3490 Model CxA tape drives are serviced from the front of the 3494 and the controller is serviced from the rear. The library must be in Pause mode when the 3490 Model CxA tape drives are serviced.

The 3590 Model B1A and the 3490 Model F1A tape drives and tape controller are serviced from the rear of the 3494, allowing concurrent maintenance with library Auto mode if the library has more than one tape drive installed.

No tape drives are installed in the 3494 B16 frame. It is all cartridge storage in the library aisle like the 3494 S10 frame. Also, each 3494 Dxx frame can configured as all cartridge storage with no tape drives.

Note: The 3494 Model Lxx frames can also be configured without tape drives but storage is not added in their place.

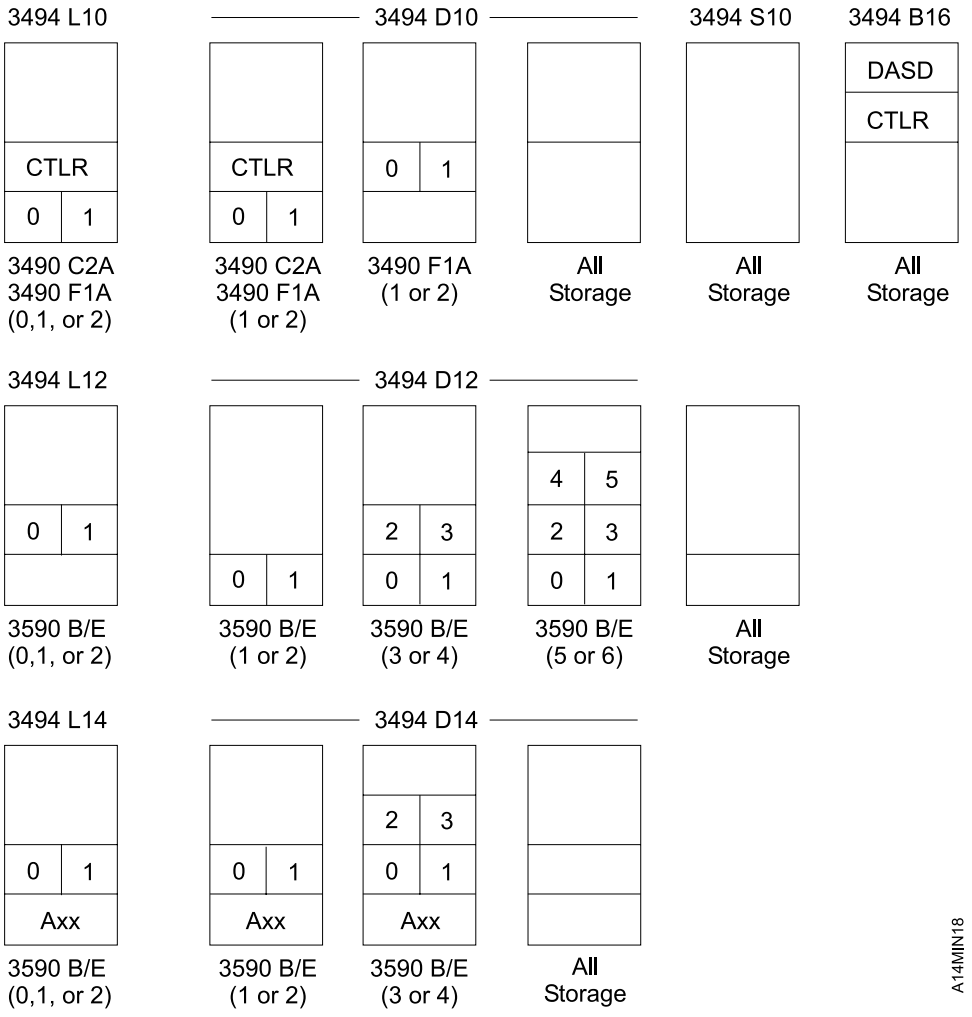

Figure 8. Tape Drive Configurations

Optional Features

The optional features for the 3494 follow. For details not shown, see *IBM 3494 Tape Library Dataserver Introduction and Planning Guide*.

2710 Remote Support Facility
2711 Remote Support Switch
2712 Remote Support Attachment
3200 ESCON High Performance Option
3302 Additional Enhanced ESCON Host Channel Attachments
3701 Disk Storage Capacity
3702 Disk Storage Capacity
5045 Enhanced Library Manager
5050 Dual Active Accessor
5210 Convenience I/O Station (10 cartridge)
5211 AS/400 Host Attachment
5212 RISC System/6000 Host Attachment
5213 Extended Length RS-232 AS/400 Host Attachment
5214 2nd Disk Drive for Library Manager
5215 Dual Gripper
5216 AS/400 Remote Power Sequence
5217 50 Ft. RS-232 Cable
5219 Token Ring Adapter
5220 Ethernet Adapter
5224 AIX Parallel Channel Tape Attachment/6000
5226 Library Manager Remote Console
5228 Tape Control Unit Expansion
5229 Expansion Attachment Card
5230 Convenience I/O Station (30 cartridge)
5232 Attachment Concentrator
5233 SCSI Extender
5234 18 Meter SCSI Cables
5300 Drive Unit, 3490E CxA
5302 Drive Unit, 3590 B1A
5304 Drive Unit, 3590 A00/B1A
5400 Storage Unit
5500 Additional Storage Unit
5502 Drive Unit for B18
| **5503** SCSI Drive Unit
| **5504** ESCON Drive Unit
9203 VSE LAN Device Driver
9204 Sun LAN Device Driver

Remote Support Facility (2710)

The Remote Support Facility feature supplies a cable and connectors for connection to an IBM supplied modem to enable remote diagnostic support. This feature should only be specified on the first unit (i.e. 3494 Model B16, B18, L10, L12, L14, or HA1; 3590 Model A00, A50) of each set of fourteen units in an installation. Each 3494 Model L1x must specify either FC 2710, 2711, or 2712.

Remote Support Switch (2711)

The Remote Support Switch feature provides a switch, cables, and connectors for the attachment of multiple units through the switch to a modem. This feature should specified on the second unit attached to the modem in an installation. One switch is required for every set of fourteen units in an installation site (i.e. 3494 Model B16, B18, L10, L12, L14, or HA1; 3590 Model A00, A50). Each 3494 Model L1x must specify either FC 2710, 2711, or 2712.

Remote Support Attachment (2712)

The Remote Support Attachment feature provides an additional cable and connector to attach to the Remote Support Switch. This feature should be specified on the third through the fourteenth unit (i.e. 3494 Model B16, B18, L10, L12, L14, or HA1; 3590 Model A00, A50). attached to the remote support switch in an installation site. Each 3494 Model L1x must specify either FC 2710, 2711, or 2712.

ESCON High Performance Option (3200)

The ESCON High Performance Option feature for the Model B18 VTS subsystem enables the support of enhanced ESCON host channel attachments with data compression, which provides larger effective disk capacities, improved performance, and 64 virtual device addressing. It replaces the two standard ESCON host channel attachments with two enhanced ESCON host channel attachments. Up to 64 logical channels can be connected per channel attachment, and using ESCON Directors can be up to 43 kilometers from the host system.

Additional Enhanced ESCON Host Channel Attachments (3302)

The Additional Enhanced ESCON Host Channel Attachments feature provides two enhanced ESCON host channel attachments for the Model B18 VTS subsystem in addition to the two added by feature 3200, for a total of four ESCON host channel attachments.

Disk Storage Capacity (3701)

The Disk Storage Capacity feature for the Model B16 VTS subsystem provides one 36 GB increment of disk storage to be used as tape volume cache by the hierarchical storage management system. Two or four of these features must be specified.

Disk Storage Capacity (3702)

The Disk Storage Capacity feature for the Model B18 VTS subsystem provides one 72 GB increment of disk storage to be used as tape volume cache by the hierarchical storage management system. One to four of these features must be specified on the initial order to select the proper disk storage capacity. Quantities of this feature are only available for field installation when concurrent with a Model B16 to B18 model conversion.

Enhanced Library Manager (5045)

The Enhanced Library Manager feature provides an enhanced library manager for a 3494 tape library that does not have the 3494 Model HA1 attached. This feature is for libraries that were shipped before the enhanced library manager was available in May, 1997.

Dual Active Accessor (5050)

The Dual Active Accessor feature enables both accessors in a library with a 3494 Model HA1 to be active at the same time.

Convenience I/O Station (5210 or 5230)

The Convenience I/O Station feature allows an operator to add or remove tape cartridges from the 3494 without interrupting normal operations. Two convenience I/O station options are planned, 10 cartridge and 30 cartridge.

Feature 5210 has a capacity of 10 cartridges and reduces the cartridge capacity in the control unit frame by 30 cartridges.

Feature 5230 (when available) has a capacity of 30 cartridges and reduces the cartridge capacity in the control unit frame by 80 cartridges.

AS/400 Host Attachment (5211)

The AS/400 Host Attachment feature is required when an AS/400 processor is directly attached to the 3494 through an RS-232 15-m (50-ft) attachment or LAN attachment between the host and the library manager. This feature includes the Media Library Device Driver (MLDD) for OS/400. A LAN adapter feature (5219 or 5220) is also required if the LAN attachment option is selected.

RISC System/6000 Host Attachment (5212)

The RISC System/6000 Host Attachment feature is required when a RISC System/6000 processor is directly attached to the 3494 through an RS-232 15-m (50-ft) attachment or LAN attachment between the host and the library manager. This feature includes the library device driver for AIX. A LAN adapter feature (5219 or 5220) is also required if the LAN attachment option is selected.

Extended Length RS-232 AS/400 Host Attachment (5213)

The Extended Length RS-232 AS/400 Host Attachment feature is required when an AS/400 processor is directly attached to the 3494 and the distance to the library is greater than 15 m (50 ft). This attachment provides a 122 m (400-ft) communication link between the AS/400 host and the 3494 tape library. This feature includes the Media Library Device Driver (MLDD) for OS/400.

2nd Disk Drive for Library Manager (5214)

The 2nd Disk Drive for Library Manager feature allows mirroring of the library manager database. This provides the capability to recover the library manager database in case of the failure of the primary disk drive. This feature is required if a Model B16, B18, or HA1 is included in the library.

Dual Gripper (5215)

The Dual Gripper feature provides accessor performance enhancement utilizing floating home cell, particularly in longer configurations with three or more frames. It also provides redundancy for the reach and grip assemblies. When this feature is installed, the storage capacity of the library is reduced by 10 percent.

AS/400 Remote Power Sequence (5216)

The AS/400 Remote Power Sequence feature permits power-on and power-off sequencing by attached AS/400 host processors.

50 Ft. RS-232 Cable (5217)

The 50 Ft. RS-232 Cable feature provides a cable for use with feature code 9204 (Sun LAN Device Driver) or for attachment to AS/400 systems with OS/400 Version 3 Release 6 or higher installed when attachment via a RS-232 port is desired.

Token Ring Adapter (5219)

The Token Ring Adapter feature allows the library manager to attach to a Token Ring LAN. The appropriate 3494 device driver feature is also required.

Ethernet Adapter (5220)

The Ethernet Adapter feature allows the library manager to attach to an Ethernet LAN. The appropriate 3494 device driver feature is also required.

AIX Parallel Channel Tape Attachment/6000 (5224)

The AIX Parallel Channel Tape Attachment/6000 feature is a device driver that, together with the System/370 Channel Emulator/A adapter (system feature), allows attachment of 3490E Models C1A and C2A on a RISC System/6000 host or POWERparallel SP2* host.

Library Manager Remote Console (5226)

The Library Manager Remote Console feature provides the capability to attach a second library console on the installation's Token Ring or Ethernet LAN to monitor and/or control the library. The appropriate 3494 LAN adapter feature is also required.

Tape Control Unit Expansion (5228)

The Tape Control Unit Expansion feature converts four direct attach host processor connections to four tape control unit connections on either the base library manager or the Expansion Attachment Card (feature 5229). The maximum number of features allowed is two.

This feature provides four RS-232 to RS-422 interface convertors. One convertor is used for each ARTIC RS-232 port that you are attaching to an RS-422 tape control unit port.

This feature is not required if a Model HA1 is included in the library because this attachment is standard with that model.

Expansion Attachment Card (5229)

The Expansion Attachment Card feature adds an additional ARTIC card with 4 direct access host RS-232 ports and four tape subsystem RS-422 ports. If feature 5228 is also installed, eight additional tape subsystems can be attached.

Attachment Concentrator (5232)

The Attachment Concentrator feature provides an internal LAN attachment for the 3494 Model B18 Virtual Tape Server to the 3494 library manager in a Model L1x frame. This feature is required when a Model B18 is attached to the library.

SCSI Extender (5233)

| The SCSI Extender feature provides two SCSI extenders for attachment of Magstar 3590 Tape Drives in the 3494 Model D12 to an externally attached 3494 Model B18 Virtual Tape Server. This feature is required to be added to any 3494 Model D12 when a Model B18 will be attached.

18 Meter SCSI Cables (5234)

The 18 Meter SCSI Cable feature provides two 18 meter SCSI cables for attachment of a 3494 Model B18
| VTS control unit to the 3590 tape drives in the associated 3494 Model D12.

Drive Unit, 3490E CxA (5300)

The Drive Unit, 3490E CxA feature is similar to the 3494 Model D10 except this feature always includes the mounting hardware for a 3490E Model CxA tape subsystem.

This feature has been dropped from marketing support.

Drive Unit, 3590 B1A (5302)

The Drive Unit, 3590 B1A feature is similar to the 3494 Model D12. This feature provides for up to two 3590 Model B1A tape drives.

This is a field feature only.

Drive Unit, 3590 A00/B1A (5304)

The Drive Unit, 3590 A00/B1A feature is similar to the 3494 Model D14. This feature provides for up to two 3590 Model B1A tape drives and one 3590 Model A00 tape controller.

This is a field feature only.

Storage Unit (5400)

The Storage Unit feature is equivalent to the 3494 Model S10.

Additional Storage Unit (5500)

The Additional Storage Unit feature must be ordered on an MES for the 3494 Model L1x frame when a Model B16 Virtual Tape Server is converted to a Model B18 and the Model 16 frame is to be converted to a storage frame which becomes a feature of the Model L1x.

Drive Unit for B18 (5502)

The Drive Unit for B18 feature must be ordered on an MES for the 3494 Model L1x frame when a Model B16 Virtual Tape Server is upgraded to a Model B18, and the Model B16 frame is converted into a Drive Unit for B18 frame (similar to a 3494 Model D12 with the SCSI Extender feature #5233 and feature #9010) that can be associated with a Model B18 Virtual Tape Server (VTS). This converted frame becomes a feature on the Model L1x. It contains the mounting hardware for three or four Magstar 3590 Tape Drives and the SCSI extender for attaching those drives to the Model B18.

SCSI Drive Unit (5503)

The SCSI Drive Unit feature must be ordered on an MES for the 3494 Model L1x frame when a Model B16 Virtual Tape Server is upgraded to a Model B18, and the Model B16 frame is converted into a SCSI Drive Unit frame (similar to a 3494 Model D12). This converted frame becomes a feature on the Model L1x. It contains the mounting hardware for three or four Magstar 3590 Tape Drives that will be SCSI attached to host system SCSI adapters.

ESCON Drive Unit (5504)

The ESCON Drive Unit feature must be ordered on an MES for the 3494 Model L1x frame when a Model B16 Virtual Tape Server is upgraded to a Model B18, and the Model B16 frame is converted into an ESCON Drive Unit frame (similar to a 3494 Model D14). This converted frame becomes a feature on the Model L1x. It contains the mounting hardware for one or two Magstar 3590 Tape Drives and one 3590 Axx Controller that can be attached to host system ESCON channels.

VSE LAN Device Driver (9203)

The VSE LAN Device Driver feature allows an ES/9000 processor running native VSE/ESA* to drive the 3494 over a LAN. The appropriate 3494 LAN adapter feature is also required.

Sun LAN Device Driver (9204)

The Sun LAN Device Driver feature allows all Sun SPARC** processors to drive the 3494 over a LAN. The appropriate 3494 LAN adapter feature is also required.

Field Conversions

The following Miscellaneous Equipment Specification (MES) conversions can be installed in the field:

- Convert 3490 Model C10 to C1A and install.
- Convert 3490 Model C11 to C1A and install.
- Convert 3490 Model C22 to C2A and install.
- Convert 3490 Model C1A to C2A.
- Convert 3590 Model B11 to B1A.
- Convert 3494 Model L10 to L12.
- Convert 3494 Model L10 to L14.
- Convert 3494 Model D10 to D14.
- Convert 3494 Model D10 to D12.
- Convert 3494 Model B16 to B18.
- Convert 3494 feature 5300 to 5302.
- Convert 3494 feature 5300 to 5304.
- Install 3490E Model CxA in 3494 Model D10 or 3494 feature 5300.
- Install 3490 Model F1A in 3494 Model D10 or 3494 feature 5300.
- Replace 3490 Model CxA with 3490 Model F1A in 3494 Model D10 or 3494 feature 5300.
- Install 3590 Model B1A in 3494 Model L12, L14, D12, or D14, or in 3494 feature 5302 or 5304.
- Install Convenience I/O Station.
- Install AS/400 Host Attachment.
- Install RISC System/6000 Host Attachment.
- Install Extended Length RS-232 AS/400 Host Attachment.
- Install 2nd Disk Drive for Library Manager.
- Install Dual Gripper.
- Install AS/400 Remote Power Sequence.
- Install Sun LAN Device Driver.
- Install Token Ring Adapter.
- Install Ethernet Adapter.
- Install AIX Parallel Channel Tape Attachment/6000.
- Install VSE LAN Device Driver.
- Install Library Manager Remote Console.
- Install Expansion Attachment Card.
- Install Tape CU Expansion
- Install Additional Storage or Drive Units.

Note: The software device drivers are delivered to the customer for customer installation on their system.

Maintenance Plan

The 3494 may include four hardware subsystems: the 3494 library, the tape subsystem, the library manager system, and the virtual tape server controller and DASD. The tape subsystem and the library manager system are maintained using their stand-alone maintenance packages. Also, if the virtual tape server subsystem is installed, the controller and DASD arrays are maintained using the virtual tape server maintenance package. The 3494 maintenance package supports the 3494 library hardware and the library interfaces with the tape subsystem and the library manager system.

The 3466 Network Storage Manager uses the 3494 maintenance package for library hardware maintenance. The controller and DASD arrays are maintained using the 3466 maintenance package.

The 3494 maintenance package includes software routines in the library manager and instructions in this document. The software routines provide guided service procedures, error log analysis, diagnostic tools, and service call administration aids. This document provides detailed problem determination information, maintenance procedures, location information, and other support information.

Maintenance Start

Start all maintenance activity for the 3494 library and the integrated subsystems using the START section in this publication. A symptom to action table is provided for you to quickly determine which procedure to use for your problem and how to prepare the library for service. Subsystem problem determination information is included to help determine the failing subsystem. For hardware failures, you will be directed to one of the following procedures to continue your maintenance activity:

- Library manager Service menu, start service call option
- A START procedure in this publication
- *PS/ValuePoint Hardware Maintenance Manual*, *IBM 7585 Industrial Computer Information*, or *IBM 7588 Industrial Computer Information*, general checkout section
- Start section of the appropriate tape subsystem manual:
  - *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Maintenance Information*,
  - *IBM 3490E Tape Subsystem Model F01, F11, FC0 and F1A Maintenance Information*,
  - *IBM 3490E Tape Subsystem FC 3000 Controller Maintenance Information*,
  - *IBM Magstar 3590 Tape Subsystem Models Bxx and Exx Maintenance Information*,
  - *IBM Magstar 3590 Tape Subsystem Axx Controller Models Maintenance Information*,
- Start section of the appropriate virtual tape server manual:
  - *IBM 3494 Model B16 Virtual Tape Server Maintenance Information*,
  - *IBM Magstar 3494 Model B18 Virtual Tape Server Maintenance Information*,

Preventive Maintenance (PM)

PM is performed yearly during a service call for the average library. For a high-usage library, PM should be performed every 500,000 meters traveled on the Y-axis. See “Preventive Maintenance (PM)” on page CARR-139 for details.

Cleaning

It is recommended that the external surfaces of the 3494 be cleaned with a mild detergent solution. Do not use abrasives, solvents, or alcohol based cleaners.

Remote Service

Remote service allows field support personnel to access the library manager transaction and error logs remotely at the time of a problem to diagnose difficult hardware problems or to analyze microcode problems. It allows faster emergency fixes using fix packs for code problems by eliminating the time required to transmit or mail the logs to the lab and the time required for error recreation by the lab personnel.

Remote support is provided through feature 2710, 2711, or 2712 for the 3494 Model L1x. This feature allows authorized personnel to access the logs normally available to the service personnel through the 3494 operator and service menus.

Remote Support Access Security: There is no customer data on the 3494 library manager other than information about where the customer's tapes are located in the library. Customer data on the tapes is passed directly to the host from the tape drive and does not pass through the library manager.

Three levels of protection are available to prevent unauthorized access to the library manager logs when the remote support features are installed.

1. Modem password protection
2. Switch password protection
3. Library manager storage administrator password protection

The modem can be configured to have password protection so that only dial-in users with the password can gain access to the serial port of the library manager. The modem can accept up to 50 unique passwords, if desired.

In addition, the switch (if installed) allows selection of one unique password. This switch is inline with the modem, and either or both can be password enabled.

Finally, the storage administrator password is required to activate the remote support access capability in the library manager.

Data Flow

The initial 3494 libraries used the MIC1/LCC card set. In later libraries, this card set was replaced by the MIC2/LPC2 card set which was updated to MIC3/LPC3 to support the 9-16 frame expansion, and then to MIC4 to support dual accessors. In the high availability library, the LPC card is replaced with the DSW or DBF cards which perform the LPC functions. The following figures show the data flow for the two versions of the library subsystem control, MIC1 and MIC2-4, and the dual library manager/accessor controls.

Data Flow with MIC1/LCC Card Set

See Figure 9 for the keys and the description of the cards. Figure 10 on page INTRO-33 shows the data flow with the MIC1/LCC card set.

Figure 9. Logic Cards

Key	Card Name	Description
1	Library Attachment Card	The interface between the library manager and the tape control unit. This card is in the tape subsystem and uses an RS-422 interface to communicate with the library manager.
2	Real-Time Interface Co-processor (ARTIC)	The serial interfaces to processors and tape subsystems. The ARTIC contains 4 RS-232 ports and 4 RS-422 ports. The RS-232 ports provide an interface to host processors. The RS-422 ports provide the interface to the tape subsystems. Two ARTIC cards are installed if feature code 5229 is installed.
3	Library Interconnect Card (LCC)	The interfaces between the library manager and the X and Y motors and their sensors. Also, the interface between the X- and Y-axis power amplifiers and the motors.
4	Bulkhead Interconnect Card (BIC)	The interface between the front and the rear of the control unit frame. Also provides unit emergency interface for attached drive units.
5	X/Y Axis Card (XAX)	The interface with the Y-axis home sensor, the Y-axis motor, and the X-axis motor. Also, the interface to the picker card.
6	Communication Port B	The serial communication interface with the bar-code reader.
7	Servo Control Card (SRV)	The interface to control the X and Y motors.
8	Digital-In/ Digital-Out Card (DI/DO)	An interface between the library manager and the other components in the 3494. The digital-in (DI) interface allows the library manager to sense the conditions of the sensors, for example, a door interlock switch. The digital-out (DO) interface allows the library manager to turn on indicators and pick solenoids, for example, to lock the I/O station.
9	Machine Interface Control Card 1 (MIC1)	The interface control between the DI/DO card and the other components. It also generates the +12V, –12V, and +5V dc. Another function of the MIC1 is that it controls the local and remote power sequencing for all attached frames.
10	Remote Power Control Card (RPC)	The remote power sequence interface when the 3494 is attached to AS/400 or 9309 processors. This card is part of the AS/400 Remote Power Sequencing feature.
11	Door Interlock Card (DIL)	The interface to the operator door interlock switches in all the frames.
12	Operator Panel Card (LPN)	The interface to the indicators and switches on the operator panel. It also provides the interface to the convenience input/output station, which is an optional feature.
13	Picker Card (GRI)	The interface to the picker sensors, solenoids, and motors. It also provides the interface to the bar-code reader.
14	Reach Card (RCH)	The interface to the reach motors and sensors. It also provides the interface to the grip card. A second reach assembly is installed if feature code 5215 is installed.
15	Grip Card (GRP)	The interface to the sensors and solenoids on the grip assembly.
16	LAN Adapter (feature)	Provides LAN attachment for direct-attached hosts or for a remote console. Token Ring or Ethernet LAN adapters are supported.

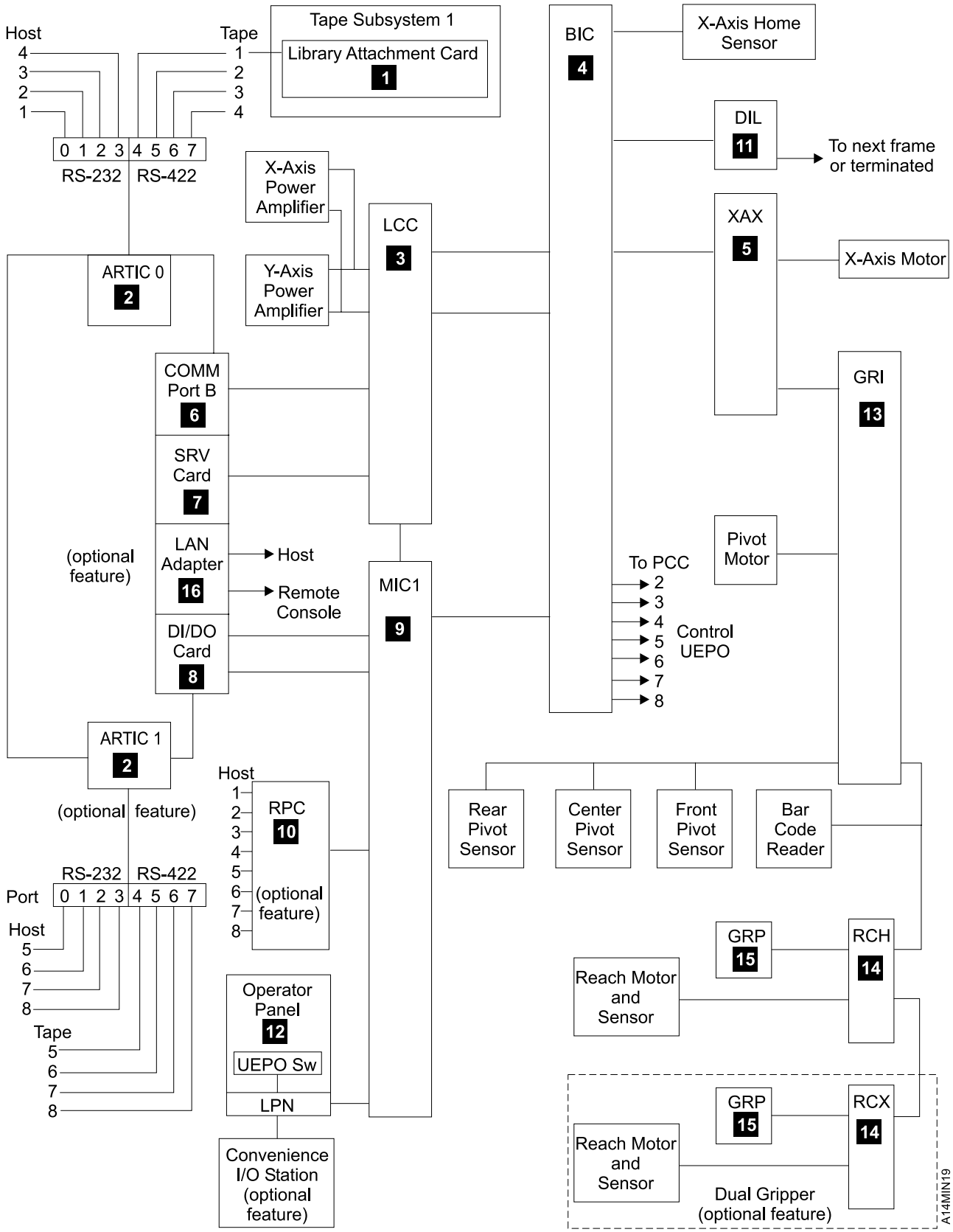

Figure 10. Data-Flow Diagram with MIC1/LCC Card Set

Data Flow with MIC2-4/LPC2,3 Card Set

See Figure 11 for the keys and the description of the cards. Figure 12 on page INTRO-35 shows the data flow with the MIC2-4/LPC2,3 card set.

Figure 11. Logic Cards

Key	Card Name	Description
1	Library Attachment Card	The interface between the library manager and the tape control unit. This card is in the tape subsystem and uses an RS-422 interface to communicate with the library manager.
2	Real-Time Interface Co-processor (ARTIC)	The serial interfaces to processors and tape subsystems. The ARTIC contains 4 RS-232 ports and 4 RS-422 ports. The RS-232 ports provide an interface to host processors. The RS-422 ports provide the interface to the tape subsystems. Two ARTIC cards are installed if feature code 5229 is installed.
3	Library Power Control Card (LPC)	Provides power control for the library. Also the interface between the MIC2-4 card and the operator panel and convenience I/O station.
4	Bulkhead Interconnect Card (BIC)	The interface between the front and the rear of the control unit frame. Also provides unit emergency interface for attached drive units.
5	X/Y Axis Card (XAX)	The interface with the Y-axis home sensor, the Y-axis motor, and the X-axis motor. Also, the interface to the picker card.
6	Communication Port B	The serial communication interface with the bar-code reader.
7	Servo Control Card (SRV)	The interface to control the X and Y motors.
8	Digital-In/ Digital-Out Card (DI/DO)	An interface between the library manager and the other components in the 3494. The digital-in (DI) interface allows the library manager to sense the conditions of the sensors, for example, a door interlock switch. The digital-out (DO) interface allows the library manager to turn on indicators and pick solenoids, for example, to lock the I/O station.
9	Machine Interface Control Card 2-4 (MIC2-4)	The interface control between the accessor manager cards and the other components. It also generates the +12V, –12V, and +5V dc.
10	Remote Power Control Card (RPC)	The remote power sequence interface when the 3494 is attached to AS/400 or 9309 processors. This card is part of the AS/400 Remote Power Sequencing feature.
11	Door Interlock Card (DIL)	The interface to the operator door interlock switches in all the frames.
12	Operator Panel Card (LPN)	The interface to the indicators and switches on the operator panel. It also provides the interface to the convenience input/output station, which is an optional feature.
13	Picker Card (GRI)	The interface to the picker sensors, solenoids, and motors. It also provides the interface to the bar-code reader.
14	Reach Card (RCH)	The interface to the reach motors and sensors. It also provides the interface to the grip card. A second reach assembly is installed if feature code 5215 is installed.
15	Grip Card (GRP)	The interface to the sensors and solenoids on the grip assembly.
16	LAN Adapter (feature)	Provides LAN attachment for direct-attached hosts or for a remote console. Token Ring or Ethernet LAN adapters are supported.
	Expansion Power Control (SPC)	Provides interface for the door interlock switches in frames 9-16, the 24V UEPO signal from each PCC in frames 9-16, and the remote Unit Emergency switch. The SPC Card is installed between the DIL Card 11 in frame 8 and frame 9.

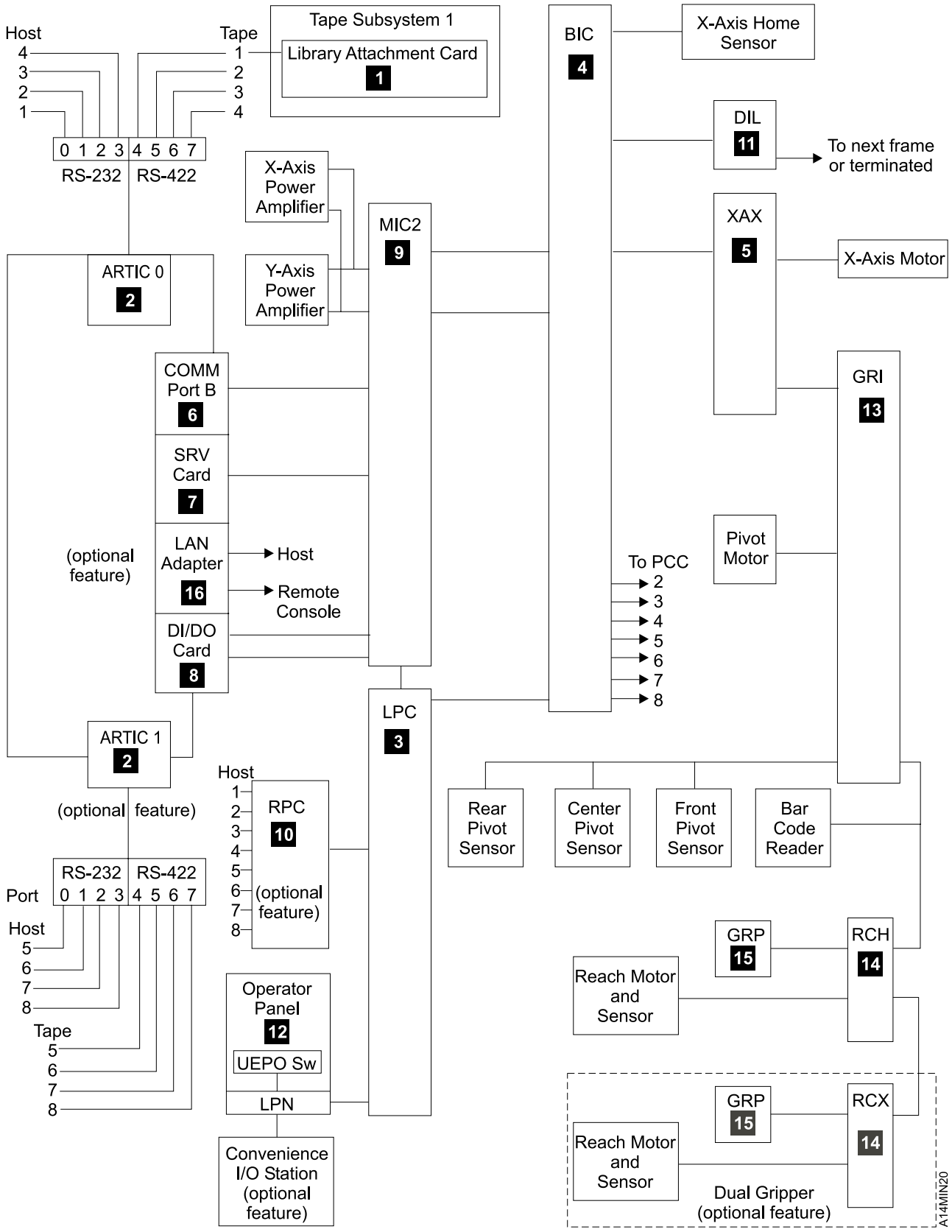

Figure 12. Data-Flow Diagram with MIC2-4/LPC Card Set

Dual Library Manager/Accessor Controls

See Figure 13 for the keys and the description of the cards. Figure 14 on page INTRO-37 shows the block diagram of the dual accessor controls. Refer to Figure 5 on page INTRO-15 for the dual library manager/dual accessor overview and to Figure 12 on page INTRO-35 for the complete data flow.

Figure 13. Logic Cards

Key	Card Name	Description
1	Unit Emergency Power Card (UEP)	Provides unit emergency power control and the non-volatile RAM (NVRAM) used to maintain the library status in the event of a power failure. This card is located in the Lxx frame.
2	Dual Switch Card (DSW)	Switches the door circuits and the front panel controls/sensors between LM A and LM B so that the active LM has control. This card is located in the Lxx frame and replaces the LPC card used in a single accessor library.
3	Dual B Frame Card (DBF)	Connects the door circuits and the front panel controls/sensors at the LM B end. This card is located in the Right Service Bay (RSB) frame and provides the LPC card functions in the accessor B data flow.
4	PCC Sequencer Card (SEQ)	Allows a Power Control Compartment (PCC) in a library expansion frame to be powered off while keeping the other PCC's powered up. This card is located in each DXX or B16 expansion frame.
	Port Mixing Card (PMX)	Dots the ARTIC ports for LM A and LM B together so both LM's can communicate with the direct attached hosts and tape/VTS subsystems. One card is required for each ARTIC card in LM A. They are located in the Left Service Bay (LSB) frame.

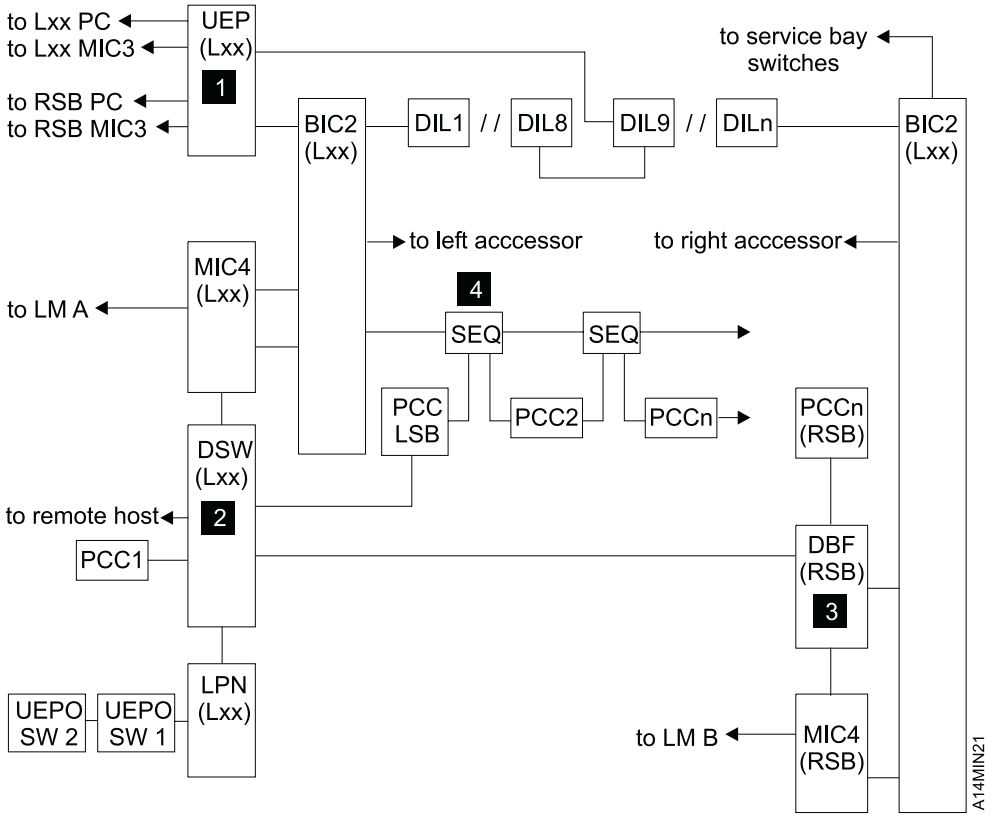

Figure 14. Dual Accessor Block Diagram

Operator Panel

The operator panel is located on the front of the control unit frame. Figure 15 and Figure 16 on page INTRO-39 show the controls, indicators, and opener.

Figure 15. Operator Panel

Key	Name	Description
1	Unit Emergency switch	Removes power to the 3494 immediately and should only be used during an emergency. This switch must be in the on position to enable the 3494 power on switch to operate. **Attention:** Do not change the position of this switch during normal operations. If the 3494 is operating, the effect is unpredictable.
2	Unit Power switch	Turns power on and off to the components inside the 3494 when the Local/Remote switch is in the Local position. The Unit Power switch is used to sequence power on and off the 3494 under normal conditions. When the switch is put in the **off** position, the library manager code automatically does a **shutdown**. When the shutdown completes, the library will power off.
3	Rack Power Ready indicator	Indicates that the 24V dc control voltage is on in the 3494 Control Unit. When the LED is flashing, AC power is on to the PCC in the 3494 Control Unit, the Power On switch is set to on, and the 24V dc control voltage has not come up.
4	System Power Ready indicator	Indicates that ac power is available to the tape subsystems in the 3494. When the LED is flashing, the PCC in the 3494 Control Unit frame is powered on, but one or more of the attached PCCs in drive unit frames have not powered up.
5	Power Off Pending indicator	Indicates that the power is being switched off to the 3494. The library manager is completing current operations.
6	Local/Remote switch	Allows the library's power to be controlled by the switches on the operator panel (local) or through a host (remote) if the remote power control feature is installed.
7	Auto switch and indicator	The 3494 will attempt the change to auto mode. When the LED is flashing, the library manager is in the process of changing to this mode. When the LED is lit, the library manager is in auto mode.
8	Pause switch and indicator	The 3494 will attempt the change to pause mode. When the LED is flashing, the library manager is in the process of changing to pause mode. When the LED is on, the library manager is in pause mode.
9	Intervention Required indicator	Indicates that operator actions are required to continue operations at full capability.
Note: The following are present if a Convenience I/O Station feature is installed.		
10	Input Mode indicator	Indicates that cartridges are in the convenience input/output station and the station is in input mode.
11	Output Mode indicator	Indicates that the cartridge accessor is ejecting cartridges from the library into the convenience input/output station.
12	Unload Required light	Indicates that the convenience input/output station has ejected cartridges that the operator must remove. If the Output Mode indicator is on, the host or operator requested an eject operation. If the Input Mode indicator is on, the operator inserted the cartridges and the 3494 cannot add them to the inventory.
13	I/O Locked indicator	Indicates that the cartridge accessor is in use and the convenience input/output station door cannot be opened.
14	Opener	Allows the operator to open the input/output station.

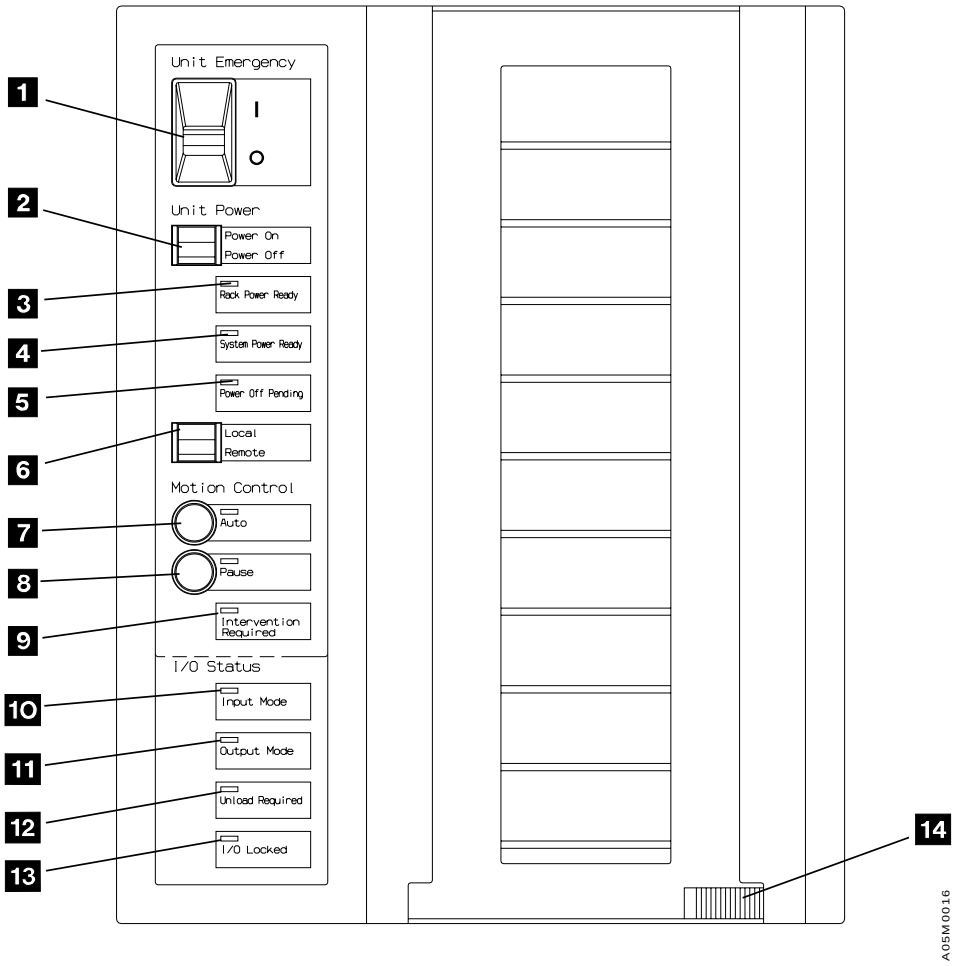

Figure 16. Operator Panel

Notes:

1. When switching power off, always wait at least 30 seconds before switching power back on. Otherwise, the 3490E tape subsystem will not complete the IML process.
2. Except for the Unit Emergency Switch, the 3494 operator panel is not active when the library is in manual mode. The library manager must be used to control the library.
3. A remote Unit Emergency switch is located at the right end of the library if it is longer than 8 frames. This switch functions the same as the Unit Emergency switch **1** on the Operator Panel. If the remote switch is installed, both switches must be in the ON position to enable the Unit Power switch to operate.

Start

Maintenance Starting Point

Start at the top of each table. Locate the reason you are here in the left column and perform the action in the right column. **Refer to "Subsystem Problem Determination" on page START-6 if you are unable to determine the maintenance action for your situation.**

Library Service Approach

1. **Use** the **Start Service** table to determine the service action to perform and the **Prepare for Service** table to prepare the library for service. The symptoms and actions are listed in order of priority.
2. **Follow** the recommended service procedure, **Library Manager Start Service Call** or **Start Procedure** in this manual, until a list of possible FRUs is recommended for the problem.
3. **Review** the **Primary** and **Secondary** FRU List, **ensure** that all associated cards and cables are properly seated, and **inspect** mechanical assemblies for obvious damage before ordering or replacing FRUs.

   Note: If a problem is fixed by reseating a cable or card, please enter a specific comment in your field tracking system or contact your next level of support with the information.
4. Use **LOC** and **CARR** in this manual to **replace** recommended FRUs in probability order. If a FRU does not correct the problem, re-install the original FRU and return the new FRU to stock. **Replace mechanical assemblies only if you detect obvious damage. Replace power supplies only if you have no DC output and the power supply does not recover when AC power is turned off to the power supply for 30 seconds.**

   Notes:

   a. If the situation is critical (i.e. single point of failure on a high availability system or severe impact to customer operations), you should ensure that all FRUs in the FRU group are available locally in case they are needed. The unused FRUs should be returned to stock immediately after the problem is corrected.

   b. If the problem is intermittent and you can not get it to fail, replacement of the Primary FRU Group (minus the mechanical assemblies) may be appropriate on the first call to minimize callbacks. Use your judgement, based on problem severity and customer input, to determine the correct action to take.

   c. Do not replace multiple FRUs on a trial repair if the problem is solid or can be recreated. In addition, if a FRU does not correct the problem, re-install the original FRU and return the new FRU to stock. This will avoid the introduction of new problems that may increase the outage time.
5. **Verify** that the library is functioning correctly. The **Library Manager Verify Repair** procedure is automatically invoked by the **Start Service Call** procedure or can be invoked directly from the **Service** menu.
6. **Return** the library to customer use as directed by the **Library Manager End Service Call** procedure. This procedure is automatically invoked by the **Start Service Call** and **Verify Repair** procedures or can be invoked directly from the **Service** menu.

Prepare for Service

Figure 17. Prepare for Service

If You Are Here for This Reason	Perform This Action
PREPARE LIBRARY FOR SERVICE	Go to “Procedure: Prepare the Library Subsystem for Service” on page START-10
ENTER SERVICE MODE ON LIBRARY MANAGER	1. Go to the display and keyboard on the rear door. If the library is powered on and the display is not on, press any key on the keyboard to activate it. Press **Alt+T** if a remote console has control. 2. At the Operator menu, select **Mode**. 3. From the Mode pull-down, select **Service menu**. 4. If password protection is used, enter **service** when the Service Password dialog box is displayed, and then press **OK**. The Service Mode action bar is displayed. **Note:** Password protection is a customer option set at installation. See “Service Mode” on page DIAG-4.
INSPECTION FOR MAINTENANCE AGREEMENT QUALIFICATION OR STATUS 3 SERVICE CALL.	Go to “Safety and Inspection” on page INSP-1.

Start Service

Figure 18 (Page 1 of 2). Start Service

If You Are Here for This Reason	Perform This Action
A 24V OR 36V DC POWER INDICATOR IS NOT ON - located on front of power supplies.	1. The DC power supplies are designed to shut off (crowbar) for protection if there is excessive current being drawn from the supply due to mechanical binding, shorted cable, defective card, or defective motor. They will reset when AC power to them is off for 20 seconds. Go to **2BF3** or **2BF4** in the **FSI** section to test the supply if it has shut off. **Do not replace the power supply if it tests OK.** 2. To analyze power problems, go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27.
LIBRARY SUBSYSTEM POWER PROBLEM (includes library, library manager, and tape subsystem)	Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27.
LIBRARY MANAGER HARDWARE PROBLEM (includes personal computer system unit, display, and keyboard)	1. Ensure that you prepare the library for service as directed by "Procedure: Prepare the Library Subsystem for Service" on page START-10. 2. If error is OS/2 Co-processor I/O error, go to "ARTIC Diagnostics" on page DIAG-24. 3. Go to **General Checkout** in *PS/ValuePoint Hardware Maintenance Manual* or *IBM 7585/7588 Industrial Computer Information*. See "Checks, Adjustments, Removals, and Replacements" on page CARR-1 for library manager FRU replacement procedures.
LIBRARY MANAGER FAILS TO INITIALIZE (library manager severe error or database problem)	Go to "Procedure: Problem Analysis when Library Manager Fails to Initialize, Hangs, or Will Not Respond" on page START-45.
LIBRARY MANAGER CODE PROBLEM	1. If the LM is hung, perform a keystroke dump by pressing the **Ctrl+Shift+F12** keys. 2. Select **Copy files** on the Service pulldown menu of the Service action bar. 3. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. 4. Contract your support center and send the files to them.
TAPE SUBSYSTEM FSC FBxx (communication failure with library manager)	Go to **Start** in the appropriate tape subsystem maintenance information manual. **Note: add FRU155 to 3490 Model Cxx FB61 FRU group**.
TAPE SUBSYSTEM PROBLEM	Go to **Start** in the appropriate tape subsystem maintenance information manual.
LIBRARY DOES NOT RESPOND TO COMMANDS	Go to "Procedure: Problem Analysis when Library Manager Fails to Initialize, Hangs, or Will Not Respond" on page START-45.
LIBRARY MANAGER INTERFACE PROBLEM WITH TAPE SUBSYSTEM OR HOST	Go to "Procedure: Analyze a 3494 Interface Problem with the Host or Tape Subsystem" on page START-15.
LIBRARY MANAGER INTERNAL LAN PROBLEM (Dual LM or Model B18 communication)	Go to "Procedure: Analyze an Internal Ethernet LAN Problem" on page START-21.
DUAL ACCESSOR LIBRARY ERROR MESSAGE OR INTERVENTION REQUIRED	1. Ensure that you prepare the library for dual accessor service as directed by "Procedure: Prepare the Library Subsystem for Service" on page START-10. 2. Go to the local LM for the failing accessor, LM A for Accessor A or LM B for Accessor B. 3. Select **Service** on the Service Mode action bar. 4. Select **Start Service Call**. 5. Follow the instructions until the Start Service Call dialog box is displayed. 6. Select **Start service with fault symptom code (FSC)**.

Figure 18 (Page 2 of 2). Start Service

If You Are Here for This Reason	Perform This Action
SINGLE ACCESSOR LIBRARY ERROR MESSAGE OR INTERVENTION REQUIRED	1. Go to the library manager and prepare library for service as directed by "Procedure: Prepare the Library Subsystem for Service" on page START-10. If the display is not on, press any key on the keyboard to activate it. Press **Alt+T** if a remote console has control. 2. Select **Service** on the Service Mode action bar. 3. Select **Start Service Call**. 4. Follow the instructions until the Start Service Call dialog box is displayed. 5. Select **Start service with fault symptom code (FSC)**.
ANALYZE LM ERROR LOG - LIBRARY IS ONLINE (LM error log analysis while the accessor is operating)	1. Select **Service menu** on the Mode pulldown of the Operator action bar. If password protection is used, enter **service** on the Service Password dialog box. 2. Select **Service** on the Service Mode action bar. 3. Select **Analyze error log**. 4. Follow the instructions on the screen or in Help to display the significant error log entries.
DUAL ACCESSOR LIBRARY PROBLEM - NO ERROR MESSAGE	1. Ensure that you prepare the library for dual accessor service as directed by "Procedure: Prepare the Library Subsystem for Service" on page START-10. 2. Go to the local LM for the failing accessor, LM A for Accessor A or LM B for Accessor B. 3. Select **Service** on the Service Mode action bar. 4. Select **Start Service Call**. 5. Follow the instructions until the Start Service Call dialog box is displayed. 6. If an FSC is displayed for the time period of your problem, select **Start service with fault symptom code (FSC)**. 7. If an FSC is not displayed for the time period of your problem, select **Start service for other symptom** or refer to "Procedure: Problem Analysis for Library Failures that Appear as Visual, Audible, or Other Symptoms without Fault Symptom Codes (FSCs)" on page START-49.
SINGLE ACCESSOR LIBRARY PROBLEM - NO ERROR MESSAGE (includes visual symptoms or noise from the accessor)	1. Go to the library manager and prepare library for service as directed by "Procedure: Prepare the Library Subsystem for Service" on page START-10. If the display is not on, press any key on the keyboard to activate it. Press **Alt+T** if a remote console has control. 2. Select **Service** on the Service Mode action bar. 3. Select **Start Service Call**. 4. Follow the instructions until the Start Service Call dialog box is displayed. 5. If an FSC is displayed for the time period of your problem, select **Start service with fault symptom code (FSC)**. 6. If an FSC is not displayed for the time period of your problem, select **Start service for other symptom** or refer to "Procedure: Problem Analysis for Library Failures that Appear as Visual, Audible, or Other Symptoms without Fault Symptom Codes (FSCs)" on page START-49.
VIRTUAL TAPE SERVER PROBLEM (includes controller, DASD, and 3590 drives)	Go to **Start** in *IBM Virtual Tape Server Maintenance Information*.
3466 CONTROLLER OR DASD PROBLEM	Go to **Start** in *IBM Network Storage Manager Maintenance Information*.
ANALYZE SENSE DATA	Go to "Procedure: Analyze Sense/SIM Data" on page START-25. You may also want to see the **SENSE** section for more details on sense data.
INSTALL THE 3494	Go to "Installation" on page INST-1.
PREVENTIVE MAINTENANCE	Go to "Preventive Maintenance (PM)" on page CARR-139.
RELOCATE OR DISCONTINUE THE 3494	Go to "Relocation/Discontinuance" on page RELOC-1.
UPDATE LIBRARY MANAGER CODE	Go to "Library Manager Software Revision Installation" on page CARR-125.

Subsystem Problem Determination

The library is maintained using the service procedures on the library manager **Service** pull-down menu and this manual. The library manager personal computer hardware is maintained by using the *PS/ValuePoint Hardware Maintenance Manual*, *IBM 7585 Industrial Computer Information: Installation, Operation, Hardware Maintenance*, or *IBM 7588 Industrial Computer Information, Installation, Operation, Hardware Maintenance*, and some library manager remove and replace procedures in this manual. The tape subsystem is maintained using the appropriate tape subsystem maintenance information manual. The virtual tape server or 3466 Network Storage Manager RS/6000 controller and DASD is maintained using either the *Magstar Virtual Tape Server Maintenance Information* or the *3466 Network Storage Manager Maintenance Information*.

The following information is intended to aid you in determining the failing subsystem. Detailed information is provided in other procedures in this section (see “Start” on page START-1) to help you determine what the problem may be and how to start your maintenance activity.

If you cannot determine the failing subsystem, call your next level of support.

Power: If you have any of the following power problems, use “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 to determine the failing component.

- **Library Power:** see “Locations” on page LOC-1 for locations.
  - No library operator panel lights are on.
  - Rack Power Ready or System Power Ready are flashing.
  - Power Off Pending is flashing.
- **Library Manager Power:** see “Model L1x Frame (Rear View)” on page LOC-10 for locations.
  - Display is blank and the system unit power light is off.
- **Library Accessor Power:** see “Model L1x Frame (Rear View)” on page LOC-10 for locations.
  - +36V or +24V power supply AC or DC light is off.
  - 36V or 24V power supply fan is not on.
  - All LEDs on the MIC card are off.
- **Tape Subsystem Power:** see “Model L1x Frame (Front View)” on page LOC-4 for location. Also, see “Tape Drive Configurations” on page INTRO-22 for the tape drive configurations available in each model.
  - 3490E Model CxA Power On light is off and drive operator display is blank. (viewed from front)
  - 3490E Model F1A control panel is blank. (viewed from front)
  - 3490E Model F1A controller power light is off. (viewed from rear)
  - 3590 drive operator/CE display is blank. (viewed from front)
  - 3590 drive AC and/or DC power lights are off. (viewed from rear)
  - 3590 A00 power light is off. (viewed from rear)

  Note: View front panels through the library window or by putting the library in **Pause** on the library operator panel and opening the library frame front door. View the rear 3590 lights by opening the library frame rear door.

Tape Drive Subsystem: For most drive failures, one or more of the following types of messages are on the host console or in a host log:

- Device equipment check
- Device hardware failure
- Device (or volid) intervention required

If you have IBM 3490E Model CxA tape subsystems, check the operator panels on the front of the 3490E for the following failure indicators. If you have any of these symptoms, go to "Procedure: Prepare the Library Subsystem for Service" on page START-10 and then go to the *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Maintenance Information* manual to complete the service call.

- **Error** is On or flashing
- **Wait** does not come on
- **CHK xy** or **E7nn** code appears in drive display
- Two or more rectangles appear in drive display
- Message display on drive is blank
- ***-*** appears in drive display
- An error code appears in the CE panel display behind the CU cover
- **NT RDY** appears in display, will not go to Ready
- **Channel Disable** is On and channel is enabled

If you have IBM 3490E Model F1A tape subsystems, check the control panel on the front of the tape subsystem for the following failure indicators. If you have any of these symptoms, go to "Procedure: Prepare the Library Subsystem for Service" on page START-10 and then go to the *IBM 3490E Tape Subsystem Models F01, F11, FC0 and F1A Maintenance Information* and/or the *IBM 3490E Tape Subsystem FC 3000 Controller Maintenance Information* manual to complete the service call.

- The Fault indicator on the control panel is On.
- A FSC code is displayed on the control panel.
- The Ready indicator does not come on when a cartridge is loaded.
- If installed, audible beeps from the controller and a flashing LED on the front of the controller.

If you have IBM 3590 tape subsystems, check the operator/CE panel on the front of the IBM 3590 tape subsystem for the following failure indicators. If you have any of these symptoms, go to "Procedure: Prepare the Library Subsystem for Service" on page START-10 and then go to the *IBM 3590 Tape Subsystem Models Bxx and Exx Maintenance Information* and/or *IBM Tape Subsystem Axx Controller Models Maintenance Information* manual to complete the service call.

- The yellow LED Processor Check Indicator is on.
- A large 8 character intervention message is displayed.
- The drive display is blank.
- The device status field is blank and a cartridge is in the drive.
- The drive is offline, will not go online.

If you have a 3590 A00 controller, check the display behind the RS/6000 C20 front door for the following failure indicators. The front of the RS/6000 is behind the rear door of the library frame. If you have any of these symptoms, go to "Procedure: Prepare the Library Subsystem for Service" on page START-10 and then go to the *IBM 3590 High Performance Tape Subsystem Maintenance Information* manual to complete the service call.

- Flashing **888** on LED display
- 3 digit number on LED display

If you do not have any of the above failure indicators, check the host error logs for a tape sense record. If you find a sense record, go to "Procedure: Analyze Sense/SIM Data" on page START-25.

The 3490E Model CxA **Good Machine Path (GMP)** test, the 3490E Model F1A **Verify Fix** drive test, or the 3590 **Verify Fix** drive test can be used to verify the basic functions of the tape subsystem if you suspect a tape drive and cannot identify a specific tape drive problem. Refer to the Start section of the appropriate tape subsystem maintenance information manual for instructions to run these tests.

Library Subsystem: For most library failures, one or more of the following types of messages will be on the host console or in a host log when a library failure is detected:

- Library hardware failure
- Library intervention required
- Library is paused

Check the library manager display and keyboard on the rear door. If you have any of the following failure indicators, go to **General Checkout** in the *PS/ValuePoint Hardware Maintenance Manual*, *IBM 7585 Industrial Computer Information: Installation, Operation, Hardware Maintenance*, or *IBM 7588 Industrial Computer Information, Installation, Operation, Hardware Maintenance*. See “Checks, Adjustments, Removals, and Replacements” on page CARR-1 for library manager FRU replacement procedures.

- Display does not come on when a keyboard key is pressed, but the system unit power light is on.

  Note: If you have a remote console and the remote console has control, the keyboard and trackball are not active on the library manager. Control must be returned to the library manager before the library manager display can be activated and the library manager used for service. Press the **Alt+T** key combination on the library manager keyboard to return control to the library manager. Refer to the *IBM 3494 Tape Library Dataserver Operator's Guide* for complete instructions.
- POST error code is on screen
- No response to keyboard or track ball, but display is on
- Information display is garbled or broken up
- Abnormal smell or noise from system unit

Check the library operator panel on the front door for any of the following failure indicators. If you have any of these symptoms, return to **Start Service** (see Figure 18 on page START-4) and follow the instructions provided.

- Intervention Required is flashing
- Motion Control is in **Pause** and will not go to **Auto**
- Motion Control **Auto** and **Pause** are both On or flashing
- An I/O Status light is On with no cartridges in the convenience I/O station

Check the library manager display on the back door for any of the following failure indicators. (Select **System Summary** on the **Status** pull-down if it is not displayed.) If you have any of these symptoms, return to **Start Service** (see Figure 18 on page START-4) and follow the instructions provided.

- Auto Pending or Pause Pending
- Online pending or Offline Pending
- A RS-232 direct-attached host is attached and initialized, but Direct-Attached ports status shows as a dash (–) instead of a number (0–3, 8–B)
- A LAN direct-attached host is attached and initialized, but LAN Attach Ports status is **Not Installed** or the number of active ports shown does not match the number of LAN connected hosts.
- CU Ports status shows as a dash (–) instead of a number (0–F).
- Convenience I/O status shows Volumes Present, but there are no cartridges in the station
- Inventory update has partially completed and the accessor is not moving
- Overall System status is Degraded
- Accessor, Gripper, or Vision has Failed
- Accessor Power is Off
- Port is Not Initialized

- Intervention Required

Look for the following visual symptoms. If you have any of these symptoms, return to **Start Service** (see Figure 18 on page START-4) and follow the instructions provided.

- Cables unplugged
- Cartridges on the floor or X-axis rail
- Cartridge partially out of cell
- Cartridge in picker
- Picker not fully rotated to front or back wall
- X-axis or Y-axis moves are not smooth

If you do not have any of the previous failure indicators, check the host error logs for a library sense record. If you find a sense record, go to “Procedure: Analyze Sense/SIM Data” on page START-25.

The **Verify Installation** procedure on the **Service** pull-down menu can be used to verify the basic functions of the library if you suspect the library and cannot identify a specific library problem.

Virtual Tape Server Subsystem: Most failures will result in messages on the host console or in a host log. If you can not find an error message, check for the following visual failure indicators to help determine the failing subsystem.

Check for power, tape subsystem, or library subsystem problems as described in the previous sections.

Check the display on the front of the RS/6000 R20 for the following failure indicators. The front of the RS/6000 is behind the rear door of the library frame. If you have any of these symptoms, go to the *Magstar Virtual Tape Server Maintenance Information* manual to complete the service call.

- Flashing **888** on LED display
- 3 digit number on LED display

3466 Network Storage Manager: Most failures will result in messages on the host console or in a host log. If you can not find an error message, check for the following visual failure indicators to help determine the failing subsystem.

Check for power, tape subsystem, or library subsystem problems as described in the previous sections.

Check the display on the front of the RS/6000 R20 for the following failure indicators. The front of the RS/6000 is behind the rear door of the library frame. If you have any of these symptoms, go to the *IBM 3466 Network Storage Manager Maintenance Information* manual to complete the service call.

- Flashing **888** on LED display
- 3 digit number on LED display

Procedure: Prepare the Library Subsystem for Service

The purpose of this procedure is to ensure that the impact of a service call to the customer is minimized. Review this procedure before performing any service on library subsystems.

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See Figure 19. Select the appropriate **Task to be Done** and the **Perform This Action** items. Perform the items listed that apply before returning to the START section to continue the call.

Figure 19 (Page 1 of 4). Procedure to Prepare the Library Subsystem Components for Service

Task to be Done	Perform This Action
	CONCURRENT MAINTENANCE WITH AUTO MODE
Accessor problem on a Dual Accessor Library	1. Go to the active library manager and put the accessor in service mode as follows. If the display is off, press any key on the keyboard to activate it. Press **Alt+T** if a remote console has control. • **LM code level 516 through 519:** a. Look at the System Summary window and ensure that the accessor you want to work on is not active. If it is active, select **Switch active accessor to standby** on the Mode pulldown. b. Select **Availability** on the Service action bar and then select **Change standby accessor availability for service**. • **LM code level 520 or greater:** a. Look at the System Summary window and check the accessor status. If both accessors are active or the accessor you want to work on is not active, skip the remainder of this step and continue at step 1b on page START-11. If the accessor you want to work on is the active accessor, select **Switch active accessor to standby** under **Accessor** on the Mode pulldown. b. Select **Availability** on the Service action bar and then select **Mark Accessor for Service**. If both accessors are active, you will be prompted for the accessor that will be serviced. **Note:** The **Availability** controls (Change accessor availability for service / Mark Accessor for Service) are toggle controls. If you select the option a second time, the accessor availability status will toggle back to the available state. Check the System summary window to ensure you have the accessor in the correct state. 2. The accessor should be in it's service bay. If it is not in the service bay, select **Pause** on the Mode pulldown, push the accessor into it's service bay, and select **Auto** on the Mode pulldown to return the library to operation. 3. Go to the rear of the service bay frame and put the barrier door in the closed position. 4. Go to the local library manager for the accessor you are working on: library manager A for accessor A and library manager B for accessor B. 5. Use **Start service call** for guided service procedures. If you need to use standalone diagnostics, select **Service Bay tests**. 6. Most accessor FRUs can be replaced/repaired while the other accessor is operating, but some FRUs in the dual accessor control paths require special consideration. Go to “Dual Accessor Library Service Preparation” on page CARR-6 for more information. 7. When you are ready to return the accessor to operation: a. Ensure the service bay barrier door is open and latched. b. Select **Availability** on the Service action bar and then select the appropriate accessor control for your code level: **LM 516-519** Select **Change standby accessor availability for service** to toggle the accessor state back to available. **LM 520-** Select **Mark Accessor for Service** and then select the appropriate accessor to be made available. c. The LM will automatically initialize the accessor and make it available in standby. Check the System summary window to ensure that the accessor is returned to standby. d. If you have the Dual Active Accessor feature, select **Accessor** on the Mode pulldown and then select **Enable Dual Active Accessors**.

Figure 19 (Page 2 of 4). Procedure to Prepare the Library Subsystem Components for Service

Task to be Done	Perform This Action
	CONCURRENT MAINTENANCE WITH AUTO MODE (Cont)
Library Manager Problem on a Dual Library Manager Library	1. If the library manager you want to service is the active library manager, switch it to standby as follows: a. On the active LM, select **Offline** on the Mode pulldown. If the display is off, press any key on the keyboard to activate it. Press **Alt+T** if a remote console has control. b. When the library is Offline, select **Pause** on the Mode pulldown. c. When the library is in Pause, select **Switch active library to standby** on the Mode pulldown. d. Put the new active LM in **Auto** and **Online** so the customer can return to operation. 2. If the local accessor for the library manager you want to service is active (i.e. Accessor A for LM A, Accessor B for LM B), switch it to standby as follows: a. If the LM code level is 516 through 519, on the active LM select **Switch active accessor to standby** on the Mode pulldown. b. If the LM code level is 520 or greater and both accessors are active, on the active LM disable the Dual Active Accessor feature by selecting **Disable Dual Active Accessors** under **Accessor** on the Mode pulldown. You will be prompted for the appropriate accessor to be active. c. If the LM code level is 520 or greater and the accessor for the LM you want to service is the active accessor, on the active LM select **Switch active accessor to standby** under **Accessor** on the Mode pulldown. 3. The LM is now available for service. Go to “Library Manager Diagnostics” on page DIAG-21 or “Library Manager” on page CARR-91 as appropriate. If you are ready to power off, go to “Dual Library Manager Service Preparation” on page CARR-91. 4. When you complete service and reinitialize the LM code, the LM and accessor will be automatically returned to standby when communication is re-established with the active LM. If you have the Dual Active accessor feature, select **Accessors** on the Mode pulldown and then select **Enable Dual Active Accessors**.
3590 or 3490 F1A Tape subsystem problem. Another tape subsystem is available.	1. Ask the operator to vary the failing tape drive offline to the hosts and to the VTS controller. 2. Select **Availability** on the **Service** action bar and make the effected tape drive unavailable. If the display is off, press any key on the keyboard to activate it. Press **Alt+T** if a remote console has control. 3. If working on the tape controller, place the tape controller in the service position. See “Tape Control Unit Service Position” on page CARR-160. 4. If working on a tape drive, place the tape drive in the service position. See “Tape Drive Service Position” on page CARR-161. 5. Remove the cartridge left in the failing drive and place it in the convenience I/O station. If a convenience I/O station is not installed, pause the library, place the cartridge in the error recovery cell (1A1 or 1A3 if dual gripper), and put the library back into Auto. 6. Go to *IBM 3590 Maintenance Information* or *IBM 3490 Model F1A Maintenance Information*. **Notes:** 1. Re-teach the tape drive using the **Teach selected devices** option on the **Teach** pulldown if it is removed from the slides or if the load assembly is removed from the drive during service. If you have a Model HA1, you must run **Teach selected devices** for each accessor. **Teach selected devices** can be run while the library is operating in Auto, Online mode if the drive is marked unavailable in the LM using the **Set tape subsystem availability** option on the **Availability** pulldown. 2. Make the drive(s) available to the library manager using the Availability pulldown and run the Drive Get/Put test to the drive(s) while the library is in Auto, Online mode to verify they are OK before returning them to the customer. 3. Return the drive(s) to the customer. Put the drive(s) online to the VTS controller and hosts.

Figure 19 (Page 3 of 4). Procedure to Prepare the Library Subsystem Components for Service

Task to be Done	Perform This Action
CONCURRENT MAINTENANCE WITH MANUAL MODE	
3490 CxA Tape subsystem problem. Another tape subsystem is available.	1. Ask the operator to vary all effected tape drives offline. 2. Select **Availability** on the **Service** action bar and make the effected tape port unavailable. If the display is off, press any key on the keyboard to activate it. Press **Alt+T** if a remote console has control. 3. Place the library manager in **Manual** and **Online**. **Note:** Except for the Unit Emergency switch, the 3494 Operator Panel is not active when the library is in Manual mode. The library manager must be used to control the library. 4. If during the call, the Service menu is needed: a. Select **Service** on the action bar. Service windows will cover manual mode window. b. To return to Manual Mode screen, select **Manual mode** on the action bar. 5. Remove the cartridges left in the effected drives and place them in the error recovery cell (1A1 or 1A3 if dual gripper), the convenience I/O station, or an empty storage cell. (Do not put them in a high capacity output cell.) 6. When you are ready to replace parts, power off the tape subsystem on the 3490E control unit operator panel. 7. Move the X and Y axes to their service positions. See “Y-Axis (Vertical) Service Position” on page CARR-8 and “X-Axis Service Position (Single Accessor)” on page CARR-8. 8. If working on the 3490E control unit, place the tape control unit in the service position. See “Tape Control Unit Service Position” on page CARR-160. 9. If working on a 3490E tape drive, place the tape drives in service position. See “Tape Drive Service Position” on page CARR-161. 10. Go to *IBM 3490 Models C10, C11, C1A, C22, and C2A Maintenance Information*. IML the 3490E control unit before running diagnostics. **Notes:** 1. Re-teach the tape drive using the **Teach selected devices** option on the **Teach** pulldown if it is removed from the sleeve or if the load assembly is removed from the drive during service. If you have a Model HA1, you must run **Teach selected devices** for each accessor. **Teach selected devices** can be run while the library is operating in Auto, Online mode if the drive is marked unavailable in the LM using the **Set tape subsystem availability** option on the **Availability** pulldown. 2. Make the tape drive available in the LM before returning it to the customer.
Accessor problems on a single accessor library. You can replace accessor FRUs (except MIC, SRV, LCC, LPC, and DI/DO cards) concurrent with Manual Mode operation if required by the customer.	1. Set the library manager to **Manual** and **Online**. If the display is off, press any key on the keyboard to activate it. Press **Alt+T** if a remote console has control. **Note:** Except for the Unit Emergency switch, the 3494 Op Panel is not active when the library is in Manual mode. The library manager must be used to control the library. 2. Power off the 24V power supply (must be powered off before the 36V power supply). 3. Power off the 36V power supply. 4. Make necessary repairs. 5. Power on the 36V power supply (must be powered on before the 24V power supply). 6. Power on the 24V power supply. **Note: You must exit manual mode to verify repair or run library diagnostics. See “CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED” on page START-14.**
Note: Before you power on the library or a tape subsystem, be sure to wait at least 30 seconds after the last power-off cycle to allow the library manager and the tape subsystem to power on and IML correctly.	

Figure 19 (Page 4 of 4). Procedure to Prepare the Library Subsystem Components for Service

Task to be Done	Perform This Action
CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED	
• **The library manager needs to be powered off for service and another library manager is NOT available.** • **The MIC, SRV, LCC, LPC, or DI/DO card in a single accessor library needs to be replaced.** • **Start service call, verify repair or library manager diagnostics need to be run on a single accessor library.** • **A tape subsystem problem and another tape subsystem is NOT available.**	1. Ask the operator to complete or cancel jobs in the queue. 2. Ask the operator to vary all library devices offline. 3. Place the library manager in **Offline** mode. If the display is off, press any key on the keyboard to activate it. Press **Alt+T** if a remote console has control. a. If the library manager "hangs" in Offline Pending state (cannot complete the jobs in the queue), go to **Auto** or **Manual** mode. b. Select **Manual** on the Offline Pending dialog box. The Manual Mode Terminal window is displayed with an Action List containing the Mounts that need to be completed before the library manager can go offline. c. Select each mount on the list one at a time and press the **F4** (error) function key on the keyboard. The Manual Mode Error Processing window is displayed. d. Select **Other Error** in the Error Description list and press the **Enter** key on the keyboard. e. When the Manual Mode Action List is empty, press the **F3** (HideScreen) function key on the keyboard. The System Summary window should show Library Manager Offline. 4. Place the library in **Pause** using the library manager **Mode** pull-down on the Operator menu. **Note:** Except for the Unit Emergency switch, the 3494 Op Panel is not active when the library is in Manual mode. The library manager must be used to control the library. 5. Remove the cartridges left in the drives and place them in the error recovery cell (1A1 or 1A3 if dual gripper), the convenience I/O station, or an empty storage cell. (Do not put them in a high-capacity output cell.) 6. When you are ready to replace parts, use the library **Unit Power** switch on the library operator panel to power the library down. **Note:** If the library does not power off within 10 minutes after the Unit Power switch is put in the off position, go to the library manager and select **Shutdown** on the Mode pulldown then select **Shutdown for power off**. When the shutdown completes, use the **Unit Emergency** switch to power the library off. If you cannot shutdown the LM, use the **Unit Emergency** switch to power the library off and then use the "CHKDSK Procedure" on page CARR-101 if required to recover. 7. If working on the tape control unit, place the tape control unit in the service position. See "Tape Control Unit Service Position" on page CARR-160. 8. If working on a tape drive, place the tape drives in service position. See "Tape Drive Service Position" on page CARR-161. 9. If this is a tape subsystem problem, go to *IBM 3490 Models C10, C11, C1A, C22, and C2A Maintenance Information*, *IBM 3490 Model F1A Maintenance Information*, or *IBM 3590 Maintenance Information*. **Note:** Re-teach the tape drive if it is removed from the sleeve during service.
Note: Before you power on the library or a tape subsystem, be sure to wait at least 30 seconds after the last power-off cycle to allow the library manager and the tape subsystem to power on and IML correctly.	

Procedure: Analyze a 3494 Interface Problem with the Host or Tape Subsystem

| Use this MAP for interface problems with ARTIC attached 3490/3590 tape subsystems, 3494 Model B16 VTS subsystems, and direct attached hosts. Use “Procedure: Analyze an Internal Ethernet LAN Problem” on page START-21 for interface problems with dual library manager, LAN attached 3590 Model A60, and 3494 Model B18 subsystems.

The purpose of this procedure is:

- Provide isolation assistance for interface problems between:
  - Library manager and the tape/Model B16 VTS subsystem
  - Library manager and a direct-attached host
  - Tape subsystem and any attached host
- Direct you to other maintenance packages when the interface problem seems to be outside the library subsystem.
- Give directions on how to test various interfaces.

In a library with dual library managers, the ARTIC ports from each library manager are dotted on the PMX (Port Mixing) card and then go to the breakout box where the tape/VTS subsystems and direct attached hosts are connected. The PMX card is located behind the rear door of the left service bay. The ports on each ARTIC186 card in the library managers must be configured as RS-485 ports to allow dotting of the ports.

In Figure 20, select the appropriate reason you are here and go to the referenced step.

Figure 20. Interface Problem Task Isolation

Reason You Are Here	Perform This Action
Tape subsystem to host interface problem	Go to the appropriate tape subsystem maintenance information manual and run the diagnostics that check the interface between the host and the failing tape subsystem.
Library manager to tape subsystem interface problem	Go to Step 001.
Library manager to direct attached host interface problem	Go to Step 009 on page START-16.

001

(From page START-15)

You are here to isolate an interface problem between the tape/VTS subsystem and the library manager.

Do you have a Dual LM?

Yes **No**

002

Go to Step 006 on page START-16.

003

| A hot driver on the standby LM ARTIC card can cause a failure on the active LM. Disconnect the standby LM cable at the PMX card and verify that the failure is still occurring on the active LM. If the failure goes away, suspect the ARTIC card in the standby LM.

Are both LM's failing?

Yes **No**

004

Go to Step 006 on page START-16 and test the card in the failing LM.

005

Communication from both LM's is failing.

Suspect a tape/VTS subsystem failure. Go to the appropriate tape/VTS subsystem maintenance information to continue isolation.

(Step **005** continues)

005 (continued)

If the tape/VTS subsystem tests OK, suspect one of the following FRUs or connections:

- ARTIC Breakout Box
- LM to tape/VTS subsystem cable
- PMX card

006

(From steps 002 and 004)

Follow the procedure in "ARTIC Diagnostics" on page DIAG-24 to run the ARTIC diagnostics and then return to this step.

Does the ARTIC Interface test run OK?
Yes **No**

007

Replace the ARTIC Multiport (or ARTIC186) card, ARTIC RS-422 card (if used), or ARTIC breakout cable as indicated by the diagnostic.

If you have a dual LM and the above FRUs do not correct the problem, suspect the PMX card or connections.

Run **Verify Repair** on the Service menu before returning the library to the customer.

008

The problem is in the tape subsystem.

Go to the appropriate tape/VTS subsystem maintenance information manual and isolate the cause of the interface failure. Replace FRUs as directed.

009

(From page START-15)

You are here to isolate an interface problem between a direct attached host and the library manager.

Is the failing interface an RS-232 attachment?
Yes **No**

010

(Step **010** continues)

010 (continued)

Go to Step 019 on page START-17.

011

Do you have a Dual LM?
Yes **No**

012

Go to Step 016.

013

A hot driver on the standby LM ARTIC card can cause a failure on the active LM. Disconnect the standby LM cable at the PMX card and verify that the failure is still occurring on the active LM. If the failure goes away, suspect the ARTIC card in the standby LM.

Are both LM's failing?
Yes **No**

014

Go to Step 016 and test the card in the failing LM.

015

Communication from both LM's is failing.

Suspect a host failure. Go to the appropriate host maintenance information to continue isolation.

If the host tests OK, suspect one of the following FRUs or connections:

- RS-422 to RS-232 Converter
- ARTIC Breakout Box
- LM to host cable
- PMX card

016

(From steps 012 and 014)

Follow the procedure in "ARTIC Diagnostics" on page DIAG-24 to run the ARTIC diagnostics and then return to this step.
(Step **016** continues)

016 (continued)

Does the ARTIC Interface test run OK?

Yes **No**

017

Replace the ARTIC Multiport (or ARTIC186) card, ARTIC RS-422 card (if used), or ARTIC breakout cable as indicated by the diagnostic.

If you have a dual LM and the above FRUs do not correct the problem, suspect the PMX card or connections.

Run **Verify Repair** on the Service menu before returning the library to the customer.

018

The problem is in the host connection.

Go to the host system maintenance information and isolate the cause of the interface failure between the host and the library manager. Replace FRUs as directed.

019

(From step 010)

The failing interface is a LAN attachment.

Is the failing interface a Token Ring attachment?

Yes **No**

020

Go to Step 024.

021

Follow the procedure in "Token Ring Adapter Diagnostics" on page DIAG-27 to run the Token Ring Adapter diagnostics and then return to this step.

Does the Token Ring Adapter test run OK?

Yes **No**

022

Replace the Token Ring Adapter or cable. (Step **022** continues)

022 (continued)

Run **Verify Repair** on the Service menu before returning the library to the customer.

023

The problem is in the Token Ring LAN or host connection.

Go to the host or token ring maintenance information and isolate the cause of the interface failure between the host and the library manager. Replace FRUs as directed.

024

(From step 020)

Follow the procedure in "Ethernet Adapter (FC 5220) Diagnostics" on page DIAG-28 to run the Ethernet Adapter diagnostics and then return to this step.

Does the Ethernet Adapter test run OK?

Yes **No**

025

Replace the Ethernet Adapter or cable.

Run **Verify Repair** on the Service menu before returning the library to the customer.

026

The problem is in the Ethernet LAN or host connection.

Go to the host or Ethernet maintenance information and isolate the cause of the interface failure between the host and the library manager. Replace FRUs as directed.

Procedure: Analyze a Mirrored Hard Drive Problem

This MAP is used for mirrored hard drive problems. The mirrored hard drive function consists of the following hardware:

- Primary hard disk
- Mirror hard disk
- Mirrored hard disk adapter card
- Cable from mirrored hard disk card to primary hard disk
- Cable from mirrored hard disk card to mirrored hard disk
- Cable from mirrored hard disk card to single board computer (SBC)
- 7588 Industrial PC single board computer (SBC)

There is also a **Mirrored Hard Drive Boot Diskette** used when a hard drive or mirror card is replaced.

With the mirrored hard drive function installed in a library manager, the cable from the primary IDE connector of the Single Board Computer is connected to the mirror card instead of the hard drive(s). Two cables from the mirror card connect the two hard disk drives. One cable connects the primary hard drive, sometimes referred to as the primary channel or the primary master. The other cable connects the mirror hard drive, sometimes referred to as the mirror channel or the mirror master. The library manager configuration utility will only show one hard drive configured. When data is written to a hard drive, the mirror card causes the data to be written not only to the primary drive, but also to the mirror drive.

When a hard drive failure occurs, the mirror card marks the channel to that drive as bad and continues to operate with the remaining drive. The library manager application code causes an operator intervention message indicating which hard drive was marked bad, that service is required, but the library is still operational.

The following symptoms usually indicate that a hard drive has failed:

- Operator intervention message indicating a hard drive failure
- Error codes A0BC, A0BD, A0BE, or A0BF during START CALL
- Operational status item, Hard Drive Mirroring, indicating a hard drive failure, i.e. Primary failed, Mirror failed

The following symptoms may indicate that the mirror card has failed:

- An indication when the library manager is booted that the configuration has changed because no hard drives have been detected
- A graphical indication when the library manager is booted that a diskette must be inserted. The library manager cannot find the boot record on the hard disk.

001

The following are symptoms that indicate a specific hard disk drive has failed:

- Operator intervention required messages
  - LM A hard drive failure. Primary hard drive failed.
  - LM A hard drive failure. Mirror hard drive failed.
  - LM B hard drive failure. Primary hard drive failed.
  - LM B hard drive failure. Mirror hard drive failed.
- One of the following error codes found during Start Service Call:

(Step **001** continues)

001 (continued)

  - A0BC - LM A primary hard drive failed.
  - A0BD - LM A mirror hard drive failed.
  - A0BE - LM B primary hard drive failed.
  - A0BF - LM B mirror hard drive failed.
- One of the following status indicators in the Operational Status display:
  - Hard drive Mirroring (LM-A): Primary failed
  - Hard drive Mirroring (LM-A): Mirror failed
  - Hard drive Mirroring (LM-B): Primary failed
  - Hard drive Mirroring (LM-B): Mirror failed

  Note: In the HA model, the hard drive mirroring Operational Status indicators are only available on the active library manager. Hard drive mirroring status can be obtained on the standby library manager by selecting **Hard drive mirroring** from Test interface on the

Service pulldown menu.

Do you have a symptom that indicates a specific hard drive failed or was marked bad?
Yes **No**

002

Follow the instructions in "Mirrored Hard Drive Card" on page CARR-118 to remove and replace the mirrored hard drive card. Then, return here.

Did replacing the mirrored hard drive card fix the problem?
Yes **No**

003

Do you still have the original symptom?
Yes **No**

004

Call your next level of support.

005

Using the same method of switching power off and on, switch off power. Reinstall the original mirror card. Disconnect the signal cable from the primary hard drive. Then, switch on power.

If the library manager application initializes, follow the instructions in "Mirrored Hard Disk Drives" on page CARR-102 to remove, replace, and rebuild the primary hard drive. When you rebuild the hard drive, you will need to select **Copy Data** and **Copy Mirror Master to Primary Master**. Then, return here. If the original symptom occurs, switch off power, reinstall the signal cable to the primary hard drive and remove the cable from the mirror hard drive. Then, switch on power.

If the library manager application initializes, follow the instructions in "Mirrored Hard Disk Drives" on page CARR-102 to remove, replace, and rebuild the mirror hard drive. When you rebuild the hard drive, you will need to select **Copy Data** and **Copy Primary Master to Mirror Master**. Then, return here.

Do you still have the problem?
Yes **No**

006

Run **Verify repair** from the Service menu before returning the 3494 to the customer.

007

Replace the following FRUs:

1. Mirrored hard drive card cables (3)
2. Single board computer (SBC)

Did one of the above listed FRUs fix the problem?
Yes **No**

008

Call your next level of support.

009

Run **Verify repair** from the Service menu before returning the 3494 to the customer.

010

Run **Verify repair** from the Service menu before returning the 3494 to the customer.

011

Follow the instructions in "Mirrored Hard Disk Drives" on page CARR-102 to remove, replace, and rebuild the drive that is indicated bad. Then, return here.

Did replacing the hard drive fix the problem?
Yes **No**

012

(Step **012** continues)

012 (continued)

Using the same method of switching power off and on, switch off power. Reinstalled the original hard drive. One of the following is likely the fault:

1. Mirrored hard drive card
2. Cable to the hard drive

Follow the instructions in “Mirrored Hard Drive Card” on page CARR-118 to remove and replace the mirrored hard drive card. Then, return here.

Did one of the above listed FRUs fix the problem?

Yes **No**

No → **013**

Call your next level of support.

Yes → **014**

Run **Verify repair** from the Service menu before returning the 3494 to the customer.

014 → **015**

Run **Verify repair** from the Service menu before returning the 3494 to the customer.

Procedure: Analyze an Internal Ethernet LAN Problem

This MAP is used for communication problems between dual library managers, between a library manager and a LAN attached 3590 Model A60, or between a library manager and a 3494 Model B18 AND

- System Summary shows "Overall system: Degraded" and Operational status from Status pulldown shows Dual Library Manager Primary or Alternate Link: Disabled

  OR
- System Summary shows a dash by a CU LAN port indicating that a Model B18 VTS control unit port or a 3590 Model A60 port is disabled.

The 3494 Model HA1 provides redundant internal ethernet LANs for communication between the dual library managers. Physically, the ethernet adapter for the primary link is plugged into slot 2 of each IBM 7588 library manager and the alternate link adapter is plugged into slot 1.

The IBM 8271 NWays Ethernet LAN Switch is used to provide switched connections between the library manager(s) and each Model B18 VTS subsystem and/or LAN attached 3590 Model A60 control unit. Depending on which model of the switch is installed, there are either 12 or 24 port connections on the front of the switch labeled 1x to 12x or 1x to 24x. Each port must be configured to **100TX FD**. Each port has two Status LEDs (a yellow Packet LED and a green Status LED) located in a 6x4 or 12x4 array. One model uses a Power LED and a MGMT LED to give operational status of the switch. Other models use a single Power/Self Test LED. The 8271 has no power switch. The unit is powered on when the 3494 unit power is switched on at the Operator Panel. There is a reset switch located on the rear panel of the 8271. LAN cables to the library manager, each LAN attached 3590 Model A60, and each Model B18 VTS control unit are plugged into the 8271 switch ports as described in “Model B18 VTS Subsystem Cables and 3590 Model A60 LAN Attach” on page INST-105.

Two different types of cables are used depending on the library configuration. When the ethernet adapters in the library managers are directly connected, a null-modem cable is used. This cable crosses over the transmit and receive signals. When the ethernet adapters in the library manager, 3590 Model A60, and 3494 Model B18 are connected to the IBM 8271 switch, straight through cables (i.e. pin 1 to pin 1, etc.) are used.

The number of Model B18 VTS subsystems attached, attachment type, and control unit port assignments can be displayed by selecting VTS status from the Status pulldown on the Operator action bar or by selecting Device Attachment Configuration on the Teach pulldown.

001

Are you here for a dual LM primary link failure?

Yes **No**

002

Go to Step 006 on page START-22.

003

Test the failing primary link using “Dual library manager link” on page DIAG-10.
(Step **003** continues)

003 (continued)

Did the link test OK?

Yes **No**

004

Verify that the cable is installed properly.

Replace the failing FRU:

- LM A Slot 2 Ethernet Adapter
- LM B Slot 2 Ethernet Adapter
- LM A to LM B Ethernet cable

Shutdown and restart the library manager application at a time acceptable to the customer.

005

(Step **005** continues)

005 (continued)

Shutdown and restart the library manager application at a time acceptable to the customer. If this does not fix the problem, call your next level of support.

006

(From step 002)

Does the library contain a 3494 Model B18 or a LAN attached 3590 Model A60?

Yes **No**

007

Test the failing alternate link using “Dual library manager link” on page DIAG-10.

Did the link test OK?

Yes **No**

008

Verify that the cable is installed properly.

Replace the failing FRU:

- LM A Slot 1 Ethernet Adapter
- LM B Slot 1 Ethernet Adapter
- LM A to LM B Ethernet cable

Shutdown and restart the library manager application at a time acceptable to the customer.

009

Shutdown and restart the library manager application at a time acceptable to the customer. If this does not fix the problem, call your next level of support.

010

View the front panel of the IBM 8271 switch. It is located behind the rear door of the L1x frame or the LSB frame if Model HA1 on a shelf at the top of the frame. Depending on the model of switch installed, there is either a single Power/Self Test LED or a Power LED and a MGMT LED.
(Step **010** continues)

010 (continued)

Is the Power/Self Test LED or Power LED on?

Yes **No**

011

Ensure that the 8271 switch is plugged into an AC power outlet. If it is, replace the 8271 switch.

012

The Power/Self Test LED or MGMT LED flashes green for a few seconds while the Power On Self Test is running or while software is downloading. The LED is yellow if the 8271 has failed it's Power On Self Test.

Is the Power/Self Test LED or MGMT LED a steady (non-flashing) green?

Yes **No**

013

Replace the 8271 switch.

If the 8271 switch is replaced, configure the ports on the new switch. See the **LAN Port Activate** procedure in the IBM 3494 Model B18 MI or 3590 Model A60 MI.

014

The Status LED for each port indicates port status as follows:

- Steady green = link is present, port is enabled
- Flashing green = link is present, port is disabled
- Off = link is not present

Note: "Link is present" indicates there is a physical connection from the switch port, through the cable, to an ethernet card that has power, in either a library manager or a control unit. "Port is enabled" indicates there is a minimal level of ethernet card operation under control of the library manager or control unit.

Check the Status LED for port 1x (and 2x for a Model HA1).
(Step **014** continues)

014 (continued)

Is the Status LED for the port a steady green?
Yes **No**

015

Is the LED off?
Yes **No**

016

The LED is flashing green.

Check that the library manager application is running and the control unit port is enabled. If they are, call your next level of support.

017

Ensure that the 8271 switch ports are configured to **100TX FD**. See the **LAN Port Activate** procedure in the IBM 3494 Model B18 MI or 3590 Model A60 MI.

Re-plug both ends of the cable for this port, or plug the cable into a different port on the 8271 switch.

Replace the failing FRU:

- LM slot 1 to 8271 cable
- Ethernet card in LM slot 1
- 8271 switch

If the 8271 switch is replaced, configure the ports on the new switch. See the **LAN Port Activate** procedure in the IBM 3494 Model B18 MI or 3590 Model A60 MI.

Shutdown and restart the library manager application at a time acceptable to the customer.

018

Are you working on an alternate link problem?
Yes **No**

019

Go to Step 023.

020

(Step **020** continues)

020 (continued)

Test the failing alternate link using “Dual library manager link” on page DIAG-10.

Did the link test OK?
Yes **No**

021

Ensure that the 8271 switch ports are configured to **100TX FD**. See the **LAN Port Activate** procedure in the IBM 3494 Model B18 MI or 3590 Model A60 MI.

Verify that the cable is installed properly.

Replace the failing FRU:

- LM A Slot 1 Ethernet Adapter
- LM B Slot 1 Ethernet Adapter
- 8271 switch
- LM A to 8271 Ethernet cable
- LM B to 8271 Ethernet cable

If the 8271 switch is replaced, configure the ports on the new switch. See the **LAN Port Activate** procedure in the IBM 3494 Model B18 MI or 3590 Model A60 MI.

Shutdown and restart the library manager application at a time acceptable to the customer.

022

Shutdown and restart the library manager application at a time acceptable to the customer. If this does not fix the problem, call your next level of support.

023

(From step 019)

Check the Status LED for each connected 3494 Model B18 VTS and 3590 Model A60 control unit.

Is the Status LED for each port a steady green?
Yes **No**

024

(Step **024** continues)

024 (continued)

Is the LED off?
Yes **No**

025

The LED is flashing green.

Check that the control unit is running. If it is, call your next level of support.

026

Ensure that the 8271 switch ports are configured to **100TX FD**. See the **LAN Port Activate** procedure in the IBM 3494 Model B18 MI or 3590 Model A60 MI.

Re-plug both ends of the cable for this port, or plug the cable into a different port on the 8271 switch.

Replace the failing FRU:

- VTS/A60 control unit to 8271 cable
- Ethernet card in VTS/A60 control unit
- 8271 switch

If the 8271 switch is replaced, configure the ports on the new switch. See the **LAN Port Activate** procedure in the IBM 3494 Model B18 MI or 3590 Model A60 MI.

Reinitialize the port using **Reinitialize ports** on the Utilities pulldown.

027

From the Utilities pulldown on the Service action bar, select **Service Window**. For each VTS control unit, enter the following at the command prompt:

- For VTS 1: **ping LM_VTS_1 500 20**
- For VTS 2: **ping LM_VTS_2 500 20**
- For 3590 A60: **ping 192.168.251.xx 500 20**
  where xx = frame # x 10 as follows:
  A60 in frame 1, xx = 10 (always L1x)
  A60 in frame 2, xx = 20
  .
  A60 in frame 16, xx = 160

Note: Service bay frames are not counted.

This will send and receive a test message to the VTS/A60 control unit 20 times for about 20 seconds. When the test is done, the results should show 20 packets transmitted, 20 packets received and 0% packet loss. Observe the Packet LED for the port(s) that were pinged.

Is the Packet LED for the port flashing yellow? (about once every second)
Yes **No**

028

The problem appears to be cabling.

Ensure that the cables are connected as described in “Model B18 VTS Subsystem Cables and 3590 Model A60 LAN Attach” on page INST-105.

029

Did all 20 pings complete successfully?
Yes **No**

030

The connection may be intermittent.

Try moving the LM cable to an unused switch port and re-test. If multiple ports fail the same way, call your next level of support.

031

The port tested OK. Reinitialize the port using **Reinitialize ports** on the Utilities pulldown.

If the port fails to reinitialize, call your next level of support.

Procedure: Analyze Sense/SIM Data

001

3490 sense or 3590 SIM data is available.

Examine the contents of byte 7.

Does byte 7 equal 23?
Yes **No**

002

Continue isolation at *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Maintenance Information* or *IBM 3590 High Performance Tape Subsystem Maintenance Information*.

003

Data is format 23, which is for a library subsystem problem.

Library subsystem failures that appear under format 23 sense data usually fall in the categories shown in Figure 21.

Figure 21. Library Subsystem Error Recovery Actions (ERA)

ERA Code	Likely cause of failure
60	Library attachment equipment check
62	Library manager is offline to the subsystem
6F	Library vision failure (bar-code reader failure)
70	Library manager equipment check
71	Library equipment check

Note: Other ERAs can occur, but they are associated with a customer's program or operational problems, or in a very few cases, product program problems. See the SENSE section for details.

Review Figure 21 and answer the following question.
(Step **003** continues)

003 (continued)

Is the ERA either 60 or 62?
Yes **No**

004

Is the ERA 6F, 70, or 71?
Yes **No**

005

An ERA has occurred that is the customer's program or operational related or was caused by product software. See the SENSE section for details. If you are unable to determine what to do to continue isolation or resolve the problem, call for support.

006

Go to the **Service** screen of the library manager and select **Start service call**. Next, select the **Start service with fault symptom code (FSC)** option using the selected FSC.

Note: If the FSCs selected by Start Service Call on the Service menu do not fix the problem, locate the FSC in sense bytes 9 and 10 and enter it at the appropriate prompt. If the FSC is not recognized by Start Service Call, call your next level of support.

007

Some failures that cause an ERA 60 or 62 may leave the library manager not operational.

Note: If the display is not on, press any key on the keyboard to activate it.

Is the library manager operational?
Yes **No**

008

Go to **General Checkout** in the *PS/ValuePoint Hardware Maintenance Manual* or *7585 Industrial Computer*

Information: Installation, Operation, Hardware Maintenance. See “Checks, Adjustments, Removals, and Replacements” on page CARR-1 for library manager FRU replacement procedures.

009

Go to the **Service** screen of the library manager and select **Start service call**. Next, select the **Start service with fault symptom code (FSC)** option using the selected FSC.

Note: If the FSCs selected by Start Service Call on the Service menu do not fix the problem, locate the FSC in sense bytes 9 and 10 and enter it at the appropriate prompt. If the FSC is not recognized by Start Service Call, call your next level of support.

Procedure: Analyze Power Problems in the Library Subsystem

This procedure guides you through all power problems in the library subsystem.

See the LOC section for location of the components and the CARR section for removal and replacement procedures. It may also be useful to review the power sequencing descriptions and diagrams in the POWER and CABLE sections.

001

Look at the library subsystem operator panel, the library manager system unit front panel (behind the rear door), and the tape subsystem operator panels, and then answer the following questions. Ensure that the library Unit Power and Unit Emergency switches are on.

Is the library manager powered on?
Yes No

002

Is the L1x frame tape subsystem powered on?
Yes No

003

This is a major library subsystem power failure. Continue at Step 034 on page START-29.

004

The library manager fails to power on, but the tape subsystem powers on OK. This is a library manager problem. Continue at Step 060 on page START-32.

005

Is the L1x frame tape subsystem powered on? (Answer Yes if not installed.)
Yes No

006

The library manager powers on, but the L1x frame tape subsystem does not. Continue at Step 109 on page START-39.

007

The library manager and L1x frame tape subsystem are powered up.

Are there additional B1x/D1x frames installed in this library?
Yes No

008

Continue at Step 011.

009

Observe the additional tape or DASD subsystems to see if they are powered on.

Are all the tape or DASD subsystems powered on?
Yes No

010

Continue at Step 109 on page START-39.

011

(From step 008)

Is the DC Present power indicator on the front of the 36V power supply ON?
Yes No

012

Continue at Step 067 on page START-33.

013

Is the DC Present power indicator on the front of the 24V power supply ON?
Yes No

014

Continue at Step 143 on page START-42.

015

The library subsystem is powered on OK when the Rack Power Ready and System Power Ready indicators are on and not flashing.
(Step **015** continues)

015 (continued)

The Power Off Pending indicator should be off when the Unit Power switch is in the On position.

Does the library subsystem operator panel show power is OK?
Yes **No**

016

Continue at Step 018.

017

The library subsystem and all its components are powered on OK.

This ends the procedure.

018

(From step 016)

A Op Panel power indicator shows a power problem but all library components are powered up.

The library must offline to all hosts before continuing with the following steps.

Is the condition that indicates a power failure a flashing power indicator?
Yes **No**

019

A power ready indicator is not on or all lights are off.

Are any of the Op Panel lights on?
Yes **No**

020

Continue at Step 031 on page START-29.

021

Put the library Unit Power switch in the Off position.

One of the following is likely the fault:

1. LPN card

(Step **021** continues)

021 (continued)

2. MIC card
3. LPC card (if installed)
   DSW or DBF card (Model HA1)
4. LPN P1 cable

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

022

A power indicator is flashing but all library components are powered up.

Is the Power Off Pending indicator flashing?
Yes **No**

023

Continue at Step 025.

024

False power off pending indication. Put the library Unit Power switch in the Off position.

Replace the LPN card.

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

025

(From step 023)

A power ready indicator is flashing.

Is the Rack Power Ready indicator flashing?
Yes **No**

026

Continue at Step 028 on page START-29.

027

False indication that the control unit frame has not powered up. Put the library Unit Power switch in the Off position.

Replace the LPN card.

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

028

(From step 026)

System Power Ready indicator is flashing but all tape subsystems are powered up.

When a library has less than the full complement of drive units installed, jumpers must be installed on the BIC card so that +24V DC UEPO circuits are completed. If any of these jumpers are missing, and a drive unit UEPO cable is not installed in its place, the result will be a flashing System Power Ready indicator.

Is a jumper or cable plugged into each PCC position on the BIC card?

Yes **No**

029

Replace the missing jumper. When you have fixed the fault, run **End Call** on Service menu.

030

False indication that one or more drive unit frames has not powered up. One of the following is likely the fault:

1. LPN card
2. MIC1 or LPC card (single accessor)
   DSW or DBF card (Model HA1)
3. LPN P1 cable
4. BIC P7 cable
5. BIC card

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

031

(From step 020)

All of the 3494 Op Panel lights are off, but the 24V and 36V power supplies are OK. This condition can be caused by missing +5V power to the MIC card logic.

Use the following procedure to isolate the problem:

1. Put the Unit Power switch on the Op Panel in the off position. If the library does not power off in 2 minutes, power off using the Unit Emergency switch.
2. Unplug the cable connector on the back of the barcode reader.
3. Put the Unit Emergency and Unit Power switches in the on position.
4. Observe the Op Panel lights. The power lights and the auto or pause light should come on and stay on when the library manager is initialized.

Are any of the Op Panel lights on when the library manager is initialized?

Yes **No**

032

Missing MIC card logic power or +5V to LPN card.

Power the library off and re-connect the Barcode Reader cable.

One of the following is likely the fault:

1. MIC card
2. LPN card
3. LPC card (if installed)
   DSW or DBF card (Model HA1)
4. LPN P1 cable

When you have fixed the fault, run **Verify Repair** on the Service menu before returning the 3494 to the customer.

033

Defective barcode reader is causing the +5V and ±12V power supply on the MIC card to shut down.

Power the library off.

Replace the barcode reader.

Run **Verify Repair** on the Service menu before returning the 3494 to the customer.

034

(From step 003)

Does this power failure occur *only* when the Local/Remote switch is in the *Remote* position?

Yes **No**

035

(Step **035** continues)

035 (continued)

Continue at Step 037.

036

The power problem is related to remote power controls. Continue at Step 080 on page START-35.

037

(From step 035)

The library must offline to all hosts before continuing with the following steps.

To isolate this problem with the Local/Remote switch set to **Local**, ensure that the Unit Emergency (UEPO) switch located on the library subsystem operator panel is in the Power On position and that the Local/Remote switch is in the **Local** position.

The first 3494 libraries used the MIC1/LCC card set. The LCC card is mounted to the left of the MIC1 card and plugs into a connector on the lower left side of the MIC1 card. This card set was replaced by the MIC2-4/LPC2,3 card set, where the LPC card (DSW or DBF card if Model HA1) is mounted below the MIC2-4 card and plugs into a connector on the bottom of the MIC2-4 card. Refer to the Locations section of this manual.

Does your machine have the MIC1/LCC card set?

Yes **No**

038

Continue at Step 042.

039

Observe the state of the EMO relay K2 located on the MIC1 card. The relay should be picked.

Note: If you have trouble seeing if the K2 relay is picked, you may pull the P10 cable connector from the MIC1 card and insert it again. The K2 relay should drop when you pull the cable, and pick again when you plug the cable.

(Step **039** continues)

039 (continued)

Does the EMO relay K2 pick?

Yes **No**

040

Continue at Step 045.

041

Continue at Step 057 on page START-32.

042

(From step 038)

Observe the green LED on the LPC card (DSW and DBF if Model HA1).

Is the green LED on?

Yes **No**

043

Continue at Step 045.

044

Continue at Step 057 on page START-32.

045

(From steps 040 and 043)

EMO circuits are open or voltage is missing to the EMO circuits.

See “Local Power, Control Unit Frame” on page POWER-11. Carefully remove the P10 cable connector from the MIC1 or LPC card (DSW and DBF if Model HA1) and measure at the cable connector for +24V DC ±10% at P10-4.

Is +24V DC ±10% present at P10-4?

Yes **No**

046

Continue at Step 048 on page START-31.

047

Continue at Step 054 on page START-31.

048

(Step **048** continues)

048 (continued)
(From step 046)

With the Unit Power switch in the Power On position, observe the PCC circuit breakers.

Are any of the circuit breakers tripped?
Yes **No**

049

Continue at Step 051.

050

Reset the circuit breaker that is tripped. If the breaker continues to trip when power on is attempted, isolate the cause by removing power plugs, one at a time, to the +24V DC power supply, +36V DC power supply, library manager, tape control unit, and the local and remote cables at the bottom of the PCC.

If circuit breakers still trip after removing all the above cables, install a new PCC.

If the machine stops tripping circuit breakers after removal of one of the cables, see Figure 165 on page CABLE-5 to find out which unit that plug goes to and trace the cause of the breaker tripping problem. If you cannot locate any cause *down stream* from the PCC, install a new PCC.

Run **End Call** procedure on Service menu.

051

(From step 049)

Power off the library subsystem and have the customer remove power to the wall plug that is the power source to the library subsystem. Remove the mainline power cable from the wall outlet and ask your customer to restore power to the library wall receptacle. Measure for the appropriate voltage levels at the customer voltage source at the wall. It should measure 220V AC ±10%, single phase.

Is the customer voltage OK?
Yes **No**

052

Ask your customer to have the input line voltage checked. Run **End Call** procedure on Service menu.

053

Customer voltage is OK. With power removed from the customer voltage source, reconnect the mainline power cable to the customer voltage source and ask that customer power be restored to the library subsystem.

Install new FRUs as follows until the problem is resolved:

1. PCC
2. Line cord from the customer voltage source
3. Cable, PCC P17 to MIC1 or LPC card P10

   Cable, LM A PCC P17 to DSW J10 (Model HA1)
   Cable, LM B PCC P17 to DBF J10 (Model HA1)

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

054

(From step 047)

Install the P10 cable into the MIC1 or LPC card (DSW and DBF if Model HA1). Measure for +24V DC ±10% at either side of the Unit Emergency (UEPO) switch located behind the operator panel.

Is +24V DC ±10% present at both sides of the UEPO switch?
Yes **No**

055

If voltage is present at one side of the UEPO switch, but not present at the other side, the switch is either in the Power Off position or is defective. Set the UEPO switch to Power On, or replace it if it is defective. If voltage is missing at both sides, install new components as follows:

1. MIC1 or LPC card (single accessor)

   DSW or DBF card (Model HA1)
   UEP card (Model HA1)

2. LPN card
3. LPN P1 cable

(Step **055** continues)

055 (continued)

4. Cable, LPN P3 to the UEPO switch

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

056

Install new components below in the order listed:

1. MIC1 or LPC card (single accessor)

   DSW or DBF card (Model HA1)
   UEP card (Model HA1)

2. LPN card
3. LPN P1 cable

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

057

(From steps 041 and 044)

The EMO relay K2 is picked or the LED is on but the 3494 still fails to power on in Local mode.

With the Unit Power switch in the **Power On** position, carefully remove the small P8 cable connector from the MIC1 or LPC card (DSW and DBF if Model HA1). Measure for +24V DC ±10% at the cable connector P8-4.

Is +24V DC ±10% present at P8-4?
Yes **No**

058

24V from PCC is missing.

Install new components in the order listed:

1. PCC
2. Cable, PCC P13 to MIC1 or LPC P8

   Cable, LM A PCC P13 to DSW J8 (Model HA1)
   Cable, LM B PCC P13 to DBF J8 (Model HA1)

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

059

(Step **059** continues)

059 (continued)

The PCC is not receiving (or not recognizing) the 24V return signal.

Plug the P8 connector cable back into the MIC1 or LPC card (DSW or DBF card if Model HA1).

Install new components in the order listed:

1. MIC1 or LPC card

   DSW or DBF card (Model HA1)
   UEP card (Model HA1)

2. PCC
3. Cable, PCC P13 to MIC1 or LPC P8

   Cable, LM A PCC P13 to DSW J8 (Model HA1)
   Cable, LM B PCC P13 to DBF J8 (Model HA1)

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

060

(From step 004)

Ensure that the library manager power switch is in the Power On position.

If the library has a single library manager, put the 3494 Operator Panel Unit Power switch in the Power Off position, wait 30 seconds, put the Unit Power switch in the Power On position, and observe if the library manager powers on. If the power light on the front of the library manager system unit does not come on in 10 seconds, check the display for an image.

Note: You must wait 30 seconds after a power off cycle before you power on the library. If you don't wait 30 seconds, the library manager may not power up.

If the library has dual library managers and the other LM is operating, ensure the tape subsystem (if installed) in the failing LM frame is offline and power the frame off using CB1 on the PCC. After 30 seconds, power the frame on using CB1.
(Step **060** continues)

060 (continued)

Does the library manager power on?
Yes **No**

061

Voltage from the PCC may not be getting to the library manager. Possible causes are:

- PCC failure
- Line cord, PCC to library manager

Remove the line cord plug from the PCC to the library manager, and with power on the library subsystem, measure for 220V AC ±10% across the PCC connector.

Is 220V AC ±10% present at the output of the PCC and at the line cord plug?
Yes **No**

062

The tape subsystem has power but the library manager does not. Try plugging the line cord into another socket. If that fixes the problem, tape over the failing plug socket so that it does not get used in the future. If no other sockets are available, install a new PCC.

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

063

Perform the "General Checkout" in *PS/ValuePoint Hardware Maintenance Manual*. *IBM 7585 Industrial Computer Information IBM 7588 Industrial Computer Information*. See "Checks, Adjustments, Removals, and Replacements" on page CARR-1 for library manager FRU replacement procedures.

064

The library manager does power on.
(Step **064** continues)

064 (continued)

Does the library manager initialize and come up with the operational screen?
Yes **No**

065

Continue isolation at "Procedure: Problem Analysis when Library Manager Fails to Initialize, Hangs, or Will Not Respond" on page START-45.

066

Possible power sequence problem in the library manager power circuits or the library was powered on too quickly after a power off cycle. If the problem persists, go to the *PS/ValuePoint Hardware Maintenance Manual IBM 7585 Industrial Computer Information*, or *IBM 7588 Industrial Computer Information* to continue problem analysis.

067

(From step 012)

The 36V DC present indicator light is off.

The DC power supplies are designed to shut off (crowbar) for protection if there is excessive current being drawn from the supply. The power supplies will reset when AC power to them is off for 20 seconds.

Measure for +36V DC at the MIC card cable connector coming from the +36V DC power supply. (MIC P2 pins 1 and 2 = ground; MIC P2 pins 3 and 4 = +36V)

Is +36V DC present at the MIC card connector?
Yes **No**

068

Is 220V AC ±10% present at the output of the PCC and at the line cord plug?
Yes **No**

069

The tape subsystem and library manager both have power. Try plugging the 36V power supply line cord into another socket. If that fixes

the problem, tape over the failing socket so that it does not get used in the future. If no other sockets are available, install a new PCC.

Run **End Call** procedure on Service menu.

070

The power supply is defective or it shut off for protection.

Be sure that the 36V DC power supply power switch is in the **On** position and that the cable from the 36V DC power supply to the MIC card is OK. If the switch is On and the cable is OK, test the +36V DC power supply as follows:

1. Turn the 36V power supply switch to OFF.
2. Unplug the AC power cord for the power supply at the PCC.
3. Unplug 36V connector MIC P2 at MIC card.
4. After 20 seconds, plug the AC power cord into it's power socket.
5. Turn the 36V power supply switch to ON.
6. The power supply is OK if the AC and DC present indicators come on.
7. Turn the power supply switch OFF and re-plug the MIC P2 connector.
8. Turn the power supply switch to ON.

Did the 36V DC power supply test fail?
Yes **No**

071

Continue at Step 074.

072

Replace the 36V power supply.

Run **Verify Repair** on the Service menu before returning the 3494 to the customer.

073

The power supply is OK, but an indicator light has failed.
(Step **073** continues)

073 (continued)

Run the **End Call** procedure on the Service menu and note the indicator failure in the comments. Do not replace the power supply.

074

(From step 071)

The power supply is OK and the problem is in the 36V power supply load.

Excessive load can be caused by a defective component, pots not adjusted correctly on the X or Y power amplifier, or by a mechanical mis-alignment. Check for binding as you manually move the accessor from one end to the other on the X-axis, and from bottom to top on the Y-axis. Also, check the adjustment of the X-axis bumper at the far end of the library to ensure the accessor can get a cartridge from the last column without touching the bumper. If the mechanical alignment is OK, continue with the following checks.

Go to “X-Axis and Y-Axis Power Amplifier Card” on page LOC-29 and ensure that the pots and switches are set correctly. If they were set OK, continue with the following checks. If they are set wrong, correct the settings and run **Verify Repair** before returning the 3494 to the customer.

Refer to Figure 151 on page POWER-5 or Figure 152 on page POWER-6. The 36V DC power supply supplies power for the +5V, +12V, and -12V DC voltages generated on the MIC card and for the X and Y axis servo power amplifiers and motors.

The components in the 36V power supply load are:

- MIC card
- LCC card (if installed)
- X/Y axis power amplifiers
- BIC card
- XAX card
- X/Y axis motors
- Interconnecting cables

If the library has a single accessor, power the library off by using the Unit Power switch. Unplug cable at LCC P5 or MIC2-4 P1 and power the library on.

If the library has dual accessors, ensure that the failing accessor is in it's service bay and that the service bay door is shut. Power the 24V power supply off and then power the 36V power supply

off for the failing accessor. Unplug cable at MIC2-4 P1 and power the 36V power supply and 24V power supply on. Run the move accessor service bay test for the failing accessor.

Does the 36V power supply stay up?
Yes No

075

Continue at Step 077.

076

The problem is in the X or Y servo motor or their connection path.

Power off the library using the appropriate switch(es) (i.e. Unit Power switch for single accessor or power supply switches for dual accessor) and connect LCC P5 or MIC2-4 P1. Continue unplugging connectors in the X and Y-axis motor path and attempting to bring the accessor up as described in step Step 074 on page START-34 until you have isolated the defective component. The associated connections are BIC P1, XAX P3, X axis motor, and Y axis motor.

When you have corrected the problem, run **Verify Repair** on the Service menu before returning the 3494 to the customer.

077

(From step 075)

The problem is not in the path to the X/Y axis motors.

Power the library off by using the appropriate switch(es) (i.e. Unit Power switch for single accessor or power supply switches for dual accessor) and connect LCC P5 or MIC2-4 P1. Unplug the X/Y axis power amplifier cable at LCC P3 or MIC2-4 P15 and attempt to bring the accessor up as described in step Step 074 on page START-34.

Does the 36V power supply stay up?
Yes No

078

The problem is not in the power amplifiers.
(Step **078** continues)

078 (continued)

Power the library off by using the appropriate switch(es) (i.e. Unit Power switch for single accessor or power supply switches for dual accessor) and connect LCC P3 or MIC2-4 P15. Replace the following components in the order listed until the problem is corrected:

1. MIC card
2. LCC card (if installed)

When you have corrected the problem, run **Verify Repair** on the Service menu before returning the 3494 to the customer.

079

The problem is in one of the power amplifiers.

Power off the library by using the appropriate switch(es) (i.e. Unit Power switch for single accessor or power supply switches for dual accessor) and connect LCC P3 or MIC2-4 P15.

Ensure that the pots and switches are set correctly on the power amplifiers. Refer to “X-Axis and Y-Axis Power Amplifier Card” on page LOC-29. If they were set wrong, correct the settings and run verify repair before returning the 3494 to the customer.

If the pots and switches were OK, disconnect the +36V wire at P2-5 on each power amplifier and attempt to bring the accessor up as described in step Step 074 on page START-34 to determine which power amplifier is causing the problem. Replace the defective power amplifier.

When you have corrected the problem, run **Verify Repair** on the Service menu before returning the 3494 to the customer.

080

(From step 036)

The library must offline to all hosts before continuing with the following steps.

We will isolate this problem with the Local/Remote switch in the **Remote** position. Ensure that the library subsystem operator panel Unit Emergency (UEPO) switch is in the On position and that the Local/Remote switch is in the **Remote** position. Place the library subsystem Unit Power switch in the Power On position.
(Step **080** continues)

080 (continued)

The first 3494 libraries used the MIC1/LCC card set. The LCC card is mounted to the left of the MIC1 card and plugs into a connector on the lower left side of the MIC1 card. This card set was replaced by the MIC2-4/LPC2,3 card set, where the LPC card (DSW or DBF card if Model HA1) is mounted below the MIC2-4 card and plugs into a connector on the bottom of the MIC2-4 card. Refer to the Locations section of this manual.

Does your machine have the MIC1/LCC card set?

Yes **No**

081

Continue at Step 085.

082

Observe the state of the EMO relay K2, which is on the MIC1 card. The relay should be picked.

Note: If you have trouble seeing if the K2 relay is picked, you may pull the P9 cable connector from the MIC1 card and insert it again. The K2 relay should drop when you pull the cable, and pick again when you plug the cable.

Does the EMO relay K2 pick?

Yes **No**

083

Continue at Step 088.

084

Continue at Step 102 on page START-38.

085

(From step 081)

Observe the green LED on the LPC card (DSW card if Model HA1).
(Step **085** continues)

085 (continued)

Is the green LED on?

Yes **No**

086

Continue at Step 088.

087

Continue at Step 102 on page START-38.

088

(From steps 083 and 086)

EMO circuits are open or voltage is missing to the EMO circuits.

See the POWER section for an overview and the CABLE section for details. Carefully remove the P9 cable connector from the MIC1 or LPC card (DSW card if Model HA1) and measure at the cable connector for +24V DC ±10% at P9-4.

Is +24V DC ±10% present at P9-4?

Yes **No**

089

Continue at Step 091.

090

Continue at Step 097 on page START-37.

091

(From step 089)

With the Unit Power switch in the Power On position, observe the circuit breakers on the PCC.

Are any of the circuit breakers tripped?

Yes **No**

092

Continue at Step 094 on page START-37.

093

Reset the circuit breaker or breakers that are tripped. If the breakers continue to trip when power on is attempted, isolate the cause by removing power plugs, one at a time, to the +24V

DC power supply, +36V DC power supply, library manager, tape control unit, and the local and remote cables at the bottom of the PCC.

If circuit breakers still trip after removing all the above cables, install a new PCC.

If the machine stops tripping circuit breakers after removal of one of the cables, see Figure 165 on page CABLE-5 to find out which unit that plug goes to, and then trace the cause of the breaker tripping problem. If you cannot locate any cause *down-stream* from the PCC, install a new PCC.

Run **End Call** procedure on Service menu.

094

(From step 092)

Power off the library subsystem and have the customer remove power to the wall plug that is the power source to the library subsystem. Remove the mainline power cable from the wall outlet and ask your customer to restore power to the library wall receptacle. Measure for the appropriate voltage levels at the customer voltage source at the wall. It should measure 220V AC ±10%, single phase.

Is the customer voltage OK?

Yes **No**

095

Ask your customer to have his voltage source checked. Run **End Call** procedure on Service menu.

096

Customer voltage is OK. With power removed from the customer voltage source, reconnect the 3494 mainline power cable to the customer voltage source and ask that customer power be restored to the library subsystem.

Install new FRUs as follows until the problem is resolved:

1. Host PCC (remote power control)
2. Cable, Host PCC to RPC card
3. Cable, RPC to MIC1 or LPC P9
   Cable, RPC to DSW J9 (Model HA1)
4. Control unit frame PCC

(Step **096** continues)

096 (continued)

5. RPC card

When you have fixed the fault, run **End Call** on Service menu.

097

(From step 090)

Install the P9 cable into the MIC1 or LPC card (DSW card if Model HA1). Measure for +24V DC ±10% at either side of the Unit Emergency (UEPO) switch.

Is +24V DC ±10% present at both sides of the UEPO switch?

Yes **No**

098

If voltage is present at one side of the UEPO switch, but not present at the other side, the switch is either in the Power Off position or is defective. Set the UEPO switch to Power On, or replace it if it is defective. If voltage is missing at both sides, install new components as follows:

1. MIC1 or LPC card (single accessor)
   DSW card (Model HA1)
2. LPN card
3. LPN P1 cable
4. LPN P3 to the UEPO switch (cable)

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

099

Turn off the main circuit breaker on the PCC, place the Unit Power switch in the **Power On** position and ensure that the Local/Remote switch is in the Remote position.

Remove the P7 cable connector from the MIC1 or LPC card (DSW card if Model HA1) and measure for continuity between P7-22 to P7-46.

Is continuity present between these points?

Yes **No**

100

Install new components below in the order listed:

1. LPN
2. LPN P1 cable

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

101

Install a new MIC1 or LPC card (DSW card if Model HA1).

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

102

(From steps 084 and 087)

The EMO relay K2 is picked or the LED is on but the library subsystem still fails to power on in Remote mode.

With the Unit Power switch in the **Power On** position, carefully remove the small P8 cable connector from the MIC1 or LPC card (DSW or DBF card if Model HA1). P8 connector. Measure for +24V DC ±10% at the cable connector P8-4.

Is +24V DC ±10% present at P8-4?
Yes No

103

Install new components in the order listed:

1. PCC
2. Cable, PCC P13 to MIC1 or LPC P8

   Cable, LM A PCC P13 to DSW J8 (Model HA1)
   Cable, LM B PCC P13 to DBF J8 (Model HA1)

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

104

Plug the P8 cable connector back into the MIC1 or LPC card (DSW or DBF card if Model HA1) P8 connector.

With the Unit Power switch still in the Power On position, remove the P9 cable connector from the MIC1 or LPC card (DSW card if Model HA1).

Note: The EMO relay K2 will drop, which is normal.

Measure for +24V DC ±10% at cable connector P9-6.

Is +24V DC ±10% present at P9-6?
Yes No

105

Install new components in the order listed:

1. Host PCC (remote power control)
2. Cable, Host PCC to RPC card
3. Cable, RPC card to MIC1 or LPC P9

   Cable, RPC card to DSW J9 (Model HA1)
4. Control unit frame PCC
5. RPC card

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

106

Plug the P9 cable connector back into the MIC1 or LPC card (DSW card if Model HA1).

Turn off the main circuit breaker on the PCC, place the Unit Power switch in the **Power On** position and ensure that the Local/Remote switch is in the Remote position.

Remove the P7 cable connector from the MIC1 or LPC card (DSW card if Model HA1) and measure for continuity between the following P7 pins:

P7-22 to P7-46

Is continuity present between these points?
Yes No

107

Install new components below in the order listed:

1. LPN
2. LPN P1 cable

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

108

Install a new MIC1 or LPC card (DSW card if Model HA1).

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

109

(From steps 006 and 010)

One or more tape/DASD subsystems is not receiving power or a tape/DASD subsystem is failing.

If you have a single accessor library and the library is offline, ensure that the tape/DASD subsystem power switch is in the Power On position. Put the 3494 Operator Panel Unit Power switch in the Power Off position, wait 30 seconds, put the Unit Power switch in the Power On position, and observe if the tape/DASD subsystem powers on. If the power light on the front of the 3490E tape subsystem or the AC light on the rear of the 3590 tape drive does not come on, check the drive displays and other tape subsystem lights to see if power is on.

Note: You must wait 30 seconds after a power off cycle before you power on the library. If you don't wait 30 seconds, the 3490E tape subsystem may not IML.

If you have a single accessor library and the library is online, answer no to the next question.

If you have a dual accessor library, you can power the B1x/D1x frame PCC down without effecting the rest of the library when the LED on the frame's SEQ card is on. Ensure that the tape drives in the frame are offline to the hosts and power the frame off using CB1 on the PCC. After 30 seconds, power the frame back on using CB1. If the LED is off on the SEQ card, the library must be taken offline before the frame can be powered off. Refer to “Power Control Compartment (PCC)” on page CARR-136

Does the tape/DASD subsystem power on?

Yes **No**

110

(Step **110** continues)

110 (continued)

Voltage may not be getting to the tape/DASD subsystem. Possible causes are:

- No AC power to tape/DASD subsystem
- Tape/DASD subsystem power switch is off
- No AC power to B1x/D1x frame PCC
- CB1 is off on B1x/D1x frame PCC
- Failure in PCC to PCC power sequence
- Failure in unit emergency control

Be sure that the tape/DASD subsystem Power switch is On. Unplug the tape/DASD subsystem line cord from the PCC and measure for 220V AC ±10% across the PCC connector.

Is 220V AC ±10% present at the output of the PCC?

Yes **No**

111

Ensure that 220V AC ±10% is present at the customer wall receptacle.

Try another spare outlet on the PCC to see if the outlet is defective.

Does the new outlet correct the problem?

Yes **No**

112

The PCC is not generating line voltage.

Continue at Step 118 on page START-40.

113

Place a piece of tape over the failing outlet so that it does not get used in the future. Run **End Call** procedure on Service menu.

114

Go to appropriate maintenance information manual for the subsystem for further isolation.

115

The tape/DASD subsystem does power on.

Does the tape subsystem initialize?
Yes **No**

116

Go to the appropriate maintenance information manual for further isolation.

117

Possible power sequence problem in tape subsystem power circuits or library was powered on too quickly after a power off cycle. If the problem persists, go to the appropriate maintenance information manual and continue problem analysis.

This ends the procedure.

118

(From step 112)

The PCC is not generating line voltage.

Does the library have any D1x or B16 expansion frames?
Yes **No**

119

Install new PCC in L1x frame.

When you have fixed the fault, run **Verify repair** on Service menu before returning the 3494 to the customer.

120

Does the library have one accessor?
Yes **No**

121

This is a dual accessor library.
(Step **121** continues)

121 (continued)

Is the LED on the SEQ card in the failing frame lighted?
Yes **No**

122

The SEQ card and PCC has failed.

Ensure that the power sequence cables and unit emergency cables are properly installed. Refer to “Power Sequence Cables for D1x/B1x Frames” on page INST-78 and “Unit Emergency Cables from Control Unit Frame to D1x / B16 Frames” on page INST-83.

Schedule a maintenance window when the entire library can be taken down. When ready, go to “Power Control Compartment (PCC)” on page CARR-136 to replace the SEQ card and PCC in the failing frame.

123

The SEQ card is operating and the PCC has failed.

You can replace the PCC while the library is operating. Refer to “Power Control Compartment (PCC)” on page CARR-136.

If the PCC does not correct the problem, schedule a maintenance window when the entire library can be taken down. When ready, continue at Step 124.

124

Refer to the Power section of this publication for an overview of the power controls.

The library must be offline to all hosts before continuing with the following steps.

Ensure that the power sequence cables and unit emergency cables are properly installed. Refer to “Power Sequence Cables for D1x/B1x Frames” on page INST-78 and “Unit Emergency Cables from Control Unit Frame to D1x / B16 Frames” on page INST-83.
(Step **124** continues)

124 (continued)

Are both sets of cables installed correctly?

Yes **No**

125

Install cable correctly and verify that the library powers up correctly. Run **End Call** procedure on Service menu.

126

Ensure that all circuit breakers are On and put the library EPO and Unit Power switches in the On position.

Unplug the unit emergency cable for the failing PCC from the L1x frame BIC card connector PCC n, where n = PCC number.

Measure for +24V DC ±10% on pin 4 of the cable connector.

Is +24V DC present on the cable pin?

Yes **No**

127

The unit emergency control signal from the PCC is missing.

Unplug the unit emergency cable from P13 on the failing PCC.

Check for continuity in the cable from P13 connector pin 22 to BIC connector pin 4.

Do you have continuity in cable?

Yes **No**

128

Install new cable, DU PCC to CU BIC.

Verify that the library powers up correctly. Run **End Call** procedure on Service menu.

129

Install new PCC in failing drive unit.

Verify that the library powers up correctly. Run **End Call** procedure on Service menu.

130

(Step **130** continues)

130 (continued)

The unit emergency control signal from the PCC is OK.

Unplug the unit emergency cable from P13 on the failing PCC.

Check for continuity in the cable from P13 connector pin 10 to BIC connector pin 2.

Do you have continuity in the cable?

Yes **No**

131

Install new cable, DU PCC to CU BIC.

Verify that the library powers up correctly. Run **End Call** procedure on Service menu.

132

Check for continuity between BIC card PCC n socket pins 2 and 4.

Do you have continuity between the BIC card pins?

Yes **No**

133

Check for continuity in MIC1 or LPC P6 (DSW or DBF if Model HA1) to BIC P7 cable for the failing PCC unit emergency lines and on the BIC card. See the Cable section of this publication.

Do you have continuity in the cable and card?

Yes **No**

134

Set the library Unit Power switch to Off.

Replace the defective FRU:

- BIC Card
- MIC1 or LPC P6 to BIC P7 Cable Cable, BIC P7 to DSW J6 (Model HA1)

Verify that the library powers up correctly. Run **End Call** procedure on Service menu.

135

Set the library Unit Power switch to Off.

Replace the MIC card.

Verify that the library powers up correctly and run **Verify Repair** on Service menu.

136

The unit emergency control lines are OK.

Re-install the unit emergency cable, DU PCC P13 to CU BIC PCC n.

Unplug the power sequence cable at the failing PCC P17 connector and the previous PCC P18 connector.

Check for continuity in the cable between the P17 and P18 cable connectors on pins 1, 2, 3, 4, and 5.

Do you have continuity in the cable?
Yes **No**

137

Replace cable DU PCC P17 to previous PCC P18.

Verify that the library powers up correctly. Run **End Call** procedure on Service menu.

138

Re-install failing PCC P17 cable connector.

With library power on, measure for +24V DC ±10% at the previous PCC P18 cable connector on pin 4.

Is +24V DC ±10% present at the connector?
Yes **No**

139

Replace PCC in failing drive unit frame.

Verify that the library powers up correctly. Run **End Call** procedure on Service menu.

140

The power sequence control signal is OK.
(Step **140** continues)

140 (continued)

Check for continuity between pins 4 and 5 on the previous PCC J18 socket.

Do you have continuity between the socket pins?
Yes **No**

141

Replace PCC in previous frame.

Verify that the library powers up correctly. Run **End Call** procedure on Service menu.

142

Replace PCC in failing frame.

Verify that the library powers up correctly. Run **End Call** procedure on Service menu.

143

(From step 014)

The +24V DC present indicator light is off.

The DC power supplies are designed to shut off (crowbar) for protection if there is excessive current being drawn from the supply. The power supplies will reset when AC power to them is off for 20 seconds.

A power sequencing circuit is implemented in the DC power cable to shut off 24V to the MIC card if 36V is lost. The 36V DC present indicator must be on before the 24V can be checked at the MIC card. If the DC present indicator light on the 36V power supply is not on, go to Step 067 on page START-33 and correct the 36V problem before continuing the 24V analysis.

Measure for +24V DC ±10% at the MIC card cable connector coming from the +24V DC power supply. (MIC P3 pins 1, 2, and 3 = ground; MIC P3 pins 4, 5, and 6 = +24V)

Is +24V DC ±10% present at the connector?
Yes **No**

144

(Step **144** continues)

144 (continued)

Is 220V AC ±10% present at the output of the PCC and at the line cord plug?
Yes **No**

145

The tape subsystem and library manager both have power. Try plugging the 24V power supply line cord into another socket. If that fixes the problem, tape over the failing socket so that it does not get used in the future. If no other sockets are available, install a new PCC.

When you have fixed the fault, run **Verify Repair** on Service menu before returning the 3494 to the customer.

146

The power supply is defective or there is a short in the power supply load.

Be sure that the 24V DC power supply power switch is in the **On** position and that the cable from the 24V DC power supply to the MIC card is OK. If the switch is On and the cable is OK, test the +24V DC power supply as follows:

1. Turn the 24V power supply switch to OFF.
2. Unplug the AC power cord for the power supply at the PCC.
3. Unplug 24V connector MIC P3 at MIC card.
4. After 20 seconds, plug the AC power cord into it's power socket.
5. Turn the 24V power supply switch to ON.
6. The power supply is OK if the AC and DC present indicators come on.
7. Turn the power supply switch OFF and re-plug the MIC P3 connector.
8. Turn the power supply switch to ON.

(Step **146** continues)

146 (continued)

Did the 24V DC power supply test fail?
Yes **No**

147

Continue at Step 150.

148

Replace the 24V power supply.

Run **Verify repair** on the Service menu before returning the 3494 to the customer.

149

The power supply is OK, but an indicator light has failed.

Run the **End Call** procedure on the Service menu and note the indicator failure in the comments. Do not replace the power supply.

150

(From step 147)

The 24V power supply is OK and the problem is in the 24V power supply load.

Refer to “24-Volt Distribution Overview” on page POWER-7 and to Figure 165 on page CABLE-5. The 24V DC power supply supplies power for the picker assembly, operator panel, and convenience I/O station feature.

The components in the 24V power supply load are:

- MIC card
- LCC or LPC card (single accessor)
- DSW or DBF card (dual accessor)
- BIC card
- XAX card
- Picker assembly
- Operator panel (LPN) card
- Convenience I/O station (feature)
- Interconnecting cables

Power the library off by using the appropriate switch (i.e. Unit Power switch if single accessor or 24V and 36V power supply switches if dual accessor). Unplug cable at LCC P5 or MIC2-4 P1 and attempt to bring the accessor up as described in Step 074 on page START-34.
(Step **150** continues)

150 (continued)

Does the 24V power supply stay up?

Yes **No**

151

Continue at Step 153.

152

The problem is in the picker assembly or its connection path.

Power the library off using the appropriate switch (i.e. Unit Power switch if single accessor or 24V and 36V power supply switches if dual accessor) and connect LCC P5 or MIC2-4 P1. Continue unplugging connectors in the picker connection path and attempting to bring the accessor up until you have isolated the defective component. The associated connections are BIC P1, GRI P1, and the picker assembly cables (pivot sensors and motor, reach sensors and motor, and grip assembly).

When you have corrected the problem, run **Verify Repair** on the Service menu before returning the 3494 to the customer.

153

(From step 151)

The problem is not in the picker path.

The library must be offline to all hosts before continuing with the following steps.

Power the library off using the Unit Power switch and connect LCC P5 or MIC2-4 P1. Unplug the convenience I/O cable (if installed) at LPN P2 and power the library on.

Does the 24V power supply stay up while the library manager initializes?

Yes **No**

154

The problem is not in the convenience I/O station.

Power the library off using the Unit Power switch and connect LPN P2. Replace the following components in the order listed until the problem is corrected:

(Step **154** continues)

154 (continued)

1. MIC card
2. LPN card
3. LCC or LPC card (single accessor)
   DSW or DBF card (Model HA1)
4. LPN P1 cable

When you have corrected the problem, run **Verify Repair** on the Service menu before returning the 3494 to the customer.

155

The problem is in the convenience I/O station.

Power the library off using the Unit Power switch and connect LPN P2. Continue unplugging connectors in the convenience I/O station and powering the library on until you have isolated the defective sensor or solenoid.

When you have corrected the problem, run **Verify Repair** on the Service menu before returning the 3494 to the customer.

Procedure: Problem Analysis when Library Manager Fails to Initialize, Hangs, or Will Not Respond

These failures are usually caused by faults in the library manager hardware or software. See the LOC section for location of the components and the CARR section for removal and replacement procedures.

Note: If the library manager appears to be in a hang condition, only cycle power off and on if you are unable to do an OS/2 dump or Ctrl+Alt+Del as described below. Cycling power while the library manager is hung may cause irrecoverable damage to the library manager database.

001

Observe the library manager Power On indicator on the front of the system unit behind the rear door of the control unit frame. It should be lit.

Is the library manager Power On indicator lit?

Yes **No**

002

Continue at "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27.

003

The library manager is powered on.

When the library manager application program is initialized, the Operator menu and the System Summary status window or the Manual Mode Terminal window is displayed.

Note: The operating system software turns the display off if there is no operator activity. Press any key on the keyboard to activate the display.

Is the library manager initialized?

Yes **No**

004

Continue at Step 013 on page START-46.

005

The library manager is initialized.
(Step **005** continues)

005 (continued)

Verify that the library is in Auto (or Manual) mode and the library manager is Online.

Does the library manager appear to be hung or will not respond?

Yes **No**

006

The library manager is responding. Choose another symptom from the Start Service table or contact your next level of support.

007

The library manager is not responding.

If the remote console feature is installed and the remote console has control, the keyboard and pointing device on the library manager are locked. To unlock, refer to **Changing the Session State of the Library Manager** in the **Remote Library Manager Console Feature** section of the IBM 3494 Operator's Guide.

Is this the standby library manager of a Model HA1?

Yes **No**

008

If the accessor is still performing cartridge movement commands, ask the operator to complete or cancel jobs in the queue and vary all library devices offline.

Continue at Step 010.

009

Ensure that the local accessor for this library manager is not active. If it is the active accessor, refer to step 2 on page START-12 to make it inactive.

Continue at Step 010.

010

(From steps 008 and 009)
(Step **010** continues)

010 (continued)

Attempt to do a keystroke dump by pressing the **Ctrl+Shift+F12** keys. If a triangle symbol does not appear on the display, attempt to do an OS/2 dump as follows:

- If you have a CD-ROM (OS/2 Warp), press and hold the **Ctrl+Alt** keys while pressing the **F10** key twice.
- If you have OS/2 2.11, press and hold the **Ctrl+Alt** keys while pressing the **NumLock** key twice.

These dumps may be needed when you contact your next level of support.

Attempt to reboot the library manager by pressing the **Ctrl+Alt+Del** keys.

If the library manager does not reboot, power cycle the LM as follows:

1. Power the library manager off using the appropriate procedure:
   - If there are no tape drives in the frame, power down using CB1 on the PCC.
   - If there are tape drives in the frame, power off the 24V power supply and then the 36V power supply. When they are off, power the LM off using the system unit power switch.
2. Wait 30 seconds and then power the LM up using the appropriate switch (CB1 or system unit).
3. If the LM does not begin initializing, go to "Library Manager Diagnostics" on page DIAG-21.
4. Use the "CHKDSK Procedure" on page CARR-101 if required to recover.
5. Power the 24V and 36V power supplies on when you have completed your problem analysis.

If the problem persists, perform "Procedure: Analyze a 3494 Interface Problem with the Host or Tape Subsystem" on page START-15 to checkout the library manager interfaces.

Are the library manager interfaces OK?

Yes **No**

011

(Step **011** continues)

011 (continued)

Repair the interface problem.

Run the **Verify Repair** procedure on the Service menu before returning the library to the customer.

012

The library manager interfaces are OK.

Go to Step 020 on page START-48.

013

(From step 004)

The library manager is not initialized.

You may have a library manager database problem. This can occur after an abnormal power off of the library manager caused by one of the following:

- Power drop to the library.
- Library power down with Unit Emergency switch.
- Library manager power down with library manager system unit power switch.
- Power drop to the library manager.
- Library manager power down with the Unit Power switch or the PCC CB1 switch if the library manager is in a hang condition.

Note: Normal library power off using the Unit Power switch on the Operator Panel does a shutdown of the library manager software before powering off, unless the library manager is in a hang condition.

Did you have an abnormal power off of the library?

Yes **No**

014

Continue at Step 018 on page START-47.

015

The library manager was powered down without a shutdown.

Go to "CHKDSK Procedure" on page CARR-101 to correct the hard disk drive.
(Step **015** continues)

015 (continued)

Do you still have the problem after running CHKDSK?

Yes **No**

016

Problem was corrected by CHKDSK.

017

The library manager database may be damaged. Usually you will receive a severe error message when the library manager attempts to initialize. **Contact your next level of support.** If you cannot wait for support, use the following procedure to clear the database.

CAUTION: This procedure will destroy the category information for the tape volumes in the library. The customer will need to restore the categories when the library is re-inventoried.

1. If the Severe Error window is displayed, select **OK** and wait for the Shutdown window to appear.

   Note: If the Severe Error window or Shutdown window is not displayed, go to Step 018.

2. Select **Service Window**.
3. Enter the service password, **service**.
4. Insert Library Manager diskette 1 into the diskette drive.
5. Clear the database as follows:
   a. If you DO NOT have a CD-ROM drive, type **a:cleardb** at the **C:** prompt.
   b. If you do have a CD-ROM drive, type **a:dropem** at the **C:** prompt.
6. When the database is cleared, remove the diskette.
7. Close the Service Window and select **Shutdown for reboot**.
8. When the shutdown completes, restart the library manager by pressing Ctrl+Alt+Del.
9. If you have dual library managers and the other LM was active during this procedure, this library manager will initialize as the standby LM and no further action is required.
10. If you have a single library manager or if both of the dual library managers failed, restore the database using the following steps:

(Step **017** continues)

017 (continued)

a. When the library manager initializes, put the library in Auto, Offline mode.
b. Select **Teach - new configuration** from the Teach pull-down on the Service menu.
c. When the teach completes, select **Inventory new storage** from the Commands pull-down on the Operator menu.
d. Ask the customer to re-insert the logical volumes if a VTS subsystem is installed.
e. Ask the customer to restore the category information.

018

(From step 014)

The library manager was powered off with a normal shutdown, but it does not initialize or the display is off.

If the library manager has a mirrored hard drive card installed, and you have one of the following symptoms, go to “Procedure: Analyze a Mirrored Hard Drive Problem” on page START-18.

- An indication when the library manager is booted that the configuration has changed because no hard drives are detected.
- A graphical indication when the library manager is booted that a diskette must be inserted. The library manager cannot find the boot record on the hard disk.

Otherwise, go to **General Checkout** in *PS/ValuePoint Hardware Maintenance Manual* or *IBM 7585 or 7588 Industrial Computer Information* and perform a general checkout of the library manager hardware. If a problem is found, use the FRU lists in that manual to correct the problem. See “Checks, Adjustments, Removals, and Replacements” on page CARR-1 for library manager FRU replacement procedures.

Is the library manager hardware OK?

Yes **No**

019

Repair the library manager.

Verify that the library powers up and initializes OK and run the **End Call** procedure on the Service menu before returning the library to the customer.

020

(From step 012)

The library manager hardware is OK.

You may have a library manager software problem. **Contact your next level of support.** If you cannot wait for support, try re-loading the library manager software. Refer to“Library Manager Software Revision Installation” on page CARR-125 .

Did the library manager software load and initialize OK?

Yes **No**

021

Contact your next level of support.

022

The library manager software loaded and initialized OK.

Run **Verify Installation** on the Service menu before returning the library to the customer.

If the problem persists, contact your next level of support.

Procedure: Problem Analysis for Library Failures that Appear as Visual, Audible, or Other Symptoms without Fault Symptom Codes (FSCs)

001

If you have a fault symptom code (FSC) that appears to represent the visual, audible, or other symptom, select **Start Service Call** on the library manager **Service** menu using that FSC.

Use Figure 22 if the library manager is not operating or if you are away from the library.

Run **Verify repair** before returning the 3494 to the customer.

Figure 22 (Page 1 of 8). Visual, Audible, or Other Symptoms

Symptom	Possible causes	Action or FRUs
Cartridge dragout (not fully seated in storage cell and sticking out into the aisle)	Storage array not parallel to X-rail, Y-axis not perpendicular to X-rail, mis-teach	**Action** 1. If the cartridges that are sticking out are all on a front door, excessive force may have been used to open or close the door, or the door cylinder may be defective. Check the door cylinder and replace if necessary. 2. If the library does not have a Y-mast clamp (Figure 116 on page CARR-65), check the Y-axis alignment. Refer to "Adjustment of Y-axis Assembly" on page CARR-64. If the y-axis is out of alignment, order the Y-mast clamp kit p/n 08L5872 and install it using the "Y-Mast Clamp Install Procedure" on page CARR-64. If you re-adjust the Y-axis or install the Y-mast clamp, run **Teach current configuration** on the entire library. Libraries manufactured in January 1998 or later have a dragout detection picker. This picker will detect excessive dragout and the code will take corrective action to push the cartridge back into it's cell. If you are not sure if your library has this picker, measure the distance between the front and middle optical sensors on the reach card. If it is 55mm (2.2 in.) center to center, it is a dragout detection picker. 3. If your library has the dragout detection picker and you are observing excessive dragout greater than 12mm (0.5 in.), the sensor on the reach card may be defective. Replace the reach card and observe library operation to determine if the problem is corrected. 4. If your library does not have the dragout detection picker, perform the following checks: • Ensure that the storage arrays are properly seated and parallel to the X-rail. If you made any adjustments to the storage arrays, run **Teach current configuration** on the frame(s) where you made the adjustment. • Run the Frame Alignment margin test in the failing frame as follows: 1. Put the library in **Auto**, **Offline**, and **Service** mode. 2. Select **Exercise cartridge accessor** on the Service pulldown and then select **Frame alignment**. 3. Select the frame(s) to test and the gripper to use. 4. If cells A01, E01, A20 and A21, E21, A40 of the selected frames contain customer cartridges, press **Ctrl-Shift-F11** to run the test using the customer's cartridges. 5. If the cells are empty, press **Ctrl-Shift-F3** to run the test using the CE cartridge. 6. Follow the instructions on the screen to run the tests and enter the number of cycles you want to run. 7. As the test runs, look for any cartridges being dragged out when the gripper retracts. • If any errors (warnings) are detected or you observe any dragout during the offset tests, re-adjust the storage arrays and re-teach the frame as required until the test runs clean.

Figure 22 (Page 2 of 8). Visual, Audible, or Other Symptoms

Symptom	Possible causes	Action or FRUs
Dropped cartridge	Drive or cell too far from picker, damaged or missing gripper clip, mis-alignment with drive or cell	**Action** 1. Ensure that the distance between the front of the picker reach platform and the cartridge label surface at the storage cell or drive unload point is 35mm (1.38 in) or less in the failing frame. If you make any adjustments to storage arrays or drive position, run **Teach current configuration** on the frame(s) where you made the adjustment. 2. Ensure that the gripper clip is installed and is not damaged. 3. Check alignment as described in the previous table entry for Cartridge dragout.
36V DC power indicator is Off or fuse F3 on the MIC card is blowing	Power supply, mechanical binding, short in power supply load	**Action** • Test the power supply as follows: 1. Turn the 36V power supply switch to OFF. 2. Unplug the AC power cord for the power supply at the PCC. 3. Unplug the 36V connector MIC P2 at the MIC card. 4. After 20 seconds, plug the AC power cord into it's power socket. 5. Turn the 36V power supply switch to ON. 6. The power supply is OK if the AC and DC present indicators come on. Replace the power supply only if the DC indicator does not come on. 7. Turn the 36V power supply switch to OFF and re-plug the MIC P2 connector. 8. Turn the 36V power supply switch to ON. • Check for binding as you manually move the accessor from one end to the other on the X-axis, and from bottom to top on the Y-axis. Also, check the adjustment of the X-axis bumper at the far end of the library to ensure the accessor can get a cartridge from the last column without touching the bumper. If the mechanical alignment is OK, go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27. **Note:** The power supply is designed to shut off (crowbar) for protection if excessive current is being drawn from it. It will reset when AC power (unit power) has been off for 20 seconds.
Fuse blown on MIC card	Shorted component or heavy load on circuit	**Action** Replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “36-Volt Distribution Overview” on page POWER-5 or “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined.
Bearing noise or squeak from X-axis	Defective bearing	**Primary FRU Group (Probability)** X rail roller (85%) **Secondary FRU Group (Probability)** X-axis pinion shaft assembly (10%) X-axis motor (5%) **Note:** If you have obvious damage to the rail rollers or pinion shaft, determine the parts to order as follows based on the X-axis casting in your library: • X-axis casting with no p/n stamped on casting: – X-axis rail roller, p/n = 61G9698, qty = 4. – X-axis pinion shaft asm, p/n = 34G9608, qty = 1. • X-axis casting with part number stamped on end of casting above the X-axis home flag: – X-axis lower rail roller, p/n = 61G9698, qty = 4. – X-axis upper rail roller, p/n = 05H4138, qty = 2. – X-axis pinion shaft asm, p/n = 05H4148, qty = 1.

Figure 22 (Page 3 of 8). Visual, Audible, or Other Symptoms

Symptom	Possible causes	Action or FRUs
Binding X-axis	Guide roller adjustment, defective bearing, or frame alignment	**Action** 1. Check top guide roller adjustment. See "Y-Axis Guide Rail Roller Adjustment" on page CARR-69. If the problem persists, replace the appropriate FRU. 2. Check frame alignment particularly for older frames without the alignment hardware. Ensure that they have not shifted and that the leveling pads are snug to the floor. If you change frame alignment, run **Teach current configuration** on the entire library before returning it to the customer. **Primary FRU Group (Probability)** X-axis pinion shaft assembly (75%) **Secondary FRU Group (Probability)** X rail roller (20%) X-axis motor (5%)
Binding in Y-axis or screw noise or squeak from Y-axis	Dry lead screw nut or defective bearing	**Action** Perform PM procedure. Go to "Preventive Maintenance (PM)" on page CARR-139. If the problem persists, replace the appropriate FRU. **Primary FRU Group (Probability)** Y-axis assembly (95%) **Secondary FRU Group (Probability)** Y-axis motor (5%)
X or Y axis vibration (oscillation) when stopping or stopped	Servo problem	**Action** Ensure that the switches and pots on the power amplifiers are set correctly. See "X-Axis and Y-Axis Power Amplifier Card" on page LOC-29. **Primary FRU Group (Probability)** X or Y axis power amplifier (95%) **Secondary FRU Group (Probability)** X or Y axis motor (5%)
Gripper thumb hits cartridge above target cartridge	Calibration sensor position or reflection at fiducial	**Action** Check for uncovered screw heads behind the fiducial label. If you find an uncovered screw head, cover it with black tape and re-teach the library. **Primary FRU Group (Probability)** Calibration sensor assembly (100%) **Secondary FRU Group (Probability)** —
1. Too many cartridges being rejected during inventory 2. Cartridges are being put into the wrong category (i.e. ECST tapes showing as CST in inventory database, etc.)	Failure to read labels correctly	**Primary FRU Group (Probability)** Bar-code reader adjustment (98%) **Secondary FRU Group (Probability)** Cartridge labels (2%)

Figure 22 (Page 4 of 8). Visual, Audible, or Other Symptoms

Symptom	Possible causes	Action or FRUs
Auto and Pause lights flash continuously	Library manager power or electronic failure	**Primary FRU Group (Probability)** Library manager (97%) **Secondary FRU Group (Probability)** Power control compartment, PCC (2%) Library manager line cord to PCC P5 (1%)
Convenience I/O Station problem	Convenience I/O mechanical or electronic failure	**Action** Run the **Test Interface, Input/output station** diagnostic to isolate the failure. The following FRUs are associated with the I/O station: **Primary FRU Group (Probability)** Convenience I/O door lock solenoid (35%) Convenience I/O cable (17%) Convenience I/O cartridge present sensor (16%) Convenience I/O door closed sensor (16%) **Secondary FRU Group (Probability)** Convenience I/O door locked sensor (8%) Op panel card, LPN (6%) Mach intf ctrl card, MIC (1%) DI/DO card, DI/DO (1%) Library Power Control card, LPC (if installed) (1%) DSW or DBF card (Model HA1) LPN P1 Op panel cable (1%) DI/DO P1,P2 to MIC P5,P4 cable (1%)
Summary Status: A direct attached host port is unavailable.	Interface failure. Should be one digit displayed (0–3) for each host attached and available. If a port has failed or is not available, a dash (–) is indicated instead of the port number.	**Action** Go to:"Procedure: Analyze a 3494 Interface Problem with the Host or Tape Subsystem" on page START-15. **Primary FRU Group (Probability)** LM ARTIC to host cable and converter (if used) (78%) ARTIC card (10%) **Secondary FRU Group (Probability)** ARTIC multiport cable (9%) ARTIC RS422 card (if used) (3%) PMX card (if Model HA1) (1%) **Note:** Refer to "Cables from Hosts" on page INST-115 for connection information for your library configuration.
Summary Status: Grip failed.	Electronic or mechanical failure	**Action** **If single accessor library**: • If you can take the library offline, use **Start service call** on the Service pulldown menu and follow the guided procedures to correct the failure. • If you cannot take the library offline, use **Analyze error log** on the Service pulldown menu to determine the error code for the failure and refer to the Fault Symptom Index section of this manual for the recommended actions and possible failing FRUs. **If dual accessor library**: • Repair problem concurrent with library operation in Auto mode. Go to "Procedure: Prepare the Library Subsystem for Service" on page START-10 and follow instructions for accessor problem.

Figure 22 (Page 5 of 8). Visual, Audible, or Other Symptoms

Symptom	Possible causes	Action or FRUs
Summary Status: Vision (bar-code reader) failed.	Electronic failure or reset needed after an unrelated error	**Action** **If single accessor library**: 1. Reset interface before replacing FRUs. See 2B63 in FSI section for reset procedure. 2. If you can take the library offline, use **Start service call** on the Service pulldown menu and follow the guided procedures to correct the failure. 3. If you cannot take the library offline, use **Analyze error log** on the Service pulldown menu to determine the error code for the failure and refer to the Fault Symptom Index section of this manual for the recommended actions and possible failing FRUs. **If dual accessor library**: • Repair problem concurrent with library operation in Auto mode. Go to "Procedure: Prepare the Library Subsystem for Service" on page START-10 and follow instructions for accessor problem.
Summary Status: Tape subsystem port failed.	Interface failure. Should be one digit displayed (4–7) for each tape CU attached If a port has failed or is not available, a dash (–) is indicated instead of the port number.	**Action** If it is not a Model B18 port, go to:"Procedure: Analyze a 3494 Interface Problem with the Host or Tape Subsystem" on page START-15. If it is a Model B18 port, go to:"Procedure: Analyze an Internal Ethernet LAN Problem" on page START-21. **Primary FRU Group (Probability)** Tape/VTS library attachment card (68%) ARTIC RS-422 card (if used) (13%) ARTIC card (12%) **Secondary FRU Group (Probability)** Tape/VTS subsystem to LM cable and converter (if used) (2%) ARTIC Multiport Cable (2%) Tape/VTS library attachment card cable (1%) PMX card (if Model HA1) (1%) **Note:** Refer to "ARTIC Adapter Cables" on page INST-89 for connection information for your library configuration.
Summary Status: Door open, but all doors are closed.	Circuit failure	**Primary FRU Group (Probability)** Door interlock switch (29%) Door interlock card, DIL (19%) Mach intf ctrl card, MIC (18%) Door interlock jumper (10%) BIC P6 to DIL P1 CU door interlock cable (10%) DU/SU door interlock cable (10%) **Secondary FRU Group (Probability)** MIC1 or LPC P6 to BIC P7 DC Controls Cable (3%) Bulkhead interconnect card, BIC (1%)

Figure 22 (Page 6 of 8). Visual, Audible, or Other Symptoms

Symptom	Possible causes	Action or FRUs
Library manager will not go into AUTO mode.	Failure in library subsystem	**Primary FRU Group (Probability)** Y axis power amplifier (25%) X axis power amplifier (21%) Y axis home sensor (13%) X axis drive belt (12%) **Secondary FRU Group (Probability)** X axis home sensor (6%) Y axis drive belt (6%) 24V picker power supply (5%) Mach intf ctrl card, MIC (4%) Door interlock switch (2%) BIC P1 to XAX P1, X axis flex cable (2%) Door interlock card, DIL (2%) Door interlock jumper (1%) BIC P6 to DIL P1, CU door interlock cable (1%) DU/SU door interlock cable (1%) DI/DO card, DI/DO (1%) XAX P2 to GRI P1, Y axis flex cable (1%) MIC1 or LPC P6 to BIC P7 DC controls cable (1%) DI/DO P1,P2 to MIC P5,P4 cable (1%)
Operator panel lights - incorrect operation.	Electronic failure or jumper missing	**Action** If a CIO is not installed, ensure that jumper p/n 50G1049 is plugged into the P2 connector socket on the Op Panel card. **Primary FRU Group (Probability)** Op panel card, LPN (83%) **Secondary FRU Group (Probability)** Mach intf ctrl card, MIC (8%) DI/DO card, DI/DO (4%) LPN P1 Op panel cable (4%) DI/DO P1,P2 to MIC P5,P4 cable (1%)
Operator panel switches - incorrect operation.	Electronic failure	**Primary FRU Group (Probability)** Op panel card, LPN (87%) **Secondary FRU Group (Probability)** Mach intf ctrl card, MIC (9%) LPN P1 Op panel cable (4%)
Library Paused but operator did not push Pause button or select Pause on LM.	Accessor error, Electronic failure, shorted cable	**Action** LM will pause library on accessor failures. Go to **Analyze error log** on the LM Service menu and look for accessor errors. If none are recorded and the operator did not select pause, suspect the following FRUs. **Primary FRU Group** Mach intf ctrl card, MIC Op panel card, LPN DI/DO card, DI/DO **Secondary FRU Group** X-axis flex cable (look for damage causing shorted lines)
Library manager does not power on.	Power problem	**Primary FRU Group (Probability)** Power supply (200 W) (95%) **Secondary FRU Group (Probability)** Library manager line cord to PCC P5 (5%)

Figure 22 (Page 7 of 8). Visual, Audible, or Other Symptoms

Symptom	Possible causes	Action or FRUs
Library manager blank display screen. (Will not activate when a key is pressed)	Electronic failure, software, a remote console has control, or SBC card Disable Video switch is on.	**Action** 1. Ensure the library manager SBC card Disable Video switch is in the Off position. 2. Ensure that a remote console does not have control. You can press the **Alt+T** key combination on the library manager keyboard to take control at the library. If the display does not activate, suspect the following FRUs. **Primary FRU Group (Probability)** Flat panel display (94%) **Secondary FRU Group (Probability)** Power supply (200 W) (5%) Display adapter (1%) Display cable (1%) Library manager line cord to PCC P5 (1%)
Library manager display problem, non-blank.	Electronic failure	**Primary FRU Group (Probability)** Flat panel display (98%) **Secondary FRU Group (Probability)** Display adapter (1%) Display cable (1%)
Library manager keyboard problem.	Electronic or mechanical failure	**Primary FRU Group (Probability)** Track-ball keyboard and cables (94%) **Secondary FRU Group (Probability)** Library manager system board (6%)
Library manager Insert a Diskette icon appears when a known good diskette is used.	Electronic or mechanical failure or drive unavailable in configuration.	**Primary FRU Group (Probability)** Diskette drive (86%) **Secondary FRU Group (Probability)** Diskette drive cable (7%) Library manager system board (7%)
Library manager Insert a Diskette icon appears when no diskette is being used.	Hard drive boot failure.	**Action** If a mirrored hard drive card is installed in the library manager, go to "Procedure: Analyze a Mirrored Hard Drive Problem" on page START-18. If a mirrored hard drive card is not installed in the library manager, go to "Library Manager Diagnostics" on page DIAG-21.
Configuration message or screen after booting indicates no hard drives are installed	Electronic failure	**Action** If a mirrored hard drive card is installed in the library manager, go to "Procedure: Analyze a Mirrored Hard Drive Problem" on page START-18. If a mirrored hard drive card is not installed in the library manager, go to "Library Manager Diagnostics" on page DIAG-21.
Operational Status: Primary or mirror hard drive failed	Electronic failure.	**Action** Go to "Procedure: Analyze a Mirrored Hard Drive Problem" on page START-18.
Hard drive failure message sent to the host	Electronic failure.	**Action** Check for an operator intervention required message that specifies which hard drive failed. Then, go to "Procedure: Analyze a Mirrored Hard Drive Problem" on page START-18.
Operator intervention required message indicating that a hard drive failed	Electronic failure.	**Action** Go to "Procedure: Analyze a Mirrored Hard Drive Problem" on page START-18.

Figure 22 (Page 8 of 8). Visual, Audible, or Other Symptoms

Symptom	Possible causes	Action or FRUs
Library manager hung. Cannot do library manager shutdown.	Internal library manager failure	**Primary FRU Group (Probability)** Library manager system board (70%) Hard disk drive (17%) Library manager memory modules (11%) **Secondary FRU Group (Probability)** Hard disk drive signal cable (2%)
Library manager real-time co-processor error	Can not initialize ARTIC card during PC initialization.	**Action** Go to “ARTIC Diagnostics” on page DIAG-24. Ensure that the ARTIC card is seated properly before replacing FRUs.
Library manager trap error	Trap errors are detected by the operating system. Trap 2, 6, and 8 errors can be caused by hardware failures. Other trap errors are usually caused by software.	**Action** Call the support center **Primary FRU Group (Probability)** Library manager memory modules (92%) **Secondary FRU Group (Probability)** Library manager system board (8%)

Procedure: Operator Panel Failure Diagnosis

001

The operator panel has a fault. Types of faults that can occur with the operator panel and possible causes are in Figure 23. A list of possible failing FRUs is also provided.

See the INTRO section for an overview and the CABLE section for wiring details.

Figure 23 (Page 1 of 2). Operator Panel

Operator Panel Symptom	Possible Causes	Possible FRUs
No indicators are working on the operator panel	1. +5V DC ± 10% missing from operator panel 2. Barcode reader shorting +12V. See error code 2BA1 in FSI section for isolation procedure.	1. +36V power supply 2. MIC card (check fuses before replacing) 3. LPN card 4. Barcode reader 5. LPC card (if installed) DSW or DBF card (Model HA1) 6. LPN P1 cable
One or more indicators fail to light. Power OK.	1. Indicator failing 2. Driver failing	1. Operator panel card (LPN) 2. MIC card (check fuses before replacing) 3. DI/DO card 4. Cable-DI/DO (P1,P2) to MIC card (P5,P4)
One or more indicators on. Should be off.	Driver failing	1. Operator panel card (LPN) 2. MIC card (check fuses before replacing)
Rack Power indicator fails to light	Indicator failing	1. Operator panel card (LPN)
System Power indicator fails to light	Indicator failing	1. Operator panel card (LPN)
Unit Emergency switch failing	1. Switch fault 2. Wiring from switch to MIC1 or LPC card 3. PCC	1. Unit Emergency (UEPO) switch 2. MIC1 or LPC card 3. PCC 4. Cable, LPN P1 to MIC1 or LPC P7 5. Cable, PCC P13 to MIC1 or LPC P8
Unit Power, Auto, Pause switches not working	1. Library is in Manual mode - no problem 2. Software not responding to switch 3. Switch failing 4. Open circuit to MIC card	1. Library Manager software hang 2. Operator panel card (LPN) 3. MIC card (check fuses before replacing) 4. LPC card (single accessor) DSW or DBF card (Model HA1) 5. LPN P1 cable
Local/Remote switch failing	1. Switch failing 2. Open circuit to MIC card	1. Operator panel card (LPN) 2. MIC1 or LPC card (single accessor) DSW or DBF card (Model HA1) 3. LPN P1 cable
Auto or Pause lights fail to come on	1. Indicator failing 2. Open circuit to MIC card	1. Operator panel card (LPN) 2. MIC card (check fuses before replacing) 3. LPN P1 cable

Figure 23 (Page 2 of 2). Operator Panel

Operator Panel Symptom	Possible Causes	Possible FRUs
Auto and Pause lights flash continually	1. Library is in Manual mode - no problem 2. Library manager is shutdown 3. Library manager failure	1. Library manager is shutdown 2. Library manager powered off 3. Library manager not working

Fault Symptom Index

Always begin a service call at **START-1**. Use Figure 24 for reference when you have a fault symptom code and the library manager is not available to you. Use Figure 22 on page START-49 for obvious symptoms.

The original or current (at time of publication) FRU part numbers are included in Figure 24 for reference. Use the 3494 Parts Catalog to order parts or to locate the current part numbers.

The full set of LM codes are listed for information purposes. If the code (or range of codes) does not have an associated **Action** or **FRU group**, it is not used for service and no action is required.

The abbreviations for the different frames are:

CU Control unit frame
DU Drive unit frame
SU Storage unit frame

When ******* is shown in the part number field, several different parts are used depending on the library configuration and/or EC level. Refer to the parts catalog for the part number for your library.

Figure 24 (Page 1 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
0000	**Successful Operation**		
0001 to 000F	**Not used**		
0010 to 0016	**Alarm message**		
0017 to 20FF	**Not used**		
2100 to 29FF	**3495 Accessor controller error codes**		

Figure 24 (Page 2 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2A00 2A01	**Positional retry warning**		

Note: 2A00 = gripper 1; 2A01 = gripper 2.
Description:

This retry was successful. It was reported only for information.

If LM code 520 or later is installed on your library, the library manager will automatically update the cell position when a positional retry is required. As the library operates, the number of positional retries should decrease.

No action is required unless you are getting a high number of retries in a specific area or consistently on cartridge moves.

Action

1. Scan the error log and transaction log to determine if you have a high retry rate and, if so, where they are occurring. If you have a dual accessor library, determine the failing accessor (left, right, or both) and adjust the following actions as appropriate.
2. Observe library operation or run the Frame Alignment or Rack Get/Put diagnostic test in the failing area to determine where the gripper finger is hitting the cartridge.
3. If gripper slides over cartridge smoothly but accessor manager still retries the operation, suspect an intermittent sensor.
   a. If gripper 1 is failing, suspect one of the following FRUs: Pivot flex cable, Gripper 1 Reach card.
   b. If gripper 2 is failing, suspect one of the following FRUs: Pivot flex cable, Gripper 2 Reach card, RCH P5 to RCX P3 cable, Gripper 1 Reach card.
   c. Run Rack Get/Put diagnostic to ensure library is functional and observe library operation for retries. If the retries continue, re-install previously replaced FRU(s) and try next FRU in the list. Call your next level of support if the suggested FRUs do not correct the problem and the gripper is aligned correctly with the cartridges.
   d. If the retries stop, select **End call** on the service pulldown menu to record the incident in the service log.
4. If you are observing retries on a high percentage of cartridge accesses, re-home the accessor as follows:
   a. Push **Pause** on the library operator panel.
   b. When the library is paused, push **Auto**. The accessor should search for the home position and return to Auto mode.
   c. Observe library operation. If the retries stop then get progressively worse, suspect one of the following:
      1) a slipping X or Y axis drive belt.
      2) SRV card jumpers. (Refer to Figure 72 on page LOC-51)
      3) X-axis flex cable connections and/or XAX card.
      4) X or Y axis motor.
   d. If the problem is corrected, select **End call** on the Service pulldown menu to record the incident in the service log.
5. If you are observing retries on a high percentage of cartridge accesses and it does not improve after the accessor is homed, ensure that the mechanical adjustments of the accessor are correct and re-teach the library as follows:
   a. Put the library in **Pause** and move the accessor manually from end-to-end. Verify the following:
      1) Ensure that the accessor moves freely without binding.
      2) If the library does not have the Y-mast clamp (Figure 116 on page CARR-65), check the alignment of the Y-axis assembly. Refer to “Adjustment of Y-axis Assembly” on page CARR-64. If the y-mast is out of alignment, order the Y-mast clamp kit p/n 08L5872 and install it using the “Y-Mast Clamp Install Procedure” on page CARR-64.
      3) Check the top guide rail roller adjustment. Refer to “Y-Axis Guide Rail Roller Adjustment” on page CARR-69.
      4) Check the front door lock adjustment. Refer to “Door Lock Adjustment” on page CARR-157.
      5) Ensure that the storage arrays are seated properly and are parallel with the X-rail in the frame.
   b. Put library in **Auto**. Select **Teach** on Service action bar and select **Teach current configuration** on teach pulldown menu.
   c. Follow the instructions and select all of the components.
   d. After the teach completes, observe library operation. If the retries stop, use **End call** on the service pulldown menu to record the incident in the service log.
6. If you are observing retries on a high percentage of cartridge accesses and it does not improve after teach, observe gripper on a retry operation. If gripper is hitting cartridge above target cartridge and pushing it up, gripper is too high. Suspect calibration sensor or reflection from behind fiducial. If screw heads behind fiducials are covered, replace calibration sensor and re-teach library. If retries stop and gripper is aligned correctly with cartridges, use **End call** on service pulldown menu to record the incident in the service log.
7. If you are observing retries on a high percentage of cartridge accesses and none of the above actions help, call your next level of support.

Figure 24 (Page 3 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2A02 to 2A0F	**Not used**		
2A11 to 2A4F	**Accessor controller internal information message**		
2A50 to 2A5F	**Not used**		
2A60 2A61	**Code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
2A62	**Failed to initialize DI/DO card**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group DI/DO card, DI/DO	61G9946	100
	Secondary FRU Group —	—	—
2A63	**Failed to initialize servo control card (SRV)**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Servo control card, SRV	61G9945	100
	Secondary FRU Group —	—	—
2A64 to 2A7F	**Not used**		

Figure 24 (Page 4 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2A80	**Cannot complete Get From Rack; cell is empty - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 1 - Grip card/cable assembly	50G1041	40
	Gripper 1 - cartridge present sensor	94F6457	18
	Pivot flex cable	*******	11
	BIC P1 to XAX P1, X-axis flex cable	*******	11
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		6
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	5
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	4
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 5 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2A81	**Cannot complete Get From Rack; cell is empty - Gripper 2**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 2 - Grip card/cable assembly	50G1041	40
	Gripper 2 - cartridge present sensor	94F6457	18
	Pivot flex cable	*******	11
	BIC P1 to XAX P1, X-axis flex cable	*******	11
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		6
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	5
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	4
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 6 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2A82	**Cannot complete Get From Drive; cell is empty - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 1 - Grip card/cable assembly	50G1041	40
	Gripper 1 - cartridge present sensor	94F6457	18
	Pivot flex cable	*******	11
	BIC P1 to XAX P1, X-axis flex cable	*******	11
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		6
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	5
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	4
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 7 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2A83	**Cannot complete Get From Drive; cell is empty - Gripper 2**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 2 - Grip card/cable assembly	50G1041	40
	Gripper 2 - cartridge present sensor	94F6457	18
	Pivot flex cable	*******	11
	BIC P1 to XAX P1, X-axis flex cable	*******	11
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		6
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	5
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	4
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 8 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2A84	**Cannot complete Get From I/O; cell is empty - Gripper 1**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 1 - Grip card/cable assembly	50G1041	40
	Gripper 1 - cartridge present sensor	94F6457	18
	Pivot flex cable	*******	11
	BIC P1 to XAX P1, X-axis flex cable	*******	11
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		6
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	5
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	4
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 9 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2A85	**Cannot complete Get From I/O; cell is empty - Gripper 2**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group Gripper 2 - Grip card/cable assembly Gripper 2 - cartridge present sensor Pivot flex cable BIC P1 to XAX P1, X-axis flex cable	 50G1041 94F6457 ******* *******	 40 18 11 11
	Secondary FRU Group Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card Gripper 2 - Reach card, RCX XAX P2 to GRI P1, Y-axis flex cable Picker card, GRI DI/DO card, DI/DO RCH P5 to RCX P3 cable LCC card (if installed) Bulkhead interconnect card, BIC LCC P5 or MIC2-4 P1 to BIC P2, P3 cable X/Y-axis card, XAX DI/DO P1, P2 to MIC P5, P4 cable	 61G9905 05H8784 ******* 61G9685 05H8492 61G9946 05H4058 50G1053 ******* 61G9676 05H8142 62G1178	 6 5 4 3 1 1 1 1 1 1 1
2A86 to 2A9F	**Not used**		

Figure 24 (Page 10 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AA0	**Crash during Get From Rack - Gripper 1**		

Action

1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding.
2. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined.
3. This error can occur if the Y-axis loses it's position (i.e. tach pulses are missed or the timing belt slips). If the problem appears to correct itself after the library is put in Pause and then back in Auto, check the Y-axis drive belt to ensure that it is not missing any teeth and that it is tight. If the belt is good, suspect the Y-axis motor P/N 05H8249 if the problem returns after running for awhile.
4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows:
   a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu.
   b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the short wrap test fails, use the error code from the test to determine the failing FRU group.
   c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group.
   d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the long wrap test fails, use the error code from the test to determine the failing FRU group.
   e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group.
5. Before replacing FRUs, ensure that all cards and cables are properly seated.
6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.

Primary FRU Group		
Gripper 1 - Grip assembly	05H8107	40
Gripper 1 - Reach compliance sensor	94F6454	16
Gripper 1 - Grip card/cable assembly	50G1041	14
Gripper 1 - Reach gear-motor	05H7877	10

Secondary FRU Group		
Gripper 1 - Thumb open sensor	94F6454	7
Pivot flex cable	*******	5
BIC P1 to XAX P1, X-axis flex cable	*******	4
Mach Intf Ctrl Card, MIC - check 5 fuses		2
MIC1 card	61G9905	
MIC2-4 card	05H8784	
Gripper 1 - Reach card, RCH	*******	2
XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
Picker card, GRI	05H8492	1
DI/DO card, DI/DO	61G9946	1
LCC card (if installed)	50G1053	1
Bulkhead interconnect card, BIC	*******	1
LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
X/Y-axis card, XAX	05H8142	1
DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 11 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AA1	**Crash during Get From Rack - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. This error can occur if the Y-axis loses it's position (i.e. tach pulses are missed or the timing belt slips). If the problem appears to correct itself after the library is put in Pause and then back in Auto, check the Y-axis drive belt to ensure that it is not missing any teeth and that it is tight. If the belt is good, suspect the Y-axis motor P/N 05H8249 if the problem returns after running for awhile. 4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 5. Before replacing FRUs, ensure that all cards and cables are properly seated. 6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 2 - Grip assembly	05H8107	40
	Gripper 2 - Reach compliance sensor	94F6454	16
	Gripper 2 - Grip card/cable assembly	50G1041	14
	Gripper 2 - Reach gear-motor	05H7877	10
	Secondary FRU Group		
	Gripper 2 - Thumb open sensor	94F6454	7
	Pivot flex cable	*******	5
	BIC P1 to XAX P1, X-axis flex cable	*******	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		2
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	Picker card, GRI	05H8492	1
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 12 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AA2	**Crash during Get From Drive - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. This error can occur if the Y-axis loses it's position (i.e. tach pulses are missed or the timing belt slips). If the problem appears to correct itself after the library is put in Pause and then back in Auto, check the Y-axis drive belt to ensure that it is not missing any teeth and that it is tight. If the belt is good, suspect the Y-axis motor P/N 05H8249 if the problem returns after running for awhile. 4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 5. Before replacing FRUs, ensure that all cards and cables are properly seated. 6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 1 - Grip assembly	05H8107	40
	Gripper 1 - Reach compliance sensor	94F6454	16
	Gripper 1 - Grip card/cable assembly	50G1041	14
	Gripper 1 - Reach gear-motor	05H7877	10
	Secondary FRU Group		
	Gripper 1 - Thumb open sensor	94F6454	7
	Pivot flex cable	*******	5
	BIC P1 to XAX P1, X-axis flex cable	*******	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		2
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	Picker card, GRI	05H8492	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 13 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AA3	**Crash during Get From Drive - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. This error can occur if the Y-axis loses it's position (i.e. tach pulses are missed or the timing belt slips). If the problem appears to correct itself after the library is put in Pause and then back in Auto, check the Y-axis drive belt to ensure that it is not missing any teeth and that it is tight. If the belt is good, suspect the Y-axis motor P/N 05H8249 if the problem returns after running for awhile. 4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 5. Before replacing FRUs, ensure that all cards and cables are properly seated. 6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 2 - Grip assembly	05H8107	40
	Gripper 2 - Reach compliance sensor	94F6454	16
	Gripper 2 - Grip card/cable assembly	50G1041	14
	Gripper 2 - Reach gear-motor	05H7877	10
	Secondary FRU Group		
	Gripper 2 - Thumb open sensor	94F6454	7
	Pivot flex cable	*******	5
	BIC P1 to XAX P1, X-axis flex cable	*******	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		2
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	Picker card, GRI	05H8492	1
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 14 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AA4	**Crash during Get From I/O - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. This error can occur if the Y-axis loses it's position (i.e. tach pulses are missed or the timing belt slips). If the problem appears to correct itself after the library is put in Pause and then back in Auto, check the Y-axis drive belt to ensure that it is not missing any teeth and that it is tight. If the belt is good, suspect the Y-axis motor P/N 05H8249 if the problem returns after running for awhile. 4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 5. Before replacing FRUs, ensure that all cards and cables are properly seated. 6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 1 - Grip assembly	05H8107	40
	Gripper 1 - Reach compliance sensor	94F6454	16
	Gripper 1 - Grip card/cable assembly	50G1041	14
	Gripper 1 - Reach gear-motor	05H7877	10
	Secondary FRU Group		
	Gripper 1 - Thumb open sensor	94F6454	7
	Pivot flex cable	*******	5
	BIC P1 to XAX P1, X-axis flex cable	*******	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		2
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	Picker card, GRI	05H8492	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 15 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AA5	**Crash during Get From I/O - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. This error can occur if the Y-axis loses it's position (i.e. tach pulses are missed or the timing belt slips). If the problem appears to correct itself after the library is put in Pause and then back in Auto, check the Y-axis drive belt to ensure that it is not missing any teeth and that it is tight. If the belt is good, suspect the Y-axis motor P/N 05H8249 if the problem returns after running for awhile. 4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 5. Before replacing FRUs, ensure that all cards and cables are properly seated. 6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 2 - Grip assembly	05H8107	40
	Gripper 2 - Reach compliance sensor	94F6454	16
	Gripper 2 - Grip card/cable assembly	50G1041	14
	Gripper 2 - Reach gear-motor	05H7877	10
	Secondary FRU Group		
	Gripper 2 - Thumb open sensor	94F6454	7
	Pivot flex cable	*******	5
	BIC P1 to XAX P1, X-axis flex cable	*******	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		2
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	Picker card, GRI	05H8492	1
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 16 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AA6	**Cannot get cartridge from rack; it is there - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the retries are occurring on the door side, check the adjustment of the front door lock to ensure that the front door is tight against the frame. 3. Check the gripper clip P/N 05H7560 to ensure that it is not catching on the cartridge. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Gripper 1 - Grip finger Gripper 1 - Reach card, RCH	 34G8763 *******	 50 44
	Secondary FRU Group Picker card, GRI Pivot flex cable	 05H8492 *******	 5 1
2AA7	**Cannot get cartridge from rack; it is there - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the retries are occurring on the door side, check the adjustment of the front door lock to ensure that the front door is tight against the frame. 3. Check the gripper clip P/N 05H7560 to ensure that it is not catching on the cartridge. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Gripper 2 - Grip finger Gripper 2 - Reach card, RCX	 34G8763 *******	 50 44
	Secondary FRU Group Picker card, GRI Pivot flex cable	 05H8492 *******	 5 1
2AA8	**Cannot get cartridge from drive; it is there - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Check the gripper clip P/N 05H7560 to ensure that it is not catching on the cartridge. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Gripper 1 - Grip finger Gripper 1 - Reach card, RCH	 34G8763 *******	 56 44
	Secondary FRU Group Picker card, GRI Pivot flex cable	 05H8492 *******	 5 1
2AA9	**Cannot get cartridge from drive; it is there - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Check the gripper clip P/N 05H7560 to ensure that it is not catching on the cartridge. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Gripper 2 - Grip finger Gripper 2 - Reach card, RCX	 34G8763 *******	 56 44
	Secondary FRU Group Picker card, GRI Pivot flex cable	 05H8492 *******	 5 1

Figure 24 (Page 17 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AAA	**Cannot get cartridge from I/O; it is there - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Check the gripper clip P/N 05H7560 to ensure that it is not catching on the cartridge. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Gripper 1 - Grip finger Gripper 1 - Reach card, RCH	 34G8763 *******	 56 44
	Secondary FRU Group Picker card, GRI Pivot flex cable	 05H8492 *******	 5 1
2AAB	**Cannot get cartridge from I/O; it is there - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Check the gripper clip P/N 05H7560 to ensure that it is not catching on the cartridge. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Gripper 2 - Grip finger Gripper 2 - Reach card, RCX	 34G8763 *******	 56 44
	Secondary FRU Group Picker card, GRI Pivot flex cable	 05H8492 *******	 5 1
2AAC to 2ABF	**Not used**		

Figure 24 (Page 18 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AC0	**Crash during Put to Rack - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	BIC P1 to XAX P1, X-axis flex cable	*******	36
	Mach Intf Ctrl Card, MIC - check 5 fuses		20
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	16
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	12
	Picker card, GRI	05H8492	10
	Secondary FRU Group		
	DI/DO card, DI/DO	61G9946	4
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	62G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 19 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AC1	**Crash during Put to Rack - Gripper 2**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	BIC P1 to XAX P1, X-axis flex cable	*******	35
	Mach Intf Ctrl Card, MIC - check 5 fuses		19
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	16
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	12
	Picker card, GRI	05H8492	10
	Secondary FRU Group		
	DI/DO card, DI/DO	61G9946	4
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	62G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 20 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AC2	**Crash during Put to Drive - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This error can occur if the tape drive is not in it's correct operating position. a. If it is a 3490E CxA, ensure that the drive sleeve is pushed all the way in and a retaining screw is installed at the rear of the sleeve. Also, check the drives in the sleeve to ensure that the screws are installed to hold them in place. b. If it is a 3490 F1A or 3590, ensure that the drive is pushed in and a retaining screw is installed in the slide. The drive should be located approximately in the middle of the retaining screw "slop". 3. This error can occur if the Teach operation did not locate the drive correctly or if the drive position was changed without re-teaching it. Before replacing any parts, re-teach the drive using the **Teach selected devices** option on the **Teach** pulldown. This can be done concurrent with Auto mode operation if the drive is made unavailable on the **Availability** pulldown. 4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 5. Before replacing FRUs, ensure that all cards and cables are properly seated. 6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	BIC P1 to XAX P1, X-axis flex cable	*******	36
	Mach Intf Ctrl Card, MIC - check 5 fuses		20
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	16
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	12
	Picker card, GRI	05H8492	10
	Secondary FRU Group		
	DI/DO card, DI/DO	61G9946	4
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	62G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 21 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AC3	**Crash during Put to Drive - Gripper 2**		

Action

1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding.
2. This error can occur if the tape drive is not in it's correct operating position.
   a. If it is a 3490E CxA, ensure that the drive sleeve is pushed all the way in and a retaining screw is installed at the rear of the sleeve. Also, check the drives in the sleeve to ensure that the screws are installed to hold them in place.
   b. If it is a 3490 F1A or 3590, ensure that the drive is pushed in and a retaining screw is installed in the slide. The drive should be located approximately in the middle of the retaining screw "slop".
3. This error can occur if the Teach operation did not locate the drive correctly or if the drive position was changed without re-teaching it. Before replacing any parts, re-teach the drive using the **Teach selected devices** option on the **Teach** pulldown. This can be done concurrent with Auto mode operation if the drive is made unavailable on the **Availability** pulldown.
4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows:
   a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu.
   b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the short wrap test fails, use the error code from the test to determine the failing FRU group.
   c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group.
   d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the long wrap test fails, use the error code from the test to determine the failing FRU group.
   e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group.
5. Before replacing FRUs, ensure that all cards and cables are properly seated.
6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing.

Primary FRU Group		
BIC P1 to XAX P1, X-axis flex cable	*******	35
Mach Intf Ctrl Card, MIC - check 5 fuses		19
MIC1 card	61G9905	
MIC2-4 card	05H8784	
Gripper 2 - Reach card, RCX	*******	16
XAX P2 to GRI P1, Y-axis flex cable	61G9685	12
Picker card, GRI	05H8492	10

Secondary FRU Group		
DI/DO card, DI/DO	61G9946	3
RCH P5 to RCX P3 cable	05H4058	1
LCC card (if installed)	50G1053	1
Bulkhead interconnect card, BIC	*******	1
LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	62G9676	1
X/Y-axis card, XAX	05H8142	1
DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 22 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AC4	**Crash during Put to I/O - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	BIC P1 to XAX P1, X-axis flex cable	*******	36
	Mach Intf Ctrl Card, MIC - check 5 fuses		20
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	16
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	12
	Picker card, GRI	05H8492	10
	Secondary FRU Group		
	DI/DO card, DI/DO	61G9946	4
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	62G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 23 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AC5	**Crash during Put to I/O - Gripper 2**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	BIC P1 to XAX P1, X-axis flex cable	*******	35
	Mach Intf Ctrl Card, MIC - check 5 fuses		19
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	16
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	12
	Picker card, GRI	05H8492	10
	Secondary FRU Group		
	DI/DO card, DI/DO	61G9946	3
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	62G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
2AC6	**Cannot complete a Put to Rack - Gripper 1**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If this error occurs after you have replaced the picker card and/or fuse F5 on the MIC card, a shorted reach motor, pivot motor, or gripper solenoid may have caused the picker card to blow again. Check the motors and solenoid to ensure they are not shorted before replacing the picker card again. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Grip card/cable assembly	50G1041	48
	Gripper 1 - cartridge present sensor	94F6457	21
	Pivot flex cable	*******	13
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		7
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	6
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1

Figure 24 (Page 24 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AC7	**Cannot complete a Put to Rack - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If this error occurs after you have replaced the picker card and/or fuse F5 on the MIC card, a shorted reach motor, pivot motor, or gripper solenoid may have caused the picker card to blow again. Check the motors and solenoid to ensure they are not shorted before replacing the picker card again. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Grip card/cable assembly	50G1041	47
	Gripper 2 - cartridge present sensor	94F6457	21
	Pivot flex cable	*******	13
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		7
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	6
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
2AC8	**Cannot complete a Put to Drive - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If this error occurs after you have replaced the picker card and/or fuse F5 on the MIC card, a shorted reach motor, pivot motor, or gripper solenoid may have caused the picker card to blow again. Check the motors and solenoid to ensure they are not shorted before replacing the picker card again. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Grip card/cable assembly	50G1041	47
	Gripper 1 - cartridge present sensor	94F6457	22
	Pivot flex cable	*******	13
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		7
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	6
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1

Figure 24 (Page 25 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AC9	**Cannot complete a Put to Drive - Gripper 2**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If this error occurs after you have replaced the picker card and/or fuse F5 on the MIC card, a shorted reach motor, pivot motor, or gripper solenoid may have caused the picker card to blow again. Check the motors and solenoid to ensure they are not shorted before replacing the picker card again. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Grip card/cable assembly	50G1041	47
	Gripper 2 - cartridge present sensor	94F6457	21
	Pivot flex cable	*******	13
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		7
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	6
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
2ACA	**Cannot complete a Put to I/O - Gripper 1**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If this error occurs after you have replaced the picker card and/or fuse F5 on the MIC card, a shorted reach motor, pivot motor, or gripper solenoid may have caused the picker card to blow again. Check the motors and solenoid to ensure they are not shorted before replacing the picker card again. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Grip card/cable assembly	50G1041	47
	Gripper 1 - cartridge present sensor	94F6457	22
	Pivot flex cable	*******	13
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		7
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	6
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1

Figure 24 (Page 26 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2ACB	**Cannot complete a Put to I/O - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If this error occurs after you have replaced the picker card and/or fuse F5 on the MIC card, a shorted reach motor, pivot motor, or gripper solenoid may have caused the picker card to blow again. Check the motors and solenoid to ensure they are not shorted before replacing the picker card again. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Grip card/cable assembly	50G1041	47
	Gripper 2 - cartridge present sensor	94F6457	21
	Pivot flex cable	*******	13
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		7
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	6
	Picker card, GRI	05H8492	3
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
2ACC	**Cannot complete a Put to I/O; I/O station is unlocked**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Before replacing FRUs, ensure that all cards and cables are properly seated. 3. This failure can be caused by a blown fuse F1 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined.		
	Primary FRU Group		
	Convenience I/O door lock solenoid	94F6802	44
	Convenience I/O cable		25
	10 Cartridge CIO	09G7554	
	30 Cartridge CIO	62G1415	
	Convenience I/O door locked sensor	05H8407	10
	Operator panel card, LPN	61G9910	10
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		7
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	DI/DO card, DI/DO	61G9946	1
	LPC card (if single LM)	05H8143	1
	DSW card (if Model HA1, LM A)	05H8237	
	DBF card (if Model HA1, LM B)	05H8239	
	MIC1 or LPC P7 to LPN P1 Op panel cable	62G1182	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 27 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2ACD	**Dragout detected, unable to complete put to rack - gripper 1**		
	Action This error code indicates that a cartridge dragout was detected and the code was unable to recover. 1. Ensure that the storage cell is not damaged. 2. If the library does not have a Y-mast clamp (Figure 116 on page CARR-65), check the Y-axis assembly alignment. Refer to “Adjustment of Y-axis Assembly” on page CARR-64. If the y-mast is out of alignment, order the Y-mast clamp kit p/n 08L5872 and install it using the “Y-Mast Clamp Install Procedure” on page CARR-64. If you re-adjust the Y-axis or install the Y-mast clamp, run **Teach current configuration** on the entire library. 3. Ensure that the storage arrays are properly seated and parallel to the X-rail. If you make any adjustments to the storage arrays, run **Teach current configuration** on the frames where you make the the adjustment.		
	Primary FRU Group —	—	—
	Secondary FRU Group —	—	—
2ACE	**Dragout detected, unable to complete put to rack - gripper 2**		
	Action This error code indicates that a cartridge dragout was detected and the error recovery was successful. 1. Ensure that the storage cell is not damaged. 2. If the library does not have a Y-mast clamp (Figure 116 on page CARR-65), check the Y-axis assembly alignment. Refer to “Adjustment of Y-axis Assembly” on page CARR-64. If the y-mast is out of alignment, order the Y-mast clamp kit p/n 08L5872 and install it using the “Y-Mast Clamp Install Procedure” on page CARR-64. If you re-adjust the Y-axis or install the Y-mast clamp, run **Teach current configuration** on the entire library. 3. Ensure that the storage arrays are properly seated and parallel to the X-rail. If you make any adjustments to the storage arrays, run **Teach current configuration** on the frames where you make the the adjustment.		
	Primary FRU Group —	—	—
	Secondary FRU Group —	—	—
2ACF to 2AE0	**Not used**		
2AE1	**Accessor was directed to make invalid X move**		
	Action This error indicates that the accessor was directed to make an invalid X-axis movement - usually to a coordinate outside the normal operating range. 1. If the library does not have a Y-mast clamp (Figure 116 on page CARR-65), check the Y-axis assembly alignment. Refer to “Adjustment of Y-axis Assembly” on page CARR-64. If the y-mast is out of alignment, order the Y-mast clamp kit p/n 08L5872 and install it using the “Y-Mast Clamp Install Procedure” on page CARR-64. If you re-adjust the Y-axis or install the Y-mast clamp, run **Teach current configuration** on the entire library. 2. Check that the X-axis home sensor has not moved and its corresponding flag is attached to the X-axis carriage assembly. 3. If this is a new install or expansion frames were added, ensure that the expansion frames are installed correctly with no gaps between the frames. 4. Contact your next level of support if the alignment is OK and the library still fails with this error.		
	Primary FRU Group —	—	—
	Secondary FRU Group —	—	—

Figure 24 (Page 28 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2AE2	**Accessor was directed to make invalid Y move**		
	Action This error indicates that the accessor was directed to make an invalid Y-axis movement - usually to a coordinate outside the normal operating range. 1. This error can be caused by incorrect shimming of the barcode reader. If the barcode reader has been shimmed, remove the shim and re-teach the accessor. 2. If there is no shim under the barcode reader and the error persists after a re-teach of the accessor, contact your next level of support.		
	Primary FRU Group —	—	—
	Secondary FRU Group —	—	—
2AE3 to 2AF0	**Not used**		
2AF1 to 2AF3	**Code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 29 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B00	**Cartridge present at start of Get command - Gripper 1**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Cartridge seated sensor	34G9339	38
	Gripper 1 - Grip card/cable assembly	50G1041	24
	Gripper 1 - Cartridge present sensor	94F6457	11
	Secondary FRU Group		
	Pivot flex cable	*******	7
	BIC P1 to XAX P1, X-axis flex cable	*******	6
	Picker card, GRI	05H8492	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		4
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	3
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	DI/DO card, DI/DO	61G9946	2
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 30 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B01	**Cartridge present at start of Get command - Gripper 2**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Cartridge seated sensor	34G9339	38
	Gripper 2 - Grip card/cable assembly	50G1041	24
	Gripper 2 - Cartridge present sensor	94F6457	11
	Secondary FRU Group		
	Pivot flex cable	*******	7
	BIC P1 to XAX P1, X-axis flex cable	*******	6
	Picker card, GRI	05H8492	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		4
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	3
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
2B02 to 2B0F	**Not used**		
2B10	**Code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 31 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B11	**Teach was not done after install/removal of dual gripper**		
	Action 1. If the dual gripper feature was installed or removed, run **Teach current configuration**. 2. If the dual gripper feature was not installed or removed since the accessor was taught, this is a false error. Replace the following FRUs in order until the problem is corrected. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Reach card, RCH	*******	40
	Gripper 2 - Reach card, RCX	*******	40
	RCH P5 to RCX P3 cable	05H4058	20
	Secondary FRU Group		
	—	—	—
2B12 to 2B1F	**Not used**		
2B20	**Grip open at start of Put command - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Grip card/cable assembly	50G1041	40
	Gripper 1 - Thumb open sensor	94F6454	16
	Pivot flex cable	*******	11
	BIC P1 to XAX P1, X-axis flex cable	*******	11
	Secondary FRU Group		
	Picker card, GRI	05H8492	6
	Mach Intf Ctrl Card, MIC - check 5 fuses		6
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	5
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	3
	DI/DO card, DI/DO	61G9946	1
	Bulkhead interconnect card, BIC	*******	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 32 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B21	**Cartridge not present at start of Put command - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Check for a dropped cartridge in the aisle and ensure that the gripper clip P/N 05H7560 is not broken. 3. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Cartridge seated sensor	34G9339	38
	Gripper 1 - Grip card/cable assembly	50G1041	24
	Gripper 1 - Cartridge present sensor	94F6457	11
	Secondary FRU Group		
	Pivot flex cable	*******	7
	BIC P1 to XAX P1, X-axis flex cable	*******	6
	Picker card, GRI	05H8492	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		4
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	3
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 33 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B22	**Grip open at start of Put command - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Grip card/cable assembly	50G1041	40
	Gripper 2 - Thumb open sensor	94F6454	16
	Pivot flex cable	*******	11
	BIC P1 to XAX P1, X-axis flex cable	*******	11
	Secondary FRU Group		
	Picker card, GRI	05H8492	6
	Mach Intf Ctrl Card, MIC - check 5 fuses		6
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	5
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	3
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	Bulkhead interconnect card, BIC	*******	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 34 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B23	**Cartridge not present at start of Put command - Gripper 2**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Check for a dropped cartridge in the aisle and ensure that the gripper clip P/N 05H7560 is not broken. 3. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Cartridge seated sensor	34G9339	38
	Gripper 2 - Grip card/cable assembly	50G1041	24
	Gripper 2 - Cartridge present sensor	94F6457	11
	Secondary FRU Group		
	Pivot flex cable	*******	7
	BIC P1 to XAX P1, X-axis flex cable	*******	6
	Picker card, GRI	05H8492	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		4
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	3
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
2B24 to 2B2F	**Not used**		

Figure 24 (Page 35 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B30	**Grip open timeout - Gripper 1**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Thumb open sensor	94F6454	8
	Gripper 1 - Grip assembly	05H8107	52
	Gripper 1 - Grip card/cable assembly	50G1041	19
	Secondary FRU Group		
	Pivot flex cable	*******	5
	BIC P1 to XAX P1, X-axis flex cable	*******	5
	Mach Intf Ctrl Card, MIC - check 5 fuses		3
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	Picker card, GRI	05H8492	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 36 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B31	**Grip open timeout - Gripper 2**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Thumb open sensor	94F6454	8
	Gripper 2 - Grip assembly	05H8107	52
	Gripper 2 - Grip card/cable assembly	50G1041	19
	Secondary FRU Group		
	Pivot flex cable	*******	5
	BIC P1 to XAX P1, X-axis flex cable	*******	5
	Mach Intf Ctrl Card, MIC - check 5 fuses		3
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	Picker card, GRI	05H8492	1
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 37 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B32	**Grip close timeout - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Check the gripper clip P/N 05H7560 to ensure that it is not catching on the cartridge. 3. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 5. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Thumb open sensor	94F6454	8
	Gripper 1 - Grip assembly	05H8107	55
	Gripper 1 - Grip card/cable assembly	50G1041	21
	Secondary FRU Group		
	Pivot flex cable	*******	6
	BIC P1 to XAX P1, X-axis flex cable	*******	5
	Mach Intf Ctrl Card, MIC - check 5 fuses		3
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	Picker card, GRI	05H8492	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2,P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 38 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B33	**Grip close timeout - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Check the gripper clip P/N 05H7560 to ensure that it is not catching on the cartridge. 3. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 5. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Thumb open sensor	94F6454	8
	Gripper 2 - Grip assembly	05H8107	52
	Gripper 2 - Grip card/cable assembly	50G1041	19
	Secondary FRU Group		
	Pivot flex cable	*******	5
	BIC P1 to XAX P1, X-axis flex cable	*******	5
	Mach Intf Ctrl Card, MIC - check 5 fuses		3
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	Picker card, GRI	05H8492	1
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2,P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
2B34 to 2B4F	**Not used**		

Figure 24 (Page 39 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B50	**FXX (find fiducial) command failed–no target found**		
	Action This error code indicates a failure in reading the white fiducial labels during library teach. Check the following: 1. Check that the black screw covers are installed on each screw immediately behind the fiducial labels. 2. Check that the Y-axis assembly is at a right angle to the X-axis. If adjustment is needed, refer to the Y-axis assembly CARR procedure. 3. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Calibration sensor assembly	05H4050	85
	Secondary FRU Group Pivot flex cable BIC P1 to XAX P1, X-axis flex cable Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card Gripper 1 - Reach card, RCH XAX P2 to GRI P1, Y-axis flex cable Picker card, GRI DI/DO card, DI/DO LCC card (if installed) Bulkhead interconnect card, BIC LCC P5 or MIC2-4 P1 to BIC P2, P3 cable X/Y-axis card, XAX DI/DO P1, P2 to MIC P5, P4 cable	 ******* ******* 61G9905 05H8784 ******* 61G9685 05H8492 61G9946 50G1053 ******* 61G9676 05H8142 62G1178	 4 4 2 2 1 1 1 1 1 1 1 1

Figure 24 (Page 40 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B51	**Teach error**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Gripper 1 Cartridge present sensor	94F6457	85
	Secondary FRU Group Pivot flex cable BIC P1 to XAX P1, X-axis flex cable Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card Gripper 1 - Reach card, RCH XAX P2 to GRI P1, Y-axis flex cable Picker card, GRI DI/DO card, DI/DO LCC card (if installed) Bulkhead interconnect card, BIC LCC P5 or MIC2-4 P1 to BIC P2, P3 cable X/Y-axis card, XAX DI/DO P1, P2 to MIC P5, P4 cable	 ******* ******* 61G9905 05H8784 ******* 61G9685 05H8492 61G9946 50G1053 ******* 61G9676 05H8142 62G1178	 4 4 2 2 1 1 1 1 1 1 1 1
2B52 to 2B5F	**Not used**		
2B60	**Scanner read failure (internal information only)**		
2B61	**Scanner read timeout (internal information only)**		
2B62	**Scanner write failure (internal information only)**		

Figure 24 (Page 41 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B63	**Bar-code reader communications failed**		
	Action 1. In some cases for a single accessor library, this bar-code reader error can be reset by switching off power to the library as follows: a. Power off the library using the Unit Power switch. b. After one minute, power on library and put in Pause/Offline mode. c. Make vision available. d. Go to Auto/Offline Mode. e. If vision fails again, replace following FRUs in order until fixed. 2. In a dual accessor library, serial port B on each LM is also used to communicate with the NVRAM. Use the NVRAM Test to help isolate the failure. Refer to "NVRAM Test" on page DIAG-11. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Bar-code reader	05H7772	60
	Picker card, GRI	05H8492	25
	Secondary FRU Group		
	System board (library manager)		5
	PS/ValuePoint	92F0396	
	Industrial Computer	*******	
	Pivot flex cable or Barcode reader card (if separate)	*******	4
	BIC P1 to XAX P1, X-axis flex cable	*******	4
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	LCC card (if installed)	50G1053	1
	Mach Intf Ctrl Card, MIC2-4	05H8784	1
	LM comm port B to LCC P7 or MIC2-4 P16	62G1181	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
2B64	**Bar-code reader communications OK, failed to read**		
	Action 1. Ensure that the wires are not blocking any portion of the scan beam. 2. Check the barcode reader adjustment before ordering or replacing FRUs. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Bar-code reader	05H7772	93
	Secondary FRU Group		
	Picker card, GRI	05H8492	5
	Pivot flex cable or Barcode reader card (if separate)	*******	1
	BIC P1 to XAX P1, X-axis flex cable	*******	1
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	X/Y axis card, XAX	05H8142	1

Figure 24 (Page 42 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B65	**Bar-code reader communications failed during inventory**		
	Action 1. Check the Y-axis to ensure that it is not binding. 2. In some cases for a single accessor library, this bar-code reader error can be reset by switching off power to the library as follows: a. Power off the library using the Unit Power switch. b. After one minute, power on library and put in Pause/Offline mode. c. Make vision available. d. Go to Auto/Offline Mode. e. If vision fails again, replace following FRUs in order until fixed. 3. In a dual accessor library, serial port B on each LM is also used to communicate with the NVRAM. Use the NVRAM Test to help isolate the failure. Refer to “NVRAM Test” on page DIAG-11. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Bar-code reader Picker card, GRI	 05H7772 05H8492	 60 25
	Secondary FRU Group System board (library manager) PS/ValuePoint Industrial Computer Pivot flex cable or Barcode reader card (if separate) BIC P1 to XAX P1, X-axis flex cable XAX P2 to GRI P1, Y-axis flex cable LCC card (if installed) Mach Intf Ctrl Card, MIC2-4 LM comm port B to LCC P7 or MIC2-4 P16 Bulkhead interconnect card, BIC LCC P5 or MIC2-4 P1 to BIC P2, P3 cable X/Y-axis card, XAX	 92F0396 ******* ******* ******* 61G9685 50G1053 05H8784 62G1181 ******* 61G9676 05H8142	 5 4 4 1 1 1 1 1 1 1
2B66 to 2B70	**Not used**		

Figure 24 (Page 43 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B71	**Cannot complete Unlock I/O Station command**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F1 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Convenience I/O door lock solenoid	94F6802	43
	Convenience I/O cable		25
	10 Cartridge CIO	09G7554	
	30 Cartridge CIO	62G1415	
	Convenience I/O door locked sensor	05H8407	10
	Operator panel card, LPN	61G9910	10
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		8
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	LPC card (if single LM)	05H8143	1
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	DI/DO card, DI/DO	61G9946	1
	MIC1 or LPC P7 to LPN P1 Op panel cable	62G1182	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
2B72	**Cannot complete Lock I/O Station command**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F1 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Convenience I/O door lock solenoid	94F6802	43
	Convenience I/O cable		25
	10 Cartridge CIO	09G7554	
	30 Cartridge CIO	62G1415	
	Convenience I/O door locked sensor	05H8407	10
	Operator panel card, LPN	61G9910	10
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		8
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	LPC card (if single LM)	05H8143	1
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	DI/DO card, DI/DO	61G9946	1
	MIC1 or LPC P7 to LPN P1 Op panel cable	62G1182	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 44 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B73	**I/O command received is not valid for current state**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Convenience I/O cartridge present sensor		52
	10 Cartridge CIO	94F6803	
	30 Cartridge CIO	62G1418	
	Convenience I/O cable		33
	10 Cartridge CIO	09G7554	
	30 Cartridge CIO	62G1415	
	Operator panel card, LPN	61G9910	12
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		3
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	DI/DO card, DI/DO	61G9946	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
2B74 to 2B7F	**Not used**		
2B80	**Verification attempted with vision off (internal information only)**		
2B81	**Inventory called with vision off (internal information only)**		
2B82 to 2B8F	**Not used**		

Figure 24 (Page 45 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B90	**Grip failed to pivot to the front of the library**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 4. Before replacing FRUs, ensure that all cards and cables are properly seated. 5. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Pivot belt	34G9342	54
	Pivot gear-motor	05H7877	15
	Secondary FRU Group		
	Picker card, GRI	05H8492	8
	Pivot detent arm assembly	34G9360	5
	Pivot assembly	05H7995	5
	Pivot front sensor	05H8407	4
	Pivot rear sensor	05H8407	4
	BIC P1 to XAX P1, X-axis flex cable	*******	3
	Mach Intf Ctrl Card, MIC - check 5 fuses		1
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	Pivot sensor cable	61G9681	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 46 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B91	**Grip failed to pivot to the back of the library**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 4. Before replacing FRUs, ensure that all cards and cables are properly seated. 5. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Pivot belt	34G9342	54
	Pivot gear-motor	05H7877	15
	Secondary FRU Group		
	Picker card, GRI	05H8492	8
	Pivot detent arm assembly	34G9360	5
	Pivot assembly	05H7995	5
	Pivot front sensor	05H8407	4
	Pivot rear sensor	05H8407	4
	BIC P1 to XAX P1, X-axis flex cable	*******	3
	Mach Intf Ctrl Card, MIC - check 5 fuses		1
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	Pivot sensor cable	61G9681	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 47 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B92	**Grip reach extension failed - Gripper 1**		

Action

1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding.
2. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined.
3. This failure can also be caused by the bar-code reader pulling down the +5V generated on the picker card. Check for a visible scan line from the reader when the library is going to Auto mode. If the scan beam does not come on, try replacing the bar-code reader, P/N 05H7772. If the new reader does not correct the problem, return it to stock.
4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows:
   a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu.
   b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the short wrap test fails, use the error code from the test to determine the failing FRU group.
   c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group.
   d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the long wrap test fails, use the error code from the test to determine the failing FRU group.
   e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group.
5. Before replacing FRUs, ensure that all cards and cables are properly seated.
6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.

Primary FRU Group		
Gripper 1 - Reach belt	34G9329	35
Gripper 1 - Reach compliance sensor	94F6454	18
Gripper 1 - Grip card/cable assembly	50G1041	12
Picker card, GRI	05H8492	11
Gripper 1 - Reach gear-motor	05H7877	10

Secondary FRU Group		
Pivot flex cable	*******	3
BIC P1 to XAX P1, X-axis flex cable	*******	3
Mach Intf Ctrl Card, MIC - check 5 fuses		2
MIC1 card	61G9905	
MIC2-4 card	05H8784	
Gripper 1 - Reach card, RCH	*******	2
Gripper 1 - Reach belt idler assembly	34G9335	2
XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
DI/DO card, DI/DO	61G9946	1
LCC card (if installed)	50G1053	1
Bulkhead interconnect card, BIC	*******	1
LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
X/Y-axis card, XAX	05H8142	1
DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
Reach end-of-travel flag	34G9332	1

Figure 24 (Page 48 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B93	**Grip reach extension failed - Gripper 2**		

Action

1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding.
2. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined.
3. This failure can also be caused by the bar-code reader pulling down the +5V generated on the picker card. Check for a visible scan line from the reader when the library is going to Auto mode. If the scan beam does not come on, try replacing the bar-code reader, P/N 05H7772. If the new reader does not correct the problem, return it to stock.
4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows:
   a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu.
   b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the short wrap test fails, use the error code from the test to determine the failing FRU group.
   c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group.
   d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the long wrap test fails, use the error code from the test to determine the failing FRU group.
   e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group.
5. Before replacing FRUs, ensure that all cards and cables are properly seated.
6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.

Primary FRU Group		
Gripper 2 - Reach belt	34G9329	35
Gripper 2 - Reach compliance sensor	94F6454	18
Gripper 2 - Grip card/cable assembly	50G1041	12
Picker card, GRI	05H8492	11
Gripper 2 - Reach gear-motor	05H7877	10

Secondary FRU Group		
Pivot flex cable	*******	3
BIC P1 to XAX P1, X-axis flex cable	*******	3
Mach Intf Ctrl Card, MIC - check 5 fuses		2
MIC1 card	61G9905	
MIC2-4 card	05H8784	
Gripper 2 - Reach card, RCX	*******	2
Gripper 2 - Reach belt idler assembly	34G9335	2
XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
DI/DO card, DI/DO	61G9946	1
RCH P5 to RCX P3 cable	05H4058	1
LCC card (if installed)	50G1053	1
Bulkhead interconnect card, BIC	*******	1
LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
X/Y-axis card, XAX	05H8142	1
DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
Reach end-of-travel flag	34G9332	1

Figure 24 (Page 49 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B94	**Grip reach retraction failed - Gripper 1**		

Action

1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding.
2. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined.
3. This failure can also be caused by the bar-code reader pulling down the +5V generated on the picker card. Check for a visible scan line from the reader when the library is going to Auto mode. If the scan beam does not come on, try replacing the bar-code reader, P/N 05H7772. If the new reader does not correct the problem, return it to stock.
4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows:
   a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu.
   b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the short wrap test fails, use the error code from the test to determine the failing FRU group.
   c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group.
   d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button.
      1) If the long wrap test fails, use the error code from the test to determine the failing FRU group.
   e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group.
5. Before replacing FRUs, ensure that all cards and cables are properly seated.
6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.

Primary FRU Group		
Gripper 1 - Reach belt	34G9329	58
Picker card, GRI	05H8492	12
Gripper 1 - Reach gear-motor	05H7877	10
Secondary FRU Group		
Pivot flex cable	*******	3
BIC P1 to XAX P1, X-axis flex cable	*******	3
Mach Intf Ctrl Card, MIC - check 5 fuses		2
MIC1 card	61G9905	
MIC2-4 card	05H8784	
Gripper 1 - Reach card, RCH	*******	2
Gripper 1 - Reach belt idler assembly	34G9335	2
XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
DI/DO card, DI/DO	61G9946	1
LCC card (if installed)	50G1053	1
Bulkhead interconnect card, BIC	*******	1
LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
X/Y-axis card, XAX	05H8142	1
DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
Reach end-of-travel flag	34G9332	1

Figure 24 (Page 50 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B95	**Grip reach retraction failed - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. This failure can also be caused by the bar-code reader pulling down the +5V generated on the picker card. Check for a visible scan line from the reader when the library is going to Auto mode. If the scan beam does not come on, try replacing the bar-code reader, P/N 05H7772. If the new reader does not correct the problem, return it to stock. 4. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 5. Before replacing FRUs, ensure that all cards and cables are properly seated. 6. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 2 - Reach belt	34G9329	58
	Picker card, GRI	05H8492	12
	Gripper 2 - Reach gear-motor	05H7877	10
	Secondary FRU Group		
	Pivot flex cable	*******	3
	BIC P1 to XAX P1, X-axis flex cable	*******	3
	Mach Intf Ctrl Card, MIC - check 5 fuses		2
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	2
	Gripper 2 - Reach belt idler assembly	34G9335	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
	Reach end-of-travel flag	34G9332	1

Figure 24 (Page 51 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B96	**Both grip reach EOT switches on at the same time - Gripper 1**		
	Action 1. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 2. Check the DC present light on the front of the 24V power supply when library power is on. If the light is on, the supply is OK. If the light is off, go to 2BF4 and test the power supply. If it is OK, return here. 3. This failure can also be caused by the bar-code reader pulling down the +5V generated on the picker card. Check for a visible scan line from the reader when the library is going to Auto mode. If the scan beam does not come on, try replacing the bar-code reader, P/N 05H7772. If the new reader does not correct the problem, return it to stock. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Picker card, GRI	05H8492	40
	Pivot Flex Cable	*******	20
	Mach Intf Ctrl Card, MIC - check 5 fuses		20
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	17
	Secondary FRU Group		
	DI/DO card, DI/DO	61G9946	4
2B97	**Both grip reach EOT switches on at the same time - Gripper 2**		
	Action 1. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 2. Check the DC present light on the front of the 24V power supply when library power is on. If the light is on, the supply is OK. If the light is off, go to 2BF4 and test the power supply. If it is OK, return here. 3. This failure can also be caused by the bar-code reader pulling down the +5V generated on the picker card. Check for a visible scan line from the reader when the library is going to Auto mode. If the scan beam does not come on, try replacing the bar-code reader, P/N 05H7772. If the new reader does not correct the problem, return it to stock. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Picker card, GRI	05H8492	59
	Mach Intf Ctrl Card, MIC - check 5 fuses		20
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	16
	Secondary FRU Group		
	DI/DO card, DI/DO	61G9946	4
	RCH P5 to RCX P3 cable	05H4058	1

Figure 24 (Page 52 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B98	**Both pivot end-of-travel switches are on at the same time**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Picker card, GRI Pivot front sensor Pivot rear sensor	 05H8492 05H8407 05H8407	 31 30 30
	Secondary FRU Group Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card Pivot sensor cable DI/DO card, DI/DO	 61G9905 05H8784 61G9681 61G9946	 6 2 1
2B99	**Not used**		
2B9A	**Invalid state with cartridge seated and cartridge present Gripper 1**		
	Action 1. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 2. Check the DC present light on the front of the 24V power supply when library power is on. If the light is on, the supply is OK. If the light is off, go to 2BF4 and test the power supply. If it is OK, return here. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Gripper 1 - Cartridge seated sensor Gripper 1 - Grip card/cable assembly	 34G9339 50G1041	 52 33
	Secondary FRU Group Picker card, GRI Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card Gripper 1 - Reach card, RCH DI/DO card, DI/DO	 05H8492 61G9905 05H8784 ******* 61G9946	 5 5 4 1

Figure 24 (Page 53 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B9B	**Invalid state with cartridge present and grip open - Gripper 1**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Cartridge present sensor	94F6457	50
	Picker card, GRI	05H8492	17
	Mach Intf Ctrl Card, MIC - check 5 fuses		16
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	13
	Secondary FRU Group		
	DI/DO card, DI/DO	61G9946	3
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
2B9C	**Invalid state with cartridge seated and cartridge present Gripper 2**		
	Action 1. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 2. Check the DC present light on the front of the 24V power supply when library power is on. If the light is on, the supply is OK. If the light is off, go to 2BF4 and test the power supply. If it is OK, return here. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Cartridge seated sensor	34G9339	52
	Gripper 2 - Grip card/cable assembly	50G1041	33
	Secondary FRU Group		
	Picker card, GRI	05H8492	5
	Mach Intf Ctrl Card, MIC - check 5 fuses		5
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	4
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1

Figure 24 (Page 54 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B9D	**Invalid state with cartridge present and grip open - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Cartridge present sensor	94F6457	49
	Picker card, GRI	05H8492	17
	Mach Intf Ctrl Card, MIC - check 5 fuses		16
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	13
	Secondary FRU Group		
	DI/DO card, DI/DO	61G9946	3
	RCH P5 to RCX P3 cable	05H4058	1

Figure 24 (Page 55 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B9E	**Reach not retracted during move request - Gripper 1**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 4. Before replacing FRUs, ensure that all cards and cables are properly seated. 5. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 1 - Reach belt	34G9329	58
	Picker card, GRI	05H8492	12
	Gripper 1 - Reach gear-motor	05H7877	10
	Secondary FRU Group		
	Pivot flex cable	*******	3
	BIC P1 to XAX P1, X-axis flex cable	*******	3
	Mach Intf Ctrl Card, MIC - check 5 fuses		2
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	2
	Gripper 1 - Reach belt idler assembly	34G9335	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 56 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2B9F	**Reach not retracted during move request - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This failure can be caused by a blown fuse F2 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 4. Before replacing FRUs, ensure that all cards and cables are properly seated. 5. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group		
	Gripper 2 - Reach belt	34G9329	58
	Picker card, GRI	05H8492	12
	Gripper 2 - Reach gear-motor	05H7877	10
	Secondary FRU Group		
	Pivot flex cable	*******	3
	BIC P1 to XAX P1, X-axis flex cable	*******	3
	Mach Intf Ctrl Card, MIC - check 5 fuses		2
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	2
	Gripper 2 - Reach belt idler assembly	34G9335	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 57 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BA0	**Pivot not in place on reach extend request after state change**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Picker card, GRI	05H8492	44
	BIC P1 to XAX P1, X-axis flex cable	*******	27
	Mach Intf Ctrl Card, MIC - check 5 fuses		15
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Secondary FRU Group		
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	9
	DI/DO card, DI/DO	61G9946	3
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
2BA1	**Invalid operator panel status with auto and pause both active**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. This error can be caused by a defective barcode reader that shorts the power supply on the MIC card. Observe the 3494 Op Panel lights: a. If any Op Panel lights are on, the power supply and reader are OK. Continue isolation using the following FRU group. b. If the Op Panel lights are all off, go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 to isolate the failure. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Operator panel card, LPN	61G9910	69
	Mach Intf Ctrl Card, MIC - check 5 fuses		19
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Secondary FRU Group		
	LPC card (if single LM)	05H8143	5
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	DI/DO card, DI/DO	61G9946	3
	MIC1 or LPC P7 to LPN P1 Op panel cable	62G1182	3
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 58 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BA2	**Conflicting door interlock status, 9-16 frame library**		
	Action Conflicting door status for frames 9-16 was reported by the SPC card. Since the code does not know which, if any, of the doors opened, it reports that all opened. If Open Door Verification (ODV) is enabled, all frames 9-16 will be inventoried. 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Supplemental Power Control (SPC) card	 05H7993	 90
	Secondary FRU Group Door interlock card, DIL Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card Door interlock jumper DU/SU door interlock cable SPC to DIL door interlock cable BIC P6 to DIL P1 CU door interlock cable MIC1 P6 or LPC P6 to BIC P7 DC ctrl cable LPC card (if single LM) DSW card (if Model HA1 LM A) DBF card (if Model HA1 LM B) DI/DO Card, DI/DO Bulkhead interconnect card, BIC DI/DO P1,P2 to MIC P5/P4 cable	 05H7875 61G9905 05H8784 62G1215 62G1218 05H8086 62G1187 62G1180 05H8143 05H8237 05H8239 61G9946 ******* 62G1178	 1 1 1 1 1 1 1 1 1 1 1
2BA3	**Not used**		

Figure 24 (Page 59 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BA4	**Reach compliance sensor state incorrect - Gripper 1**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 1 - Reach compliance sensor	94F6454	49
	Gripper 1 - Grip card/cable assembly	50G1041	24
	Secondary FRU Group		
	Pivot flex cable	*******	7
	BIC P1 to XAX P1, X-axis flex cable	*******	6
	Picker card, GRI	05H8492	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		4
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	3
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	DI/DO card, DI/DO	61G9946	2
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 60 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BA5	**Reach compliance sensor state incorrect - Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Gripper 2 - Reach compliance sensor	94F6454	49
	Gripper 2 - Grip card/cable assembly	50G1041	24
	Secondary FRU Group		
	Pivot flex cable	*******	7
	BIC P1 to XAX P1, X-axis flex cable	*******	6
	Picker card, GRI	05H8492	4
	Mach Intf Ctrl Card, MIC - check 5 fuses		4
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	3
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	2
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 61 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BA6	**Accessor sensors may not have power**		
	Action 1. This failure can be caused by a blown fuse F2 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 2. Check the DC present light on the front of the 24V power supply when library power is on. If the light is on, the supply is OK. If the light is off, go to 2BF4 and test the power supply. If it is OK, return here. 3. This failure can also be caused by the bar-code reader pulling down the +5V generated on the picker card. Check for a visible scan line from the reader when the library is going to Auto mode. If the scan beam does not come on, try replacing the bar-code reader, P/N 05H7772. If the new reader does not correct the problem, return it to stock. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Picker card, GRI Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card	 05H8492 61G9905 05H8784	 25 25
	Secondary FRU Group X/Y-axis card, XAX BIC P1 to XAX P1, X-axis flex cable Bulkhead interconnect card, BIC XAX P2 to GRI P1, Y-axis flex cable LCC P5 or MIC2-4 P1 to BIC P2,P3 cable LCC card (if installed)	 05H8142 ******* ******* 61G9685 61G9676 50G1053	 10 10 10 10 10 *
2BA7 to 2BBF	**Not used**		
2BC0	**X-axis servo error (internal information only)**		
2BC1	**Y-axis servo error (internal information only)**		

Figure 24 (Page 62 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BC2	**X-axis failed to reach target**		
	Action 1. Check the DC present light on the front of the 24V power supply when library power is on. If the light is off, go to 2BF4 and test the power supply. If it is OK, return here. 2. This error can occur if the X-axis bumper is not adjusted correctly. Refer to step 3 on page INST-52. If the adjustment is OK and the library is still failing, continue with FRU isolation. 3. Before replacing FRUs, ensure that all cards and cables are properly seated. 4. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them. **Note:** If you have obvious damage to the rail rollers or pinion shaft causing the X-axis to bind, determine the parts to order as follows based on the X-axis casting in your library: • X-axis casting with no p/n stamped on casting: – X-axis rail roller, p/n = 61G9698, qty = 4. – X-axis pinion shaft assembly, p/n = 34G9608, qty = 1. • X-axis casting with p/n 05H4142 stamped on end of casting above the X-axis home flag: – X-axis lower rail roller, p/n = 61G9698, qty = 4. – X-axis upper rail roller, p/n = 05H4138, qty = 2. – X-axis pinion shaft assembly, p/n = 05H4148, qty = 1.		
	Primary FRU Group		
	X-axis belt	34G9629	40
	X-axis motor	05H8249	20
	X-axis home sensor	05H8407	10
	X-axis power amplifier	61G9893	10
	Secondary FRU Group		
	Servo control card, SRV	61G9945	8
	X-axis rail roller (see note above)	**note*	2
	BIC P1 to XAX P1, X-axis flex cable	*******	2
	X/Y-axis card, XAX	05H8142	2
	Mach Intf Ctrl Card, MIC - check 5 fuses		1
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	X-axis home sensor cable	*******	1
	X-axis pinion shaft asm (see note above)	**note*	1
	LCC P3 or MIC2-4 P15 to X/Y power amp P2	50G1036	1
	LCC P2 or MIC2-4 P14 to BIC P4 X/Y cable	61G9686	1
	LCC P4 or MIC2-4 P13 to X/Y power amp P1	62G1176	1
	X-rail assembly		1
	Control unit frame or LSB frame (if Model HA1)	34G9605	
	Expansion unit frame	34G9611	
	SRV to LCC P1 or MIC2-4 P12 cable	62G1179	1
	X/Y-motors to XAX P3/P4 cable	61G9682	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2,P3 cable	61G9676	1
	DI/DO P1,P2 to MIC P5,P4 cable	62G1178	1

Figure 24 (Page 63 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BC3	**Y-axis failed to reach target**		
	Action 1. Check the DC present light on the front of the 24V power supply when library power is on. If the light is off, go to 2BF4 and test the power supply. If it is OK, return here. 2. Before replacing FRUs, ensure that all cards and cables are properly seated. 3. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them. Ensure that the Y-axis is lubricated as specified in the CARR section PM procedure. 4. If the library has one accessor and the failure is occurring at the far end, ensure that the X-axis bumper is adjusted correctly. Refer to step 3 on page INST-52.		
	Primary FRU Group		
	Y-axis belt	34G9629	40
	Y-axis motor	05H8249	20
	Y-axis power amplifier	61G9893	10
	Secondary FRU Group		
	Y-axis assembly (only if obvious damage)	05H8063	9
	Servo control card, SRV	61G9945	7
	Y-axis home sensor	05H8407	3
	BIC P1 to XAX P1, X-axis flex cable	*******	2
	X/Y-axis card, XAX	05H8142	2
	Mach Intf Ctrl Card, MIC - check 5 fuses		1
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	LCC P3 or MIC2-4 P15 to X/Y power amp P2	50G1036	1
	LCC P2 or MIC2-4 P14 to BIC P4 X/Y cable	61G9686	1
	LCC P4 or MIC2-4 P13 to X/Y power amp P1	62G1176	1
	SRV to LCC P1 or MIC2-4 P12 cable	62G1179	1
	X/Y-motors to XAX P3/P4 cable	61G9682	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2,P3 cable	61G9676	1
	DI/DO P1,P2 to MIC P5,P4 cable	62G1178	1
2BC4	**Write to servo failed**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Servo control card, SRV	61G9945	70
	System board (library manager)		20
	PS/ValuePoint	92F0396	
	Industrial Computer	*******	
	Riser card (library manager)	*******	10
	Secondary FRU Group		
	—	—	—

Figure 24 (Page 64 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BC5	**Read from servo failed**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Servo control card, SRV	61G9945	40
	System board (library manager)		20
	PS/ValuePoint	92F0396	
	Industrial Computer	*******	
	Riser card (library manager)	*******	10
	Secondary FRU Group		
	Y-axis power amplifier	61G9893	5
	X-axis power amplifier	61G9893	5
	Y-axis motor	05H8249	5
	X-axis motor	05H8249	5
	BIC P1 to XAX P1, X-axis flex cable	*******	1
	Mach Intf Ctrl Card, MIC - check 5 fuses		1
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	LCC P3 or MIC2-4 P15 to X/Y power amp P2	50G1036	1
	LCC P4 or MIC2-4 P13 to X/Y power amp P1	62G1176	1
	LCC P2 or MIC2-4 P14 to BIC P4 X/Y-cable	61G9686	1
	X/Y-motors to XAX P3/P4 cable	62G9682	1
	SRV to LCC P1 or MIC2-4 P12 cable	62G1179	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1

Figure 24 (Page 65 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BC6	**X-axis offset error**		
	Action 1. This failure can be caused by an obstacle in the aisle preventing X-axis motion. Check for cartridges on the floor or cartridges that are not fully seated in their storage cell. 2. Check the Y-axis Guide Rail Roller adjustment to ensure that the center (bottom) rollers are NOT tight against the rail at any point along the length of the library causing an accessor bind. See "Y-Axis Guide Rail Roller Adjustment" on page CARR-69. 3. This failure can be caused by a blown fuse F3 or F5 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "36-Volt Distribution Overview" on page POWER-5 or "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 4. This failure can be caused by a defective barcode reader that shorts the +12V power supply on the MIC card. If you are getting this error along with a 2BF3 error after the accessor runs into the bumper, power down the library and disconnect the cable from the reader. If the library comes up OK, replace the reader. 5. Check the DC present light on the front of the 24V power supply when library power is on. If the light is off, go to 2BF4 and test the power supply. If it is OK, return here. 6. Before replacing FRUs, ensure that all cards and cables are properly seated. 7. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them. **Note:** If you have obvious damage to the rail rollers or pinion shaft causing the X-axis to bind, determine the parts to order as follows based on the X-axis casting in your library: • X-axis casting with no p/n stamped on casting: – X-axis rail roller, p/n = 61G9698, qty = 4. – X-axis pinion shaft assembly, p/n = 34G9608, qty = 1. • X-axis casting with p/n 05H4142 stamped on end of casting above the X-axis home flag: – X-axis lower rail roller, p/n = 61G9698, qty = 4. – X-axis upper rail roller, p/n = 05H4138, qty = 2. – X-axis pinion shaft assembly, p/n = 05H4148, qty = 1.		
	Primary FRU Group		
	X-axis power amplifier	61G9893	52
	X-axis motor	05H8249	22
	Servo control card, SRV	61G9945	8
	Secondary FRU Group		
	X-axis rail roller (see note above)	**note*	8
	X-axis pinion shaft asm (see note above)	**note*	3
	BIC P1 to XAX P1, X-axis flex cable	*******	2
	X/Y-axis card, XAX	05H8142	2
	X-axis home sensor	05H8407	1
	X-rail assembly		1
	Control unit frame or LSB frame (if Model HA1)	34G9605	
	Expansion unit frame	34G9611	
	Mach Intf Ctrl Card, MIC - check 5 fuses		1
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	BIC P5 to X-axis home sensor cable	*******	1
	LCC P4 or MIC2-4 P13 to X/Y power amp P1	62G1176	1
	LCC P2 or MIC2-4 P14 to BIC P4 X/Y-cable	61G9686	1
	LCC P3 or MIC2-4 P15 to X/Y power amp P2	50G1036	1
	X/Y-motors to XAX P3/P4 cable	61G9682	1
	SRV to LCC P1 or MIC2-4 P12 cable	62G1179	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 66 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BC7	**Y-axis offset error**		
	Action 1. This failure can be caused by an obstacle in the aisle preventing Y-axis motion. Check for cartridges that are not fully seated in their storage cell. 2. This failure can be caused by a blown fuse F3 or F5 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “36-Volt Distribution Overview” on page POWER-5 or “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 3. Check the DC present light on the front of the 24V power supply when library power is on. If the light is off, go to 2BF4 and test the power supply. If it is OK, return here. 4. This failure can be caused by binding in the Y-axis assembly. If you do not have a teflon-coated leadscrew, lubricate the Y-axis as specified in “Preventive Maintenance (PM)” on page CARR-139. If the error persists, continue with the following steps. 5. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them. 6. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Y-axis power amplifier	61G9893	43
	Y-axis assembly (only if obvious damage)	05H8063	30
	Y-axis motor	05H8249	17
	Secondary FRU Group		
	Servo control card, SRV	61G9945	6
	BIC P1 to XAX P1, X-axis flex cable	*******	2
	X/Y-axis card, XAX	05H8142	2
	Y-axis home sensor	05H8407	1
	Mach Intf Ctrl Card, MIC - check 5 fuses		1
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	LCC P2 or MIC2-4 P14 to BIC P4 X/Y-cable	61G9686	1
	LCC P4 or MIC2-4 P13 to X/Y power amp P1	62G1176	1
	LCC P3 or MIC2-4 P15 to X/Y power amp P2	50G1036	1
	X/Y-motors to XAX P3/P4 cable	61G9682	1
	SRV to LCC P1 or MIC2-4 P12 cable	62G1179	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 67 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BC8	**Accessor timeout when going to home**		
	Action 1. This failure can be caused by a blown fuse F3 or F5 on the MIC card. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "36-Volt Distribution Overview" on page POWER-5 or "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 2. Check the DC present light on the front of the 24V power supply when library power is on. If the light is off, go to 2BF4 and test the power supply. If it is OK, return here. 3. Clean the X and Y home sensors and retry going to Auto mode. If this error re-occurs, continue with FRU replacement. 4. Before replacing FRUs, ensure that all cards and cables are properly seated. 5. Check for obvious damage to the mechanical assemblies or belts listed in the following FRU group before ordering or replacing them.		
	Primary FRU Group X-axis drive belt Y-axis drive belt	 34G9629 34G9629	 35 35
	Secondary FRU Group X-axis power amplifier X-axis home sensor Y-axis home sensor BIC P1 to XAX P1, X-axis flex cable X/Y-axis card, XAX Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card BIC P5 to X-axis home sensor cable DI/DO card, DI/DO LCC card (if installed) Bulkhead interconnect card, BIC LCC P5 or MIC2-4 P1 to BIC P2, P3 cable DI/DO P1, P2 to MIC P5, P4 cable	 61G9893 05H8407 05H8407 ******* 05H8142 61G9905 05H8784 ******* 61G9946 50G1053 ******* 61G9676 62G1178	 9 8 8 2 2 1 1 1 1 1 1 1
2BC9	**Unexpected X-axis motion**		
	Action This error may be caused by a mis-adjustment of the X-axis power amplifier. This is a factory adjustment. Replace the amplifier and ensure that the switches are set as shown in "X-Axis and Y-Axis Power Amplifier Card" on page LOC-29 and the pots have loctite on them.		
	Primary FRU Group X-axis power amplifier	 61G9893	 100
	Secondary FRU Group		
2BCA to 2BEF	**Not used**		
2BF0	**Servo power is off**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group 36V servo power supply	 05H9616	 98
	Secondary FRU Group DI/DO card, DI/DO 24/36V to MIC P2, P3 dc power cable MIC P6 to BIC P7 dc controls cable	 61G9946 05H8093 62G1180	 1 1 1

Figure 24 (Page 68 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BF1	**Cannot switch on servo power**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Picker card, GRI	05H8492	65
	Mach Intf Ctrl Card, MIC - check 5 fuses		30
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Secondary FRU Group		
	DI/DO card, DI/DO	61G9946	3
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	2
	24/36V to MIC P2,P3 DC power cable	05H8093	1
2BF2	**Cannot switch on servo power - door safety switch is open**		
	Action 1. This failure can be caused by a blown fuse F4 on the MIC card. If the fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to “24-Volt Distribution Overview” on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Supplemental Power Control, SPC (9-16 frames only)	05H7993	30
	Door interlock switch	62G2745	27
	Door interlock card, DIL	05H7875	18
	Mach Intf Ctrl Card, MIC - check 5 fuses		15
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Door interlock jumper	62G1215	9
	Secondary FRU Group		
	DU/SU door interlock cable	62G1218	9
	SPC to DIL door interlock cable (9-16 frames only)	05H8086	9
	BIC P6 to DIL P1 CU door interlock cable	62G1187	9
	MIC1 P6 or LPC P6 to BIC P7 DC ctrl cable	62G1180	5
	LPC card (if single LM)	05H8143	3
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	DI/DO Card, DI/DO	61G9946	2
	Bulkhead interconnect card, BIC	*******	1
	DI/DO P1,P2 to MIC P5/P4 cable	62G1178	1

Figure 24 (Page 69 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BF3	**Cannot detect 36V at the MIC card**		
	Action 1. Test the power supply as follows: a. Turn the 36V power supply switch to OFF. b. Unplug the 36V power supply AC power cord at the PCC. c. Unplug the 36V connector MIC P2 at the MIC card. d. After 20 seconds, plug the AC power cord into it's power socket. e. Turn the 36V power supply switch to ON. f. If the AC and DC present indicators on the 36V power supply come on, the power supply is OK. Suspect a load problem (binding, short, etc.) or a FRU in the Secondary FRU group. g. If the DC present indicator does not come on, replace the 36V power supply. h. Turn the 36V power supply switch to OFF and re-plug the 36V connector MIC P2. i. Turn the 36V power supply switch to ON. 2. The supply will shutdown for protection if the load exceeds the rated capacity. This may be caused by a defective component in the 36V distribution, pots or switches not set correctly on the X or Y power amplifiers, or by a mechanical mis-alignment in the library. Check for binding as you move the accessor manually from one end to the other on the X-axis and from bottom to top on the Y-axis. Also, ensure that the accessor can get a cartridge from the last column in the library without touching the X-axis bumper at the far end. If the mechanical alignment is OK, go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27. **Note:** The power supply will reset automatically after AC power is off for 20 seconds. 3. If you are also getting a servo error code 2BCx, use the servo error code to isolate the failure. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group 36V servo power supply	 05H9616	 88
	Secondary FRU Group Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card 24/36V to MIC P2,P3 DC power cable DI/DO card, DI/DO DI/DO P1, P2 to MIC P5, P4 cable	 61G9905 05H8784 05H8093 61G9946 62G1178	 6 4 1 1

Figure 24 (Page 70 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BF4	**Cannot detect 24V at the MIC card**		
	Action 24 volts is shut off by a circuit in the DC power cable if the 36 volt power drops. If the DC Present light on the 24V power supply is on and the DC Present light on the 36V power supply is off, the problem is a 36V failure. Go to 2BF3 and continue analysis. 1. Test the power supply as follows: a. Turn the 24V power supply switch to OFF. b. Unplug the 24V power supply AC power cord at the PCC. c. Unplug the 24V connector MIC P3 at the MIC card. d. After 20 seconds, plug the AC power cord into it's power socket. e. Turn the 24V power supply switch to ON. f. If the AC and DC present indicators on the 24V power supply come on, the power supply is OK. Suspect a load problem (binding, short, etc.) or a FRU in the Secondary FRU group. g. If the DC present indicator does not come on, replace the 24V power supply. h. Turn the 24V power supply switch to OFF and re-plug the 24V connector MIC P3. i. Turn the 24V power supply switch to ON. 2. The supply will shutdown for protection if the load exceeds the rated capacity. This may be caused by a defective component in the 24V distribution. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27. **Note:** The power supply will reset automatically after AC power is off for 20 seconds. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group 24V picker power supply	05H9615	88
	Secondary FRU Group Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card 24/36V to MIC P2,P3 DC power cable DI/DO card, DI/DO DI/DO P1, P2 to MIC P5, P4 cable	 61G9905 05H8784 05H8093 61G9946 62G1178	6 4 1 1
2BF5	**Cannot detect 5V or 12V on the MIC card**		
	Action 1. Check the DC present light on the front of the 36V power supply. If it is on, the power supply is OK. Continue with the following FRU group. If it is off, go to error code 2BF3 and test the power supply. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Mach Intf Ctrl Card, MIC MIC1 card MIC2-4 card Picker card, GRI	 61G9905 05H8784 05H8492	57 39
	Secondary FRU Group DI/DO card, DI/DO DI/DO P1, P2 to MIC P5, P4 cable	61G9946 62G1178	3 1
2BF6	**Tried to use accessor A - Left Service Bay barrier door not retracted**		
	Action 1. Ensure that the left service bay barrier door is retracted and latched. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Barrier door A retracted switch Dual switch card, DSW	62G2745 05H8237	52 27
	Secondary FRU Group Mach Intf Ctrl Card, MIC4 - check 5 fuses DI/DO card, DI/DO Bulkhead interconnect card 2, BIC2 Service bay switches cable	05H8784 61G9946 05H8247 05H8259	10 5 5 1

Figure 24 (Page 71 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2BF7	**Tried to use accessor B - Right Service Bay barrier door not retracted**		
	Action 1. Ensure that the right service bay barrier door is retracted and latched. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Barrier door B retracted switch Dual B frame card, DBF	 62G2745 05H8239	 52 27
	Secondary FRU Group Mach Intf Ctrl Card, MIC4 - check 5 fuses DI/DO card, DI/DO Bulkhead interconnect card 2, BIC2 Service bay switches cable	 05H8784 61G9946 05H8247 05H8259	 10 5 5 1
2BF8	**Corrected accessor drift during periodic re-homing operation**		
	Description The accessor servo position was corrected successfully. It was reported for information only. No action is required unless you are getting a high number of positional retries (error codes 2A00, 2A01). Normally, the retry rate should be under 5%. **Action** 1. Ensure that the X and Y axis belts are not damaged and are tight. 2. Ensure that the SRV Card jumpers are set correctly. See Figure 72 on page LOC-51. 3. If your library has an XAX1 Card P/N 62G1188, replace it with the XAX2 Card P/N 05H8142. 4. If your library has a MIC1 Card P/N 61G9905, replace it with the MIC3/LPC Card Assembly P/N 05H8148. 5. If your library has a 5-8 frame X-axis cable with a metal band P/N 62G1192, replace it with the new-style cable P/N 05H7283. 6. If none of the above apply or correct the problem, replace the FRUs in order.		
	Primary FRU Group BIC P1 to XAX P1, X-axis flex cable X/Y-axis card, XAX X/Y motor	 ******* 05H8142 05H8249	
	Secondary FRU Group Servo control card, SRV X/Y-motors to XAX P3/P4 cable MIC2-4 P1 to BIC P2,P3 cable SRV to MIC2-4 P12 cable	 61G9945 61G9682 61G9676 62G1179	
2BF9 to 2BFF	**Not used**		
2C00 to 2EFF	**Internal status codes, not used as error codes**		
2F01	**The standby accessor could not be pushed into service bay**		
	Action 1. Check for an obstruction that is preventing the standby accessor from being pushed into it's service bay. 2. This error can also be caused by failure on the UEP card. Refer to “NVRAM Test” on page DIAG-11 and test the NVRAM. If you get all zeros on the test, replace the FRUs in order until the test successfully reads data from the NVRAM. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group UEP card	 05H8241	 95
	Secondary FRU Group LM A Serial Port B to UEP J10 cable LM B Serial Port B to UEP J20 cable	 05H8264 05H8265	 5

Figure 24 (Page 72 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2F03	**Cannot power on accessor A - Left Service Bay safety interlocks are open**		
	Action 1. Ensure that accessor A is in the left service bay and the service bay barrier door and front door are closed and latched. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	In-bay switch assembly, Accessor A	05H7338	24
	Barrier door A closed switch	62G2745	24
	Left service bay door interlock switch	62G2745	24
	Dual switch card, DSW	05H8237	12
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC4 - check 5 fuses	05H8784	8
	DI/DO card, DI/DO	61G9946	4
	Bulkhead interconnect card 2, BIC2	05H8247	3
	Service bay switches cable	05H8259	1
2F04	**Cannot power accessor B - Right Service Bay safety interlocks are open**		
	Action 1. Ensure that accessor B is in the right service bay and the service bay barrier door and front door are closed and latched. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	In-bay switch assembly, Accessor B	05H7338	24
	Barrier door B closed switch	62G2745	24
	Right service bay door interlock switch	62G2745	24
	Dual B frame card, DBF	05H8239	12
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC4 - check 5 fuses	05H8784	8
	DI/DO card, DI/DO	61G9946	4
	Bulkhead interconnect card 2, BIC2	05H8247	3
	Service bay switches cable	05H8259	1
2F05	**Tried to use accessor A - Left Service Bay barrier door not retracted or front door open**		
	Action 1. Ensure that the left service bay front door is closed and the barrier door is retracted and latched. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Barrier door A retracted switch	62G2745	33
	Left service bay door interlock switch	62G2745	33
	Dual switch card, DSW	05H8237	18
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC4 - check 5 fuses	05H8784	8
	DI/DO card, DI/DO	61G9946	4
	Bulkhead interconnect card 2, BIC2	05H8247	3
	Service bay switches cable	05H8259	1

Figure 24 (Page 73 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2F06	**Tried to use accessor B - Right Service Bay barrier door not retracted or front door open**		
	Action 1. Ensure that the right service bay front door is closed and the barrier door is retracted and latched. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Barrier door B retracted switch	62G2745	33
	Right service bay door interlock switch	62G2745	33
	Dual B frame card, DBF	05H8239	18
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC4 - check 5 fuses	05H8784	8
	DI/DO card, DI/DO	61G9946	4
	Bulkhead interconnect card 2, BIC2	05H8247	3
	Service bay switches cable	05H8259	1
2F07	**Tried to use accessor B - accessor A was detected in aisle**		
	Action 1. Ensure that accessor A is in the service bay. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	In-bay switch assembly, Accessor A	05H7338	54
	Dual switch card, DSW	05H8237	28
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC4 - check 5 fuses	05H8784	9
	DI/DO card, DI/DO	61G9946	4
	Bulkhead interconnect card 2, BIC2	05H8247	3
	Service bay switches cable	05H8259	1
2F08	**Tried to use accessor A - accessor B was detected in aisle**		
	Action 1. Ensure that accessor B is in the service bay. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	In-bay switch assembly, Accessor B	05H7338	54
	Dual B frame card, DBF	05H8239	28
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC4 - check 5 fuses	05H8784	9
	DI/DO card, DI/DO	61G9946	4
	Bulkhead interconnect card 2, BIC2	05H8247	3
	Service bay switches cable	05H8259	1
2F09	**Tried to use accessor A - barrier door is not retracted**		
	Action 1. Ensure that the barrier door in the left service bay is fully retracted and latched. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Barrier door A retracted switch	62G2745	54
	Dual switch card, DSW	05H8237	28
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC4 - check 5 fuses	05H8784	9
	DI/DO card, DI/DO	61G9946	4
	Bulkhead interconnect card 2, BIC2	05H8247	3
	Service bay switches cable	05H8259	1

Figure 24 (Page 74 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
2F0A	**Tried to use accessor B - barrier door is not retracted**		
	Action 1. Ensure that the barrier door in the right service bay is fully retracted and latched. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Barrier door B retracted switch Dual B frame card, DBF	 62G2745 05H8239	 54 28
	Secondary FRU Group Mach Intf Ctrl Card, MIC4 - check 5 fuses DI/DO card, DI/DO Bulkhead interconnect card 2, BIC2 Service bay switches cable	 05H8784 61G9946 05H8247 05H8259	 9 4 3 1
2F0B to 2F10	**Dual active accessor status codes**		
2F11 to 31FF	**Not used**		
3200 to 321F	**3495 vision controller codes**		
3220 to 33FF	**Not used**		
3400 3401 3402	**Cannot read bar-code reader label**		
	Note 3400 = 1 cell inventory. 3401 = 5 cell inventory. 3402 = 20 cell inventory. **Description** This is a temporary read error. If error recovery is not successful, a permanent 2B6x error is logged and should be used for service. If the retry threshold is exceeded, a 3403 error is logged and should be used for service. If you do not have a permanent error and the retry threshold was not exceeded, no action is required. **Action** 1. Check the cartridge labels in the library to ensure they meet specifications, are installed properly, and are not damaged or dirty. 2. Ensure that the wires are not blocking any portion of the scan beam. 3. Check the bar-code reader adjustment.		
	Primary FRU Group —	 —	 —
	Secondary FRU Group —	 —	 —
3403	**Inventory retry threshold exceeded**		
	Action 1. Check the cartridge labels in the library to ensure they meet specifications, are installed properly, and are not damaged or dirty. 2. Ensure that the wires are not blocking any portion of the scan beam. 3. Check the bar-code reader adjustment before ordering or replacing FRUs. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Bar-code reader	 05H7772	 100
	Secondary FRU Group —	 –	 –

Figure 24 (Page 75 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
3404	**Cell empty but did not see empty cell label**		
	Action 1. Check library for a missing empty cell label. 2. Ensure that the wires are not blocking any portion of the scan beam. 3. Check bar-code reader adjustment before ordering or replacing the reader. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Bar-code reader	05H7772	100
	Secondary FRU Group –	–	–
3405	**More than 7 characters read on a label**		
	Action Check cartridges for an invalid label or for a misplaced label. Look for a cartridge with an unsupported barcode in the label area.		
3406	**Unexpected empty cell label warning**		
	Action This code is a warning that the barcode reader sensed an empty cell label when one was not expected at the start of an inventory scan and had to adjust upward to recover. Usually, this is caused by missing cell blockers for the dual gripper feature. Ensure that the cartridge storage inserts are installed in the top and bottom 2 rows of cartridge storage in each library frame. Refer to the Dual Gripper feature installation instructions.		
3407 to 342F	**Not used**		
3430	**Cannot read bar-code reader label during verify (Audit command)**		
	Description This is a temporary read error. If error recovery is not successful, a permanent 2B6x error is logged and should be used for service. If the retry threshold is exceeded, a 3403 error is logged and should be used for service. If you do not have a permanent error and the retry threshold was not exceeded, no action is required. **Action** 1. Check the cartridge labels in the library to ensure they meet specifications, are installed properly, and are not damaged or dirty. 2. Ensure that the wires are not blocking any portion of the scan beam. 3. Check the bar-code reader adjustment.		
	Primary FRU Group —	—	—
	Secondary FRU Group —	—	—
3431	**Missing cartridge label (audit operation)**		
	Action Check cartridges for a missing label.		
3432 to 343F	**Not used**		
3440	**Cartridge label does not match expected value (internal information only)**		
3441 to 346F	**Not used**		
3700 to 39FF	**Internal status codes, not used as error codes**		

Figure 24 (Page 76 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
3A00 to 3A1F	**Not used**		
3A20 to 3A24	**Internal status codes, not used as error codes**		
3A25 to 5FFF	**Not used**		
6000 to 6FFF	**Library manager-Host/operator interface codes**		
7000 to 70E4	**Library manager-command execution codes**		
70E5	**Code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
70E6 to 7623	**Library manager-command execution codes**		
7624	**A storage cell was detected as bad and marked as broken**		
	Action A cell is marked as bad when a cartridge cannot be put into it on a Put OR when a cartridge cannot be taken out of it on a Get AND other cells are working OK. Analyze the problem as follows: 1. Select Fix Broken Cell from the Service pull-down on the Service action bar to determine which cell is marked as broken. 2. Review the service log to see if previous broken cell incidents have occurred on the same cell or in the same area. 3. Inspect the broken cell for a cartridge and/or any other object. 4. If a cartridge is in the broken cell, ensure that it can be removed and replaced without binding. a. If the cartridge is broken, give it to the customer for repair. 5. Inspect the cell for damage. a. If the cell is damaged, replace the storage array. Refer to the parts catalog for the P/N and the CARR section for the remove and replace procedure. 6. If you can not locate a problem with the cell or when you have corrected the problem, select OK on the Fix Broken Cell window to mark the cell as not broken. 7. Use the Rack Get/Put test on the Exercise Cartridge Accessor pull-down to verify that the cell is OK. The cell must be in the cartridge inventory to execute the test. a. If a problem is detected by the Rack Get/Put test, select Start Service Call and analyze the problem using the selected FSC. 8. Use End Call to record any information you have about the problem in the comments section of the service log. The next CE may need this information if the problem re-occurs.		
7625 to 7F8E	**Library manager-command execution codes**		
7F8F	**CHKDSK errors on D Disk**		
	Action CHKDSK errors were detected on the D disk. Go to “CHKDSK Procedure” on page CARR-101 to correct the errors.		
7F90 to 7FFF	**Library manager-command execution codes**		

Figure 24 (Page 77 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8000 to 85DF	**Library manager-low level interface support codes**		
85E0 to 85E2	**3495 emergency stop messages**		
85E3	**Emergency stop occurred, a front door was opened**		
	Action 1. This code is logged when a front door is opened while the accessor is in Auto mode. Generally, it is **NOT** a failure and no action is required. If this code is logged and a door has not been opened, continue with problem analysis. 2. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card LPC card (if single LM) DSW card (if Model HA1 LM A) DBF card (if Model HA1 LM B) DI/DO card, DI/DO	 61G9905 05H8784 05H8143 05H8237 05H8239 61G9946	63 20 15
	Secondary FRU Group DI/DO P1, P2 to MIC P5, P4 cable	62G1178	2
85E4	**Emergency stop occurred, accessor in aisle and barrier door not retracted**		
	Action 1. Ensure that the barrier doors are fully retracted and latched. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Barrier door A retracted switch Barrier door B retracted switch Dual switch card, DSW Dual B frame card, DBF	 62G2745 62G2745 05H8237 05H8239	
	Secondary FRU Group Bulkhead interconnect card 2, BIC2	 05H8247	
85E5 to 85E8	**3495 Emergency stop messages**		

Figure 24 (Page 78 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
85E9	**Emergency stop occurred, safety circuit failed**		
	Action Redundant safety circuits are provided through the door interlock switches. When this error is logged, one of the circuits shows that a front door is open while the other shows that all doors are closed. 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Supplemental Power Control, SPC (9-16 frames only)	05H7993	30
	Door interlock switch	62G2745	27
	Door interlock card, DIL	05H7875	18
	Mach Intf Ctrl Card, MIC - check 5 fuses		15
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Door interlock jumper	62G1215	9
	Secondary FRU Group		
	DU/SU door interlock cable	62G1218	9
	SPC to DIL door interlock cable (9-16 frames only)	05H8086	9
	BIC P6 to DIL P1 CU door interlock cable	62G1187	9
	MIC1 P6 or LPC P6 to BIC P7 DC ctrl cable	62G1180	5
	LPC card (if single LM)	05H8143	3
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	DI/DO Card, DI/DO	61G9946	2
	Bulkhead interconnect card, BIC	*******	1
	DI/DO P1,P2 to MIC P5/P4 cable	62G1178	1
85EA to 85EE	**Not used**		
85EF	**An emergency stop condition occurred, undetermined cause**		
	Action 1. Check the DC present light on the front of the 36V power supply when library power is on. If the light is on, the supply is OK. If the light is off, go to error code 2BF3 and test the power supply. 2. Check for a dropped cartridge on the rail. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		51
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	24/36V to MIC P2, P3 DC power cable	05H8093	28
	DI/DO card, DI/DO	61G9946	12
	Secondary FRU Group		
	LPC card (if single LM)	05H8143	8
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	2
85F0 to 85FF	**Library manager-low level interface support codes**		
8600 to 8603	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 79 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8604	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8605	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8606	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8607	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8608 to 860B	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
860C to 860D	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 80 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
860E	**ARTIC 0 hardware error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 0 card ARTIC 0 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
860F to 8614	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8615 to 8616	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8617	**ARTIC 1 hardware error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 1 card ARTIC 1 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
8618 to 8623	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8624 to 8625	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 81 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8626 to 8627	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8628 to 862A	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
862B to 862C	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
862D	**ARTIC 0 hardware error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 0 card ARTIC 0 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
862E to 8630	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8631	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 82 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8632	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8633 to 8636	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8637 to 863C	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
863D to 863E	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
863F	**ARTIC 1 hardware error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 1 card ARTIC 1 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
8640 to 8645	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 83 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8646 to 8648	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8649 to 864E	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
864F	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8650	**ARTIC 0 diagnostics failed during initialize**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 0 card ARTIC 0 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
8651	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8652	**ARTIC 1 diagnostics failed during initialize**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 1 card ARTIC 1 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —

Figure 24 (Page 84 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8653	**Device driver unable to read from ARTIC 0**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 0 card ARTIC 0 RS-422 card (if used)	******* 09F1937	77 23
	Secondary FRU Group —	—	—
8654	**Error detected on ARTIC 0 during reset**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 0 card ARTIC 0 RS-422 card (if used)	******* 09F1937	77 23
	Secondary FRU Group —	—	—
8655	**Device driver unable to read from ARTIC 1**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 1 card ARTIC 1 RS-422 card (if used)	******* 09F1937	77 23
	Secondary FRU Group —	—	—
8656	**Error detected on ARTIC 1 during reset**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 1 card ARTIC 1 RS-422 card (if used)	******* 09F1937	77 23
	Secondary FRU Group —	—	—
8657 to 865A	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
865B to 865D	**Library manager ARTIC internal message codes**		

Figure 24 (Page 85 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
865E	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
865F to 867F	**Not used**		
8680 to 8681	**Library manager ARTIC internal message codes**		
8682 to 86AF	**Not used**		
86B0 to 86B2	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
86B3 to 86BF	**Not used**		
86C0 to 86C2	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
86C3 to 86CF	**Not used**		
86D0 to 86DA	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
86DB to 86DD	**Library manager ARTIC internal message codes**		
86DE	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
86DF to 86E0	**Library manager ARTIC internal message codes**		

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Error Code	Description and FRU Groups	Part Number	Probable Cause %
86E1 to 86EB	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
86EC to 86EF	**Not used**		
86F0	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
86F1 to 86FD	**Not used**		
86FE	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
86FF	**Not used**		
8700 to 871E	**Library manager ARTIC internal message codes**		
871F to 872B	**Not used**		
872C	**Library manager ARTIC internal message codes**		
872D to 872F	**Not used**		
8730 to 8737	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8738 to 8739	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
873A to 874F	**Not used**		

Figure 24 (Page 87 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8750 to 8751	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8752	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8753	**Library manager ARTIC internal message codes**		
8754	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8755	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8756	**Library manager ARTIC internal message codes**		
8757	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8758	**Library manager ARTIC internal message codes**		
8759	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 88 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
875A to 875B	**ARTIC 0 hardware error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 0 card ARTIC 0 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
875C	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
875D	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
875E	**Library manager ARTIC internal message codes**		
875F to 8760	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8761	**Library manager ARTIC internal message codes**		
8762 to 8763	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8764 to 8765	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8766	**Library manager ARTIC internal message codes**		

Figure 24 (Page 89 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8767 to 876A	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
876B	**Library manager ARTIC internal message codes**		
876C	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
876D	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
876E	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
876F	**Library manager ARTIC internal message codes**		
8770	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8771	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8772	**Library manager ARTIC internal message codes**		
8773	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 90 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8774	**Library manager ARTIC internal message codes**		
8775 to 8776	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8777	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8778	**Library manager ARTIC internal message codes**		
8779	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
877A	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
877B	**Library manager ARTIC internal message codes**		
877C	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
877D	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
877E	**Library manager ARTIC internal message codes**		

Figure 24 (Page 91 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
877F to 8781	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8782 to 8783	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8784 to 8785	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8786	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8787	**Library manager ARTIC internal message codes**		
8788	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8789	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
878A	**Library manager ARTIC internal message codes**		
878B to 878C	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 92 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
878D	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
878E	**ARTIC 1 hardware error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 1 card ARTIC 1 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
878F to 8791	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8792	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8793	**Library manager ARTIC internal message codes**		
8794	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8795	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8796	**Library manager ARTIC internal message codes**		

Figure 24 (Page 93 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8797	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8798	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8799	**Library manager ARTIC internal message codes**		
879A	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
879B	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
879C	**Library manager ARTIC internal message codes**		
879D	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
879E	**Not used**		
879F	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 94 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
87A0	**Configure port indicates wrong ARTIC daughter card**		
	Action This failure indicates that the wrong daughter card is present for the requested port configuration. Example: a direct attach host port is trying to be configured on a RS-422 ARTIC port. The modifier (see error log record) indicates the failing port number in the third character and the return code in the last character. The return code is 6 for trying to configure a direct attach host on a RS-422 port or 7 for trying to configure a tape subsystem on a RS-232 port. 1. Verify that the direct attach hosts and tape subsystems are connected to the correct ARTIC ports. 2. Verify that the daughter card and SCC modules are installed correctly on the ARTIC multiport card (if single LM). 3. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on the ARTIC cards. If a diagnostic test fails, replace FRU(s) as directed. 4. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC card ARTIC RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
87A1	**Library manager ARTIC internal message codes**		
87A2	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87A3	**Library manager ARTIC internal message codes**		
87A4	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87A5	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87A6	**Library manager ARTIC internal message codes**		
87A7	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87A8	**Not used**		

Figure 24 (Page 95 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
87A9	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87AA to 87AB	**ARTIC 1 hardware error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 1 card ARTIC 1 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
87AC	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87AD to 87AE	**Not used**		
87AF to 87B0	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87B1	**Library manager ARTIC internal message codes**		
87B2 to 87B3	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 96 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
87B4 to 87B5	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87B6	**Library manager ARTIC internal message codes**		
87B7	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87B8 to 87BB	**Not used**		
87BC	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87BD	**Not used**		
87BE	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87BF	**Library manager ARTIC internal message codes**		
87C0	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87C1	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 97 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
87C2	**Library manager ARTIC internal message codes**		
87C3	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87C4 to 87C6	**Not used**		
87C7	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87C8	**Library manager ARTIC internal message codes**		
87C9	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87CA	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87CB	**Library manager ARTIC internal message codes**		
87CC	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87CD	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87CE	**Library manager ARTIC internal message codes**		

Figure 24 (Page 98 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
87CF	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87D0 to 87D1	**Not used**		
87D2	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87D3	**Library manager ARTIC internal message codes**		
87D4 to 87D5	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87D6	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87D7	**Library manager ARTIC internal message codes**		
87D8	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87D9	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87DA	**Library manager ARTIC internal message codes**		

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Error Code	Description and FRU Groups	Part Number	Probable Cause %
87DB	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87DC	**Not used**		
87DD	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87DE	**ARTIC 1 hardware error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 1 card ARTIC 1 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
87DF	**Not used**		
87E0 to 87E1	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87E2	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87E3	**Library manager ARTIC internal message codes**		
87E4	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 100 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
87E5	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87E6	**Library manager ARTIC internal message codes**		
87E7	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87E8	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87E9	**Library manager ARTIC internal message codes**		
87EA	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87EB	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87EC	**Library manager ARTIC internal message codes**		
87ED	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
87EE to 87FF	**Not used**		
8800 to 8827	**Library manager ARTIC internal message codes**		

Figure 24 (Page 101 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8828	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8829 to 882B	**Library manager ARTIC internal message codes**		
882C to 882F	**Not used**		
8830 to 8834	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8835 to 8836	**Library manager ARTIC internal message codes**		
8837 to 8839	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
883A to 883B	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
883C	**Library manager ARTIC internal message codes**		
883D	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
883E	**Library manager ARTIC internal message codes**		

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Error Code	Description and FRU Groups	Part Number	Probable Cause %
883F	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8840 to 884F	**Not used**		
8850 to 8851	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8852	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8853	**Library manager ARTIC internal message codes**		
8854	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8855	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8856	**Library manager ARTIC internal message codes**		
8857	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

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Error Code	Description and FRU Groups	Part Number	Probable Cause %
8858 to 885C	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
885D to 885E	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
885F	**Library manager ARTIC internal message codes**		
8860	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8861 to 8862	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8863	**Library manager ARTIC internal message codes**		
8864 to 8865	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8866 to 8867	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8868	**Library manager ARTIC internal message codes**		
8869 to 886A	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 104 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
886B to 8872	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8873	**Library manager ARTIC internal message codes**		
8874 to 8875	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8876	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8877 to 8878	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8879 to 887A	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
887B	**Library manager ARTIC internal message codes**		
887C	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
887D	**Library manager ARTIC internal message codes**		
887E to 887F	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

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Error Code	Description and FRU Groups	Part Number	Probable Cause %
8880	**Library manager ARTIC internal message codes**		
8881	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8882	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8883	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8884	**Library manager ARTIC internal message codes**		
8885	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8886	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8887	**Library manager ARTIC internal message codes**		
8888	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8889	**Library manager ARTIC internal message codes**		

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Error Code	Description and FRU Groups	Part Number	Probable Cause %
888A to 888B	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
888C	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
888D	**Library manager ARTIC internal message codes**		
888E	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
888F	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8890	**Library manager ARTIC internal message codes**		
8891	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8892	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8893	**Library manager ARTIC internal message codes**		
8894	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

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Error Code	Description and FRU Groups	Part Number	Probable Cause %
8895	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8896	**Library manager ARTIC internal message codes**		
8897 to 8899	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
889A	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
889B	**Library manager ARTIC internal message codes**		
889C	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
889D to 889E	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
889F	**Library manager ARTIC internal message codes**		
88A0 to 88A1	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88A2	**Library manager ARTIC internal message codes**		

Figure 24 (Page 108 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
88A3 to 88A5	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88A6	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88A7	**Library manager ARTIC internal message codes**		
88A8	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88A9	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88AA	**Library manager ARTIC internal message codes**		
88AB	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88AC	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88AD	**Library manager ARTIC internal message codes**		
88AE	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		

Figure 24 (Page 109 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
88AF	**Not used**		
88B0 to 88B4	**Library manager ARTIC internal message codes**		
88B5 to 88B8	**Not used**		
88B9 to 88BD	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88BE	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88BF	**ARTIC 1 hardware error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group ARTIC 1 card ARTIC 1 RS-422 card (if used)	 ******* 09F1937	 77 23
	Secondary FRU Group —	 —	 —
88C0	**Not used**		
88C1 to 88C2	**Library manager ARTIC internal message codes**		
88C3 to 88C7	**Not used**		
88C8 to 88D3	**Library manager ARTIC internal message codes**		
88D4 to 88DF	**Not used**		

Figure 24 (Page 110 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
88E0	**ARTIC 0 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88E1	**Library manager ARTIC internal message codes**		
88E2	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88E3	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88E4	**Library manager ARTIC internal message codes**		
88E5 to 88E6	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88E7 to 88EF	**Not used**		
88F0 to 88F5	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
88F6 to 88FF	**Not used**		
8900	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8901 to 890F	**Not used**		

Figure 24 (Page 111 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8910 to 8919	**Library manager ARTIC internal message codes**		
891A	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
891B to 891E	**Library manager ARTIC internal message codes**		
891F	**Not used**		
8920	**Library manager ARTIC internal message codes**		
8921 to 892F	**Not used**		
8930	**ARTIC 0 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 0. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8931	**Library manager ARTIC internal message codes**		
8932	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8933	**ARTIC 1 hardware or code error**		
	Action 1. Go to “ARTIC Diagnostics” on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8934	**Library manager ARTIC internal message codes**		
8935	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8936 to 893F	**Not used**		
8940	**Library manager ARTIC internal message codes**		

Figure 24 (Page 112 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
8941	**ARTIC 1 hardware or code error**		
	Action 1. Go to "ARTIC Diagnostics" on page DIAG-24 and run the diagnostic tests on ARTIC card 1. If a diagnostic test fails, replace FRU(s) as directed. **Note:** Before replacing FRUs, ensure that all cards and cables are properly seated. 2. If the card tests OK, select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8942	**Library manager ARTIC internal message codes**		
8943	**Library manager ARTIC code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
8944 to 894F	**Not used**		
8950 to 8951	**Library manager ARTIC internal message codes**		
8952 to 8FFF	**Not used**		
9000 to 9FFF	**Library manager-Host/operator interface codes**		
A000 to A0BB	**Library manager-RAS interface codes**		
A0BC	**Library Manager A primary hard drive failed**		
	Action Go to "Procedure: Analyze a Mirrored Hard Drive Problem" on page START-18.		
A0BD	**Library Manager A mirror hard drive failed**		
	Action Go to "Procedure: Analyze a Mirrored Hard Drive Problem" on page START-18.		
A0BE	**Library Manager B primary hard drive failed**		
	Action Go to "Procedure: Analyze a Mirrored Hard Drive Problem" on page START-18.		
A0BF	**Library Manager B mirror hard drive failed**		
	Action Go to "Procedure: Analyze a Mirrored Hard Drive Problem" on page START-18.		
A0C0 to A120	**Library manager-RAS interface codes**		

Figure 24 (Page 113 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
A121	**Rack get/put diagnostic, initial get from rack failed Gripper 1**		
	Action 1. Go to "Procedure: Analyze Power Problems in the Library Subsystem" on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Pivot belt	34G9342	23
	Gripper 1 - Reach belt	34G9329	20
	Gripper 1 - Grip assembly	05H8107	11
	Secondary FRU Group		
	Pivot gear-motor	05H7877	6
	Pivot front sensor	05H8407	6
	Pivot rear sensor	05H8407	6
	Servo control card, SRV	61G9945	6
	Gripper 1 - Grip card and cable assembly	34G9677	4
	Gripper 1 - Reach gear-motor	05H7877	4
	Picker card, GRI	05H8492	3
	Pivot detent arm assembly	34G9360	2
	Pivot assembly	05H7995	2
	Gripper 1 - Thumb open sensor	94F6454	2
	Pivot flex cable	*******	1
	BIC P1 to XAX P1, X-axis flex cable	*******	1
	Mach Intf Ctrl Card, MIC - check 5 fuses		1
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 1 - Reach card, RCH	*******	1
	Gripper 1 - Reach belt idler assembly	34G9335	1
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	Pivot sensor cable	*******	1
	DI/DO card, DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
A122 to A133	**Library manager-RAS interface codes**		

Figure 24 (Page 114 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
A134	**Rack get/put diagnostic, initial get from rack failed Gripper 2**		
	Action 1. Go to “Procedure: Analyze Power Problems in the Library Subsystem” on page START-27 and check for a 24V or 36V power supply problem before proceeding. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Pivot belt	34G9342	23
	Gripper 2 - Reach belt	34G9329	20
	Gripper 2 - Grip assembly	05H8107	11
	Secondary FRU Group		
	Pivot gear-motor	05H7877	6
	Pivot front sensor	05H8407	6
	Pivot rear sensor	05H8407	6
	Servo control card, SRV	61G9945	6
	Gripper 2 - Grip card and cable assembly	34G9677	4
	Gripper 2 - Reach gear-motor	05H7877	4
	Picker card, GRI	05H8492	3
	Pivot detent arm assembly	34G9360	2
	Pivot assembly	05H7995	2
	Gripper 2 - Thumb open sensor	94F6454	2
	Pivot flex cable	*******	1
	BIC P1 to XAX P1, X-axis flex cable	*******	1
	Mach Intf Ctrl Card, MIC - check 5 fuses		1
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Gripper 2 - Reach card, RCX	*******	1
	Gripper 2 - Reach belt idler assembly	34G9335	1
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	Pivot sensor cable	*******	1
	DI/DO card, DI/DO	61G9946	1
	RCH P5 to RCX P3 cable	05H4058	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
A135 to A1AA	**Library manager-RAS interface codes**		

Figure 24 (Page 115 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
A1AB	**Timeout waiting for response after loading tape drive**		
	Action 1. Run test interface - tape subsystem 2. If the interface tests OK, go to the appropriate tape subsystem maintenance information Start section and checkout the tape subsystem. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Library attachment card: 3490E library attachment 3590 Card pack assembly ARTIC card ARTIC RS-422 card (if used)	 62G2320 45G0100 ******* 09F1937	 55 30 11
	Secondary FRU Group Tape subsystem to library manager cable ARTIC multiport cable Library attachment card cable: 3490E library attachment	 ******* 00F5524 62G1363	 2 1 1
A1AC to A1B5	**Library manager-RAS interface codes**		
A1B6	**Bad rewind/unload command response from the tape drive**		
	Action 1. Run test interface - tape subsystem 2. If the interface tests OK, go to the appropriate tape subsystem maintenance information START section and checkout the tape drive.		
A1B7 to A1D6	**Library manager-RAS interface codes**		
A1D7 A1D8	**No 3490 CE cartridge in library**		
	Action Locate your 3490 CE cartridge and place it in CE cell 1A20.		
A1D9 A1DA	**No 3590 CE cartridge in library**		
	Action Locate your 3590 CE cartridge and place it in CE cell 1A19.		
A1DB to A210	**Library manager-RAS interface codes**		
A211	**No CE cartridges are in the library**		
	Action Locate your CE cartridge and place it in the CE cell, 1A20.		
A212 to A3A6	**Library manager-RAS interface codes**		
A3A7	**Mount failed on online drive GET/PUT test**		
	Action 1. Run test interface - tape subsystem 2. If the interface tests OK, go to the appropriate tape subsystem maintenance information START section and checkout the tape drive.		
A3A8 to A3AE	**Library manager-RAS interface codes**		

Figure 24 (Page 116 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
A3AF	**Demount failed on online drive GET/PUT test**		
	Action 1. Run test interface - tape subsystem 2. If the interface tests OK, go to the appropriate tape subsystem maintenance information START section and checkout the tape drive.		
A3B0 to A3B2	**Library manager-RAS interface codes**		
A3B3	**Rewind/unload failed on online drive GET/PUT test**		
	Action 1. Run test interface - tape subsystem 2. If the interface tests OK, go to the appropriate tape subsystem maintenance information START section and checkout the tape drive.		
A3B4 to A738	**Library manager-RAS interface codes**		
A739	**The LM primary link test failed**		
	Action 1. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group LM A Primary link EtherJet adapter LM B Primary link EtherJet adapter	 86H2423 86H2423	
	Secondary FRU Group Primary link ethernet cable	 05H2914	
A73A to A7B2	**Library manager-RAS interface codes**		
A7B3	**The LM alternate link test failed**		
	Action 1. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group LM A Alternate link EtherJet adapter LM B Alternate link EtherJet adapter	 86H2423 86H2423	
	Secondary FRU Group Alternate link ethernet cable	 05H2914	
A7B4 to A7FF	**Library manager-RAS interface codes**		
A800 to A8A4	**Diagnostic error codes**		
A8A5	**LM host port diagnostic error**		
	Action Go to “Procedure: Analyze a 3494 Interface Problem with the Host or Tape Subsystem” on page START-15.		

Figure 24 (Page 117 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
A8A6	**Tape subsystem diagnostic, test message error or cancelled**		
	Action 1. Follow the procedure in “ARTIC Diagnostics” on page DIAG-24 to checkout the RS-422 port for the failing tape subsystem. 2. If the port tests OK, go to the appropriate tape subsystem maintenance information START section and checkout the tape drive. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Library attachment card: 3490E library attachment 3590 Card pack assembly ARTIC card ARTIC RS-422 card (if used)	 62G2320 45G0100 ******* 09F1937	 55 30 11
	Secondary FRU Group Tape subsystem to library manager cable ARTIC multiport cable Library attachment card cable: 3490E library attachment	 ******* 00F5524 62G1363	 2 1 1
A8A7 to A8B7	**Diagnostic error codes**		
A8B8	**Tape subsystem diagnostic, unable to initialize port**		
	Action 1. Follow the procedure in “ARTIC Diagnostics” on page DIAG-24 to checkout the RS-422 port for the failing tape subsystem. 2. If the port tests OK, go to the appropriate tape subsystem maintenance information START section and checkout the tape drive. 3. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group Library attachment card: 3490E library attachment 3590 Card pack assembly ARTIC card ARTIC RS-422 card (if used)	 62G2320 45G0100 ******* 09F1937	 55 30 11
	Secondary FRU Group Tape subsystem to library manager cable ARTIC multiport cable Library attachment card cable: 3490E library attachment	 ******* 00F5524 62G1363	 2 1 1
A8B9 to A8BA	**Diagnostic error codes**		
A8BB A8BC	**LM host port diagnostic error**		
	Action Go to “Procedure: Analyze a 3494 Interface Problem with the Host or Tape Subsystem” on page START-15.		
A8BD to A8EF	**Diagnostic error codes**		

Figure 24 (Page 118 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
A8F0	**Bar-code reader interface test, bar-code reader check failed**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Bar-code reader	05H7772	80
	System board (library manager)		14
	PS/ValuePoint	92F0396	
	Industrial Computer	*******	
	Secondary FRU Group		
	Pivot flex cable or Barcode reader card (if separate)	*******	2
	BIC P1 to XAX P1, X-axis flex cable	*******	2
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	1
	Picker card	05H8492	1
	LM comm port B to LCC P7 or MIC2-4 P16	62G1181	1
	LCC card (if installed)	50G1053	1
	Mach Intf Ctrl Card, MIC2-4	05H8784	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
A8F1 to A950	**Diagnostic error codes**		
A951	**I/O station diagnostic, error 1**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Convenience I/O door closed sensor	6262886	44
	Convenience I/O cable		37
	10 Cartridge CIO	09G7554	
	30 Cartridge CIO	62G1415	
	Op panel card, LPN	61G9910	14
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		4
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	DI/DO card, DI/DO	61G9946	1
	LPC card (if single LM)	05H8143	1
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
A952	**Diagnostic error codes**		

Figure 24 (Page 119 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
A953	**I/O station diagnostic, error 2**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Convenience I/O door closed sensor	6262886	44
	Convenience I/O cable		37
	10 Cartridge CIO	09G7554	
	30 Cartridge CIO	62G1415	
	Op panel card, LPN	61G9910	14
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		4
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	DI/DO card, DI/DO	61G9946	1
	LPC card (if single LM)	05H8143	1
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
A954 to AB79	**Diagnostic error codes**		
AB80 to AB81	**Sensors wrap test, short, failed**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		77
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	DI/DO card, DI/DO	61G9946	21
	Secondary FRU Group		
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	2
AB82	**Reserved**		
AB83 to AB86	**Sensors wrap test, short, failed**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		77
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	DI/DO card, DI/DO	61G9946	21
	Secondary FRU Group		
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	2
AB87 to ABA6	**Sensors wrap test, mid, failed**		
	Primary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		100
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Secondary FRU Group		
	–	–	–

Figure 24 (Page 120 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
ABA7 to ABC6	**Sensors wrap test, long, failed**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	BIC P1 to XAX P1, X-axis flex cable	*******	44
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	29
	Picker card, GRI	05H8492	19
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		5
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
ABC7 to ABCA	**Wrap test code error**		
	Action Select **Copy files** on the Service pulldown menu of the Service action bar. Copy the transaction log(s) and error log(s) for the time period of the error plus any associated dump files to a diskette. Contact your support center and send the files to them.		
ABCB to ABCE	**Sensors wrap test, long, failed**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	BIC P1 to XAX P1, X-axis flex cable	*******	44
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	29
	Picker card, GRI	05H8492	19
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		5
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card, BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card, XAX	05H8142	1
ABCF	**Wrap test detected invalid picker card ID**		
	Action Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	DI/DO card, DI/DO	61G9946	25
	Picker card, GRI	05H8492	25
	Mach Intf Ctrl Card, MIC - check 5 fuses		15
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	BIC P1 to XAX P1, X-axis flex cable	*******	10
	XAX P2 to GRI P1, Y-axis flex cable	61G9685	10
	Secondary FRU Group		
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	3
	LCC card (if installed)	50G1053	3
	Bulkhead interconnect card, BIC	*******	3
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	3
	X/Y-axis card, XAX	05H8142	3
ABD0 to ABFF	**Not used**		

Figure 24 (Page 121 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
AC00 to AF7F	**Library manager - RAS interface codes**		
AF80	**The NVRAM test failed**		
	Action 1. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	UEP card	05H8241	95
	Secondary FRU Group		
	LM A Serial Port B to UEP J10 cable	05H8264	5
	LM B Serial Port B to UEP J20 cable	05H8265	
AF81 to AFFE	**Library manager - RAS interface codes**		
AFFF	**Tape drive reported failure to library manager**		
	Action The check code should be displayed on the tape drive display. Go to the appropriate tape subsystem maintenance information START section to continue problem analysis. If you are unable to view the drive display, you can select **View logs** on the Utilities pulldown menu on the library manager service action bar and search for the AFFF entry in the appropriate error log. The drive error information is provided in the log entry.		
B000 to BFFF	**Library Manager - database manager codes**		
	Action If you are getting many BDxx errors, go to “CHKDSK Procedure” on page CARR-101 and checkout your hard disk drives.		
C000 to C0C2	**Library manager predictive maintenance codes**		
C0C3	**Convenience I/O station lock error threshold exceeded**		
	Action Check for loose solenoid or cable connector.		
	Primary FRU Group		
	Convenience I/O door locked solenoid	94F6802	48
	Convenience I/O cable		28
	10 Cartridge CIO	09G7554	
	30 Cartridge CIO	62G1415	
	Convenience I/O door locked sensor	05H8407	11
	Operator panel card - LPN	61G9910	10
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		3
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	DI/DO card - DI/DO	61G9946	1
	LPC card (if single LM)	05H8143	1
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	MIC1 or LPC P7 to LPN P1 Op panel cable	62G1182	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 122 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
C0C4	**Convenience I/O station unlock error threshold exceeded**		
	Action Check for loose solenoid or cable connector.		
	Primary FRU Group		
	Convenience I/O door locked solenoid	94F6802	48
	Convenience I/O cable		28
	10 Cartridge CIO	09G7554	
	30 Cartridge CIO	62G1415	
	Convenience I/O door locked sensor	05H8407	11
	Operator panel card - LPN	61G9910	10
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		3
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	DI/DO card - DI/DO	61G9946	1
	LPC card (if single LM)	05H8143	1
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	MIC1 or LPC P7 to LPN P1 Op panel cable	62G1182	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
C0C5	**Convenience I/O station lock error threshold exceeded**		
	Action Check for loose solenoid or cable connector.		
	Primary FRU Group		
	Convenience I/O door locked solenoid	94F6802	48
	Convenience I/O cable		28
	10 Cartridge CIO	09G7554	
	30 Cartridge CIO	62G1415	
	Convenience I/O door locked sensor	05H8407	11
	Operator panel card - LPN	61G9910	10
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		3
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	DI/DO card - DI/DO	61G9946	1
	LPC card (if single LM)	05H8143	1
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	MIC1 or LPC P7 to LPN P1 Op panel cable	62G1182	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 123 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
C0C6	**Convenience I/O station unlock error threshold exceeded**		
	Action Check for loose solenoid or cable connector.		
	Primary FRU Group		
	Convenience I/O door locked solenoid	94F6802	48
	Convenience I/O cable		28
	10 Cartridge CIO	09G7554	
	30 Cartridge CIO	62G1415	
	Convenience I/O door locked sensor	05H8407	11
	Operator panel card - LPN	61G9910	10
	Secondary FRU Group		
	Mach Intf Ctrl Card, MIC - check 5 fuses		3
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	DI/DO card - DI/DO	61G9946	1
	LPC card (if single LM)	05H8143	1
	DSW card (if Model HA1 LM A)	05H8237	
	DBF card (if Model HA1 LM B)	05H8239	
	MIC1 or LPC P7 to LPN P1 Op panel cable	62G1182	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1
C0C7 C0C8	**ARTIC adapter error threshold exceeded**		
	Action C0C7 = ARTIC 1 (feature), C0C8 = ARTIC 0 1. Go to “Procedure: Analyze a 3494 Interface Problem with the Host or Tape Subsystem” on page START-15. 2. Before replacing FRUs, ensure that all cards and cables are properly seated.		
	Primary FRU Group		
	ARTIC card	*******	75
	ARTIC RS-422 card (if used)	09F1937	22
	Secondary FRU Group		
	ARTIC multiport cable	00F5524	3
C0C9	**Rack position error threshold exceeded**		
	Action Run Teach Current Configuration to re-teach the entire library		

Figure 24 (Page 124 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
C0CA	**Gripper error threshold exceeded - Gripper 1**		
	Action 1. Visually inspect the picker assembly for loose connections or components. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group.		
	Primary FRU Group		
	Gripper 1 - Grip assembly	05H8107	51
	Gripper 1 - Grip card/cable assembly	50G1041	19
	Secondary FRU Group		
	Gripper 1 - Thumb open sensor	94F6454	8
	Mach Intf Ctrl Card, MIC - check 5 fuses		6
	MIC1 card	61G9905	
	MIC2-4 card	05H8784	
	Pivot flex cable	*******	5
	BIC P1 to XAX P1, X-axis flex cable	*******	5
	Gripper 1 - Reach card, RCH	*******	2
	XAX P2 to GRI P1 - Y-axis flex cable	61G9685	2
	Picker card - GRI	05H8492	1
	DI/DO card - DI/DO	61G9946	1
	LCC card (if installed)	50G1053	1
	Bulkhead interconnect card - BIC	*******	1
	LCC P5 or MIC2-4 P1 to BIC P2, P3 cable	61G9676	1
	X/Y-axis card - XAX	05H8142	1
	DI/DO P1, P2 to MIC P5, P4 cable	62G1178	1

Figure 24 (Page 125 of 125). Reference Code to FRU List

Error Code	Description and FRU Groups	Part Number	Probable Cause %
C0CB	**Gripper error threshold exceeded - Gripper 2**		
	Action 1. Visually inspect the picker assembly for loose connections or components. 2. If the library has a MIC2-4 card and LM code 516.xx or above, use the DI/DO wrap tests to help isolate the failure as follows: a. Select the **DI/DO card** test under **Test interface** on the Service pulldown menu. b. Click on the **Wrap tests** button on the main screen (if not enabled, click on **Power On** button first), then select **Short wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the short wrap test fails, use the error code from the test to determine the failing FRU group. c. If the short wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Medium wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the medium wrap test fails, use the error code from the test to determine the failing FRU group. d. If the medium wrap test is OK, click on the **Wrap tests** button on the main screen, then select **Long wrap** under the Wrap Test Options and click on the **Test wrap** button. 1) If the long wrap test fails, use the error code from the test to determine the failing FRU group. e. If all of the wrap tests run OK, suspect the picker components (cards, motors, sensors) or the pivot flex cable if it is in the FRU group.		
	Primary FRU Group Gripper 2 - Grip assembly Gripper 2 - Grip card/cable assembly	 05H8107 50G1041	 51 19
	Secondary FRU Group Gripper 2 - Thumb open sensor Mach Intf Ctrl Card, MIC - check 5 fuses MIC1 card MIC2-4 card Pivot flex cable BIC P1 to XAX P1, X-axis flex cable Gripper 2 - Reach card, RCX XAX P2 to GRI P1 - Y-axis flex cable Picker card - GRI DI/DO card - DI/DO RCH P5 to RCX P3 cable LCC card (if installed) Bulkhead interconnect card - BIC LCC P5 or MIC2-4 P1 to BIC P2, P3 cable X/Y-axis card - XAX DI/DO P1, P2 to MIC P5, P4 cable	 94F6454 61G9905 05H8784 ******* ******* ******* 61G9685 05H8492 61G9946 05H4058 50G1053 ******* 61G9676 05H8142 62G1178	 8 6 5 5 2 2 1 1 1 1 1 1 1 1
C0CC to C7FF	**Not used**		
C800 to C8A5	**LM LAN host interface error**		
	Action Go to “Procedure: Analyze a 3494 Interface Problem with the Host or Tape Subsystem” on page START-15.		
C8A6 to C9FF	**Not used**		
CA00 to CA2A	**LM LAN host interface error**		
	Action Go to “Procedure: Analyze a 3494 Interface Problem with the Host or Tape Subsystem” on page START-15.		
CA2B to EFFF	**Not used**		
F000 to FFFF	**Library manager - control unit codes**		

Locations

The LOC section contains FRU location information for the IBM 3494 Tape Library Dataserver. See the CARR section for removal, replacement, and adjustment procedures.

IBM 3494 Tape Library Dataserver Overview

See Figure 25.

1 Control unit frame. (See also Figure 26 on page LOC-4.)

2 Drive unit frame

3 Storage unit frame

4 Door lock, operator access

5 Door handle, operator access

6 Convenience input/output station. (See also Figure 31 on page LOC-9.)

7 Operator panel. (See also Figure 45 on page LOC-23 and Figure 16 on page INTRO-39).

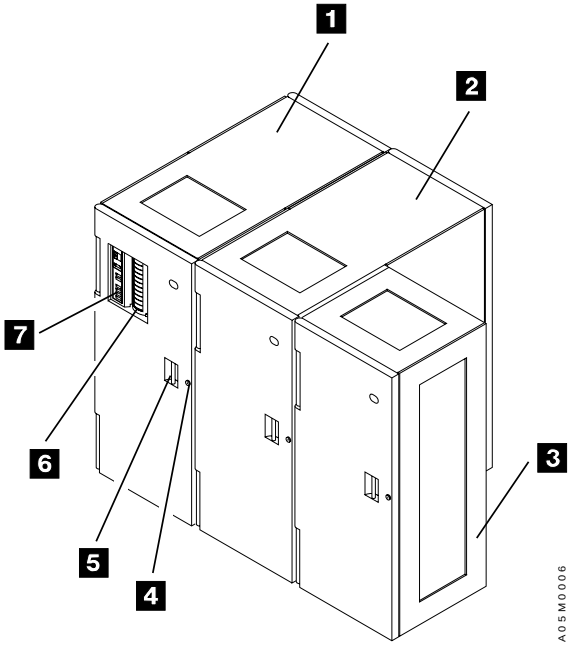


Figure 25. IBM 3494 Tape Library Dataserver

Model L1x Frame (Front View)

See Figure 26.

1. Convenience input/output station. (See also Figure 31 on page LOC-9.)
2. Operator panel card (LPN). (See also Figure 45 on page LOC-23.)
3. Door interlock switch
4. Door interlock card (DIL). The card is present on all types of frames. It is located and mounted the same way on all frames. (See also Figure 37 on page LOC-15.)
5. Storage Rack Assembly
6. Tape subsystem (3490E shown)
7. X-rail assembly
8. Cartridge accessor. (See also Figure 27 on page LOC-5.)
9. Storage Rack Assembly

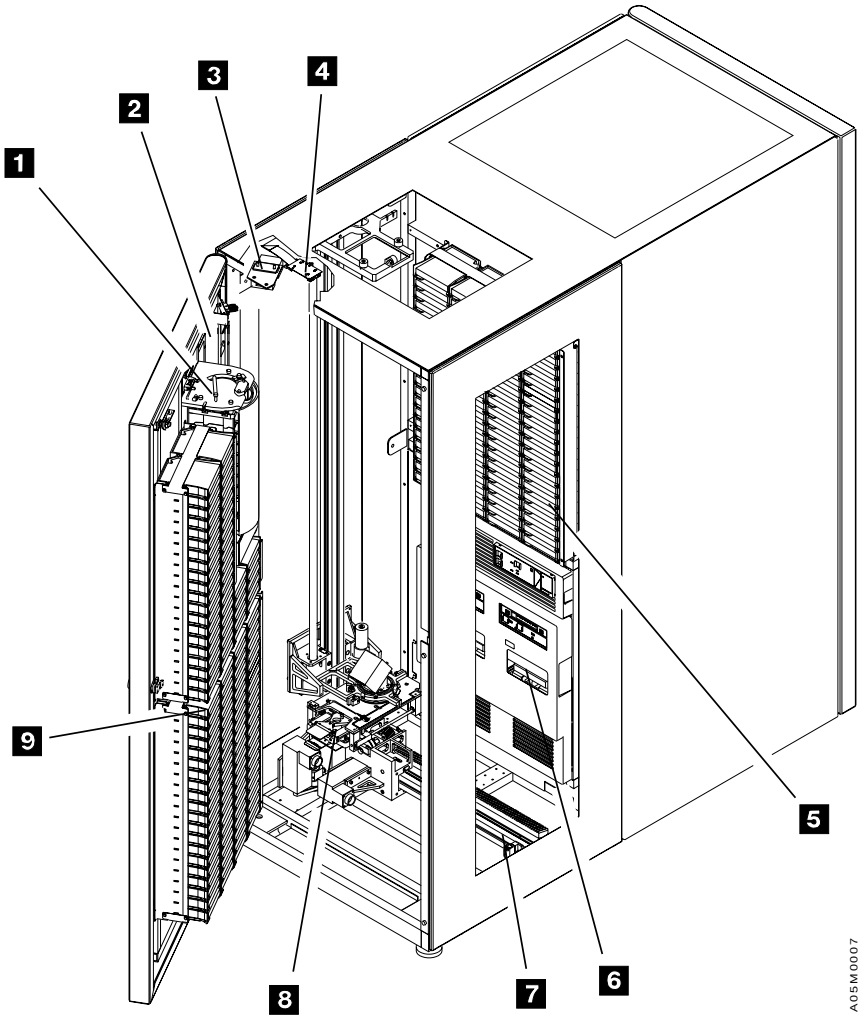


Figure 26. IBM 3494 Tape Library Dataserver Control Unit

Cartridge Accessor

See Figure 27.

1. Y-axis assembly. (See also Figure 28 on page LOC-6.)
2. Picker assembly. (See also Figure 29 on page LOC-7.)
3. X-rail assembly
4. X-axis assembly. (See also Figure 28 on page LOC-6.)

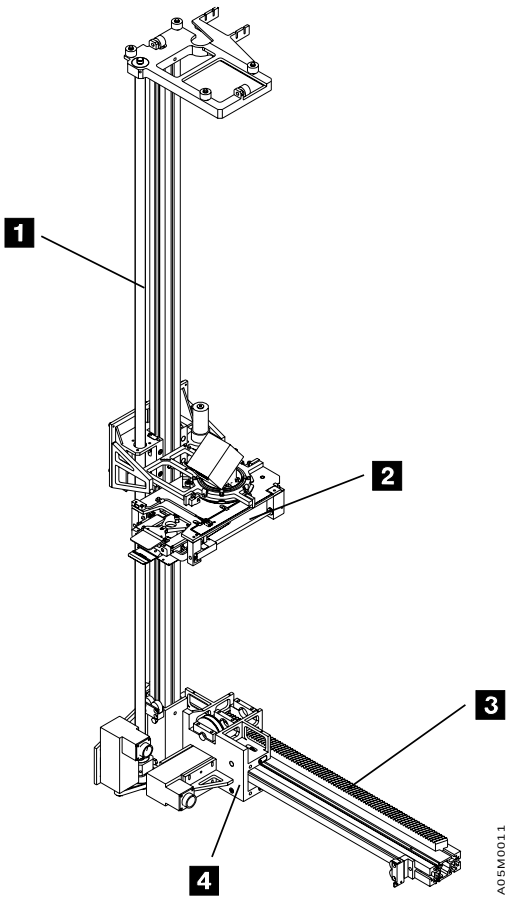


Figure 27. Cartridge Accessor

X-Axis and Y-Axis Assemblies

See Figure 28.

1. Y-axis flex cable
2. X-axis flex cable
3. Y-axis motor
4. Y-axis cable connector
5. X-axis motor
6. X-axis cable connector
7. X-axis pinion shaft
8. X-axis drive belt
9. X-axis rail rollers (2-top, 2 or 4-bottom)
10. X/Y-axis card (XAX). (See also Figure 50 on page LOC-28.)
11. Y-axis drive belt
12. X-axis home sensor
13. Y-axis home sensor
14. Bulkhead interconnect card (BIC). (See also Figure 35 on page LOC-13.)

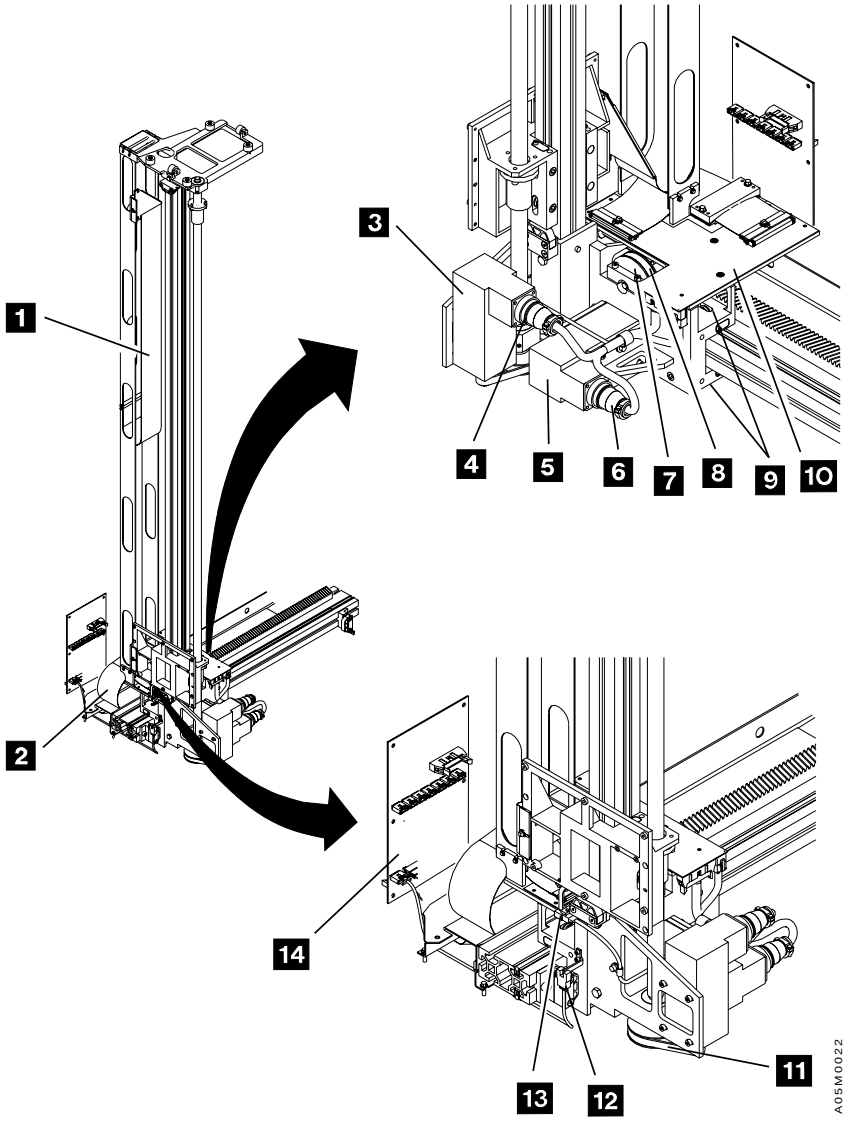


Figure 28. X-Axis and Y-Axis Assemblies

Picker Assembly

See Figure 29. (See also “Cartridge Accessor” on page LOC-5.)

1. Reach assembly
2. Reach gear motor
3. Reach card (RCH)
4. Grip assembly. (See also Figure 30 on page LOC-8.)
5. Reach belt idler assembly
6. Calibration sensor
7. Reach belt
8. Bar-code reader assembly
9. Picker card (GRI). (See also Figure 46 on page LOC-24.)
10. Pivot flex cable
11. Pivot gear motor
12. Pivot sensor cable
13. Pivot belt
14. Pivot detent arm
15. Pivot rear sensor
16. Pivot center sensor
17. Pivot front sensor
18. Reach Assembly 2 (optional feature)

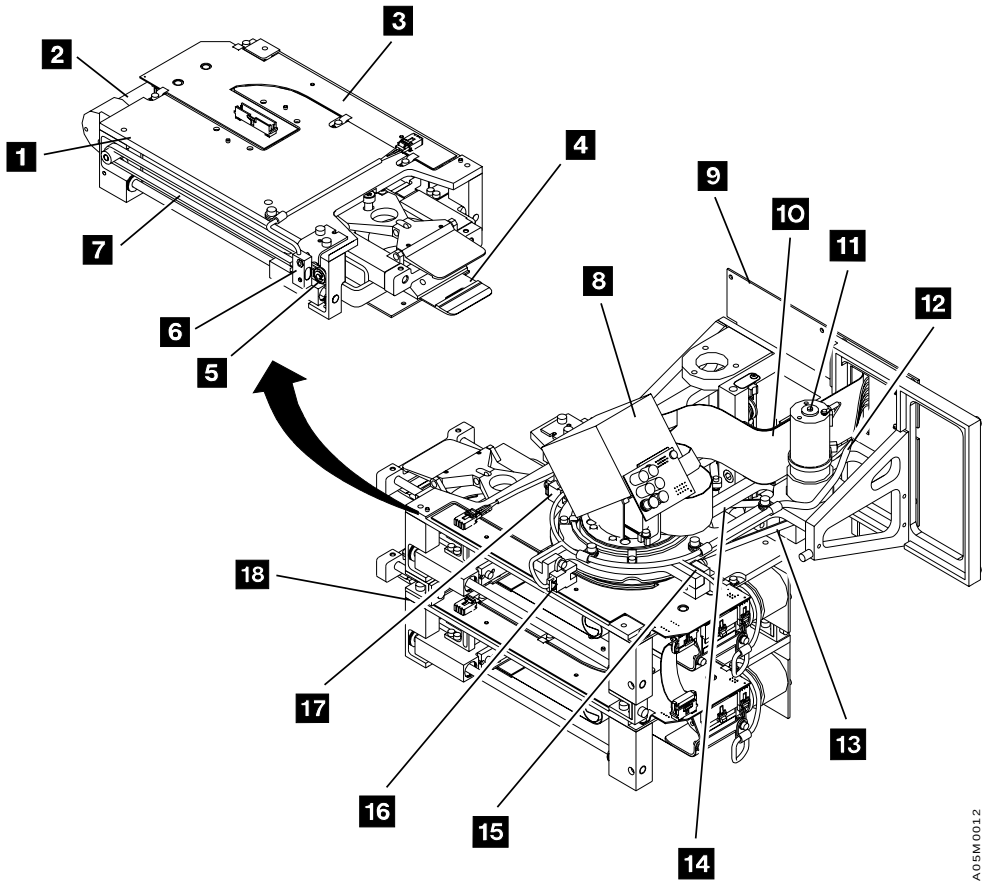


Figure 29. Picker Assembly

Grip Assembly

See Figure 30. (See also “Picker Assembly” on page LOC-7.)

1. Cartridge present sensor
2. Thumb open sensor
3. Reach compliance sensor
4. Cartridge seated sensor
5. Grip thumb
6. Grip finger
7. Grip card and cable assembly (GRP)
8. Grip thumb open solenoid
9. Reach end-of-travel flag

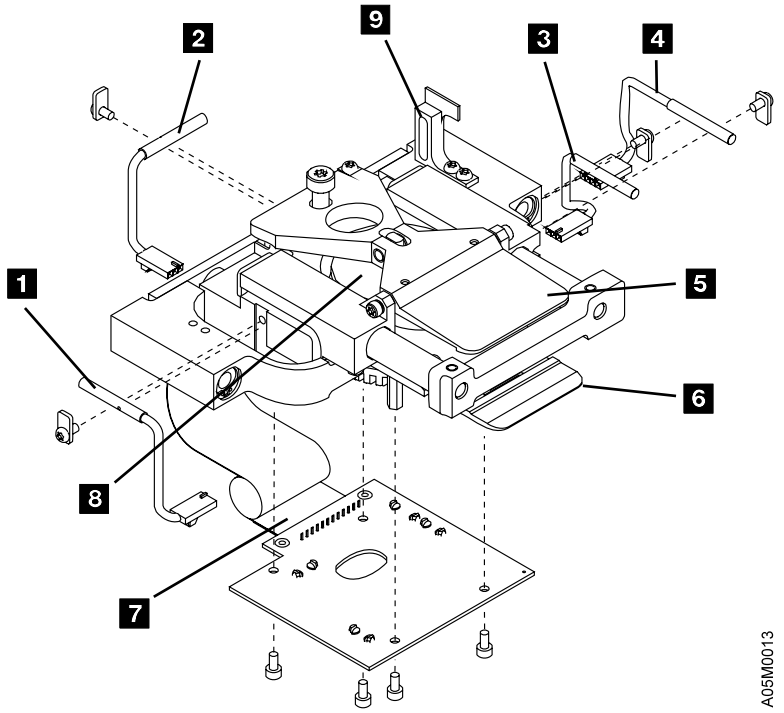


Figure 30. Grip Assembly

Convenience Input/Output Station

See Figure 31. (See also “IBM 3494 Tape Library Dataserver Overview” on page LOC-3.)

1	Convenience input/output station (10 cartridge feature shown)	5	Convenience I/O door closed sensor
2	Over-center spring (top)	6	Convenience I/O door locked sensor
3	Convenience I/O cartridge present sensor	7	Convenience I/O door lock solenoid
4	Over-center spring (bottom)	8	Convenience I/O cable

Note: The 30 cartridge convenience I/O station extends towards the bottom of the door and displaces all of the storage cells in columns C & D.

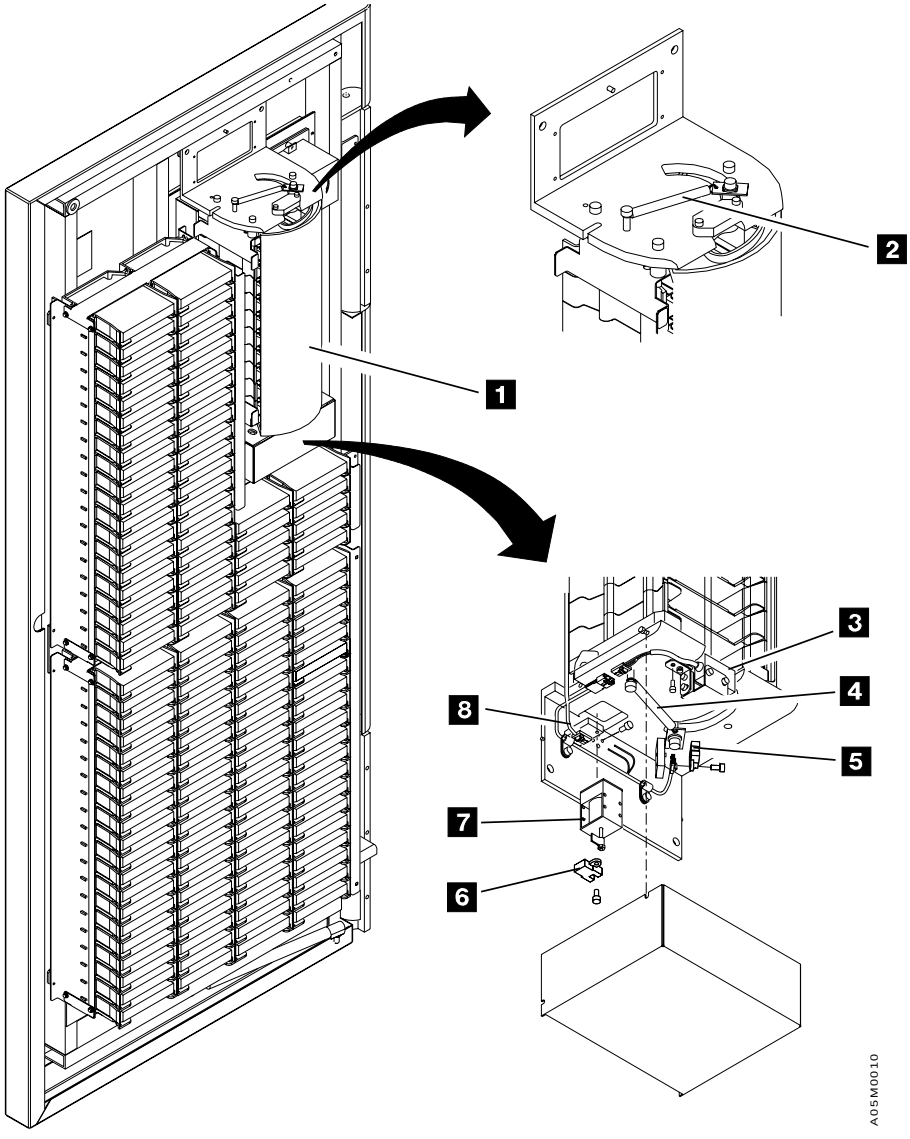


Figure 31. Convenience Input/Output Station

Model L1x Frame (Rear View)

See Figure 32.

1 Breakout box (ARTIC cable). (See also Figure 55 on page LOC-33.) On newer libraries, the box(es) are rotated 90° and mounted on a bracket.

2 Library interconnect card (LCC) (shown) or Library power control card (LPC). (See also Figure 41 on page LOC-19 for LCC or Figure 42 on page LOC-20 for LPC)

3 X-axis power amplifier. (See also Figure 51 on page LOC-29.)

4 Y-axis power amplifier. (See also Figure 51 on page LOC-29.)

5 Machine interface control card (MIC). (See also Figure 43 on page LOC-21 for MIC1 or Figure 44 on page LOC-22 for MIC2-4)

6 +24 V dc power supply

7 +36 V dc power supply

8 Library manager system unit. (See also Figure 56 on page LOC-34.)

9 Bulkhead interconnect card (BIC). (See also Figure 35 on page LOC-13.)

10 Power control compartment (PCC)

11 Remote power control card (RPC). (See Figure 48 on page LOC-26.)

12 Library manager keyboard

13 Library manager flat panel display

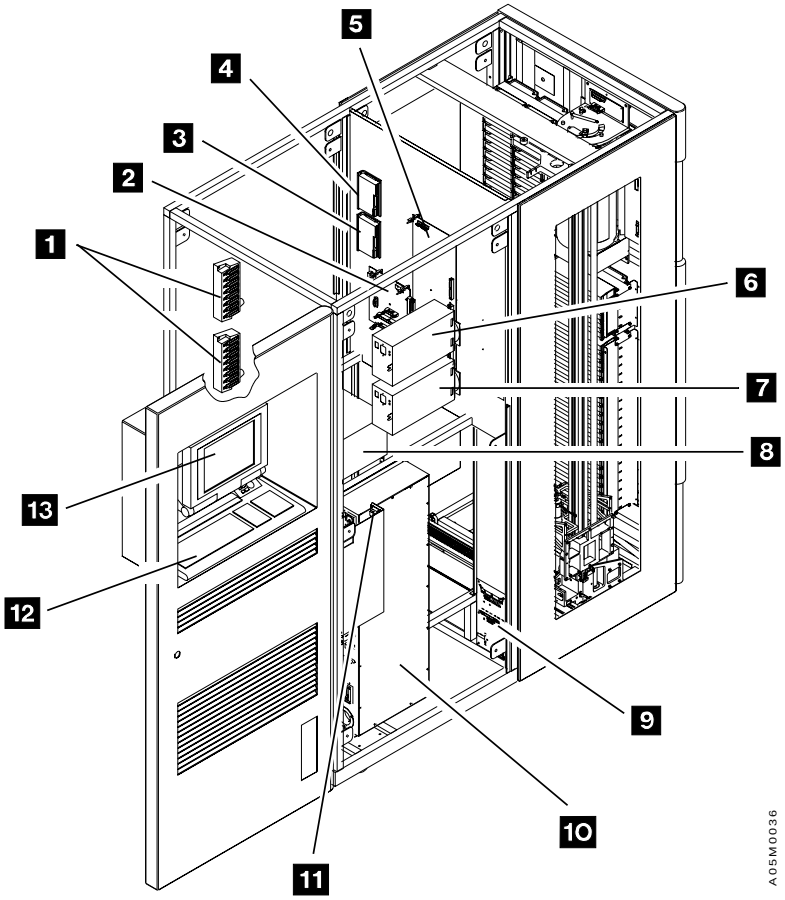


Figure 32. Control Unit Frame (Rear View)

Model L1x Frame with Model HA1 attached (Rear View)

Refer to “Model L1x Frame (Rear View)” on page LOC-10 for the common frame components.

See Figure 33.

1. Accessor A Machine Interface Control card (MIC4)
2. Accessor A Dual Switch card (DSW)
3. Unit Emergency Power card (UEP)

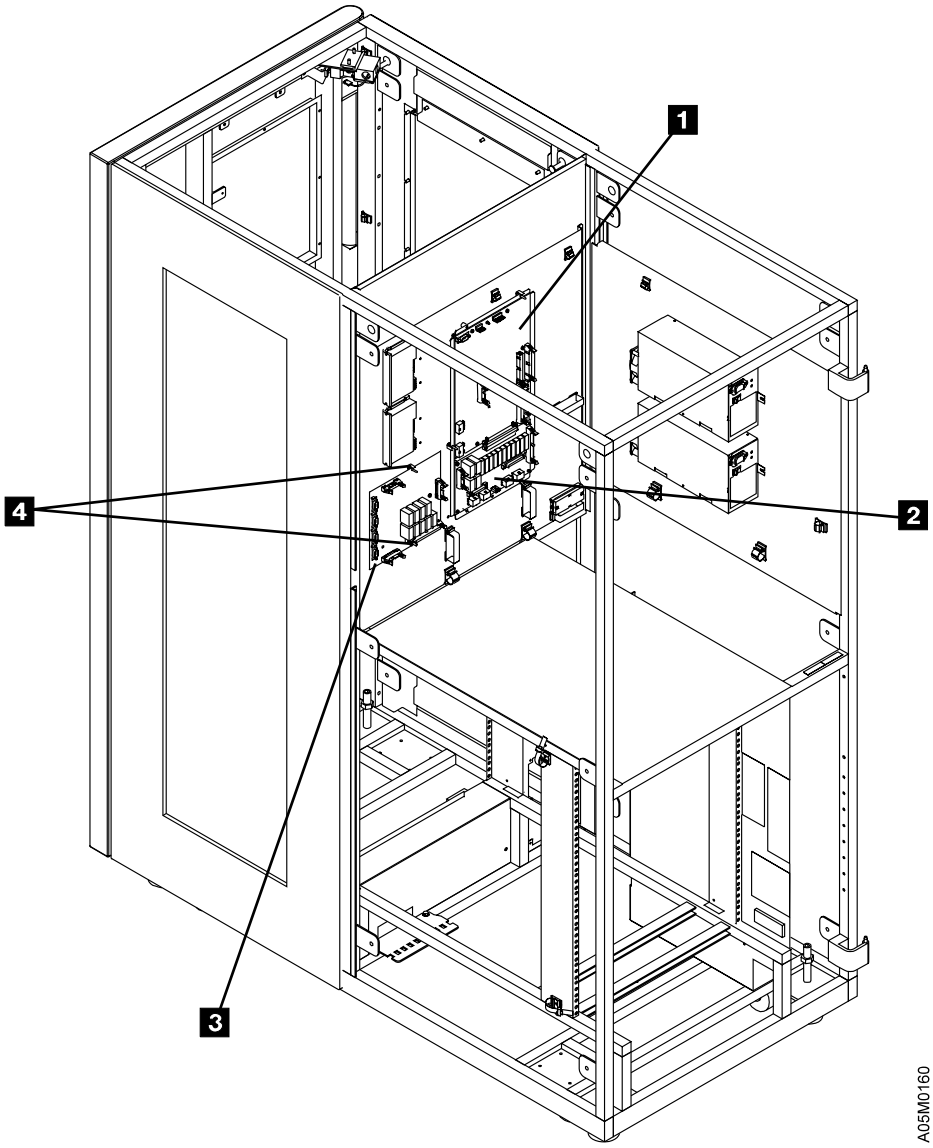


Figure 33. Model L1x Frame with Model HA1 attached (Rear View)

Model HA1 Right Service Bay Frame (Rear View)

Refer to “Model L1x Frame (Rear View)” on page LOC-10 for the common frame components.

See Figure 34.

1 Accessor B Machine Interface Control Card (MIC4)

2 Accessor B Dual B Frame Card (DBF)

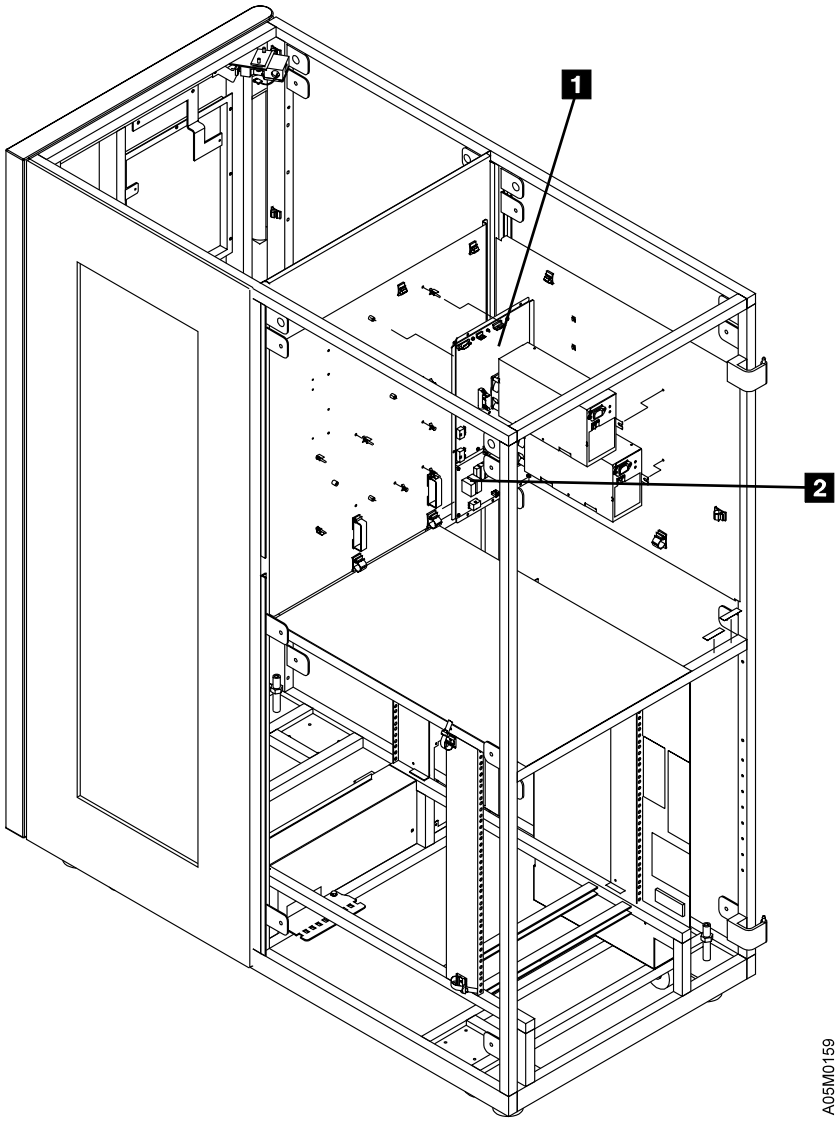


Figure 34. Model HA1 Right Service Bay Frame (Rear View)

Library Accessor Cards

Bulkhead Interconnect Card (BIC)

This card is used on single accessor libraries.

See Figure 35. (See also “X-Axis and Y-Axis Assemblies” on page LOC-6.)

1	P7 connector	5	P5 connector
2	P6 connector	6	P3 connector
3	PCC 8, PCC 7, PCC 6, PCC 5, PCC 4, PCC 3, and PCC 2 connectors	7	P4 connector
4	P1 connector (X-axis flex cable)	8	P2 connector

Note: Jumper P/N 62G1195 should be plugged into all unused PCC2 to PCC8 connectors.

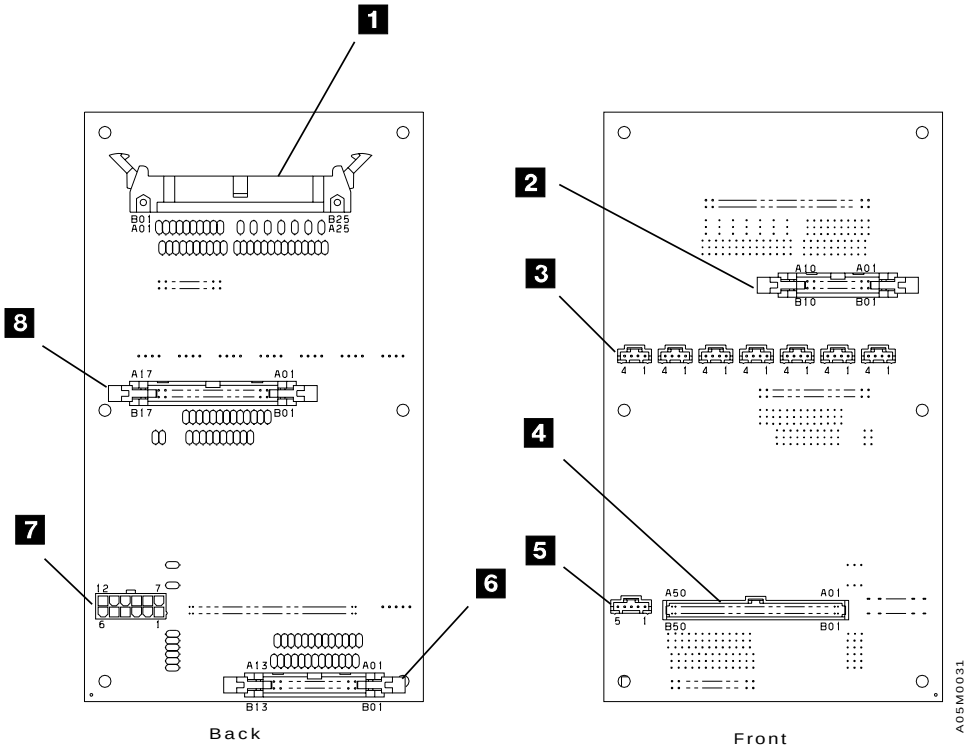


Figure 35. Bulkhead Interconnect Card (BIC)

Bulkhead Interconnect Card 2 (BIC2)

This card is used on dual accessor libraries.

See Figure 36. (See also “X-Axis and Y-Axis Assemblies” on page LOC-6.)

1	J7 connector	7	J1 connector
2	J24 connector	8	J5 connector
3	J23 connector	9	J3 connector
4	J6 connector	10	J4 connector
5	J8-J14, J26 connector (PCC 1-8)	11	J2 connector
6	J15-J21, J25 connector (PCC 9-16)	12	J22 connector

Note: Jumper P/N 62G1195 should be plugged into all unused PCC connectors, J8-J21, J25, J26.

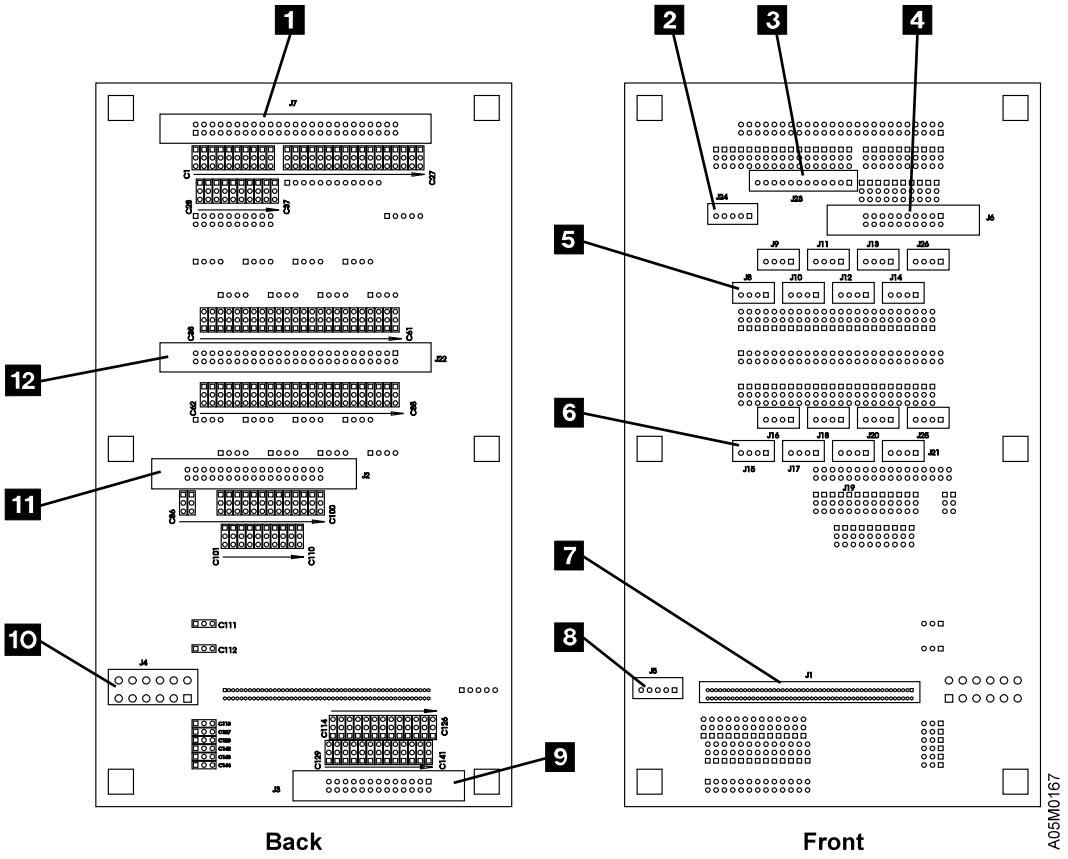


Figure 36. Bulkhead Interconnect Card 2 (BIC2)

Door Interlock Card (DIL)

See Figure 37. The DIL1 version is at the top and the DIL2 version is at the bottom of the figure.

1	P2 connector (terminator location on the last frame)	3	P1 connector
2	P3 connector	4	P4 connector (DIL2 card only)

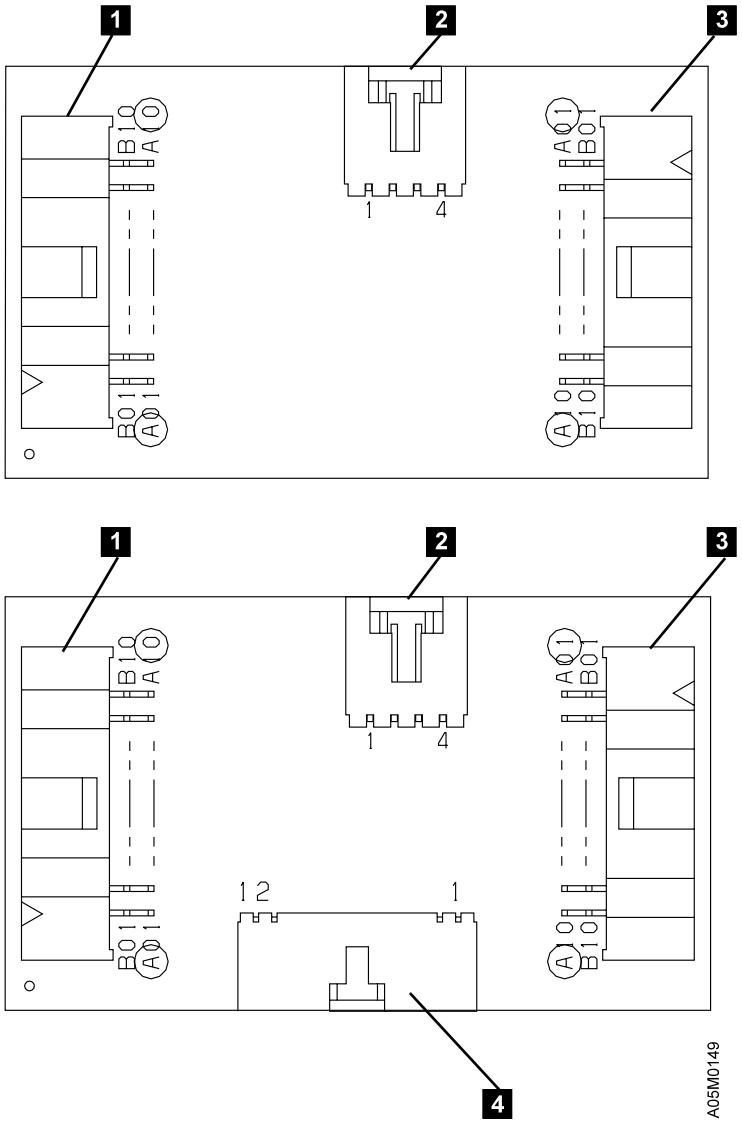


Figure 37. Door Interlock Card (DIL)

Dual B Frame Card (DBF)

This card is used in dual accessor libraries only.

See Figure 38.

1	J18 connector	4	J10 connector
2	J6 connector	5	J8 connector
3	J3 connector	6	J5 connector

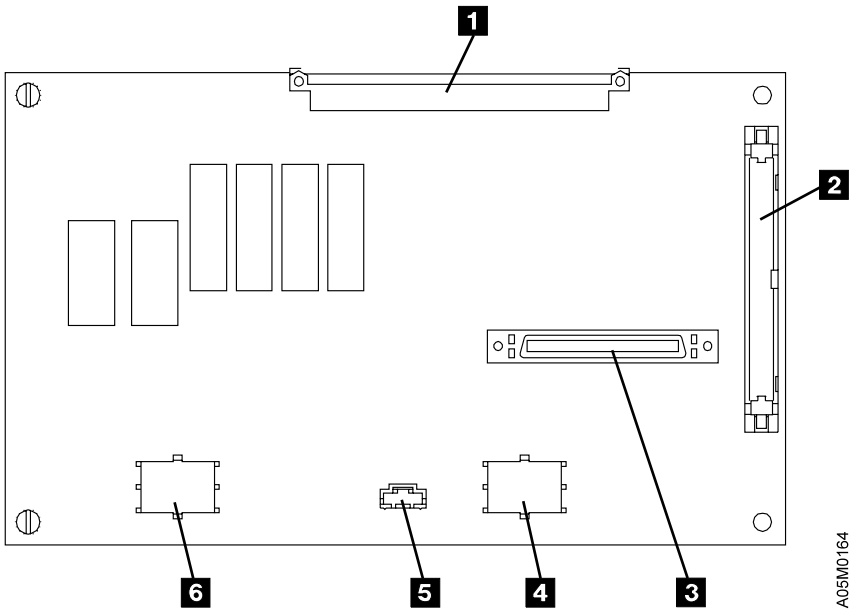


Figure 38. Dual B Frame Card (DBF)

Dual Switch Card (DSW)

This card is used in dual accessor libraries only.

See Figure 39.

1	J18 connector	6	J8 connector
2	J6 connector	7	J5 connector
3	J3 connector	8	J11 connector
4	J9 connector	9	J7 connector
5	J10 connector	10	J16 connector

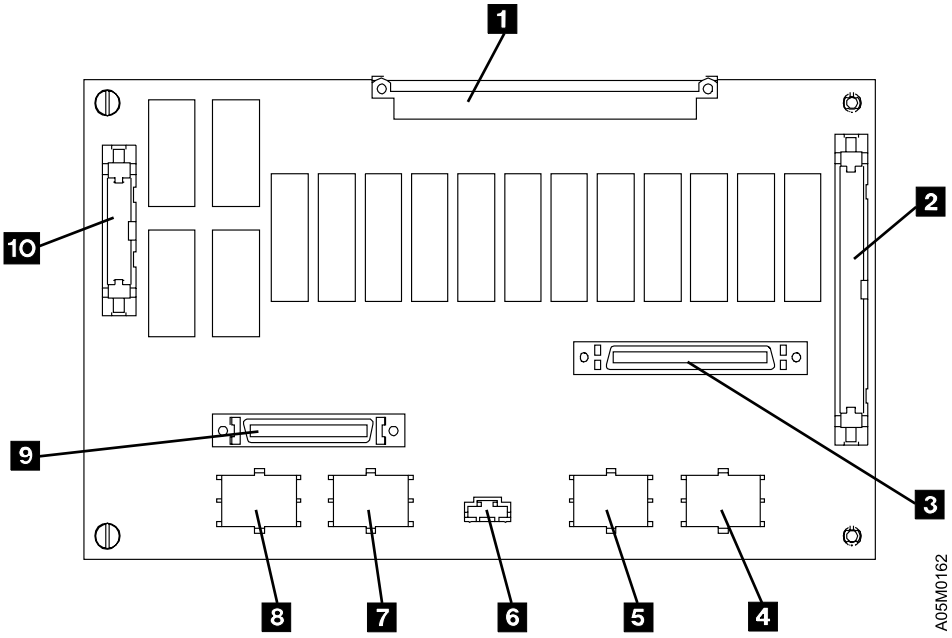


Figure 39. Dual Switch Card (DSW)

Grip Card and Cable Assembly (GRP)

See Figure 40. (See also “Grip Assembly” on page LOC-8.)

1. Thumb open sensor (TOS) connector
2. Grip cartridge present sensor (CPS) connector
3. Thumb open solenoid connector
4. Reach compliance sensor (RCS) connector
5. Cartridge seated sensor (CSS) connector
6. Cable connector

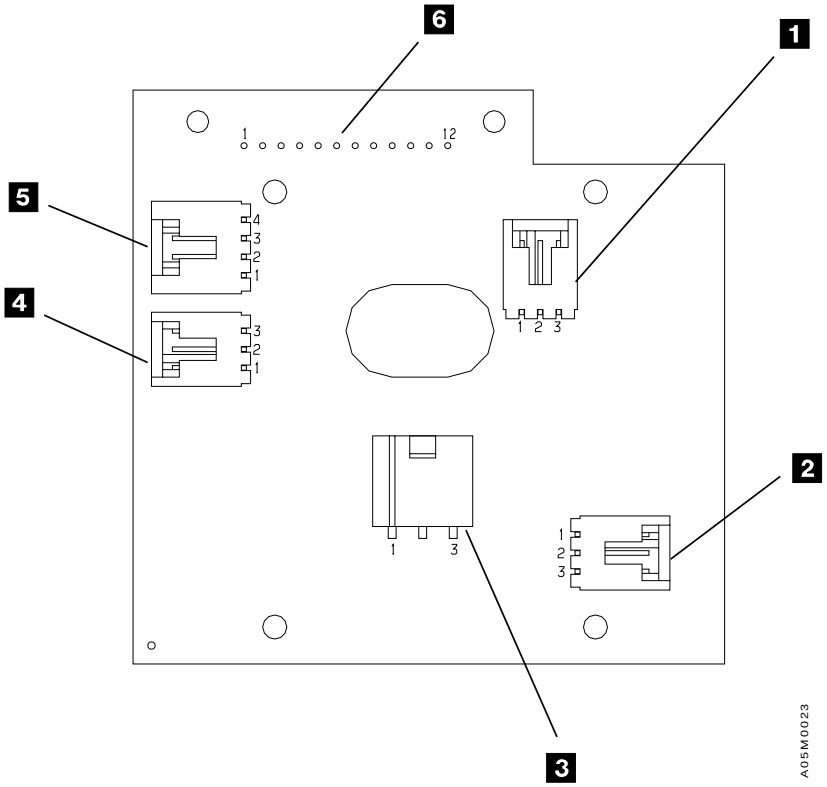


Figure 40. Grip Card and Cable Assembly (GRP)

Library Interconnect Card (LCC)

This card is used in single accessor libraries with MIC1 only.

See Figure 41. (See also “Model L1x Frame (Rear View)” on page LOC-10.)

1	P3 connector	5	P7 connector
2	P6 connector	6	P4 connector
3	P5 connector	7	P2 connector
4	P1 connector	8	Relays

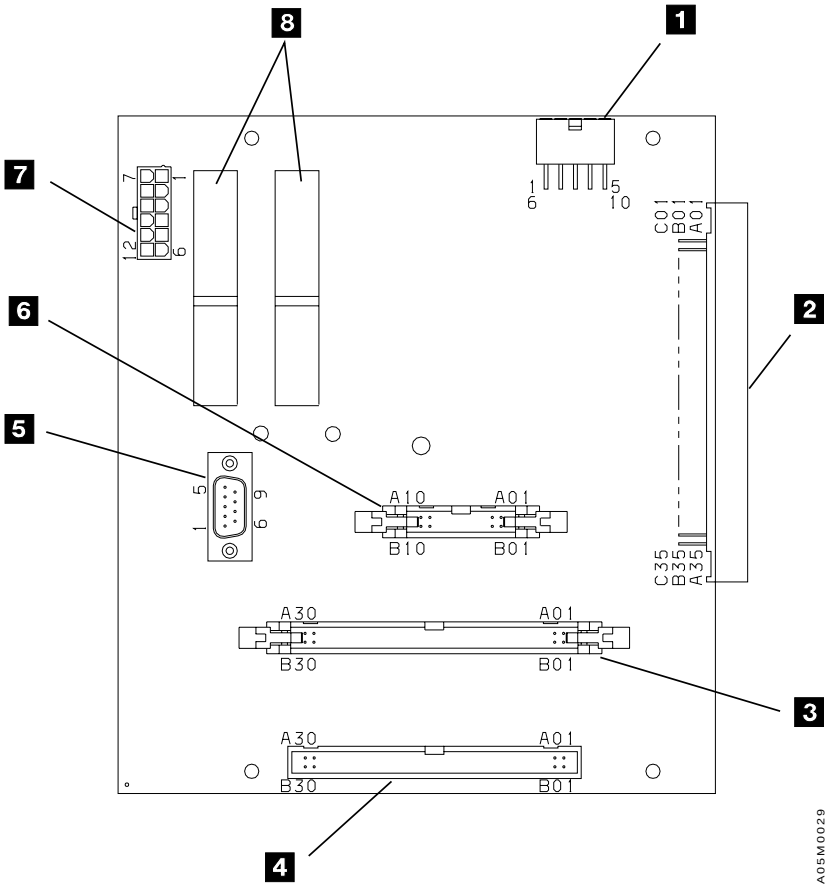


Figure 41. Library Interconnect Card (LCC)

Library Power Control Card (LPC)

This card is used in single accessor libraries only.

See Figure 42.

1. CR5 LED (24V power control)
2. P18 connector
3. P6 connector
4. K4 Relay (UEPO return)
5. P9 connector
6. K3 Relay (UEPO return)
7. K2 Relay (UEPO return)
8. P10 connector
9. K1 Relay (UEPO return)
10. P8 connector
11. P7 connector

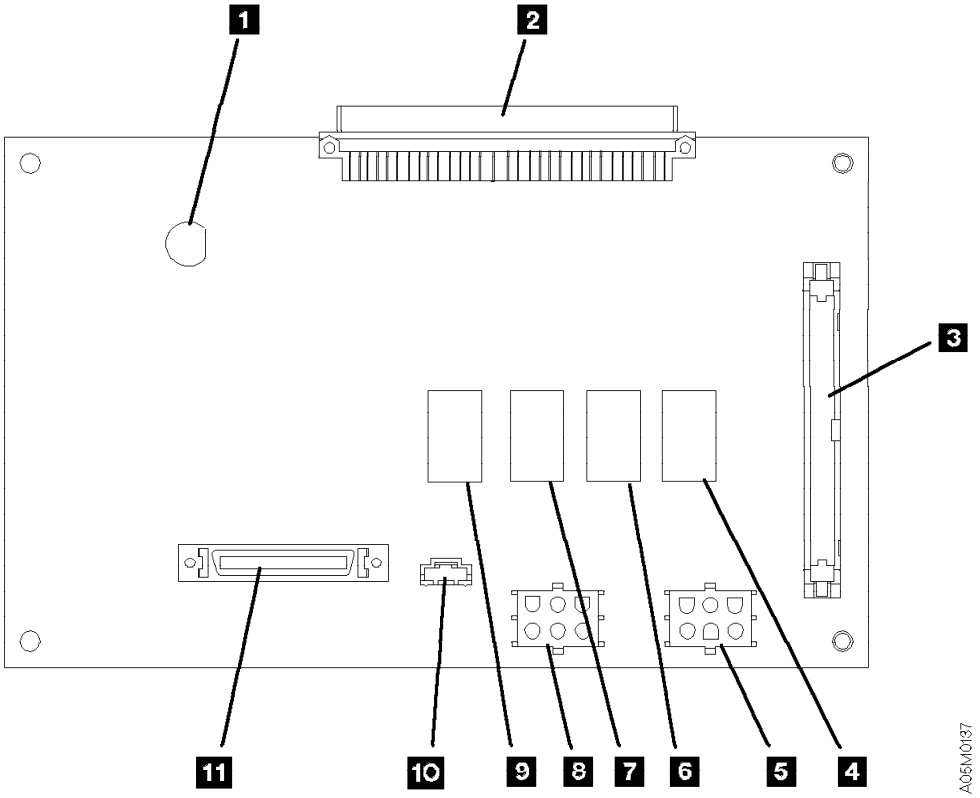


Figure 42. Library Power Control Card (LPC)

Machine Interface Control Card 1 (MIC1)

This card was used in single accessor libraries only.

See Figure 43. (See also “Model L1x Frame (Rear View)” on page LOC-10.)

1. P2 connector
2. P3 connector
3. K4 relay (power sequence)
4. K5 relay (servo power on)
5. CR4 LED (K5 picked)
6. CR5 LED (K6 picked)
7. CR6 LED (K4 picked)
8. CR7 LED (K7 picked)
9. P5 connector
10. K1 relay (power on enable)
11. P4 connector
12. K2 relay (power on enable)
13. K3 relay (power on enable)
14. P6 connector
15. P9 connector
16. P10 connector
17. P8 connector
18. P7 connector
19. P1 connector
20. F2 1.5A SB fuse (24V sensors)
21. F5 1.5A SB fuse (24V motors/solenoid)
22. F4 1.5A SB fuse (24V UEPO detect)
23. F3 5A fuse (36V servo)
24. F1 1.5A SB fuse (24V operator panel)
25. K7 relay (+24V from door switches)
26. K6 relay (reset safety interlock)

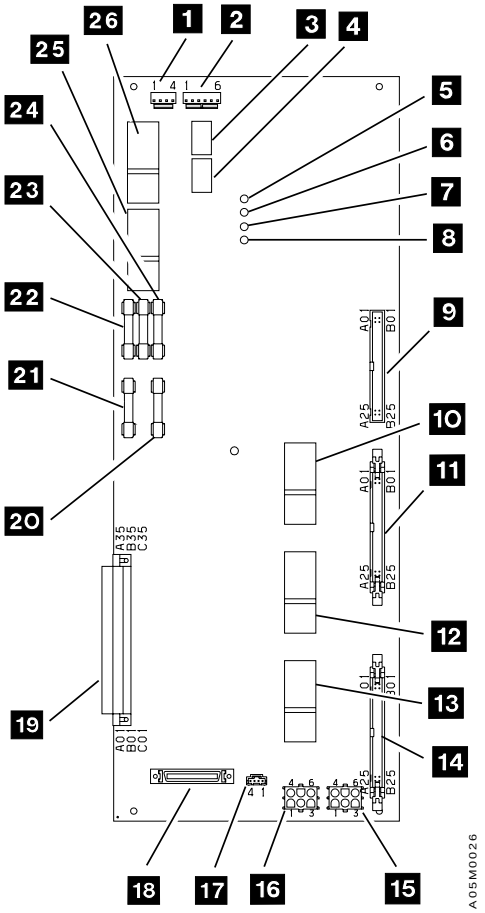


Figure 43. Machine Interface Control Card 1 (MIC1)

Machine Interface Control Card 2-4 (MIC2-4)

See Figure 44.

1. P16 connector
2. P2 connector
3. K3 Relay (reset safety interlock)
4. P3 connector
5. K4 Relay (24V from door switches)
6. P11 connector (no removable cable)
7. P5 connector
8. P4 connector
9. P1 connector
10. P12 connector
11. P17 connector
12. K2 Relay (X motor back EMF)
13. K1 Relay (Y motor back EMF)
14. P14 connector
15. P15 connector
16. CR12 LED (K2 picked)
17. CR10 LED (K1 picked)
18. P13 connector
19. K5 Relay (servo power on)
20. K6 Relay (power sequence)
21. CR7 LED (K4 picked)
22. CR6 LED (K6 picked)
23. CR5 LED (K3 picked)
24. F5 1.5A SB fuse (24V motors/solenoid)
25. F3 5A fuse (36V servo)
26. CR4 LED (K5 picked)
27. F4 1.5A SB fuse (24V UEPO detect)
28. F1 1.5A SB fuse (24V operator panel)
29. F2 1.5A SB fuse (24V sensors)

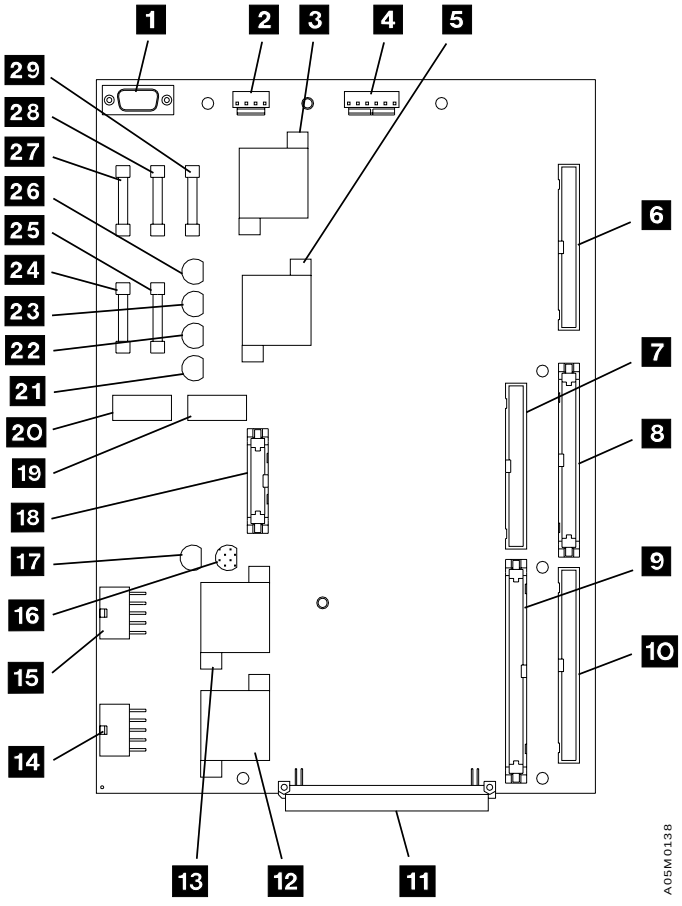


Figure 44. Machine Interface Control Card 2-4 (MIC2-4)

Operator Panel Card (LPN)

See Figure 45. (See also “IBM 3494 Tape Library Dataserver Overview” on page LOC-3.)

1. P3 connector
2. P1 connector
3. P2 connector (see note)
4. I/O Locked LED
5. Unload Required LED
6. Output Mode LED
7. Input Mode LED
8. Intervention Required LED
9. Pause mode switch and LED
10. Auto mode switch and LED
11. Local Remote switch
12. Power Off Pending LED
13. System Power Ready LED
14. Rack Power Ready LED
15. Unit Power On/Off

Note: If there is no Convenience I/O station, jumper p/n 50G1049 is plugged into the P2 connector socket.

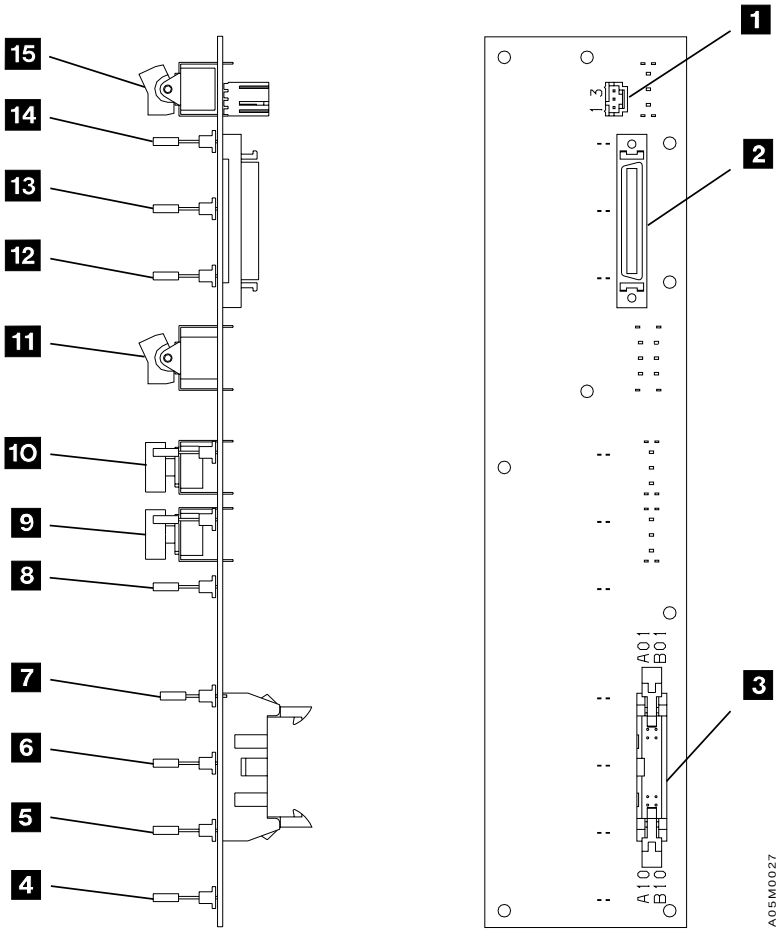


Figure 45. Operator Panel Card (LPN)

Picker Card (GRI)

See Figure 46. (See also “Picker Assembly” on page LOC-7.)

1 P4 connector

2 P2 connector (Pivot flex cable)

3 P3 connector

4 P1 connector (Y-axis flex cable)

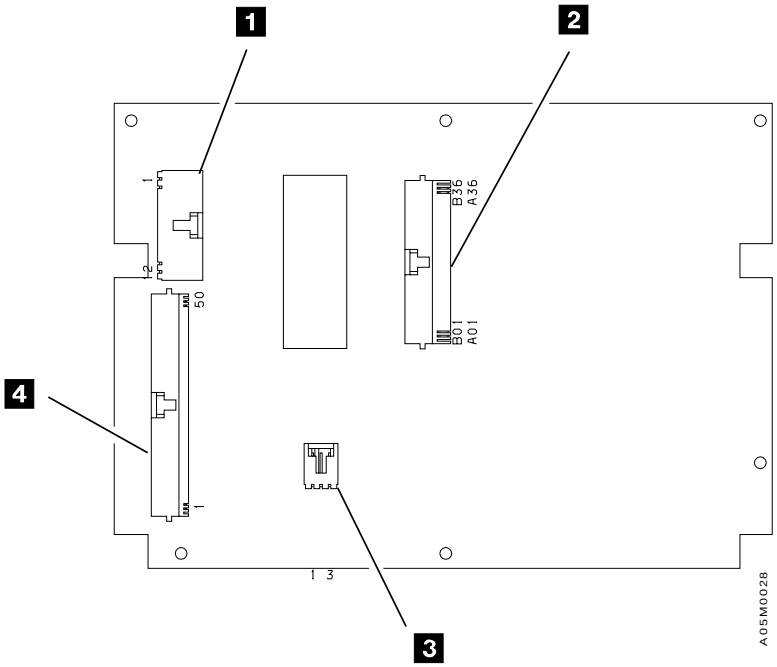


Figure 46. Picker Card (GRI)

Reach Card (RCH, RCH2, and RCX)

See Figure 47. (See also “Picker Assembly” on page LOC-7.)

1. Calibration sensor connector
2. Pivot cable connector
3. Gripper connector
4. Reach gear motor connector
5. Reach Card 2 connector

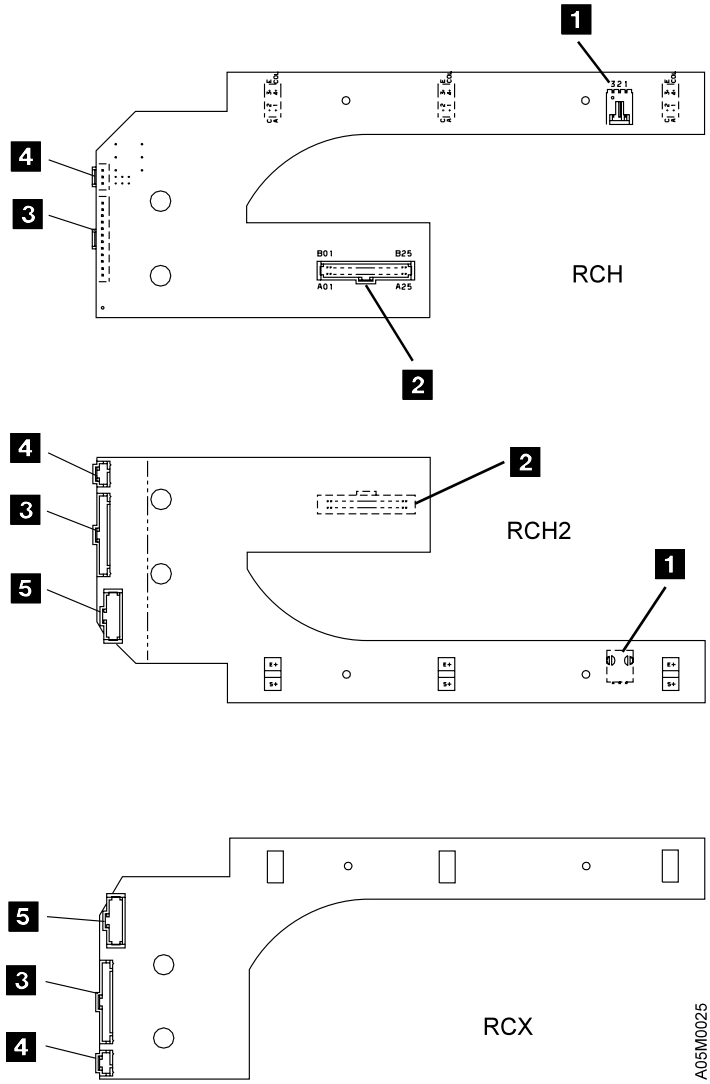


Figure 47. Reach Card (RCH, RCH2, and RCX)

Remote Power Control Card (RPC)

See Figure 48.

1. J1 connector
2. J9 host 8 connector
3. J9 host 7 connector
4. J9 host 6 connector
5. J9 host 5 connector
6. J9 host 4 connector
7. J9 host 3 connector
8. J9 host 2 connector
9. J9 host 1 connector

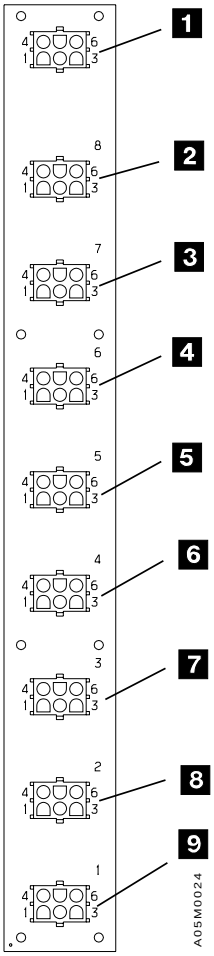


Figure 48. Remote Power Control Card (RPC)

Unit Emergency Card (UEP)

This card is used in dual accessor libraries only.

See Figure 49.

1	J2 connector	5	J10 connector
2	J18 connector	6	J11 connector
3	J1 connector	7	J21 connector
4	J5 connector	8	J20 connector

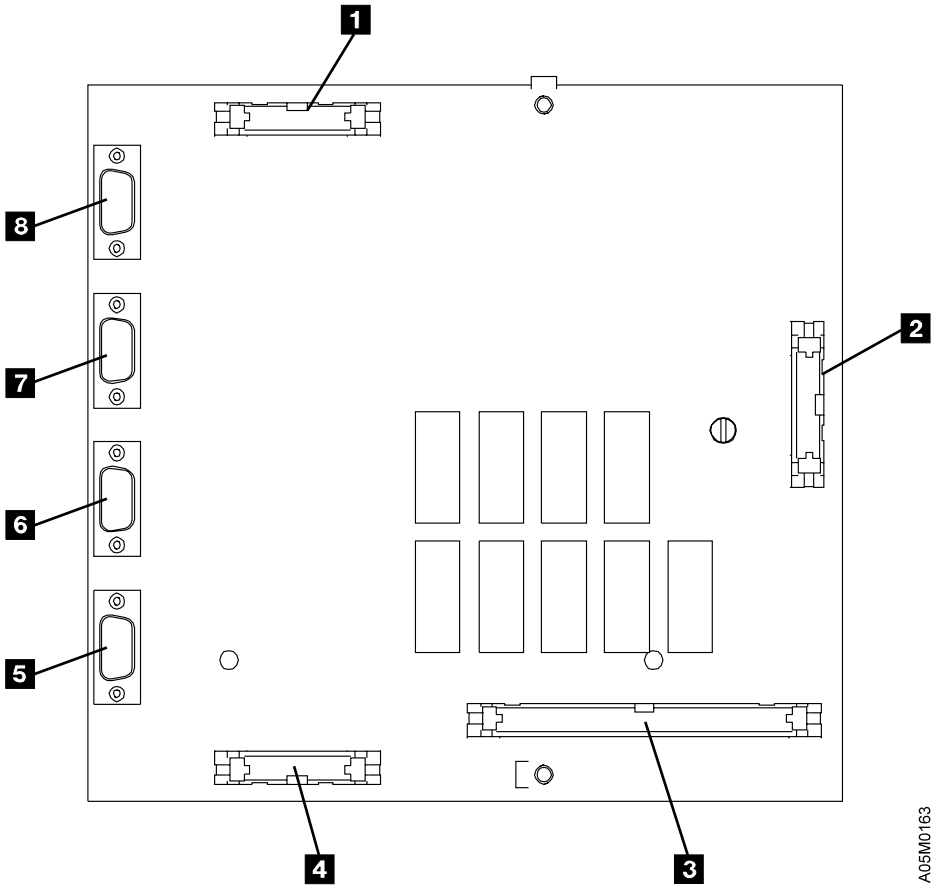


Figure 49. Unit Emergency Card (UEP)

X/Y-Axis Card (XAX)

See Figure 50. (See also “X-Axis and Y-Axis Assemblies” on page LOC-6.)

1	P2 connector (Y-axis flex cable)	3	P3 connector
2	P1 connector (X-axis flex cable)	4	P4 connector

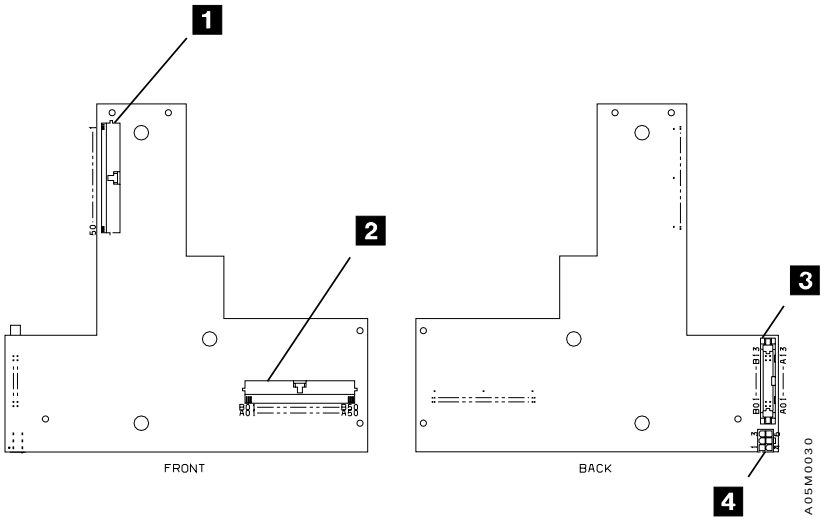


Figure 50. X/Y-Axis Card (XAX)

X-Axis and Y-Axis Power Amplifier Card

See Figure 51. (See also Figure 32 on page LOC-10.)

1 Fault LED. (A red LED indicates an error.)

2 Switch settings: S1 ON, S2 ON, S3 OFF, S4 OFF

Notes:

1. If the card has AMC P/N B12A6F-IBM1 or higher on it, the pots are set at the factory and a tamper resistant loctite is applied. No further adjustment is required.
2. The pots should be set as follows. The pots on this card are 15-turn pots with no stop. To adjust the pots, take the amplifier to a quiet area. Turn the pot until you hear a click and then turn it back as described.

   Pot 1: full counter-clockwise (CCW)
   Pot 2: full clockwise (CW) then back 4.5 turns CCW
   Pot 3: full clockwise (CW)
   Pot 4: full clockwise (CW) then back 7.5 turns CCW

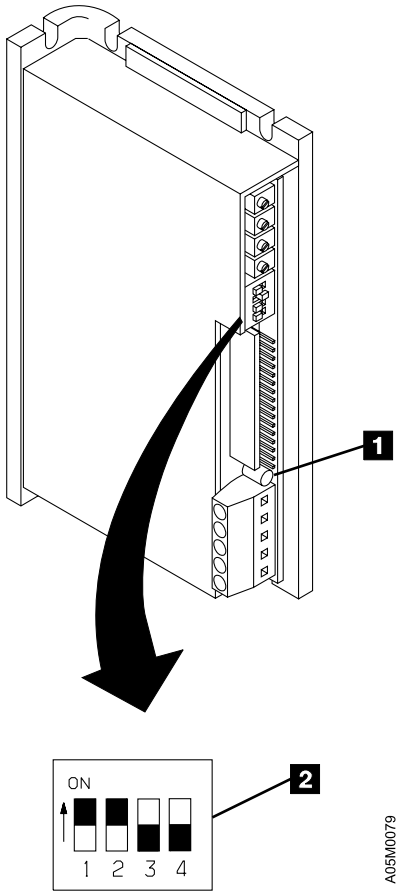


Figure 51. X-Axis and Y-Axis Power Amplifier Card

Expansion Frame Cards

Door Interlock Card (DIL)

See Figure 52. The DIL1 version is at the top and the DIL2 version is at the bottom of the figure.

1 P2 connector (terminator location on the last frame)

2 P3 connector

3 P1 connector

4 P4 connector (DIL2 card only)

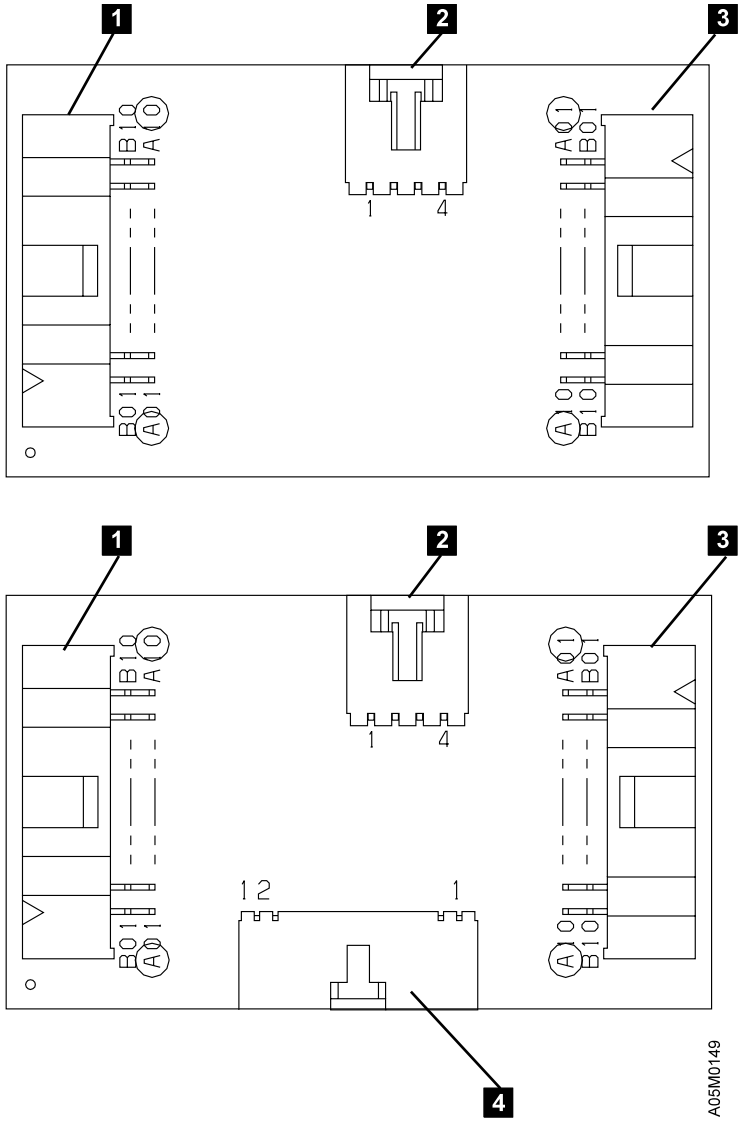


Figure 52. Door Interlock Card (DIL)

Supplemental Power Control (SPC)

See Figure 53. The SPC card is added when a library is expanded past 8 frames. The card is located on the back aisle wall between frames 8 and 9.

1	P1 connector (frame 8 DIL)	7	P11 connector (frame 11 PCC)
2	P2 connector (frame 9 DIL)	8	P12 connector (frame 12 PCC)
3	P3 connector (BIC card)	9	P13 connector (frame 13 PCC)
4	P8 connector (frame 8 PCC)	10	P14 connector (frame 14 PCC)
5	P9 connector (frame 9 PCC)	11	P15 connector (frame 15 PCC)
6	P10 connector (frame 10 PCC)	12	P16 connector (frame 16 PCC)

Note: Jumper P/N 62G1195 should be plugged into all unused P8 to P16 connectors.

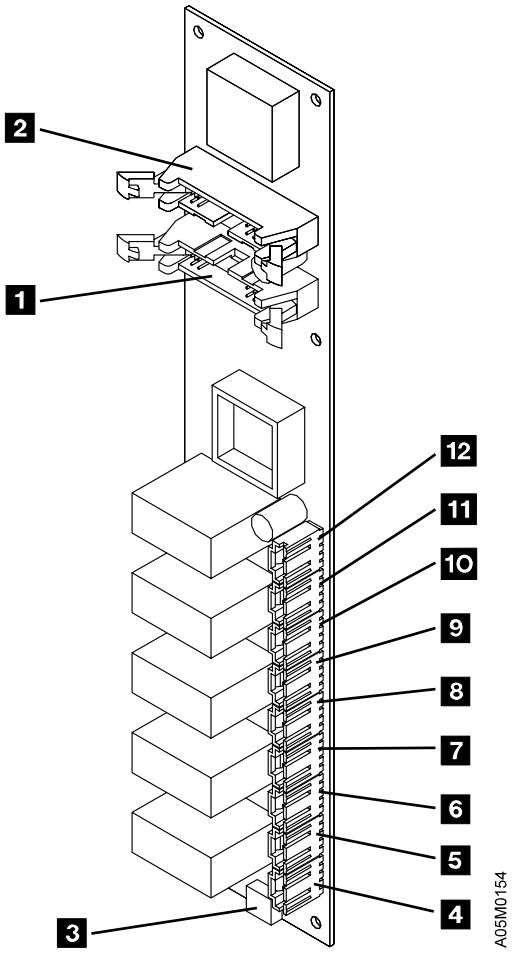


Figure 53. Supplemental Power Control (SPC)

PCC Sequencer Card (SEQ)

This card is used in dual accessor libraries only. It is located behind the rear door either above the PCC or on the lower left side of the rack in each D1x or B1x expansion frame.

See Figure 54.

1. J1 connector
2. J3 connector
3. J4 connector
4. J2 connector

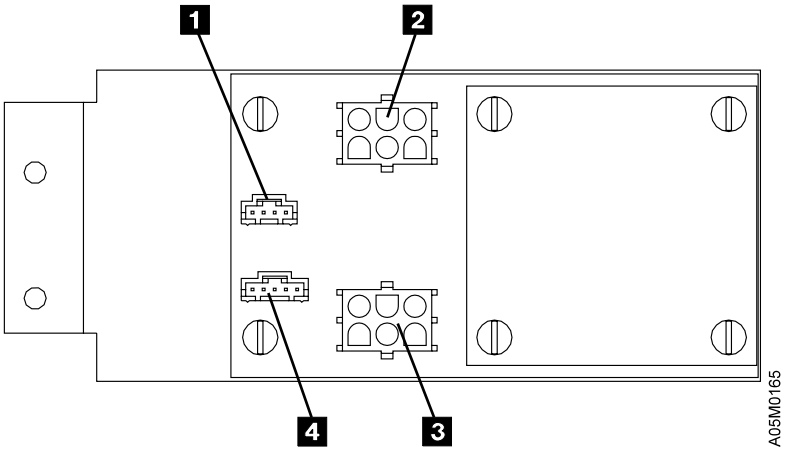


Figure 54. PCC Sequencer Card (SEQ)

Library Manager

ARTIC Breakout Box 1 and 2

See Figure 55. On newer libraries, the box(es) are rotated 90° and mounted on a bracket.

1. Host 1 cable connector
2. Host 2 cable connector
3. Host 3 cable connector
4. Host 4 cable connector
5. Tape subsystem 1 cable connector
6. Tape subsystem 2 cable connector
7. Tape subsystem 3 cable connector
8. Tape subsystem 4 cable connector
9. Host 5 cable connector (Port 8)
10. Host 6 cable connector (Port 9)
11. Host 7 cable connector (Port A)
12. Host 8 cable connector (Port B)
13. Tape subsystem 5 cable connector (Port C)
14. Tape subsystem 6 cable connector (Port D)
15. Tape subsystem 7 cable connector (Port E)
16. Tape subsystem 8 cable connector (Port F)
17. ARTIC Breakout Box 1
18. ARTIC Breakout Box 2 (optional feature)

Note: Ports 0-3 and/or ports 8-B may be converted to tape subsystem ports. See “ARTIC Port Assignments” on page INST-98.

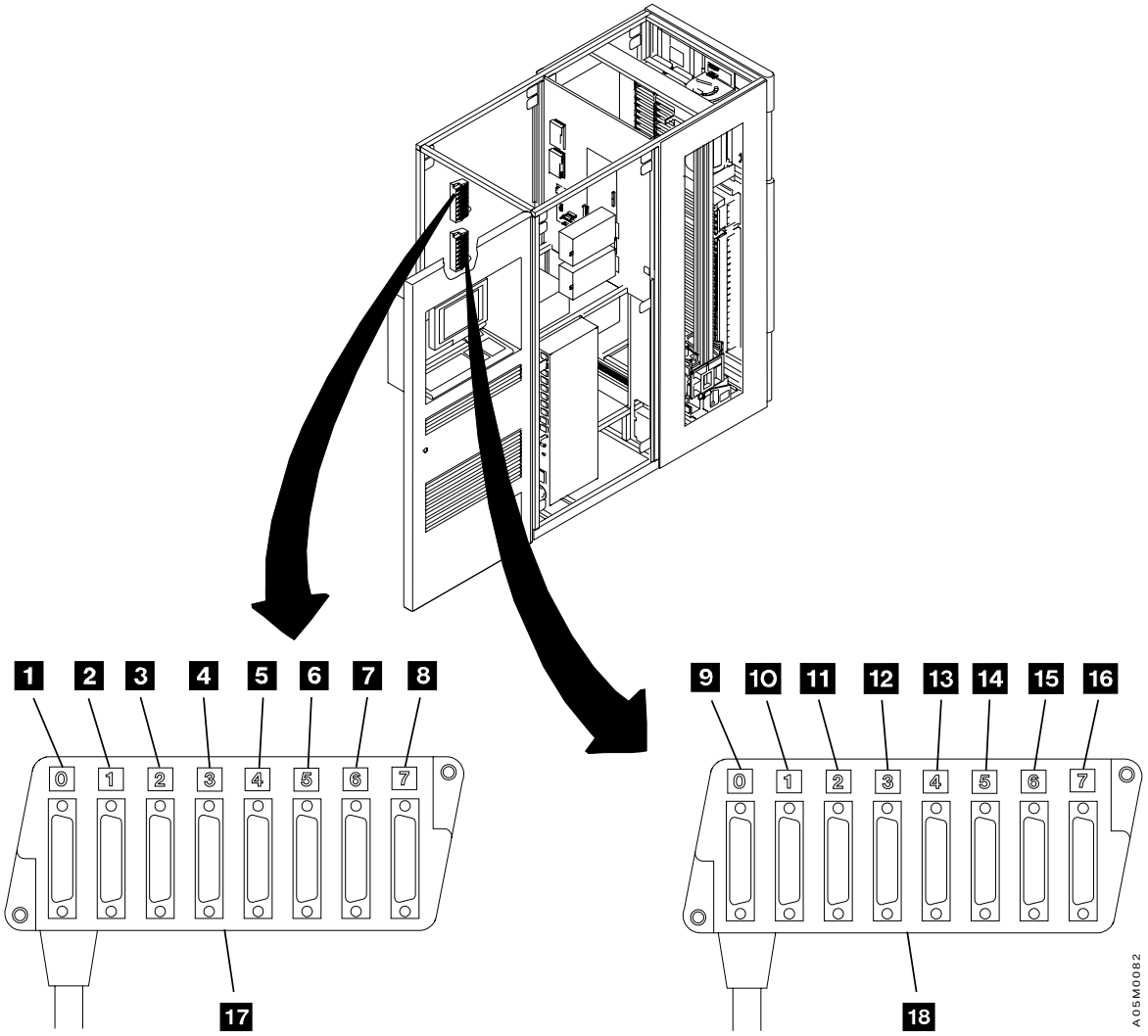


Figure 55. ARTIC Breakout Box Connections

System Unit

PS/ValuePoint System Unit. See Figure 56. (See also Figure 32 on page LOC-10.)

1. Not used
2. Not used
3. Communication port A (not used)
4. Communication port B
5. Track ball cable connector
6. Keyboard cable connector
7. Library manager line cord connector
8. Not used
9. Voltage selector. (Voltage must be set to 230 volts.)
10. ARTIC card cable connector. (See also Figure 70 on page LOC-49.)
11. ARTIC Card 1, Token Ring Adapter, or Ethernet Adapter (optional feature)
12. Display adapter card cable connector. (See also Figure 67 on page LOC-46.)
13. Servo control card cable connector. (See also Figure 72 on page LOC-51.)
14. DI/DO card cable connector. (See also Figure 66 on page LOC-45.)

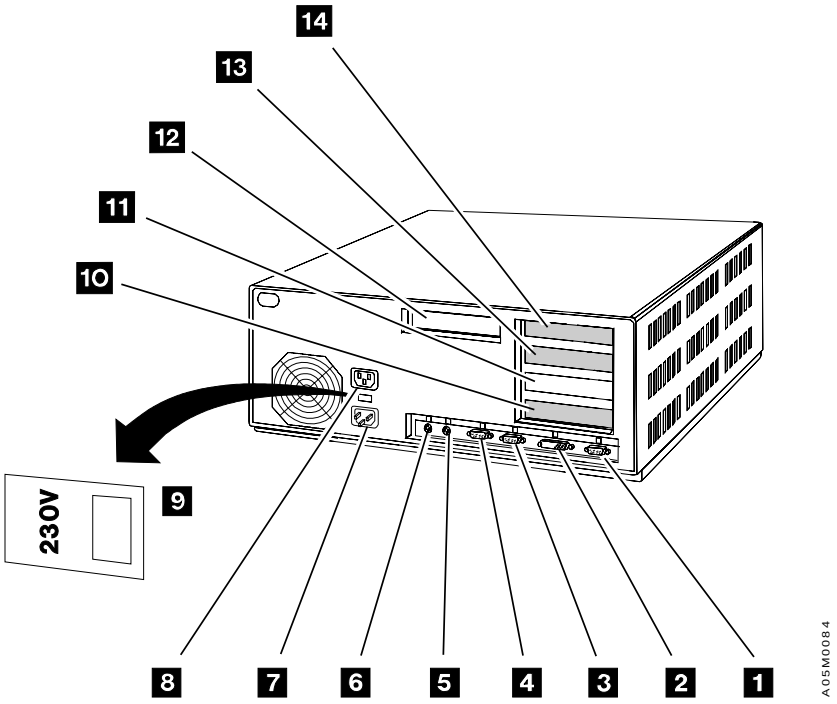


Figure 56. PS/ValuePoint System Unit

7585 Industrial Computer System Unit. See Figure 57. (See also Figure 60 on page LOC-38).

1. DI/DO card cable connector. (See also Figure 66 on page LOC-45.)
2. Display Adapter card cable connector. (See also Figure 67 on page LOC-46.)
3. Reserved for LAN Adapter or future need.
4. Servo Control card cable connector. (See also Figure 72 on page LOC-51.)
5. ARTIC Card 1, Token Ring Adapter, or Ethernet Adapter (optional feature)
6. ARTIC card 0 cable connector. (See also Figure 70 on page LOC-49.)
7. Not used
8. Not used
9. Communication Port B
10. Communication port A (Not used)
11. Track ball (or pointer) cable connector
12. Keyboard cable connector
13. Line cord connector
14. Voltage selector. (Voltage must be set to 230 volts.)

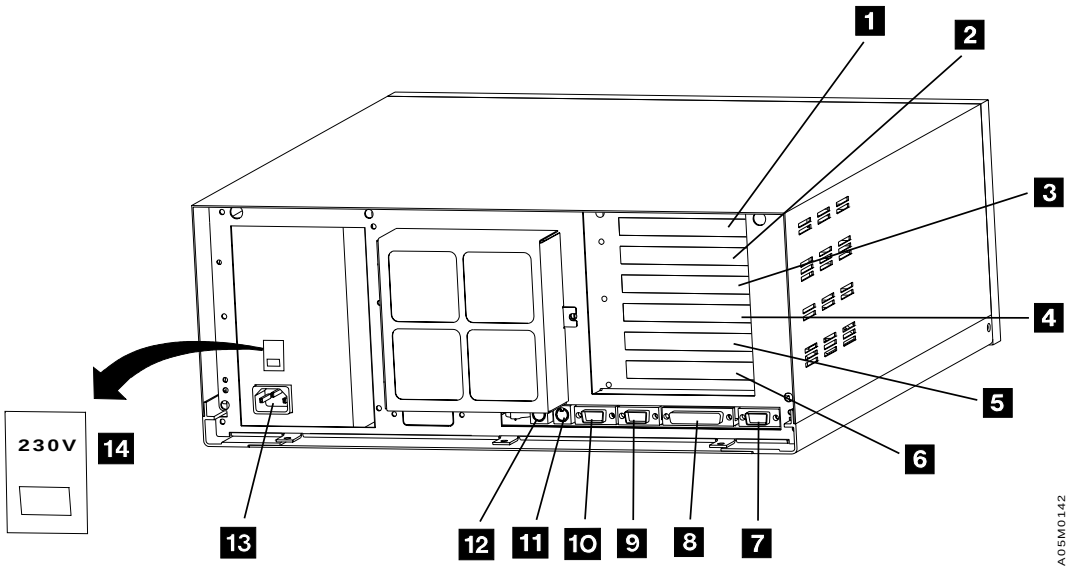


Figure 57. 7585 Industrial Computer System Unit

7588 Industrial Computer System Unit. See Figure 58. (See also Figure 61 on page LOC-39).

1. Line cord connector.
2. Serial port A
3. Serial port B - Barcode reader
4. Parallel port (unused).
5. Mouse (or pointer) cable connector
6. Keyboard cable connector
7. ARTIC card 0 cable connector. (See also LOC-49 or LOC-42.)
8. ARTIC card 1 cable connector (optional feature). (See also LOC-50 or LOC-42.)
9. Servo Control card cable connector. (See also Figure 72 on page LOC-51.)
10. DI/DO card cable connector. (See also Figure 66 on page LOC-45.)
11. Token Ring Adapter or Ethernet Adapter (optional feature) (See also LOC-52 or LOC-47.)
12. Display Adapter card cable connector. (See also Figure 67 on page LOC-46.)
13. Etherjet Card (Model HA1 Alternate Link, Model B18 Internal LAN)
14. Etherjet Card (Model HA1 Primary Link)
15. Mirrored Hard Drive Card (See also Figure 69 on page LOC-48.)

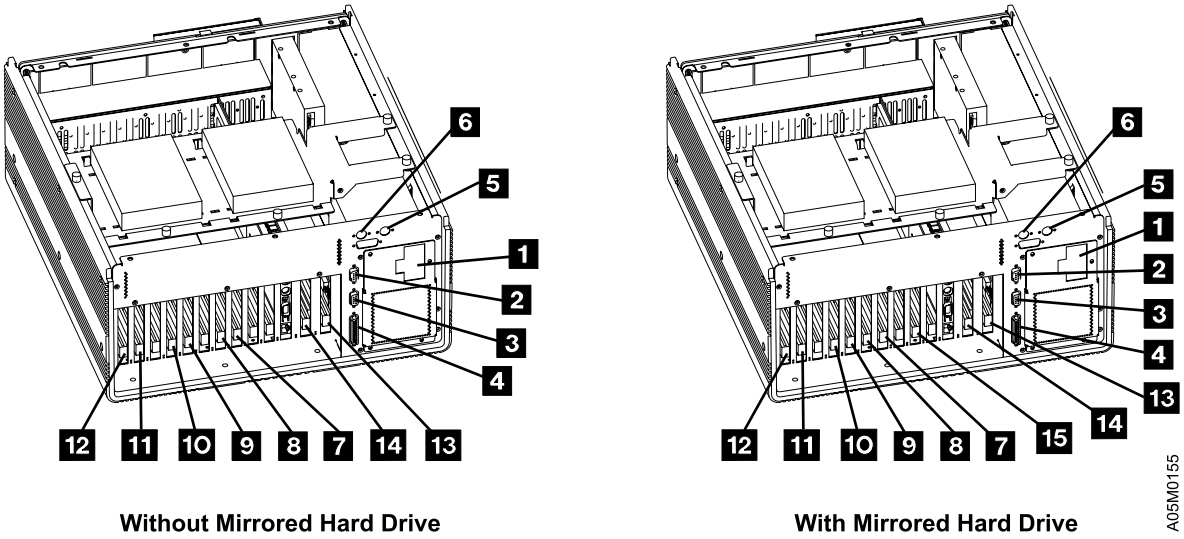


Figure 58. 7588 Industrial Computer System Unit

System Unit (Interior View)

PS/ValuePoint System Unit (Interior View). See Figure 59 (See also Figure 56 on page LOC-34.)

1. ARTIC 0 Multiport card. (See also Figure 70 on page LOC-49.)
2. ARTIC 0 RS-422 card. (See also Figure 70 on page LOC-49.)
3. DI/DO card. (See also Figure 66 on page LOC-45.)
4. Riser card
5. Display adapter card. (See also Figure 67 on page LOC-46.)
6. System board
7. Battery
8. Power supply
9. Secondary hard disk drive (feature)
10. Diskette drive
11. Primary hard disk drive
12. Memory modules
13. Servo control card. (See also Figure 72 on page LOC-51.)

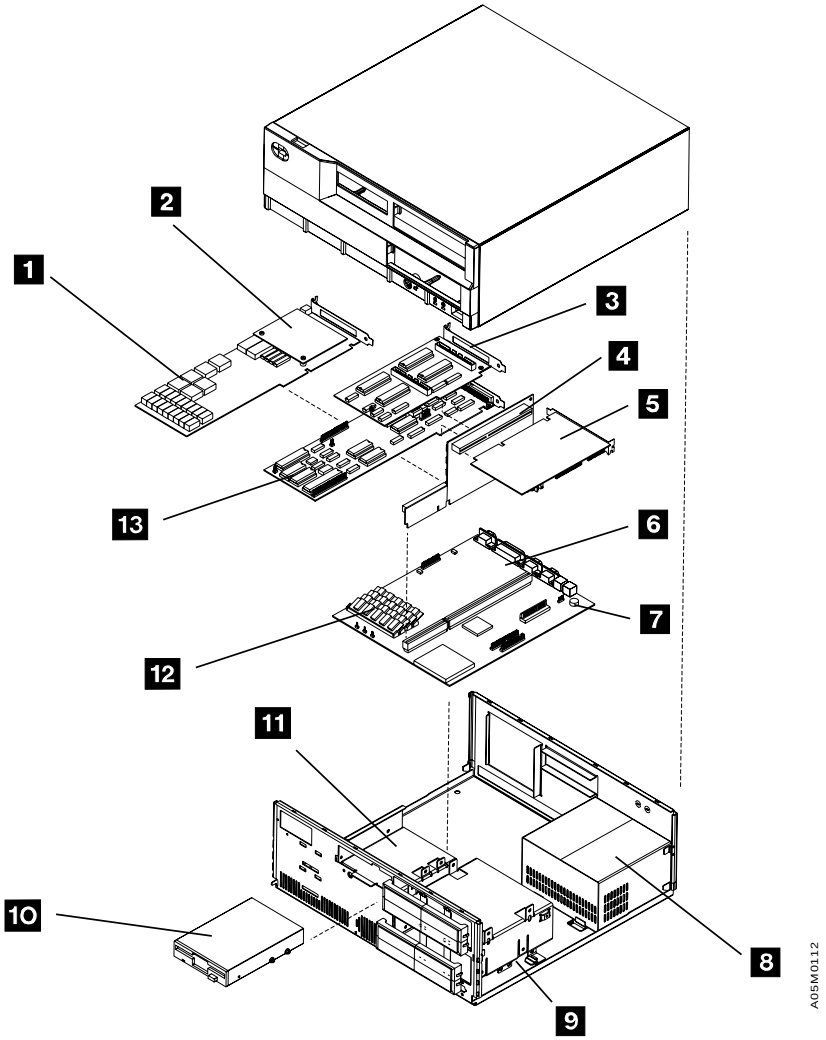


Figure 59. PS/ValuePoint System Unit (Interior View)

7585 Industrial Computer System Unit (Interior View). See Figure 60 (See also Figure 57 on page LOC-35.)

1. Primary hard disk drive
2. Power Supply
3. Secondary hard disk drive
4. Diskette drive
5. Power switch (behind access cover)
6. Memory modules
7. System board
8. ARTIC 0 card slot. (See also Figure 70 on page LOC-49.)
9. ARTIC Card 1, Token Ring Adapter, or Ethernet Adapter slot (optional feature)
10. Servo Control card slot. (See also Figure 72 on page LOC-51.)
11. Reserved for LAN Adapter or future need.
12. Display Adapter card slot. (See also Figure 67 on page LOC-46.)
13. DI/DO card slot. (See also Figure 66 on page LOC-45.)
14. Riser card

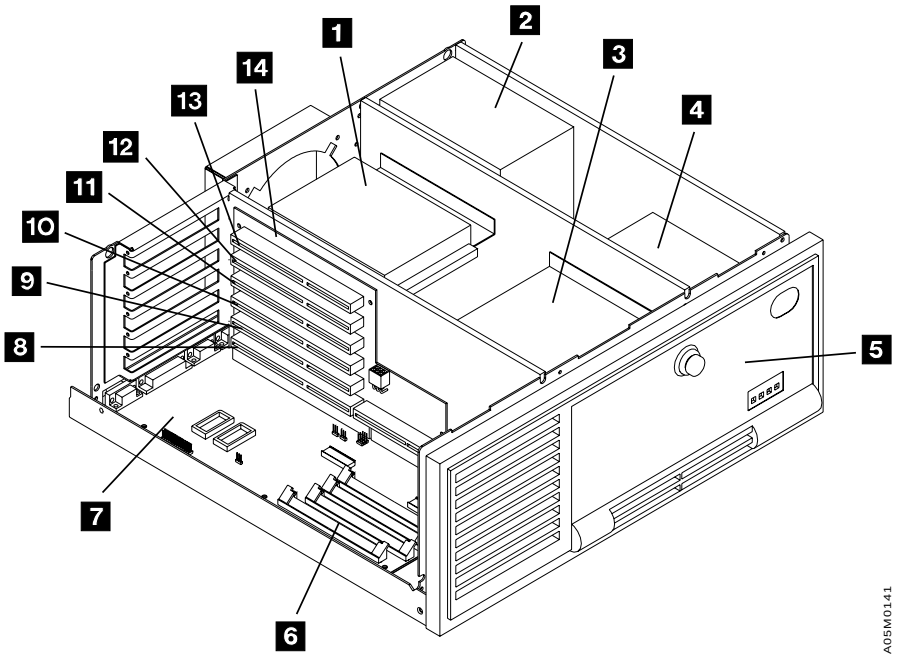


Figure 60. Industrial Computer System Unit (Interior View)

7588 Industrial Computer System Unit. See Figure 61. (See also Figure 58 on page LOC-36).

1. IBM single-board computer. (See also Figure 63 on page LOC-41.)
2. Processor.
3. Lithium battery
4. Cache.
5. Memory
6. Diskette drive
7. Primary hard drive
8. Power supply
9. ARTIC card 0. (See also LOC-49 or LOC-42.)
10. ARTIC card 1 (optional feature). (See also LOC-50 or LOC-42.)
11. Servo control card. (See also Figure 72 on page LOC-51.)
12. DI/DO card. (See also Figure 66 on page LOC-45.)
13. Token Ring Adapter or Ethernet Adapter (optional feature) (See also LOC-52 or LOC-47.)
14. Display adapter card. (See also Figure 67 on page LOC-46.)
15. Secondary (mirror) hard drive
16. CD-ROM Drive
17. Etherjet Card (Model HA1 Alternate Link)
18. Etherjet Card (Model HA1 Primary Link)
19. Mirrored Hard Drive Card (See also Figure 69 on page LOC-48.)

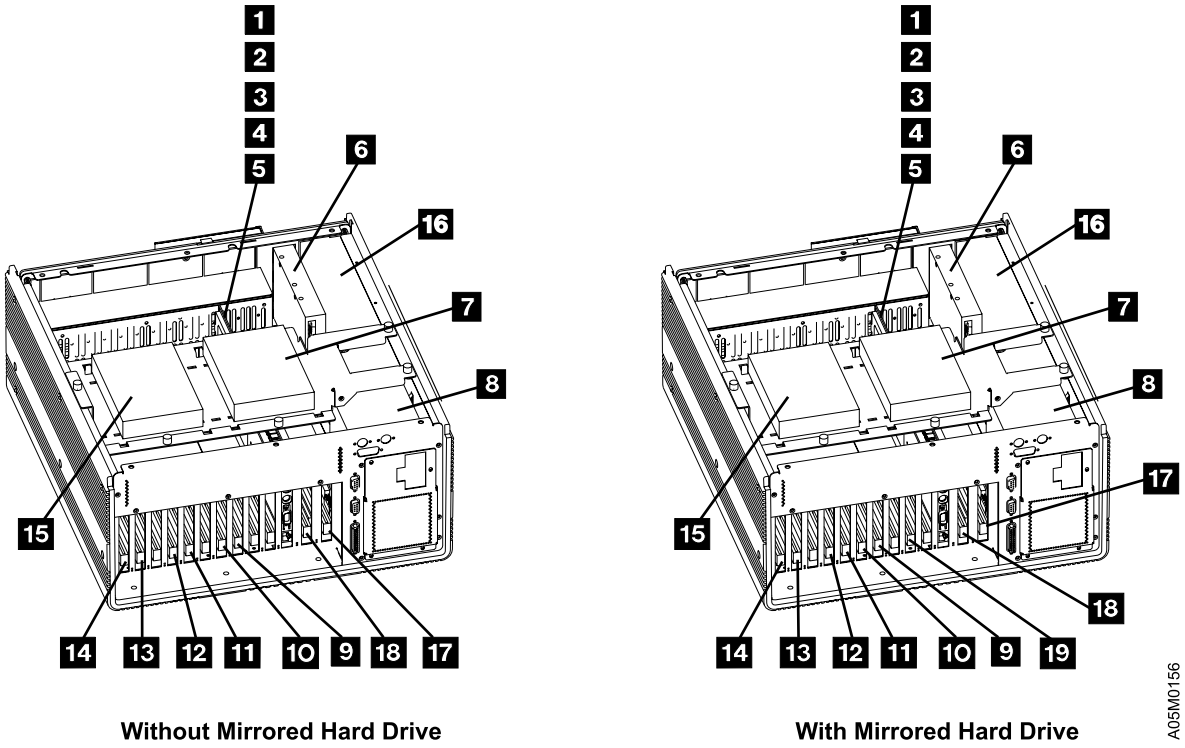


Figure 61. 7588 Industrial Computer System Unit

IBM 7588 Drive Cables

See Figure 62. (See also Figure 61 on page LOC-39).

1	Hard drive connector	6	CD-ROM connector
2	Hard Drive Cable or Mirror Card Cable	7	Diskette drive connector
3	Adapter P/N 05H7333	8	6 unused pins (adapter offset on connector)
4	CD-ROM Drive Cable	9	Pin 1 position
5	Diskette Drive Cable		

Note: If mirrored hard drive is installed, the hard drive cables plug into the mirrored hard drive card. See Figure 69 on page LOC-48.

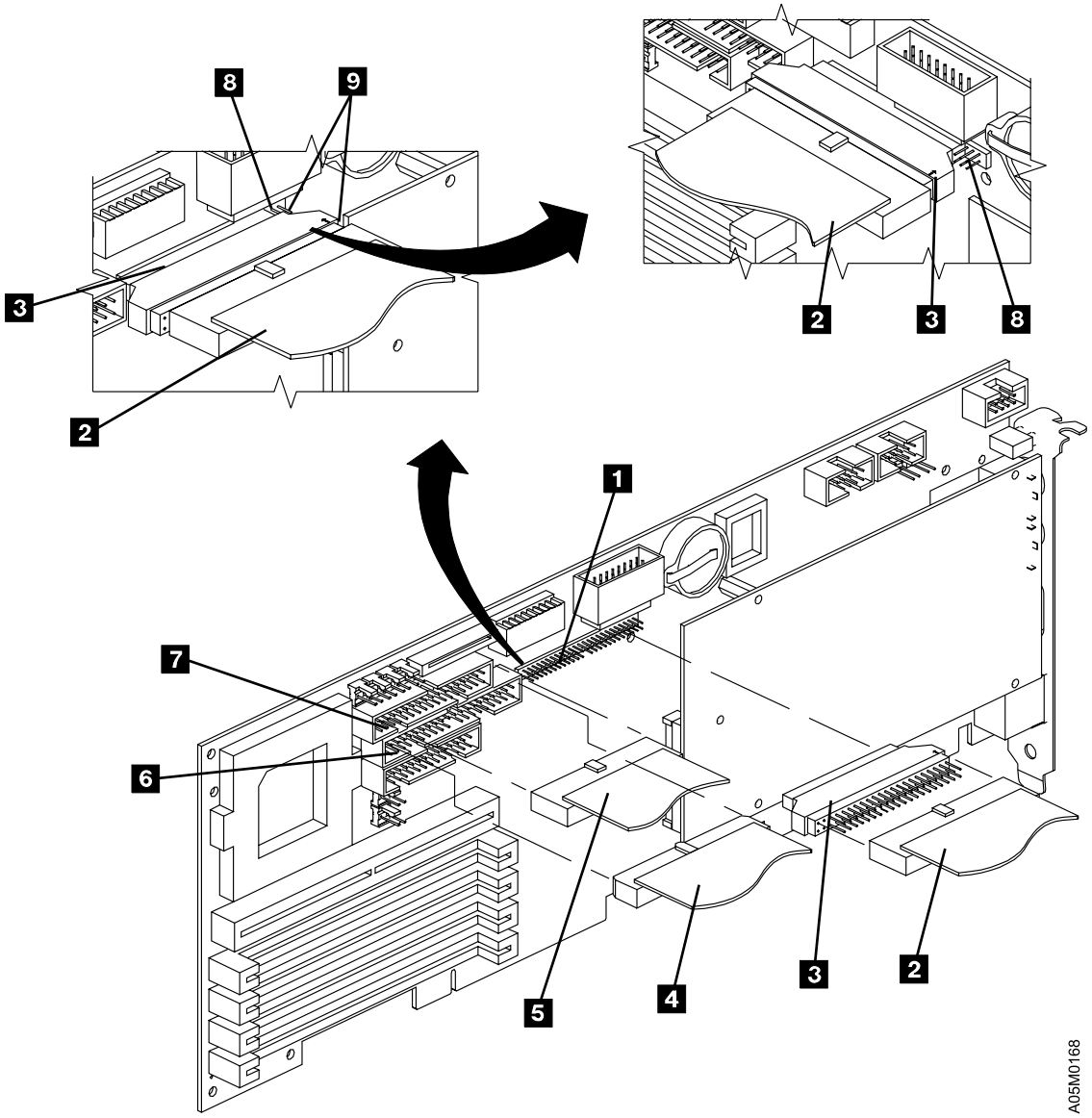


Figure 62. 7588 Industrial Computer Drive Cables

IBM 7588 Single Board Computer (SBC)

See Figure 63. (See also Figure 61 on page LOC-39).

1	Password Override	11	Serial Ports
2	Plug cable to green system power-on LED	12	LED Display
3	Plug cable to yellow HD access LED	13	Keyboard, Mouse
4	Plug cable to speaker LED	14	RS-422/485 Termination Jumpers
5	Plug cable to backplane (reset switch)	15	PMC Connectors
6	Mini-FDD	16	Memory SIMMs
7	Configuration Switches	17	L2 Cache
8	External Power	18	Processor
9	Backup Battery	19	5V Fan
10	BIOS	20	12V Fan

Switch Settings:

1 = On	4 = On	7 = On
2 = On	5 = Off	8 = Off
3 = Off	6 = On	9 = Off

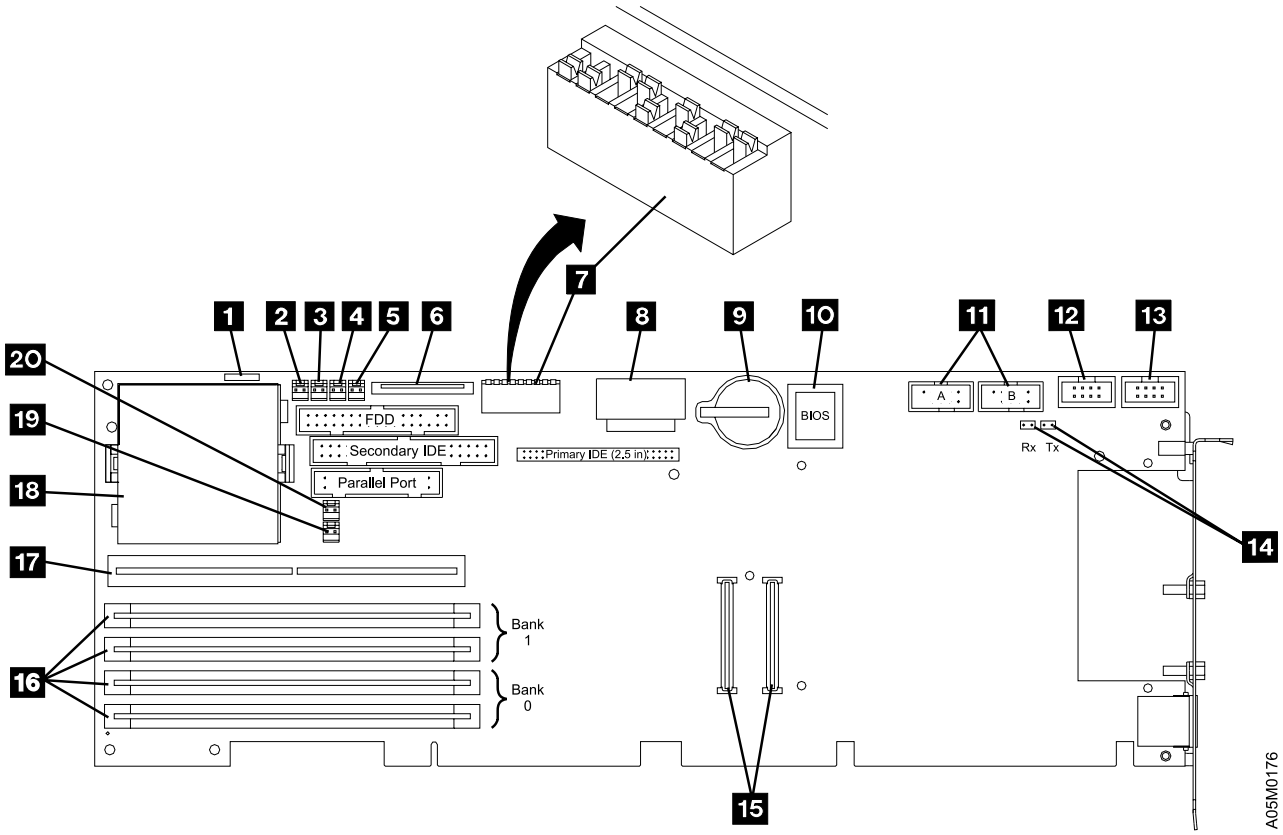


Figure 63. 7588 Industrial Computer SBC Card

Library Manager Cards

ARTIC186 8 Port Adapter

Two inter-changeable versions of the ARTIC186 8 Port Adapter have been used. If the option switches are located near the cable connector, go to “ARTIC186 8 Port Adapter Version 2” on page LOC-44. If the option switches are located at the far end of the card away from the cable connector, go to “ARTIC186 8 Port Adapter Version 1” on page LOC-43.

ARTIC186 8 Port Adapter Version 1: See Figure 64. The default port configuration is shown. Refer to “ARTIC Port Assignments” on page INST-98 for the port configuration in your library.

1. ARTIC Card 0 switch setting (3,4 open)
2. ARTIC Card 1 switch setting (3,4,5 open)
3. Port 0 jumpers
4. Port 7 jumpers
5. Port 5 jumpers
6. Port 4 jumpers
7. Port 6 jumpers
8. Port 3 jumpers
9. Port 2 jumpers
10. Port 1 jumpers

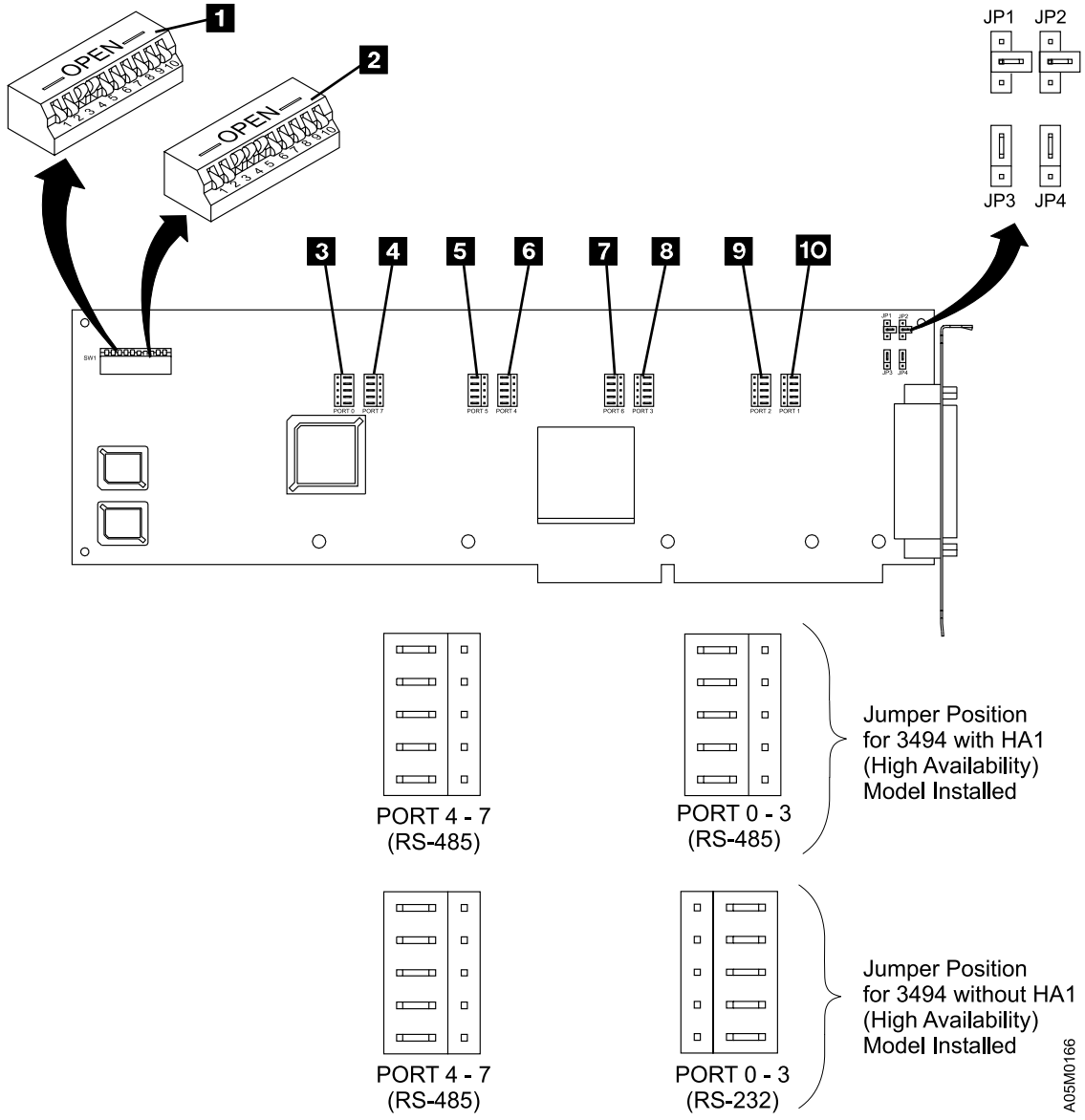


Figure 64. ARTIC186 8 Port Adapter Version 1

ARTIC186 8 Port Adapter Version 2: See Figure 65. The default port configuration is shown. Refer to “ARTIC Port Assignments” on page INST-98 for the port configuration in your library.

1. Port 0 jumpers
2. Port 1 jumpers
3. Port 2 jumpers
4. Port 3 jumpers
5. Port 4 jumpers
6. Port 5 jumpers
7. Port 6 jumpers
8. Port 7 jumpers
9. ARTIC Card 0 switch setting (3,4 open)
10. ARTIC Card 1 switch setting (3,4,5 open)

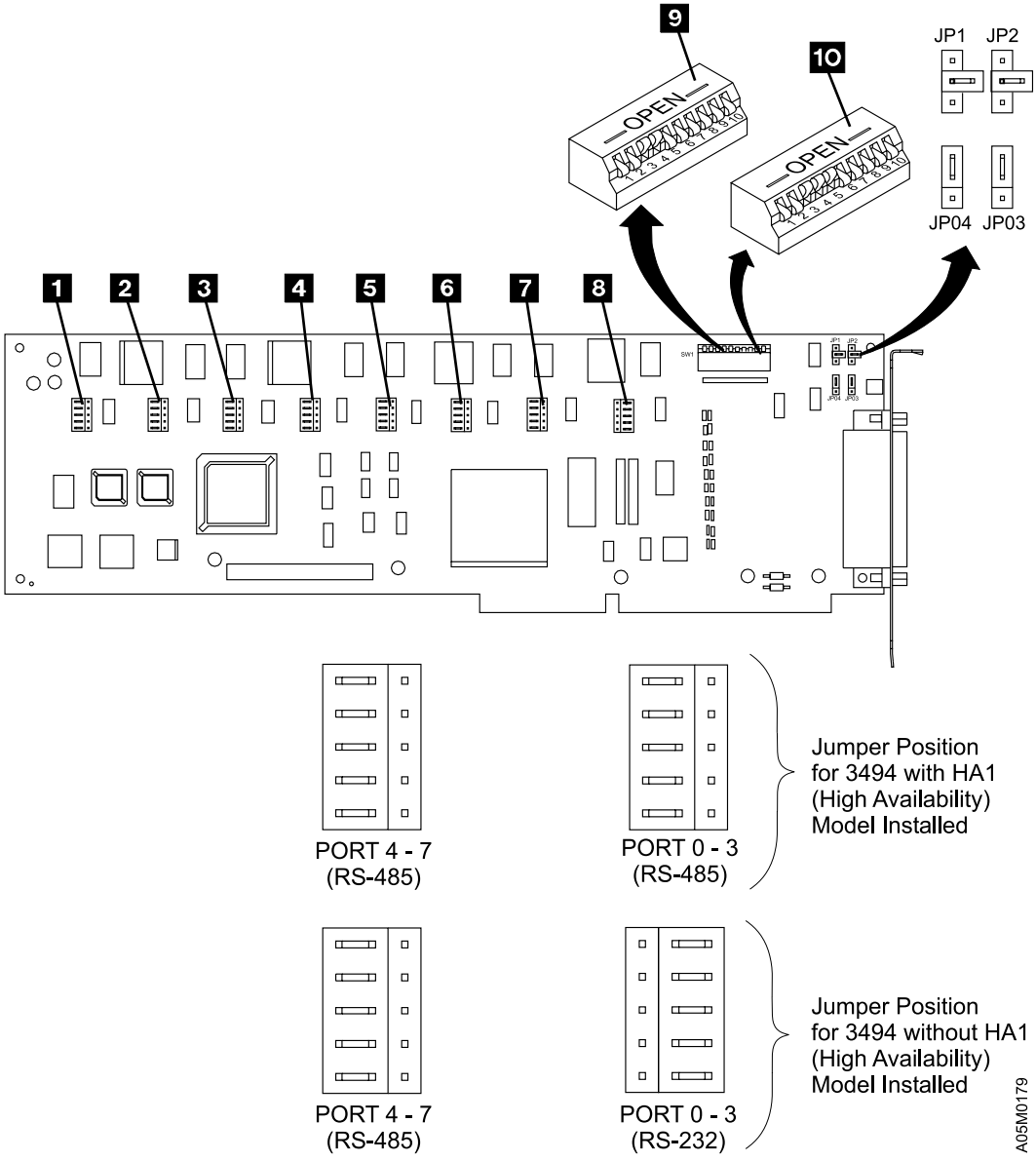


Figure 65. ARTIC186 8 Port Adapter Version 2

Digital Input/Digital Output Card (DI/DO)

See Figure 66. (See also Figure 56 on page LOC-34.)

1. P2 connector
2. P1 connector
3. Switch settings: S1-S2 OFF, S3-S6 ON
4. J1 jumper

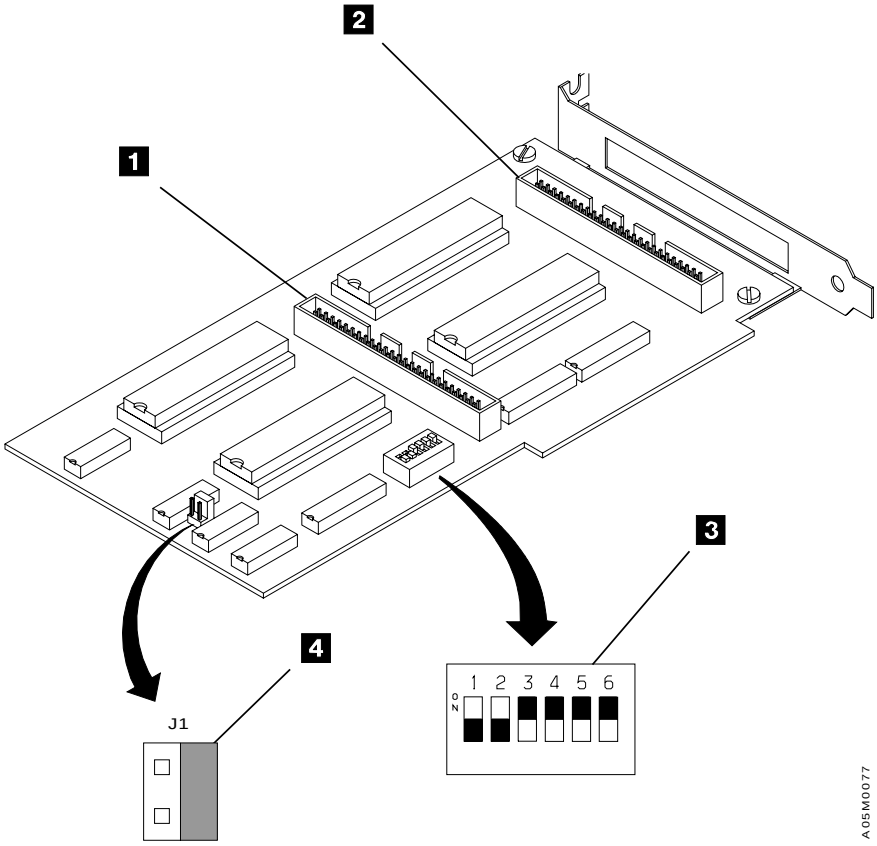


Figure 66. Digital Input/Digital Output (DI/DO) Card

Display Adapter Card

See Figure 67. (See also Figure 56 on page LOC-34.)

1. Test points
2. JP1 jumper
3. J4 connector (no jumpers installed)
4. J3 connector (no jumpers installed)
5. Flat panel display cable connector
6. Not used
7. JP4 jumper (no jumpers installed)

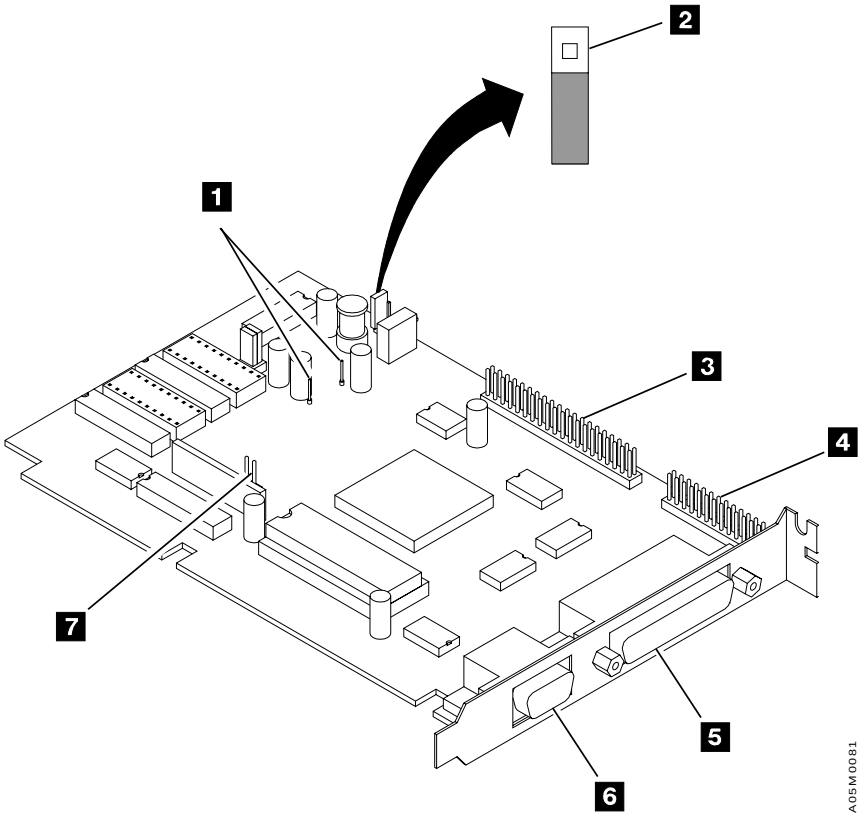


Figure 67. Display Adapter Card

Ethernet Adapter (Optional Feature)

See Figure 68.

1 RJ-45 connector

2 AUI connector

3 BNC connector

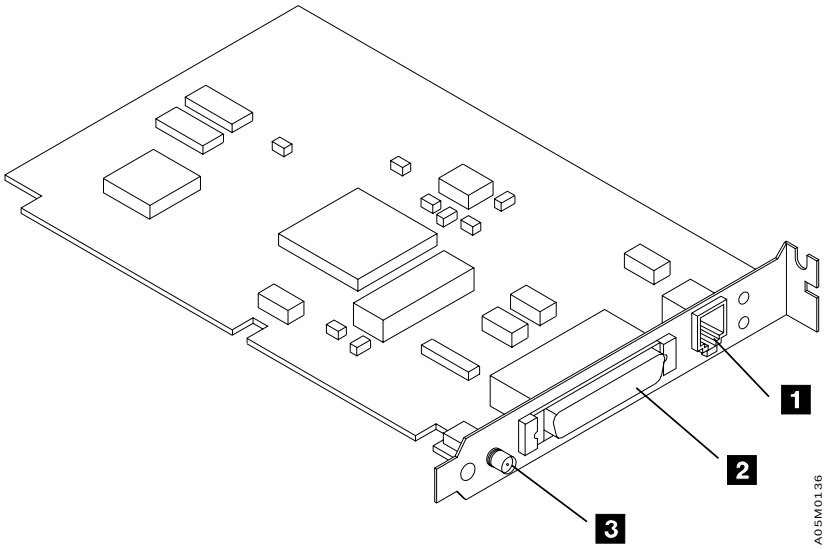


Figure 68. Ethernet Adapter (Optional Feature)

Mirrored Hard Drive Card

See Figure 69.

1	Primary hard drive connector	6	Buzzer switch (not used)
2	Mirror Hard drive connector	7	Primary hard drive channel LED
3	Host connector (to SBC primary IDE connector)	8	Mirror hard drive channel LED
4	J7	9	Status LED
5	J6	10	Status jumper pins (not jumpered)

- **Primary and Mirror Hard Drive LEDs:**

  Green Drive installed on the channel
  Red Drive not installed or channel marked as bad
  Orange Drive activity

- **Status LED:**

  Green Drives are in Mirror mode
  Red Drives are in Single (non-mirror) mode

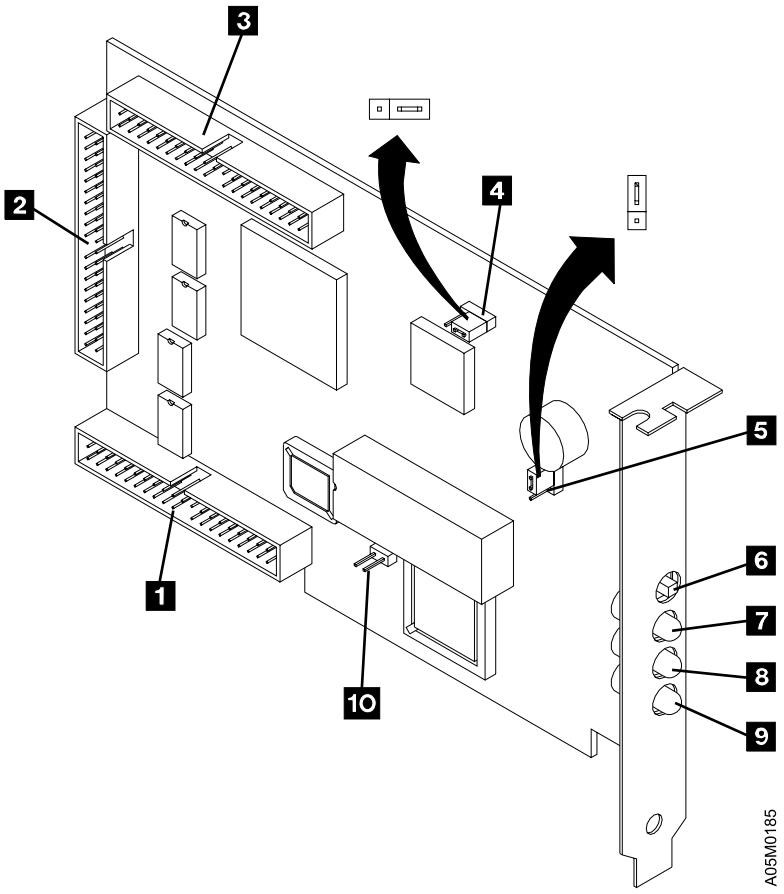


Figure 69. Mirrored Hard Drive Card

Real-Time Interface Coprocessor Multiport Card 0 (ARTIC 0)

See Figure 70. (See also Figure 56 on page LOC-34.)

1. JP15 jumper
2. JP8 jumper
3. JP9 jumper
4. JP2 jumper
5. JP3 jumper
6. SW1 switch settings
7. CIO modules
8. SCC modules
9. ARTIC 0 RS-422 card
10. JP12 jumper
11. JP1 jumper

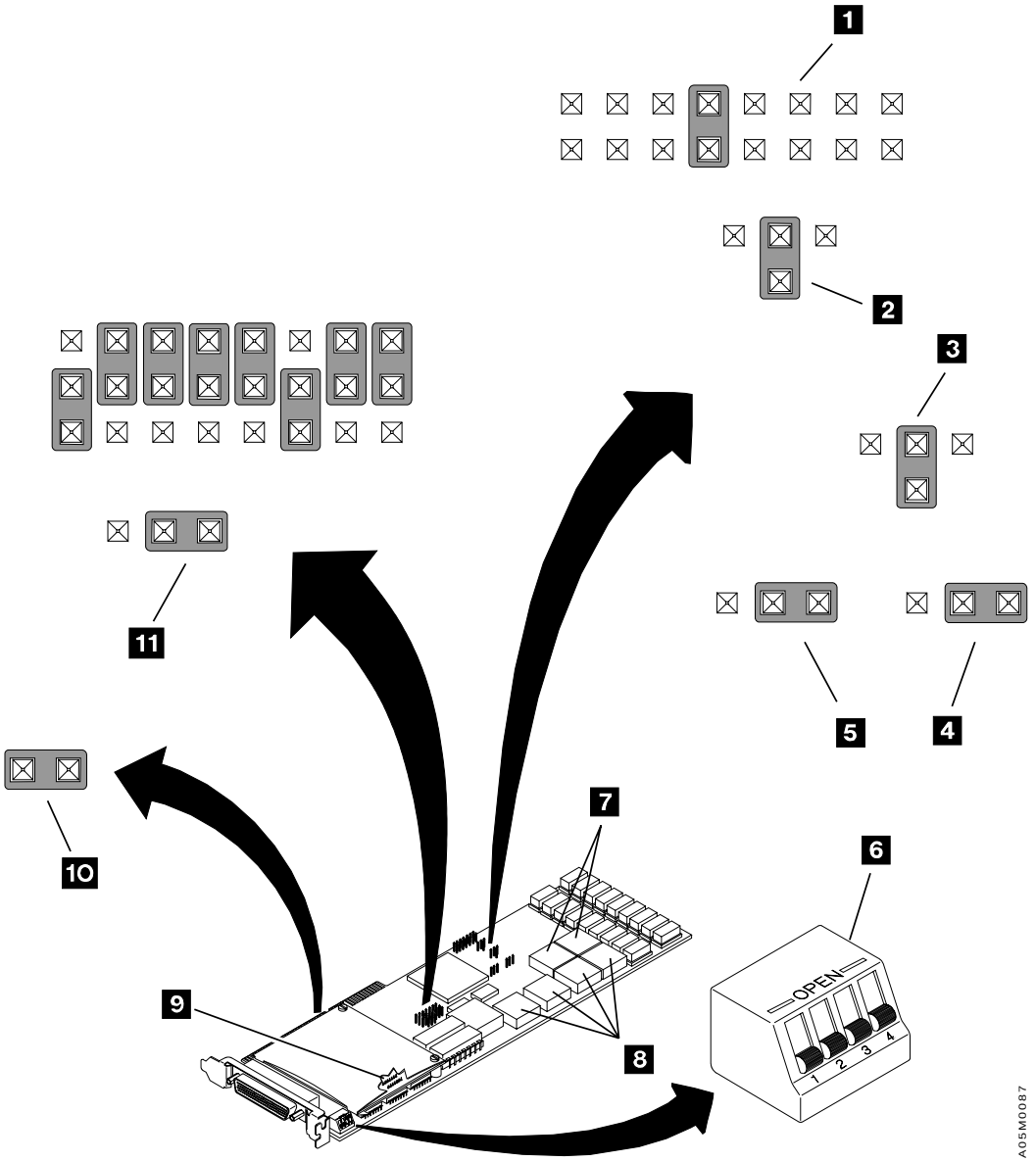


Figure 70. Real-Time Interface Coprocessor Multiport Card 0 (ARTIC 0)

Real-Time Interface Coprocessor Multiport Card 1 (ARTIC 1) (Optional Feature)

This card was used in single library manager libraries only.

See Figure 71.

1. JP15 jumper
2. JP9 jumper
3. JP8 jumper
4. JP2 jumper
5. JP3 jumper
6. SW1 switch settings
7. CIO modules
8. SCC modules
9. ARTIC 1 RS-422 card
10. JP12 jumper
11. JP1 jumper

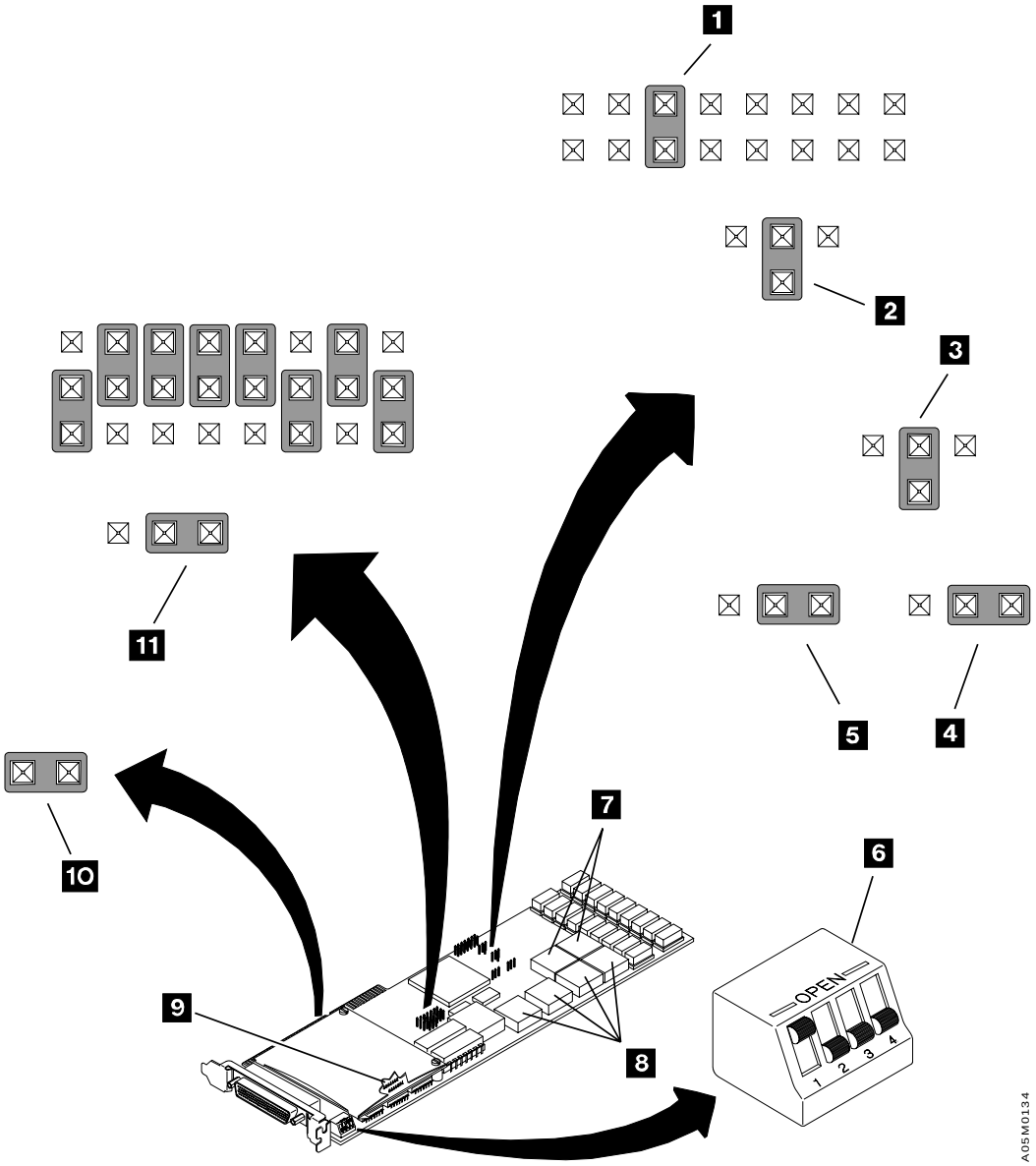


Figure 71. Real-Time Interface Coprocessor Multiport Card 1 (ARTIC 1) (Optional Feature)

Servo Control Card (SRV)

See Figure 72 for the original SRV card p/n 61G9945. See Figure 73 for SRV card p/n 05H8792.

1. No jumpers installed
2. J10 connector
3. Jumpers installed as shown

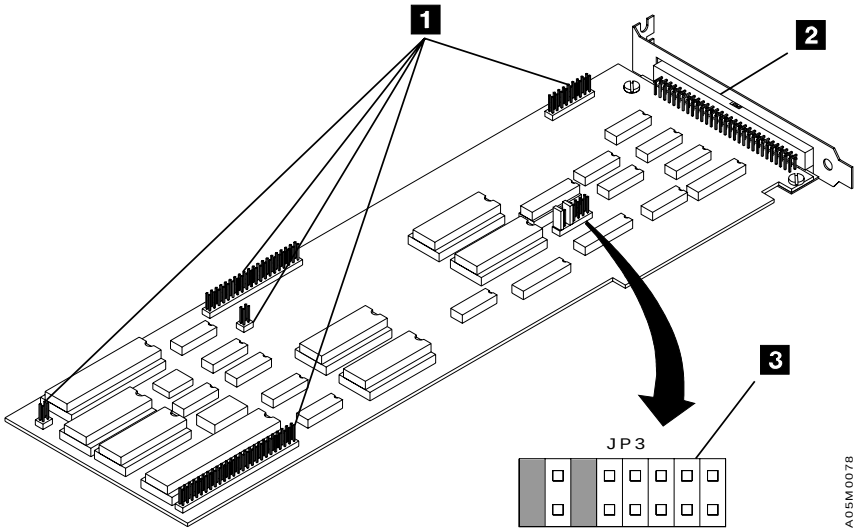


Figure 72. Servo Control Card (SRV) P/N 61G9945

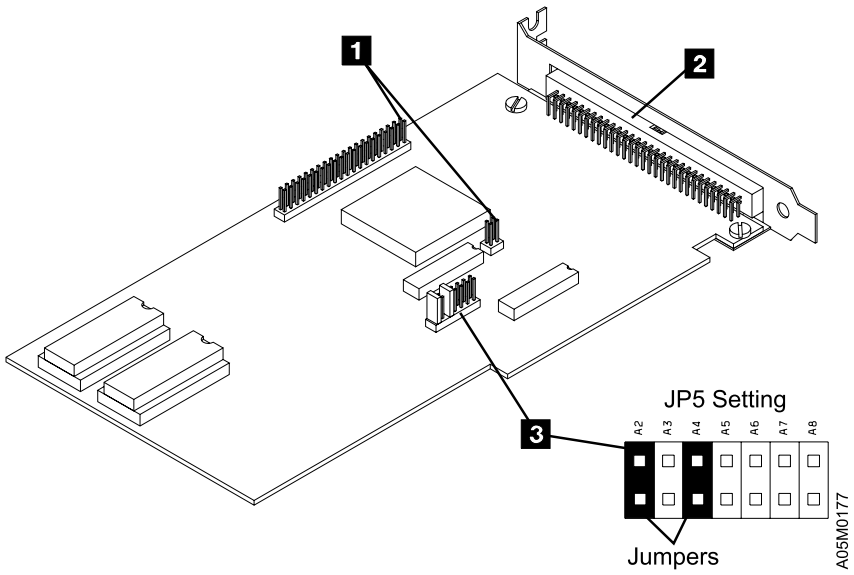


Figure 73. Servo Control Card (SRV) P/N 05H8792

Token Ring Adapter (Optional Feature)

Three different adapter cards have been used for this feature. If your card has switch blocks on it, see Figure 74. If your card has no switch blocks and one telephone RJ-45 connector, see Figure 75 on page LOC-53. If your card has no switch blocks and two connectors (RJ-45 and D-shell), see Figure 76 on page LOC-53.

IBM 16/4 ISA-16 Adapter: See Figure 74.

1. Switch Block 2
2. Switch Block 1
3. IBM Cabling System connector
4. Telephone RJ-45 connector

Switch Block 1 Settings

S1 ON = Shielded cable (IBM Cabling System)
OFF=Unshielded cable (telephone)
S2 OFF

Switch Block 2 Settings

S1	OFF	S5	OFF	S9	OFF
S2	ON	S6	ON	S10	OFF
S3	ON	S7	ON	S11	ON
S4	OFF	S8	ON	S12	ON = 4MB OFF=16MB

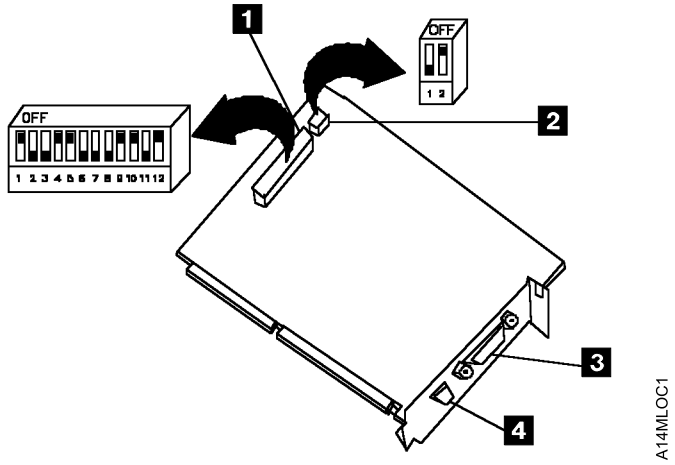


Figure 74. IBM 16/4 ISA-16 Adapter

Options by IBM Auto 16/4 Token-Ring ISA Adapter: See Figure 75.

1 Telephone RJ-45 connector

2 Conversion cable

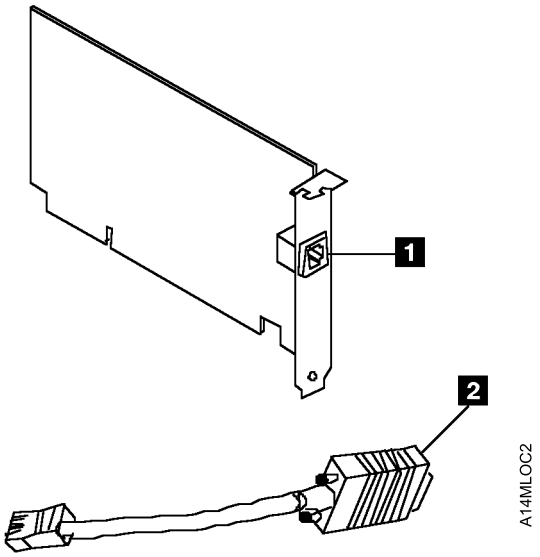


Figure 75. Options by IBM Auto 16/4 ISA Adapter

IBM Auto 16/4 Token-Ring ISA Adapter: See Figure 76.

1 IBM Cabling System connector

2 Telephone RJ-45 connector

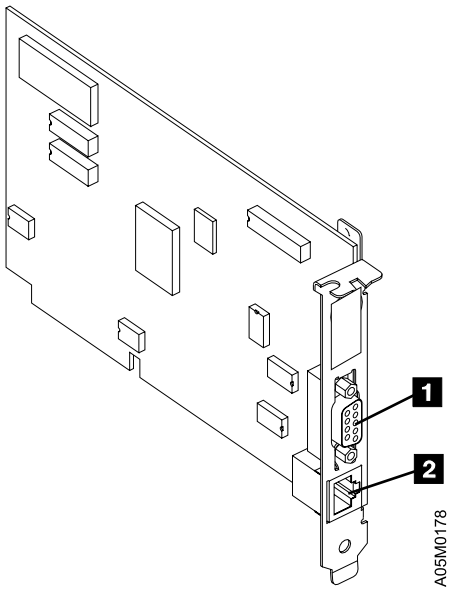


Figure 76. IBM Auto 16/4 ISA Adapter

Connector Pin Numbering

See Figure 77, Figure 78 on page LOC-55, Figure 79 on page LOC-56, and Figure 80 on page LOC-57 for connector type and pin numbering.

See page LOC-57 for connector locations.

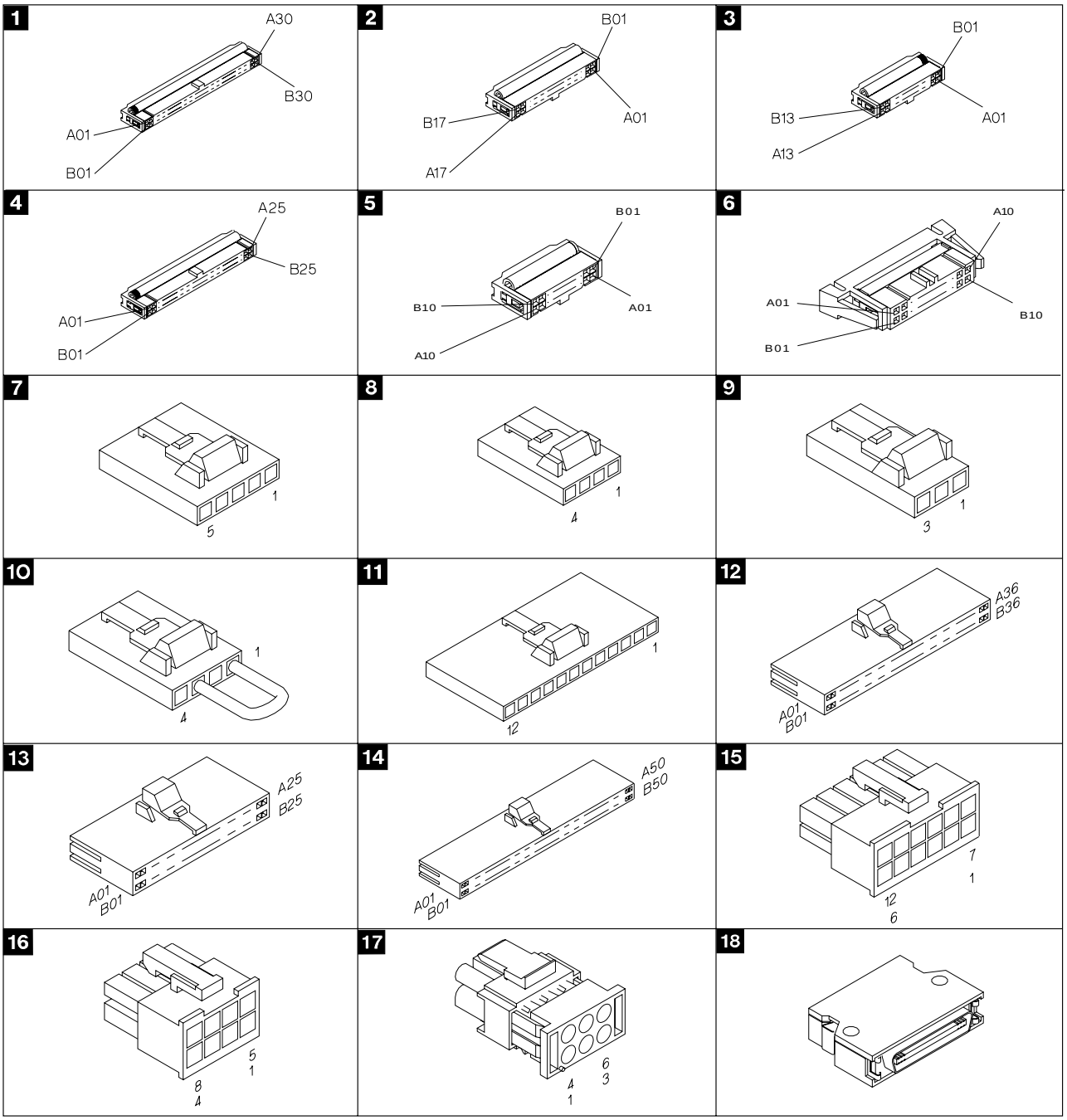


Figure 77. Connector Types 1—18

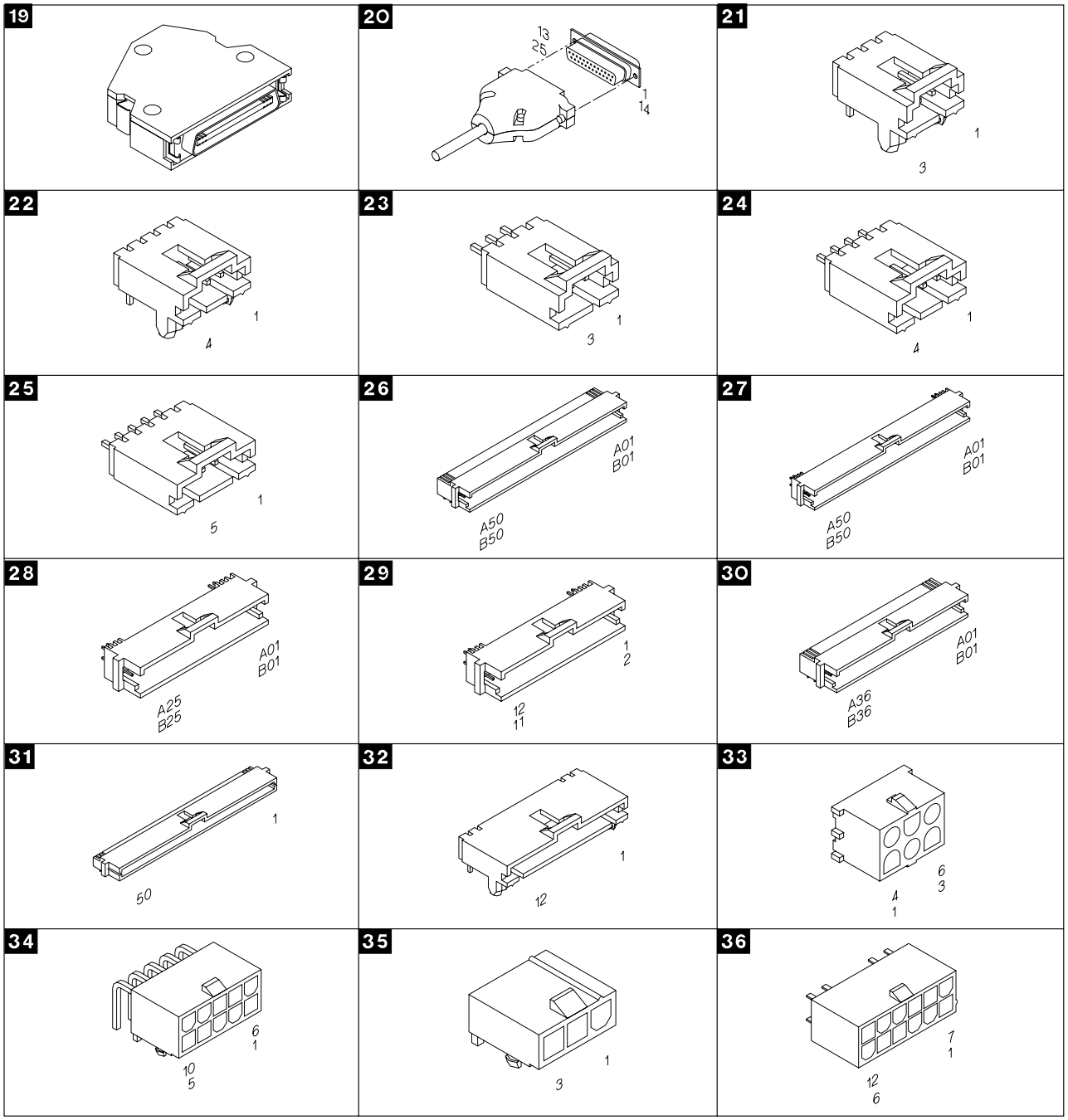


Figure 78. Connector Types 19—36

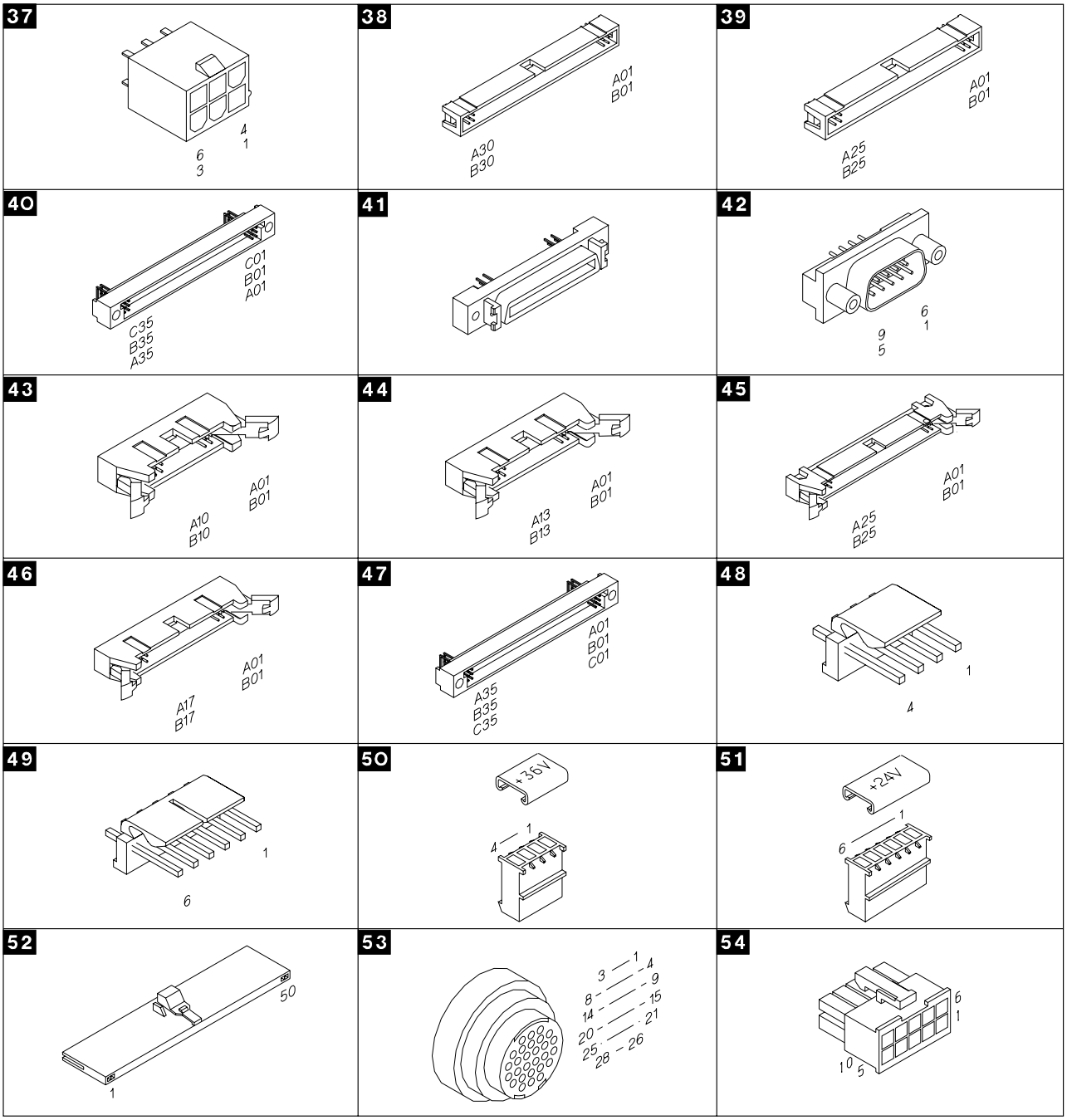


Figure 79. Connector Types 37—54

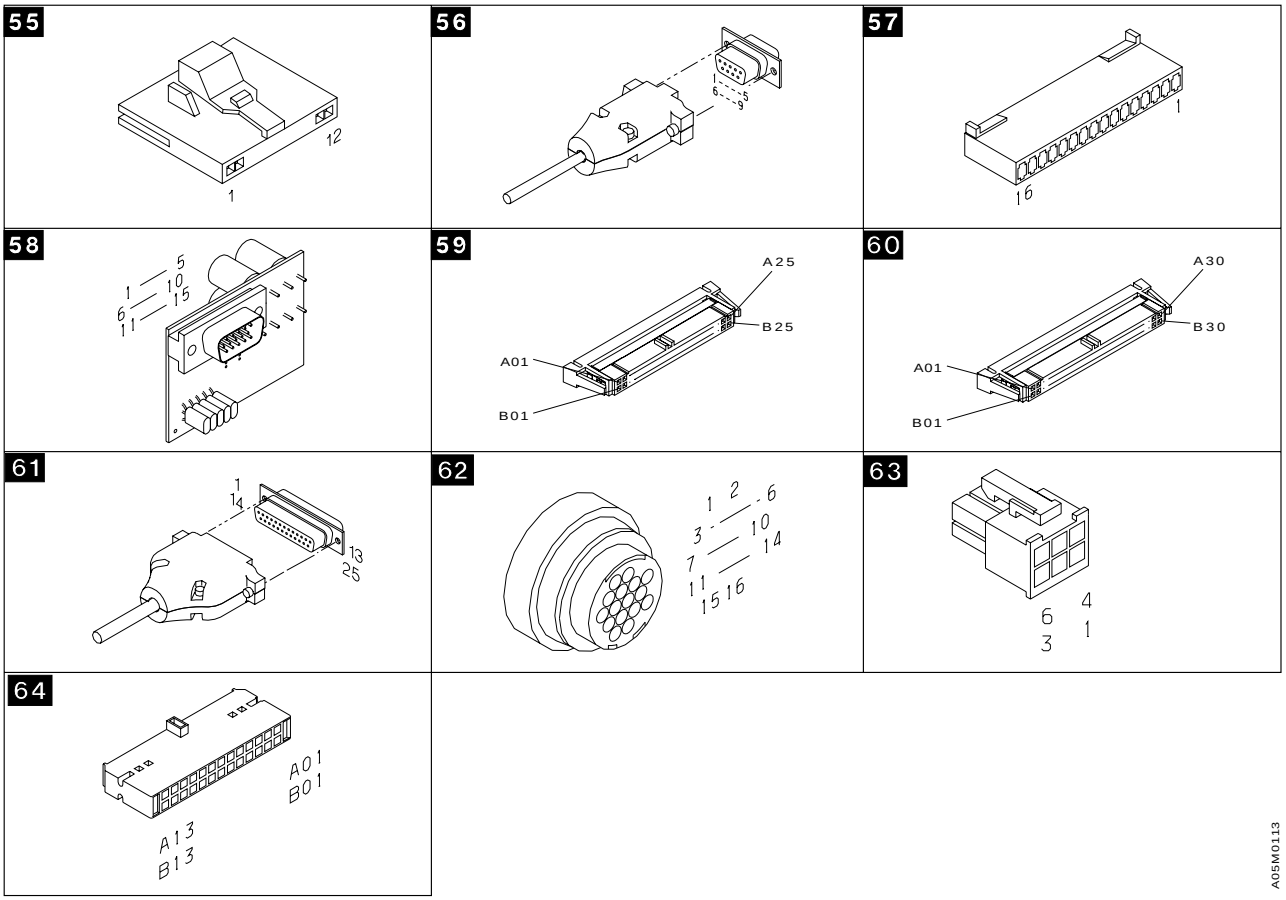


Figure 80. Connector Types 55—64

Connector Locations

See Figure 77 on page LOC-54, Figure 78 on page LOC-55, Figure 79 on page LOC-56, and Figure 80 for connector types and pin numbering.

Connector	Type	Page
Control Unit Frame		
Door interlock switch	08	LOC-4
Door interlock cable	05 06	LOC-4
Operator panel-convenience I/O station	18 19	LOC-4
Unit Emergency Power Off switch	09	LOC-4
Convenience Input/Output Station		
Convenience I/O cable	05	LOC-9
Convenience I/O door closed sensor	08	LOC-9
Convenience I/O door locked sensor	08	LOC-9
+24 V dc power supply	16 51	LOC-10
+36 V dc power supply	16 50	LOC-10
Power control compartment (PCC)	08 17	LOC-10
PCC not present jumper	10	LOC-10
Power control cable and cable from drive unit back to control unit	08 53	LOC-10

Connector	Type	Page
Remote power control	17	LOC-10
Cartridge Accessor		
X-Axis and Y-Axis Assemblies		
X/Y axis motor cables to XAX card	08 62 63 64	LOC-6
X-axis flex cable	14	LOC-6
Y-axis flex cable	52	LOC-6
X-axis home sensor	07 08	LOC-6
Y-axis home sensor and X/Y motors	08	LOC-6
Picker Assembly		
Pivot flex cables	12 13	LOC-7
Pivot motor cables	09	LOC-7
Pivot sensors	08 11	LOC-7
Bar-code reader interface	56	LOC-7
Control Unit Frame Cards		
Bulkhead interconnect card (BIC)		
P1	27	LOC-13
P2	46	LOC-13
P3	44	LOC-13
P4	36	LOC-13
P5	25	LOC-13
P6	43	LOC-13
P7	45	LOC-13
PCC 2–PCC 8	22	LOC-13
BIC to LCC cable	01 02 03	LOC-4
Door interlock card (DIL)		
P1	43	LOC-15
P2	43	LOC-15
P3	08	LOC-15
Grip card and cable assembly		
Grip cartridge present sensor	21	LOC-18
Cartridge seated sensor	24	LOC-18
Reach complete sensor	21	LOC-18
Thumb open sensor	21	LOC-18
Solenoid	21	LOC-18
Reach card		
Calibration sensor	21	LOC-25
GRPR	32	LOC-25
Reach cable	55	LOC-7
Pivot cable	28	LOC-25
Library interconnect card (LCC)		
P1	38	LOC-19
P2	36	LOC-19
P3	34	LOC-19
P4	43	LOC-19

Connector	Type	Page
P5	38	LOC-19
P6	40	LOC-19
P7	42	LOC-19
LCC to BIC	15	LOC-4
Power amplifier to LCC	05 54 57	LOC-10
Machine interface control card (MIC)		
P1	47	LOC-21
P2	48	LOC-21
P3	49	LOC-21
P4	45	LOC-21
P5	39	LOC-21
P6	45	LOC-21
P7	41	LOC-21
P8	24	LOC-21
P9	33	LOC-21
P10	33	LOC-21
X/Y-Axis Card (XAX)		
P1	26	LOC-28
P2	31	LOC-28
P3	44	LOC-28
P4	37	LOC-28
Operator panel card (LPN)		
P1	41	LOC-23
P2	43	LOC-23
P3	23	LOC-23
Picker card (GRI)		
P1	31	LOC-24
P2	30	LOC-24
P3	23	LOC-24
P4	11	LOC-24
Remote power control card (RPC)		
J1	34	LOC-26
J9 host 1	34	LOC-26
J9 host 2	34	LOC-26
J9 host 3	34	LOC-26
J9 host 4	34	LOC-26
J9 host 5	34	LOC-26
J9 host 6	34	LOC-26
J9 host 7	34	LOC-26
J9 host 8	34	LOC-26
Library manager		
DI/DO cable	04 59	LOC-37
Servo control cable	01 60	LOC-37
Library manager interface to drive unit	20 61	LOC-10

Checks, Adjustments, Removals, and Replacements

The CARR section contains maintenance and repair information for the IBM 3494 Tape Library Dataserver. See the LOC section for FRU locations.

Cartridge Accessor

The cartridge accessor identifies and moves cartridges between storage cells, drives, and input/output facilities.

Cartridge Removal

Figure 81 on page CARR-5 shows the picker assembly. Remove the cartridge from the grip assembly as follows:

1. Rotate the picker assembly **1** so the assembly is pointing toward the right side of the machine, paralleling the rails **3**.
2. Push the reach assembly **5** out so it is fully extended.
3. Press the top of the grip assembly **2** to release the cartridge **4**.
4. Push the reach assembly in so it is fully retracted.
5. Place the cartridge in the error recovery cell 1A1 (1A3 with dual gripper).

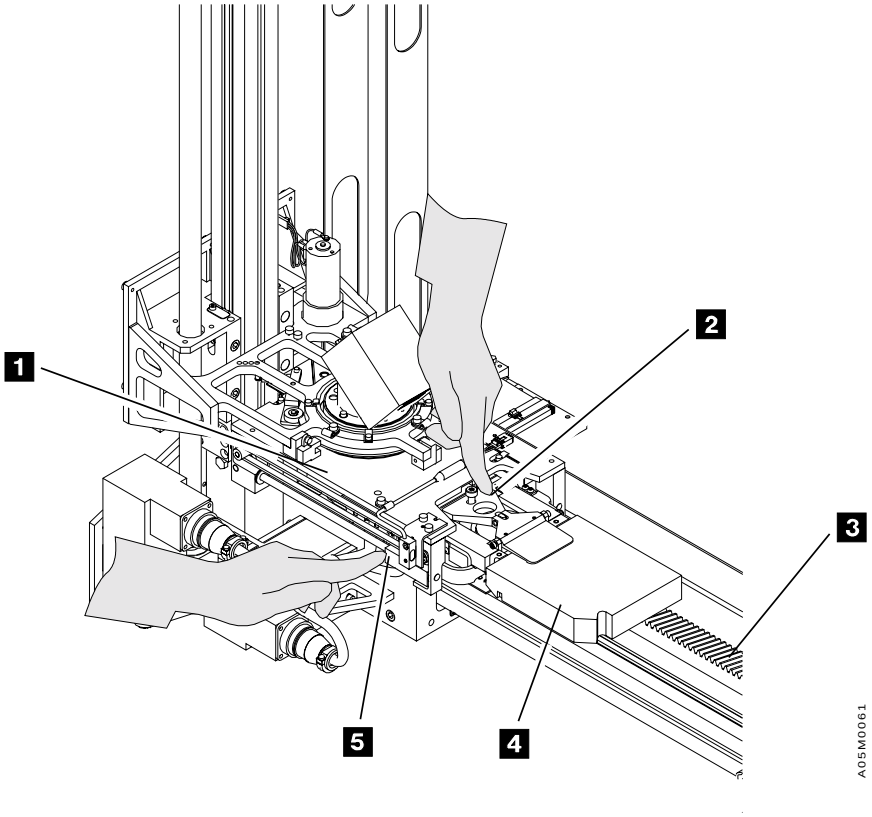


Figure 81. Cartridge Removal

Cartridge Accessor Service Preparation

Dual Accessor Library Service Preparation: In a dual accessor library, a service bay is provided for each accessor. When an accessor fails, the accessor is automatically moved (or pushed) into it's service bay, if possible, and the library continues to operate using the other accessor. Most accessor FRU's can be replaced/repaired while the other accessor is operating, but the accessor control cards require special consideration.

1. Go to “Procedure: Prepare the Library Subsystem for Service” on page START-10 and follow the procedure under **CONCURRENT MAINTENANCE WITH AUTO MODE** for accessor problems.
2. The guided service procedures under **Start call** on the Service pulldown will automatically power the accessor servo power up and down as required.
   a. If you are not using the guided procedures, you must power the accessor servo power off by selecting **Power-off accessor** under **Service bay tests** on the Service pulldown.
3. Before replacing FRUs on the accessor, power off the local 24V power supply and then power off the local 36V power supply.

   Following are the library power conditions required before replacing the accessor control cards:

   DBF2 The DBF2 card located in the right service bay has controls for both accessors so the library can not run without the card installed; however, the card can be replaced without removing library AC power. To replace the card, the library should be placed in Pause mode and the local DC power supplies should be turned off. After the card is replaced, the library can be put back into Auto mode before the local DC power is turned back on.

   DI/DO The DI/DO card for the accessor is located in the local library manager. Before replacing the card, the library manager must be made available for service as described in “Dual Library Manager Service Preparation” on page CARR-91.

   DSW2 The DSW2 card located in the L1x frame has controls for both accessors so the library can not run without the card installed and functional. Before removing the card, the library should be powered off using the Unit Power switch on the Operator panel.

   MIC4 The MIC4 card for an accessor can be removed without removing library AC power; however, the library should be placed in Pause mode and the local DC power supplies should be turned off before removing the card. After removing the card, the library can be put back into Auto mode using the other accessor.

   PMX The PMX card located in the left service bay frame dots the ARTIC interface lines for the two library managers. It does not have any components other then connectors, but in the event that it must be replaced, the library must be offline.

   SEQ3 The SEQ3 card in each D1x or B16 frame contains few components and the library should continue to operate in the event of a failure. However, the library must be powered down using the Unit Power switch on the Operator panel before replacing any of the SEQ3 cards.

   SRV The SRV card for the accessor is located in the local library manager. Before replacing the card, the library manager must be made available for service as described in “Dual Library Manager Service Preparation” on page CARR-91.

   UEP2 The UEP2 card located in the L1x frame controls PCC AC power for all frames so the library can not run without the card installed and functional. Before removing the card, the library should be powered off using the Unit Power switch on the Operator panel.

4. Open the service bay front door and continue with the procedure that sent you here.

   Note: If you are working on accessor A in the left service bay, spread the prongs slightly on the bumper safety guard **2** and slide it over the front of the service bay X-rail **3** near the right end. Push it against the lower right frame member **1** as shown in Figure 82. The bumper safety guard should be stored in the LSB frame on the clip in the lower left corner of the rear wall.

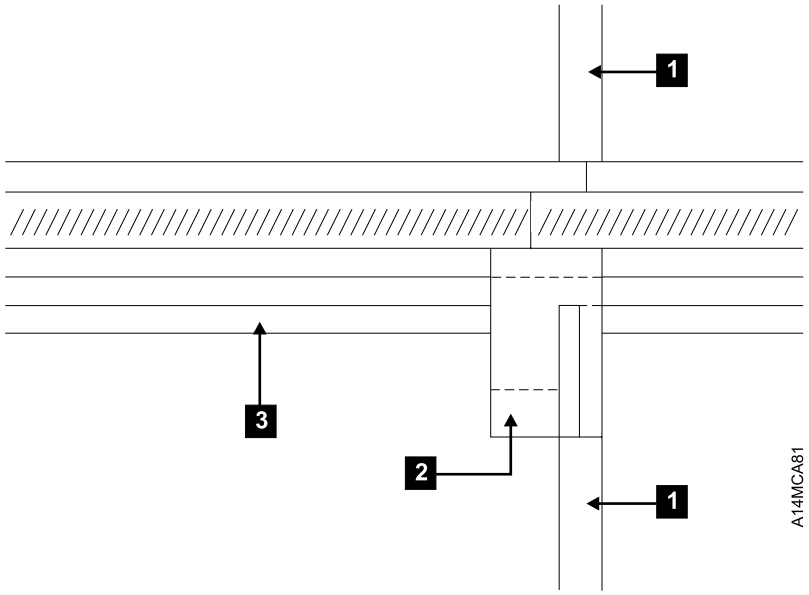


Figure 82. LSB Bumper Safety Guard Placement

Single Accessor Library Service Preparation: In a single accessor library, most accessor failures can be repaired while the library is operated in Manual mode. However, the library must be powered off if an accessor control card (MIC, SRV, LCC/LPC, or DI/DO) needs to be replaced.

1. If you are replacing parts on the accessor and the customer wants to continue to operate in Manual mode, go to “Procedure: Prepare the Library Subsystem for Service” on page START-10 and follow the procedure under **CONCURRENT MAINTENANCE WITH MANUAL MODE**.
2. If you are replacing parts on the accessor and the customer does not want to use Manual mode, go to “Procedure: Prepare the Library Subsystem for Service” on page START-10 and follow the procedure under **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED**.
3. If you are replacing accessor control cards, go to “Procedure: Prepare the Library Subsystem for Service” on page START-10 and follow the procedure under **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED**.

Y-Axis (Vertical) Service Position: See Figure 83.

The Y-axis service position secures the picker assembly in place. There are two positions provided, middle and top. Early accessors have one position at the top.

1. Lift the picker assembly above the desired service position and insert an allen wrench in the opening on the left side of the Y-axis (vertical) assembly **1** . (The allen wrench should not protrude through the Y-axis assembly and interfere with the picker assembly.)

X-Axis Service Position (Single Accessor): See Figure 83.

The X-axis service position secures the X-axis assembly.

1. Move the accessor to the left side of the control unit frame. Insert an allen wrench in the hole in the X-axis (horizontal) assembly **2** .

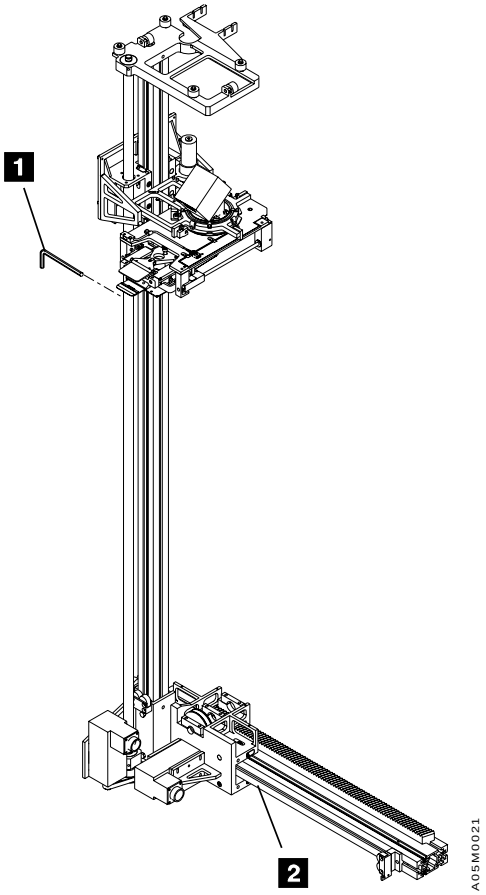


Figure 83. Cartridge Accessor in Service Position

Bar-Code Reader Assembly

See Figure 84. (See also Figure 29 on page LOC-7 for location information.)

Notes:

1. Before replacing the bar-code reader, verify that the COMM B serial port on the library manager has been reset and that the bar-code reader still fails after the port is re-initialized. See error code 2B63 in the FSI section for the reset procedure.
2. A 2.5-mm allen wrench is needed to complete this procedure.

Removal of Bar-Code Reader Assembly

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
4. Unsnap the card cover **3**, if installed, and remove the 2 screws **2** that attach the BCD card to the bar-code reader **6**. (On some libraries, the cover may be held by the 2 screws).
5. Disconnect the 15-pin connector **1** from the bar-code reader. If you have an old-style cable that is soldered onto the BCD card, also remove the cable retaining bracket **4**.
6. Remove the adjustment screw **7** from the bracket.
7. Remove the 2 screws **5** from the opposite side of the bracket.
8. Remove the bar-code reader assembly **6**.

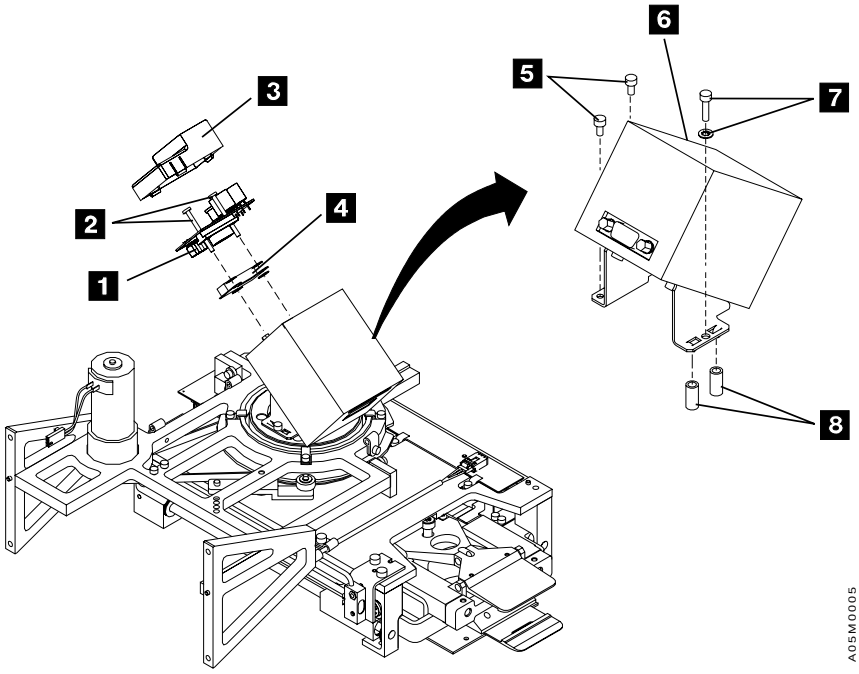


Figure 84. Bar-Code Reader

Replacement of Bar-Code Reader Assembly

1. If the old bar-code reader does not have a stainless steel shim between the reader body and the bracket, remove the shim from the new bar-code reader. The shim is slotted so it may be removed by loosening the 2 screws between the mounting bracket and the bar-code reader, sliding the shim out, and re-tightening the 2 screws.
2. Perform the removal steps in reverse order.

   Note: Ensure that the springs **8** align in the holes of the pivot bearing cap.
3. Go to “Adjustment of Bar-Code Reader Assembly” then return here.
4. Re-teach the accessor as follows:
   a. If the LM code level is before 520, perform “Teach Current Configuration” on page DIAG-5 on one frame. Ensure that the accessor with the new barcode reader is active. The library must be in auto offline mode.
   b. If the LM code level is 520 or later, perform “Teach Scanner Offset” on page DIAG-6. The library should be in auto online mode and the accessor with the new barcode reader must be active (full aisle or dual active) to minimize the impact on operations.

Adjustment of Bar-Code Reader Assembly

1. Before adjusting the bar-code reader, perform the following procedure to clean the lens:
   a. Put the 3494 into pause mode and open the control unit frame or service bay door.
   b. Clean the lens on the bar-code reader assembly with a dry lint-free cloth.
   c. Close the door and set the 3494 into auto mode.
2. Select **Service menu** from the Mode pull-down on the library manager.
3. Select the Rack Get/Put test.
   a. If you have a single accessor library, select **Exercise cartridge accessor** from the service pull-down selections, then select **Rack Get/Put** from the pop-up window.
   b. If you have a dual accessor library, prepare the accessor for service as described in “Procedure: Prepare the Library Subsystem for Service” on page START-10. Go to the LM for the accessor and select **Service bay tests** from the service pull-down selections, then select **Rack get/put** from the pop-up window.
4. Select a cell, usually the CE cell, that is in easy view through the window at the end of the library. The cell you select must contain a cartridge and it must be in the inventory database.

   Note: If you are adjusting the bar-code reader assembly during installation before cartridges are inventoried or in the service bay of a dual accessor library, skip step 8 on page CARR-11.

   Perform the following steps to verify the adjustment:
   a. Follow this procedure to adjust the reader assembly using the CE cell and complete the installation. On a dual accessor library, return the accessor to standby or active status.
   b. Observe the performance of the reader assembly during customer inventory to add cartridges and/or during customer operation.
   c. During Inventory if several retries are required in multiple columns on a side, re-adjust the reader assembly using this complete adjustment procedure after the customer inventory completes.
   d. If you have a dual accessor library and you are getting a high number of read retries on an accessor, arrange a PM time with the customer and take the library offline to re-adjust the

reader assembly using the full-aisle Exercise cartridge accessor, Rack get/put test at each end of the library.

5. Select **OK** and run the test one time by selecting **OK** again on the next pop-up window.
6. After the test completes, view the alignment of the bar-code reader scan line with respect to the cartridge label.
7. Note if the scan line is slanted down or up on the right side of the cartridge label (as *viewed* by the bar-code reader).
8. Repeat this procedure for a cell on the door side of the last frame in the library that is in easy view through the window on the right end of the library (for example, for a one-frame library use 2A20, for a two-frame library use 4A20, etc.). The cell you select must contain a cartridge and it must be in the inventory database.

   Note: Note the orientation of the scan line (right or left) as viewed by the bar-code reader and not relative to the front of the library.

9. Again, note if the scan line is slanted down or up on the right side of the cartridge label (as viewed by the bar-code reader).
10. If the scan line is slanted down to the right side on both the drive and door sides or up to the right side on both the drive and door sides, perform the following adjustment procedure:

    a. On a single accessor library, set the 3494 in pause mode and open the door. On a dual accessor library, select Accessor power off on the Service bay tests menu and open the service bay door.

    b. Using a 2.5-mm allen wrench, turn the adjustment screw **7** (shown in Figure 84 on page CARR-9)

       - If the scan line is slanted *down* to the right, turn the adjustment screw counterclockwise to raise the right end of the scan line.
       - If the scan line is slanted *up* to the right, turn the adjustment screw clockwise to lower the right end of the scan line.

         Note: One full turn of the screw raises or lowers the right end of scan line approximately 1 mm (0.04 in.).

11. Close the door. Repeat step 2 on page CARR-10 through step 10 to verify that the scan line is now parallel with the cartridge labels on both the drive and door sides of the library.

    Note: The scan line may not exactly parallel the labels on both sides of the library. Balance the adjustment between the front and back cartridge labels.

12. If the scan line is not parallel with the cartridge labels, repeat steps 10a through 11.

Calibration Sensor Assembly

See Figure 85 on page CARR-13. (See also Figure 29 on page LOC-7 for location information.)

Removal of Calibration Sensor Assembly

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
4. Remove the 2 screws **3** that secure the calibration sensor assembly bracket to the reach platform.
5. Remove the screw **4** that secures the cable clamp to the reach platform.
6. Disconnect the cable connector **1** from the reach card.
7. Remove the calibration sensor assembly **2** .

Replacement of Calibration Sensor Assembly

1. Perform the removal steps in reverse order.
2. Re-teach the library as follows:
   a. If you have a single accessor library, perform “Teach Current Configuration” on page DIAG-5 on the entire library.
   b. If you have a dual accessor library, perform “Teach Accessor” on page DIAG-6.

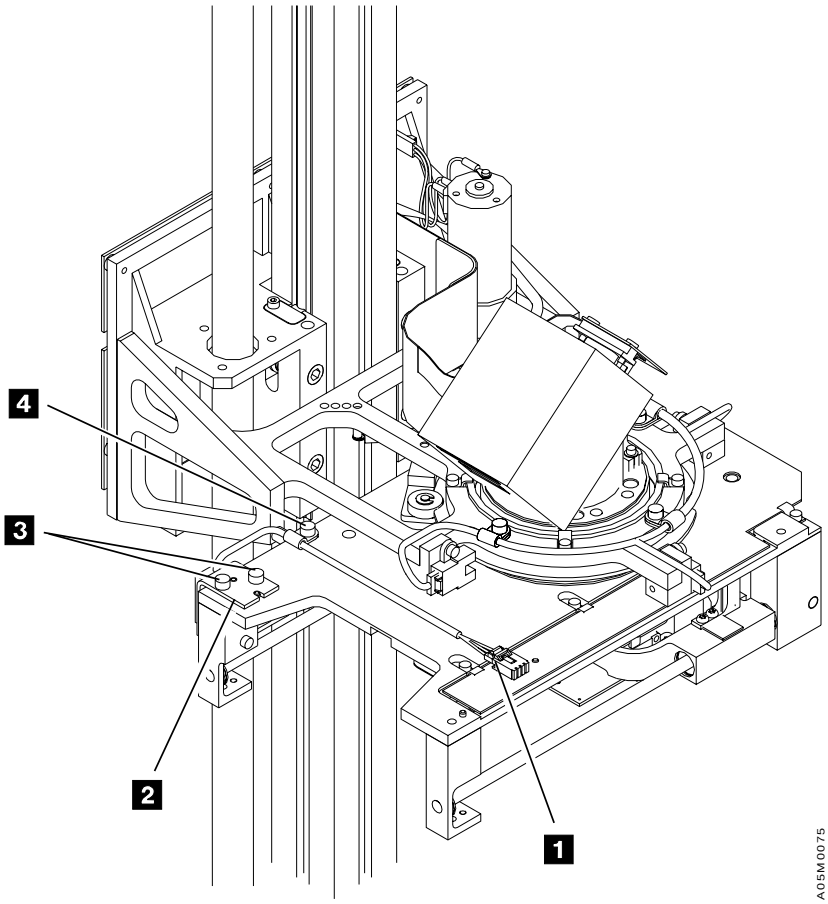


Figure 85. Calibration Sensor Assembly

Grip Assembly

See Figure 86 on page CARR-15. (See also Figure 30 on page LOC-8 for location information.)

Removal of Grip Assembly

1. If you are working on gripper 1:
   a. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
   b. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
   c. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.

   Note: Remove Reach Assembly 2 if it is installed. Refer to step 4 on page CARR-40 through step 6 on page CARR-40 of procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40.
2. If you are working on gripper 2, perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40, place Reach Assembly 2 on a work surface, and then return here.
3. Position the grip assembly **6** so that the belt clamp **5** is under the belt clamp access hole **2**, loosen the 2 screws **4** that attach the belt clamp **5** to the grip assembly, and disengage the belt **3** from the clamp **5**.
4. Remove the grip card and cable assembly. Perform procedure “Grip Card and Cable Assembly (GRP)” on page CARR-24, and then return here.
5. Remove 2 screws **7** and **9** that secure the shafts **1** to the reach assembly, slide the shafts forward, and carefully remove the grip assembly.
6. Remove the reach end-of-travel flag. Perform the procedure “Reach End-of-Travel Flag” on page CARR-46.

   Note: Save the bumpers **8** and the reach end-of-travel flag for installation of the new grip assembly.

Replacement of Grip Assembly

Note: Clean the old Loctite adhesive threadlocker from the screw threads and apply the new Loctite adhesive threadlocker before replacing the screws.

1. Perform the removal steps in reverse order.

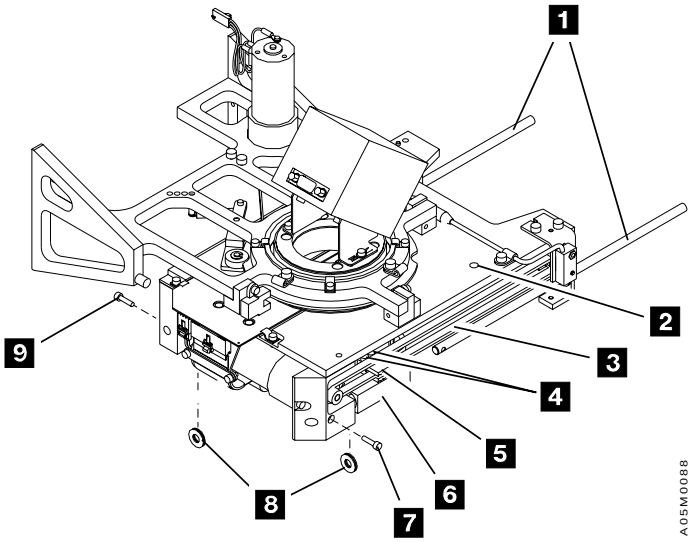


Figure 86. Grip Assembly

Grip Assembly Sensors

Cartridge Seated Sensor: See Figure 87 on page CARR-17. (See also Figure 30 on page LOC-8 for location information.)

Note: You need a 2.5-mm allen wrench to complete this procedure.

Removal of Cartridge Seated Sensor (CSS)

1. If you are working on gripper 1:
   a. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
   b. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
   c. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
2. If you are working on gripper 2, perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40, place Reach Assembly 2 on a work surface, and then return here.
3. Loosen the screw **1** that secures the clamp **2** to the cartridge seated sensor (CSS) **6**.
4. Rotate the holding cable clamp **2** out of the way.
5. Disconnect the CSS connector **6** from the grip card and cable assembly (GRP) **5**.

Replacement of Cartridge Seated Sensor (CSS)

1. Perform the removal steps in reverse order.
2. Go to “Adjustment of Cartridge Seated Sensor (CSS).”

Adjustment of Cartridge Seated Sensor (CSS)

1. Position the sensor so the end of the sensor **3** is flush with the grip body plate. It must not protrude beyond the grip body plate.
2. Verify that the LED **7** on the sensor body is visible through the cutout in the grip body plate.
3. Tighten the holding clamp screw **2**.
4. Ensure that the eject bar **4** does not contact the sensor. Verify by pushing in and releasing the eject bar **4**.

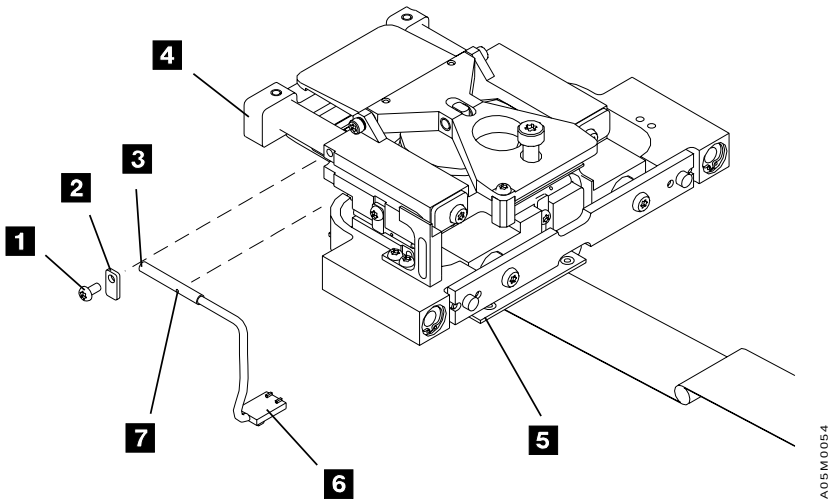


Figure 87. Cartridge Seated Sensor

Grip Cartridge Present Sensor: See Figure 88 on page CARR-19. (See also Figure 30 on page LOC-8 for location information.)

Note: You need a 2.5-mm allen wrench to complete this procedure.

Removal of Grip Cartridge Present Sensor (CPS)

1. If you are working on gripper 1:
   a. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
   b. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
   c. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
2. If you are working on gripper 2, perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40, place the Reach Assembly 2 on a work surface, and then return here.
3. Loosen the screw **1** that secures the clamp **2** to the cartridge present sensor (CPS) **7**.
4. Rotate the holding cable clamp **2** out of the way.
5. Disconnect the CPS connector **7** from the grip card and cable assembly (GRP) **6**.

Replacement of Grip Cartridge Present Sensor (CPS)

1. Perform the removal steps in reverse order.
2. Go to “Adjustment of Grip Cartridge Present Sensor (CPS).”

Adjustment of Grip Cartridge Present Sensor (CPS)

1. Position the sensor so the end of the sensor **3** is flush with the grip body plate. It must not protrude beyond the grip body plate.
2. Verify that the LED **8** on the sensor body is visible through the cutout in the grip body plate.
3. Tighten the holding clamp screw **2**.
4. Ensure that the flag **4** on the eject bar **5** does not contact the sensor. Verify by pushing in and releasing the eject bar **5**.

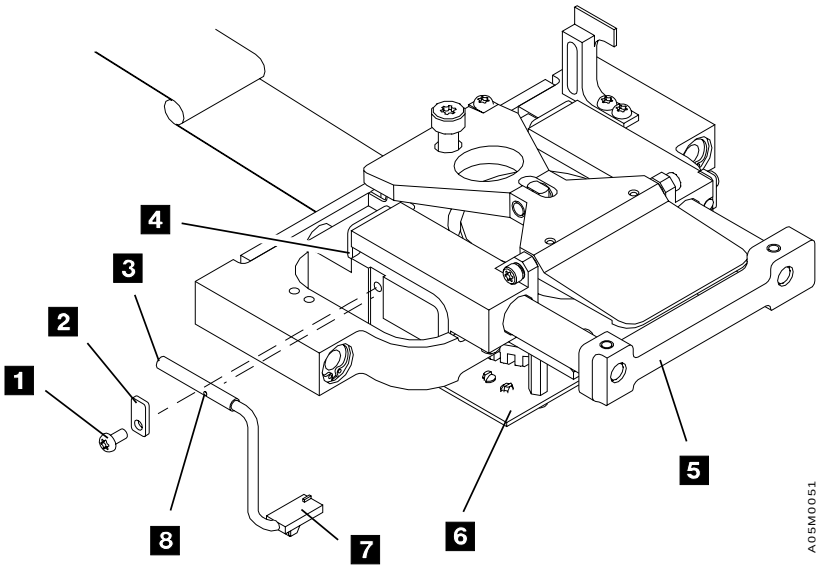


Figure 88. Grip Cartridge Present Sensor

Reach Compliance Sensor: See Figure 89 on page CARR-21. (See also Figure 30 on page LOC-8 for location information.)

Note: You need a 2.5-mm allen wrench to complete this procedure.

Removal of Reach Compliance Sensor (RCS)

1. If you are working on gripper 1:
   a. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
   b. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
   c. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
2. If you are working on gripper 2, perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40, place Reach Assembly 2 on a work surface, and then return here.
3. Loosen the screw **1** that secures the clamp **2** to the reach compliance sensor (RCS) **5**.
4. Rotate the holding cable clamp **2** out of the way.
5. Disconnect the RCS connector **5** from the grip card and cable assembly (GRP) **4**.

Replacement of Reach Compliance Sensor (RCS)

1. Perform the removal steps in reverse order.
2. Go to “Adjustment of Reach Compliance Sensor (RCS).”

Adjustment of Reach Compliance Sensor (RCS)

1. Position the sensor so the end of the sensor **3** is flush with the grip body plate. It must not protrude beyond the grip body plate.
2. Verify that the LED **6** on the sensor body is visible through the cutout in the grip body plate.
3. Tighten the holding clamp screw **2**.

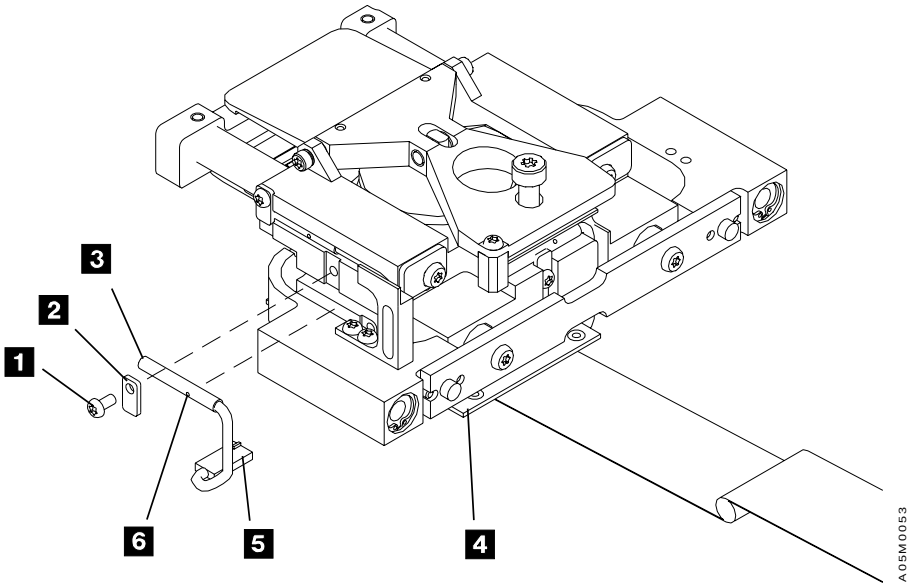


Figure 89. Reach Compliance Sensor

Thumb Open Sensor: See Figure 90 on page CARR-23. (See also Figure 30 on page LOC-8 for location information.)

Note: You need a 2.5-mm allen wrench to complete this procedure.

Removal of Thumb Open Sensor (TOS)

1. If you are working on gripper 1:
   a. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
   b. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
   c. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
2. If you are working on Reach Assembly 2, perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40, place Reach Assembly 2 on a work surface, and then return here.
3. Loosen the screw **3** that secures the clamp **2** to the thumb open sensor (TOS) **4**.
4. Rotate the holding cable clamp **2** out of the way.
5. Disconnect the TOS connector **4** from the grip card and cable assembly (GRP) **6**.

Replacement of Thumb Open Sensor (TOS)

1. Perform the removal steps in reverse order.
2. Go to “Adjustment of Thumb Open Sensor (TOS).”

Adjustment of Thumb Open Sensor (TOS)

1. Position the sensor so that the end of the sensor **5** is flush with the grip body plate. It must not protrude beyond the grip body plate.
2. Ensure the LED **1** on the sensor body is visible through the cutout of the grip body plate.
3. Tighten the holding clamp screw **2**.
4. Ensure the flag **7** on the thumb **8** does not contact the sensor.
5. Verify by operating the thumb manually.

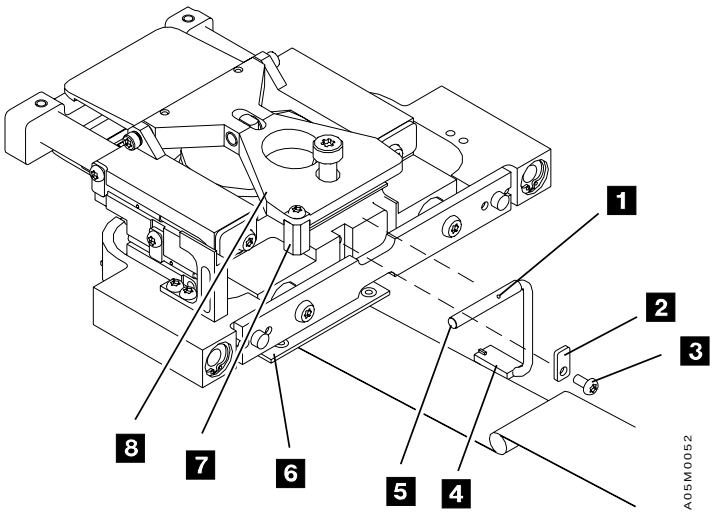


Figure 90. Thumb Open Sensor

Grip Card and Cable Assembly (GRP)

See Figure 91 on page CARR-25. (See also Figure 30 on page LOC-8 for location information.)

Removal of Grip Card and Cable Assembly (GRP)

1. If you are working on gripper 1:
   a. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
   b. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
   c. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.

   Note: Remove Reach Assembly 2 if it is installed. Refer to step 4 on page CARR-40 and step 6 on page CARR-40 of procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40.
2. If you are working on gripper 2, perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40, place Reach Assembly 2 on a work surface, and then return here.
3. Loosen the screw **9** and remove the other screw **11** that attach the clamp to the reach card bracket, and disconnect the grip card cable connector **10**.
4. Disconnect the solenoid **3**, the cartridge present sensor **2**, the reach compliance sensor **5**, the cartridge seated sensor **6**, and the thumb open sensor **1** from the grip card and cable assembly **7**.
5. Remove the 4 screws **4** that secure the card assembly to the grip assembly, remove the spacer **8**, and remove the card.

   Note: Save the spacer for installation of the new grip card assembly.

Replacement of Grip Card and Cable Assembly (GRP)

Note: Clean the old Loctite adhesive threadlocker from the screw threads and apply the new Loctite adhesive threadlocker before replacing the screws.

Perform the removal steps in reverse order.

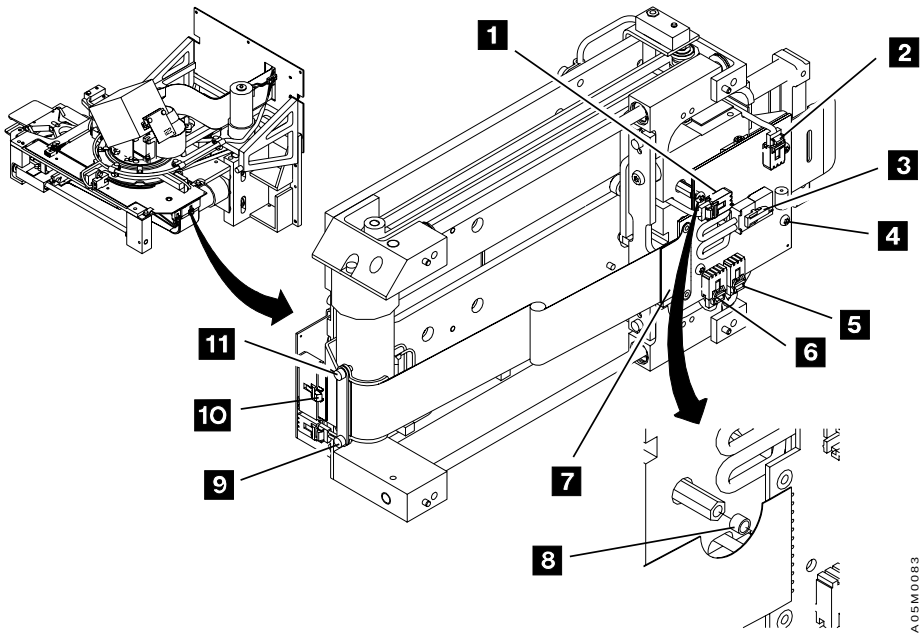


Figure 91. Grip Card and Cable Assembly (GRP)

Grip Finger

See Figure 92 on page CARR-27. (See also Figure 30 on page LOC-8 for location information.)

Removal of Grip Finger

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
4. Push the grip assembly out until you have access to the grip finger screws **1**.
5. Remove the 2 screws **1** securing the grip finger **2** to the grip assembly.
6. Lift the grip finger off the 2 pins and remove the grip finger.

Replacement of Grip Finger

Install the grip finger **2** on the grip assembly by positioning the grip finger over the 2 pins and securing the grip finger with the 2 screws removed earlier.

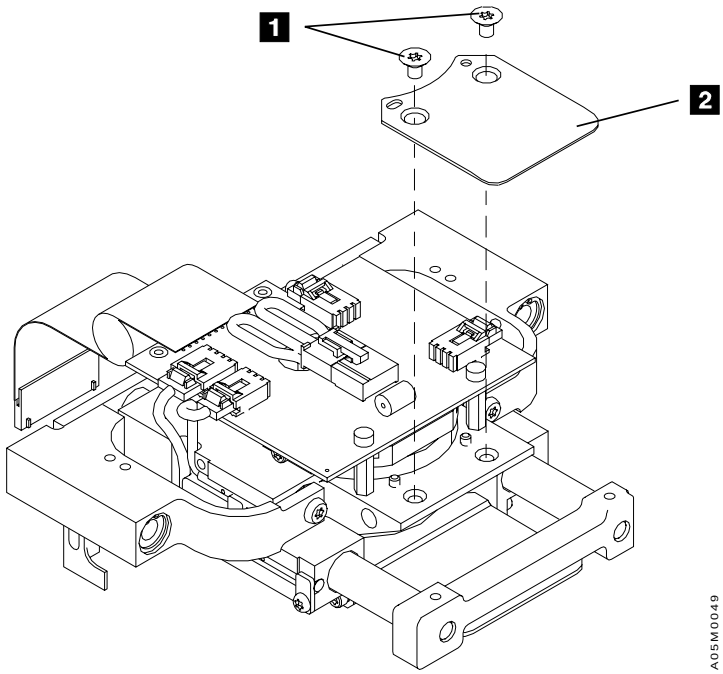


Figure 92. Grip Finger

Picker Assembly

The picker assembly consists of several FRUs. See the LOC section for the location of each FRU in the picker assembly.

See Figure 93 on page CARR-29. (See also Figure 27 on page LOC-5 and Figure 29 on page LOC-7 for location information.)

Removal of Picker Assembly

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
4. Disconnect the pivot flex cable **3**, pivot sensor cable **1**, the Y-axis flex cable **6**, and the pivot motor cable **4** (from the back of the picker card **2**).
5. Remove the 2 screws **7** that secure the Y-axis cable to the picker assembly. If your library as a Y-axis cable back plate, observe its location between the Y-axis cable and the pivot casting and set it aside for re-installation when you re-attach the cable.
6. **Attention** To prevent damage to the picker assembly, carefully remove the screws holding the assembly so that it does not fall.

   Remove the 4 screws **5** that secure the picker assembly to the pivot bracket.
7. Remove the picker assembly **8**.

Replacement of Picker Assembly

1. Perform the removal steps in reverse order.
2. Ensure that the 2 alignment pins **9** align to the Y-axis bearing assembly.

   Notes:

   a. Do not tighten the 2 screws **7** that secure the Y-axis flex cable **6** to the picker assembly before plugging the cable into the connector on the picker card **2**.

   b. Align the cable carefully with the connector, plug it into the connector, and then tighten the screws **7**.

   c. When replacing the Y cable clamp, ensure that the back plate is placed between the cable and pivot casting and is angled at the top and flat at the bottom. The angle at the top is to allow clearance to the frame.

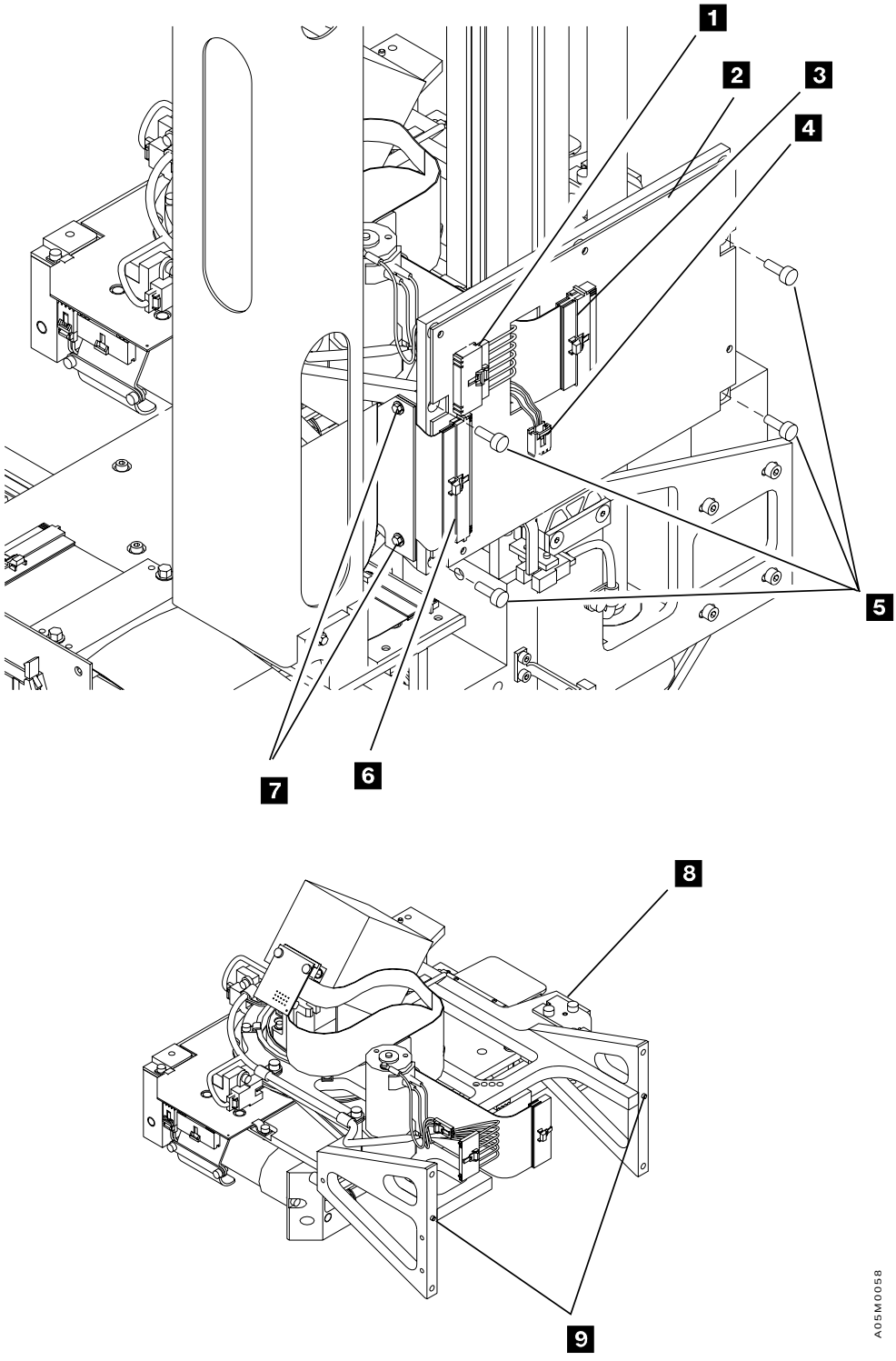


Figure 93. Picker Assembly

Pivot Assembly

See Figure 29 on page LOC-7 for location information.

Pivot Assembly Removal

1. Remove the Picker Assembly. Perform the procedure“Removal of Picker Assembly” on page CARR-28 and then return here.
2. Place the Picker Assembly on a work surface.
3. Remove the Bar-code Reader Assembly. Perform the procedure “Bar-Code Reader Assembly” on page CARR-9 and then return here.
4. Remove Reach Assembly 2, if installed. Perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40 and then return here.
5. Remove Reach Assembly 1. Perform the procedure “Reach Assembly 1” on page CARR-38 and then return here.
6. Remove the pivot flex cable. Perform the procedure “Pivot Flex Cable” on page CARR-33 and then return here.
7. Remove the pivot sensor cable. Perform the procedure “Pivot Sensor Cable Removal” on page CARR-36 and then return here.

Pivot Assembly Replacement

1. Perform the removal procedure in reverse order.
2. Re-teach the library as follows:
   a. If you have a single accessor library, perform “Teach Current Configuration” on page DIAG-5 on the entire library.
   b. If you have a dual accessor library, perform “Teach Accessor” on page DIAG-6.

Pivot Belt

See Figure 94. (See also Figure 29 on page LOC-7 for location information.)

Removal of Pivot Belt

1. Remove the picker assembly and carefully place it on a work table. Perform the procedure “Removal of Picker Assembly” on page CARR-28, and then return here.
2. Remove the reach assembly. Go to “Reach Assembly 1” on page CARR-38, and then return here.
3. If the assembly has a spring pin **3**, loosen the spring pin.
4. Remove the 3 screws **1** that secure the pivot motor in place.
5. Remove the pivot belt **2**.

Replacement of Pivot Belt

Note: Clean the old Loctite adhesive threadlocker from the screw threads and apply the new Loctite adhesive threadlocker before replacing the screws.

Perform the removal steps in reverse order. If your assembly has a spring pin **3**, go to “Pivot Belt Adjustment.”

Pivot Belt Adjustment

1. Loosen the motor screws **1** 1/2 to 3/4 turn from tight.
2. Tighten the spring pin **3** until it is fully engaged, then back it off 2 to 2.5 turns.
3. Tighten the motor screws **1**.

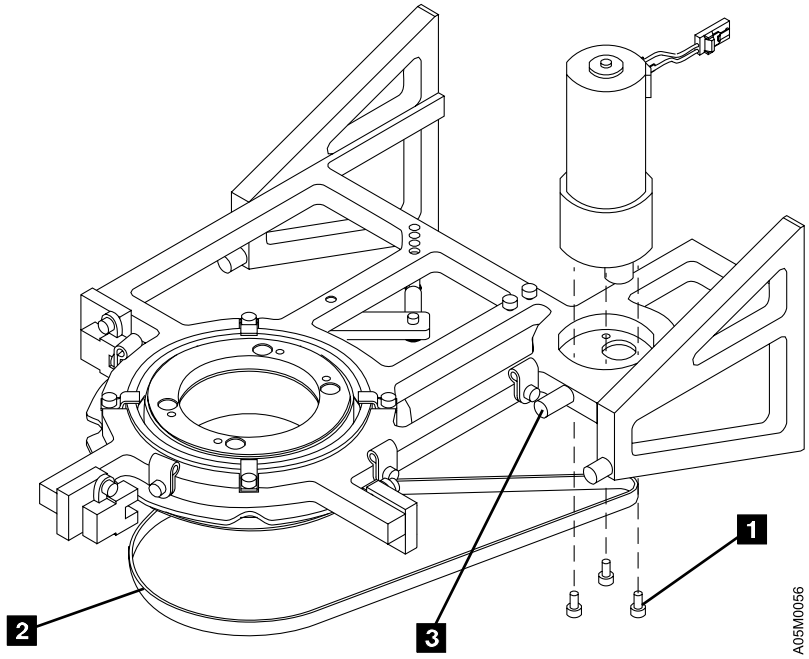


Figure 94. Pivot Belt

Pivot Detent Arm

See Figure 95. (See also Figure 29 on page LOC-7 for location information.)

Removal of Pivot Detent Arm

1. Remove the picker assembly and carefully place it on a work table. Perform the procedure “Removal of Picker Assembly” on page CARR-28, and then return here.
2. Remove the reach assembly **3**. Go to “Reach Assembly 1” on page CARR-38, and then return here.
3. Remove the retaining clip **4** that secures the pivot detent arm **5**.
4. Manually disconnect the spring **2** from the pivot housing **1**.
5. Remove the pivot detent arm **5**.

Replacement of Pivot Detent Arm

Perform the removal steps in reverse order.

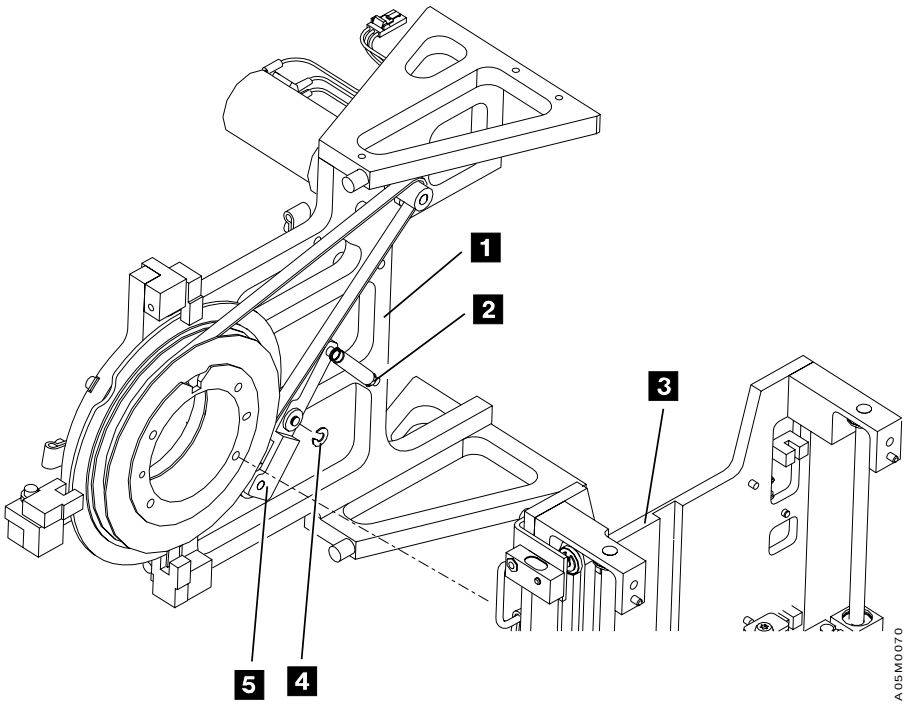


Figure 95. Pivot Detent Arm

Pivot Flex Cable

See Figure 96. (See also Figure 29 on page LOC-7 for location information.)

Removal of Pivot Flex Cable

1. Perform procedure “Removal of Bar-Code Reader Assembly” on page CARR-9, then return here.
2. Disconnect the pivot flex cable connector **3** from the back of the picker card **2**.
3. Remove the 2 screws **1** that secure the pivot flex cable to the picker assembly.
4. If you have the old-style cable with the BCD card soldered to the cable:
   a. Remove the top screw **7** that secures cable clamp **6** to the pivot flex cable assembly **3**.
   b. Loosen the screw **5** on the other side of the cable clamp.
5. If you have the new-style cable that plugs into a separate BCD card:
   a. Remove the 2 screws holding the cable clamp **6** in place.
   b. Disconnect the cable from the 2 BCD card cable connectors and set the card to the side for re-installation with the new cable.
6. Disconnect the cable connector **8** from the reach card **9**.

Replacement of Pivot Flex Cable

Note: Clean the screws and apply new Loctite adhesive threadlocker before replacing them.

1. Perform the removal steps in reverse order.
2. Adjust the bar-code reader. See “Adjustment of Bar-Code Reader Assembly” on page CARR-10.

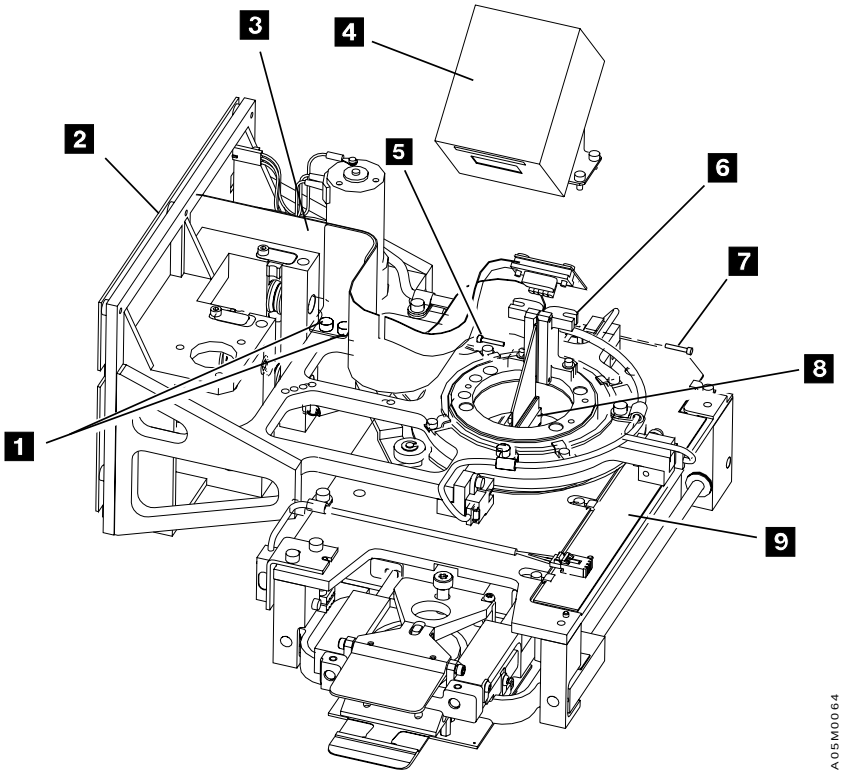


Figure 96. Pivot Flex Cable

Pivot Gear Motor

See Figure 97 on page CARR-35. (See also Figure 29 on page LOC-7 for location information.)

Removal of Pivot Gear Motor

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
4. Disconnect the pivot gear motor cable connector **1** from the back of the picker card **2**.
5. Remove the 3 screws **4** that secure the motor **3** and remove the motor.

Replacement of Pivot Gear Motor

Note: Clean the old Loctite adhesive threadlocker from the screw threads and apply the new Loctite adhesive threadlocker before replacing the screws.

1. Perform the removal steps in reverse order. Loop the belt around the pulley.
2. If your assembly has a spring pin (see **3** in Figure 94 on page CARR-31), go to “Pivot Belt Adjustment” on page CARR-31.

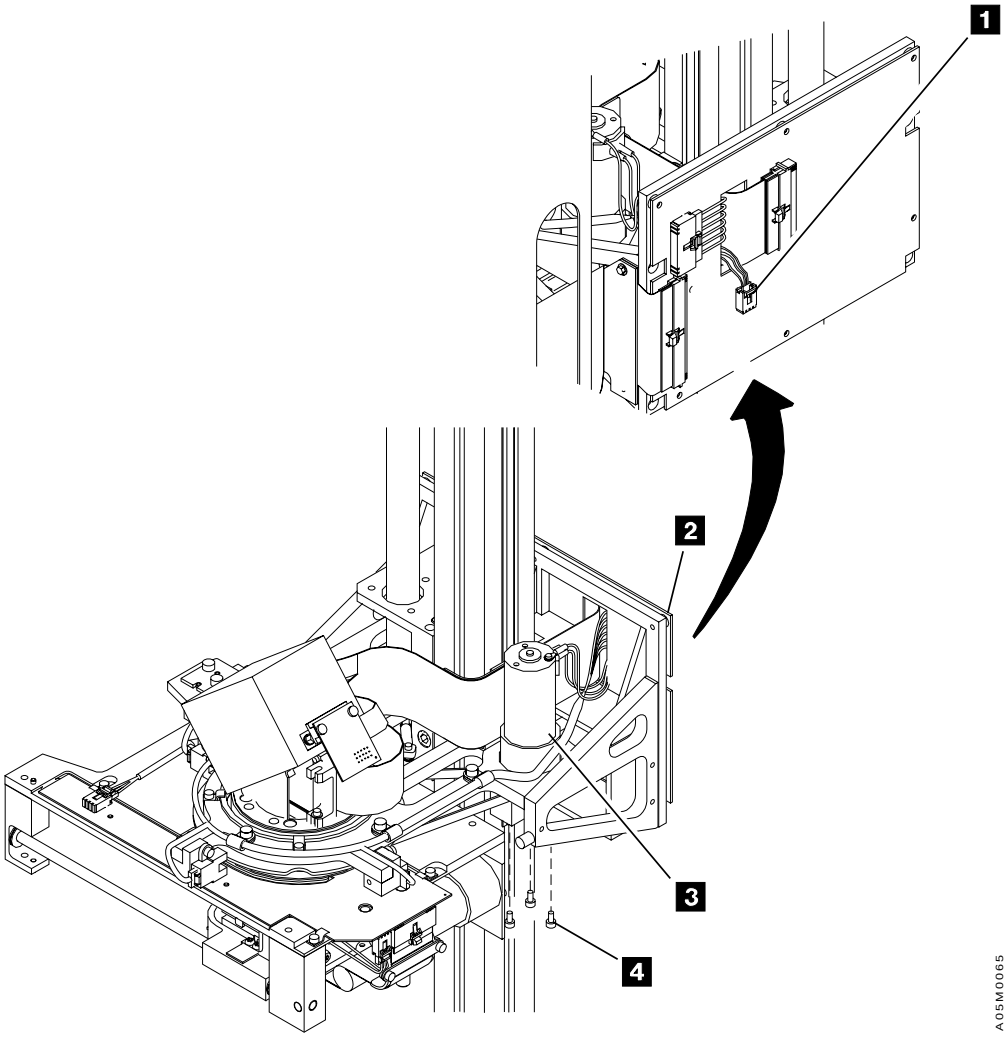


Figure 97. Pivot Gear Motor

Pivot Sensor (Front, Center, and Rear) and Pivot Sensor Cable

See Figure 98 on page CARR-37. (See also Figure 29 on page LOC-7 for location information.

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.

Pivot Sensor Removal

1. Remove the sensor cable connector from the sensor **2**, **4**, or **6** that you want to replace.
2. Remove the screw that secures the sensor to the pivot assembly frame.

Pivot Sensor Cable Removal

1. Remove the sensor cable connectors from the sensors **2**, **4**, and **6**.
2. Remove the three cable clamps **1**, **3**, **5**, and one clamp that is not shown behind the bar-code reader assembly.
3. Remove the pivot sensor cable connector P4 from the Picker Card (GRI). See Figure 46 on page LOC-24 for location information.
4. Remove the pivot sensor cable from the picker assembly.

Pivot Sensor and Pivot Sensor Cable Replacement

Perform the removal procedure in reverse order.

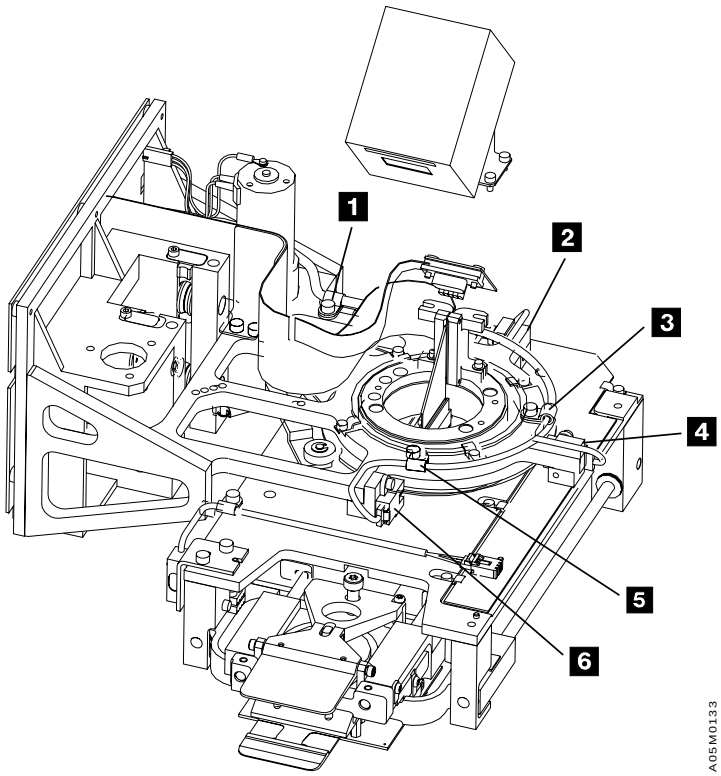


Figure 98. Pivot Sensors (front, center, and rear)

Reach Assembly 1

See Figure 99 on page CARR-39. (See also Figure 29 on page LOC-7 for location information.)

Note: The Reach Assembly 1 is not a FRU. This procedure is provided for FRUs that require removal of the entire assembly. The Reach Assembly 1 consists of the calibration sensor, grip assembly, reach belt, reach belt idler assembly, reach card (RCH), and reach gear motor. See the specific FRU procedure before using this procedure.

Removal of Reach Assembly 1

1. Remove the bar-code reader assembly **1**. Go to "Removal of Bar-Code Reader Assembly" on page CARR-9 and then return here.
2. Remove Reach Assembly 2 if it is installed. Refer to step 4 on page CARR-40 through step 6 on page CARR-40 of procedure "Reach Assembly 2 (Optional Feature)" on page CARR-40.
3. Remove the top screw **4** in the cable clamp that secures the pivot flex cable **10**.
4. Loosen the other screw **2** from the other side of the cable clamp.
5. Loosen the screw **3** that secures the cable clamp to the pivot assembly.
6. Disconnect the cable connector **5** from the reach card.
7. Manually move the grip assembly **6** to the extended position.
8. Remove the 4 screws **7** that secure the reach assembly to the pivot assembly.

   Attention Be careful not to damage the grip card and cable connectors when removing the reach assembly.
9. Remove the reach assembly **8**.

Replacement of Reach Assembly 1

Note: Clean the old Loctite adhesive threadlocker from the screw threads and apply the new Loctite adhesive threadlocker before replacing the screws.

1. Perform the removal steps in reverse order.
2. Ensure that the reach assembly faces the same direction as the pivot sensor flag **9**.
3. Re-teach the library as follows:
   a. If you have a single accessor library, perform "Teach Current Configuration" on page DIAG-5 on the entire library.
   b. If you have a dual accessor library, perform "Teach Accessor" on page DIAG-6.
4. Adjust the bar-code reader. See "Adjustment of Bar-Code Reader Assembly" on page CARR-10.

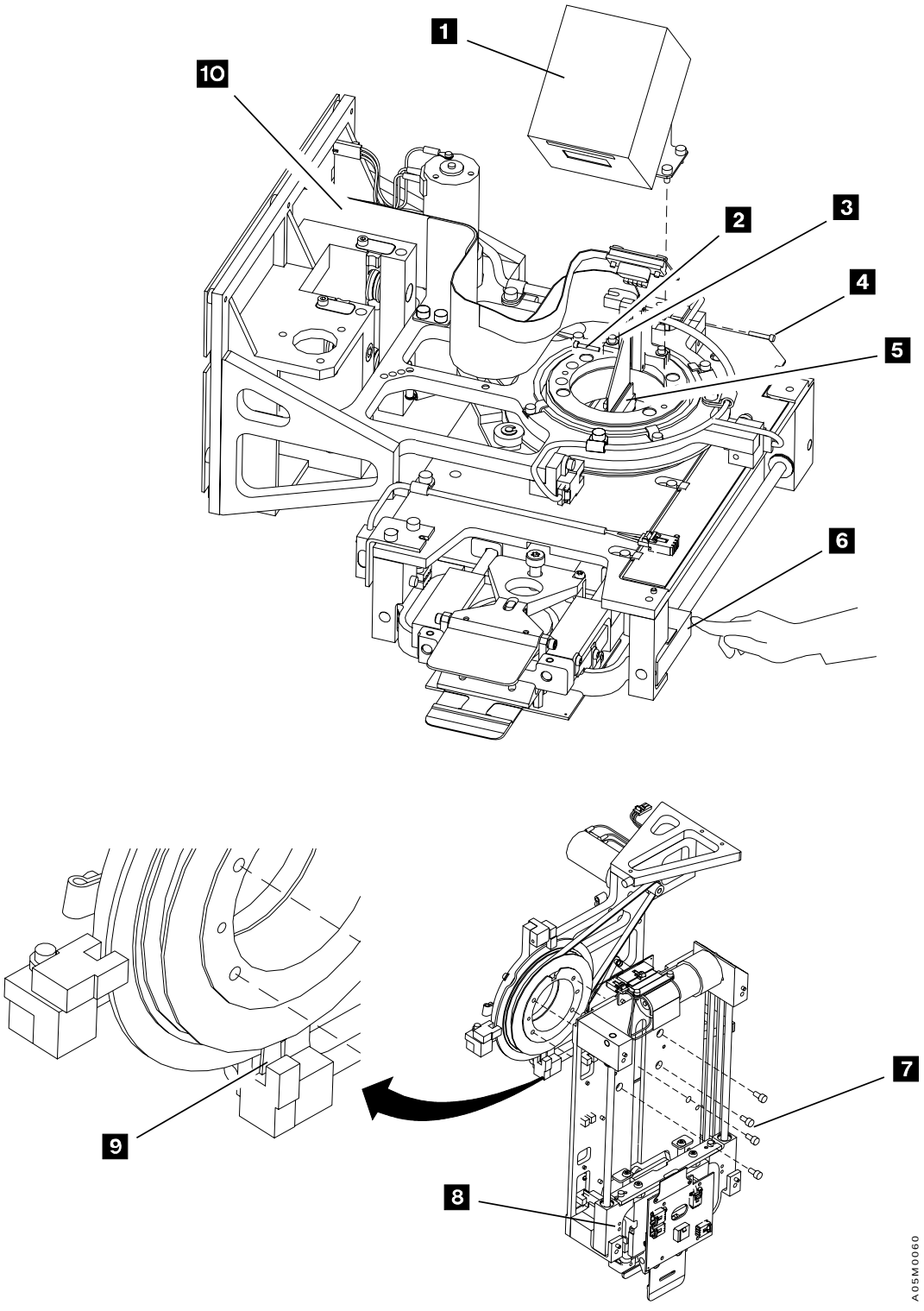


Figure 99. Reach Assembly 1

Reach Assembly 2 (Optional Feature)

See Figure 100 on page CARR-41. (See also “Picker Assembly” on page LOC-7 for location information.)

Note: The Reach Assembly 2 is not a FRU. This procedure is provided for FRUs that require removal of the entire assembly. The Reach Assembly 2 consists of the grip assembly, reach belt, reach belt idler assembly, reach card (RCX), and reach gear motor.

Removal of Reach Assembly 2

1. If this is a single accessor library, put the library in **Pause** mode and open the front door.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
4. Unplug Reach Assembly 2 cable **2** from Reach Assembly 1 **1**.
5. Remove four screws **3** and lock-washers that secure Reach Assembly 2 to Reach Assembly 1.
6. Remove Reach Assembly 2 **4**.

   Note: The library can operate with only Reach Assembly 1 while you are repairing this assembly. You can make gripper 2 unavailable from the availability pull-down menu and put the library in **Auto/Online** mode.

Replacement of Reach Assembly 2

1. Perform the removal steps in reverse order.
2. Re-teach the library as follows:
   a. If you have a single accessor library, perform “Teach Current Configuration” on page DIAG-5 on the entire library.
   b. If you have a dual accessor library, perform “Teach Accessor” on page DIAG-6.

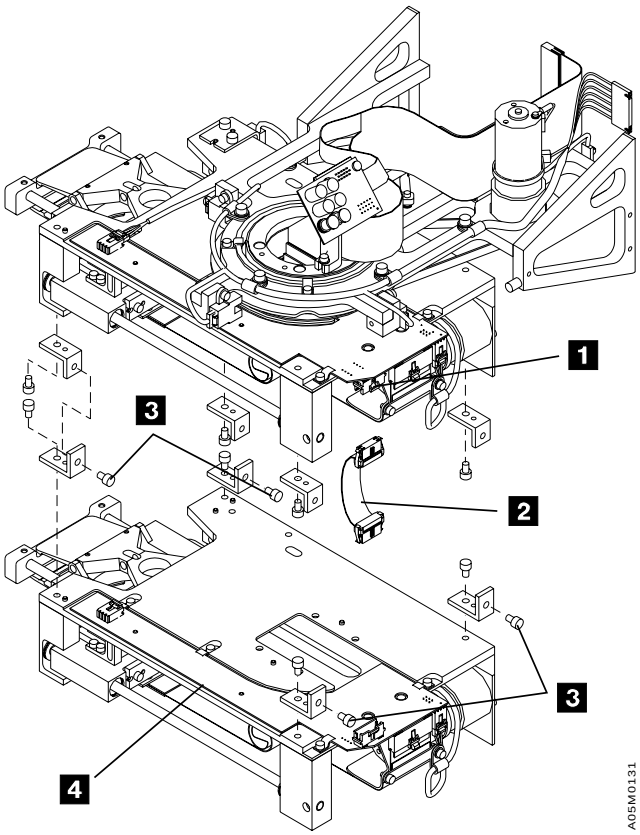


Figure 100. Reach Assembly 2

Reach Belt

See Figure 101 on page CARR-43. (See also Figure 29 on page LOC-7 for location information.)

Removal of Reach Belt

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
4. If you are working on gripper 1, remove the calibration sensor assembly by removing the 2 mounting screws **2** and place the assembly on the housing. Go to step 6.
5. If you are working on gripper 2, perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40, place Reach Assembly 2 on a work surface, and then return here.
6. Position the grip assembly **1** so that the belt clamp **5** is under the belt clamp access hole **4**.
7. Loosen the 3 screws **8** that secure the reach motor.
8. Loosen the 2 screws **6** that secure the belt clamp **5** and remove the belt **7**.

Replacement of Reach Belt

Note: Clean the old Loctite adhesive threadlocker from the screw threads and apply the new Loctite adhesive threadlocker before replacing the screws.

1. Place the belt **7** over the reach belt idler **3** and the reach motor pulley.
2. Position the belt between the belt clamp **5**.
3. Ensure that the belt teeth align with the reach motor pulley and tighten the 3 screws **8** that secure the reach motor.
4. Slightly tighten the belt clamp **5** and ensure that the grip assembly **1** can fully retract and extend and that the belt **7** is centered on the reach motor pulley, then tighten the clamp.

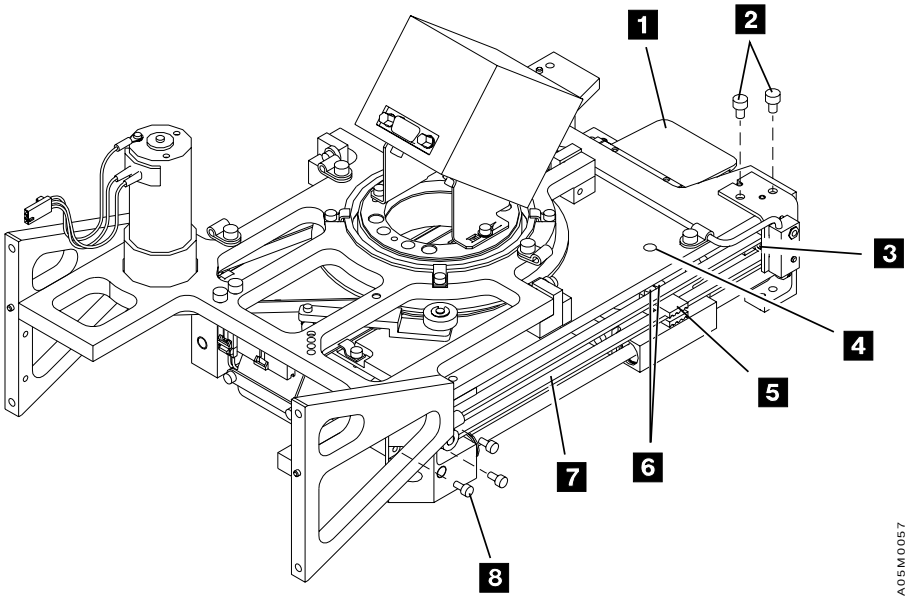


Figure 101. Reach Belt

Reach Belt Idler Assembly

See Figure 102. (See also Figure 29 on page LOC-7 for location information.)

Removal of Reach Belt Idler Assembly

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
4. If you are working on gripper 1, remove the calibration sensor assembly **3** and place it on the housing.
5. If you are working on gripper 2, perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40, place Reach Assembly 2 on a work surface, and then return here.
6. Loosen the three screws that secure the reach motor.
7. Remove the screw **1** that secures the belt idler assembly **2** to the reach platform.
8. Remove the reach belt idler assembly **2** .

Replacement of Reach Belt Idler Assembly

Note: Clean the old Loctite adhesive threadlocker from the screw threads and apply the new Loctite adhesive threadlocker before replacing the screws.

1. Perform the removal steps in reverse order.
2. Ensure that the Grip Assembly can fully retract and extend and that the belt is centered on the reach motor pulley

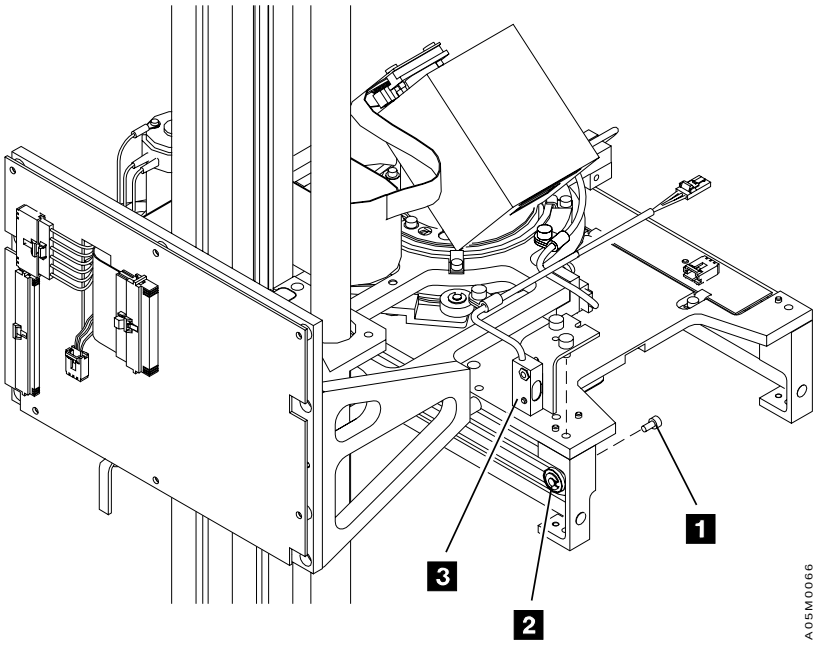


Figure 102. Reach Belt Idler Assembly

Reach Card (RCH, RCH2, and RCX)

See Figure 103. (See also Figure 29 on page LOC-7 for location information.)

Removal of Reach Card (RCH)

1. If you are working on gripper 1, remove the picker assembly and carefully place it on a work table. Perform the procedure “Removal of Picker Assembly” on page CARR-28, and then return here.
2. If you are working on gripper 1, perform the procedure “Reach Assembly 1” on page CARR-38, and go to 4.
3. If you are working on gripper 2, perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40, place Reach Assembly 2 on a work surface, and then return here.
4. Loosen one of the reach cable clamp screws **4** and remove the other.
5. Disconnect the calibration sensor cable connector **1**, (gripper 1 only) the reach motor cable connector **6**, and the grip card and cable connector **5**.
6. Loosen the 4 screws **2** and move the clamps **3** out of the way.
7. Remove the reach card **7**.

Replacement of Reach Card (RCH)

5

1. Perform the removal steps in reverse order.
2. **Attention** Ensure that the reach card **7** aligns to the dowel pins **8** on the reach platform to prevent damage to the card.

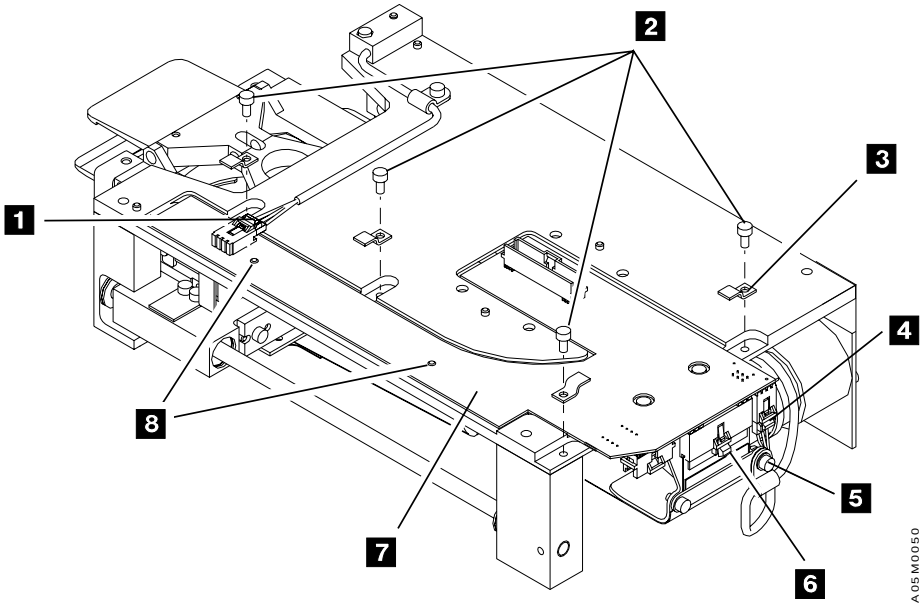


Figure 103. Reach Card Assembly

Reach End-of-Travel Flag

See Figure 104.

Removal of End-of-Travel Flag that secure the reach end-of-travel flag **2** .

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
4. Remove the 2 screws **1**

Replacement of End-of-Travel Flag

Perform the removal steps in reverse order.

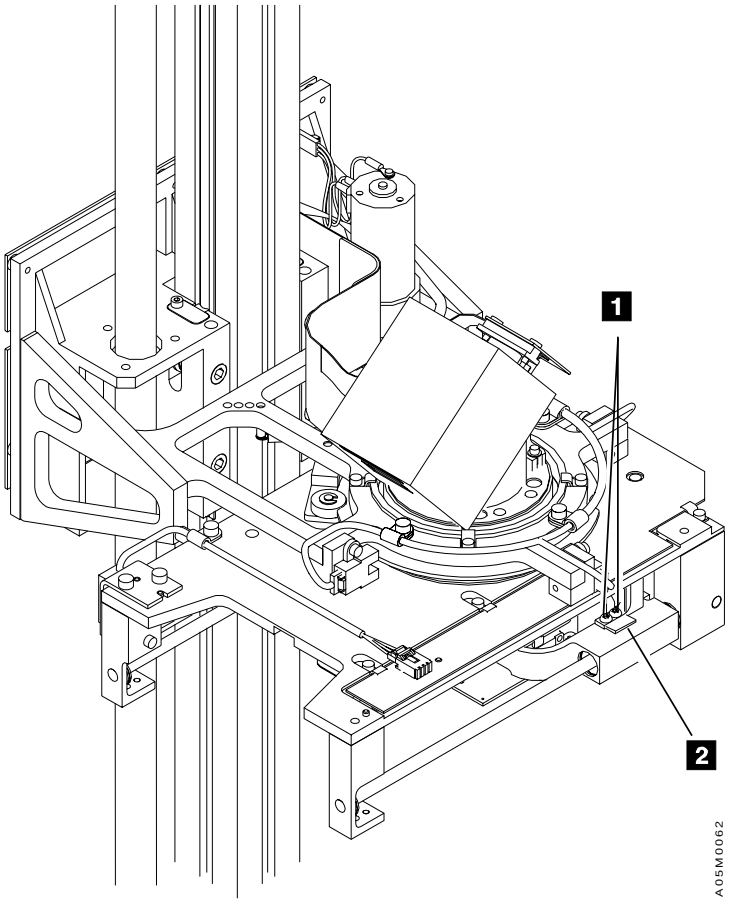


Figure 104. Reach End-of-Travel Flag

Reach Gear Motor

See Figure 105. (See also Figure 29 on page LOC-7 for location information.)

Removal of Reach Gear Motor

1. If you are working on gripper 1:
   a. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
   b. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
   c. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
2. If you are working on gripper 2, perform the procedure “Reach Assembly 2 (Optional Feature)” on page CARR-40, place Reach Assembly 2 on a work surface, and then return here.
3. Loosen 1 of the reach cable clamp screws **3** and remove the other, then disconnect the cable connector **4** from the reach card.
4. Remove the reach cable clamp screws **5** and remove the clamp.
5. Remove the 3 screws **1** that secure the motor to the bracket and remove the motor **2**.

Replacement of Reach Gear Motor

Note: Clean the old Loctite adhesive threadlocker from the screw threads and apply the new Loctite adhesive threadlocker before replacing the screws.

Perform the removal steps in reverse order. Do not tighten the motor until you put the belt on the motor. Ensure that the belt teeth align with the reach motor pulley.

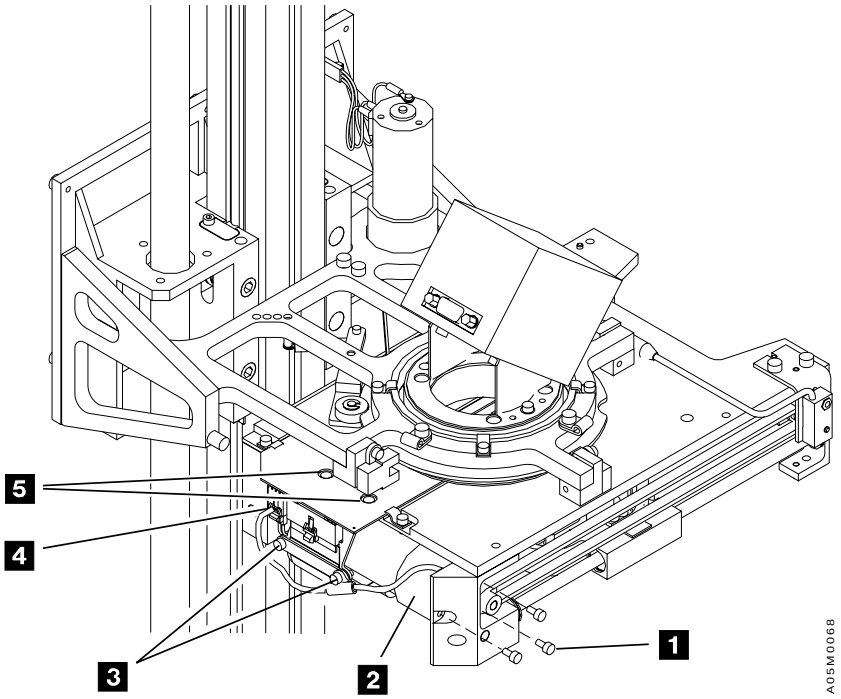


Figure 105. Reach Gear Motor

X-Axis Assembly

See Parts 1 and 2 of Figure 106 on page CARR-49. (See also Figure 27 on page LOC-5 for location information.)

Removal of X-Axis Assembly

1. Remove the picker assembly and set it out of the control unit frame. Go to “Picker Assembly” on page CARR-28, and then return here.
2. Remove the front side cover of the L1x frame (single accessor) or the accessor's service bay frame.
3. Disconnect the X-axis flex cable **3** from the X/Y-axis card **2**.
4. Unlatch and disconnect the X-axis home sensor cable **4** from the sensor.
5. Loosen the screw **5** and remove the x-axis home sensor/bumper assembly from the x-rail.
6. Slide the cartridge accessor out of the frame.
7. Disconnect the Y-axis flex cable **1** from the X/Y-axis card **2**.
8. Loosen the Y-axis cable trough **8** by removing the 8 screws (4 at top **7** and 4 at bottom **9**).
9. Remove the trough **8** and Y-axis flex cable from the cartridge accessor.
10. Remove the X/Y-axis card by removing 4 screws **10** that hold the card and mounting plate.
11. See “Y-Mast Clamp Install Procedure” on page CARR-64 to determine if your library has a Y-mast clamp. If it does, loosen the Y-mast bolts.
12. Loosen the 2 bolts **12** that attach the Y-axis assembly to the X-axis assembly.
13. Remove the X-axis assembly **11**.

Replacement of X-Axis Assembly

1. If your library is longer than 8 frames, compare the Y-axis cable trough brackets on the old and new X-axis assembly. If they do not match, transfer the brackets from the old assembly to the new assembly.
2. Perform the removal steps in reverse order.
3. If you are working on accessor B, re-adjust the RSB X-axis home sensor as shown in Figure 237 on page INST-50.
4. If your library has a Y-mast clamp, go to “Y-Mast Clamp Install Procedure” on page CARR-64 to re-install the clamp.
5. If your library does not have a Y-mast clamp, go to “Adjustment of Y-axis Assembly” on page CARR-64 to realign the mast.
6. Re-teach the library as follows:
   a. If you have a single accessor library, perform “Teach Current Configuration” on page DIAG-5 on the entire library.
   b. If you have a dual accessor library, perform “Teach Accessor” on page DIAG-6.

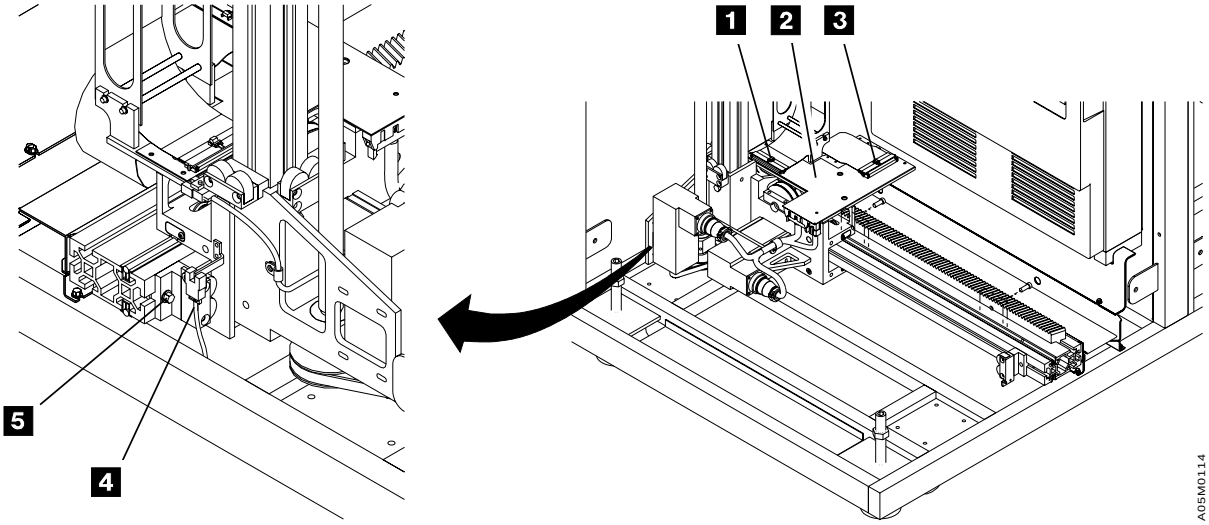


Figure 106 (Part 1 of 2). X-Axis Assembly

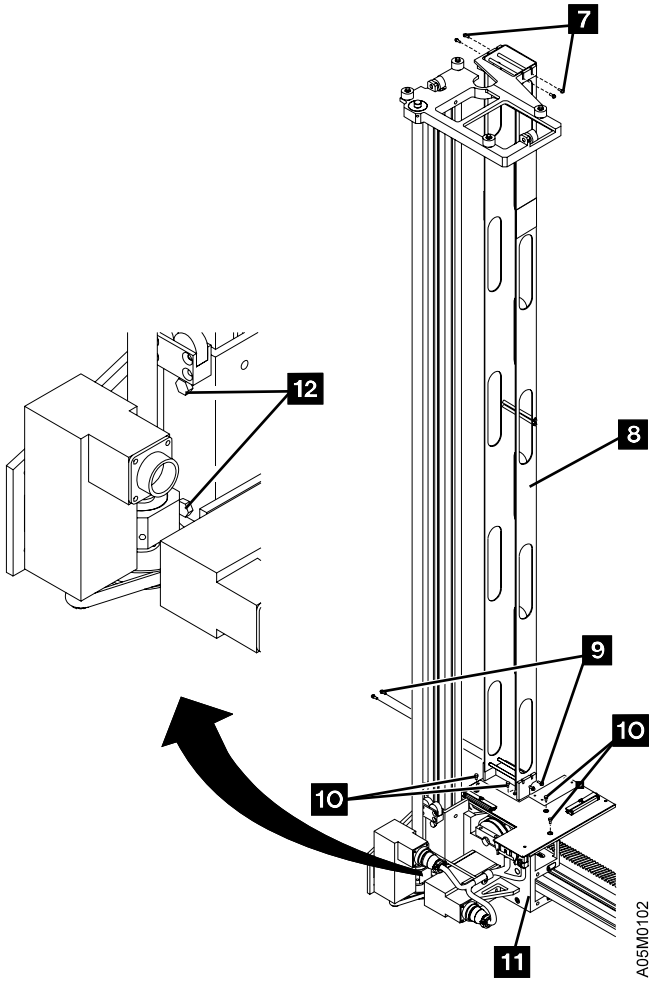


Figure 106 (Part 2 of 2). X-Axis Assembly

X-Axis Drive Belt

See Figure 107 on page CARR-51. (See also Figure 28 on page LOC-6 for location information.)

Removal of X-Axis Drive Belt

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the Y-axis in the service position. Refer to “Y-Axis (Vertical) Service Position” on page CARR-8.
4. Disconnect the 3 cable connectors labeled P2 **1**, P3 **3**, and P4 **5**.
5. Loosen the 8 screws (4 at the top **14** and 4 at the bottom **11**) that secure the Y-axis flex cable guide to the Y-axis assembly.
6. Lift and remove the Y-axis flex cable and trough **13** and place them vertically in the left corner of the control unit frame or hang it on the upper cable trough bracket at **14**. Cables do not have to be removed.
7. If your X-axis cable is covered with a trough cover, remove the trough cover as follows:
   a. Move the accessor into the next frame. If you have a dual accessor library, you will need to pause the library and open the barrier door.
   b. Remove the trough cover in the L1x frame for a single accessor library or in the appropriate service bay for a dual accessor library.
   c. Move the accessor back into the frame. If you have a dual accessor library, re-close the barrier door and put the library back into auto.
8. Remove the 4 screws **12** that secure the X/Y-axis card and mounting plate **10**. (Remove the card and plate as one assembly.)

   Note: Before you perform the following step, note the position and orientation of the bearing caps. You will need to reinstall them in the original position and orientation.
9. Loosen and remove the 3 bearing caps **7**. 2 screws **9** hold each bearing cap.
10. Remove the screw **8** securing the X-axis and Y-axis motor cable assembly.
11. Remove the X-axis motor and bracket **4**. (Do not remove the screws securing the motor to the bracket.) Perform steps 4, 5, and 7 from procedure “Removal of X-Axis Motor” on page CARR-55 and then return here.
12. Remove the X-axis pinion shaft **6**.
13. Remove the belt **2**.

Replacement of X-Axis Drive Belt

1. Perform the removal steps in reverse order.
2. Ensure that the belt teeth align properly with the pulleys.
3. Start the 4 mounting screws in the motor bracket and push the motor and bracket down so the belt is as tight as possible. Tighten the screws.

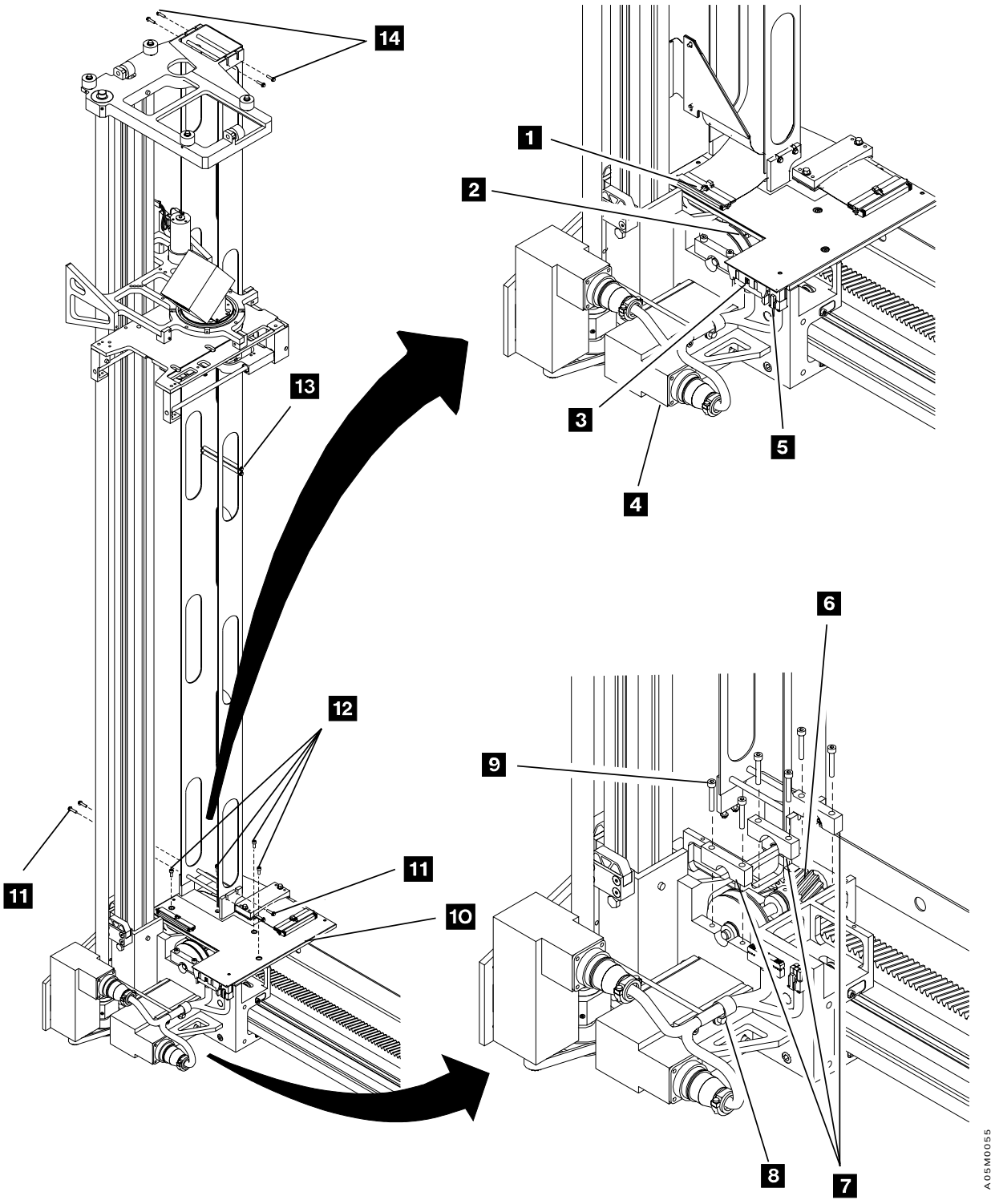


Figure 107. X-Axis Drive Belt

X-Axis Flex Cable

Note: Two different types of cable support are used depending on the library vintage, metal band or plastic track. Figure 108 on page CARR-53 shows the cable with the metal band and Figure 244 on page INST-63 shows the cable with the plastic track.

See Figure 108 on page CARR-53. (See also Figure 28 on page LOC-6 for location information.)

Removal of X-Axis Flex Cable

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in"Procedure: Prepare the Library Subsystem for Service" on page START-10 and then return here.
2. If this is a single accessor library, remove the left side cover on the control unit frame.
3. If this is a dual accessor library, remove the side cover on the accessor end of the library, left or right.
4. If your library has a cable with the plastic track, remove the cable trough covers at the accessor end of the library and at the mid-cable clamp point.
5. Remove 2 X-axis cable clamp screws **1** from the XAX card support plate and unplug the X-axis flex cable from the XAX card P1 connector.
6. If this library contains three or more frames, move the accessor assembly to the other end of the library and remove 2 X-axis cable clamp screws in the mid-cable clamp **3**.
7. Unplug the X-axis flex cable from the BIC card P1 connector **5** and unfold (straighten) the cable.
8. Pull the X-axis flex cable out through the mid-cable trough opening and remove it from the library.

Replacement of X-Axis Flex Cable

1. Perform the removal steps in reverse order.

   Attention If replacing a long cable with a metal band, P/N 62G1191 or 62G1192, the length of the cable and the support band can make it difficult to control. It is fragile and can be damaged if you nick or put a kink in the band. Handle the cable carefully.

2. If your cable has a metal band, adjust the cable as follows:
   a. Move the accessor assembly along the length of the X-axis flex cable and verify that the cable remains reasonably centered between the guides and does not lean into the tape drive cover or the X-axis gear rack.
   b. If the cable does not track evenly between the guides, then;
      1) Move the accessor to the position where the cable leans excessively to one side.
      2) Adjust the rotation of the cable clamp **1** on the accessor (XAX card) to move the cable back toward the center of the trough.
      3) Move the accessor several times from one end of the library to the other and verify that the cable remains reasonably centered in the cable trough. If not, check the mid-cable clamp **3** adjustment to ensure the cable band **2** is centered in the trough and then go to step 2b1 to repeat the cable adjustment.
3. Ensure that you can move the accessor freely from one end of the library to the other.

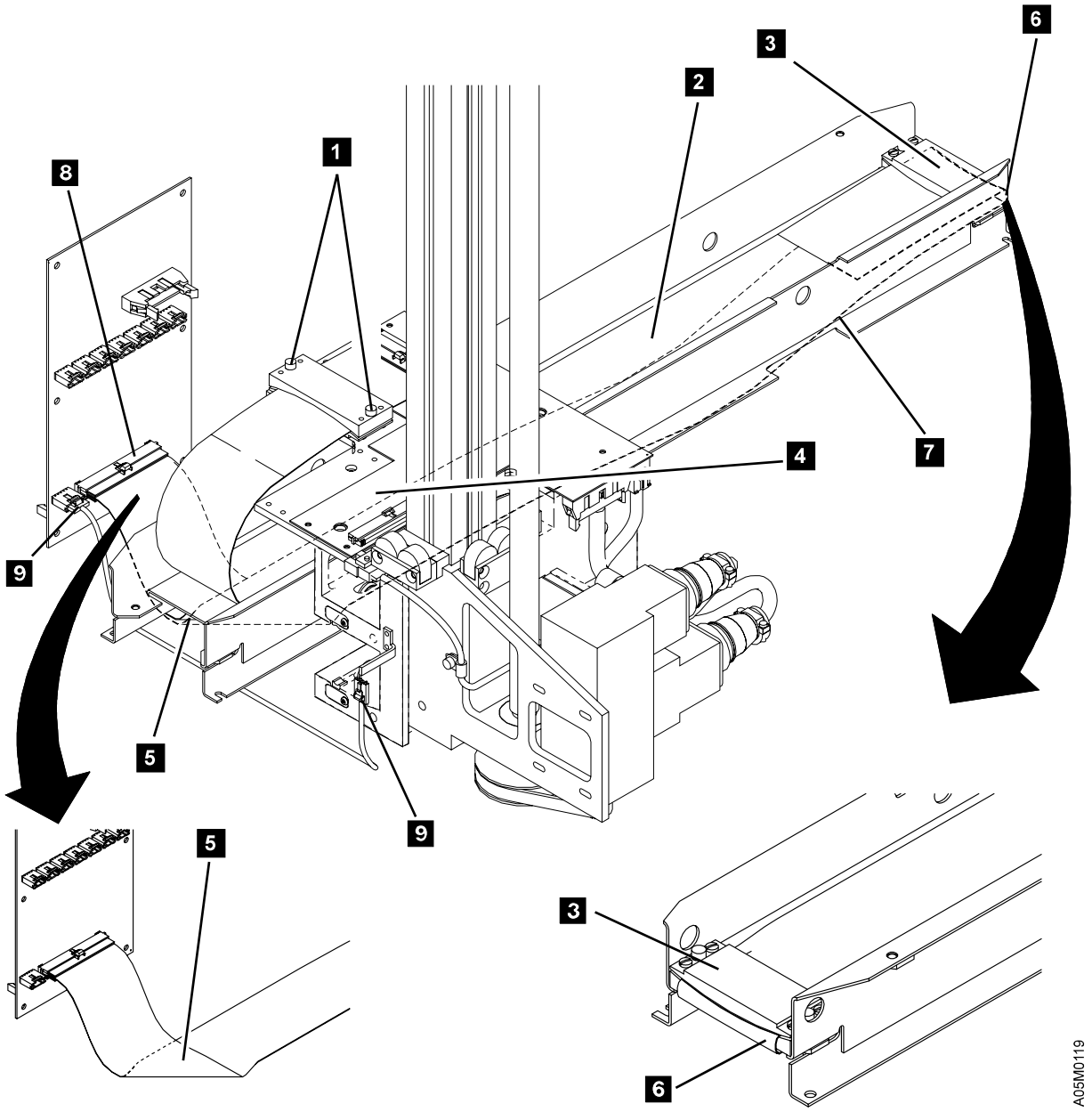


Figure 108. X-Axis Flex Cable

X-Axis Home Sensor

See Figure 109. (See also Figure 28 on page LOC-6 for location information.)

Removal of X-Axis Home Sensor

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Remove the front side cover of the end frame where the sensor is located.
4. Remove the screw **1** that secures the X-axis home sensor **3** to the bracket.
5. Unlatch and disconnect the cable **2** by pressing on the housing and remove the sensor.

Replacement of X-Axis Home Sensor

1. Perform the removal steps in reverse order.

   Notes:

   a. Ensure that the locating pin in the bumper assembly is fully seated in the locating hole.

   b. Ensure that the sensor mounting block in the right service bay of a dual accessor library is flush with the right side of the frame. Refer to Figure 237 on page INST-50.

2. Re-teach the library as follows:

   a. If you have a single accessor library, perform “Teach Current Configuration” on page DIAG-5 on the entire library.

   b. If you have a dual accessor library, perform “Teach Accessor” on page DIAG-6.

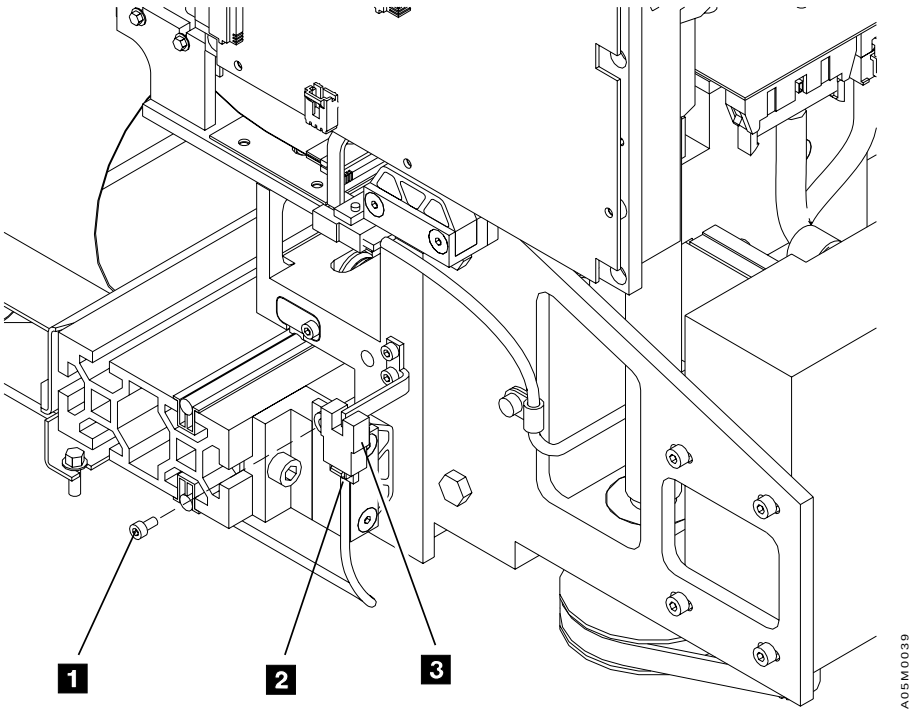


Figure 109. X-Axis Home Sensor

X-Axis Motor

See Figure 110. (See also Figure 28 on page LOC-6 for location information.)

Removal of X-Axis Motor

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Perform the procedure “Y-Axis (Vertical) Service Position” on page CARR-8.
4. Disconnect the X-axis motor cable connector **3** .
5. Remove the 4 screws **4** that secure the X-axis motor and X-axis motor bracket.

   Note: A new-style motor that does not require the bracket was released in April 1997. Skip the following step if your replacement motor has raised ribs in the housing on the connector side of the motor or if your old motor does not have a bracket.
6. Remove the 4 screws **1** that secure the motor to the bracket.
7. Remove the motor **2** .

Replacement of X-Axis Motor

1. Perform the removal steps in reverse order.
2. Start the 4 mounting screws **4** in the motor (or motor bracket) and push the motor down so the belt is as tight as possible. Tighten the screws.

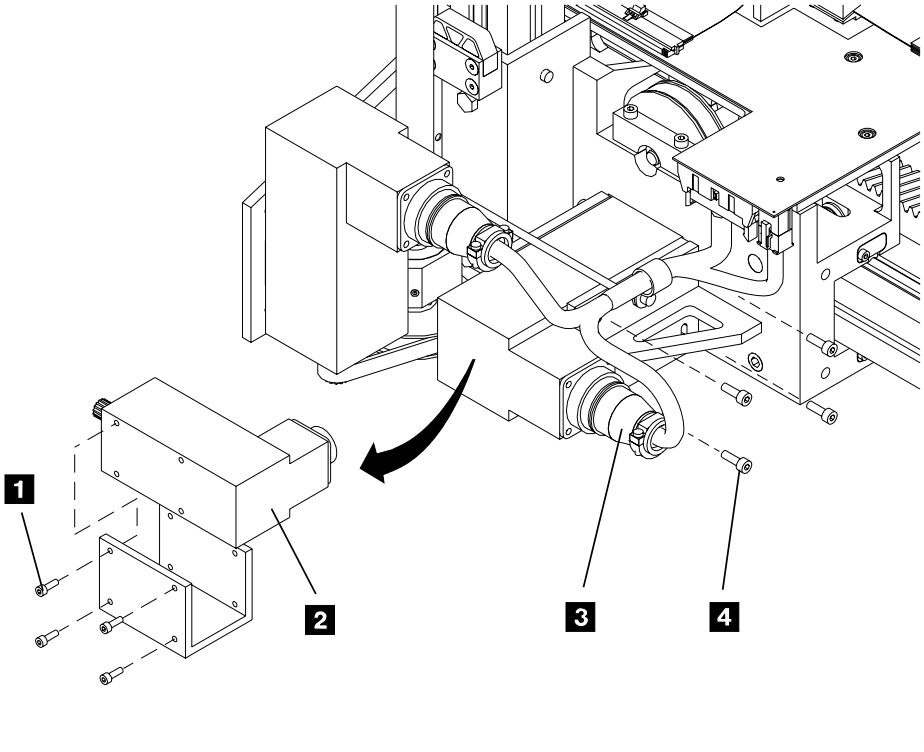


Figure 110. X-Axis Motor

X-Axis Pinion Shaft Assembly

See Figure 111 and Figure 107 on page CARR-51.

Removal of X-Axis Pinion Shaft Assembly

For the removal of the x-axis pinion shaft assembly **1** , perform procedure “X-Axis Drive Belt” on page CARR-50 then return here.

Note: Two different pinion shaft assemblies have been used. Check the parts catalog to ensure you have ordered the correct pinion shaft assembly for your library.

Replacement of X-Axis Pinion Shaft Assembly

1. Perform the removal procedure in reverse order.
2. Start the 4 mounting screws in the motor bracket and push the motor and bracket down so the belt is as tight as possible. Tighten the screws.

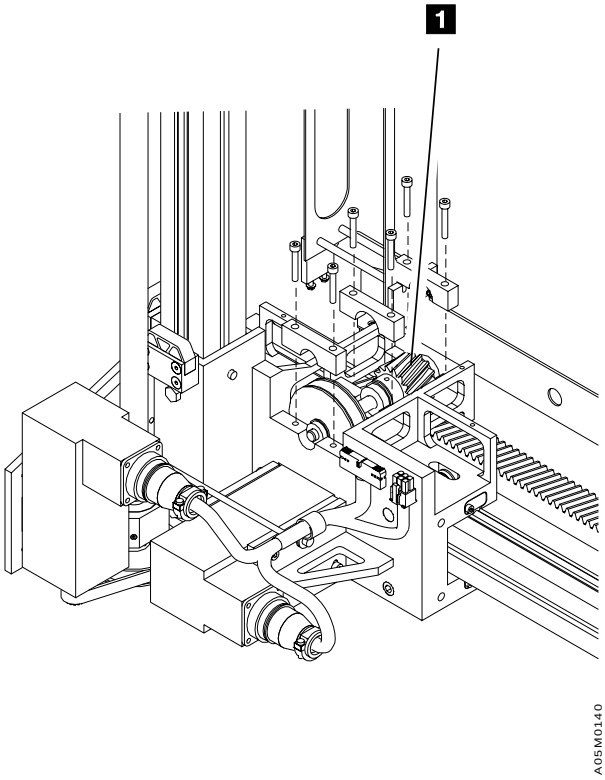


Figure 111. X-Axis Pinion Shaft

X-Axis Rail Roller

See Figure 112. (See also Figure 28 on page LOC-6 for location information.)

Removal of X-Axis Rail Roller

1. Remove the X-Axis Assembly. Go to "X-Axis Assembly" on page CARR-48 and then return here.
2. Locate the defective rail rollers **2**. The rail rollers should spin easily and quietly, and there should not be any side-to-side movement or wobble.
   Note: Two different top rollers have been used. Check the parts catalog to ensure you have ordered the correct roller.
3. To remove the defective roller, loosen the set screw **1** holding the roller shaft in the casting, tap the shaft lightly through the small (rear) shaft hole in the casting to push the shaft out through the large (front) hole, and pull the shaft out of the casting until the roller drops out of the slot.
4. If your casting has tandem rollers in the bottom slot, replace the defective roller in the tandem roller bracket.
   Note: the tandem roller casting is not shown.
5. Insert the new rail roller **2** in the casting slot, hold the roller in place, and push the shaft into the casting through the rail roller bearing.
6. Tighten the set screw **1** in the end of the x-axis casting. Ensure that the bottom rollers are at their lowest point in the casting.

Replacement of X-Axis Rail Roller

1. Slide the X-Axis Assembly onto the x-rail assembly **3**.
2. Adjust both of the bottom rail rollers by loosening the set screw **1** holding the roller shaft, turning the shaft **4** with an allen wrench until the roller just touches the rod, and tightening the set screw.
   ATTENTION: DO NOT over-cam the roller shafts, early bearing failure will occur if the rollers are too tight.
3. Replace the Y-Axis Assembly. Go to "Y-Axis Assembly" on page CARR-60.

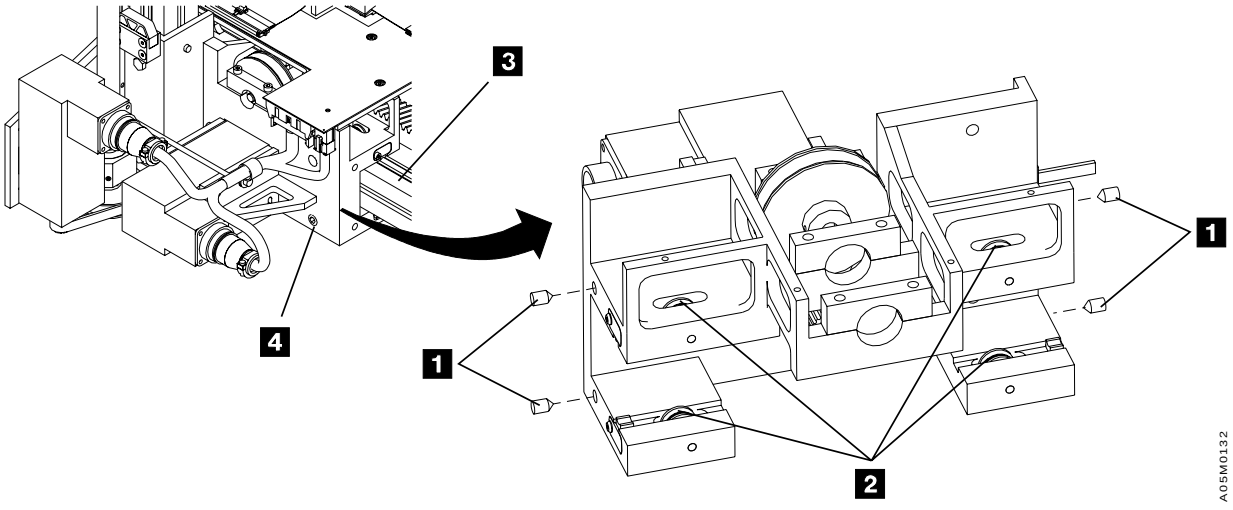


Figure 112. X-Axis Rail Rollers

X-Rail Assembly

See Figure 113 on page CARR-59. (See also Figure 27 on page LOC-5 for location information.)

Removal of X-Rail Assembly in a Single-Frame Library

The following steps are for removing an X-rail assembly in a single-frame library configuration.

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in "Procedure: Prepare the Library Subsystem for Service" on page START-10 and then return here.
2. Remove the left side cover of the L1x frame.
3. Remove 2 x-axis cable clamp screws and disconnect the X-axis flex cable **3** from the X/Y-axis card **2**.
4. Unplug the X-axis home sensor cable connector **9**.
5. Loosen the 2 screws **4** that hold the X-rail assembly **5** to the control unit frame and slide the rail assembly out of the frame.
6. Loosen the middle screw **10** and remove the X-axis home sensor/bumper bracket **8** from the X-rail assembly.
7. Slide the cartridge accessor off the rail and set it aside.

Removal of X-Rail Assembly in a multi-frame library

The following steps are for removing an X-rail assembly in a multi-frame library configuration.

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in "Procedure: Prepare the Library Subsystem for Service" on page START-10 and then return here.
2. Push the cartridge accessor to the left or right end of the library depending on the location of the rail being replaced.
   a. If you are replacing a rail in the center frame or in a frame in the right half of the library, move the cartridge accessor to the left end of the library.
   b. If you are replacing a rail in the left half of the library, move the cartridge accessor to the right end of the library.
3. Remove the appropriate side cover.
   a. If you are replacing a rail in the center frame or in a frame in the right half of the library, remove the right side cover.
   b. If you are replacing a rail in the left half of the library, remove the left side cover.
4. Start at the end of the library with the side cover removed and loosen the 2 screws **4** that hold each X-rail assembly up to the X-rail assembly being replaced.
5. Loosen the 2 set screws **6** in the long T-nuts (front and back) connecting the X-rail assembly being replaced.
6. Slide the X-rail assemblies back through the open end of the library until the end nearest the rail being replaced clears the T-nuts **4** that held it to the frame (about 75% of the frame width). Use a screwdriver or bar to gently separate the rail assemblies from the rail being replaced and slide the rod **7** out of the rail assembly.
7. Remove the 2 screws **4** that hold the X-rail assembly being replaced and loosen the set screws **6** in the long T-nuts (front and back) connecting it to the next rail assembly.
8. Slide the X-rail assembly off the long T-nuts and rod. Use a screwdriver or bar to gently separate the rail assemblies.

Replacement of X-Rail Assembly

1. Install the 2 screws **4** loosely in the short T-nuts and remove the rod from the old X-rail assembly to prepare for installing the new X-rail assembly.
2. Install the new X-rail assemblies. See “X-Rail Assembly” on page INST-34.
3. Perform the removal steps in reverse order.
4. Re-teach the library as follows:
   a. If you have a single accessor library, perform “Teach Current Configuration” on page DIAG-5 on the entire library.
   b. If you have a dual accessor library, perform “Teach Accessor” on page DIAG-6.

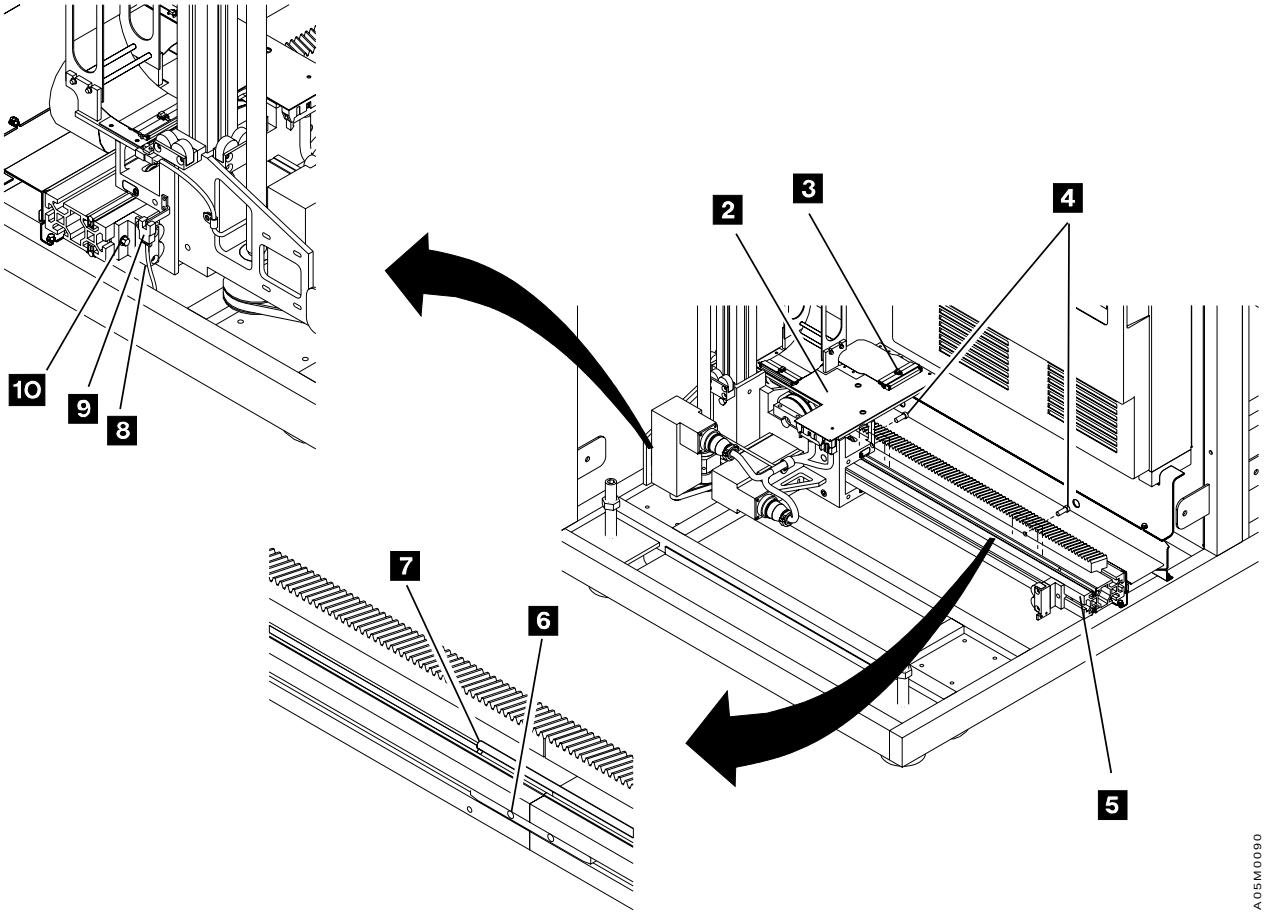


Figure 113. X-Rail Assembly

Y-Axis Assembly

See Figure 114 on page CARR-61. (See also Figure 27 on page LOC-5 for location information.)

Note: You need a 4mm socket P/N 73G1479 and a 1.5mm allen wrench to complete this procedure.

Removal of Y-Axis Assembly

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Remove the front side cover **1** of the L1x frame (single accessor) or the accessor's service bay frame.
4. Place the picker in the middle Y-axis service position, remove the picker card cover (if installed), and unplug the 4 cables on the picker card.
5. Remove 6 screws attaching the picker card to the Y-axis picker bracket and remove the picker card **2**.
6. Remove 2 screws attaching the Y-axis flex cable to the picker assembly, remove 4 screws that attach the picker assembly to the Y-axis picker bracket, and remove the picker assembly **3**.
7. Loosen the middle screw **12** on the X-axis home sensor/bumper assembly **11** and slide the assembly off the end of the X-rail assembly.
8. Remove the X-axis home sensor flag to prevent damage when the cartridge accessor is out of the library.
9. Pull the cartridge accessor off of the X-rail and out the end of the control unit frame. Set it down gently on the floor to avoid damage to the Y-axis pulley.
10. Loosen the 4 screws at the top **4** that secure the Y-axis cable trough to the Y-axis top guide assembly **9**.
11. Unplug the Y-axis motor cable connector **7** from the Y-axis motor.
12. Unplug the Y-axis home sensor cable and remove 1 screw in the cable clamp.
13. Remove the middle screw on the Y-axis home sensor/bumper assembly and remove the assembly and the T-nut.
14. See “Y-Mast Clamp Install Procedure” on page CARR-64 to determine if your library has the Y-mast clamp. If it does, loosen the Y-mast bolts.
15. Loosen the 2 screws **10** that separate the Y-axis assembly from the X-axis assembly. (These bolts cannot be removed.)
16. Remove the Y-axis assembly **9**.

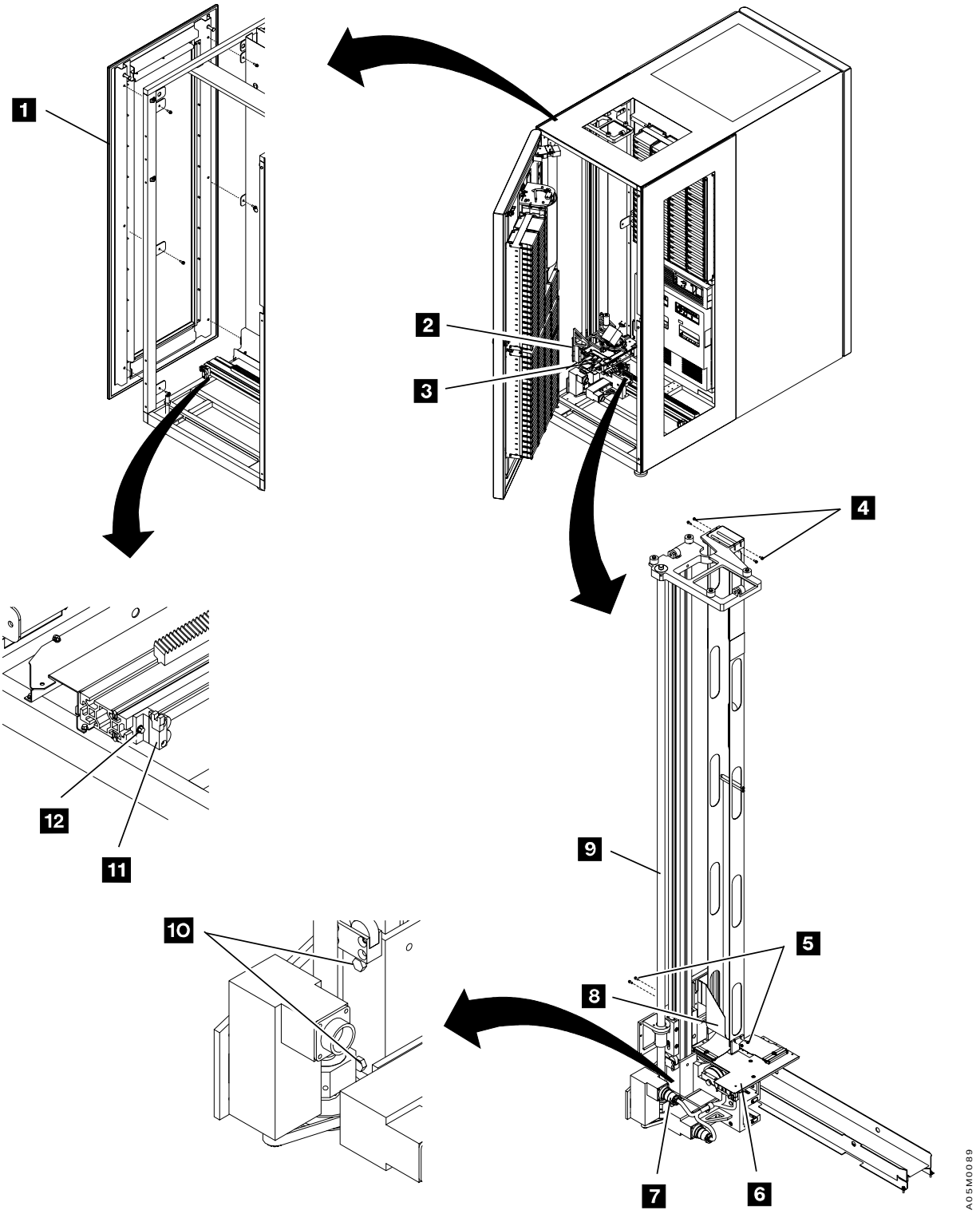


Figure 114. Y-Axis Assembly

Replacement of Y-Axis Assembly

See Figure 115 on page CARR-63.

1. Place the new Y-axis assembly on the X-axis assembly. Ensure that the Y-axis top guide assembly is seated properly on the cable trough **4** .
2. See “Y-Mast Clamp Install Procedure” on page CARR-64 to determine if your library has a Y-mast clamp. If it does, complete the Y-mast clamp install procedure and return here.
3. If your library does not have a Y-mast clamp, tighten bolts **10** securing the Y-axis shaft to the X-axis assembly.
4. Tighten 4 screws **4** attaching the Y-axis cable trough to the Y-axis assembly.
5. If your library has the dual gripper feature, replace the Y-axis home sensor on your new Y-axis assembly with the dual gripper Y-axis home sensor assembly from your old Y-axis assembly.
6. Install the Y-axis home sensor flag. Ensure that it is aligned correctly with the home sensor.
7. Plug the Y-axis motor cable connector **7** on the Y-axis motor.
8. Plug the Y-axis home sensor cable in the Y-axis home sensor and attach the cable clamp with 1 screw. Ensure that the cable is not touching the leadscrew.
9. Depress the X-axis felt oil pads as required to get them on the rail rods and re-install the cartridge accessor on the X-rail.

   Note: Ask a second person to help you re-install the cartridge accessor in the library. It works best to have one person guide the accessor on the lower X-rail while the other person is guiding the Y-axis top guide assembly on the upper guide rail.
10. Slide the X-axis home sensor assembly **11** on the X-rail and tighten the screw **12** Ensure that the pin is seated properly in the locating hole.
11. Plug the X-axis flex cable into the XAX card **6** and attach it with 2 screws.
12. Re-install the X-axis home sensor flag. Ensure that it is aligned correctly with the home sensor.
13. Re-install the picker assembly **3** with 4 screws.
14. Attach the Y-axis flex cable to the picker assembly with 2 screws. If your library has a Y-axis cable back plate, re-install it between the cable and pivot casting with the angled end at the top. **Do not tighten the screws.**
15. Re-install the picker card **2** with 6 screws.
16. Plug 4 cables into the picker card and tighten 2 screws attaching the Y-axis flex cable to the picker assembly. Re-install the picker card cover (if installed).
17. Adjust the top guide rail rollers. Perform “Y-Axis Guide Rail Roller Adjustment” on page CARR-69 and return here.
18. If your library does not have a Y-mast clamp, perform “Adjustment of Y-axis Assembly” on page CARR-64.
19. Re-teach the library as follows:
    a. If you have a single accessor library, perform “Teach Current Configuration” on page DIAG-5 on the entire library.
    b. If you have a dual accessor library, perform “Teach Accessor” on page DIAG-6.

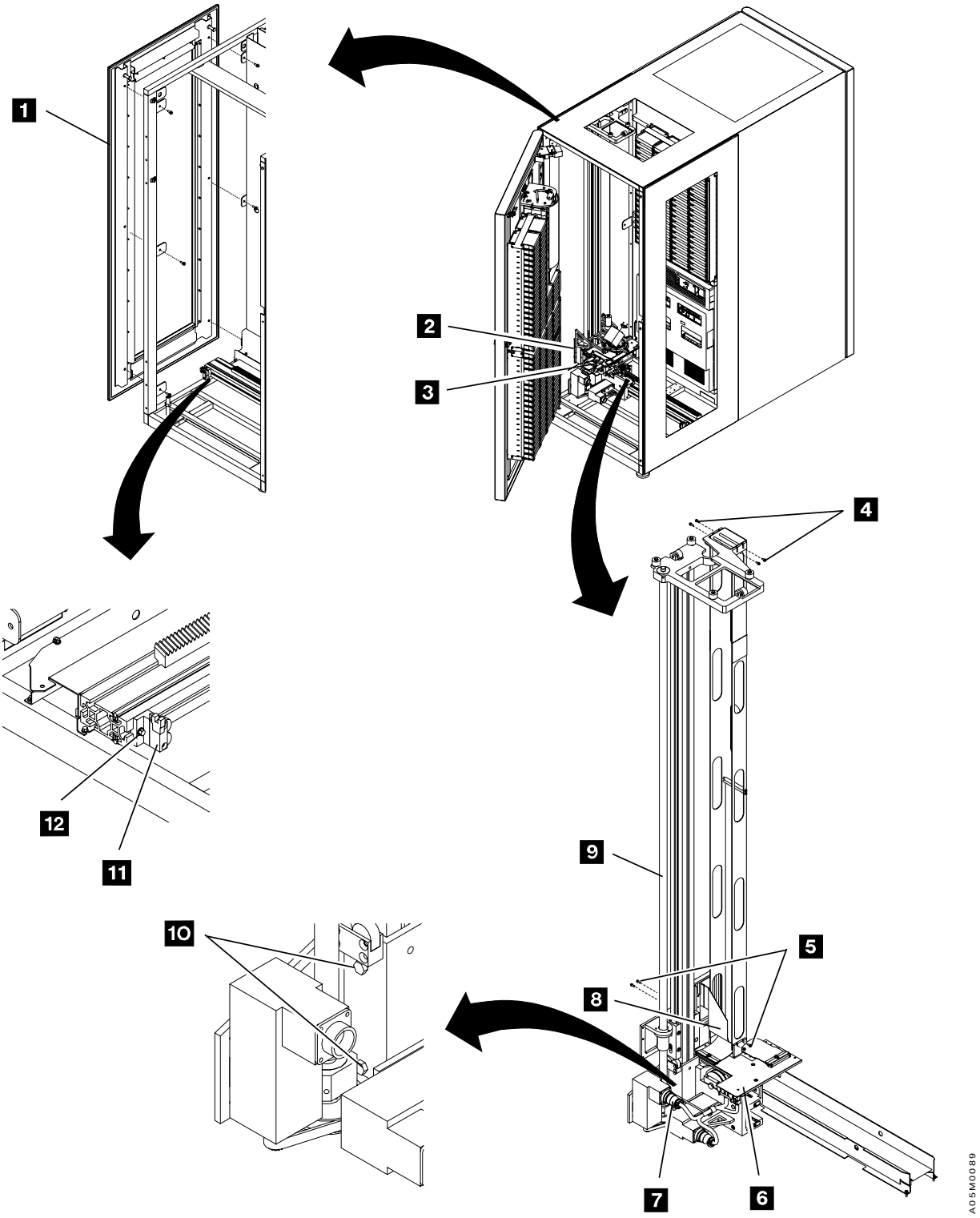


Figure 115. Y-Axis Assembly

Y-Mast Clamp Install Procedure:

See Figure 116 on page CARR-65.

Libraries manufactured in July 1998 or later may have a Y-mast clamp P/N 05H8872 **1**. If your library has the clamp, install or replace it using the following procedure.

1. Loosen the bolts **2** attaching the Y-axis assembly to the X-axis assembly and the bolts **3** attaching the Y-mast.
2. If the Y-mast clamp **1** was not already installed, remove the old Y-mast bolts **3**.
3. Install the clamp with 2 bolts P/N 1621607 and 2 washers P/N 1622306 **3**.
4. Ensure that the clamp **1** is over the X-axis casting and tighten the Y-mast bolts **3** to 5.65 N·m (50 in-lbs).
5. Re-tighten the Y-axis assembly bolts **2** to 11.3 N·m (100 in-lbs).

Adjustment of Y-axis Assembly:

If your library has a Y-mast clamp, this adjustment is not required. If your library does not have the Y-mast clamp, adjust the Y-axis assembly using the following procedure.

1. Move the accessor to the middle of the 3494 Model L1x frame (or the appropriate service bay frame for a Model HA1).
2. Attach a plumb bob to the upper rail at the left side of the accessor so it hangs freely just above the X-rail.
3. Measure the distance from the Y-axis mast to the string on the plumb bob near the top and bottom of the mast.
4. If the difference is more than 4 mm (0.16 in.), realign the Y-axis assembly. Ensure that the 2 bolts **10** attaching the Y-axis assembly to the X-axis assembly are tight when you have completed the adjustment.

Notes:

1. It is recommended that you order the Y-mast Clamp Kit p/n 08L5872 and install it if your Y-mast is out of alignment.
2. If you have a single accessor library and the Y-mast alignment is changed, refer to step 3 on page INST-52 and ensure that the X-axis bumper adjustment is OK.

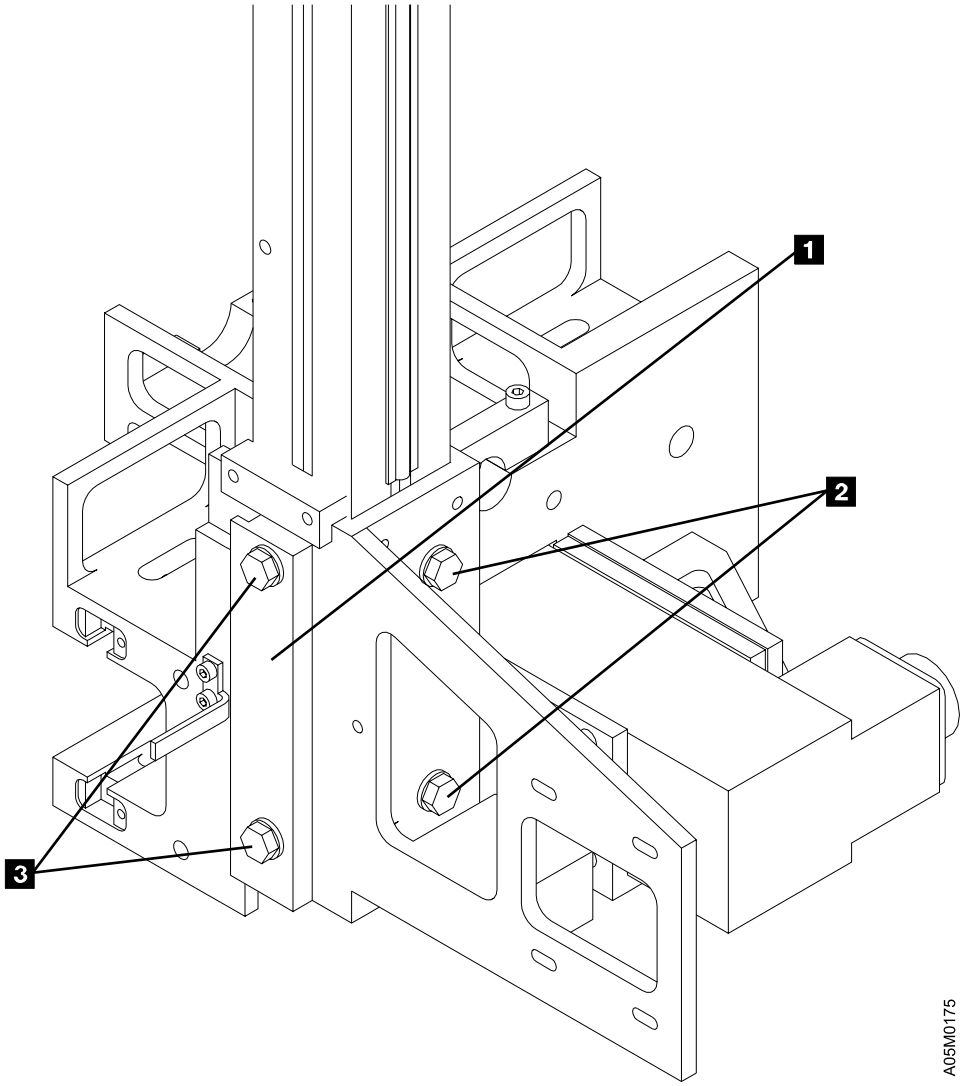


Figure 116. Y-Mast Clamp

Y-Axis Drive Belt

See Figure 117 on page CARR-67. (See also Figure 28 on page LOC-6 for location information.)

Removal of Y-Axis Drive Belt

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Loosen the 4 screws **2** that hold the Y-axis motor.
4. Remove the belt **3**.

   Note: If you can not slip the belt under the motor pulley, remove the front side cover of the L1x frame (single frame library) or the accessor's service bay frame, remove the X-Axis Home Sensor, and move the accessor carefully toward the end of the library until you can remove it. If you have a multi-frame single accessor library, you can move the accessor to a inter-frame gap and remove the belt.

Replacement of Y-Axis Drive Belt

1. Perform the removal steps in reverse order.
2. Ensure that the belt teeth align with the pulleys.
3. Use a screwdriver to pry the motor over so the belt is tight and tighten the mounting screws **2**.
4. If you removed the X-axis home sensor, re-teach the library as follows:
   a. If you have a single accessor library, perform “Teach Current Configuration” on page DIAG-5 on the entire library.
   b. If you have a dual accessor library, perform “Teach Accessor” on page DIAG-6.

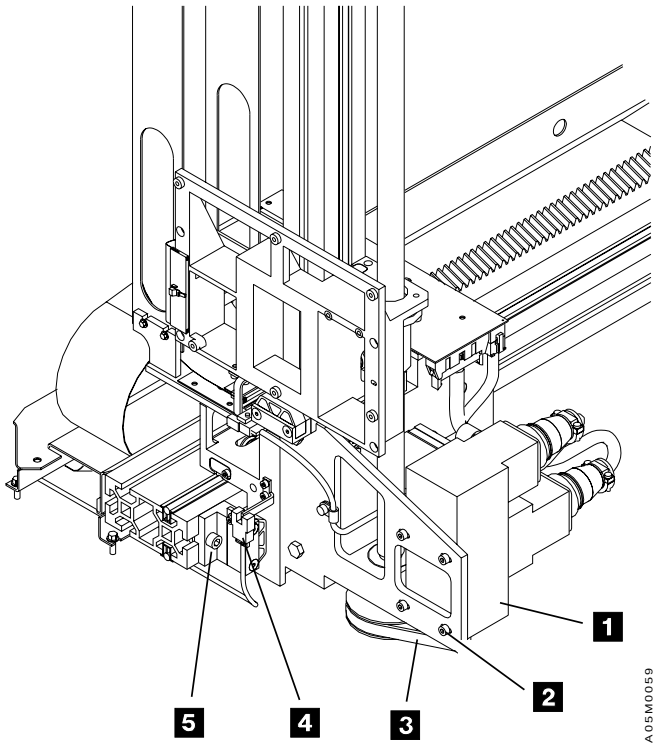


Figure 117. Y-Axis Drive Belt

Y-Axis Home Sensor

See Figure 118. (See also Figure 28 on page LOC-6 for location information.)

Removal of Y-Axis Home Sensor

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Remove the screw **2** that secures the Y-axis home sensor **1** to the bracket.
4. Unlatch and disconnect the cable **3** by pressing on the housing and remove the sensor.

Replacement of Y-Axis Home Sensor

1. Perform the removal steps in reverse order.
2. Re-teach the library as follows:
   a. If you have a single accessor library, perform “Teach Current Configuration” on page DIAG-5 on the entire library.
   b. If you have a dual accessor library, perform “Teach Accessor” on page DIAG-6.

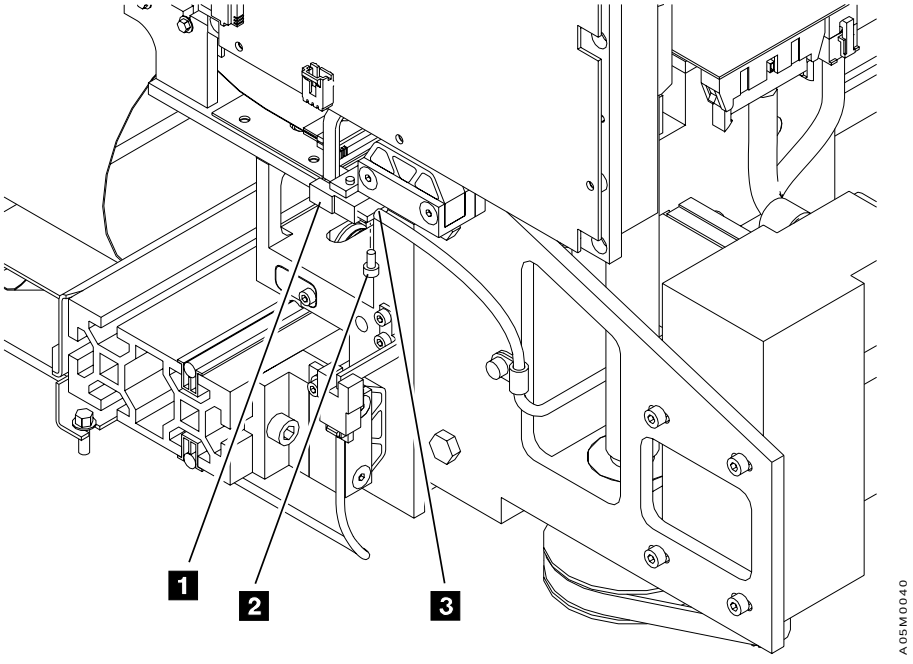


Figure 118. Y-Axis Home Sensor

Y-Axis Flex Cable

See Figure 119 on page CARR-70. (See also Figure 28 on page LOC-6 for location information.)

Note: You need a 4mm socket P/N 73G1479 to complete this procedure.

Removal of Y-Axis Flex Cable

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Place the picker assembly in the top Y-axis service position. See “Y-Axis (Vertical) Service Position” on page CARR-8.
4. Unplug the Y-axis flex cable from the XAX card **7** P2 connector **4**.
5. Remove 4 screws **2** and 2 spacers **3** securing the Y-axis flex cable at the mid-cable point **1**.
6. Remove 2 Y-axis cable clamp screws **5** from the pivot assembly. If your library as a Y-axis cable back plate, observe its location between the Y-axis cable and the pivot casting and set it aside for re-installation when you re-attach the cable.
7. Unplug the Y-axis flex cable from the Picker Card (GRI) P1 connector **6** and remove the Y-axis flex cable.

Replacement of Y-Axis Flex Cable

1. Perform the removal steps in reverse order. If your library as a Y-axis cable back plate, re-install it between the Y-axis cable and the pivot casting with the angled end at the top.

   Note: Plug the Y-axis flex cable into the Picker Card (GRI) P1 connector **6** before tightening the 2 cable clamp screws **5** to avoid damage to the connectors.
2. Verify that the Y-axis flex cable tracks properly in the center of the cable trough when you move the picker from the top to the bottom of the Y-axis.

Y-Axis Guide Rail Roller Adjustment

1. Pause the library by pushing **Pause** on the operator panel.
2. Loosen the 1.5mm set screws for the two front rollers, turn each front roller shaft until the front and rear rollers are just touching the guide rail, and tighten the set screw.
3. Move the accessor manually to each end of the library and ensure that the bottom (center) two rollers do not touch the bottom of the guide rail and that the accessor does not bind.
4. If a bottom roller touches the guide rail, loosen the 1.5mm set screw, turn the roller shaft until there is a 1mm gap at the closest point along the length of the library, and tighten the set screw.
5. Verify that the accessor moves freely from end-to-end.

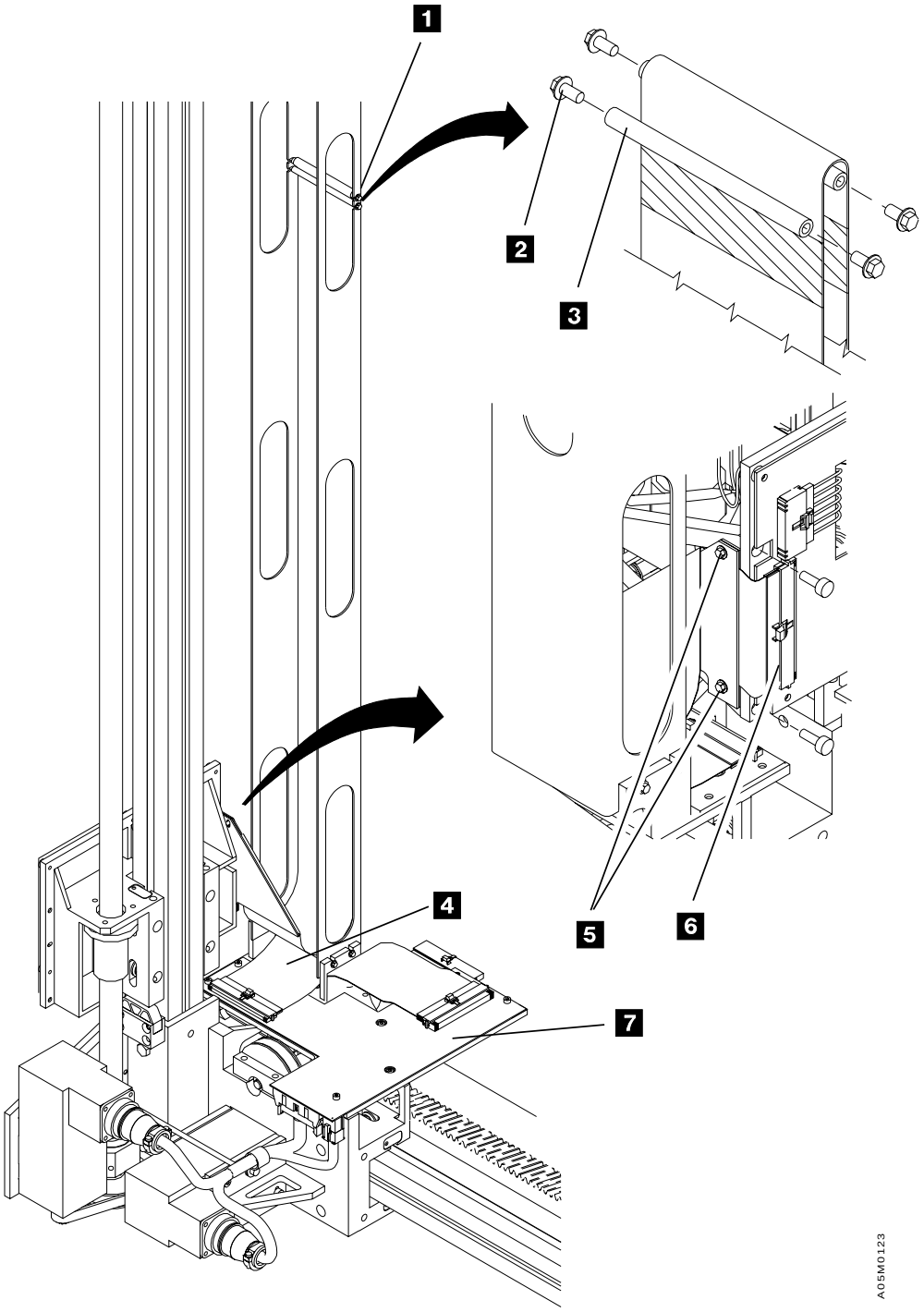


Figure 119. Y-Axis Flex Cable

Y-Axis Motor

See Figure 120. (See also Figure 28 on page LOC-6 for location information.)

Removal of Y-Axis Motor

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6.
3. Put the picker assembly in the service position. See the procedure “Y-Axis (Vertical) Service Position” on page CARR-8, and then return here.
4. Disconnect the Y-axis motor cable connector **1**.
5. Remove the 4 screws **3** securing the Y-axis motor.
6. Remove the Y-axis motor **2**, which also releases the belt **4**.

Replacement of Y-Axis Motor

1. Wrap the drive belt **4** around the pulley.
2. Ensure that the belt teeth align with the pulleys.
3. Install the new motor and use a screwdriver to pry the motor over so the belt is tight. Tighten the mounting screws **3**.
4. Reconnect the Y-axis motor cable connector **1** to the cable.

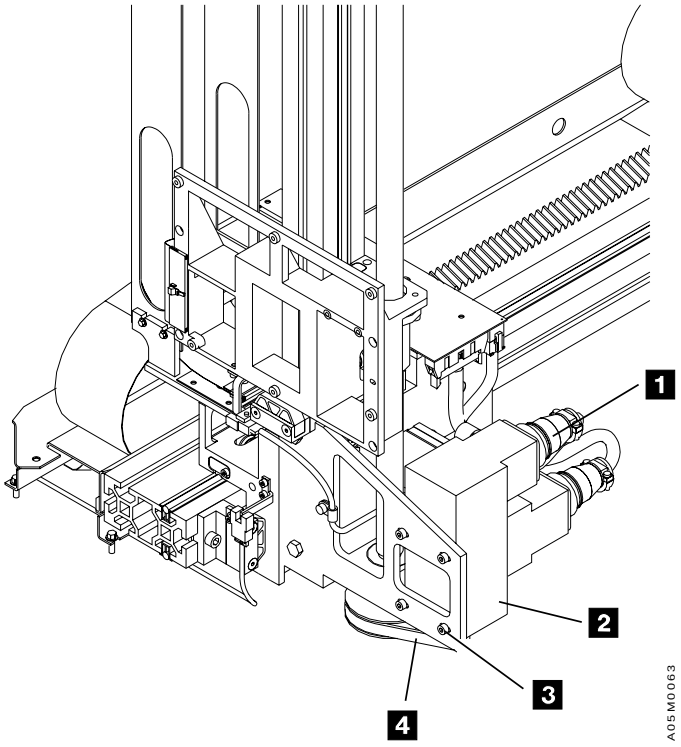


Figure 120. Y-Axis Motor

Cartridge Accessor Control Cards

See “Data Flow” on page INTRO-32 for a description of the cards.

Bulkhead Interconnect Card (BIC)

See Figure 32 on page LOC-10 for location information. Also see Figure 35 on page LOC-13 for single accessor library and Figure 36 on page LOC-14 for dual accessor library.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See “Working with ESD-Sensitive Parts” on page CARR-166.

Removal of Bulkhead Interconnect Card (BIC)

1. If this is a single accessor library perform “Single Accessor Library Service Preparation” on page CARR-7 and then return here.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6 and then return here.
3. Move the accessor assembly to the right to get service clearance to the BIC card. See Figure 28 on page LOC-6 for a view of the card.
4. Remove the cables from the front of the BIC card.
5. Remove the 6 screws that secure the card to the bulkhead and tilt the card forward.
6. Remove the cables from the back of the BIC card.

Replacement of Bulkhead Interconnect Card (BIC)

Perform the removal steps in reverse order.

Dual B Frame Card (DBF)

This card is used in high availability libraries only. This card is located below the MIC4 card in the Right Service Bay frame. See Figure 34 on page LOC-12 and Figure 38 on page LOC-16 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See “Working with ESD-Sensitive Parts” on page CARR-166.

Removal of Dual B Frame Card

1. Perform “Dual Accessor Library Service Preparation” on page CARR-6 and then return here.
2. Before removing the DBF card, prepare the library as follows:
   a. Put the library in Pause by pushing the **Pause** button on the operator panel.
   b. Power off the 24V power supply in the Right Service Bay frame.
   c. Power off the 36V power supply in the Right Service Bay frame.
3. Disconnect cables from the DBF card.
4. Remove screws that secure the card to the card frame.
5. Unplug the card from the MIC4 card and remove.

Replacement of Dual B Frame Card

Perform the removal steps in reverse order.

After the new card is plugged in and the cables are connected, you can put the library back into **Auto** before the local DC power is turned back on.

Door Interlock Card (DIL)

See Figure 26 on page LOC-4 and Figure 37 on page LOC-15 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of Door Interlock Card

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in "Procedure: Prepare the Library Subsystem for Service" on page START-10 and then return here.
2. Remove the cables from the DIL card. (The card is near the door interlock switch.) See Figure 26 on page LOC-4 for a view of the card.
3. If the DIL card is in the last frame in the configuration, remove the terminator from the card.
4. Note the orientation of the card and remove the screws that secure the card to the frame.

Replacement of Door Interlock Card

Perform the removal steps in reverse order.

The new card must be installed in the same orientation as the old card. If it is a DIL1 card, the side without a connector should be toward the door. If it is a DIL2 card, the side with the J4 connector should be toward the door.

Dual Switch Card (DSW)

This card is used in high availability libraries only. This card is located below the MIC4 card in the L1x frame. See Figure 33 on page LOC-11 and Figure 39 on page LOC-17 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of Dual Switch Card

1. Perform "Dual Accessor Library Service Preparation" on page CARR-6 and then return here.
2. Before removing the DSW card, prepare the library as follows:
   a. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in "Procedure: Prepare the Library Subsystem for Service" on page START-10.
3. Disconnect cables from the DSW card.
4. Remove screws that secure the card to the card frame.
5. Unplug the card from the MIC4 card and remove.

Replacement of Dual Switch Card

Perform the removal steps in reverse order.

Library Interconnect Card (LCC)

This card is used in single accessor libraries only. See Figure 32 on page LOC-10 and Figure 41 on page LOC-19 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Note: This card is used with the MIC1 card. When the LCC card or MIC1 card is no longer available, you must replace both cards with the MIC4/LPC card set.

Removal of Library Interconnect Card (LCC)

1. Perform "Single Accessor Library Service Preparation" on page CARR-7 and then return here.
2. Disconnect the cables from the library interconnect card (LCC). See Figure 32 on page LOC-10 for a view of the card.
3. Remove the screws that secure the card to the frame.
4. Remove the card from the clamps and unplug it from the MIC1 card.

Replacement of Library Interconnect Card (LCC)

Perform the removal steps in reverse order.

Note: If a cable has been replaced in your library, the connector may be labeled for the MIC2-4/LPC card set. Refer to the cable section to locate the correct cable socket on the LCC card.

Library Power Control Card (LPC)

This card is used in single accessor libraries only. See Figure 42 on page LOC-20 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Note: This card is used with the MIC2-4

Removal of Library Power Control Card (LPC)

1. Perform "Single Accessor Library Service Preparation" on page CARR-7 and then return here.
2. Disconnect cables from the LPC card.
3. Remove screws that secure card to card frame.
4. Unplug the card from the MIC card and remove.

Replacement of Library Power Control Card (LPC)

Perform the removal steps in reverse order.

Machine Interface Control Card 1 (MIC1)

This card is used in single accessor libraries only. See Figure 32 on page LOC-10 and Figure 43 on page LOC-21 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Note: This card is used with the LCC card. When the MIC1 card or LCC card is no longer available, you must replace both cards with the MIC2-4/LPC card set.

Removal of Machine Interface Card 1 (MIC1)

Note: Before replacing the MIC card as the cause of failure, check that fuses F1–F5 are not blown. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "36-Volt Distribution Overview" on page POWER-5 or "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined.

1. Perform "Single Accessor Library Service Preparation" on page CARR-7 and then return here.
2. Disconnect cable connectors labeled P1 through P10 from the card.
3. Remove the screws securing the card to the control unit frame.
4. Remove the card from the clamps (top and bottom).
5. Remove the MIC1 card.

Replacement of Machine Interface Card 1 (MIC1)

Perform the removal steps in reverse order.

Note: If a cable has been replaced in your library, the connector may be labeled for the MIC2-4/LPC card set. Refer to the cable section to locate the correct cable socket on the MIC1 card.

Machine Interface Control Card 2-4 (MIC2-4)

This card is used with the LPC card in a single accessor library and with the DSW or DBF cards in a dual accessor library. See Figure 44 on page LOC-22 for single accessor location information. See Figure 33 on page LOC-11 and Figure 34 on page LOC-12 dual accessor location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of Machine Interface Card 2-4

Note: Before replacing the MIC card as the cause of failure, check that fuses F1–F5 are not blown. If a fuse is blown, replace the fuse and bring the library up in Auto/Offine mode. If the fuse continues to blow, go to "36-Volt Distribution Overview" on page POWER-5 or "24-Volt Distribution Overview" on page POWER-7 and isolate the failing component by unplugging cables in the fuse circuit until the failing FRU is determined.

1. If this is a single accessor library, perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in "Procedure: Prepare the Library Subsystem for Service" on page START-10 and then go to step 4.
2. If this is a dual accessor library, perform "Dual Accessor Library Service Preparation" on page CARR-6 and then return here.
3. Before removing a MIC4 card on a dual accessor library, prepare the library as follows:
   a. Put the library in Pause by pushing the **Pause** button on the operator panel.
   b. Power off the 24V power supply in the frame with this MIC card.
   c. Power off the 36V power supply in the frame with this MIC card.
4. Disconnect all cables from the MIC card.
5. Remove the screws that secure the MIC card to the card frame.
6. Unplug the MIC card from the LPC, DSW, or DBF card and remove it.

Replacement of Machine Interface Card 2-4

After the old card is removed, you can put the library back into **Auto** before you install the replacement card.

Perform the removal steps in reverse order.

Operator Panel Card (LPN)

See Figure 26 on page LOC-4 and Figure 45 on page LOC-23 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of Operator Panel Card (LPN)

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in "Procedure: Prepare the Library Subsystem for Service" on page START-10 and return here.
2. Put the Unit Emergency Switch in the off position.
3. Disconnect cables connectors P1 and P2 from the LPN card. See Figure 26 on page LOC-4 for a view of the card.
4. Remove the screws that secure the cover to the plate.
5. Remove cable connector P3 that goes to the EPO switch.
6. Remove the screws that secure the card to the plate.
7. Remove the LPN card.

Replacement of Operator Panel Card (LPN)

Note: If the convenience I/O station is not installed, connector P2 on the LPN card has a terminator installed.

Perform the removal steps in reverse order.

Picker Card (GRI)

See Figure 29 on page LOC-7 and Figure 46 on page LOC-24 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of Picker Card (GRI)

1. If this is a single accessor library perform "Single Accessor Library Service Preparation" on page CARR-7 and then return here.
2. If this is a dual accessor library, perform "Dual Accessor Library Service Preparation" on page CARR-6 and then return here.
3. Unsnap the card cover, if installed, and disconnect cable connectors P1, P2, P3, and P4 from the picker card. See Figure 26 on page LOC-4 for a view of the card.
4. Remove the 6 screws that secure the card to the Y-axis assembly.
5. Remove the GRI card.

Replacement of Picker Card (GRI)

Perform the removal steps in reverse order.

Port Mixing Card (PMX)

This card is used in high availability libraries only. This card is located in the rear of the Left Service Bay frame.

Removal of Port Mixing Card

1. Select **Offline** from the Mode pulldown of the Operator action bar on the active library manager.
2. Wait until the library is offline.
3. Remove the screws holding the card bracket to the rack.
4. Disconnect the cables from the PMX card.
5. Remove the screws that secure the card to the card bracket and remove it.

Replacement of Port Mixing Card

Perform the removal steps in reverse order.

PCC Sequencer Card (SEQ)

This card is used in high availability libraries only. This card is located behind the rear door either above the PCC or in the lower left corner in each D1x and B1x frame. See Figure 54 on page LOC-32 for location information.

Removal of PCC Sequencer Card

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in “Procedure: Prepare the Library Subsystem for Service” on page START-10.
2. Disconnect the cables from the SEQ card.
3. Remove the screws that secure the card bracket to the frame and remove the card and bracket.

Replacement of PCC Sequencer Card

Perform the removal steps in reverse order.

Unit Emergency Power Card (UEP)

This card is used in high availability libraries only. This card is located next to the DSW card mounted below the MIC4 card in the L1x frame. See Figure 33 on page LOC-11 and Figure 49 on page LOC-27 for location information.

Removal of Unit Emergency Power Card

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in “Procedure: Prepare the Library Subsystem for Service” on page START-10.
2. Disconnect the cables from the UEP card.
3. Remove the screws that secure the card to the panel and remove the card.

Replacement of Unit Emergency Power Card

Perform the removal steps in reverse order.

X-Axis and Y-Axis Power Amplifier Card

See Figure 32 on page LOC-10 and Figure 51 on page LOC-29 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Note: You need a 4mm socket P/N 73G1479 to complete this procedure.

Removal of X-Axis and Y-Axis Power Amplifier Card

1. If this is a single accessor library ensure that the 24 V dc and the 36 V dc power supplies are powered off or that the Unit Power switch is set to Power Off on the operator panel. See "Procedure: Prepare the Library Subsystem for Service" on page START-10.
2. If this is a dual accessor library, perform "Dual Accessor Library Service Preparation" on page CARR-6 and then return here.
3. Disconnect the signal cable connector.
4. Remove the 5 wires from the power amplifier connectors by loosening the screws.
5. Remove the screws holding the power amplifier to the control unit frame.
6. Remove the power amplifier.

Replacement of X-Axis and Y-Axis Power Amplifier Card

1. Perform the removal steps in reverse order.
2. Ensure that the pot and switch settings on the amplifiers are set correctly. See Figure 51 on page LOC-29 for pot and switch settings.

X/Y-Axis Card (XAX)

See Figure 121. (See also Figure 28 on page LOC-6 for location information.)

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of X/Y-Axis Card (XAX)

1. If this is a single accessor library, perform "Single Accessor Library Service Preparation" on page CARR-7 and then return here.
2. If this is a dual accessor library, perform "Dual Accessor Library Service Preparation" on page CARR-6 and then return here.
3. Perform "Y-Axis (Vertical) Service Position" on page CARR-8 and return here.
4. Remove the 5 screws **1** that secure the X/Y-axis card **3** to the mounting plate.
5. Remove the 2 screws **2** holding the cable clamp.
6. Disconnect the cable connectors labeled P1, P2, P3, and P4 **4**.
7. Remove the card **3**.

Replacement of X/Y-Axis Card (XAX)

Perform the removal steps in reverse order.

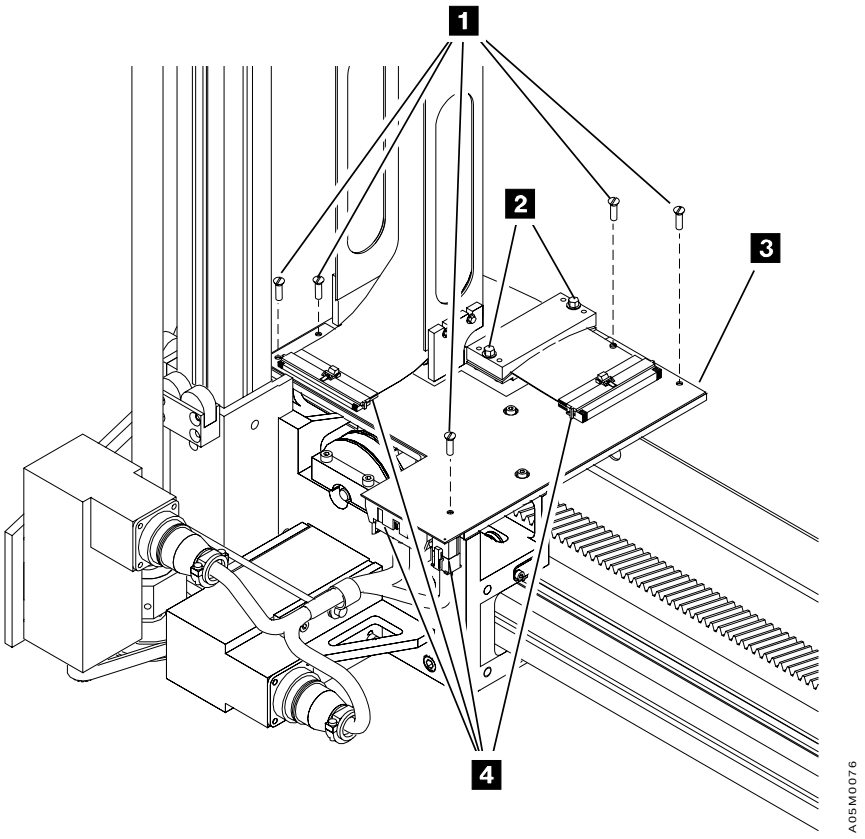


Figure 121. X/Y-Axis Card

Convenience Input/Output Station

Note: The 10 cartridge convenience I/O station is shown in each of the figures in this section. The 30 cartridge I/O station is functionally the same as the 10 cartridge I/O station. The 30 cartridge I/O station is mounted in the same area and extends towards the bottom of the door, displacing all of the storage cells in columns C & D on the CU front door.

Convenience I/O Cable

See Figure 122 on page CARR-82. (See also Figure 31 on page LOC-9 for location information.)

Removal of Convenience I/O Cable

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in"Procedure: Prepare the Library Subsystem for Service" on page START-10 and return here.
2. If the convenience input/output station in your library has a screw **8** in the left side of the bottom cover **4**, remove the convenience I/O station as follows:
   a. Disconnect the convenience I/O cable **12** at the operator panel card (LPN) P2 connector **11**.
   b. Remove the convenience input/output station by removing 4 bolts (2 at the top **10** and 2 at the bottom **9**).
3. Remove the bottom cover **4** by removing the screw **1** (and screw **8** if installed) and remove the cover.
4. Disconnect the convenience I/O cable **7** from the convenience I/O cartridge present sensor **2**, the convenience I/O door locked sensor **5**, the convenience I/O closed sensor **3**, and disconnect the convenience I/O door lock solenoid wires **6**.
5. Remove 3 cable clamps from the convenience I/O casting and remove the cable **7**.

Replacement of Convenience I/O Cable

Perform the removal steps in reverse order.

Note: Do not install screw **8** on the bottom cover.

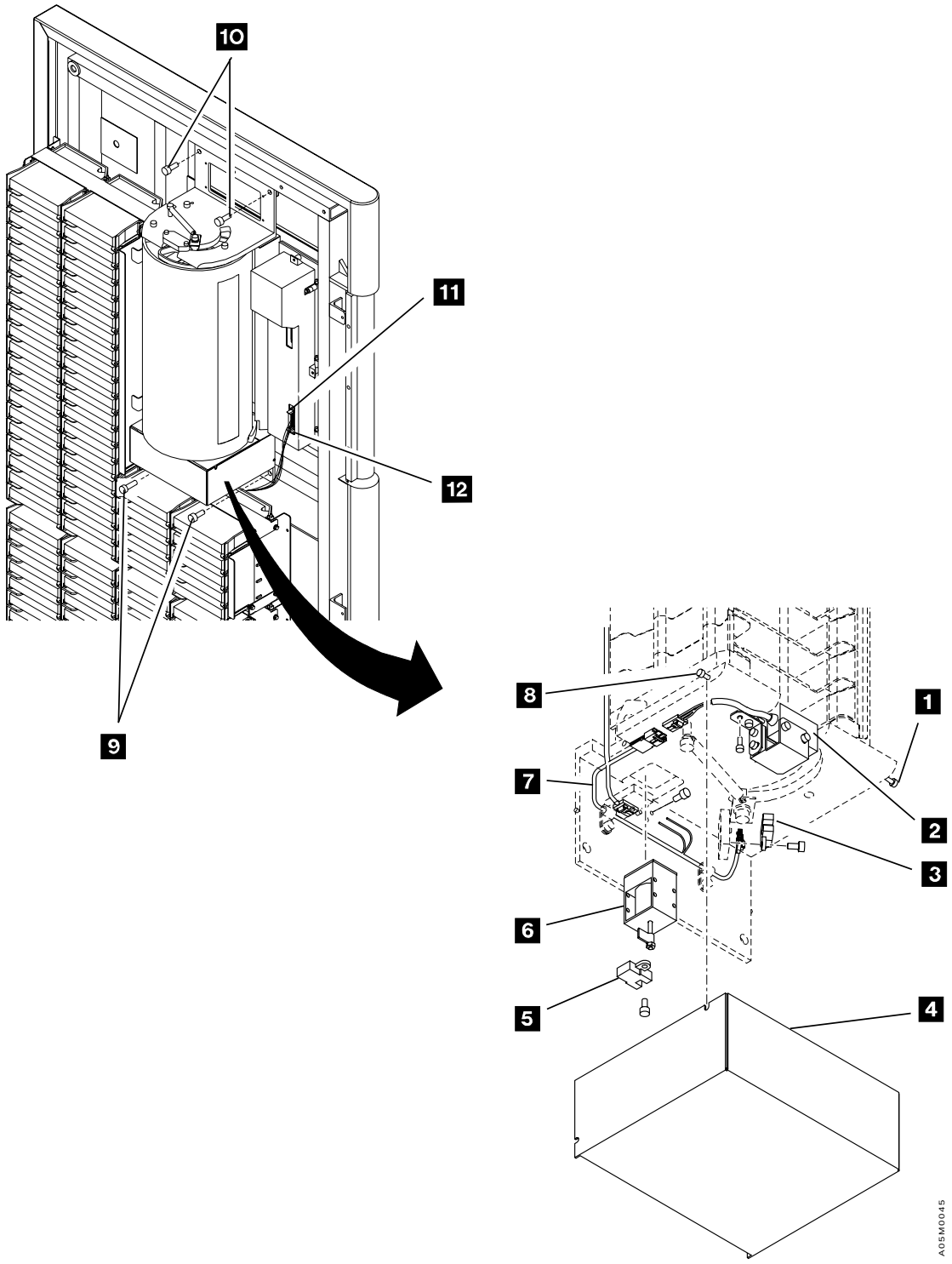


Figure 122. Convenience I/O Cable

Convenience I/O Cartridge Present Sensor

See Figure 123 on page CARR-84. (See also Figure 31 on page LOC-9 for location information.)

Removal of Convenience I/O Cartridge Present Sensor

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in“Procedure: Prepare the Library Subsystem for Service” on page START-10 and return here.
2. If the convenience input/output station in your library has screw **7** in the left side of the bottom cover **5**, remove the convenience I/O station as follows:
   a. Disconnect the convenience I/O cable **11** at the operator panel card (LPN) P2 connector **10**.
   b. Remove the convenience input/output station by removing 4 bolts (2 at the top **9** and 2 at the bottom **8**).
3. Remove the screw **1** (and screw **7** if installed) that secures the bottom cover **5** and remove the bottom cover.
4. Remove the 4-wire cable connector from the convenience I/O cartridge present sensor **2** bracket.
5. Remove the 2 screws **4** holding the convenience I/O cartridge present sensor bracket to the casting and remove the convenience I/O cartridge present sensor.
6. Remove the 2 screws **3** securing the bracket to the convenience I/O cartridge present sensor.

Replacement of Convenience I/O Cartridge Present Sensor

1. Install the new convenience I/O cartridge present sensor **2** on the bracket with the 2 screws **3** removed earlier, and do not tighten the screws so the sensor can be adjusted later.
2. Secure the bracket to the casting with the 2 screws **4** removed earlier.
3. Connect the 4-wire cable connector on the cartridge present sensor **2**.
4. If the convenience I/O station was removed, reinstall it using the 4 bolts **8** and **9**, then connect the convenience I/O cable **11** into the operator panel card (LPN) connector P2 **10**.
5. Go to “Adjustment of Convenience I/O Cartridge Present Sensor.”

Adjustment of Convenience I/O Cartridge Present Sensor

1. Power on the 3494 with the door open. If the 3494 is not powered on, set the Unit Power switch to Power On.
2. Loosen the cartridge present mounting screws **3** **4** and position the convenience I/O cartridge present sensor so the sensor is aimed at the reflector and the LED stays green.
3. Tighten the cartridge present sensor mounting screws **3** **4**.
4. If you have a 30 Cartridge CIO, adjust the shutter bracket above the sensor as follows:
   a. Loosen the 2 mounting screws and slide the shutter to the right until the green light on the sensor goes out.
   b. Then slide the shutter to the left until the green light comes back on and tighten the screws.
5. Replace the bottom cover **5**. Do not install screw **7**.

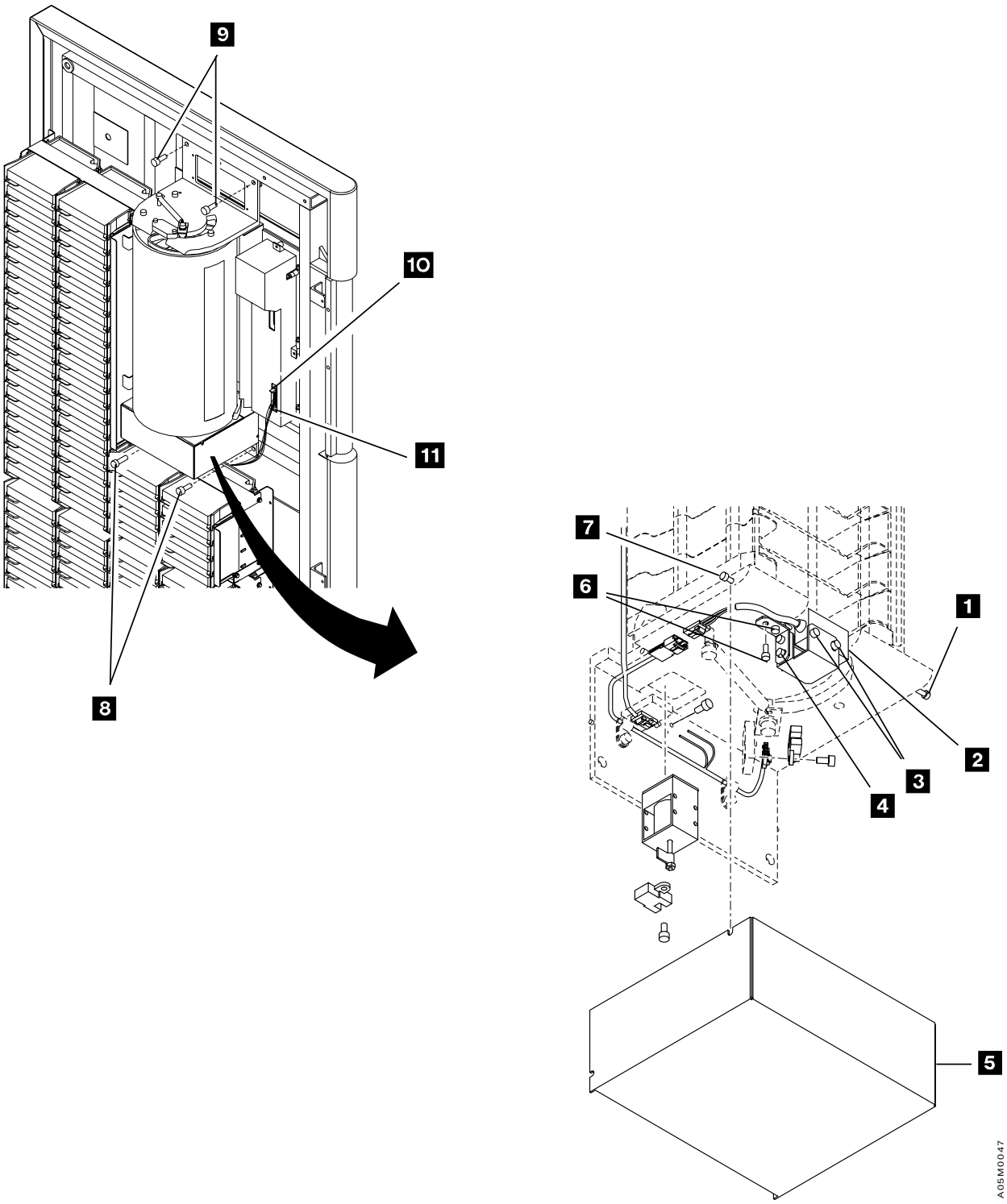


Figure 123. Convenience I/O Cartridge Present Sensor

Convenience I/O Door Closed Sensor

See Figure 124 on page CARR-86. (See also Figure 31 on page LOC-9 for location information.)

Removal of Convenience I/O Door Closed Sensor

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in"Procedure: Prepare the Library Subsystem for Service" on page START-10 and return here.
2. If the convenience input/output station in your library has screw **7** in the left side of the bottom cover **5**, remove the convenience I/O station as follows:
   a. Disconnect the convenience I/O cable **11** at the operator panel card (LPN) P2 connector **10**.
   b. Remove the convenience input/output station by removing 4 bolts (2 at the top **9** and 2 at the bottom **8**).
3. Remove the bottom cover **5** by removing the screw **1** (and screw **7** if installed) and remove the cover.
4. Remove the 4-wire cable connector from the convenience I/O door closed sensor **2**.
5. Remove the screw **4** to remove the sensor.

Replacement of Convenience I/O Door Closed Sensor

1. Perform the removal steps in reverse order.

   Note: Do not install screw **7** on the bottom cover.
2. Ensure that the flag **6** on the spring bracket aligns with the slot **3** in the sensor when the door is closed.

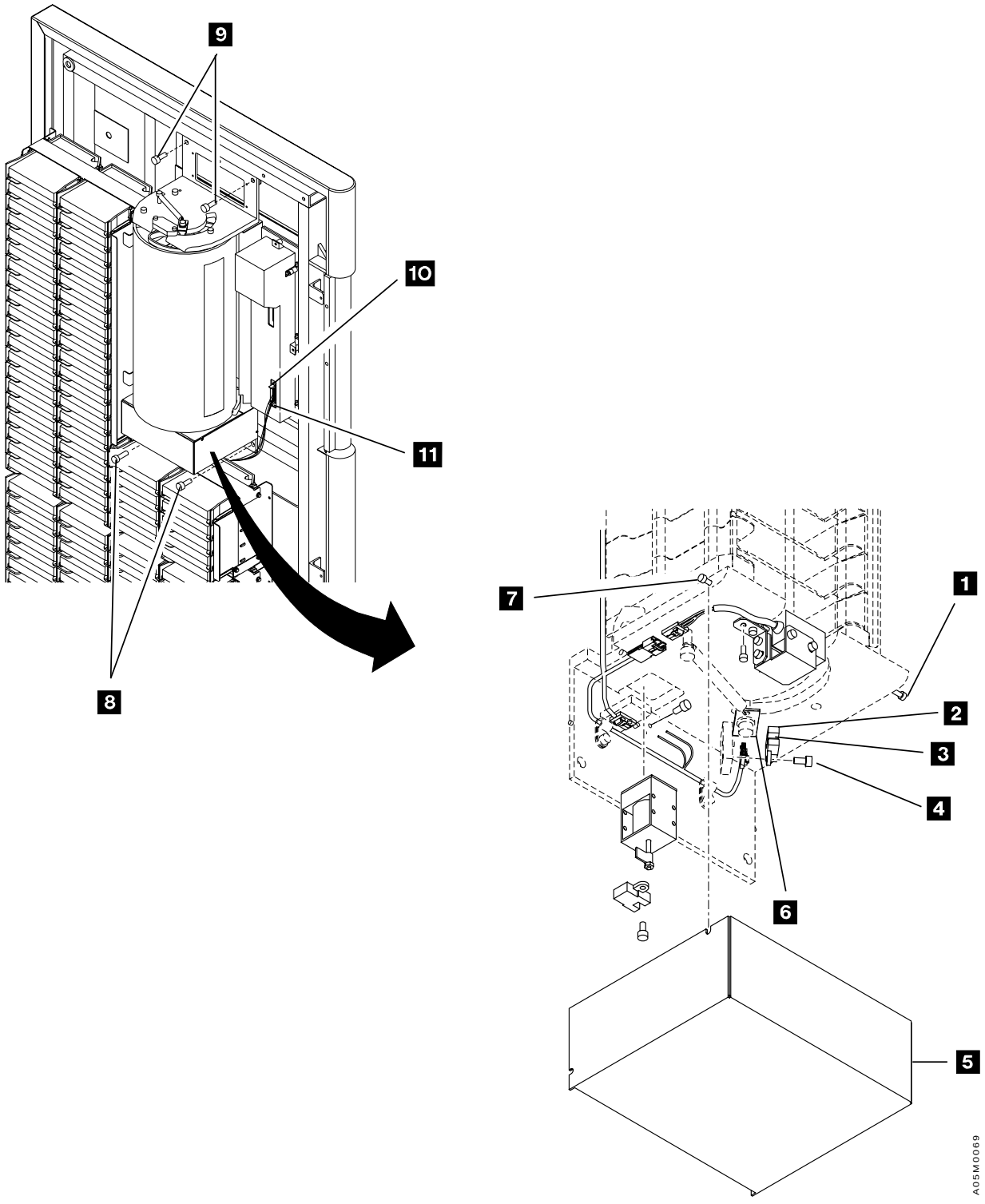


Figure 124. Convenience I/O Door Closed Sensor

Convenience I/O Door Locked Sensor

See Figure 125 on page CARR-88. (See also Figure 31 on page LOC-9 for location information.)

Removal of Convenience I/O Door Locked Sensor

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in"Procedure: Prepare the Library Subsystem for Service" on page START-10 and return here.
2. If the convenience input/output station in your library has screw **7** in the left side of the bottom cover **2**, remove the convenience I/O station as follows:
   a. Disconnect the convenience I/O cable **11** at the operator panel card (LPN) P2 connector **10**.
   b. Remove the convenience input/output station by removing 4 bolts (2 at the top **9** and 2 at the bottom **8**).
3. Remove the bottom cover **2** by removing the screw **1** (and screw **7** if installed) and remove the cover.
4. Remove the 4-wire cable connector from the convenience I/O door locked sensor **5**.
5. Remove the screw **3** to remove the sensor.

Replacement of Convenience I/O Door Locked Sensor

1. Perform the removal steps in reverse order.

   Note: Do not install screw **7** on the bottom cover.
2. Ensure that the flag **6** on the solenoid aligns with the slot **4** in the sensor.

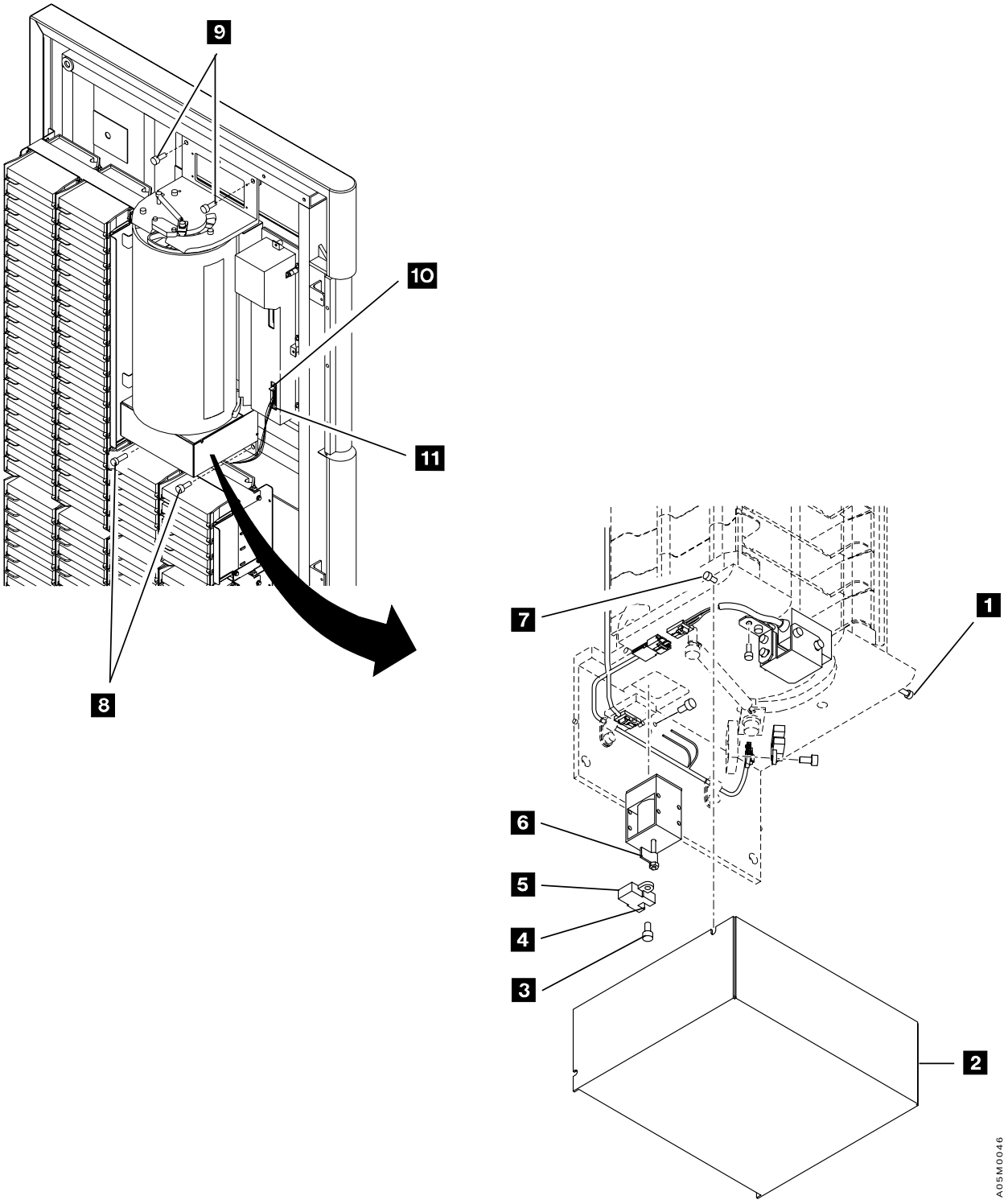


Figure 125. Convenience I/O Door Locked Sensor

Convenience I/O Locked Solenoid

See Figure 126 on page CARR-90. (See also Figure 31 on page LOC-9 for location information.)

Removal of Convenience I/O Locked Solenoid

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in"Procedure: Prepare the Library Subsystem for Service" on page START-10 and return here.
2. If the convenience input/output station in your library has screw **5** in the left side of the bottom cover **2**, remove the convenience I/O station as follows:
   a. Disconnect the convenience I/O cable **9** at the operator panel card (LPN) P2 connector **8**.
   b. Remove the convenience input/output station by removing the 4 bolts (2 at the top **7** and 2 at the bottom **6**).
3. Remove screw **1** (and screw **5** if installed) that secures the bottom cover **2** and remove the cover.
4. Remove the solenoid cable connector from the solenoid **3**.
5. Remove the 2 screws **4** holding the door locked solenoid and remove the solenoid from the assembly.

Replacement of Convenience I/O Locked Solenoid

Perform the removal steps in reverse order.

Note: Do not install screw **5** on the bottom cover.

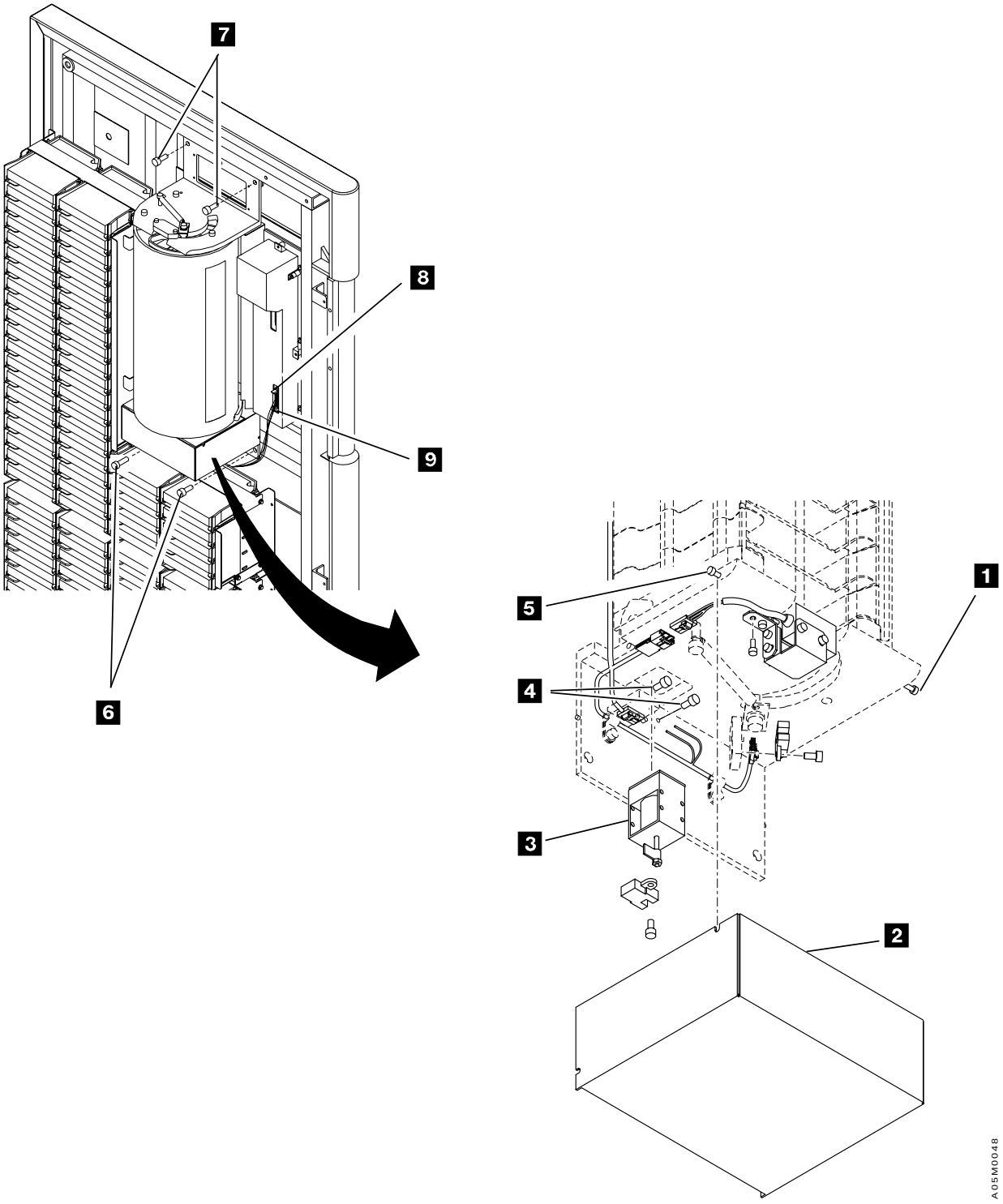


Figure 126. Convenience I/O Door Locked Solenoid

Library Manager

Three different personal computer systems are used for the library manager in the 3494:

- IBM PS/ValuePoint 6384/D 433DX/D
- IBM 7585 Industrial Computer
- IBM 7588 Industrial Computer

If you have a PS/ValuePoint, use the following manuals included with the library to service the library manager:

- *IBM PS/ValuePoint Hardware Maintenance Manual*
- *IBM PS/ValuePoint Installing Options*

If you have an Industrial Computer, use the *IBM 7585 Industrial Computer Information: Installation, Operation, Hardware Maintenance* or the *IBM 7588 Industrial Computer Information, Installation, Operation, Hardware Maintenance* manual included with the library to service the library manager.

Refer to the Locations section and this section for specific information about the library manager adapter cards and disk drives.

Library Manager Service Preparation

Dual Library Manager Service Preparation: In a library with dual library managers, the library can continue to operate while one of the library managers is being repaired.

1. Go to “Procedure: Prepare the Library Subsystem for Service” on page START-10 and follow the procedure under **CONCURRENT MAINTENANCE WITH AUTO MODE** for library manager problems.
2. Follow the procedures in this section and in the *IBM 7588 Industrial Computer Information* as appropriate.
3. Before replacing FRUs in the library manager, the library manager must be shutdown and the frame powered off as follows:
   a. If you are working on the Model L1x frame, ask the operator to take the tape subsystem(s) in the L1x frame offline to all hosts.
   b. Select **Shutdown** on the library manager Mode pulldown.
   c. When the library manager shutdown completes, select **Shutdown for power-off** on the Shutdown window.
   d. When the computer shutdown completes, turn off CB1 on the frame's Power Control Compartment (PCC).

      Note: Do not power the LM off using the system unit power switch. Unpredictable results may occur if the entire frame is not powered off.

   e. Replace the FRU(s) and power-up by turning on CB1.

Single Library Manager Service Preparation: In a library with a single library manager, the library must be taken offline to repair the library manager.

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in “Procedure: Prepare the Library Subsystem for Service” on page START-10.

Prepare System Unit for Service: See Figure 32 on page LOC-10.

1. Loosen the screw holding the braided strap to the MIC card and remove the strap from the card.
2. If you have a PS/ValuePoint, remove the cover of the library manager by:
   a. Setting the key to the unlock position.
   b. Pushing down and holding the cover-release latch (on the top left-hand side of the unit) as you slide the cover forward.
3. If you have an IBM 7585 Industrial Computer, see **Opening the System Unit** in the "Removal and Replacement Procedures" in *IBM 7585 Industrial Computer Information*.
4. If you have an IBM 7588 Industrial Computer, loosen the six top cover screws and lift off the cover.

   Warning: Ensure the system unit is powered off before lifting the cover off the library manager.

Battery

1. If you have a single library manager, follow the instructions in "Single Library Manager Service Preparation" on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in "Dual Library Manager Service Preparation" on page CARR-91 to prepare for service.
3. For instructions on how to remove, replace, and dispose of the battery, see "Appendix C. Changing the Battery" in *IBM PS/ValuePoint Installing Options* or "Removal and Replacement Procedures" in *IBM 7585 Industrial Computer Information* or *IBM 7588 Industrial Computer Information*.
4. After replacing the battery, update the library manager's configuration. Perform the procedure described in "Configuration Utility Program."

Configuration Utility Program

Use the following procedure after replacing a system board or battery. In addition, see "Configuration Utility Program" in *IBM PS/ValuePoint Installing Options*, *IBM 7585 Industrial Computer Information*, or *IBM 7588 Industrial Computer Information*.

1. Power on using the appropriate power switch (i.e.Unit Power for single library manager or frame CB1 for dual library manager).
2. When the Configuration Utility program symbol appears in the upper right-hand corner of the display, press and release the F1 key. The Configuration Utility screen should be displayed as shown in Figure 127 on page CARR-93 for the PS/ValuePoint, Figure 128 on page CARR-95 for the 7585 Industrial Computer, or Figure 129 on page CARR-98 for the 7588 Industrial Computer.
3. Check and modify the Configuration Utility screens to match those shown in Figure 127 on page CARR-93 for the PS/ValuePoint, Figure 128 on page CARR-95 for the 7585 Industrial Computer, or Figure 129 on page CARR-98 for the 7588 Industrial Computer.

   Note: Two hard drives should be listed on the screen if you have the library manager dual hard disk drive feature installed, but only one hard drive will be listed if a mirrored hard drive card is installed.
4. Toggle the Num Lock key off to enable the PgUp and PgDn keys. If an item cannot be corrected, replace the appropriate FRU.

```
                        Configuration Utility

System Information:

Processor                           486DX
Math Coprocessor                    Installed
Video Controller                    VGA/EGA
Hard Disk                           245 MB (IDE)
Mouse                               Installed

Memory:
Memory                              16000 KB
Internal Cache                      8 KB (Enabled)
External Cache                      Not Installed
BIOS Shadowed in RAM                Yes
Video Memory                        1024 KB
Flash EEPROM Revision Level         L6ET XX AUS (xx=54 or higher)


Use ↑ and ↓ to highlight an option.       P5 = Default Configuration
Use ← and → to change an option.
F1 = Help                           Page Down = Next          Esc = Save/Exit
```

Figure 127 (Part 1 of 3). PS/ValuePoint Configuration

```
                        Configuration Utility

System Setup:

Diskette Drive A:                   1.44 MB 3.5 in.
Diskette Drive B:                   Not Installed
Serial Port A                       Serial_1 (3F8-IRQ4)
Serial Port B                       Serial_2 (2F8-IRQ3)
Parallel Port                       Parallel_1 (3BC-IRQ7)
Keyboard Speed                      Normal

Start-up Options:

First Start-up Device               Diskette Drive A:
Second Start-up Device              Hard Disk 1
Unattended Start Mode               Disabled
Keyboardless Operation Mode         Disabled
Keyboard NumLock State              On


Use ↑ and ↓ to highlight an option.       P5 = Default Configuration
Use ← and → to change an option.
F1 = Help                           Page Down = Next          Esc = Save/Exit
```

Figure 127 (Part 2 of 3). PS/ValuePoint Configuration

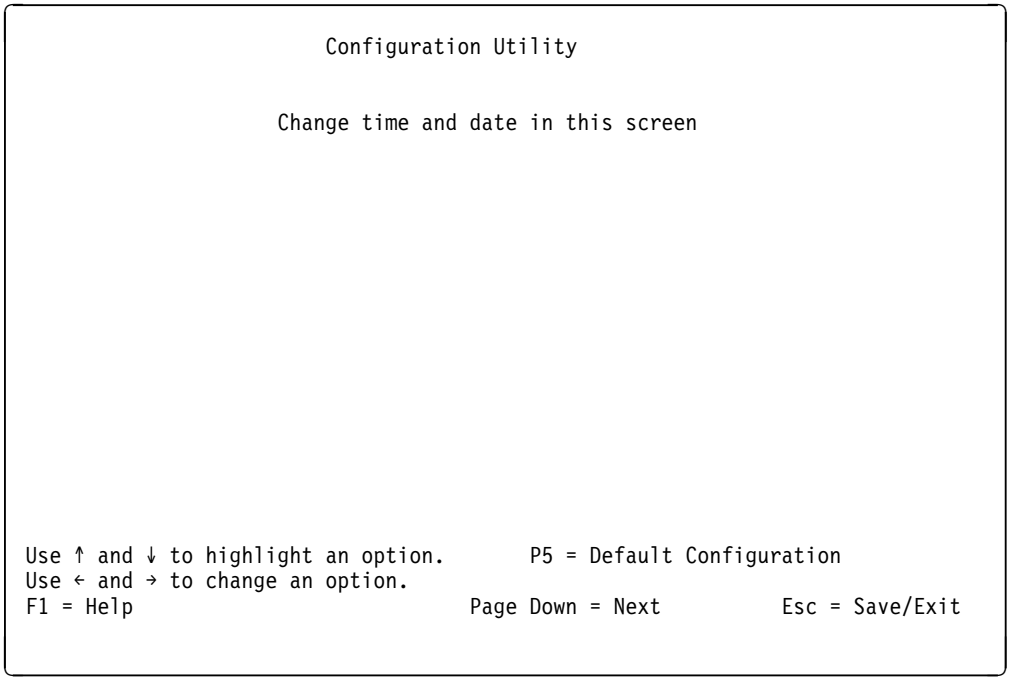


Figure 127 (Part 3 of 3). PS/ValuePoint Configuration

```
                    Configuration Utility              Page 1 of 6

System Information:

Processor                         80486SX
Processor Speed                   33 MHz
Math Coprocessor                  Not Installed
System Memory                     16000 KB
Flash EEPROM Revision Level       LDETxxAUS    (xx = 64 or higher)

Video:

Video Controller                  *IBM*MFG*
Video Memory                      Unknown
Video Display Type                [IBM 6314]
Refresh Rate for (640x480)        75 Hz
Refresh Rate for (800x600)        75 Hz
Refresh Rate for (1024x768)       72 Hz
Refresh Rate for (1280x1024)      45 Hz
Refresh Rate for (1600x1200)      Not Supported


Use ↑ and ↓ to highlight an option.           F5 = Default Configuration
Use ← and → to change an option.
F1 = Help                          Page Down = Next    Esc = Save/Exit
```

Figure 128 (Part 1 of 6). IBM 7585 Industrial Computer Configuration

```
                    Configuration Utility              Page 2 of 6

Security:

Power-on Password                 [Disabled]
Administrator Password            [Disabled]
Diskette Drive Access             [Enabled]
Hard Disk Access                  [Enabled]

Clock:

Date                              [mm/dd/yy]
Time                              [hh/mm/ss]









Use ↑ and ↓ to highlight an option.           F5 = Default Configuration
Use ← and → to change an option.
F1 = Help    Page Up = Previous    Page Down = Next    Esc = Save/Exit
```

Figure 128 (Part 2 of 6). IBM 7585 Industrial Computer Configuration

```
                    Configuration Utility              Page 3 of 6

Keyboard and Mouse:

Keyboard Speed                  [Normal]
Keyboard NumLock State          [Off]
Keyboardless Operation Mode     [Disabled]
Mouse                           Installed

Input/Output Ports:

Serial Port A                   [3F8-IRQ4] COM1
Serial Port B                   [2F8-IRQ3] COM2
Parallel Port                   [3BC-IRQ7] LPT1
Parallel Port Mode              [PC/AT (Compatible)]

Cache:

Internal Cache                  8 KB [Enabled]
External Cache                  Not Installed


Use ↑ and ↓ to highlight an option.          F5 = Default Configuration
Use ← and → to change an option.
F1 = Help    Page Up = Previous    Page Down = Next    Esc = Save/Exit
```

Figure 128 (Part 3 of 6). IBM 7585 Industrial Computer Configuration

```
                    Configuration Utility              Page 4 of 6

Mass Storage Devices:

Diskette Drive 0                [2.88 MB 3.5"]
Diskette Drive 1                Not Installed
Hard Disk 0                     270 MB (IDE)
Primary IDE Mode                [Compatible]
Secondary IDE Mode              [Compatible]

Startup Options:

First Startup Device            [Diskette Drive 0]
Second Startup Device           [Hard Disk 0]
Unattended Start Mode           Disabled









Use ↑ and ↓ to highlight an option.          F5 = Default Configuration
Use ← and → to change an option.
F1 = Help                         Page Down = Next    Esc = Save/Exit
```

Figure 128 (Part 4 of 6). IBM 7585 Industrial Computer Configuration

```
                    Configuration Utility              Page 5 of 6

Power Management:

Power Down Timer                [4 Hours]
Processor                       [Not Managed]
Video Display                   Not Supported by Display
Hard Disks                      [Not Managed]

Interrupts:

IRQ 5                           [Available]
IRQ 10                          [Available]
IRQ 11                          [Available]









Use ↑ and ↓ to highlight an option.          F5 = Default Configuration
Use ← and → to change an option.
F1 = Help    Page Up = Previous    Page Down = Next    Esc = Save/Exit
```

Figure 128 (Part 5 of 6). IBM 7585 Industrial Computer Configuration

```
                    Configuration Utility              Page 6 of 6

Memory Map (C0000-DFFFF):

System Video BIOS at            (C0000-C7FFF)  Shadowed
Memory Space at                 (C8000-C9FFF)  Reserved for ROM or UMB
Memory Space at                 (CA000-CBFFF)  Reserved for ROM or UMB
Memory Space at                 (CC000-CDFFF)  Reserved for ROM or UMB
Memory Space at                 (CE000-CFFFF)  Reserved for ROM or UMB
Memory Space at                 (D0000-D1FFF)  [Available]
Memory Space at                 (D2000-D3FFF)  [Available]
Memory Space at                 (D4000-D5FFF)  [Available]
Memory Space at                 (D6000-D7FFF)  [Available]
Memory Space at                 (D8000-D7FFF)  [Available]
Memory Space at                 (DA000-DBFFF)  [Available]
Memory Space at                 (DC000-DDFFF)  [Available]
Memory Space at                 (DE000-DFFFF)  [Available]

Internal Caching at             (C0000-CFFFF)  [Enabled]


Use ↑ and ↓ to highlight an option.          F5 = Default Configuration
Use ← and → to change an option.
F1 = Help    Page Up = Previous                      Esc = Save/Exit
```

Figure 128 (Part 6 of 6). IBM 7585 Industrial Computer Configuration

IBM 7588 Industrial Computer Configuration

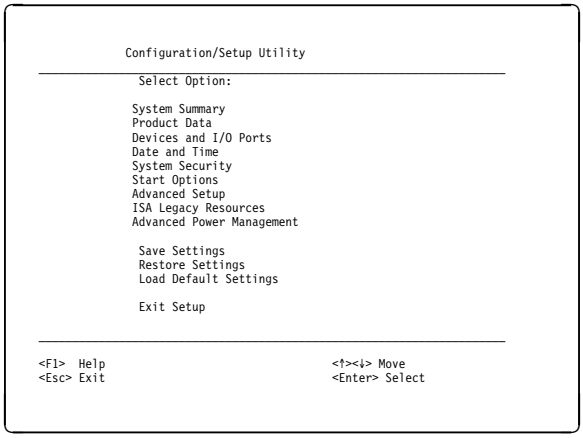


Figure 129. IBM 7588 Industrial Computer Configuration

Set the IBM 7588 configuration using the default settings except as described in the following steps:

1. See **Using the Configuration/Setup Utility Program** in the *IBM 7588 Industrial Computer Information, Installation, Operation, Hardware Maintenance* manual for a description of the options available.
2. If you have installed a 850MB or smaller hard drive in this computer, change the **IDE Performance** parameter for the hard drive to [Compatible] instead of the default of High Performance.
3. Set the date and time using the **Date and Time** option on the main screen.
4. Set reserved address areas to **disabled** as follows:
   a. Select **Advanced Setup**.
   b. Select **ROM shadowing**.
   c. Set the following address areas to **disabled**:
      C8000 - CBFFF Reserved for ARTIC card 0
      CC000 - CFFFF Reserved for Token-ring card or Ethernet card
      D4000 - D7FFF Reserved for ARTIC card 1
      D8000 - DBFFF Reserved for disk mirroring
   d. Push the **Esc** key twice to return to main menu.
5. Set ISA resources as follows:
   a. Select **ISA Legacy Resources**.
   b. Select **Memory Resources**.
   c. Set the following address areas to **Not available**:
      C8000 - C9FFF Reserved for ARTIC card 0
      CC000 - CDFFF Reserved for Token-ring card or Ethernet card
      D4000 - D5FFF Reserved for ARTIC card 1
      D8000 - D9FFF Reserved for disk mirroring
   d. Push the **Esc** key to return to **ISA Legacy Resources** menu and select **I/O Port Resources**.
   e. Scroll down to address 2A0 - 2A3 and set to **Not available**.
   f. Scroll down to address 2A4 - 2A7 and set to **Not available**.
   g. Push the **Esc** key to return to **ISA Legacy Resources** menu and select **Interrupt Resources**.
   h. Set interrupts 9 and 10 to **Not Available**.
   i. Push the **Esc** key twice to return to main menu.
6. Select **Save Settings** and push **Enter**.
7. Push **Enter** again and then select **Exit Setup**. The library manager will initialize.

Diskette or CD-ROM Drive

1. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.
3. For PS/ValuePoint location information, see Figure 59 on page LOC-37. For IBM 7585 Industrial Computer location information, see Figure 60 on page LOC-38. For IBM 7588 Industrial Computer location information, see Figure 61 on page LOC-39.
4. For instructions on how to remove an internal drive in a PS/ValuePoint, see “Removing Internal Drives” in *IBM PS/ValuePoint Installing Options*. See “Installing Internal Drives” in *IBM PS/ValuePoint Installing Options* for the instructions on how to install an internal drive.
5. For Industrial Computer instructions, see “Removal and Replacement Procedures” in *IBM 7585 Industrial Computer Information* or the *IBM 7588 Industrial Computer Information*.

Ethernet LAN Switch

When a 3494 Model B18 is attached to the library, the IBM 8271 Ethernet LAN Switch is located in either the Model L1x frame of a single LM library or the Model HA1 Left Service Bay frame of a dual LM library. It is installed on a shelf near the top of the frame behind the rear door.

Removal of Ethernet LAN Switch

1. Select **Offline** from the Mode pulldown on the Operator action bar of the active library manager. Wait until the library is offline.
2. Unplug the IBM 8271 power cord at the PCC.
3. Disconnect the ethernet cables. Ensure they are labeled with the port number.
4. Remove the IBM 8271 switch.

Replacement of Ethernet LAN Switch

1. Perform the removal steps in reverse order.
2. Configure the LAN switch ports and IP address. See the **LAN Port Activate** procedure in the 3494 Model B18 VTS MI.
3. Reinitialize the VTS device ports by selecting **Reinitialize ports** from the Utilities pulldown of the Service action bar on the active library manager.

Flat Panel Display

Removal of Flat Panel Display

1. Ensure that pin 13 is present in the male plug of the display cable. If not, order a new cable before replacing the display.
2. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
3. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.
4. Disconnect the cable connector from behind the flat panel display.
5. Remove the 2 screws located on the bottom of the flat panel display, and carefully lift and remove the flat panel display.

Replacement of Flat Panel Display

1. Perform the removal steps in reverse order.

Hard Disk Drives

The library manager comes with a single (primary) hard disk drive. A dual (secondary) hard disk drive is installed if the Second Disk Drive for Library Manager, Feature Code 5214, is installed. Mirrored hard disk drives is incorporated in libraries with EC F24313 and is included with the Enhanced Library Manager FC 5045 when the EC is available (planned for release in September 1999). If your LM has the Mirrored Hard Drive Card (see Figure 61 on page LOC-39), use procedure "Mirrored Hard Disk Drives" on page CARR-102. If your LM does not have mirrored hard drives, use procedure "Primary Hard Disk Drive (without mirroring)" on page CARR-103 or "Secondary Hard Disk Drive (without mirroring)" on page CARR-110 as appropriate.

C-drive BackUp Procedure: The C-drive BackUp (CBU) procedure can only be used on library managers without mirrored hard drive that meet the following criteria:

- Single library manager (no Model HA1)
- OS/2 version 2.11
- Feature code 5214, Second Disk Drive for Library Manager
- At least 190MB of free space on the D-drive

The CBU procedure is provided as a faster alternative to reloading the 3494 library manager code after the primary hard drive has been replaced. This procedure creates a backup image file of the entire C-drive on the D-drive that resides on the secondary hard disk drive.

The creation of the C-drive image file takes about 40 minutes and is performed in the background to minimize the impact to the customer when the library manager is restarted following installation of the program. All subsequent reboots of the library manager will cause an incremental backup to be created, again in background, and should take less than 5 minutes on average.

CBU Program Diskettes

A C-Drive BackUp Kit p/n 09L5133 is available and can be ordered through your parts system.

The CBU program diskette images also reside on SERVTOOL. If you do not have a copy of the program, download the CBU package and create the program diskettes using the instructions in the CBU README file.

The following program diskettes are required:

- Library Manager C-drive BackUp Install diskette
- Library Manager C-drive BackUp Restore Disk 1 of 2 diskette
- Library Manager C-drive BackUp Restore Disk 2 of 2 diskette

Install CBU Program

If the CBU program has not been installed on your library manager, install the CBU program using the following steps.

1. From the LM application, select **Shutdown** from the Mode pulldown menu.
2. From the Shutdown screen, open a Service window.
3. Insert the Library Manager C-drive BackUp Install diskette in the diskette drive.
4. Type **a:\install** at the prompt and follow the instructions.
5. Once the installation is complete, the program requests a shutdown of the system for reboot. It is during the reboot of OS/2 that the backup program will initialize and if a full backup is not detected, one is created. This operation will be performed in the background so as to not delay the start of the LM code.

6. Check that the CBU program installed correctly using the following steps:
    a. When the LM operator menu is displayed, select **Service menu** on the Mode pulldown.
    b. Select **Service window** on the Utilities pulldown.
    c. Type **cd \cbu** at the prompt.
    d. Type **ckicbu** at the prompt.
    e. A message will be displayed indicating if the program was successfully installed. This is the only time you will need to do this check if it was successful.

Maintain C-drive BackUp

When the LM is rebooted or powered-on in the future after the C-drive backup image has been created, the LM will again initialize but because a full drive backup is detected, only an incremental backup file will be created on the D-drive from the recently updated files on the C-drive.

If the D-drive is replaced, the entire C-drive image will be recreated on the D-drive after the library is powered on and the library manager initializes.

To maintain the C-drive backup image on the D-drive, a reboot of the library manager needs to be performed after the installation of any of the following if not done automatically during the upgrade of the code or features:

- Installation of 3494 LM base level code
- Installation of 3494 LM fix pack level code
- Installation of a new 3494 feature

Restore C-drive Image

This procedure replaces the steps in “Preparation of the Primary Hard Disk Drive and Installation of the Software” on page CARR-104 for single accessor libraries that have the CBU program installed.

To restore the C-drive image onto a new, replacement primary hard drive, use the following steps to reload the code:

1. After the primary drive is replaced and before powering the library up, locate the Library Manager C-drive BackUp Restore Disk 1 of 2 and insert it in the diskette drive.
2. Power the library on using the Unit Power switch.
3. When prompted, insert Library Manager C-drive BackUp Restore Disk 2 of 2 and press the Enter key.
4. Follow the instructions on the screen.
5. If the C-drive image is not restored, insure that both drives are operational by running diagnostics from the PC diagnostics disk.

CHKDSK Procedure: The check disk (CHKDSK) procedure is both an error recovery tool and a prevention aid. CHKDSK corrects errors in file allocation sizes, lost clusters, and extended attributes. These types of errors can occur if power to the hard disk drive is suddenly removed while the drive is in use.

1. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.

3. If possible, shutdown the library manager from the mode pulldown and select **Shutdown for reboot** on the shutdown window. If you have a dual library manager, the active LM should still be running in Auto/Online mode.
4. Power off using the power switch on the library manager system unit.
5. Insert the appropriate install diskette in the diskette drive:
   - If you have a CD-ROM drive, insert **Restore Image Facility Boot Diskette 1**.
   - If you do not have a CD-ROM drive, insert **Library Manager System Software Install Diskette 1**.
6. Power on the library manager using the system unit power switch.
7. When prompted, remove diskette 1 and insert diskette 2 in the diskette drive and press **Enter**.
8. Ignore the install instructions and type **chkdsk c:** at the **A:** prompt.
9. If errors are reported, correct the errors as follows:
   - If you have a CD-ROM drive, type **chkdsk c: /f** and press **Enter**.
   - If you do not have a CD-ROM drive, type **chkdsk c: /f:3** and press **Enter**.
10. If no errors are reported, skip to step 12.
11. Repeat step 8 and, if necessary step 9 until the **chkdsk c:** runs with no errors.
12. It is recommended to also run the CHKDSK procedure for the secondary hard disk drive if installed. Repeat step 8 and, if necessary step 9 using **chkdsk d:** until the **chkdsk d:** runs with no errors.
13. When complete, remove the diskette and place it back into the 3494 LIC binder.
14. Press **Ctrl-Alt-Del** to reboot the library manager.

Mirrored Hard Disk Drives: The primary and mirror hard disk drives are installed in library managers which have a mirrored hard drive card. See Figure 61 on page LOC-39 for the card and drive locations.

Attention Do not replace (or format) both hard drives in a LM at the same time. If you do, you will lose your backup code image and, in the case of a library without a Model HA1, your backup database. Also, if you have the Dual Active Accessor feature, your feature diskette will be unusable and you will have to replace it. If you feel you must replace/format both hard drives, call your next level of support before proceeding.

Removal of Mirrored Hard Disk Drive (Primary or Mirror)

1. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.
3. Perform the procedure “Prepare System Unit for Service” on page CARR-92, and then return here.
4. Disconnect the power and signal cables from the hard disk drive to be removed.
5. Loosen the captive thumb screw that secures the hard disk drive mounting plate and remove the drive and its attached mounting plate. Refer to **Removal and Replacement Procedures** in *IBM 7588 Industrial Computer Information*.
6. Remove the mounting plate from the hard drive and mark the drive "primary" or "mirror" for possible future reference.

Replacement of Mirrored Hard Disk Drive (Primary or Mirror)

1. Ensure that the jumpers on the replacement hard disk drive are positioned for **Master** and **16 heads**. Refer to the documentation supplied with the replacement drive or the jumpering label attached to the drive.

   Note: The primary hard disk drive and the mirror hard disk drive are both jumpered as Master.

2. Attach the mounting plate to the replacement hard disk drive.
3. Re-install the hard drive and attach the cables by performing the removal steps in reverse order.
4. Go to “Rebuild a Mirrored Hard Disk Drive (Primary or Mirror).”

Rebuild a Mirrored Hard Disk Drive (Primary or Mirror)

1. If power to the library manager is on, use the appropriate procedure to power off. Refer to “Single Library Manager Service Preparation” on page CARR-91 or “Dual Library Manager Service Preparation” on page CARR-91.
2. Insert the **Mirrored Hard Drive Boot Diskette** into the diskette drive and power on using the appropriate switch (Unit Power for single LM and frame CB1 for dual LM).
3. When the **Initialization Status** screen appears, ensure that if a hard drive is marked bad, it is the same drive you are replacing. Press any key to continue.
4. When the **ACP Adapter Setup Utility** screen appears, if the hard drive was marked bad, continue at 4a If the hard drive was not marked bad, continue at 4b.
   a. A screen will display the options, **Clear the Error Message** and **Rebuild Drive**. Select **Rebuild Drive**. Then, press **Enter** to initiate copying from the remaining good drive to the hard drive that you have just installed.
   b. Use the right-arrow key to select **Copy Data**. Then from the pulldown menu, select **Copy Mirror Master to Primary Master** if you replaced the Primary Hard Disk Drive, or select **Copy Primary Master to Mirror Master** if you replaced the Mirror Hard Disk Drive.
5. When the message, 'The drives are now identical!' is displayed, press any key to continue. Use the right arrow key to select **Exit**, then press **Enter**.
6. When asked, 'Are you sure you want to exit?', type **Y**, remove the **Mirrored Hard Drive Boot Diskette** from the diskette drive and press **Enter**. Press **Enter** again to continue. The library manager will initialize.

Primary Hard Disk Drive (without mirroring): The primary hard disk drive is standard in the library manager system unit.

Attention Do not replace (or format) both hard drives in a LM at the same time. If you do, you will lose your backup code image and, in the case of a library without a Model HA1, your backup database. Also, if you have the Dual Active Accessor feature, your feature diskette will be unusable and you will have to replace it. If you feel you must replace/format both hard drives, call your next level of support before proceeding.

Prepare for Service of the Primary Hard Disk Drive

1. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.

Removal of the Primary Hard Disk Drive (Industrial Computer)

For Industrial Computer instructions, see “Removal and Replacement Procedures” in *IBM 7585 Industrial Computer Information* or *IBM 7588 Industrial Computer Information*. (See Figure 60 on page LOC-38 or Figure 61 on page LOC-39 for location of the primary hard disk drive.)

Removal of the Primary Hard Disk Drive (PS/ValuePoint)

For additional information on how to remove the hard disk drive, see *IBM PS/ValuePoint Installing Options*.

1. Perform “Prepare System Unit for Service” on page CARR-92 and return here.
2. Remove the power cable and the signal cable from the 3.5 inch diskette drive in bay 1 and the hard disk drive in bay 2. The hard disk drive is located under the diskette drive in the drive-bracket assembly. (See Figure 59 on page LOC-37 for a view of the primary hard disk drive.)
3. Remove the 2 front panel screws located under the diskette drive. Set the screws aside for use later.
4. Remove the drive-bracket assembly rear screw. Then, remove the drive-bracket assembly from the library manager.
5. Remove the hard disk drive from the drive-bracket assembly.

Replacement of the Primary Hard Disk Drive

For additional detail on how to replace the hard disk drive, see *IBM PS/ValuePoint Installing Options* or “Removal and Replacement Procedures” in *IBM 7585 Industrial Computer Information* or *IBM 7588 Industrial Computer Information*.

1. Ensure that the jumper on the replacement hard disk drive is in the primary (or master) position. Refer to the documentation supplied with the replacement drive for the primary (or master) setting for your drive.
2. Perform the removal steps in reverse order.
3. Reload the code using the appropriate procedure for your library:
   - If you have a single accessor library and the C-drive BackUp (CBU) program is installed, go to “Restore C-drive Image” on page CARR-101.
   - For all other cases, go to “Preparation of the Primary Hard Disk Drive and Installation of the Software.”

Preparation of the Primary Hard Disk Drive and Installation of the Software

Use this procedure to prepare the drive and install the software.

1. Use the system software CD-ROM or diskettes and library manager diskettes stored in the 3494 Licensed Internal Code binder. The CD-ROM may be kept in the drive.
2. Check the label on a library manager system software. If it is at EC C88495 or higher, continue at step 4 on page CARR-105.
3. To install system software EC C88494, perform the following steps:
   a. Insert the 3494 Library Manager System Software Boot diskette into the diskette drive and power on using the Unit Power switch on the Operator panel.
   b. At the **A:** prompt, type **step1** to create the C drive partition.
   c. At the **A:** prompt, type **step2** to format the C drive and install the system software.
   d. Respond to the questions as directed. Type **c-disk** when prompted for the volume label.
   e. Each of the Library Manager System Software diskettes must be inserted into the diskette drive when instructed.

f. Remove the last system software diskette from the diskette drive when installation is complete.

g. Press **Ctrl+Alt+Del** to re-boot the operating system.

h. Ignore **The system cannot find the file...** warning message. Press **Enter**.

i. Select the full screen option from Group-Main.

Continue at step 6 on page CARR-108.

4. To install system software EC C88495 or higher on a library manager without CD-ROM, perform the following steps. If you have CD-ROM, continue at step 5.

   a. Insert Lib Mgr System Software Install Disk 1 of 3 into the diskette drive and power on using the Unit Power switch on the Operator panel.

   b. When prompted, insert Lib Mgr System Software Install Disk 2 of 3 into the diskette drive and press **Enter**.

   c. Type **step1** when instructed.

   d. When step 1 is complete, you are prompted to place Lib Mgr System Software Install Disk 1 of 3 into the diskette drive and restart the computer by pressing the **Ctrl+Alt+Del** keys twice. This will restart the operating system.

   e. When prompted, insert Lib Mgr System Software Install Disk 2 of 3 into the diskette drive and press **Enter**.

   f. Type **step2** when instructed.

   g. Answer **Y** to the **Proceed with FORMAT (Y/N)?** prompt. This will take approximately 10 minutes.

   h. When prompted, insert Lib Mgr System Software Install Disk 3 of 3 into the diskette drive and press **Enter**.

   i. Insert Lib Mgr System Software Backup diskettes as requested to load the operating system.

   j. After the last backup diskette is restored, you are then requested to re-insert Lib Mgr System Software Install Disk 3 of 3 into the diskette drive and press **Enter**.

   k. When completed, remove the last diskette from the diskette drive and re-boot the computer by pressing the **Ctrl+Alt+Del** keys twice.

   l. When the operating system has restarted, open an OS/2 Window by double-clicking the left trackball button on the OS/2 Window ICON normally found in the middle of the screen.

   m. Insert disk 1 of the Database Services (DB2/2) WR07042 fix pack in the diskette drive. The diskettes should be in your 3494 LIC binder.

   n. Enter **a:install** at the command prompt and follow the instructions to install the fix pack.

   Continue at step 6 on page CARR-108.

5. To restore the system software on a library manager with CD-ROM installed, perform the following steps:

   a. Make sure that you have the following Diskettes and CD-ROM

      1) 3494 Restore Image Facility Boot Disks Kit. The kit contains 2 diskettes.

      2) 3494 CD-ROM (may be in CD-ROM drive).

   b. Place the **Restore Image Facility Boot Diskette 1** into the diskette drive.

   c. Power on using the appropriate power switch (i.e. Unit Power for single library manager or frame CB1 for dual library manager).

d. When prompted remove the **Restore Image Facility Boot Diskette 1** and place the **Restore Image Facility Boot Diskette 2** into the diskette drive and press **Enter**.

e. The following menu will be displayed after the boot-up process is completed:

```
RESTIMG
  - IF A SINGLE DRIVE MACHINE -
  Partition drive 1 to C: and D: and reboot machine
  Format C: and D:
  Restore image to C:

  - IF A DUAL DRIVE MACHINE -
  Partition drive 1 to C: and E: and reboot machine
  Format C: and E:
  Restore image to C:
```

f. Place the **3494 Image CD-ROM** into the CD-ROM drive if it is not already in the drive.

g. Type **RESTIMG** at the **A:** prompt and press **Enter** to restore the software on the primary drive.

h. The following message will be displayed:

```
You are about to destroy any data on drive 1.
Press Ctrl-Break to quit OR
Press any key when ready....
```

i. After pressing any key the following messages will start to appear:

```
Deleting drive 1 partitions
Creating new drive 1 partition 2
Creating new drive 1 partition 1
Making drive 1 partition 1 startable

PARTITIONING COMPLETE.  THE COMPUTER WILL NOW BE REBOOTED
INSERT THE "RESTORE IMAGE FACILITY BOOT DISK 1"
INTO DRIVE A AND HIT ANY KEY TO CONTINUE.

Press any key when ready .....
```

j. Place the **Restore Image Facility Boot Diskette 1** into the diskette drive and **press** any key to continue.

k. The PC will automatically re-boot after any key is pressed.

l. When prompted, remove the **Restore Image Facility Boot Diskette 1** from the A: drive and insert the **Restore Image Facility Boot Diskette 2** into the A: drive and then press **Enter**.

m. For a single drive system, the following messages will begin to appear after the boot-up process is complete:

Note: It will take approximately **30 minutes** for the following steps to complete. No operator intervention or input will be required for the following steps.

```
DRIVES WILL NOW BE FORMATTED.

Drive Name  Partition  Vtype  FStype  Status  Start  Size
1 0000003f         C:      1      06       6      0  1019
1 001fdebf         D:      2      06       4   1019   200

Formatting C: drive
Formatting D: drive

FORMATTING COMPLETE

THE OPERATING SYSTEM WILL NOW BE TRANSFERRED TO THE C: DRIVE

THE OPERATING SYSTEM IS NOW TRANSFERRED. THE C: DRIVE
WILL NOW BE RESTORED FROM THE BACKUP IMAGE ON THE CD.
THIS WILL TAKE A FEW MINUTES, SO PLEASE BE PATIENT...

IMAGE HAS BEEN RESTORED. THE C: DRIVE WILL NOW BE
CHECKED FOR FILE AND DIRECTORY PROBLEMS USING CHKDSK.
THIS WILL TAKE A FEW MINUTES, SO PLEASE BE PATIENT....
```


n. For a dual drive system, the following messages will begin to appear after the boot-up process is complete:

Note: It will take approximately **30 minutes** for the following steps to complete. No operator intervention or input will be required for the following steps.

```
DRIVES WILL NOW BE FORMATTED.

Drive Name  Partition  Vtype  FStype  Status  Start  Size
1 0000003f         C:      1      06       6      0  1019
1 001fdebf         E:      2      06       4   1019   200

Formatting C: drive
Formatting E: drive

FORMATTING COMPLETE

THE OPERATING SYSTEM WILL NOW BE TRANSFERRED TO THE C: DRIVE

THE OPERATING SYSTEM IS NOW TRANSFERRED. THE C: DRIVE
WILL NOW BE RESTORED FROM THE BACKUP IMAGE ON THE CD.
THIS WILL TAKE A FEW MINUTES, SO PLEASE BE PATIENT...

A DELTA IMAGE EXISTS ON D:\DELTAIMAGE. THIS
IMAGE WILL NOW BE RESTORED TO THE C: DRIVE.
THIS COULD TAKE A FEW MINUTES, SO PLEASE BE PATIENT...

IMAGE HAS BEEN RESTORED. THE C: DRIVE WILL NOW BE
CHECKED FOR FILE AND DIRECTORY PROBLEMS USING CHKDSK.
THIS WILL TAKE A FEW MINUTES, SO PLEASE BE PATIENT....
```

Note: The message pertaining to the **DELTA IMAGE** will not appear if a delta image was never created.

o. When **CHKDSK** finishes, installation is complete. Remove the **Restore Image Facility Boot Diskette 2** from the A: drive.

p. **Reboot** the library manager by pressing the **Ctrl-Alt-Del** keys.

q. If the **DELTA IMAGE** of the LM code and features was restored on your library manager, you do not need to reload the LM code or features. The library manager(s) should initialize and you can put the library back online.

r. If a **DELTA IMAGE** was not available for your library and you did not receive any messages indicating that it was restored (i.e. the LM only initializes to the OS/2 desktop), you will need to re-install the LM code and features. **After rebooting**, the library manager is now ready to have the 3494 Library Manager code installed. Continue at step 6.

6. Perform the following steps to install the library manager application program:

   a. Open an OS/2 window.

   b. Insert Library Manager diskette 1 into the diskette drive. Enter **a:lminst**.

   c. Follow the instructions from the screen.

   d. During the code install process you may be asked the following question:

```
Is this installation being performed as the result
of recovering from a defective C: hard drive or
after installing the software image on the C: drive?

Type 'Y' (without the quotes) and press the 'Enter' key if true, OR
press just the 'Enter' key to continue.
```

   Type **Y** and hit the Enter key. You will then be asked a series of questions.

```
Is this a Dual Library Manager configuration?

Type 'Y' (without the quotes) and press the 'Enter' key if true, OR
press just the 'Enter' key to continue.
```

   If the library is to be configured as a Dual Library Manager, type **Y** and hit the Enter key. You will then be asked:

```
Do you wish to modify your configuration now?
```

   Type **Y** and hit the Enter key. The Dual Library Manager feature will be configured. Installing the Dual Library Manager feature on a Library Manager with the OS/2 Warp operating system, also enables a LAN attached VTS to be configured.

   If you answer **No** to the Dual Library Manager Configuration question and the Library Manager has the OS/2 Warp operating system, you will be asked if the library will be configured with a LAN attached 3494 Model B18 VTS.

```
Does the library contain a LAN attached VTS?

Responding Yes to this question will configure an Etherjet card in slot 0014.
(physical location 1)

Type 'Y' (without the quotes) and press the 'Enter' key if true, OR
press just the 'Enter' key to continue.
```

   If the library is to be configured with a LAN attached VTS, type **Y** and hit the Enter key. You will then be asked:

```
Do you wish to modify your configuration now?
```

   Type **Y** and hit the Enter key. The Library Manager will be configured for a LAN attach VTS.

e. You will also be asked if you want to install other features that you have purchased. Examples of features that will need to be re-installed: FC 5050 Dual Active Accessor, FC 5214 Second Hard Drive, FC 5219 Token Ring Adapter, FC 5220 Ethernet Adapter, FC 5226 Library Manager Remote Console, FC 5229 Expansion Attachment Card.

Note: Do not bypass installation of any LM feature that was previously installed. For example, if you bypass the 2nd hard drive feature, you will lose your backup database and cause a long outage to rebuild it. If you can not find your feature diskette(s) or do not know what features were installed, call your next level of support. Do not continue until you have the required diskettes.

f. After the library manager application program installation completes, the OS/2 prompt will appear.

7. If you were asked in the previous step if this is a dual library configuration, skip this step and continue at step 8.

   If the library is to be configured as a **DUAL** library manager, the following **must be done BEFORE** the IBM 7588 Industrial Computer is **rebooted**.

   a. Type in **DLM94** at the OS/2 prompt. The following will appear on the screen:

```
3494 Dual Library Manager Installation Configurator, Version X.XX.

(C) Copyright IBM Corp. 1992, 1997.  All Rights Reserved.
US Government Users Restricted Rights - Use, duplication or
disclosure restricted by GSA ADP Schedule Contract w/IBM Corp.
Do you wish to Modify your Configuration Now? (Y/n)
```

   b. Type **Y** and hit the **Enter** key, or just hit the **Enter** key to continue. The following message will appear:

```
Logging onto the database manager
Backing up existing configuration to C:\DUAL ...
Please Enter the Dual Library Manager Identifier:

Enter "A" for Dual Library Manager A.

Enter "B" for Dual Library Manager B.

Enter "Q" to Quit this Utility.

Then Press the ENTER Key...
```

   c. Type the appropriate response for the configuration required.

   d. When **DLM94** is completed, you will be returned to the OS/2 prompt.

8. Remove any diskettes from the A: drive.

9. Reboot the library manager by pressing the **Ctrl-Alt-Del** keys.

10. If you did not re-load the image from a CD-ROM and the library contains a 3590 Model A00 tape controller, a Virtual Tape Server controller (3494 Model B16 frame), or a remote support feature, EBTERM must be re-loaded on the hard disk as follows:

    a. Select **Service** on the Mode pulldown.

    b. Select **Utilities** on the Service action bar.

    c. Select **Service Window** on the Utilities action bar.

d. Insert the EBTERM installation diskette in the a: drive. The diskette should be in the 3494 LIC binder.

e. Type **a:install**.

f. Remove the diskette from the a: drive after the install completes and return it to the 3494 LIC binder.

11. If you don't have dual library managers and the 2nd Disk Drive for Library Manager feature is not installed, you will need to re-teach and re-inventory the library using the following steps:

    a. Select **Service menu** from the mode pull-down on operator action bar. Enter password **service** if requested.

    b. Select **Teach new configuration** from the teach pull-down on the service action bar. Refer to step 15 on page INST-122 through step 16 on page INST-126.

    c. Have the operator re-inventory the library and re-establish the volume categories.

| **Secondary Hard Disk Drive (without mirroring):** The secondary hard disk drive is installed in the library manager system unit if the 2nd Disk Drive for Library Manager feature is installed.

| **Attention** Do not replace (or format) both hard drives in a LM at the same time. If you do, you will lose your backup code image and, in the case of a library without a Model HA1, your backup database. Also, if you have the Dual Active Accessor feature, your feature diskette will be unusable and you will have to replace it. If you feel you must replace/format both hard drives, call your next level of support before proceeding.

Prepare to Remove Secondary Hard Disk Drive

1. If you have a dual library manager, refer to the instructions in “Procedure: Prepare the Library Subsystem for Service” on page START-10 to make the library manager you are working on the standby LM and it's local accessor the standby accessor.
2. If you have a single library manager, refer to the instructions in “Procedure: Prepare the Library Subsystem for Service” on page START-10 to take the library offline and put it in Pause.
3. If you have a CD-ROM drive AND your 2nd Disk Drive feature diskette is NOT at EC F23195 or later, bypass the following steps and continue at “Removal of the Secondary Hard Disk Drive (Industrial Computer)” on page CARR-111
4. Select **Shutdown** on the library manager Mode pulldown menu.
5. Select **Service Window** on the 3494 Tape Library Dataserver Shutdown window. If asked for, type the password **service**.
6. Insert the 2nd Disk Drive for Library Manager feature install diskette in the diskette drive. This diskette should be stored in the 3494 Licensed Internal Code binder.

    a. If the feature diskette is at EC F23195 or later, type **a:hddinst**.

    b. If the feature diskette is NOT at EC F23195 or later, type **a:step1**.

7. Remove the 2nd Disk Drive feature install diskette from the diskette drive and type **exit**.
8. Select **Shutdown for power-off** on the Shutdown window.
9. Power down as follows:

    a. If you have a single library manager, power off using the library Unit Power switch on the Operator panel.

    b. If you have a dual library manager and you are working on LM A, power off using CB1 on the PCC in the L1x frame.

c. If you have a dual library manager and you are working on LM B, power off using CB1 on the PCC in the RSB frame.

Removal of the Secondary Hard Disk Drive (Industrial Computer)

For Industrial Computer instructions, see "Removal and Replacement Procedures" in *IBM 7585 Industrial Computer Information* or *IBM 7588 Industrial Computer Information*. (See Figure 60 on page LOC-38 or Figure 61 on page LOC-39 for location of the secondary hard disk drive.)

Removal of the Secondary Hard Disk Drive (PS/ValuePoint): If you have a PS/ValuePoint, remove the hard drive using the following instructions. For additional information, see *IBM PS/ValuePoint Installing Options*.

1. Disconnect the signal and power cables from the hard disk drive in bay 5. See Figure 59 on page LOC-37 for a view of the secondary hard disk drive.
2. Remove the drive support bracket by removing the 2 front panel screws located under the bay 4 opening and the right side support screw.
3. Remove the hard disk drive from the drive support bracket.

Replacement of Secondary Hard Disk Drive

For additional information on replacing the hard disk drive, see *IBM PS/ValuePoint Installing Options* or "Removal and Replacement Procedures" in *IBM 7585 Industrial Computer Information* or *IBM 7588 Industrial Computer Information*.

1. Ensure that the jumper on the new drive is in the secondary (or slave) position. Refer to the documentation supplied with the replacement drive for the secondary (or slave) setting for your drive.
2. Perform the removal steps in reverse order.
3. Perform the procedure described in "Secondary Hard Disk Drive Preparation."

Secondary Hard Disk Drive Preparation

This procedure assumes that the primary hard disk drive (logical drive C) is loaded with the library manager system software, library manager application code, and primary library database.

Perform the following steps to create the D and E disk drive partitions for a single LM library or the D and F partitions for a dual LM library.

1. If you do not have a CD-ROM drive, go to step 2 on page CARR-112. If you have a CD-ROM drive and your 2nd Hard Drive for Library Manager feature diskette is at EC F23195 or later, go to step 1m on page CARR-112 to prepare the drive. If you have a CD-ROM drive and your 2nd Hard Drive for Library Manager feature diskette is NOT at EC F23195 or later, go to step 1a to prepare the drive.
   a. Place the **Restore Image Facility Boot Diskette 1** into the diskette drive.
   b. Power on using the appropriate power switch (i.e. Unit Power for single library manager or frame CB1 for dual library manager).
   c. When prompted, remove the **Restore Image Facility Boot Diskette 1** and place the **Restore Image Facility Boot Diskette 2** into the diskette drive and press **Enter**.
   d. Ignore the displayed menu and type **disk2** and press **Enter**.
   e. When the disk is partitioned, remove the **Restore Image Facility Boot Diskette 2**, place the **Restore Image Facility Boot Diskette 1** into the diskette drive, and reboot the library manager by pressing the **Ctrl-Alt-Del** keys.
   f. When prompted, remove the **Restore Image Facility Boot Diskette 1** and place the **Restore Image Facility Boot Diskette 2** into the diskette drive and press **Enter**.

g. Type **disk2 FMT** and press **Enter**. FMT must be uppercase.

h. When the disk is formatted, remove the diskette from the diskette drive.

i. If the Dual Active Accessor feature was installed, put the DAA feature diskette in the diskette drive, type **a:daainst** and press **Enter**. When complete, remove the DAA feature diskette.

j. Type **h:deltaimg** and press **Enter** to create the LM code delta image for backup in case you have a primary hard drive failure in the future. Ensure that the 3494 image CD-ROM is in the drive.

k. Reboot by pressing **Ctrl-Alt-Del**.

l. This procedure is complete. The library manager will initialize and begin using the 2nd hard drive.

m. Power on using the appropriate power switch (i.e. Unit Power for single library manager or frame CB1 for dual library manager).

n. When the 162 error occurs, press **Enter** to run configuration. A window may appear that requires Enter to be pressed, press **Enter** to continue.

o. Press **Esc** to save/exit and reply **yes** to save configuration.

p. After the computer reboots, the rest of the process is automated. The steps that occur are as follows:

- The new hard disk is partitioned.
- The computer is rebooted.
- The new hard disk partitions are formatted.
- The logs and dumps from the C: drive are transferred to the D: drive.
- The computer is rebooted.

q. Select **Shutdown** on the library manager Mode pulldown menu.

r. Select **Service Window** on the shutdown window. If asked for, type the password **service**.

s. If the Dual Active Accessor feature was installed, put the DAA feature diskette in the diskette drive, type **a:daainst** and press **Enter**. When complete, remove the DAA feature diskette.

t. Type **h:deltaimg** and press **Enter** to create the LM code delta image for backup in case you have a primary hard drive failure in the future. Ensure that the 3494 image CD-ROM is in the drive.

u. Type **Exit** to exit the service window.

v. Select **Start 3494**.

w. This procedure is complete. The library manager will initialize and begin using the 2nd hard drive.

2. Power on using the Unit Power switch on the operator panel.

3. If a 162 error occurs, press **Enter** to run configuration. Press **Esc** to save/exit and reply **yes** to save configuration.

4. Re-insert the 2nd Hard Disk feature install diskette in the diskette drive when instructed.

5. Type **ver** to determine the operating system version. If the OS/2 version is 2.11, continue at step 7 on page CARR-113.

6. If the version is 1.3, prepare the drive using the following steps:

a. Type **a:step2**.
b. Select the icon for disk 2.
c. Select **Options** from the action bar.
d. Select **Create Primary Partition** from the pull-down menu.
e. Enter **235** as the primary partition size to create.
f. Select **Create**.
g. Select **OK** when the primary partition has been created.

h. Select **Options** from the action bar.
i. Select **Create Extended Partition** from the pull-down menu.
j. Select **Create**.
k. Select **OK** when the extended partition has been created.
l. Select **Options** from the action bar.
m. Select **Create Logical Drive** from the pull-down menu.
n. Select **Create**.
o. Select **OK** when the logical drive has been created.
p. Select **F3** function key.
q. Select **Yes** when prompted ***'Do you want to close the FDISKPM Utility?'***. Continue at step 8.

7. If the version is 2.11, prepare the drive using the following steps:

   a. Type **a:step2**.
   b. Select the icon for disk 2.
   c. Select **Options** from the action bar.
   d. Select the line indicating **Primary log free space 257**.
   e. Select **Create partition...** from the pulldown menu.
   f. Enter **200** as the primary partition size to create.
   g. Select **Primary** as the Type.
   h. Select **Start** as the Location.
   i. Select **Create**.
   j. Select the line indicating a File System Type of **Free Space**.
   k. Select **Options** from the action bar.
   l. Select **Create partition...** from the pulldown menu.
   m. Select **Logical** as the Type.
   n. Select **Create**.
   o. Select **F3** function key.
   p. Select **Save** when prompted ***'Do you want to close the FDISKPM Utility?'***.

8. Remove the 2nd Disk Drive feature install diskette from the diskette drive.
9. Press **Ctrl-Alt-Del** when the Restart System dialog box appears.
10. When the full screen session starts, re-insert the 2nd Disk Drive feature install diskette in the diskette drive.
11. Type **a:step3**.
12. Type **Y** and press **Enter** when prompted **Proceed with FORMAT (Y/N)?**, first for the D disk and then for the E disk.

    File directories for logical drive D will be created. When complete, the last item on the screen will be **'D:\lm'**.

13. Remove the 2nd Disk Drive feature install diskette and store it in the 3494 Licensed Internal Code binder.
14. Power the library off using the appropriate power switch (i.e. Unit Power for single library manager or frame CB1 for dual library manager).
15. Wait 30 seconds and power the library on. The library manager will initialize.

The library manager secondary database files and log files that reside on the secondary hard disk drive are automatically created or copied during the normal operation of the library manager application program.

Keyboard

The keyboard is located on the rear door of the L1x frame and the RSB frame (if installed).

Removal/Replacement of Keyboard

1. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.
3. Unplug the cable from the keyboard.
4. Plug the cable into the new keyboard and position it on the shelf.
5. Power up using the appropriate switch.

Library Manager Cards

See “System Unit (Interior View)” on page LOC-37 for a view of the card locations in your library manager.

ARTIC186 8 Port Adapter (ARTIC 0 and ARTIC 1): One or two cards (ARTIC card 0 and 1) may be installed in each library manager. See “ARTIC186 8 Port Adapter” on page LOC-42 for card jumpering and switch information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See “Working with ESD-Sensitive Parts” on page CARR-166.

Removal of ARTIC186 8 Port Adapter

1. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.
3. Perform the procedure “Prepare System Unit for Service” on page CARR-92, and then return here.
4. Disconnect the cable connector from the card.
5. Using a screwdriver, remove the expansion slot screw that secures the card to the system unit and slide the card out of the card slot.

Replacement of ARTIC186 8 Port Adapter

1. Ensure that the positions of the jumpers and switches are as shown in “ARTIC186 8 Port Adapter” on page LOC-42 for the card you are replacing, ARTIC card 0 or ARTIC card 1.
2. Perform the removal steps in reverse order. Slide the card into the same slot from which it was removed.

Display Adapter Card: See Figure 67 on page LOC-46 for card jumpering information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of Display Adapter Card

1. If you have a single library manager, follow the instructions in "Single Library Manager Service Preparation" on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in "Dual Library Manager Service Preparation" on page CARR-91 to prepare for service.
3. Perform the procedure "Prepare System Unit for Service" on page CARR-92, and then return here.
4. Disconnect the flat panel display cable from the display adapter card.
5. Using a screwdriver, remove the expansion slot screw that secures the card to the system unit and then slide the adapter out of the card slot.

Replacement of Display Adapter Card

1. Perform the removal steps in reverse order. Slide the card into the same slot from which it was removed.
2. Ensure that the positions of the jumpers are as shown in Figure 67 on page LOC-46. If any jumpers are on the card in positions **3**, **4**, or **7**, remove them.

DI/DO Card: See Figure 66 on page LOC-45 for card jumpering information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of DI/DO Card

1. If you have a single library manager, follow the instructions in "Single Library Manager Service Preparation" on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in "Dual Library Manager Service Preparation" on page CARR-91 to prepare for service.
3. Perform the procedure "Prepare System Unit for Service" on page CARR-92, and then return here.
4. Disconnect cable connectors labeled DI/DO connector P1 to MIC connector and DI/DO connector P2 to MIC connector P4 from the card and feed the cables through the card slot.
5. Using a screwdriver, remove the expansion slot screw that secures the card to the system unit.
6. Slide the card out of the card slot.

Replacement of DI/DO Card

1. Perform the removal steps in reverse order. Slide the card into the same slot from which it was removed.
2. Ensure that the positions of the jumpers are as shown in Figure 66 on page LOC-45.

Etherjet Card (Internal LANs): See Figure 58 on page LOC-36 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of Etherjet Card

1. If you have a single library manager, follow the instructions in "Single Library Manager Service Preparation" on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in "Dual Library Manager Service Preparation" on page CARR-91 to prepare for service.
3. Perform the procedure "Prepare System Unit for Service" on page CARR-92, and then return here.
4. Using a screwdriver, remove the expansion slot screw that secures the card to the system unit.
5. Slide the card out of the card slot.

Replacement of Etherjet Card

1. Perform the removal steps in reverse order. Slide the card into the same slot from which it was removed and connect the LAN cable.

Ethernet Adapter Card (Feature Code 5220): See Figure 68 on page LOC-47 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal and Replacement of Ethernet Adapter Card

1. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.
3. Use the 3494 LAN attachment card Installation Instructions (p/n 09L4584) shipped with the new adapter to complete the removal and replacement of your adapter.

   Note: If you did not receive the 3494 LAN Attachment Card Installation Instructions and three 3494 Ethernet diskettes with your new card, go to the 3494 Parts Catalog and ensure that you ordered the correct FRU (p/n 09L4583 or higher) for the Ethernet adapter. If you ordered the correct p/n and did not get the instructions, contact your next level of support before attempting to replace the adapter.

Memory: For PS/ValuePoint location information, see Figure 59 on page LOC-37. For the IBM 7585 Industrial Computer location information, see Figure 60 on page LOC-38. For the IBM 7588 Industrial Computer location information, see Figure 61 on page LOC-39.

1. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.
3. To remove memory-module kits in the PS/ValuePoint, see “Removing Memory-Module Kits” in *IBM PS/ValuePoint Installing Options*. To install memory-module kits, see “Installing Memory-Module Kits” in *IBM PS/ValuePoint Installing Options*.

   Note: The library manager will operate with either 70 ns or 80 ns memory modules. These modules can be intermixed.
4. For the Industrial Computer, see “Removal and Replacement Procedures” in *IBM 7585 Industrial Computer Information* or *IBM 7588 Industrial Computer Information*.

Mirrored Hard Drive Card: For the IBM 7588 Industrial Computer location information, see Figure 61 on page LOC-39. For card jumper information, see Figure 69 on page LOC-48.

Attention Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of Mirrored Hard Drive Card

1. If you have a single library manager, follow the instructions in "Single Library Manager Service Preparation" on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in "Dual Library Manager Service Preparation" on page CARR-91 to prepare for service.
3. Perform the procedure "Prepare System Unit for Service" on page CARR-92, and then return here.
4. Disconnect the power and signal cables from the hard disk drives.
5. Loosen the three captive thumb screws that secure the hard disk drive assembly and remove the assembly.
6. Remove the expansion slot screw that secures the card and slide the card out of the system unit.
7. Disconnect the three cables from the card

Replacement of Mirrored Hard Drive Card

1. Ensure that the positions of the jumpers are as shown in Figure 69 on page LOC-48.
2. Connect the three cables (Primary, Mirror, and Host) to the card. Match the labels on the cables to the printing next to the connectors on the card.
3. Slide the card into the card slot and secure it with the expansion slot screw.
4. Connect the cable marked Host to the Hard Drive Connector Adapter on the SBC card as shown in Figure 62 on page LOC-40. Notice the pin 1 position of the cable and adapter.
5. Reinstall the hard disk drive assembly. Reconnect the hard drive signal and power cables. Read the labels on the signal cables and ensure they are connected to the correct hard drives. Then, tighten the three captive thumb screws.
6. Reinstall the cover of the library manager.
7. The card BIOS should be pre-loaded with the correct code. Power the library manager up using the appropriate power switch (Unit Power for single LM, frame CB1 for dual LM) and it should initialize.
8. If the library manager fails to initialize, perform "BIOS Upgrade of Mirrored Hard Drive Card" and retry before replacing FRUs.

BIOS Upgrade of Mirrored Hard Drive Card

1. If you have a single library manager, follow the instructions in "Single Library Manager Service Preparation" on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in "Dual Library Manager Service Preparation" on page CARR-91 to prepare for service.
3. Insert the **Mirrored Hard Drive Boot Diskette** into the diskette drive and power on using the appropriate switch.
4. When the **Initialization Status** screen appears, press any key.
5. When the **ACP Adapter Setup Utility** screen appears, **Configure** is highlighted, displaying its pulldown menu.

6. From the pulldown menu, select **Restore Factory Defaults** with the down-arrow key and press **Enter**. When **'Restore factory defaults settings? (Y/N)'** appears, type **Y** and press **Enter**. When the factory defaults have been reset, press **Enter** to continue.
7. From the **Configure** pulldown menu, select **BIOS Upgrade** with the down-arrow key and press **Enter**.
8. When **'Select a revision'** appears, accept the revision highlighted by pressing **Enter**. Type **Y** and press **Enter** when asked if you want to continue. Type **Y** and press **Enter** when asked if you are sure. Do not interrupt the 2 minute BIOS loading process.
9. When **'BIOS update successful!'** and **'Would you like to reboot now? (Y/N)'** appear, type **Y**, remove the **Mirrored Hard Drive Boot Diskette** from the diskette drive, and then press **Enter**. The library manager will initialize.

Real-Time Interface Coprocessor Multiport Card 0 and 1 (ARTIC): This card was used in older vintage single accessor libraries built prior to July 1998. If you are replacing this card with an ARTIC186 card, go to “ARTIC186 8 Port Adapter (ARTIC 0 and ARTIC 1)” on page CARR-114.

See Figure 70 on page LOC-49 for ARTIC 0 card jumpering information. See Figure 71 on page LOC-50 for ARTIC 1 card jumpering information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See “Working with ESD-Sensitive Parts” on page CARR-166.

The ARTIC Multiport card installed in the library manager consists of the following FRUs:

- ARTIC Multiport card
- ARTIC RS-422 card

The ARTIC RS-422 card has 4 RS-232-C ports and 4 RS-422-A ports. When you order the ARTIC RS-422 card part number as a FRU, 2 SCC modules are included with the card. These modules install into the 2 SCC sockets on the ARTIC Multiport card nearest to the ARTIC RS-422 card. See Figure 70 on page LOC-49 or Figure 71 on page LOC-50.

When you order the ARTIC Multiport card part number as a FRU, the 2 SCC sockets nearest the ARTIC RS-422 card are without modules. Either remove the SCC modules from the ARTIC Multiport card that was removed, or order the ARTIC RS-422 card part number.

Removal of ARTIC Multiport Card

1. Follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. Perform the procedure “Prepare System Unit for Service” on page CARR-92, and then return here.
3. Using a screwdriver, remove the expansion slot screw that secures the card to the system unit and slide the card out of the card slot.
4. Remove the ARTIC RS-422 card from the ARTIC Multiport card. The ARTIC RS-422 card is held onto the ARTIC Multiport card by plastic screw-type fasteners and by rows of connector pins. After the plastic fasteners are removed, carefully and uniformly pry the 2 cards apart.
5. Remove the 2 SCC modules nearest the ARTIC RS-422 card.

Replacement of ARTIC Multiport Card

1. Install the old ARTIC RS-422 card and SCC modules in the same positions on the replacement ARTIC card.
2. Perform the removal steps in reverse order. Slide the card into the same slot from which it was removed.
3. Ensure that the positions of the jumpers are as shown in Figure 70 on page LOC-49 for ARTIC 0 card and Figure 71 on page LOC-50 for ARTIC 1 card.

Replacement of ARTIC RS-422 Card

1. Install the new ARTIC RS-422 card and SCC modules in the same positions on the old ARTIC Multiport card.
2. Ensure that the positions of the jumpers are as shown in Figure 70 on page LOC-49 for ARTIC 0 card and Figure 71 on page LOC-50 for ARTIC 1 card.
3. Slide the card into the same slot from which it was removed.

Servo Control Card (SRV): See Figure 72 on page LOC-51 for card jumpering information.

Attention Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal of Servo Control Card

1. If you have a single library manager, follow the instructions in "Single Library Manager Service Preparation" on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in "Dual Library Manager Service Preparation" on page CARR-91 to prepare for service.
3. Perform the procedure "Prepare System Unit for Service" on page CARR-92, and then return here.
4. Disconnect the cable connector labeled SRV card to LCC connector P1 from the card.
5. Using a screwdriver, remove the expansion slot screw that secures the card to the system unit and slide the card out of the card slot.

Replacement of Servo Control Card

1. Perform the removal steps in reverse order. Slide the card into the same slot from which it was removed.
2. Ensure that the positions of the jumpers are as shown in "Servo Control Card (SRV)" on page LOC-51. If any jumpers are on the card in positions **1**, remove them.

System Board/Single Board Computer:

Attention Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See “Working with ESD-Sensitive Parts” on page CARR-166.

Removal/Replacement of System Board/SBC (Industrial Computer)

1. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.
3. For Industrial Computer instructions, see “Removal and Replacement Procedures” in *IBM 7585 Industrial Computer Information* or *IBM 7588 Industrial Computer Information*. (See Figure 60 on page LOC-38 or Figure 61 on page LOC-39 for location of the system board/SBC.)

   Notes:

   a. Be sure to set all jumpers and switches on the new system board/single board computer just like the jumpers on the old card. For the 7588 SBC, refer to Figure 63 on page LOC-41.

   b. The processor may be pre-installed on the SBC card for the 7588 Industrial Computer.

   c. See Figure 62 on page LOC-40 for drive cable plugging.

4. Update the library manager's configuration. Perform the procedure described in “Configuration Utility Program” on page CARR-92.

Removal of System Board (PS/ValuePoint)

See Figure 59 on page LOC-37 for location information.

1. Follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. Remove the library manager cards from the system unit. Perform procedures “Display Adapter Card” on page CARR-115, “DI/DO Card” on page CARR-116, “Real-Time Interface Coprocessor Multiport Card 0 and 1 (ARTIC)” on page CARR-120, and “Servo Control Card (SRV)” on page CARR-121.

   See Figure 59 on page LOC-37 for placement in the library manager system unit.
3. Remove the drive bracket assembly by:

   a. Removing the screw from the back of the drive-bracket assembly.

   b. Removing the 2 screws located under the front of the diskette drive.

   c. Lifting the rear of the drive-bracket assembly and sliding it up and out toward the rear of the system unit.
4. Disconnect all cable connectors from the system board.
5. Remove the screws that secure the system board.

Replacement of System Board (PS/ValuePoint)

1. Ensure that the positions of the jumpers are as described in Figure 130 on page CARR-123. See also “Appendix B. Jumpers” in *IBM PS/ValuePoint Installing Options*.
2. Perform the removal steps in reverse order.
3. Update the library manager’s configuration. Perform the procedure described in “Configuration Utility Program” on page CARR-92 and see “Configuration Utility Program” in *IBM PS/ValuePoint Installing Options*.

Note: If the Flash EEPROM revision level is not 54 or higher, order the CPU BIOS Code Kit P/N 05H1981 and install the BIOS Code by using the installation instructions supplied with the diskette.

Figure 130. System Board Jumpers (PS/ValuePoint)

Jumper	Position
BOOTBLK	Rear (See note.)
ENABL DISABL	DISABL
MONOADPTR	Rear
OD DX/DX2 (2 jumpers are included) OD DX/D2 OD DX/DX2	 DX/D2 OD
PWDBYP	This jumper can be in either position. It is changed to override a password.
WRTPRO	Rear

Note: The rear jumper position is that which is nearest to the connector end of the system board.

Token Ring Adapter Card:

See Figure 74 on page LOC-52 for location information.

| **Attention** Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See "Working with ESD-Sensitive Parts" on page CARR-166.

Removal and Replacement of Token Ring Adapter Card

1. If you have a single library manager, follow the instructions in "Single Library Manager Service Preparation" on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in "Dual Library Manager Service Preparation" on page CARR-91 to prepare for service.
3. Use the 3494 LAN Attachment Card Installation Instructions (p/n 09L4584) shipped with the new adapter to complete the removal and replacement of your adapter. **When you are instructed to remove the cable from the adapter, you should unplug the token-ring cable from the wall plug (i.e. customer's ring) first before you unplug the cable at the adapter to minimize disruption of the customer's ring.**

   Note: If you did not receive the 3494 LAN Attachment Card Installation Instructions and three 3494 Token-ring diskettes with your new card, go to the 3494 Parts Catalog and ensure that you ordered the correct FRU for the Token-ring adapter. If you ordered the correct p/n and did not get the instructions, contact your next level of support before attempting to replace the adapter.

Library Manager Power Supply

Removal of Power Supply (Industrial Computer): See Figure 60 on page LOC-38 orFigure 61 on page LOC-39 for a view of the power supply.

1. If you have a single library manager, follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. If you have a dual library manager, follow the instructions in “Dual Library Manager Service Preparation” on page CARR-91 to prepare for service.
3. For Industrial Computer instructions, see “Removal and Replacement Procedures” in *IBM 7585 Industrial Computer Information IBM 7588 Industrial Computer Information*.

Removal of Power Supply (PS/ValuePoint)

See Figure 59 on page LOC-37 for a view of the power supply.

1. Follow the instructions in “Single Library Manager Service Preparation” on page CARR-91 to prepare for service.
2. Perform “Procedure: Prepare the Library Subsystem for Service” on page START-10, and then return here.
3. Remove the display adapter card. Perform the procedure “Display Adapter Card” on page CARR-115.
4. Disconnect the power supply cable connectors P1 and P2 from the system board connector J1.
5. Disconnect cable connector P3 from the diskette drive.
6. Disconnect cable connector P4 from the hard diskette drive.
7. Remove the 2 screws that secure the power-on switch to the front of the system unit.
8. Remove the power-on switch and cable as one assembly.
9. Remove the 4 screws that secure the power supply to the rear of the system unit.
10. Remove the power supply by sliding it up and then out.

Replacement of Power Supply

Perform the removal steps in reverse order.

| **Attention** To prevent damage to the library manager, ensure that the PS/ValuePoint or IBM 7585 Industrial Computer power supply voltage selector is set to 230 V.

Library Manager Software Revision Installation

Emergency Fix - Single Library Manager: Refer to the README.TXT file on the Fix Pack diskette for any special instructions for this change. Unless you are given special instructions, use the following procedure to apply the emergency fix.

1. Ask the operator to vary all library devices offline.
2. Put the library manager into offline state by selecting **Offline** from the Mode pull-down menu.
3. When the library is offline, pause the library by selecting **Pause** from the Mode pull-down menu.
4. Shut down the library manager application by selecting **Shutdown** from the Mode menu. If you are prompted to do so, type the service password (**SERVICE**) and select **yes** from the Shutdown Request window.
5. Select **Service window** from the Shutdown dialog box. Enter the service password. (**SERVICE**)
6. Insert the library manager Fix Pack diskette into the diskette drive.
7. Maximize the Service window.
8. At the [C:\] prompt, type **a:lmef94** and follow the instructions.

   Notes:

   a. If you have a CD-ROM drive and a secondary hard drive on your LM, ensure that you update the delta image when directed.

   b. If you are directed to run CHKDSK, refer to “CHKDSK Procedure” on page CARR-101.
9. When the installation is complete, minimize the service window.
10. Restart the library manager application by selecting **Start 3494** from the 3494 Tape Library Dataserver Shutdown window.

Emergency Fix - Dual Library Manager: Refer to the README.TXT file on the Fix Pack diskette for any special instructions for this change. Unless you are given special instructions, use the following procedure to apply the emergency fix.

1. If the local accessor for the library manager you want to service is active (i.e. Accessor A for LM A, Accessor B for LM B, or both are active with the dual active accessor feature), switch it to standby as follows:

   a. If the LM code level is 516 through 519, on the active LM select **Switch active accessor to standby** on the Mode pulldown.

   b. If the LM code level is 520 or greater and both accessors are active, on the active LM disable the Dual Active Accessor feature by selecting **Disable Dual Active Accessors** under **Accessor** on the Mode pulldown. You will be prompted for the appropriate accessor to be active.

   c. If the LM code level is 520 or greater and the accessor for the LM you want to service is the active accessor, on the active LM select **Switch active accessor to standby** under **Accessor** on the Mode pulldown.
2. Shut down the standby library manager application by selecting **Shutdown for library manager code update** from the Service pulldown menu. If you are prompted to do so, type the service password (**SERVICE**) and select **yes** from the Shutdown Request window.
3. Select **Service window** on the Shutdown dialog box. Enter the service password. (**SERVICE**)
4. Insert the library manager Fix Pack diskette into the diskette drive.
5. Maximize the Service window.

6. At the [C:\] prompt, type **a:lmef94** and follow the instructions.

   Notes:

   a. Ensure that you update the delta image when directed.

   b. If you are directed to run CHKDSK, refer to “CHKDSK Procedure” on page CARR-101.

7. When the installation is complete, minimize the service window.
8. Restart the library manager application by selecting **Start 3494** from the 3494 Tape Library Dataserver Shutdown window.
9. When the standby library manager initializes, ask the operator to vary all library devices offline.
10. Put the active library manager into offline state by selecting **Offline** from the Mode pull-down menu.
11. When the library is offline, pause the library by selecting **Pause** from the Mode pull-down menu of the active library manager.
12. Select **Switch active library to standby** on the Mode pulldown of the active library manager.
13. Switch the active accessor as follows:

    a. If the LM code level is 516 through 519, on the active LM select **Switch active accessor to standby** on the Mode pulldown.

    b. If the LM code level is 520 or greater, on the active LM select **Switch active accessor to standby** under **Accessor** on the Mode pulldown.

14. Put the active library manager back into **Auto** and **Online** and ask the operator to put it back online to the hosts.
15. Shut down the standby library manager application by selecting **Shutdown for library manager code update** from the Service pulldown menu. If you are prompted to do so, type the service password (**SERVICE**) and select **yes** from the Shutdown Request window.
16. Select **Service window**. Enter the service password. (**SERVICE**)
17. Insert the library manager Fix Pack diskette into the diskette drive.
18. Maximize the Service window.
19. At the [C:\] prompt, type **a:lmef94** and follow the instructions.
20. When the installation is complete, minimize the service window.
21. Restart the library manager application by selecting **Start 3494** from the 3494 Tape Library Dataserver Shutdown window.
22. This library manager should return to the standby state after a few minutes.
23. If the dual active accessor feature is installed, on the active LM enable the feature by selecting **Enable Dual Active Accessors** under **Accessor** on the Mode pulldown.

New Level - Single Library Manager: Use the following procedure if you are installing a new level of the library manager application program. You should inform the customer that operation of the library, including manual mode, will not be possible until after the software revision installation is complete.

1. Ask the operator to vary all library devices offline.
2. Put the library manager into offline state by selecting **Offline** from the Mode pull-down menu.
3. Pause the library by selecting **Pause** from the Mode pull-down menu.
4. Shut down the library manager application by selecting **Shutdown** from the Mode menu. If you are prompted to do so, type the service password (**SERVICE**) and select **yes** from the Shutdown Request window.
5. Select **Service window**. Enter the service password. (**SERVICE**)
6. Insert the library software revision diskette 1 into the diskette drive.
7. Maximize the Service window.
8. At the [C:\] prompt, type **a:lminst** and follow the instructions.

   Notes:

   a. If you have a CD-ROM drive and a secondary hard drive on your LM, ensure that you update the delta image when directed.

   b. If you are directed to run CHKDSK, refer to “CHKDSK Procedure” on page CARR-101.

9. When the installation is complete, follow the directions displayed on the screen.

New Level - Dual Library Manager

You should inform the customer that operation of the library, including manual mode, will not be possible until after the software revision installation is complete.

1. Ask the operator to vary all library devices offline.
2. Put the active library manager into offline state by selecting **Offline** from the Mode pull-down menu.
3. When the library is offline, pause the library by selecting **Pause** from the Mode pull-down menu.
4. Shut down the active library manager application by selecting **Shutdown** from the Mode menu. If you are prompted to do so, type the service password (**SERVICE**) and select **yes** from the Shutdown Request window.
5. On both LM A and B select **Service window** from the Shutdown dialog box. Enter the service password. (**SERVICE**)
6. Insert the library manager code diskette 1 into the diskette drive of LM A.
7. Maximize the Service window.
8. At the [C:\] prompt, type **a:lminst** and follow the instructions.

   Notes:

   a. Ensure that you update the delta image when directed.

   b. If you are directed to run CHKDSK, refer to “CHKDSK Procedure” on page CARR-101.
9. When directed to insert diskette 2, insert the diskette 2 in LM A and insert diskette 1 in LM B.
10. Maximize the Service window in LM B.
11. On LM B at the [C:\] prompt, type **a:lminst** and follow the instructions.
12. Continue inserting the diskettes as directed (first in LM A, then in LM B) until the installation is complete in both library managers.
13. When the installation is complete, follow the directions displayed on the screens of both LM A and B.

    Note: When rebooting, for best results, you should reboot both library managers within 5 minutes of each other.

Library Manager Software Tools

This section provides information for commonly used software tools used to aid in debugging library manager problems.

APING

Description

APING is used to debug library manager to remote console (using APPC) communication problems. It can also be used for library manager to APPC LAN attached host problems. It goes through communication manager and attempts to establish a connection via APPC.

If communication fails with the other machine, there is either a hardware or software configuration problem.

Execution

1. Locate the third diskette of the Remote Console feature 5226 diskettes and put it into the library manager diskette drive.
2. Open a service window from the Service mode Utilities pulldown.
3. Type **a:\aping** at the prompt.
4. The program options will be displayed. Select the options you want to use for your situation.
5. Type **a:\aping [flags] destination** at the prompt, where flags = your options and destination = the symbolic destination name or a partner LU name.

CHKFINS

Description

CHKFINS shows all of the installed feature codes on the library manager.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **chkfins c** at the prompt.

CMQUERY

Description

CMQUERY checks to see if Communication Manager is already running. It is usually used to debug DCAF or APPC related problems.

DCAF (using APPC) or APPC attached hosts will not be able to communicate with the library manager if Communication Manager is not running so this function provides a quick check to verify its status.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **cmquery** at the prompt.

CMSTART

Description

CMSTART is used to start Communication Manager on the library manager.

In the event of a communication problem with a remote console or a direct attached host and Communication Manager is not active, this function is used to start CM to determine if this is the only problem.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **start cmstart** at the prompt.

DELTAIMG

Description

DELTAIMG creates a LM code delta image on the secondary hard drive. This image is necessary to reduce the time to reload code in the event that the primary hard drive is replaced. Normally, this image is created when the LM code is installed or upgraded (i.e. new level, emergency fix, or feature install).

Note: The delta image is only for LM application code. It does not contain the LM database files. It allows the LM code and all installed features to be restored without individually re-loading the base code, fixes, and features.

This function is available on library managers with the CD-ROM drive (OS/2 Warp).

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Put the 3494 image CD-ROM in the drive.
3. Type **h:deltaimg** at the prompt.
4. Ignore the warning messages that are received.

DH

Description

DH provides a Decimal to Hex or Hex to Decimal number conversion that is helpful when looking at library manager logs.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **dh** at the prompt.
3. Instructions on usage will be displayed.

DLM94

Description

DLM94 will setup and configure all the necessary items for a dual library manager (i.e. 3494 Model HA1) when at least one 3494 Model B18 is attached to the library.

This function can be run after SLM94 has been run on the library manager (i.e single library manager to dual library manager conversion).

Use the **restore** option if you want to remove the dual library manager setup on a LM where DLM94 was previously run.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **dlm94** at the prompt.
3. Follow the directions displayed on the screen.

ECD

Description

ECD gives a description of all of the library manager error codes. It can be used to get information on internal error codes that are not used by the maintenance package and are not known to the Analyze Error Log function on the Service menu.

This function is useful when reviewing library manager logs.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **ecd cccc** at the prompt, where cccc is the library manager error code.

FDISK

Description

FDISK can be used for many reasons and the user must be very careful when using this function. Therefore, it should only be used as described here unless you are specifically directed otherwise by support center personnel.

This function is used to locate problems with drives going bad. It will list how the current drives in the library manager are configured. The user must know what the expected drive configuration is for his installation to determine if there is a problem.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **fdisk /query** at the prompt.

Examples

Figure 131. Model HA1 Library Manager with Dual Hard Drives

Drive	Name	Partition	Vtype	FStype	Status	Start	Size
1	0000003f	C:	1	07	2	0	2236
1	0045e43f	E:	2	07	0	2236	200
2	0000003f	D:	1	07	2	0	2236
2	0045e43f	F:	2	06	0	2236	200

Figure 132. Library Manager with Disk Mirroring

Drive	Name	Partition	Vtype	FStype	Status	Start	Size
1	0000003f	C:	1	07	2	0	1567
1	0030f93f	D:	2	07	0	1567	1000
1	00503a3f	E:	2	07	0	2567	200
1	005680bf	F:	2	06	0	2768	303

FMTDBFLS

Description

FMTDBFLS formats the current library manager database files. It is used to view the current values of parameters in the database. Each database (i.e. SYS*.PRI) file will have its own section in the formatted output file.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **cd c:\lm\pri** to change to the primary database directory.
3. Type **fmtdbfls** at the prompt.
4. The output is stored in file c:\lm\pri\fmtdbfls.txt.
5. Type **tedit fmtdbfls.txt** to edit/display the contents of the output file.

JD

Description

JD is a Julian Date conversion program that is helpful when looking at library manager logs.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **jd ddd** at the prompt, where ddd is the Julian Date in question.

LANCHECK

Description

LANCHECK is used to ensure that the direct attach LAN features, FC 5219 or FC 5220, are configured correctly.

LANCHECK is used when features are being added to the 3494 to allow LAN connectivity to one or more hosts. It helps the installer determine if all of the installation steps have completed successfully.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **lancheck** at the prompt.
3. Follow the directions displayed on the screen.

LINKTEST

Description

LINKTEST is used to ensure that the internal ethernet LANs used for library manager to 3494 Model B18 communication and/or for dual library manager communication are configured correctly.

LINKTEST can be used to help locate LAN problems rapidly in a Model HA1 and/or VTS2 environment. It attempts to use knowledge gained during the development process to locate common problems. Certain results may not make sense at first so use the information as an aid when working with support.

Notes:

1. If you run LINKTEST before teaching the VTS2, LINKTEST will post errors that the IP address and name are not located in the c:\mptn\etc\hosts file. This is OK because the VTS configuration information does not get added until after the Teach.
2. If an older version of DLM94 was run and a Model B18 is attached to the library, LINKTEST will report that SET TCPIPINSTALLED is not set to YES. In this case, follow the directions to correct the problem.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **linktest** at the prompt.
3. Follow the directions displayed on the screen.

Examples

A Model B18 has just been installed on an existing Model HA1 library and its associated Model D12 is frame 2. The VTS2 has been taught, both LMs and the VTS2 are running, but communication can not be established between the LM and the VTS2. Open a service window and run **linktest 2 20**. This will check all the different parameters and drivers necessary for communication. If there are errors, correct them and run LINKTEST again. If there are no errors, run **linktest 5**. This will perform the ping test for a Model HA1. Use the information provided as a debug tool.

MIRRORST

Description

MIRRORST is used to determine the operational status of the mirrored hard drives function if the library manager cannot complete initialization, e.g. Initialization Error or Severe Execution Error.

MIRRORST displays the status of the primary and mirror channels, whether mirroring is on, and which channel is active.

Execution

1. Select **Service window** from the 3494 Tape Library Dataserver Shutdown selection window.
2. Type **mirrorst check** at the prompt.

PING

Description

PING is a TCP/IP program that is used to debug library manager to library manager, library manager to VTS2, library manager to remote console (using TCP/IP), or library manager to TCP/IP LAN attached host communication problems.

If communication fails with the other machine, there is either a hardware or software configuration problem.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **ping xxxxxxxx** at the prompt, where xxxxxxxx is either the IP address, alias, or name of the machine that you want to communicate with.
3. Push **Ctrl+C** keys to end the ping.

QPHYMEM

Description

QPHYMEM shows how much memory is installed in the library manager system unit.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **qphymem** at the prompt.

SLM94

Description

SLM94 will setup and configure all the necessary items for a single library manager (i.e. no 3494 Model HA1) when at least one 3494 Model B18 is attached to the library.

This function cannot be run if DLM94 has already been run on the library manager (i.e. dual LM to single LM conversion). You must run DLM94 again and use the **restore** option before SLM94 can be run.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **slm94** at the prompt.
3. Follow the directions displayed on the screen.

SYSLEVEL

Description

SYSLEVEL is used to gather system information on the library manager. It lists the current level of installed programs.

Execution

1. Open a service window from the Service mode Utilities pulldown.
2. Type **syslevel** at the prompt.

Power

Power Control Compartment (PCC)

See Figure 32 on page LOC-10 for location information.

DANGER

Do not power on the power control compartment (PCC) unless it is installed in a frame.

The PCC does not contain any field serviceable parts. The PCC is sealed for your protection. Do not remove the cover from the PCC. (D03)

Removal of PCC

1. If this is a single accessor library, perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in "Procedure: Prepare the Library Subsystem for Service" on page START-10 and then return here.
2. If this is a dual accessor library, prepare for service as follows:
   a. If the defective PCC is in the L1x or right service bay frame, perform **CONCURRENT MAINTENANCE WITH AUTO MODE** for a library manager problem in "Procedure: Prepare the Library Subsystem for Service" on page START-10.
   b. If the defective PCC is in a D1x or B1x frame and the light on the SEQ card is NOT ON, perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in "Procedure: Prepare the Library Subsystem for Service" on page START-10. The defective SEQ card or cable should be repaired while the library is down.
   c. If the defective PCC is in a D1x or B1x frame and the light on the SEQ card is ON, the PCC can be replaced without powering down the library. Ask the operator to take the devices in the frame offline and then power them off.
3. Disconnect the mainline power cable from the frame that contains the PCC to be removed.
4. Disconnect the other cables from the front of the PCC.
5. Remove the green and yellow ground wire from the frame. Save the screw and lock washer.
6. Remove the 2 screws that fasten the PCC to the frame.
7. Pull the PCC, by using the handle, partially out of the frame.
8. Reach into the frame and disconnect the cable from the rear of the PCC.

Replacement of PCC

Perform the removal steps in reverse order.

Remote Power Control Card (RPC) (Optional Feature)

See Figure 48 on page LOC-26 for location information.

Removal of Remote Power Control Card (RPC)

1. Ensure that the Local/Remote power switch on the Operator panel is in the Local position.
2. Label and remove all cables from the Remote Power Control Card (RPC).
3. Remove the screws that secure the card to the Power Control Compartment (PCC).
4. Remove the Remote Power Control Card (RPC).

Replacement of Remote Power Control Card (RPC)

Perform the removal procedure in reverse order.

Unit Emergency Power Off Switch (UEPO)

See Figure 45 on page LOC-23 for location information.

Removal of Unit Emergency Power Off Switch (UEPO)

1. If the library is not already powered off, perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in“Procedure: Prepare the Library Subsystem for Service” on page START-10 procedure then return here.
2. Disconnect cable connector P3 from the Operator Panel Card (LPN).
3. Remove the two screws that secure the switch to the operator panel frame.
4. Remove the switch.

Replacement of Unit Emergency Power Off Switch (UEPO)

Perform the removal procedure in reverse order.

+24 V dc Power Supply

See Figure 32 on page LOC-10 for location information.

Removal of +24 V dc Power Supply

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7 then return here.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6 then return here.
3. Unplug the cable connector from the power supply.
4. Remove the screw that secures the power supply to the side wall.
5. Remove the power supply.

Replacement of +24 V dc Power Supply

Perform the removal procedure in reverse order. Ensure that the power switch is in the On position.

+36 V dc Power Supply

See Figure 32 on page LOC-10 for location information.

Removal of +36 V dc Power Supply

1. If this is a single accessor library, perform “Single Accessor Library Service Preparation” on page CARR-7 then return here.
2. If this is a dual accessor library, perform “Dual Accessor Library Service Preparation” on page CARR-6 then return here.
3. Unplug the cable connector from the power supply.
4. Remove the screw that secures the power supply to the side wall.
5. Remove the power supply.

Replacement of +36 V dc Power Supply

Perform the removal procedure in reverse order. Ensure that the power switch is in the On position.

Preventive Maintenance (PM)

See Figure 133 on page CARR-140.

Notes:

1. Wash your hands after applying the lubricants to avoid any possible adverse reaction to one of the lubricants. Refer to the chemical safety data sheet with each lubricant for more information.
2. If cleaning of the external surfaces of the 3494 is required, it is recommended that you use a mild detergent solution. Do not use abrasives, solvents, or alcohol based cleaners.

Supplies needed:

P/N 0223980 - IBM Lubricant #6
P/N 0435682 - Lubriplate
P/N 1706205 - Swabs (foam tipped)
P/N 34G9329 - Reach Belt
P/N 34G9342 - Pivot Belt
P/N 34G9629 - Y-Axis Drive Belt
P/N 62G1424 - IBM 3495 Track Cable Lubricant (only for leadscrew w/o teflon)
P/N 65F5228 - Krytox Lubricant
Lint-free cloth

Perform the following procedure once a year (or as needed) during a service call. For a high-usage library, perform PM every 500,000 meters traveled on the Y-axis. Select **View usage information** on the Service Pull-down for the current Y-axis usage.

1. Lubricate the 8 wiper pads **1** **4** **6** on the X-axis (2 top and 2 bottom) and Y-axis (2 front and 2 back) with IBM Lubricant #6.
2. Put a few drops of IBM Lubricant #6 on a cloth and wipe the top and bottom X-rail rods **5** and the front and back Y-rail rods **3**.
3. Move the grip assembly **7** to the middle of the shafts and apply Krytox lubricant to the shaft **2** on each side of the bearings by using foam-tipped swabs.
4. Move the grip assembly back and forth on the shafts to load the bearings with lubricant. Wipe off the excessive lubricant on the shafts by using a clean lint-free cloth.
5. If the library has a teflon-coated (black) leadscrew, **DO NOT** lubricate the leadscrew. Go to step 7.
6. If your library **DOES NOT** have a teflon-coated leadscrew, lubricate the leadscrew as follows:
   a. With the picker assembly at the bottom, wipe the Y-axis leadscrew with a clean lint-free cloth.
   b. Soak a clean lint-free cloth with IBM 3495 Track Cable Lubricant and apply the lubricant to the exposed length of the leadscrew threads above the leadscrew nut **8**. **You should see small beads of lubricant on the leadscrew after you have applied it.**
   c. Move the picker assembly up and down the Y-axis to load the leadscrew nut with lubricant.
7. Apply a thin coat of Lubriplate grease to the front door bracket and pin. The bracket is mounted on the door and the pin is mounted on the frame near the top of the door opening.
8. If you have a 6 to 8 frame library with the metal band X-axis cable, apply a small amount of Lubriplate grease with a toothpick to the plastic roller shaft of each X-axis long cable support. The long cable supports are located between frames 5 and 6 and between frames 6 and 7.
9. Replace the pivot belt, reach belt, and Y-axis drive belt. Refer to “Pivot Belt” on page CARR-31, “Reach Belt” on page CARR-42, and “Y-Axis Drive Belt” on page CARR-66.

10. Record the date and Y-axis meters traveled for this PM. (See **View usage information** on the Service Pull-down).

Date	Meters Traveled
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

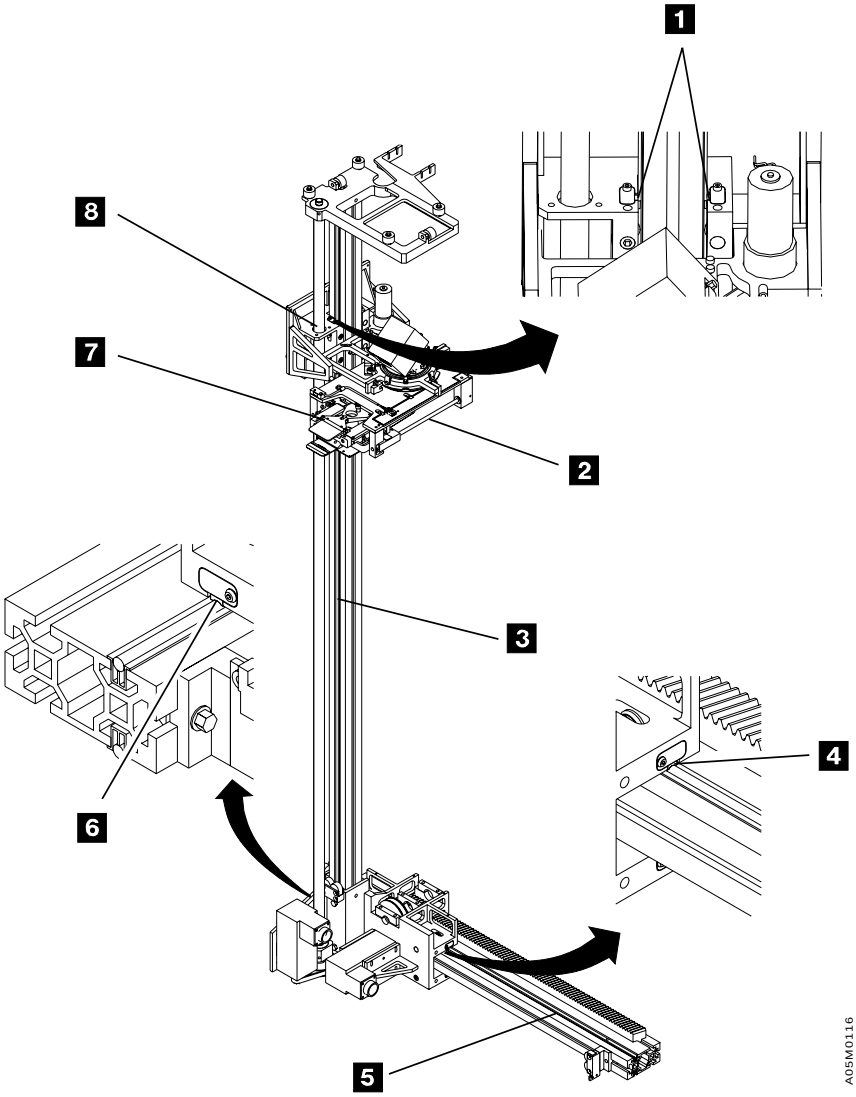


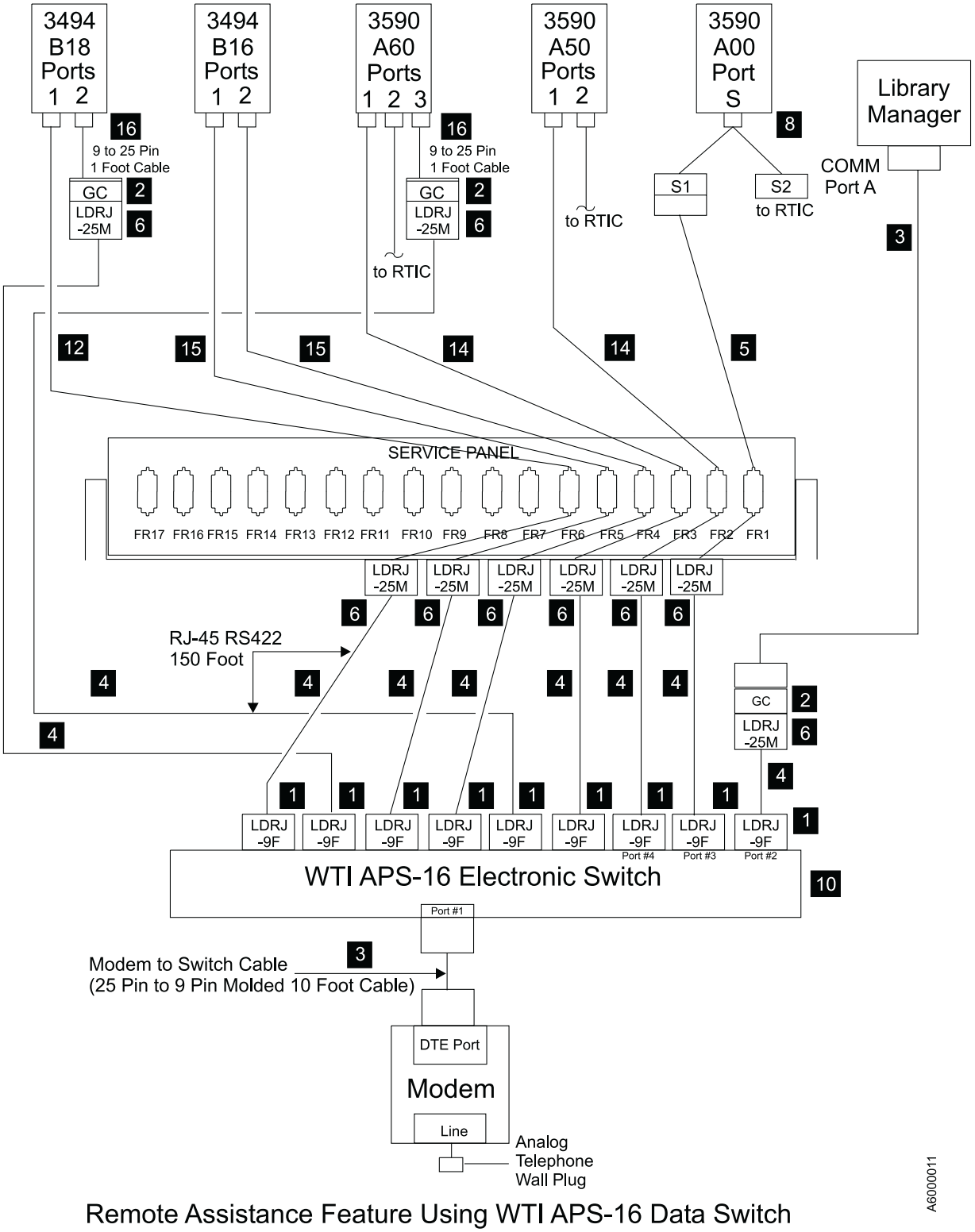
Figure 133. Lubricant Locations

Remote Service Connection

This section describes the remote service connection for the library manager. Refer to the appropriate tape subsystem maintenance information manual and the *IBM 3494 B16 VTS Maintenance Information* manual for details on the remote service connections for the VTS and tape subsystem controllers.

Figure 134 on page CARR-142 shows the remote service connections for the 3494 library. Following is the key list:

- **1** Adapter LDRJ-9F (9 pin to RJ45) P/N 05H9745
- **2** Gender Changer (25 pin F-F) P/N 05H7939
- **3** Cable (9 pin to 25 pin) P/N 05H3299
- **4** Cable (8 conductor RJ45) 150 foot P/N 05H9744
- **5** Cable (25 pin to 25 pin) if L1x use P/N 05H8038; if D1x/B16 use P/N 05H7878.
- **6** Adapter LDRJ-25M (25 pin to RJ45) P/N 05H9746
- **8** Y Cable P/N 32F4128 or 31F4126
- **9** Cable (6 conductor RJ12) 100 foot P/N 05H3352
- **10** WTI Data Switch Model APS-16 P/N 05H9742
- **12** Cable (9 pin to 25 pin) P/N 05H8743
- **14** Cable (9 pin to 25 pin) P/N 05H2943
- **15** Cable (25 pin to 25 pin) P/N 05H7878
- **16** Cable (9 pin to 25 pin) 1 foot P/N 40H6328



Remote Assistance Feature Using WTI APS-16 Data Switch

Figure 134. Remote Service Connections

Note: If you have a Model HA1, LM A should be connected to Port 2 of the switch and LM B should be connected to Port 3. If you do not have a switch, the LM may be connected directly to the modem.

Modem Initialization without Modem Password

The Modem must be initialized prior to using the system. Use the following steps to accomplish this.

1. Turn Modem power off.
2. Either the MoST or the Library Manager may be used to initialize the modem.
   a. If using the MoST terminal:
      - Use the 9 pin to 25 pin cable included with the 3590 Control Unit to use with this procedure. Connect the 9 pin connector to the MoST terminal serial port and the 25 pin connector to the DTE connector on the back of the modem (Do **NOT** use the null modem adapter that is also provided with the cable.)

   b. If using the Library Manager:
      - Locate the Service Cable between the Library Manager Serial Port A and switch port 2 (refer to Figure 134 on page CARR-142). Leave the 9 pin connector of the Service Cable connected to the Library Manager Serial Port A. Disconnect the 25 pin connector from the switch and connect it to the DTE connector on the back of the modem
3. .Remove the small panel (approximately 1.5 inches X 0.3 inches ("DeskPorte FAST" on it) from the front of the modem. There will be a series of switches behind this panel.
4. Set the switches as shown, from left to right.

   D D D D D D D U D D D D

   Note: Only **one** switch is up. The remainder are down. D=down, U=up.
5. Turn modem power on.
6. Start EBTERM.
   a. Select **"Modify"** from the toolbar across the top of the window.
   b. In the pop-up list, verify that **"Direct Connect Mode"** does **NOT** have a check mark (√) next to it.
   c. Point and click on **"Direct Connect Mode"** if it needs to be changed, i.e. remove Check mark (√).
7. In the pop-up list displayed (step 6), select **"Dial Prefix Selections"**
8. Select **"External Prefix 2"** from the pop-up list.

   Note: there should be a check mark (√) next to "External Prefix2".
9. Select **"Connect"** from the toolbar across the top of the window.
10. Select **"3494-B16 Virtual Tape Server Modem Setup"** from the pop-up list.
11. The characters **"AT&F*E1%U1$B38400&D0*W0&Y0** should be displayed in the EBTERM window. On the next line, **OK** should be displayed.

    If the displays specified are not correct;
    a. Check the switch settings in step 4.
    b. If the problem persists, contact your next level of support.
12. Select **"Disconnect"** from the tool bar across the top of the EBTERM window.
13. Turn modem power **"Off"**
14. Reset the switches on the modem (see step 4).

    D D D D D D D D D D D D

    Note: all switches are in the down (D) position.

15. Turn the modem **"On"** and check the LCD display. The display should continue to show 28.8.

    If the displays specified are not correct:

    Start at step 1 on page CARR-143.

    a. If the problem persists, contact your next level of support.

16. Reinstall the panel removed in step 3 on page CARR-143.

Setting up EBTERM for Setting Modem Password

Note: The modem password should **only** be used for configurations where the LM is directly connected to the modem (**no** WTI data switch is used). For configurations with the WTI data switch the **WTI Data Switch password** should be used instead of the modem password.

EBTERM must be "setup" prior to using for the first time on setting up the modem password.

1. Start EBTERM by double clicking on the EBTERM icon.
2. Select **"Setup"** from the tool bar across the top of the window.
3. Select **"Dialing Profiles"** from the pop-up list.
4. Select **"Add Profile"** from the pop-up list.
5. Select the first unused profile number from the pop-up list. This will open a window with the title **"EBTERM[A] Dialing Directory: Profile X"** where X is the profile number just selected.
6. Set the fields of the following window as shown.

Field Name	Set To Value
Host Location Description	A00 or A50 Modem Setup with Password
Modem Initialization	AT&FQ1E0\Q1*E1%U1$B9600&D0&M2\N2*W0&Y0<e <all are the number zero(0)> <alpha characters are upper/lower case <sensitive>
Number to Dial	<Leave blank>
Long Distance Prefix	<Leave blank>
Response to Connect	<Clear this field-should be blank>
Serial Port Speed	9600 <point and clink on arrows to scroll through choices>
Bits Setting	8/N/1
Serial Port Buffer	Ignore
Display Buffer	Checkmark OFF in box <point and click on box to change>
Flow Control XON/XOFF	Checkmark OFF in box
Flow Control CTS/RTS	Checkmark OFF in box
Host Protocol	IBM 3151
Host Codepage	ASCII 437 U.S. English
Host Script	None

   Point and click on **Enter** at bottom of window after setting fields.

7. Select **"Setup"** from the tool bar across the top of the window.
8. Select **"Save as..."** from the pop-up list.
9. Press **"Enter"** to save changes just made.
10. Select **"Setup"** from the toolbar across the top of the window.
11. Select **"Dialing Profiles"** from the pop-up list.

12. Select **Add Profile"** from the pop-up list.
13. Select the first unused profile number from the pop-up list. This will open a window with the title **"EBTERM[A] Dialing Directory: Profile X"** where X is the profile number just selected.
14. Set the fields of the following window as shown.

Field Name	Set To Value
Host Location Description	Direct Modem AT Command Entry
Modem Initialization	<Clear this field - should be blank>
Number to Dial	<Leave blank>
Long Distance Prefix	<Leave blank>
Response to Connect	<Clear this field-should be blank>
Serial Port Speed	9600 <point and click on arrows to scroll through choices>
Bits Setting	8/N/1
Serial Port Buffer	Ignore
Display Buffer	Checkmark OFF in box <point and click on box to change>
Flow Control XON/XOFF	Checkmark OFF in box
Flow Control CTS/RTS	Checkmark OFF in box
Host Protocol	DEC VT100
Host Codepage	ASCII 437 U.S. English
Host Type	ASCII
Logon Script	None

Point and click on **Enter** at the bottom of the window, after setting fields.

15. Select **"Setup"** from the tool bar across the top of the window.
16. Select **"Configuration/Modem"** from the pop-up list.
17. Clear the field **"Modem Dial Prefix 3"**. Leave all other fields unchanged. Point and click on **"Enter"** at bottom of window after clearing field.
18. Select **"Setup"** from the tool bar across the top of the window.
19. Select **"Save as..."** from the pop-up list.
20. Press **"Enter"** to save changes just made.

The EBTERM program is now set up to correctly initialize the modem with password protection.

Note:

Modem initialization string

&F	set factory defaults
Q1	disable result codes
E0	turn off echo of the AT commands
\Q1	set XON/XOFF on the DTE port
*E1	enable remote access
%U1	always keeps the current serial port speed
$B9600	set serial port rate to 9600
&D0	ignores DTR (DTR not needed for auto-answer)
&M2	set password verification
\N2	set modem to reliable mode (required for password verification)
*W0	store setup in memory zero
&Y0	make setup the default

Modem Initialization with Modem Password

Note: The Modem password should **only** be used for configurations where the LM is directly connected to the modem (**no** WTI data switch is used). For configurations with the WTI data switch the **WTI Data Switch password** should be used instead of the modem password.

The Modem must be initialized, prior to using the system. Use the following steps to accomplish this.

Note: EBTERM must be set up before continuing with the modem initialization. See “Setting up EBTERM for Setting Modem Password” on page CARR-144.

1. Turn Modem power off.
2. Either the MoST or the Library Manager may be used to initialize the modem.
   a. If using the MoST terminal:
      - A spare 9 pin to 25 pin cable is included with the 3590-Axx to use with this procedure. Connect the 9 pin connector to the MoST terminal serial port and the 25 pin connector to the DTE connector on the back of the modem (Do **NOT** use the null modem adapter that is provided with the cable.)

   b. If using the Library Manager:
      - Locate the Service Cable between the Library Manager Serial Port A and switch port 2 (refer to Figure 134 on page CARR-142). Leave the 9 pin connector of the Service Cable connected to the Library Manager Serial Port A. Disconnect the 25 pin connector from the switch and connect it to the DTE connector on the back of the modem.
3. .Remove the small panel (approximately 1.5 inches X 0.3 inches ("DeskPorte FAST" on it) from the front of the modem. There will be a series of switches behind this panel.
4. Set the switches as shown, from left to right.

   D D D D D D D U D D D D

   Note: Only **one** switch is up. The remainder are down. (D=down, U=up.)
5. Turn modem power on.
6. Start EBTERM.
   a. Select **"Modify"** from the toolbar across the top of the window.
   b. In the pop-up list, verify that **"Direct Connect Mode"** does **NOT** have a check mark (√) next to it.
   c. If it needs to be changed, point and click on **"Direct Connect Mode"**, to remove check mark (√).
7. In the pop-up list displayed in step 6, select **"Dial Prefix Selections"**.
8. Select **"External Prefix 2"** from the pop-up list.

   Note: There should be a check mark (√) next to "External Prefix 2".
9. Select **"Connect"** from the toolbar across the top of the window.
10. Select **"3590-Axx Modem Setup with Password"** from the pop-up list.

11. The characters **"AT&FQ1E0\Q1*E1%U1$B9600&D0&M2\N2*W0&Y0"** should be displayed in the EBTERM window. On the next line, **OK** should be displayed.

    If the displays specified are not correct;

    a. Check the switch settings in step 4 on page CARR-146.

    b. Return to "Setting up EBTERM for Setting Modem Password" on page CARR-144 and make sure that EBTERM was set up correctly.

    c. If the problem persists, contact your next level of support.

12. Select **"Disconnect"** from the tool bar across the top of the EBTERM window.

13. Password protection is now active on the modem. The following steps are used to enter or change the password.

    a. Select **"Modify"** from the toolbar across the top of the window

    b. In the pop-up list, verify the **"Direct Connect Mode'** does have a check mark (√) next to it.

    c. Point and click on **"Direct Connect Mode"**. If it needs to be changed, add the Check mark (√).

14. Select **"Connect"** from the tool bar across the top of the window.

15. Select **"Direct Modem at Command Entry"** from the pop-up list.

16. Wait a few seconds to allow the CONNECT to complete. CONNECT has completed when the EBTERM Status line (line above tool bar) changes from **"EBTERM[A] [min]** to **"EBTERM[A] [0]"**

17. Type **AT%I0** (letter I, number zero) and press ENTER.

    Note: The **AT%I0** will not be displayed when entered)

18. The EBTERM display should now show **NEW PASSWORD:**. Unless directed otherwise by your second level support or by your customer, enter **pfe4u** as the password. Type in the password and press ENTER.

    Note: Passwords must contain exactly five alphanumeric characters. The password letters are not upper and lower case sensitive.

19. Select **"Disconnect"** from the tool bar at the top of the EBTERM window.

20. Turn modem power **OFF**.

21. Reset the switches on the modem.

    D D D D D D D D D D D D

    Note: all switches are in the down (D) position.

22. Turn the modem **"On"**. Check the LCD of the modem. The display should continue to show 28.8. If the displays specified are not correct:

    a. Start at step 1 on page CARR-146.

    b. If the problem persists, contact your next level of support.

23. Reinstall the panel removed in step 3 on page CARR-146

WTI Switch Set-up and Testing

1. The library manager should be connected to Port 2 of the WTI data switch and the modem should be connected to Port 1. See Figure 134 on page CARR-142.

   Note: If you have a dual library manager, LM A should be connected to Port 2 and LM B to Port 3 of the switch.

2. .Change the EBTERM baud rate to match the speed to the WTI switch port 1.

   a. Start EBTERM

   b. Select **"Setup"** from the tool bar across the top of the window

   c. Select **"Dialing Profiles"** from the pop-up list

   d. Select **"Update Profile"** from the pop-up list

   e. Select **"3590-Axx & 3494-B16 Subsystem Service"** from the pop-up list

   f. Change the **Serial Port Speed** from 9600 to 38400

   g. Point and click on Enter at bottom of window after changing Serial Port Speed.

      Note: IMPORTANT: The speed will need to be changed back to 9600 after testing the WTI switch.

3. From EBTERM select **"Modify"** from the tool bar across the top of the window. In the pop-up window verify the **"Direct Connect Mode"** has a check mark(√) next to it. Point and click on **"Direct Connect Mode"** if you need to change it.

4. From EBTERM select **"Connect"** from the tool bar across the top of the window. In the pop-up window select **"3590-Axx & 3494-B16 Subsystem Service"**.

5. Wait for EBTERM to complete the connection before continuing. EBTERM is connect when the top status line changes from **EBTERM[A] [min]:** to **EBTERM[A] [0]:**.

6. Issue the WTI **"Wake Port"** command to access the WTI switch Command Mode. Type **"/"**, then press and hold the **"Ctrl"** key and momentarily press the **E** key, then release the **"Ctrl"**, then press **"Enter"**.

   Note: Some EBTERM configurations use the Right Ctrl key as the "Enter" key.

   Note: Holding down the **E** key too long may cause the WTI switch to enter an error state. Use Figure 135 to correct.

   a. If the "MDS>" or "APS>" prompt is displayed, you have successfully accessed the WTI switch Command Mode.

   b. If the "MDS>" or "APS>" prompt is not displayed, use Figure 135 to correct.

Figure 135 (Page 1 of 2). WTI Error Correction Table.

Condition	Procedure to Correct
WTI switch in error state because the **E** key was held down too long in **Wake Port** command sequence	Issue the Disconnect Sequence to the WTI switch. On the service terminal press "Enter", then press "+" three times, the press "Enter". This will put the switch in the state where the "APS>" or "MDS>" prompt is displayed but will not accept the "/H" or "/S" commands. Use the procedure in the next entry of this table to correct.

Figure 135 (Page 2 of 2). WTI Error Correction Table.

Condition	Procedure to Correct
"APS>" or "MDS>" prompt is displayed but does not echo "/H" or "/S" on display when entered.	1. Re-enter **Wake Port** command and retry **/H** or **/S** command. 2. If "/H" or "/S" was not echoed: a. Select "Disconnect" from the EBTERM toolbar. b. On the WTI switch press and hold both the SET button and the CLEAR button. Release only the CLEAR button, and then release the SET button. c. Repeat steps 4 through 6.
WTI switch port that you are using has been left in a connected state to another port on the WTI data switch.	Issue the Disconnect Sequence to the WTI switch. On the service terminal press "Enter", then press "+" three times, the press "Enter" **Note:** The sequence above (Enter + + + Enter) must be entered without any one second pauses between characters.
BAUD rate mismatch between WTI switch and EBTERM	Verify that EBTERM setup has been changed to match the WTI port 1 baud rate, refer to step 2.
WTI setup switches not set correctly.	Refer to step 7 on page INST-132 for correct switch setting.
WTI switch has not been initialized with setting.	Press and hold both the **SET** button and the **CLEAR** button on the front of the WTI data switch. Release only the **CLEAR** button, and then release the **SET** button.

7. Display the WTI switch help screen:
   a. From the WTI "MDS>" or "APS>" prompt on the service terminal type: **"/h"** then press **"ENTER"**.
   b. The display should now show:

```
COMMAND MENU:

/¬E               Wake-up port
/X                Sleep - only accepts Wake-up command
/H                Help - displays command list
/S                Status - displays status screen  +--------------------+
/W ffln“           Who - displays port parameters   | n   Port # or name |
/C <n> ffln“       Connect - local ffremote“        | N   Port #         |
/D <n | ... | *>  Disconnect                       | |   "or"           |
/E <n | ... | *>  Erase Buffer                     | *   "all"          |
/I                Initialize / test unit           | <>  Required entry |
/F                Enter Site ID                    | ff“  Optional entry |
/J                Read Site ID                     +--------------------+
/P ffln“           Set Port Parameters
/U                Read Port Parameters
/L-<N>            Load Port Parameters
/G-00             Reinitialize All Ports

/D, /E, /I commands: add /Y to bypass "Are you sure (y/n)?"



APS> -
```

Figure 136. WTI Command Menu Screen.

8. Display the WTI switch status screen:
   a. From the WTI "MDS>" or "APS>" prompt on the service terminal type: **"/s"** then press **"ENTER"**.
   b. The display should now show:

```
SYSTEM STATUS                    VERSION 1.1

PORT |    NAME    | STATUS |  BAUD  | COM |  HS  |  MODE  | TIMEOUT |  BUF  | CTS
-----+------------+--------+--------+-----+------+--------+---------+-------+----
 01+ |            | *Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  H
 02+ |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 03  |   axx      |  Free  |  9600  | 8N1 | XON  |  Any   |   Off   |     0 |  L
 04  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 05  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 06  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 07  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 08  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 09  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 10  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 11  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 12  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 13  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 14  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 15  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L
 16  |            |  Free  |  38.4K | 8N1 | RTS  |  Any   |   Off   |     0 |  L

APS>
```

Figure 137. WTI Switch System Status Screen.

9. If you have a WTI APS-16 switch, set WTI APS-16 Data Modem Mode as follows. If you have a WTI MDS-16 switch, go to step 10 on page CARR-152.

a. From the WTI "APS>" prompt on the service terminal type**"/p 1'** then press **"ENTER"** to select PORT PARAMETERS for the modem port.

b. Enter **"1"** then press **"ENTER"** to select PORT NAME option.

c. Enter the word **"Modem"** and press **"ENTER"**.

d. You should still be at the PORT PARAMETERS #01 menu. Type **"7"** then press **"ENTER"** to select MODE menu.

e. From the INPUT MODE menu type **"4"** then press **"ENTER"** to select "Modem".

f. you should still be at the PORT PARAMETERS #01 menu. Type **"71"** and then press **"ENTER"** to select RESET STRING menu.

g. From the RESET STRING menu press the **"SPACE"** bar and then press **"ENTER"** to clear the RESET STRING.

h. You should still be at the PORT PARAMETERS #01 menu. Type **"72"** then press **"ENTER"** to select INIT STRING menu.

i. From the INIT STRING menu press the **"SPACE"** bar and then press **"ENTER"** to clear the INIT STRING.

j. You should still be at the PORT PARAMETERS #01 menu. Type **"73"** then press **"ENTER"** to select HANG-UP STRING menu.

k. From the HANGUP STRING menu type **"ATH0"** (**0** is the number zero) then press **"ENTER"** to set the HANG-UP STRING.

l. You should still be at the PORT PARAMETERS #01 menu. Type **"2"** then press **"ENTER"** to select PASSWORD.

m. Type **"pfe4u"** as the password then press **"ENTER"**

Note: If the customer requests a specific password, enter the customers password instead of pfe4u.

n. You should still be at the PORT PARAMETERS #01 menu. Verify that menu number **71** and **72** are both set to **undefined)** and that menu number **73** is set to **ATH0**. Also verify that the PASSWORD is set to **pfe4u**. The &itp. screen should now show:

```
PORT PARAMETERS #01

 1. PORT NAME:            Modem
 2. PASSWORD:             pfe4u
 3. BAUD RATE:            38.4K
 4. BITS/PARITY:          8-None
 5. STOP BITS:            1
 6. HANDSHAKE:            RTS/CTS
 7. MODE:                 Modem
    71. RESET STRING:     (undefined)
    72. INIT STRING:      (undefined)
    73. HANG-UP STRING:   ATH0
 8. COMMANDS:             All
 9. LOGOFF CHAR:          +
10. SEQUENCE DISC:        On
11. TIMEOUT DISC:         15 Min
12. MESSAGE TYPE:         Verbose
13. ECHO:                 On


Enter: "<" previous port,
       ">" next port,
       "##" change parameter,
       <CTRL-X> exit ...
```

o. Press the left **Ctrl** and the **X** keys simultaneously to exit the PORT PARAMETERS screen. This will take you back to the "APS>" prompt. An example of a typical screen is shown:

```
SYSTEM STATUS                    VERSION 1.1

PORT ¼   NAME   ¼ STATUS ¼  BAUD  ¼ COM ¼  HS  ¼  MODE  ¼ TIMEOUT ¼  BUF  ¼ CTS
-----+----------+--------+--------+-----+------+--------+---------+-------+----
 01+ ¼ Modem    ¼ *Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Modem ¼ 15 Min  ¼     0 ¼  H
 02+ ¼ LM_A     ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  H
 03  ¼ LM_B     ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  H
 04  ¼ A50_FC0  ¼  Free  ¼  9600  ¼ 8N1 ¼ XON  ¼  Any   ¼   Off   ¼     0 ¼  H
 05  ¼ B16_C00  ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  H
 06  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L
 07  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L
 08  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L
     ¼          ¼       ¼        ¼     ¼      ¼        ¼           ¼       ¼
 09  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L
 10  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L
 11  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L
 12  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L
 13  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L
 14  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L
 15  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L
 16  ¼          ¼  Free  ¼  38.4K ¼ 8N1 ¼ RTS  ¼  Any   ¼   Off   ¼     0 ¼  L


APS>
```

10. If you have a WTI MDS-16 switch, enter port 1 "Name" as follows. If you have a WTI APS-16 switch, go to step 11 on page CARR-153.
    a. From the WTI "MDS>" prompt on the service terminal type: **"/p 1"** then press **"ENTER"**.
    b. The display should now show:

```
PORT PARAMETERS #01

 1. PORT NAME:           (undefined)
 2. PASSWORD:            (undefined)
 3. BAUD RATE:           38.4K
 4. BITS/PARITY:         8-None
 5. STOP BITS:           1
 6. HANDSHAKE:           RTS/CTS
 7. MODE:                Any-to-Any
 8. COMMANDS:            All
 9. LOGOFF CHAR:         +
10. SEQUENCE DISC:       On
11. TIMEOUT DISC:        Off
12. MESSAGE TYPE:        Verbose
13. ECHO:                On




Enter: "<" previous port,
       ">" next port,
       "##" change parameter,
       <CTRL-X> exit ...
```

Figure 138. WTI Switch Port Parameters #01 Screen.

c. Enter **"1"** then press **"ENTER"** to select the PORT NAME option.

d. Enter the word **"Modem"** the press **"ENTER"**.

e. Press the left **Ctrl** and the **X** keys simultaneously (on some MDS-16 you may need to press **ESC**) to exit this screen. The will take you back to the "MDS>" prompt.

f. Enter **"/s"** to display the status screen. The word **Modem** should now be displayed in the Name column for Port 1.

11. Enter port 2 "name".

a. From the WTI "MDS>" or "APS>" prompt on the service terminal type: **"/p 2"** then press **"ENTER"**.

b. Enter **"1"** then press **"ENTER"** to select the PORT NAME option.

c. Enter the word **"LM_A"** then press **"ENTER"**.

d. Press the left **Ctrl** and the **X** keys simultaneously (on some MDS-16 you may need to press **ESC**) to exit this screen. The will take you back to the "APS>" or MDS>" prompt.

e. Enter **"/s"** to display the status screen. The word **LM_A** should now be displayed in the Name column for Port 2.

Note: If you have a dual library manager, repeat this step for **Port 3** using the name **LM_B**.

12. Configure WTI ports that have a 3590-Axx connected:

a. From the WTI "MDS>" or "APS>" prompt on the service terminal type: **"/p n"** (**"n"** is the port number that has the Axx connected) then press**"ENTER"** You should be at the PORT PARAMETERS screen for the selected port.

b. Enter 1 then press **"ENTER"** to select the **PORT NAME** option.

c. Enter a descriptive name to identify the Axx then press **"ENTER"**

d. You should still be at the **PORT PARAMETERS** screen for the selected port. From this screen menu enter the number to select the **BAUD RATE** and then press **"ENTER"**.

e. From the BAUD RATE menu select the number for 9600 and then press **"ENTER"**.

f. You should still be at the **PORT PARAMETERS** screen for the selected port. From this screen menu enter the number to select **HAND SHAKE** and then press **"ENTER"**.

g. From the HAND SHAKE menu select the number for **XON/XOFF** and then press **"ENTER"**.

h. Press the left **Ctrl** and the **X** keys simultaneously (on some MDS-16 you may need to press **ESC**). This will take you back to the "APS>" or "MDS>" prompt.

i. Enter **"/s"** to display the status screen. Verify the **NAME, BAUD RATE,** and **HAND SHAKE** columns are correct for the port you just configured.

j. Repeat from 12 on page CARR-153 for each Axx connected to the WTI data switch.

13. Configure WTI ports that have a 3494-B16 connected. (Only the NAME field need to be entered for the 3494-B16. The other parameters should not be changed):

    a. From the WTI "MDS>" or "APS>" prompt on the service terminal type: /p n (n is the port number that has the Axx connected) then press**"ENTER"** You should be at the PORT PARAMETERS screen for the selected port.

    b. Enter **"1"** then press **"ENTER"** to select the **PORT NAME** option.

    c. Enter a descriptive name to identify the B16 then press **"ENTER"**

    d. Press the left **Ctrl** and the **X** keys simultaneously (on some MDS-16 you may need to press **ESC**). This will take you back to the "APS>" or "MDS>" prompt.

    e. Enter **"/s"** to display the status screen. Verify the **NAME** column is correct for the port you just configured.

    f. Repeat steps from 13 for each B16 connected to the WTI data switch.

14. Verify connections to Axx controls units.

    Note: These steps will not work with B16 control units as they use a protocol not compatible with EBTERM.

    a. To connect the switch port 1 to an Axx enter **"/c n"** (**"n"** is the port number of the Axx you want to connect to) then press **"ENTER"**.

    b. The following screen will be displayed when the Axx is connected through the WTI switch (May need to press **"ENTER"** a second time to display screen).

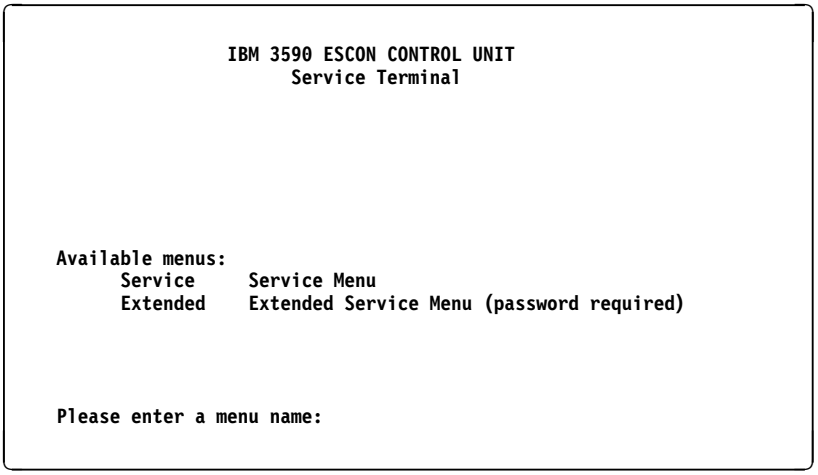


Figure 139. Initial 3494 Service Terminal Screen

c. Enter **"Service"** then press **"ENTER"** to go to the service menus.

d. This completes the checkout for this port. Press **F10** to exit the service menu.

e. Issue the WTI Disconnect Sequence. Press "Enter", then press "+" three times, the press "Enter"

Note: The sequence above (Enter + + + Enter) must be entered without any one second pauses between characters.

The screen should now display the "APS>" or the "MDS>" prompt.

f. Repeat from 14 on page CARR-154 for each Axx attached to the WTI switch.

15. From the "APS>" or "MDS>" prompt enter **"/x"** then press **"ENTER"** The word **Asleep** should now be displayed indicating that the switch is in the sleep mode.
16. Follow the procedure in step 2 on page CARR-148 to change your EBTERM **"3590-Axx & 3494-B16 Subsystem Service"** setup back to 9600 baud.
17. Contact your support center and have them call the modem to verify the modem to WTI switch connection.

Safety Circuit

The safety circuit consists of one door interlock switch and door key lock for each frame.

Door Interlock Switch

See Figure 26 on page LOC-4 for location information.

Removal of Door Interlock Switch: See Figure 140.

1. Perform “Procedure: Prepare the Library Subsystem for Service” on page START-10 and return here.

   Note: The switch can be replaced while the library is in Pause mode.
2. Disconnect the door interlock switch connector **3** from the door interlock card (DIL) P3 connector **2**.
3. Remove the 2 bolts **7** that fasten the switch assembly **6** to the switch bracket **1**.

Replacement of Door Interlock Switch: See Figure 140.

1. Secure the new switch assembly **6** on the switch bracket **1** using bolts **7** removed earlier.
2. Connect the switch cable **3** connector to the DIL card P3 connector **2**.
3. Go to “Door Interlock Switch Adjustment” on page CARR-157.

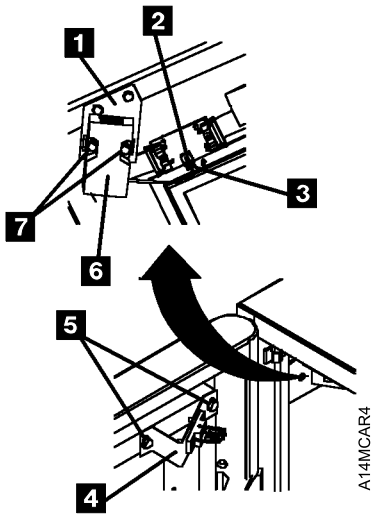


Figure 140. Door Interlock Switch

Door Interlock Switch Adjustment

See Figure 140 on page CARR-156.

1. Close the door slowly and observe switch alignment with the actuator as the actuator engages the switch lower slot.
2. If the actuator is not aligned with the switch lower slot, adjust the switch actuator bracket **4** on the door until it is aligned with the switch **6** lower slot.
3. If the library has one frame, remove the left side cover by removing the 6 mounting bolts.
4. Close the frame front door and lock it.
5. Loosen the bolts **7** attaching the switch to the bracket **1**, push the switch **6** toward the door onto the actuator as far as it will go, and tighten the bolts **7**.
6. Close and lock all of the front doors and replace the left side cover if it was removed.
7. Set the Unit Power switch to Power On and bring the library up in **Pause** mode.
8. When the System Summary window is displayed on the library manager, verify that **Enclosure Door** status indicates closed.
9. Open each library front door one-at-a-time and verify that the enclosure door status indicates open and shows the correct door number.

Door Lock Replacement

1. Remove the old lock assembly from the door by removing the nut.
2. Remove the commercial pawl from the replacement lock assembly.
3. Remove the 3494 pawl from the old lock assembly and install it on the replacement lock assembly.
4. Install the replacement lock assembly on the door.
5. Adjust the door lock using the following procedure.

Door Lock Adjustment

1. Close and lock the front door.
2. Ensure that the front door is tight against the frame. You should not feel any movement of the door when you push or pull on the door.
3. If there is movement of the door when it is locked, re-adjust the door as follows:
   a. Put the library in **Pause** and open the door.
   b. Turn the locating nut on the lock shaft closer to the door approximately the distance of the door movement.
   c. Tighten the retaining nut on the lock shaft.
   d. Close and lock the door.
   e. Ensure that the door is tight against the frame.
4. Verify that **Enclosure Door** status on the library manager System Summary window indicates closed.
5. Open the door and verify that the enclosure door status indicates open and shows the correct door number.

Storage Rack Assembly

See Figure 141 on page CARR-159. (See also Figure 26 on page LOC-4 for location information.)

Removal of Storage Rack Assembly

1. Perform **CONCURRENT MAINTENANCE IS NOT POSSIBLE OR REQUIRED** in"Procedure: Prepare the Library Subsystem for Service" on page START-10 and return here.
2. Remove the cartridges from the storage rack assembly.

   If you are replacing a lower storage rack assembly, also remove the cartridges from the upper storage rack assembly on the wall or door.

   Note: Storage rack assemblies with convenience I/O station are mounted to the door with 6 screws, while all other storage rack assemblies are mounted to the wall or door with 4 screws.
3. Remove 4 screws **3** (there are 6 screws **1** in the storage rack used with the 10 cartridge convenience I/O station) that secure the storage rack assembly to the wall or door.
4. If you are removing a lower storage rack assembly, loosen 4 screws **3** (there are 6 screws **1** in storage rack with convenience I/O) that secure the upper storage rack assembly to the wall or door.
5. Remove the storage rack assembly as follows:

   Upper storage rack assembly
   Lift the assembly off the lower storage rack assembly pins **4** (if a lower assembly is installed) and remove it from the library.

   Lower storage rack assembly
   Push the upper storage rack assembly up until it clears the pins **4** on the top of the lower rack assembly and remove the lower assembly from the library.

   Note: If you cannot push the upper storage rack assembly high enough to free the lower assembly, remove the upper assembly.

Replacement of Storage Rack Assembly

1. Perform the removal steps in reverse order.
2. Ensure that the lower storage rack is aligned and seated firmly on the support plate and tighten the mounting screws before securing the upper storage rack assembly.
3. Ensure that the upper storage rack assembly is aligned properly with the pins on the lower storage rack and is seated firmly on the lower rack or support plate before tightening the mounting screws.
4. Install the row label **2** on the storage rack assembly. The appropriate label should be ordered when the storage rack assembly is ordered.

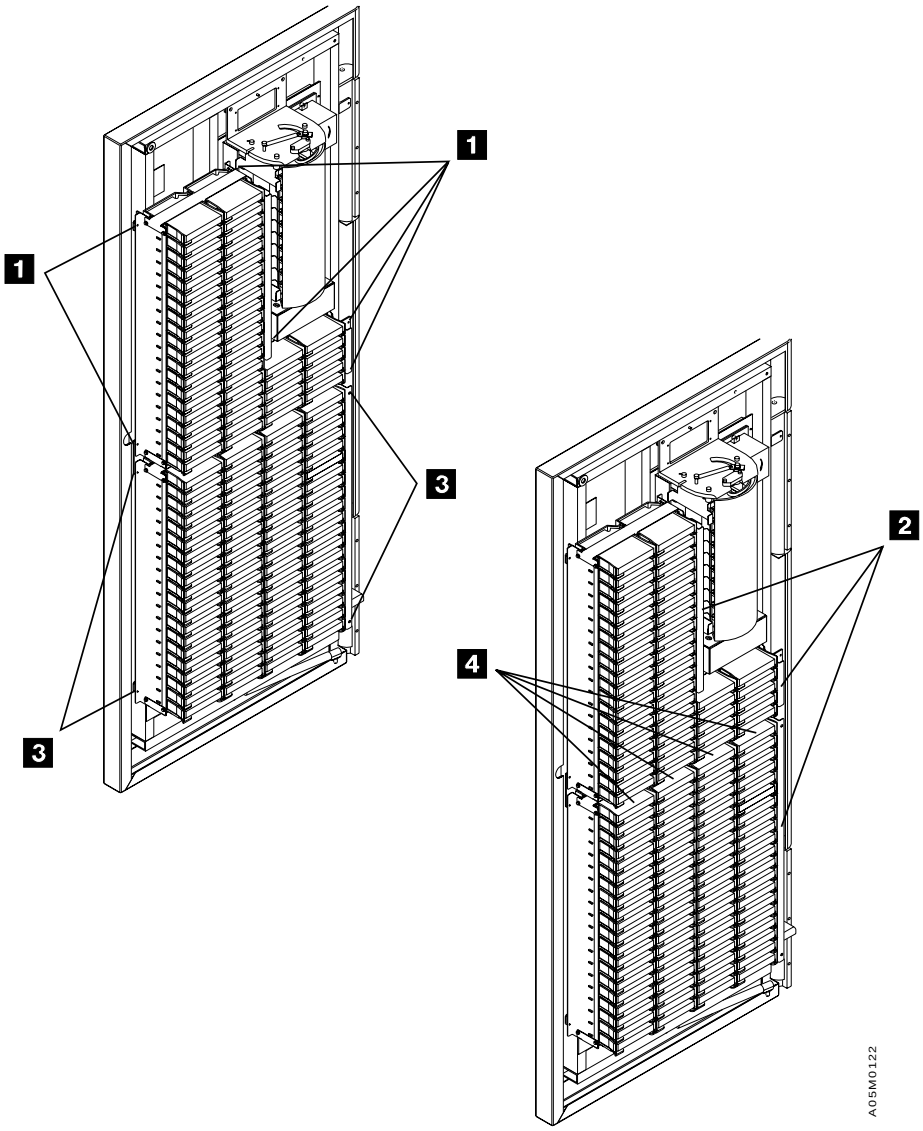


Figure 141. Storage Rack Assembly

Tape Control Unit Service Position

3490E CxA Tape Subsystem

See Figure 142.

1. Remove the front cover of the tape control unit by pulling on the sides.
2. Remove the 2 screws **1** that secure the tape control unit in the rack, and remove the *swing-out pin* **2** from the cable holder.
3. Pull the tape control unit out the rear for service. Avoid getting the cables caught while sliding the control unit out.

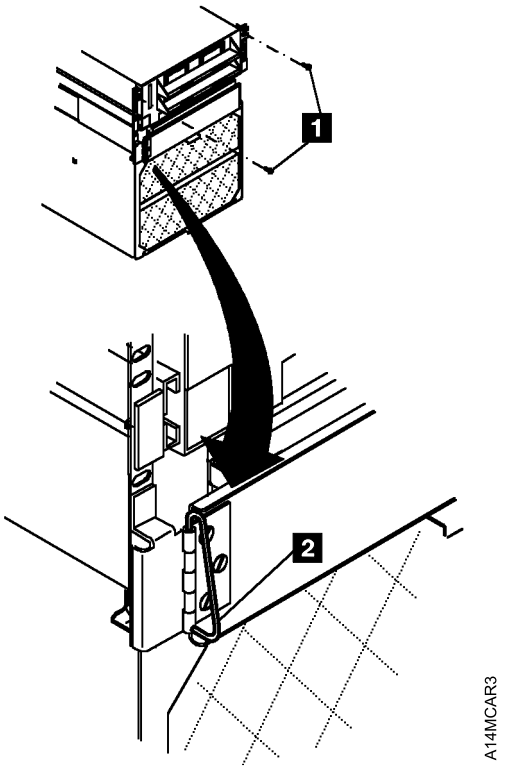


Figure 142. 3490 Tape Control Unit Service Position

3490 F1A and 3590 Tape Controller

1. The tape controller is serviced in place from the rear. Open the rear door of the frame containing the failing controller for access.
2. The 3590 Model A00 is mounted on a fixed shelf. If you need to remove the controller, unplug the cables, remove 4 screws securing the controller to the shelf, and slide the controller out the rear of the frame.
3. The 3490 Model F1A FC 3000 and 3590 Model A50 are mounted on a shelf with slides so they can be pulled out for service.

Tape Drive Service Position

For the 3590, go to “3590 Tape Subsystem” on page CARR-162.

3490E CxA Tape Subsystem

See Figure 143.

1. Remove the front cover of the tape control unit. The X and Y axes must be in the service position before the tape drive is pulled forward.
2. From the rear of the frame, loosen the 4 screws **1** that hold the fan screen, and then remove the screen by sliding it up and out of the sleeve.
3. Remove the 4 screws **2** that were covered by the screen.
4. From the front, pull the tape drive out to the extended position so that the top cover is fully visible and remove the screw **3** holding the top cover secure.
5. Remove the top cover **4** by lifting the front of the cover up slightly and sliding the cover forward until the tabs at the rear of the cover are clear. On some machines it may be necessary to use a tool to pry the cover forward.
6. Lift the cover from the rear and remove it.

Note: Reteach the tape drive if it is removed from the sleeve during service. Ensure that the drive is positioned at the mid-point of the retaining screw "slack" and is even with the other drive if one is installed in the sleeve.

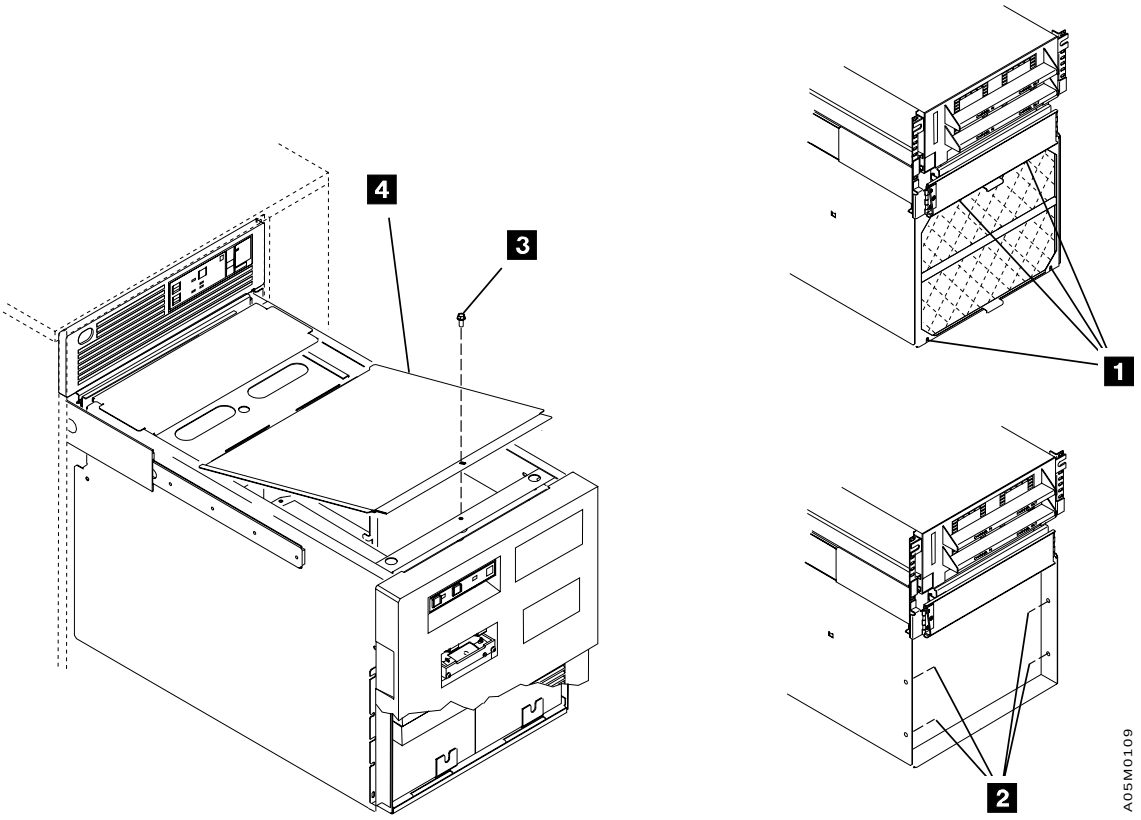


Figure 143. 3490 Tape Drive Service Position

3590 Tape Subsystem

See Figure 144 on page CARR-163.

1. When the tape drive is offline to the system, open the rear door of the frame containing the failing drive and locate the drive. **Ensure that you identify the correct tape drive since the library will continue to operate in automatic mode while you are servicing the drive.**
2. Remove the drive retaining screws **2** in the drive slides.
3. Pull the drive out the rear of the frame to the service position **1**. **Ensure that the cables are free as you pull it out, and that the slides are fully extended and locked.**

| **Attention** You must start from the fully extended and locked position when pushing the drive back into the frame; otherwise, the slides may be damaged..*:eattention.

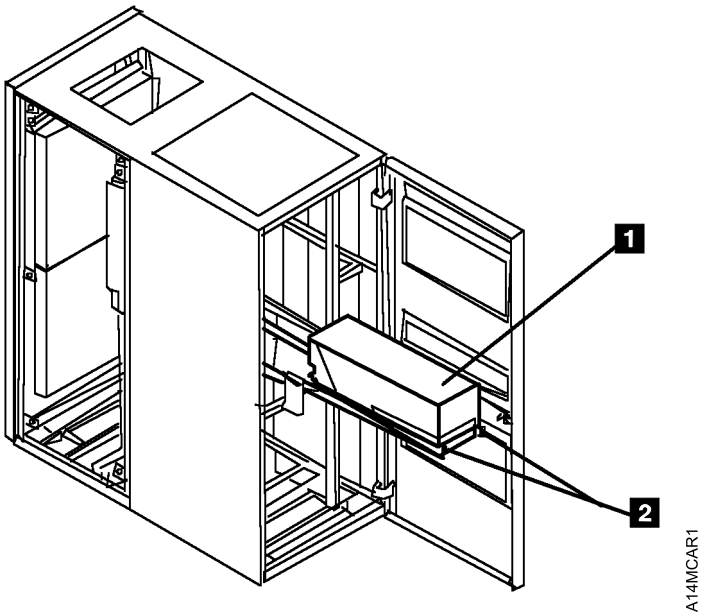
4. Unlatch the operator/service panel from the front cover of the tape drive and set it on top of the drive so you can see the display.
5. If you want to remove the drive from the slides to service it:
   a. Remove the rear door of the 3494 frame.
   b. Unplug the cables from the rear of the drive. **DO NOT** unplug the terminator or next drive cable from the back of the drive cable connector. The SCSI interface loop must be maintained in order for the customer to continue to use the other drives on the interface.
   c. Remove the screws holding the two cable brackets on the bottom of the drive.
   d. Unlock the inner section of each slide.
   e. With assistance, pull the drive out of the slides.

      CAUTION:
      The tape drive weighs approximately 28 kilograms (63 pounds). It takes 2 persons to safely lift the tape drive and to re-install it on the slides.

   f. To re-install the drive, read this complete step before proceeding. With one person on each side of the drive, lift the 3590 and place the inner section carefully into the slides. Hold the ball-bearing retainers to the rear while you guide the inner section into the ball-bearing retainer assemblies and then push the 3590 in place. Guide the 3590 onto 4 or 5 bearings before you push it forward. Ensure that the top and bottom of the inner section are inside the slide assembly. Ensure that the middle section of the slide is fully extended and locked before you push the drive in place.

| **Attention** If you do not have the inner section aligned in the ball-bearing retainers, you may damage the slides and they will have to be replaced. Do not force the drive to the front.

Note: Reteach the tape drive using the **Teach selected devices** option on the **Teach** pulldown if it is removed from the slides or if the load assembly is removed from the drive during service. This can be done while the library is operating in Auto mode if the drive is marked unavailable using the **Set tape subsystem availability** on the **Availability** pulldown.



| *Figure 144. 3490 F1A / 3590 Tape Drive Service Position (3590 shown)*

3490 Model F1A Tape Subsystem

See Figure 144 on page CARR-163.

1. When the tape drive is offline to the system, open the rear door of the frame containing the failing drive and locate the drive. **Ensure that you identify the correct tape drive since the library will continue to operate in automatic mode while you are servicing the drive.**
2. Remove the drive retaining screws **2** in the drive slides.
3. Pull the drive out the rear of the frame to the service position **1**. **Ensure that the cables are free as you pull it out, and that the slides are fully extended and locked.**

   Attention You must start from the fully extended and locked position when pushing the drive back into the frame; otherwise, the slides may be damaged..*:eattention.
4. Disconnect the control panel from the front of the tape drive and turn it so you can see the display from the side.

   See Figure 145 on page CARR-165.

   a. Remove 2 screws **2** holding the control panel **1** to the top cover.

   b. Turn the control panel **1** 90° and secure it with a screw **3**.
5. If you want to remove the drive from the slides to service it:

   a. Remove the rear door of the 3494 frame.

   b. Unplug the cables from the rear of the drive. **DO NOT** unplug the terminator or next drive cable from the back of the drive cable connector. The SCSI interface loop must be maintained in order for the customer to continue to use the other drives on the interface.

   c. Remove 3 screws holding the tape drive to the pan.

   d. With assistance, remove the drive.

   CAUTION:
   The tape drive weighs approximately 25 kilograms (55 pounds). It takes 2 persons to safely lift the tape drive and to re-install it.

Note: Reteach the tape drive using the **Teach selected devices** option on the **Teach** pulldown if it is removed from the slides or if the load assembly is removed from the drive during service. This can be done while the library is operating in Auto mode if the drive is marked unavailable using the **Set tape subsystem availability** on the **Availability** pulldown.

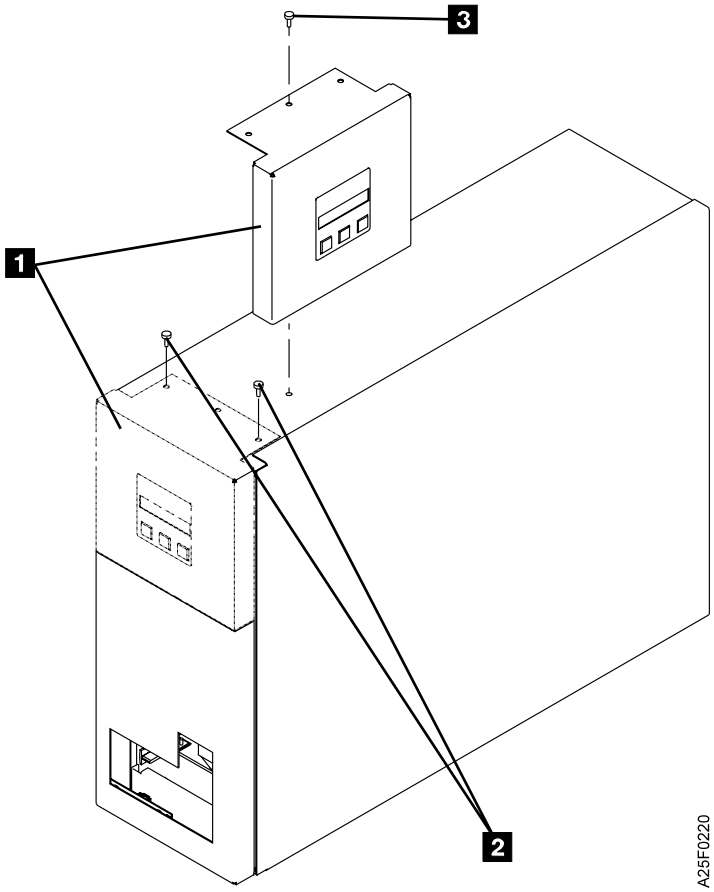


Figure 145. 3490 Model F1A Control Panel Service Position

Working with ESD-Sensitive Parts

Observe the following instructions to prevent damage when you work with electrostatic discharge (ESD) sensitive parts. These instructions are in addition to all the usual precautions:

- Leave ESD-sensitive parts in the special ESD bag until you are ready to immediately install them into the machine.
- Before touching the ESD-sensitive part, put on the ESD grounding wrist strap **1** on either wrist. See Figure 146. This strap has a high-resistance (1-megohm) resistor in series with the grounding clip **2**, so there is no danger to you. The ESD grounding wrist strap discharges the static electricity from your body. Connect the clip to the ground strap of the control unit frame or the library manager. Keep the strap on while you are inserting or removing a logic card or handling any ESD-sensitive part.

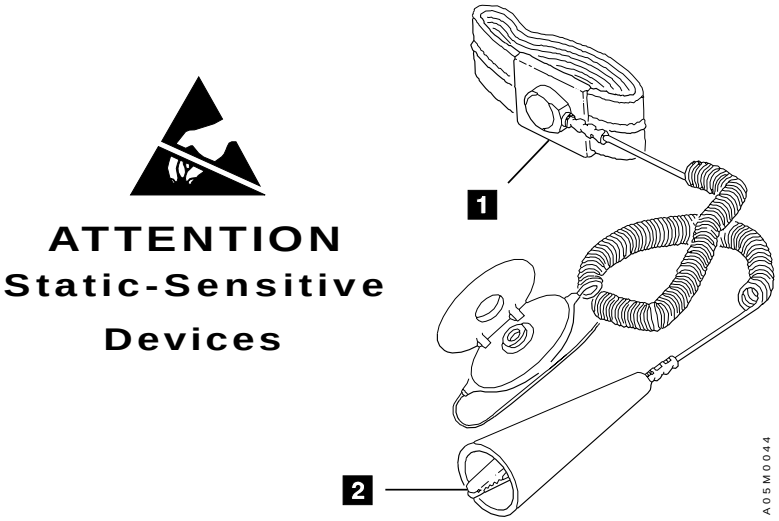


Figure 146. ESD Grounding Wrist Strap

- Do not place the ESD-sensitive part on the machine cover or on a metal table. If you need to put down the ESD-sensitive part for any reason, first put it into its special bag. (Large metal objects can be discharge paths without being grounded.)
- Prevent ESD-sensitive parts from being touched by other people, such as service representatives or customers. Reinstall all covers when you are not working on the machine.
- If possible, keep all ESD-sensitive parts in a grounded metal cabinet (case).
- In cold weather, be extra careful when working with ESD-sensitive parts. Heating of cold air decreases the relative humidity which increases static electricity.

CAUTION:
When wearing the ESD grounding wrist strap, ensure that the ground strap remains connected. Failure to keep the ground strap connected creates a safety exposure when working on live exposed electrical circuits. (C03)

Use the most current IBM part number available for the ESD grounding strap.

Power

AC and DC Power

The control unit frame and each drive unit frame contains an AC power control compartment (PCC) that requires 220V ±10% single-phase AC power. The customer provides AC power to the control unit frame and each drive unit frame.

The Rack Power Ready indicator on the operator panel is lit when the Unit Power switch is set to Power On.

Note: Rack power refers to the AC power in the control unit frame.

When the AC power sequence is complete to all frames, the System Power Ready indicator is lit.

Note: When switching power off, always wait at least 30 seconds before switching power back on. Otherwise, the 3490E tape subsystem will not complete the IML process.

Figure 147 shows the 3494 grounding circuit. For example, the PCC is physically grounded to the frame with a green wire with a yellow stripe.

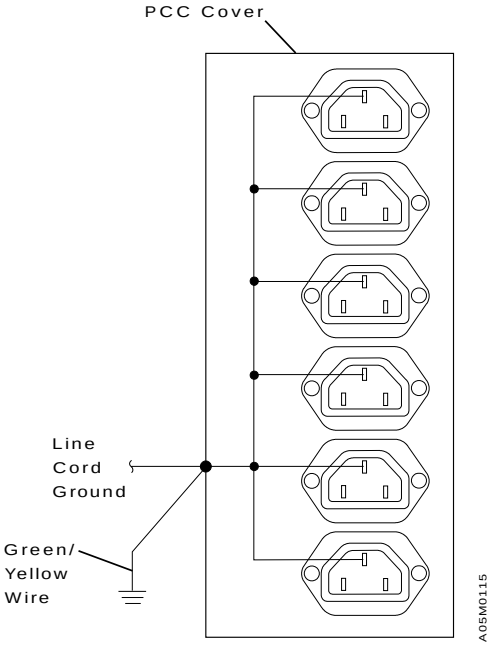


Figure 147. Grounding Circuit

Power distribution and control in the 3494 varies depending on the card set used in the library. The initial 3494 libraries used the MIC1/LCC card set. In later libraries, this card set was replaced by the MIC2-4/LPC card set. Separate diagrams are provided in this section where necessary.

You can identify the card set in your library as follows:

- In the MIC1/LCC configuration, the LCC card is mounted to the left of the MIC1 card and plugs into a connector on the lower left side of the MIC1 card.
- In the MIC2-4/LPC configuration, the LPC card is mounted below the MIC card and plugs into a connector on the bottom of the MIC card.

AC and DC Power Distribution Overview

220V AC ±10% is distributed by the Power Control Compartment (PCC) in each 3494 control unit and drive unit frame. Each PCC provides 10 220V AC outlets for use by the 3494 components. The stage 2 PCC used in the AS/400 9406 rack is used by the 3494.

The output of the PCC is controlled by the Unit Emergency and Unit Power switches on the 3494 Operator Panel, along with the Local/Remote switch if the AS/400 Remote Power Sequence feature is installed. When local or remote control is On and both power switches are set to the On position, 220V AC is immediately available at control unit PCC outlets J1 - J5 and after 2 seconds at outlets J6 - J10.

In a multiple frame library, the control unit frame is the primary rack. A power sequencing cable between each PCC and the next PCC in the library allows each frame to power up sequentially starting with the control unit frame. There is a delay of approximately 15 seconds before the next PCC in the library powers up. In a library with 3 drive units, it will take approximately 45 seconds for all of the frames to bring up AC power.

In a dual accessor library, an SEQ card is inserted across each expansion frame PCC to allow concurrent maintenance of the PCC. This card is not shown in the following diagrams. Refer to Figure 162 on page POWER-17 for the SEQ card connections.

In the control unit frame, the outlets are assigned as follows:

J3 Tape subsystem
J8 24V power supply
J9 36V power supply
J10 Library manager

Figure 148 on page POWER-4 and Figure 149 on page POWER-4 show the ac and dc power distribution for the 3494.

ac Alternating current lines
AC line cord Customer-supplied single-phase ac power; also known as mainline power cable
P9 +24 V dc power-on sequence voltage from host (AS/400 or 9309)
P13 Unit emergency +24 V dc generated in the power control compartment (PCC)
P17 +24 V dc local power-on sequence voltage
P18 Power sequence voltage

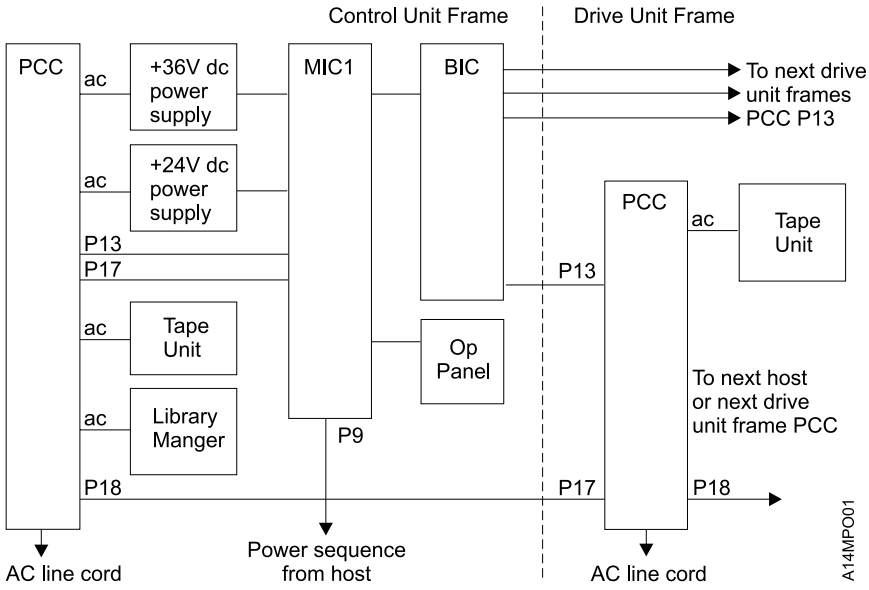


Figure 148. AC and DC Power Distribution Overview with MIC1/LCC Card Set

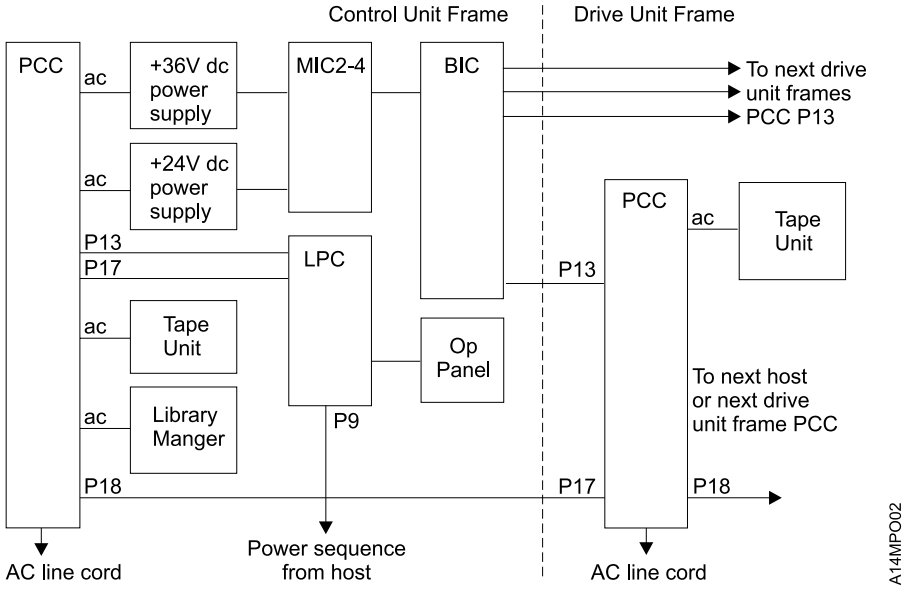


Figure 149. AC and DC Power Distribution Overview with MIC2-4/LPC Card Set

DC Voltage Distribution Overview

The DC power supplies are designed to shut off (crowbar) for protection when excessive current is being drawn because of a short somewhere in the load on the supply or an overload caused by binding in the system. They will reset automatically after AC power is off to them for 20 seconds.

If the 36 volts drops at the power supply, a field effect transistor (FET) located in the DC power cable will shut-off 24V to the MIC card to protect the machine.

Figure 150 on page POWER-5 shows an overview of the dc voltage distribution in the control unit frame. It shows how the +36 and +24 dc voltages are generated. It also shows how the +36 voltage allows the machine interface control (MIC) card to generate 3 additional dc voltages. See “24-Volt Distribution Overview” on page POWER-7 for the output of the MIC card.

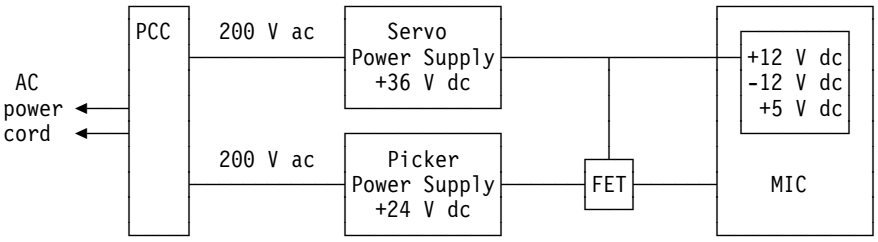


Figure 150. DC Voltage Distribution Overview

36-Volt Distribution Overview: Figure 151 and Figure 152 on page POWER-6 shows the distribution of +36 volts in the control unit frame. The ±12 volts for the bar-code reader and the +5 volts for the MIC and LPN card logic is generated on the MIC card. The +5 volts for the picker cards and bar-code reader is generated on the GRI card (Picker). See the CABLE section for connector and pin numbers.

Note: +5V servo tach for the X and Y motors is supplied from the SRV card (Servo Control) in the library manager.

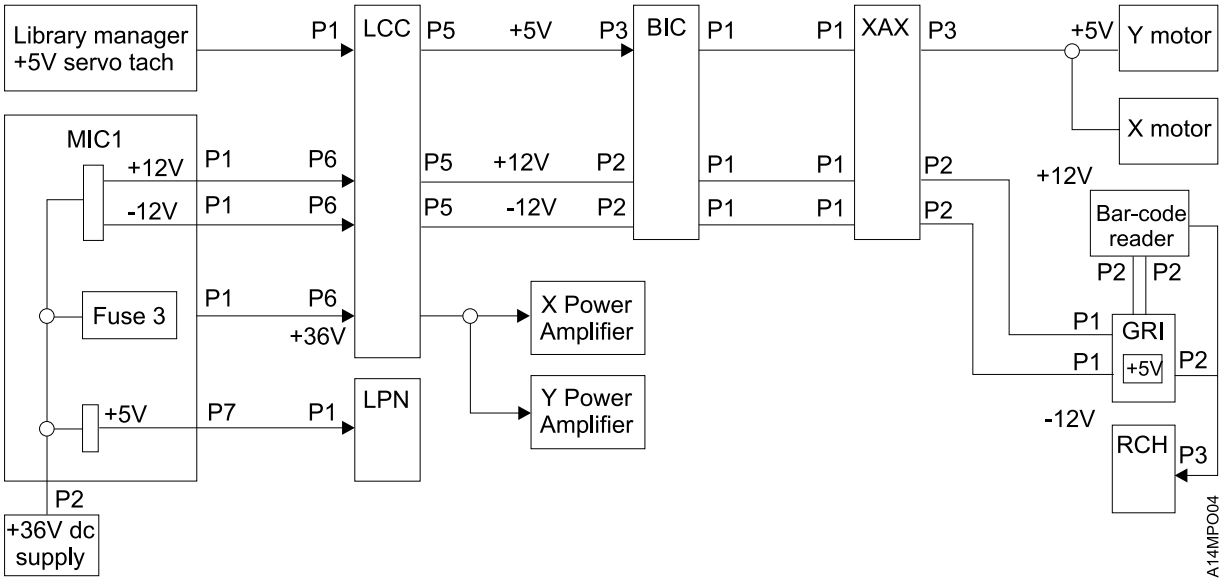


Figure 151. 36-Volt Distribution with MIC1/LCC Card Set

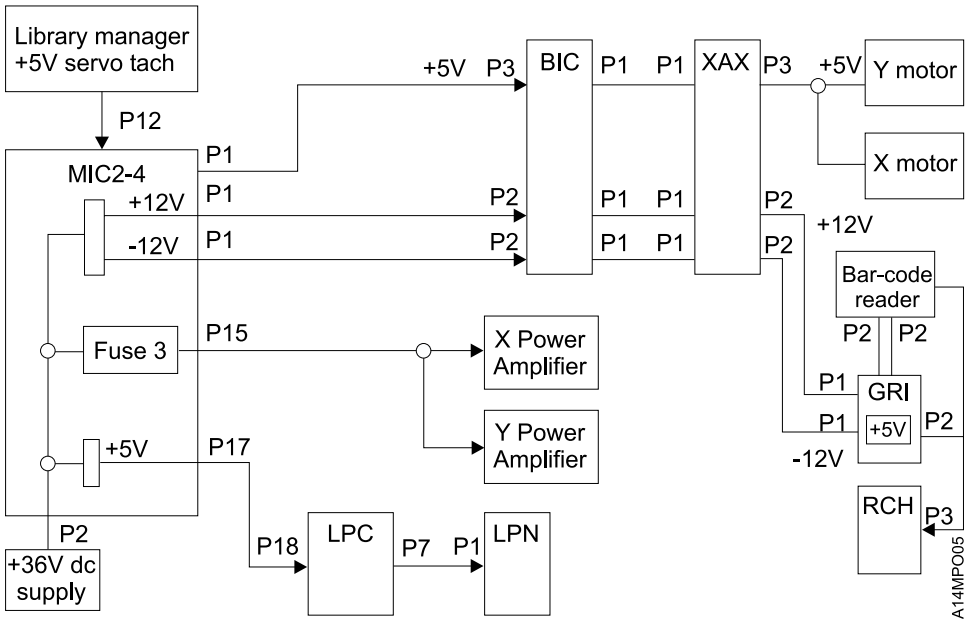


Figure 152. 36-Volt Distribution with MIC2-4/LPC Card Set

24-Volt Distribution Overview: Figure 153 and Figure 154 on page POWER-8 shows the distribution of 24 volts in the control unit frame. There are two +24V power circuits, 24V power control and 24V accessor power. The +24V power control (UEPO) is generated by the PCC. The +24V accessor power is generated by the +24V power supply.

See the CABLE section for connector and pin numbers.

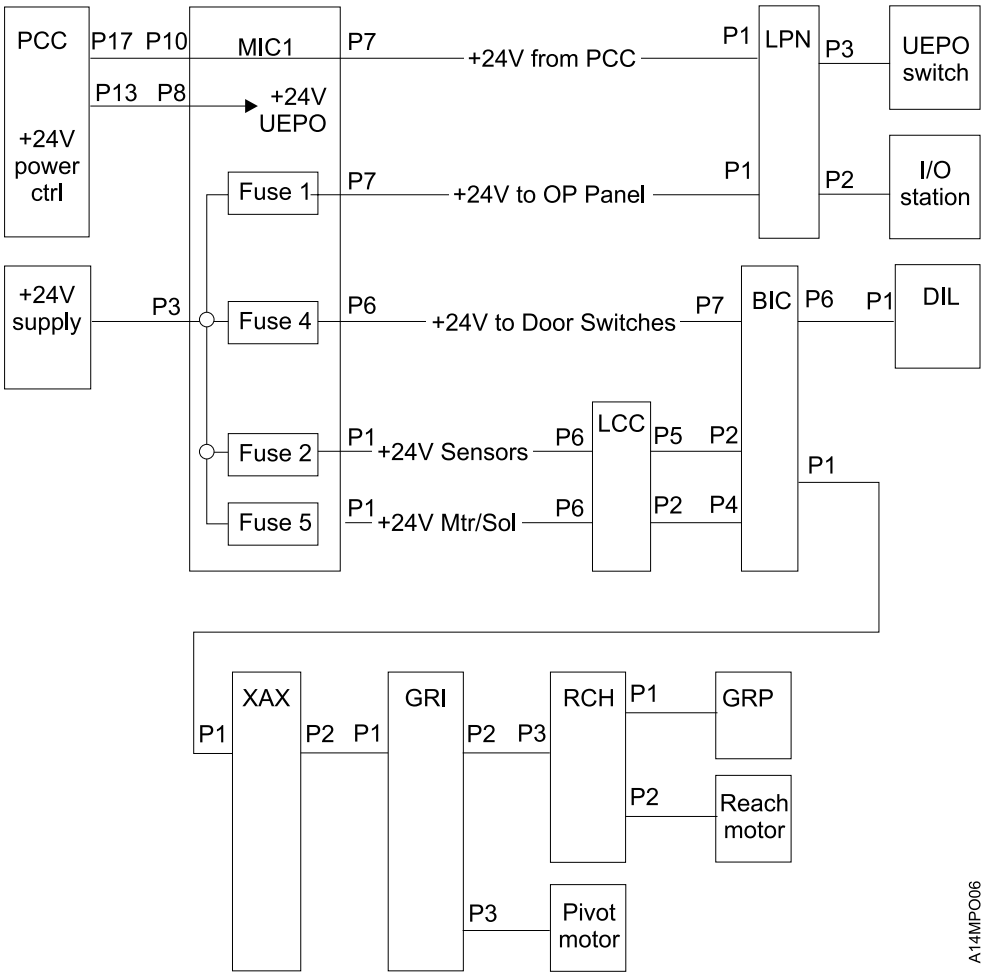


Figure 153. +24 Volt Distribution with MIC1/LCC Card Set

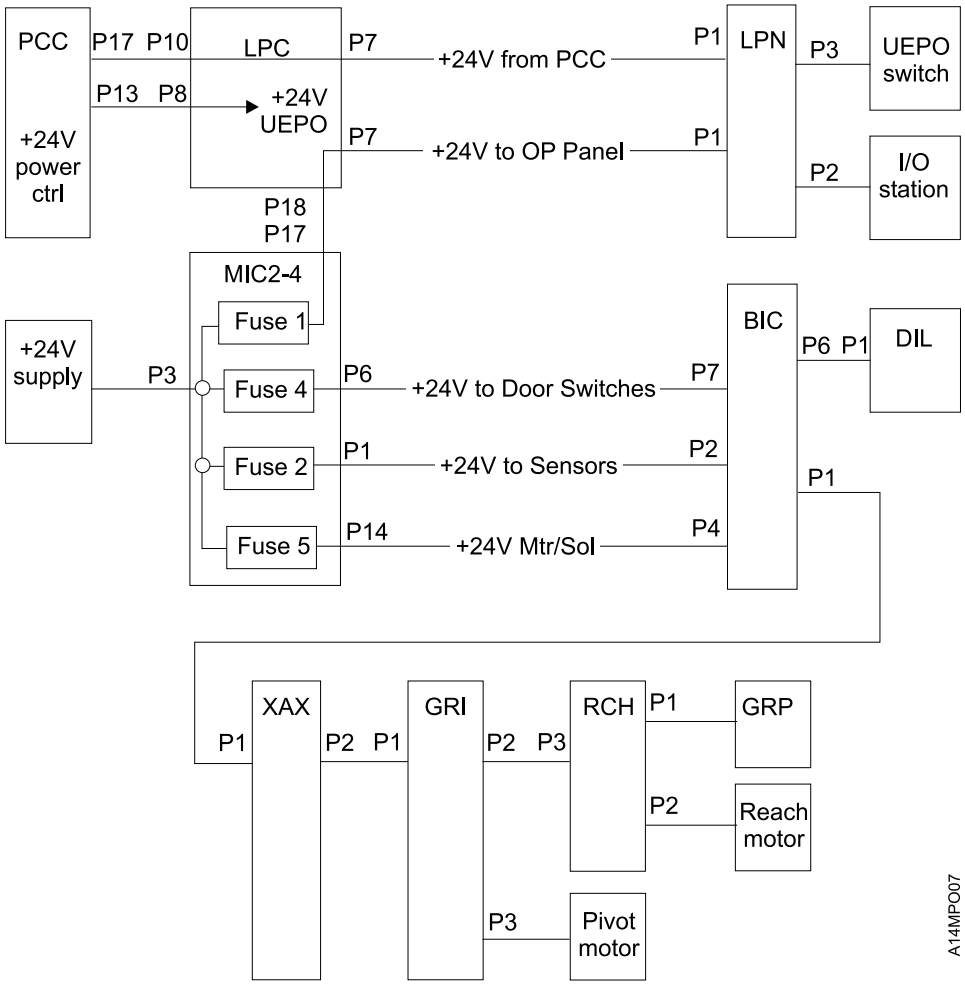


Figure 154. +24 Volt Distribution with MIC2-4/LPC Card Set

Single Accessor Local/Remote Power and UEPO Controls

Remote power sequencing is only supported for AS/400 processors.

Figure 155 on page POWER-10 shows the power sequencing controls for the 3494. When the Local/Remote switch **1** is in the Remote position, the first AS/400 that powers on also causes the 3494 to power on. The last AS/400 to power off causes the 3494 to power off. When the Local/Remote switch is in the Local position, power is controlled by the Unit Power switch on the operator panel.

When the 3494 is attached to hosts, the RPC (remote power control) card is installed and cable **4** is connected to P9.

Local and Remote Power-On Operation

1. When attached to more than one host, the +24 V dc power-sequencing signal from P18 in the host goes through the RPC card and enters the MIC card at P9.

   For local power-on conditions, the +24 V dc is generated in the PCC (P17).
2. The +24 V dc signal from the MIC1 or LPC card at P7 enters the operator panel at P1.
3. The signal goes through the Local/Remote switch and returns to the MIC1 or LPC card at P7.
4. The signal from the MIC1 or LPC card at P5 goes to the DI/DO card **5** (via the MIC2-4 card if from the LPC card) in the library manager.
5. The library manager has the cartridge accessor finish the current operation and does a code **shutdown**. When the shutdown completes, it sends the signal from the DI/DO card to the MIC1 or LPC card at P5 (via the MIC2-4 card if to the LPC card).
6. The signal from the MIC1 or LPC card at P10 enters the PCC at P17 to turn the PCC off.

   When the control unit frame powers off, the signal from the PCC at P18 will turn the next drive unit frame off and the process continues until all drive unit frames are powered off.

   Note: It can take up to 10 seconds to power off each frame.

Unit Emergency Power Off (UEPO) Operation

The Operator Panel Unit Emergency switch **2** in Figure 155 on page POWER-10 immediately shuts power down in the control unit frame and all attached drive unit and virtual tape server frames. If the library has more than 8 frames, two Unit Emergency switches are provided, one on the Operator Panel at the left end and one at the right end of the library. If the library has two switches, either switch will immediately shut power down in all frames.

Note: +24 v dc is still present on the MIC1 or LPC card and the PCC when the Unit Emergency switch is set to Power Off.

1. When the Unit Emergency switch or the Remote Unit Emergency switch (if installed) is set to Off, the signal at the operator panel P1 enters the MIC1 or LPC card at P7.
2. The signal from the MIC1 or LPC card P6 enters the bulkhead interconnect card (BIC) **3**. The output of the BIC turns off the PCC in all attached drive unit frames. The signal at MIC1 or LPC card P8 enters the PCC at P13 to turn the control unit frame PCC off.
3. If the library has 9-16 frames, the BIC turns off the PCC in frames 2-7 and passes the signal to the SPC card. The SPC card turns off the PCC in frames 8-16.

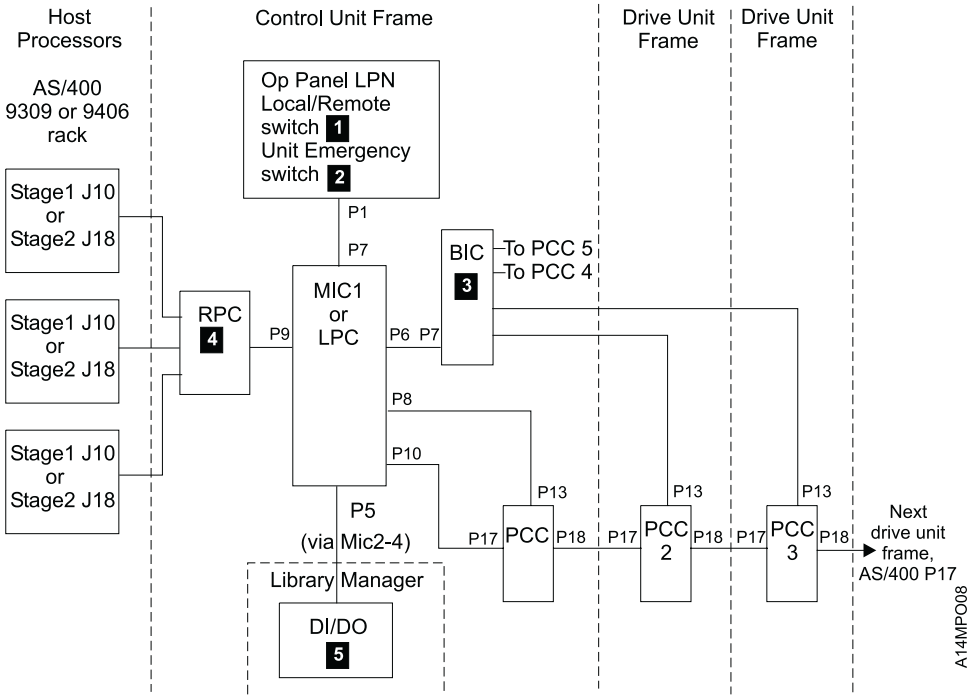


Figure 155. Local/Remote Power and UEPO Controls, 1-8 Frame Library

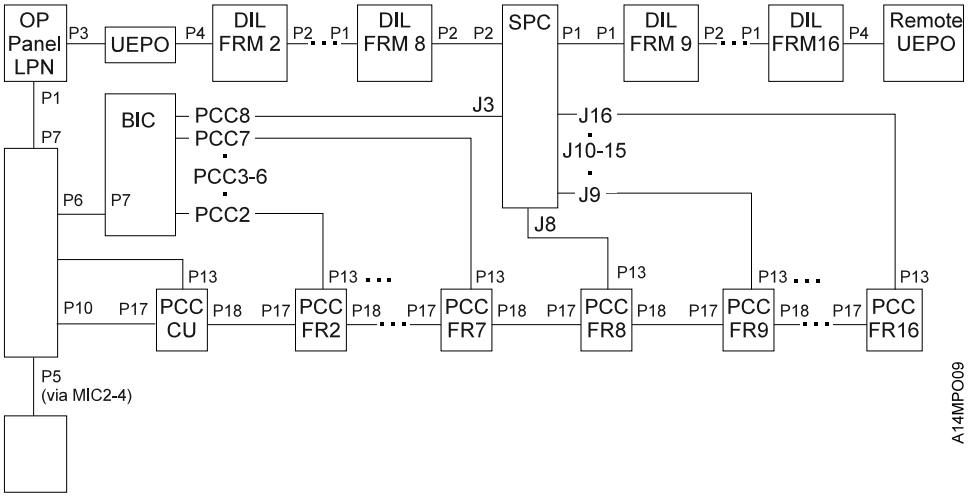


Figure 156. Local Power and UEPO Controls, 9-16 Frame Library

Local Power, Control Unit Frame

Figure 157 shows the +24 V dc circuits for the control unit frame when the Local/Remote switch is in the Local position. Notice the two sources of +24 V dc from the PCC. Also notice the two sets of contacts on the Local switch. See the CABLE section for the connector pin numbers.

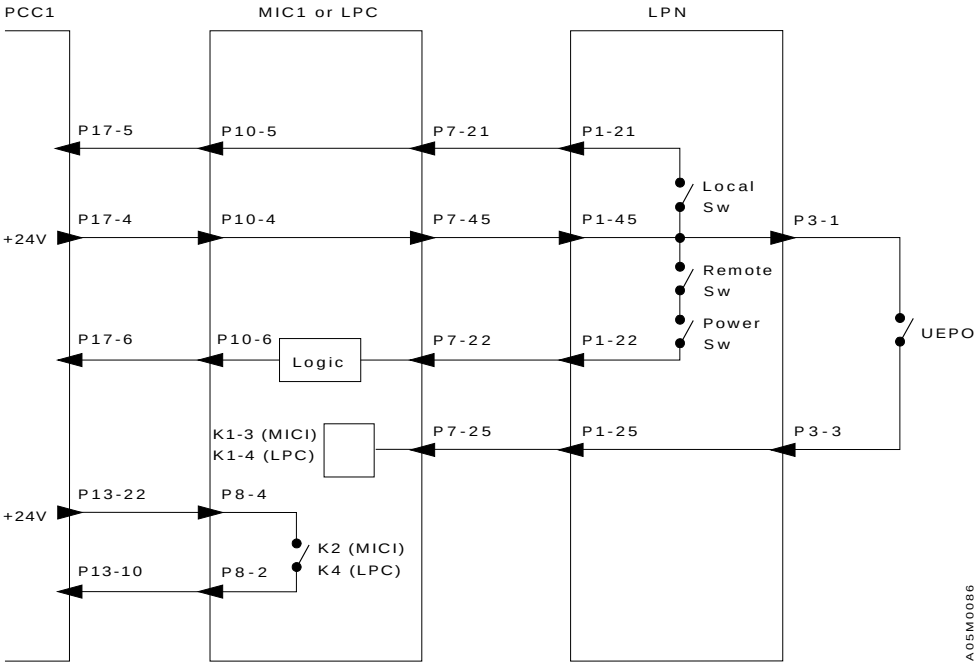


Figure 157. Local Power

Remote Power, Control Unit Frame

Figure 158 shows the +24 V dc circuits for the control unit frame when the Local/Remote switch is in the Remote position. See the CABLE section for the connector pin numbers.

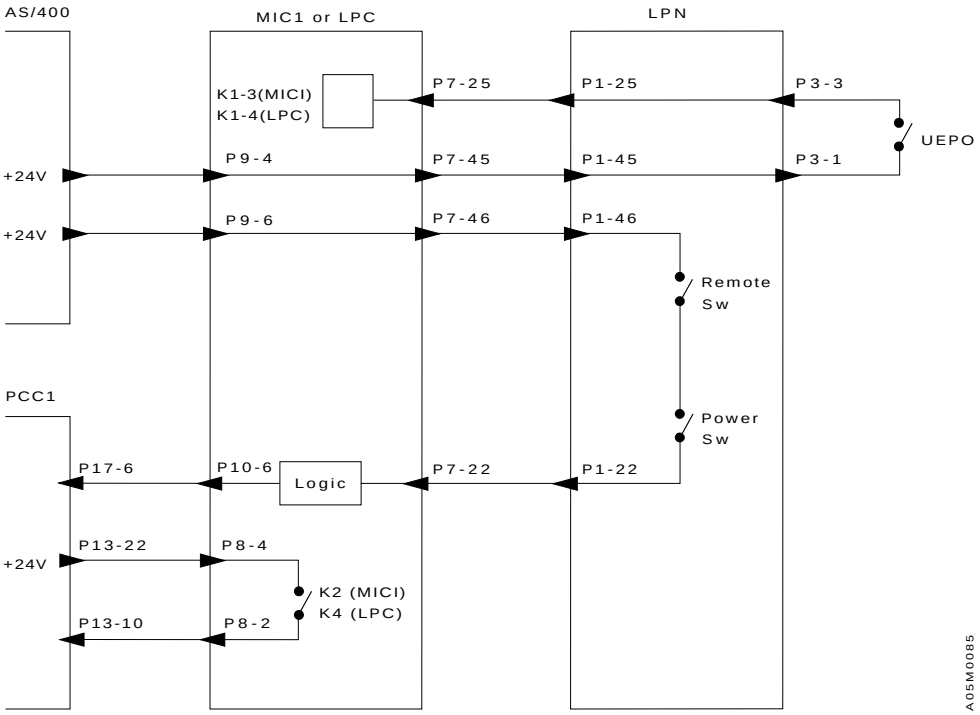


Figure 158. Remote Power

Dual Accessor Power

A **Local/Remote** power switch is provided on the library Operator Panel located on the front of the 3494 Model L1x frame. Remote power sequencing is an optional feature that is only supported for AS/400 processors. When the switch is in the **Remote** position and the feature is installed, the first AS/400 to power on will also cause the 3494 to power on, and the last AS/400 to power off causes the 3494 to power off. When the switch is in the **Local** position, power is controlled by the **Unit Power** switch on the operator panel.

Two **Unit Emergency** switches are provided, one at the left end of the library on the Operator Panel and one at the right end of the library on the front panel of the Right Service Bay. Either switch immediately shuts power down in all of the attached frames.

The following diagrams are AC power, UEPO, and safety circuits for the dual accessor feature.

Dual Accessor UEPO Circuit

By pressing either UEPO Switch **1** on the front panel of the library will cause relays K1 through K9 **2** on the UEP2 card to drop. This will open the 24 volt power on lines to all PCCs, which in turn will drop power to all PCCs and shutdown the library.

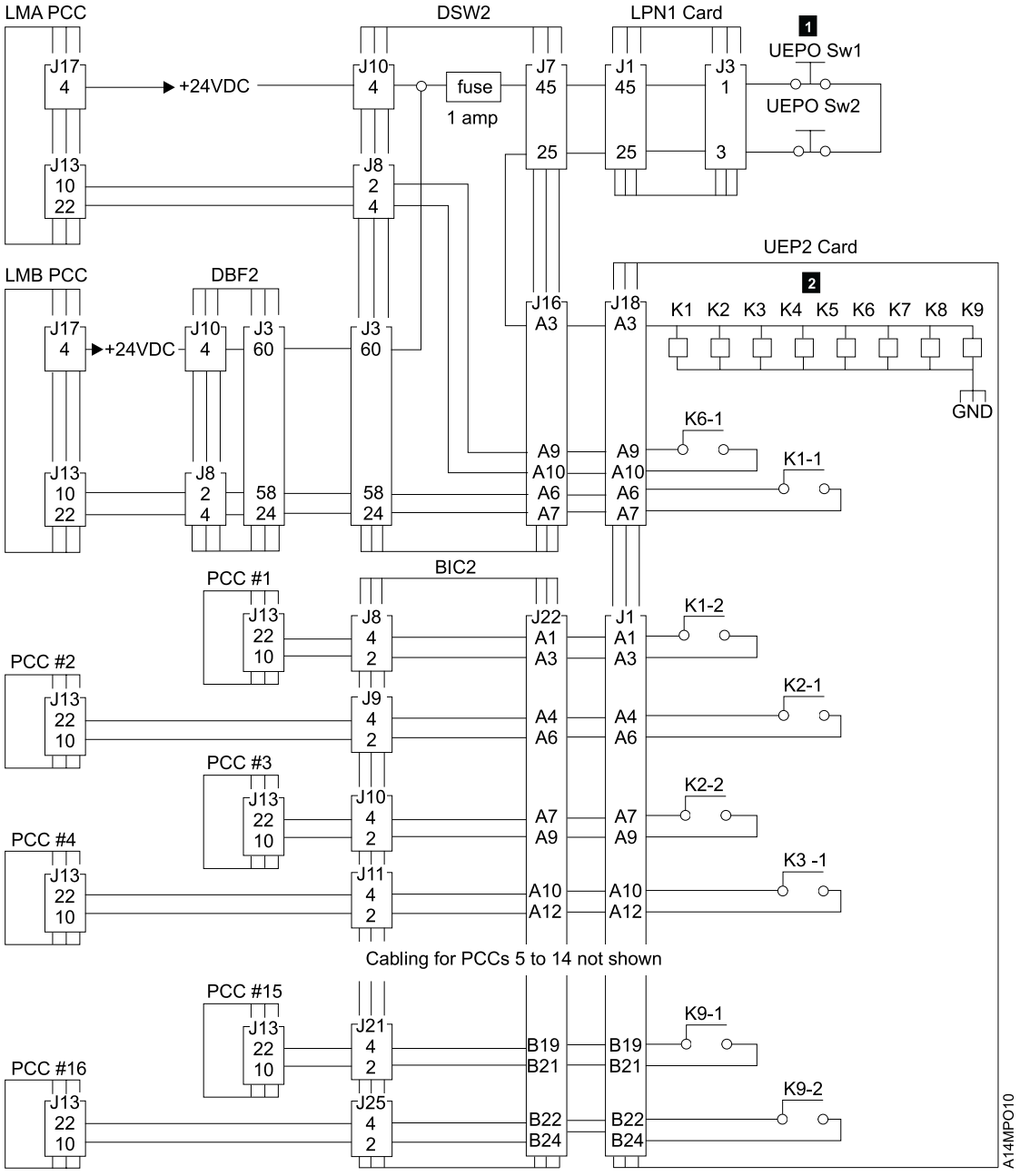


Figure 159. Dual Accessor UEPO Circuit

Dual Accessor Safety Circuits

The following figure is the safety circuit diagram of a dual accessor machine in normal operating mode. Follow the arrows starting at **A** and ending at **B**. The following conditions are assumed:

LMA and accessor A active
Accessor B in service bay (RL16 picked)
All service bay doors closed (RL14 picked)

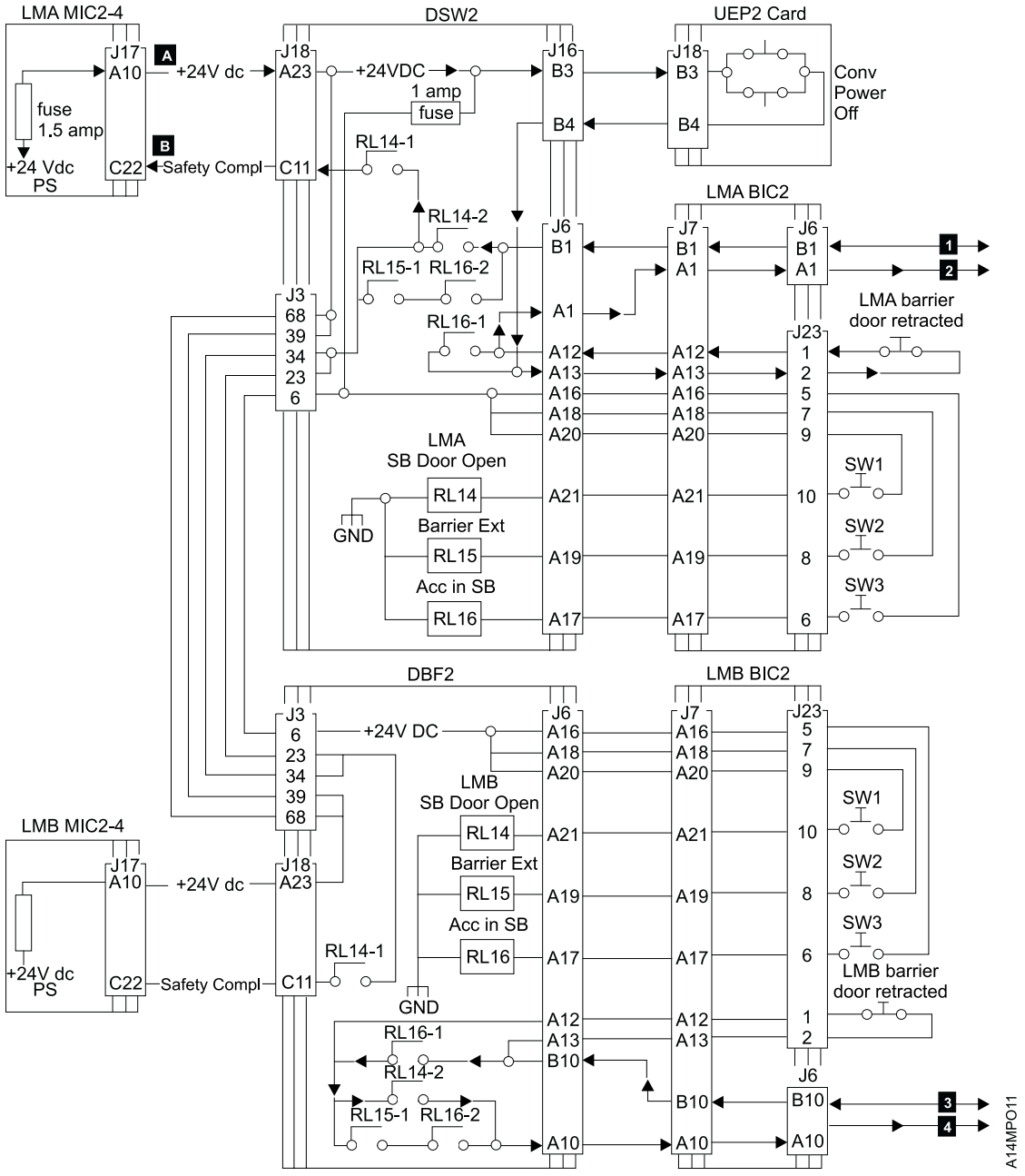


Figure 160 (Part 1 of 2). Dual Accessor Safety Circuits

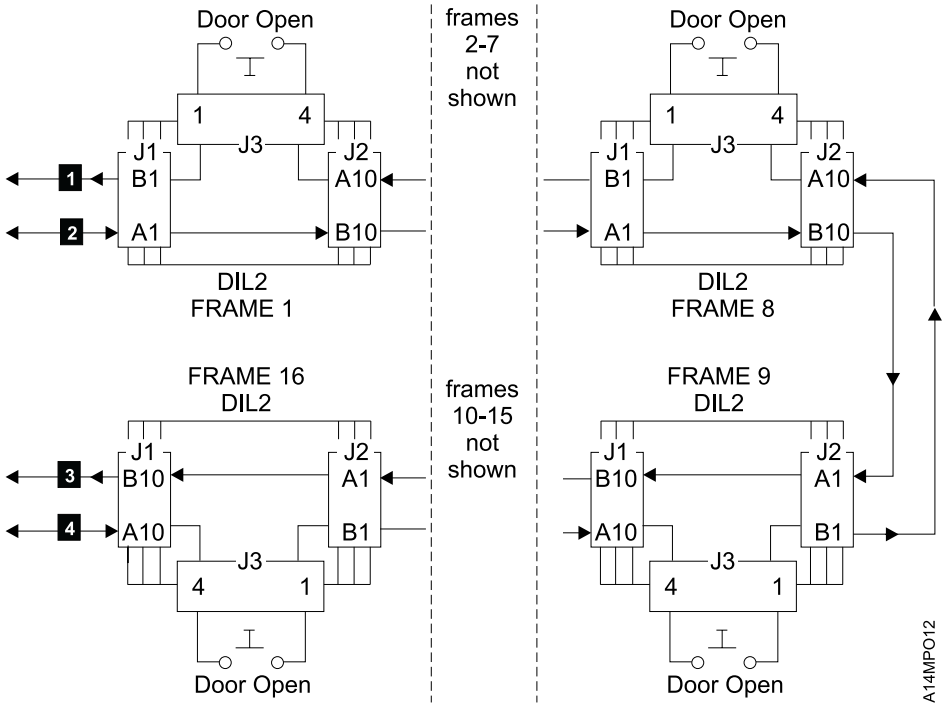


Figure 160 (Part 2 of 2). Dual Accessor Safety Circuits

Dual Accessor AC Power Controls and Power Sequencing

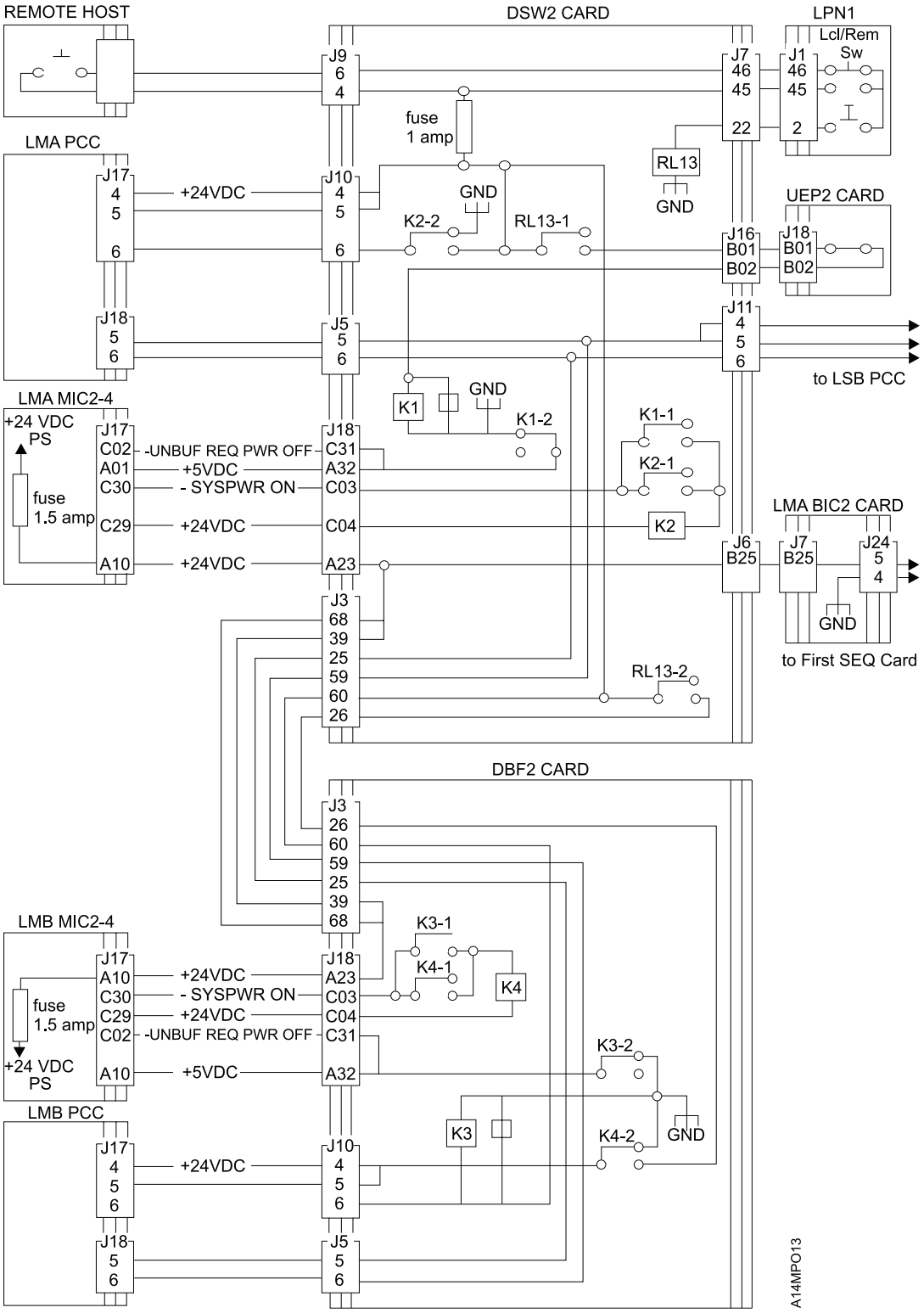


Figure 161. Dual Accessor AC Power Controls and Power Sequencing.

Dual Accessor Expansion Frame Power Sequencing

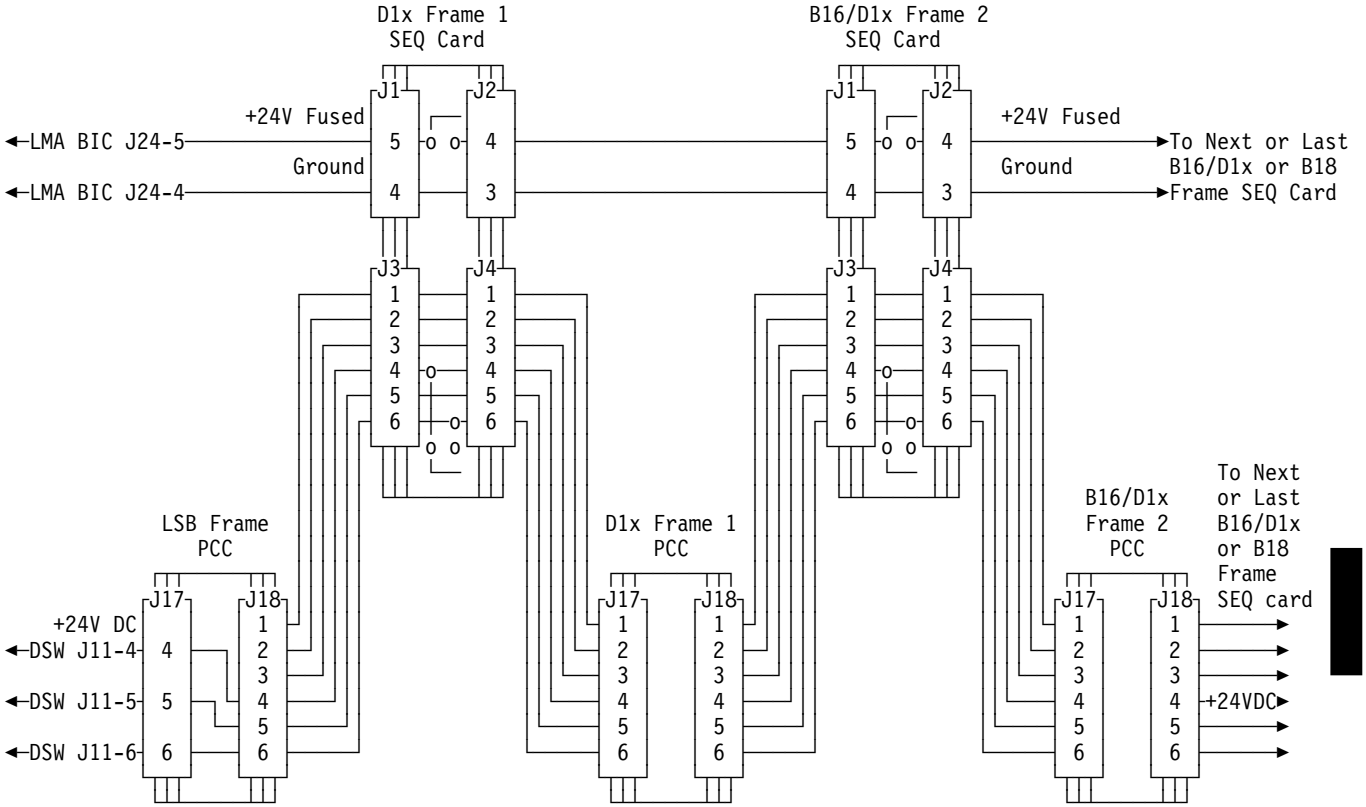


Figure 162. Dual Accessor Expansion Frame Power Sequencing.

Cable Diagrams

Identifying the Library Control Card Set

The initial 3494 libraries used the MIC1/LCC card set. In later libraries, this card set was replaced by the MIC2/LPC2 card set which was modified to MIC3/LPC3 to support the 9-16 frame libraries and then to MIC4/LPC3 to support dual accessors The library control cards are located behind the rear door of the control unit frame on the wall behind the library manager system unit. You can identify the card set in your library as follows:

- In the MIC1/LCC configuration, the LCC card is mounted to the left of the MIC1 card and plugs into a connector on the lower left side of the MIC1 card.
- In the MIC2-4/LPC configuration, the LPC card is mounted below the MIC2-4 card and plugs into a connector on the bottom of the MIC2-4 card.

Description of Abbreviations

Figure 163. Description of Abbreviations in Cable Section

Acronym	Description
A/P	Auto/Pause
BIC	Bulkhead Interconnect Card
CCW	Counter-clockwise
CW	Clockwise
DBF	Dual B Frame Card
DI/DO	Digital Input/Digital Output Card
DIL	Door Interlock Card
DSW	Dual Switch Card
EMO	Emergency Motion Off
GRI	Picker Card
GRP	Grip Card and Cable Assembly
LCC	Library Interconnect Card
LED	Light Emitting Diode
LMA	Library Manager A
LMB	Library Manager B
LPC2,3	Library Power Control Card 2 or 3
LPN	Operator Panel Card
LWR	Loop Write/Read
MIC1	Machine Interface Card 1
MIC2-4	Machine Interface Card 2-4
PB	Push Button
PCC	Power Control Compartment
RCH	Reach Card
RCX	Reach Card (dual gripper)
RPC	Remote Power Control Card
SIAL	System in Auto Latch
SIPL	System in Pause Latch
SRV	Servo Control Card
UEPO	Unit Emergency Power Off
UEP	Unit Emergency Power Card
XAX	X/Y-Axis Control Card

Cable Diagrams with MIC1/LCC Card Set

To find the pin-to-pin connections for each cable, see Figure 164 for the page number and Figure 165 on page CABLE-5 for the source and destination of the cables.

Figure 164. Cable Key to Page Number Cross-Reference

Cable Key	Page Number	Page Number	Page Number	Page Number
1	CABLE-18			
2	CABLE-18			
3	CABLE-18			
4	CABLE-7			
5	CABLE-9	CABLE-10	CABLE-16	CABLE-17
6	CABLE-9	CABLE-10	CABLE-16	
7	CABLE-7			
8	CABLE-7			
9	CABLE-7	CABLE-11		
10	CABLE-7	CABLE-11		
11	CABLE-9	CABLE-10		
12	CABLE-10			
13	CABLE-9			
14	CABLE-9			
15	CABLE-15			
16	CABLE-17			
17	CABLE-16			
18	CABLE-15			
19	CABLE-8	CABLE-11		
20	CABLE-8			
21	CABLE-17			
22	CABLE-19			
23	CABLE-16			
24	CABLE-16			
25	CABLE-16			
26	CABLE-12			
27	CABLE-13			
28	CABLE-12			
29	CABLE-13	CABLE-14		
30	CABLE-13	CABLE-14		
31	CABLE-15			
32	CABLE-19			
33	CABLE-13			
34	CABLE-12			

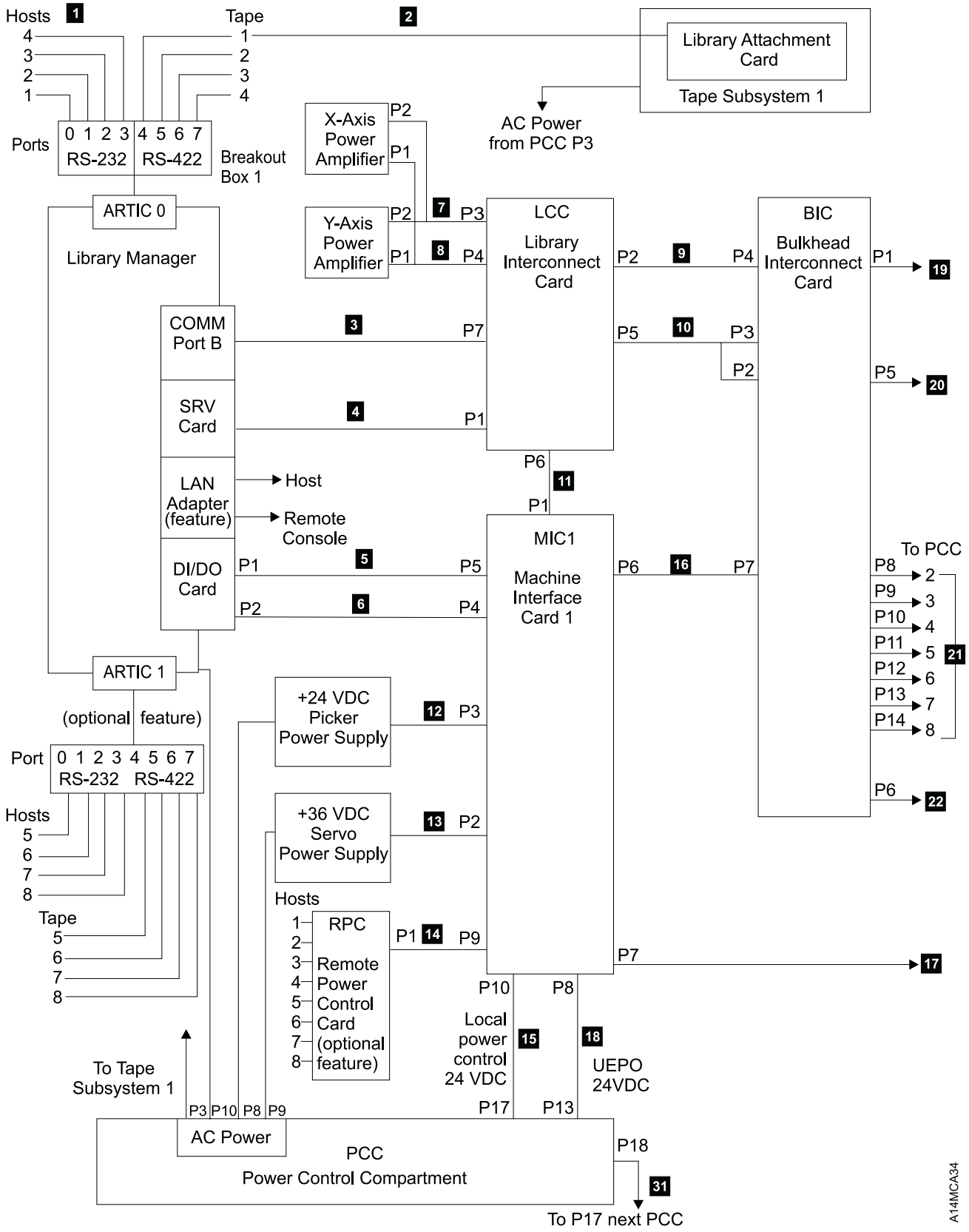


Figure 165 (Part 1 of 2). Cable Diagram with MIC1/LCC Card Set

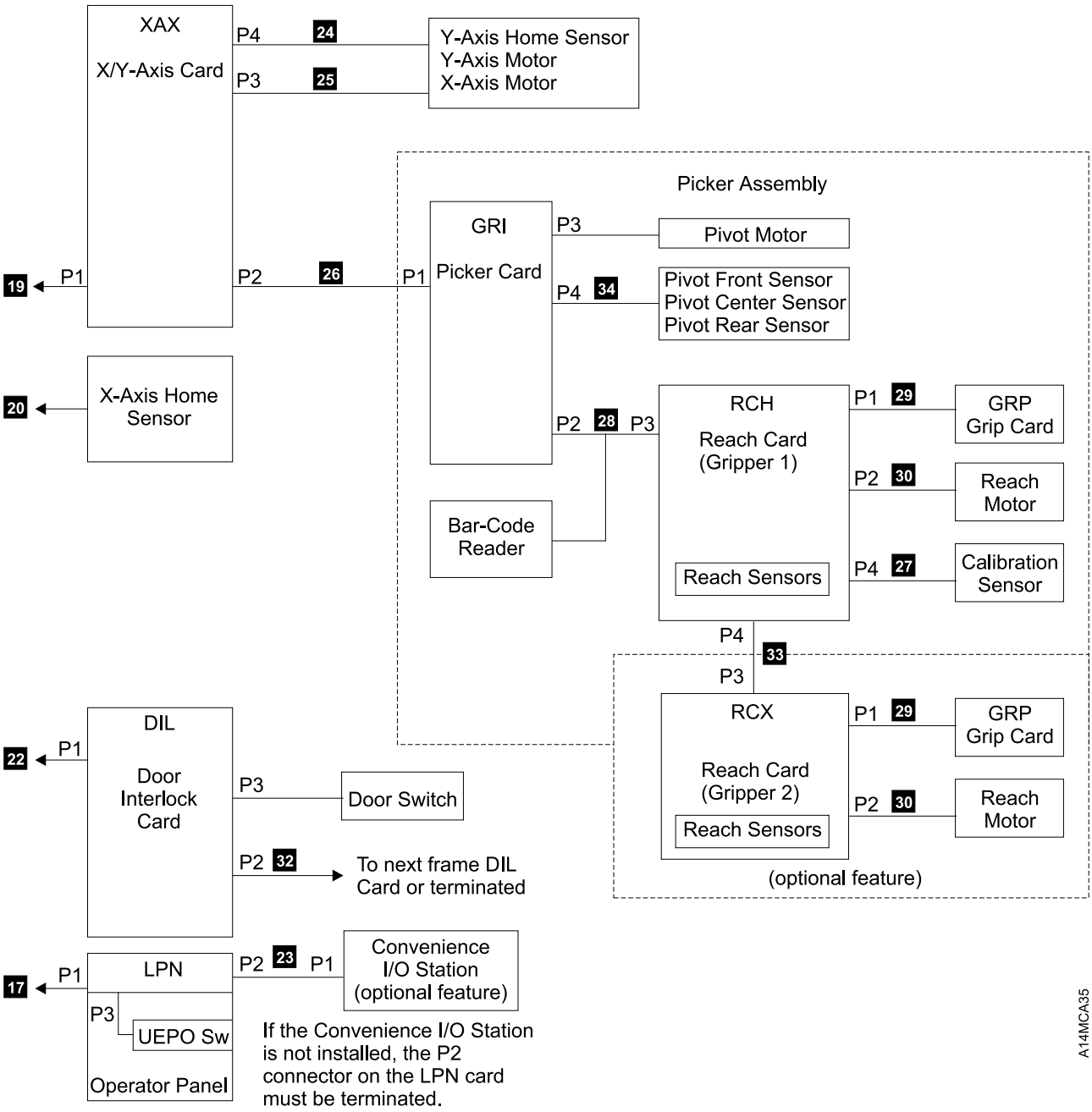


Figure 165 (Part 2 of 2). Cable Diagram with MIC1/LCC Card Set

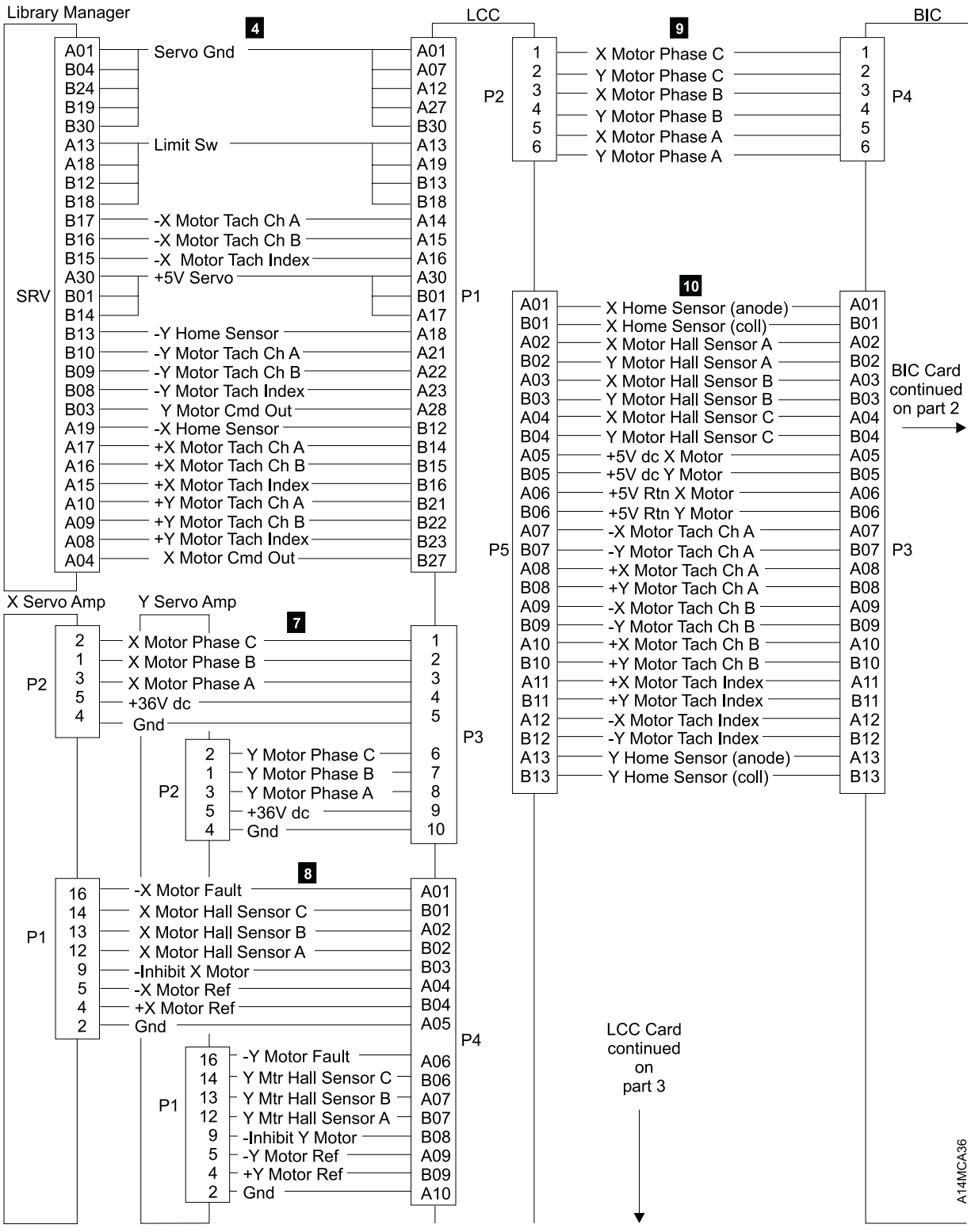


Figure 166 (Part 1 of 3). X/Y-Axis Motor Wiring Diagram with MIC1/LCC Card Set

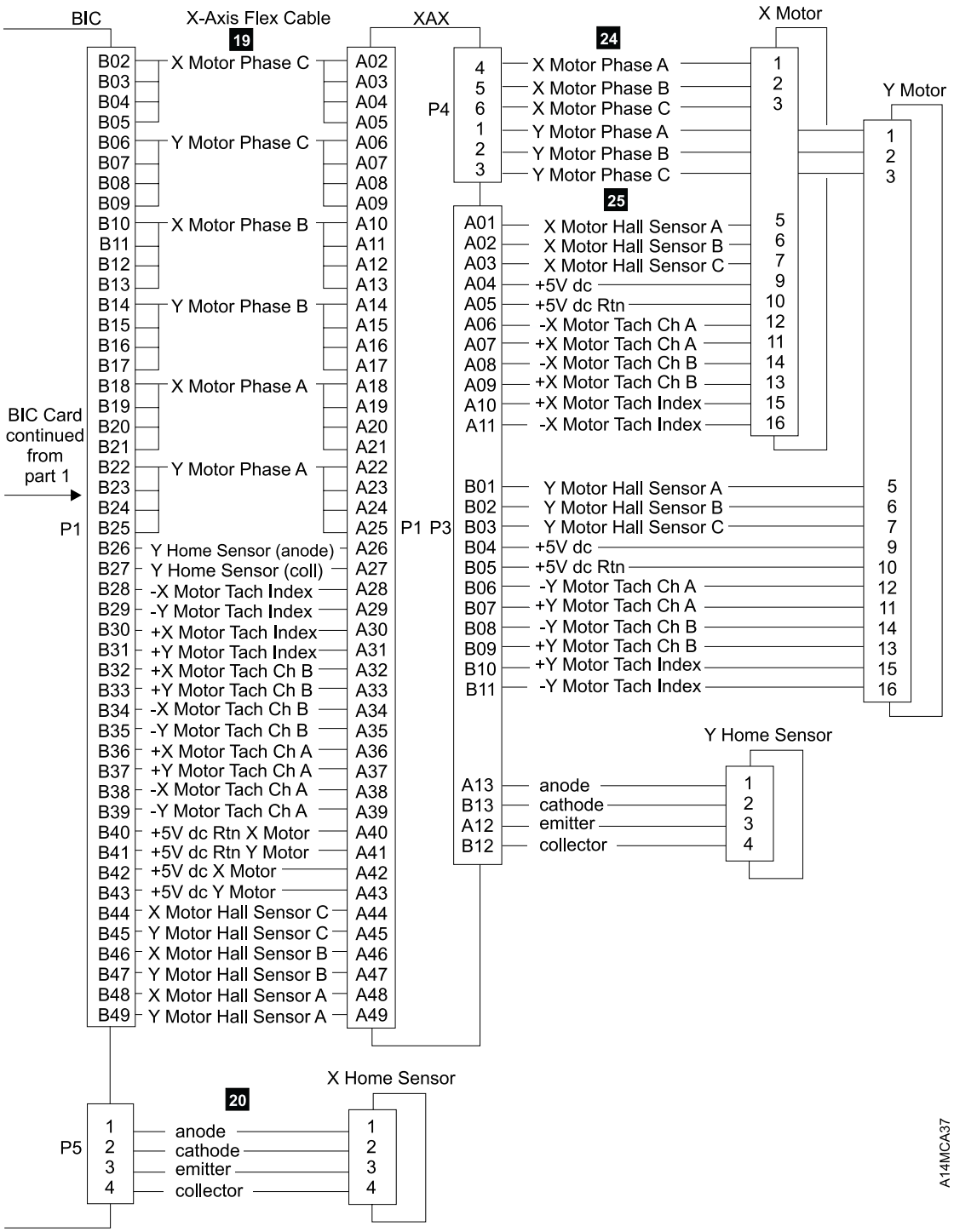


Figure 166 (Part 2 of 3). X/Y-Axis Motor Wiring Diagram with MIC1/LCC Card Set

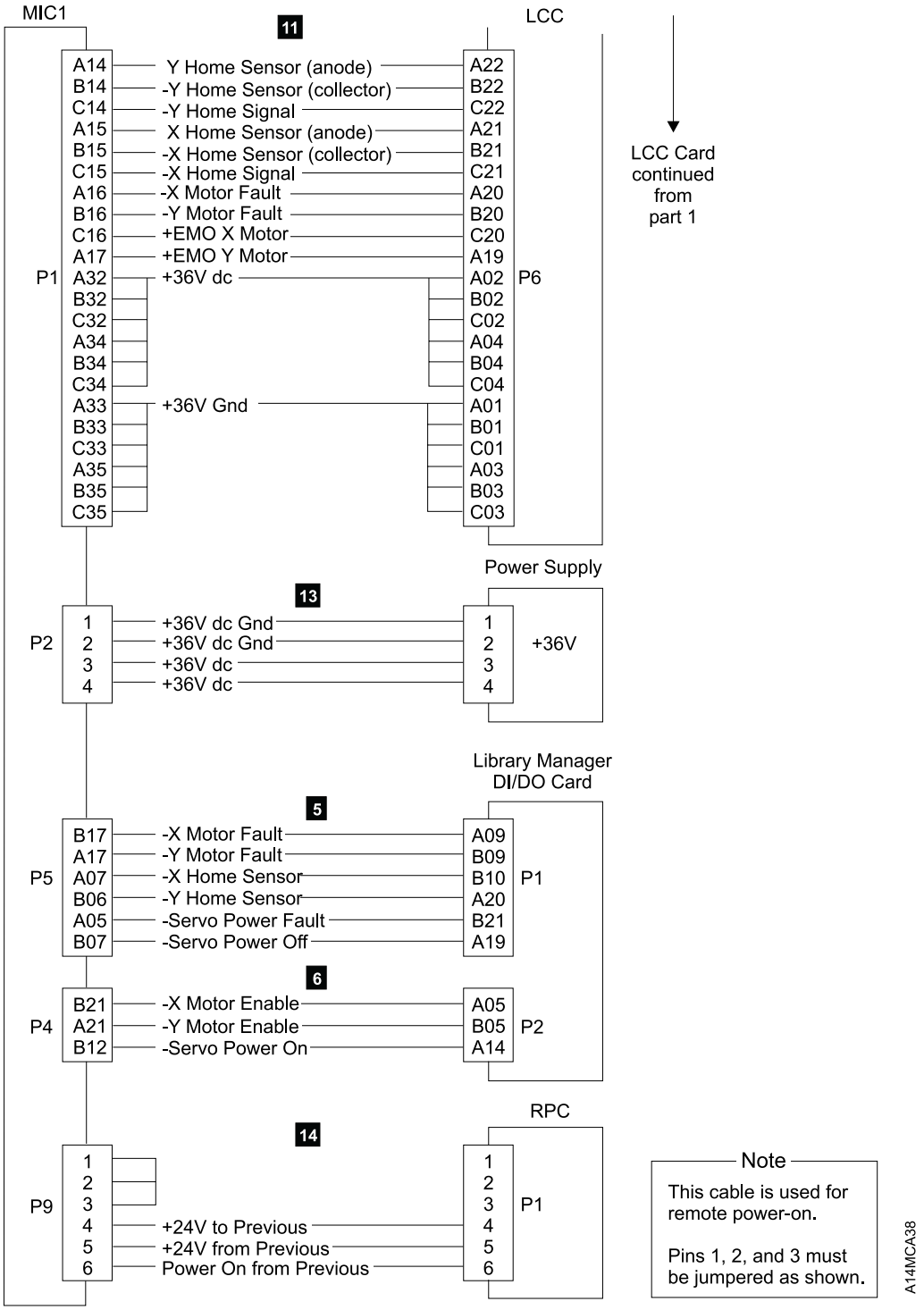


Figure 166 (Part 3 of 3). X/Y-Axis Motor Wiring Diagram with MIC1/LCC Card Set

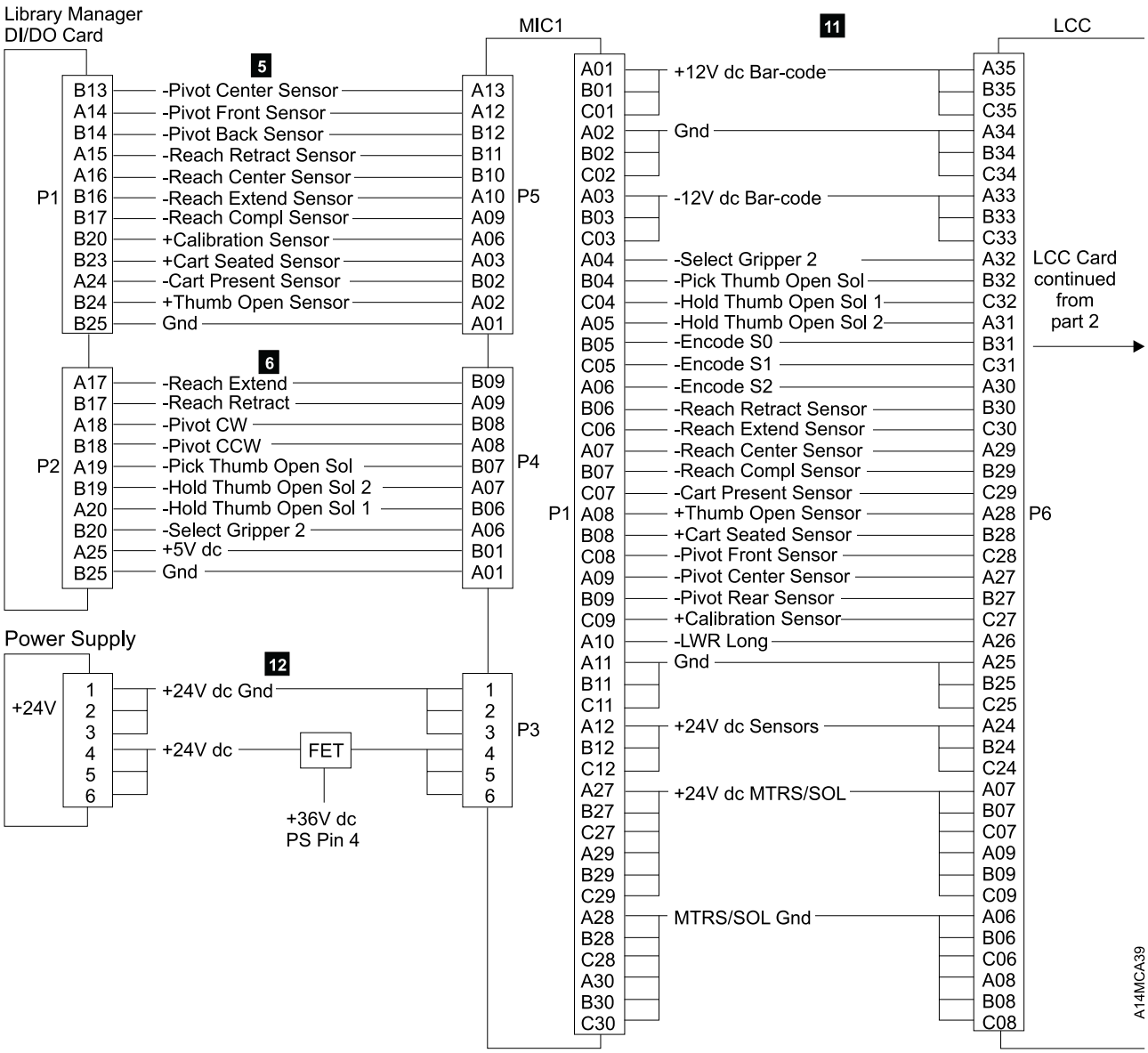


Figure 167 (Part 1 of 5). Picker Assembly Wiring Diagram with MIC1/LCC Card Set

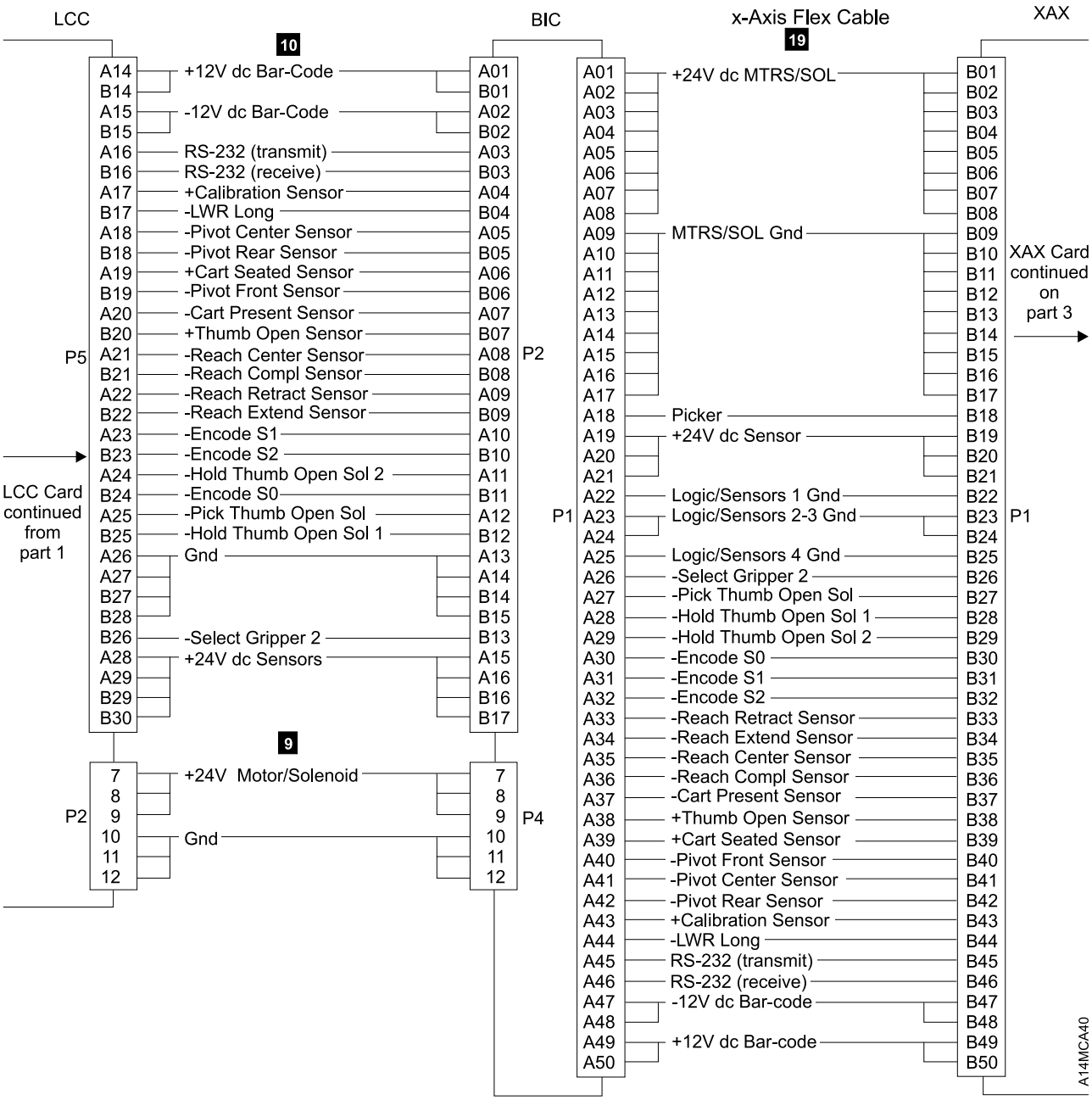


Figure 167 (Part 2 of 5). Picker Assembly Wiring Diagram with MIC1/LCC Card Set

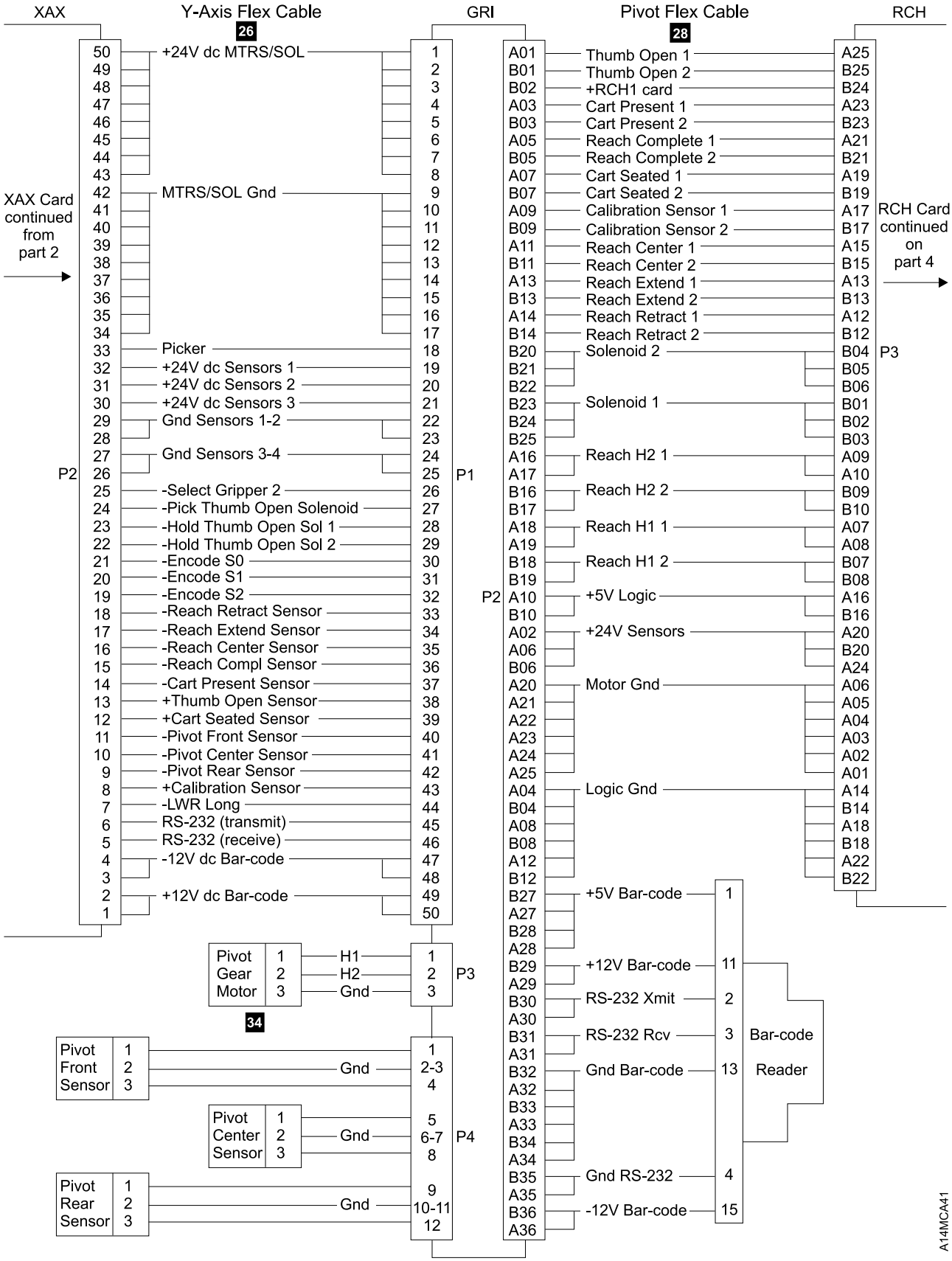


Figure 167 (Part 3 of 5). Picker Assembly Wiring Diagram with MIC1/LCC Card Set

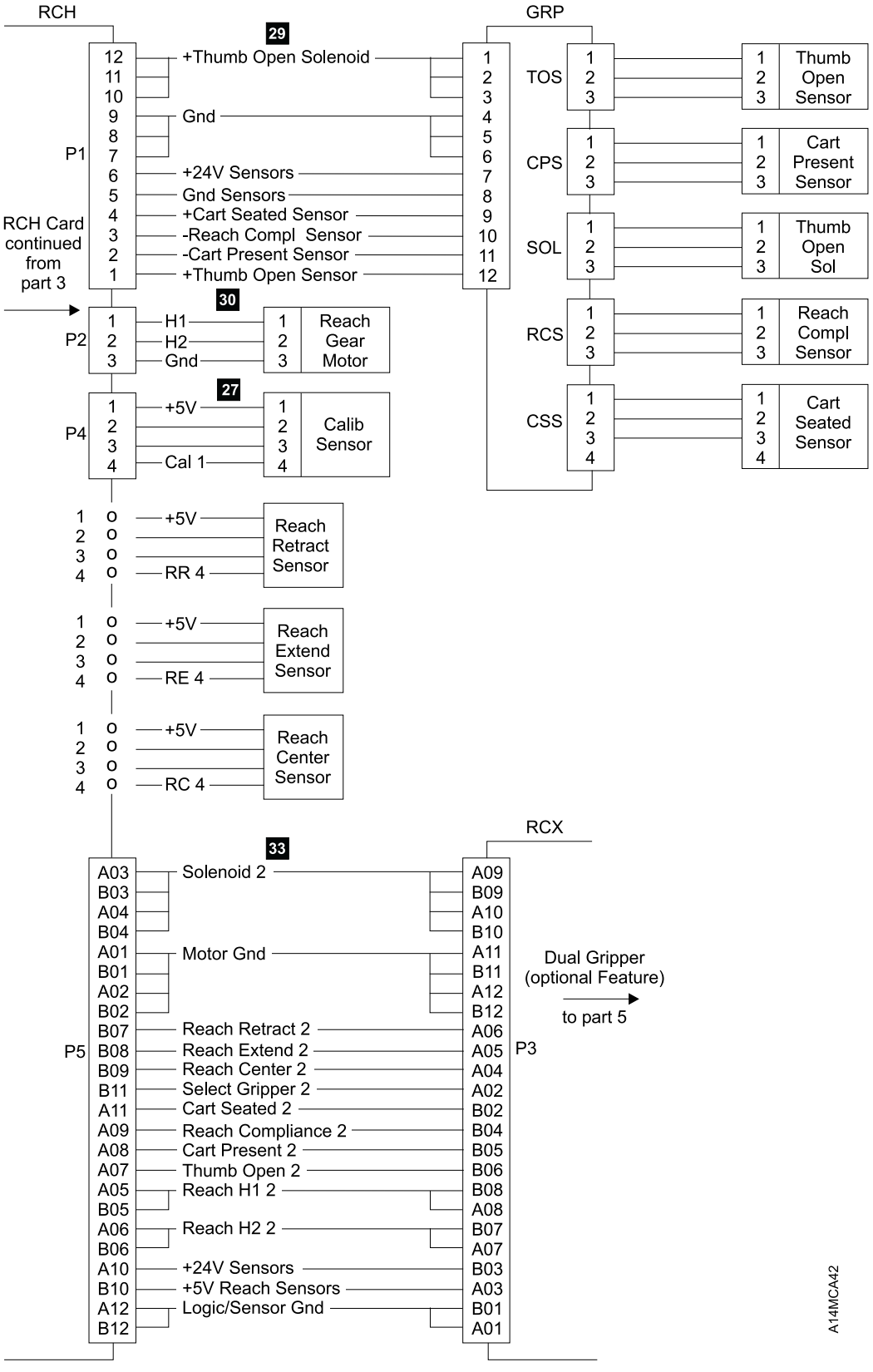


Figure 167 (Part 4 of 5). Picker Assembly Wiring Diagram with MIC1/LCC Card Set

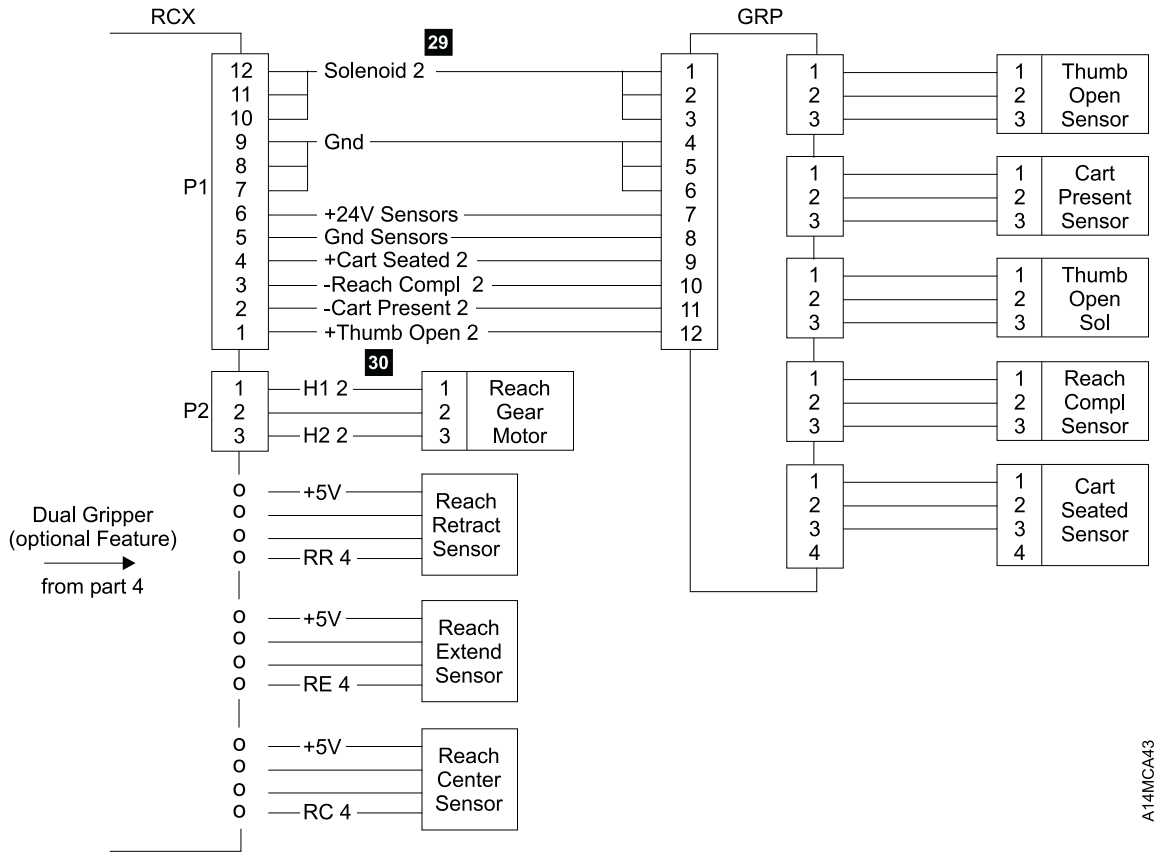


Figure 167 (Part 5 of 5). Picker Assembly Wiring Diagram with MIC1/LCC Card Set

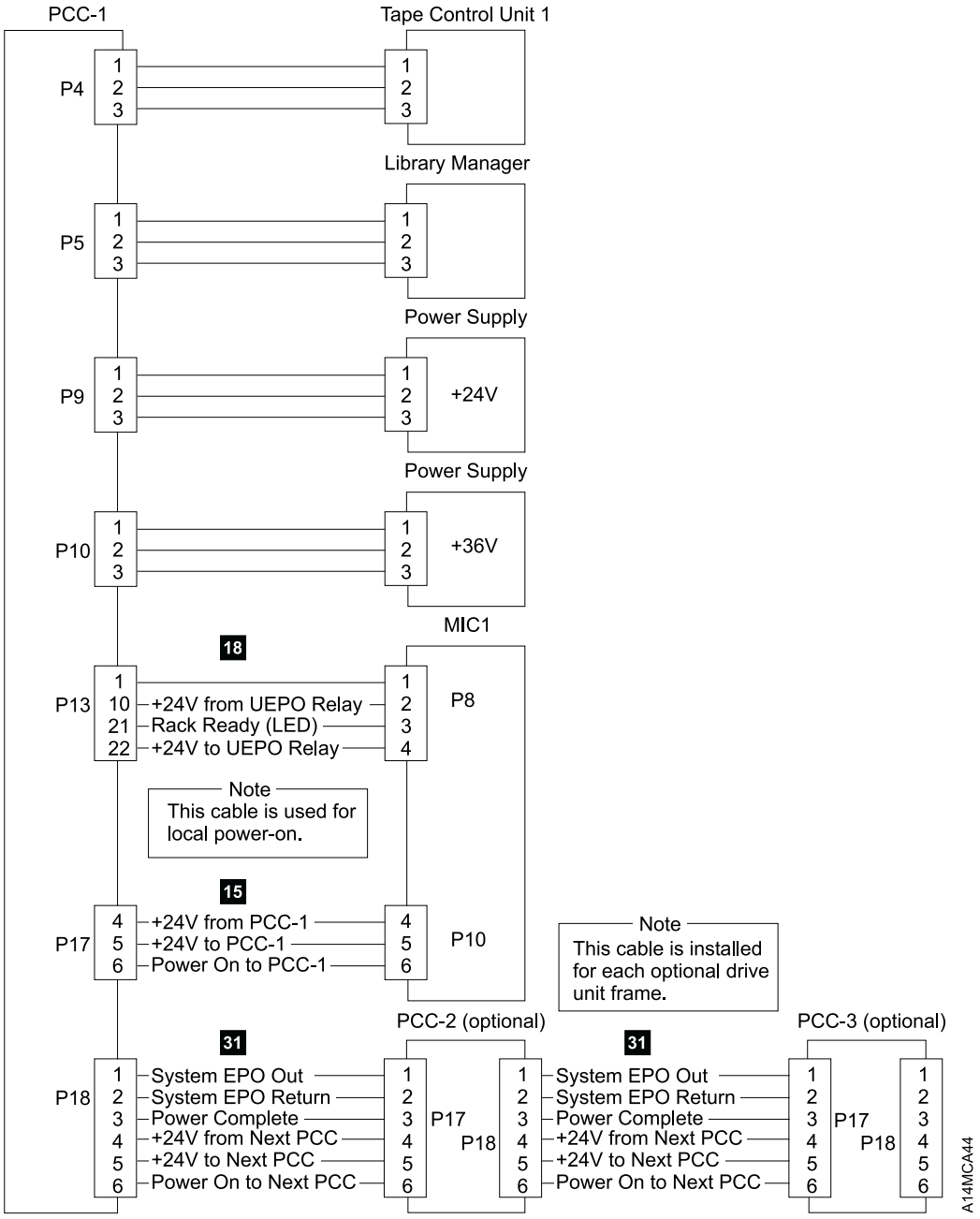


Figure 168. AC Distribution Wiring Diagram with MIC1/LCC Card Set

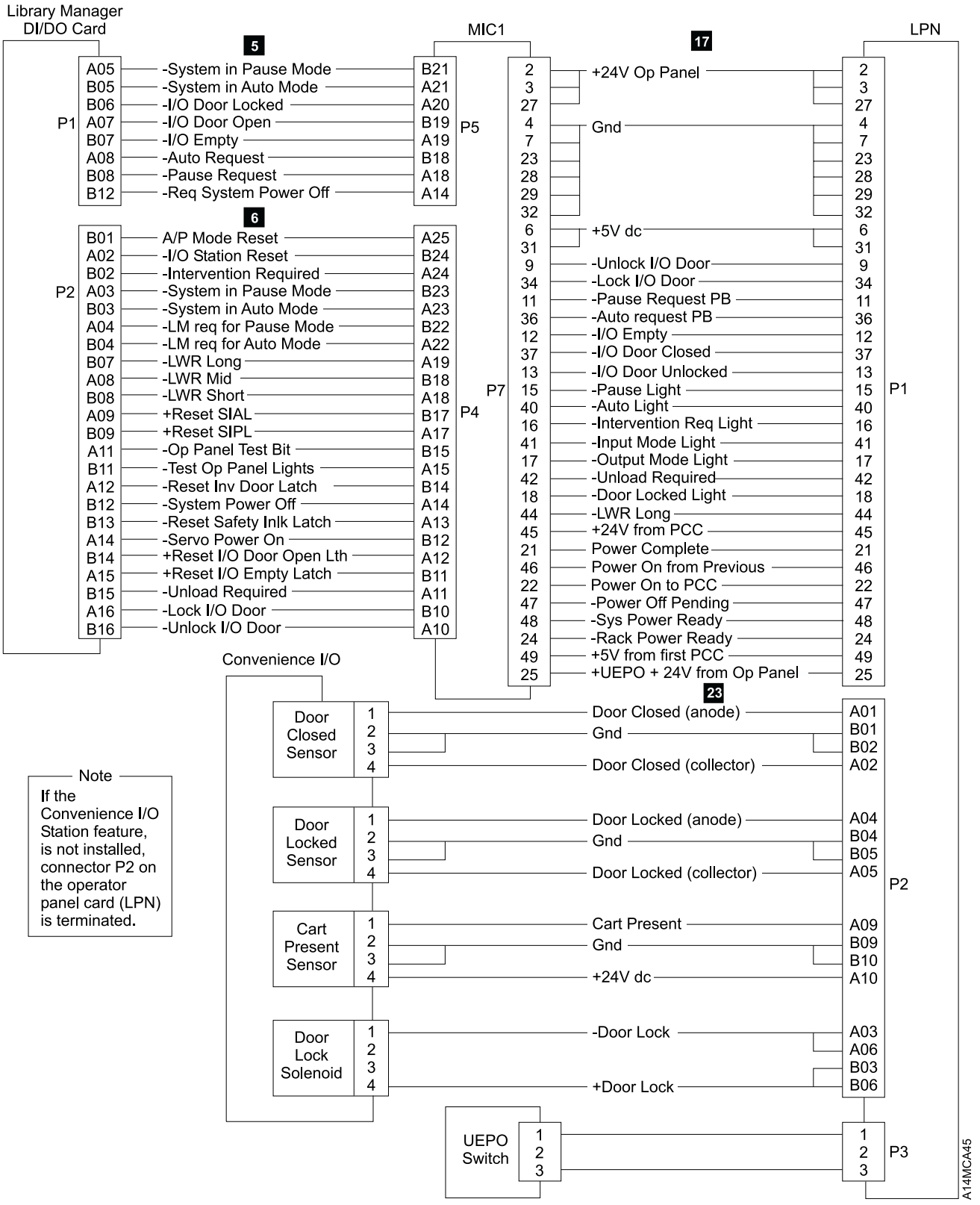


Figure 169. Operator Panel and Convenience I/O Wiring Diagram with MIC1/LCC Card Set

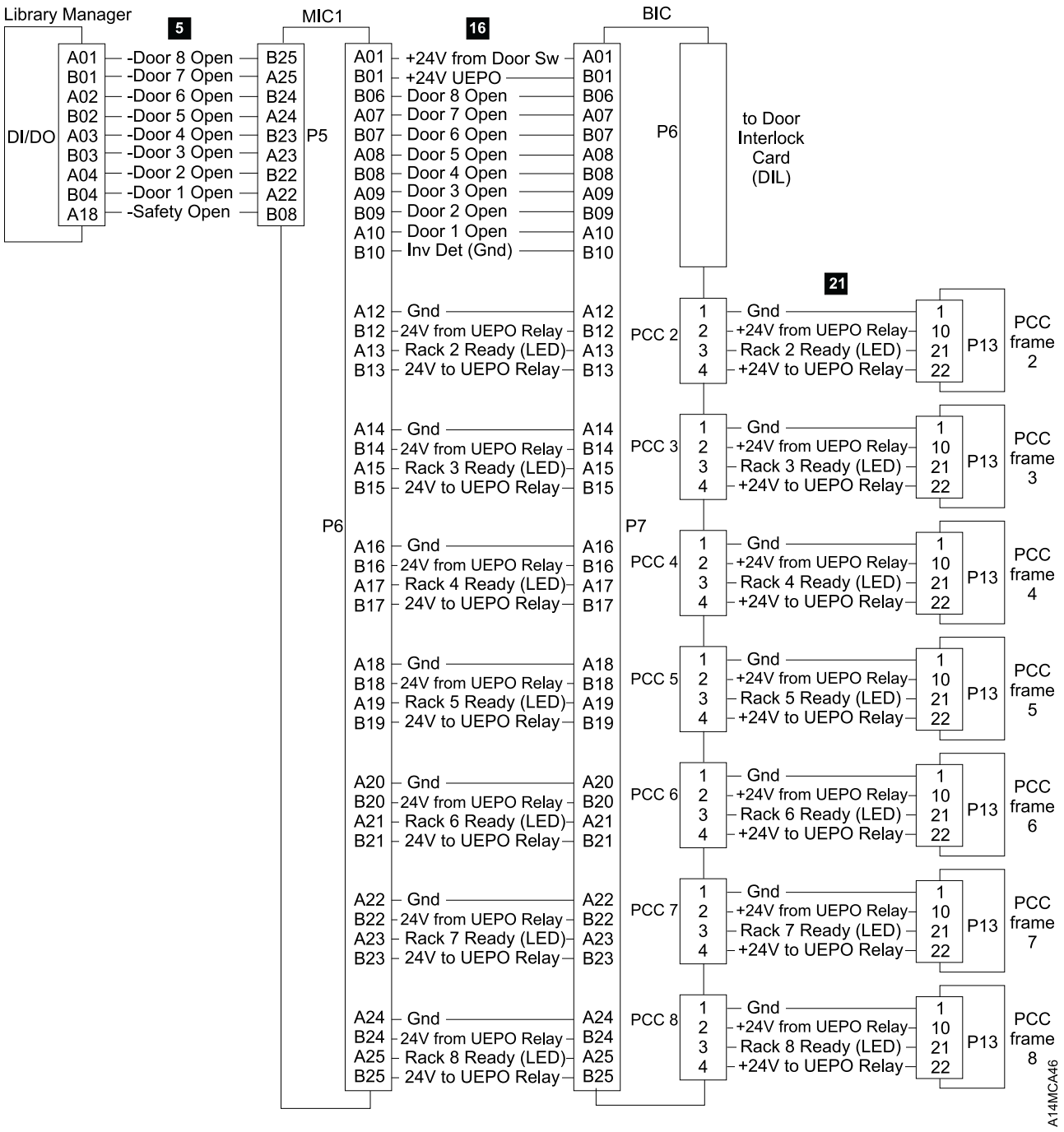


Figure 170. UEPO and Safety Circuit Wiring Diagram with MIC1/LCC Card Set

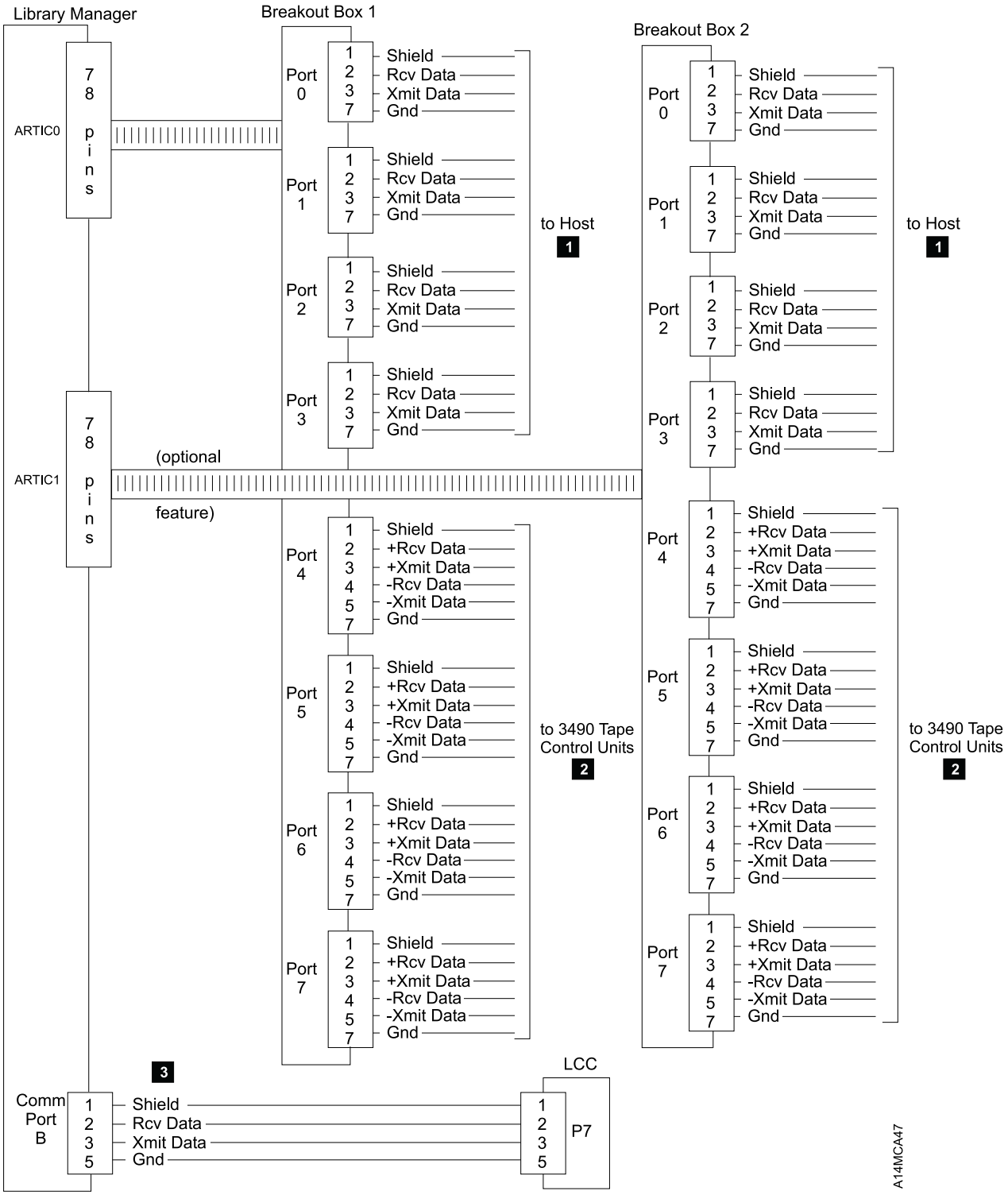
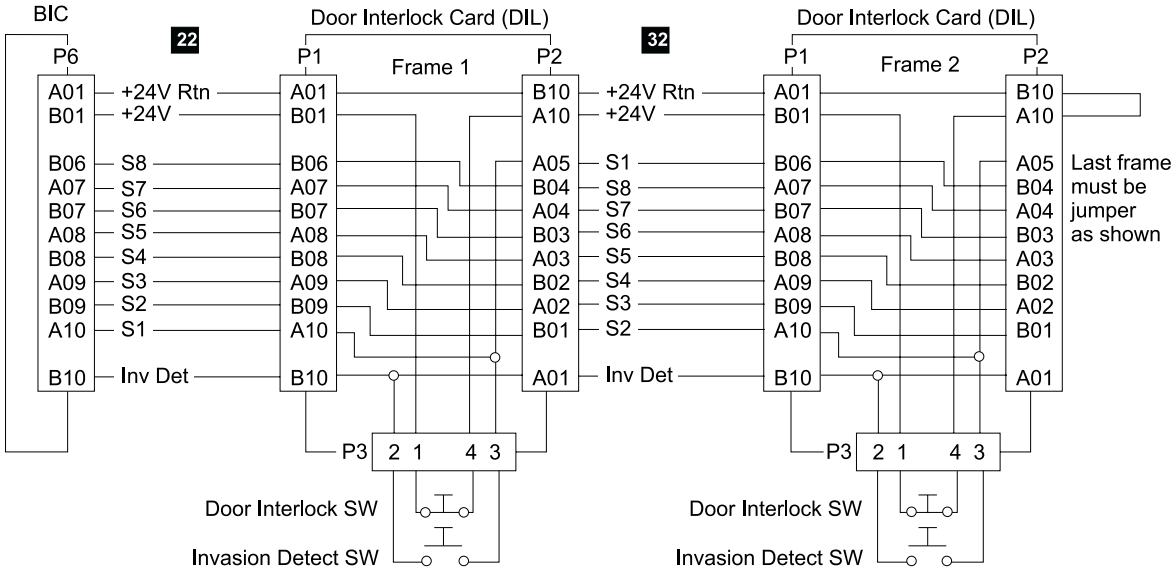


Figure 171. Library Manager Wiring Diagram with MIC1/LCC Card Set

Figure 172. DIL Card Line Names and Description	
Line Name	**Description**
+24V	+24V dc to the door interlock switches.
+24V Rtn	+24V dc from the door interlock switches.
S1	Frame 1 invasion detect switch return.
S2	Frame 2 invasion detect switch return.
S3	Frame 3 invasion detect switch return.
S4	Frame 4 invasion detect switch return.
S5	Frame 5 invasion detect switch return.
S6	Frame 6 invasion detect switch return.
S7	Frame 7 invasion detect switch return.
S8	Frame 8 invasion detect switch return.
Inv Det	Invasion Detect line to all invasion detect switches.



Notes: 1. Each additional expansion frame (2 - 8) has a DIL card installed.
2. Only the last expansion frame has a jumper plug.
3. The door interlock switches are shown in the door closed position.

Figure 173. DIL Card to Next Frame DIL Card Cable Diagram with MIC1/LCC Card Set

Cable Diagrams with MIC2-4/LPC Card Set

To find the pin-to-pin connections for each cable, see Figure 174 for the page number and Figure 175 on page CABLE-21 for the source and destination of the cables.

Figure 174. Cable Key to Page Number Cross Reference

Cable Key	Page Number	Page Number	Page Number	Page Number
1	CABLE-34			
2	CABLE-34			
3	CABLE-34			
4	CABLE-23			
5	CABLE-23	CABLE-25	CABLE-30	CABLE-32
6	CABLE-23	CABLE-25	CABLE-30	
7	CABLE-23			
8	CABLE-23			
9	CABLE-23	CABLE-25		
10	CABLE-23	CABLE-25		
11	CABLE-30	CABLE-32		
12	CABLE-25			
13	CABLE-23			
14	CABLE-32			
15	CABLE-32			
16	CABLE-32			
17	CABLE-31			
18	CABLE-32	CABLE-29		
19	CABLE-24	CABLE-26		
20	CABLE-24			
21	CABLE-33			
22	CABLE-33			
23	CABLE-31			
24	CABLE-24			
25	CABLE-24			
26	CABLE-26			
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28	CABLE-27			
29	CABLE-27	CABLE-28		
30	CABLE-27	CABLE-28		
31	CABLE-29			
32	CABLE-33			
33	CABLE-27			
34	CABLE-26			

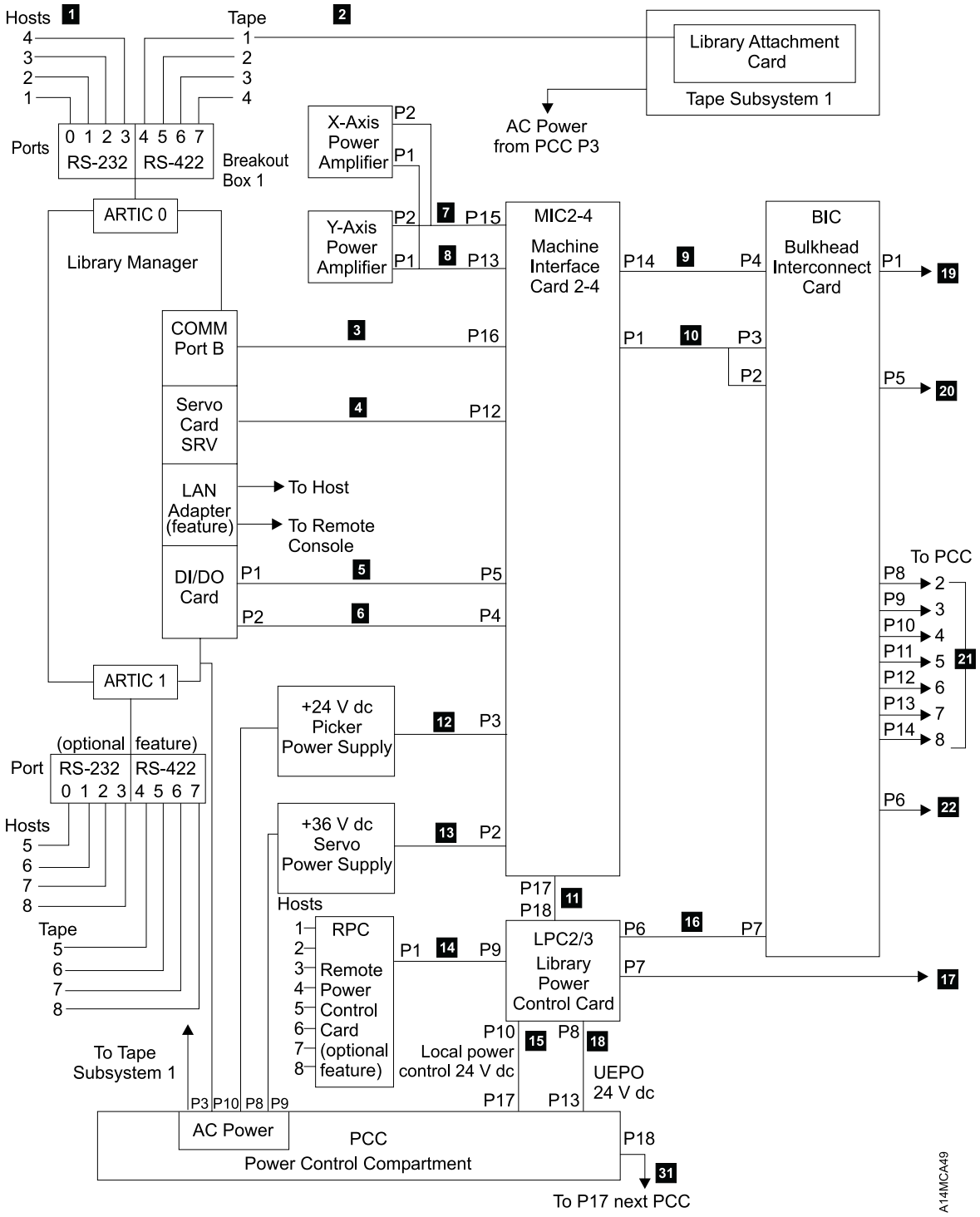

Figure 175 (Part 1 of 2). Cable Diagram with MIC2-4/LPC Card Set

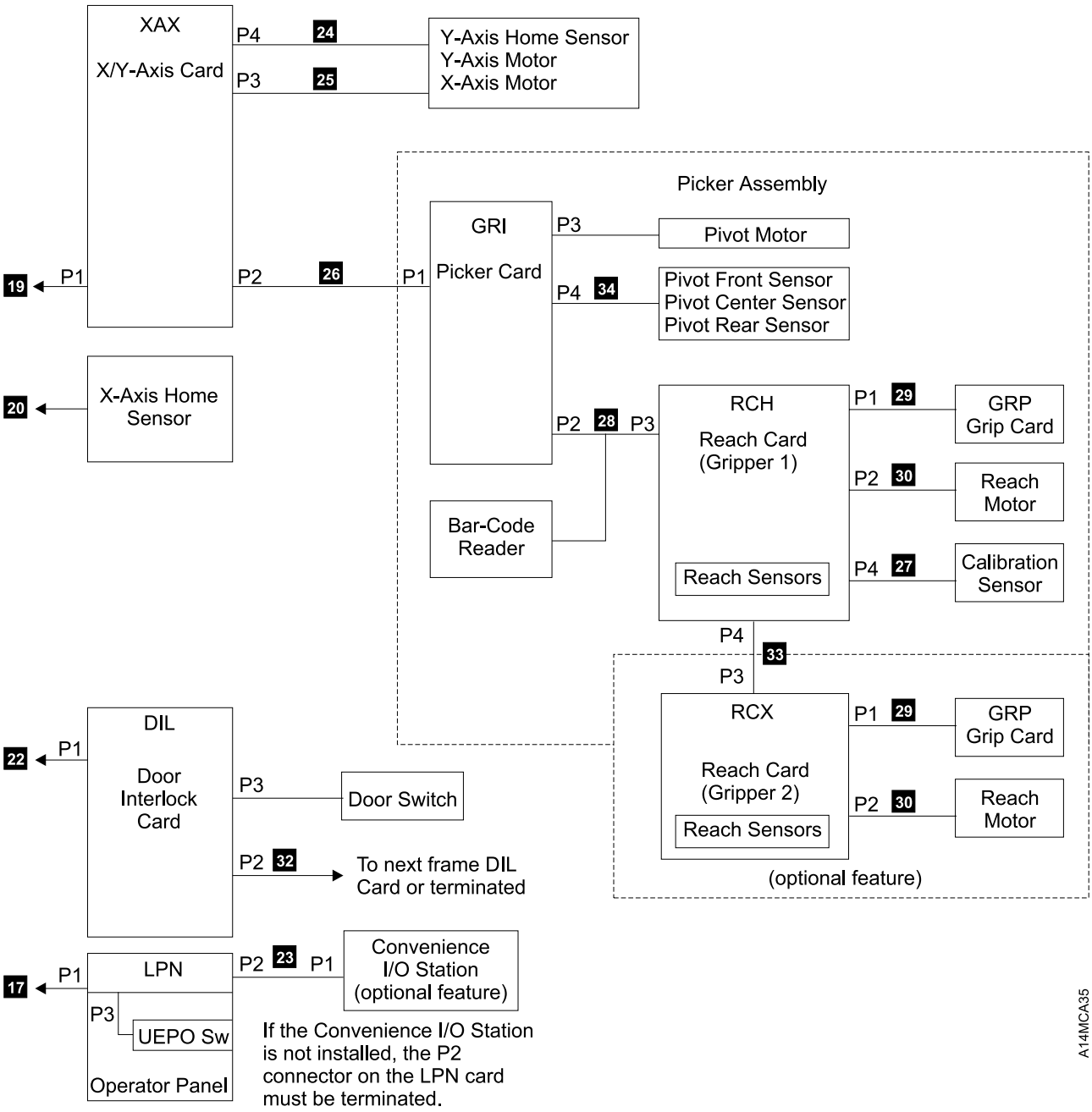

Figure 175 (Part 2 of 2). Cable Diagram with MIC2-4/LPC Card Set

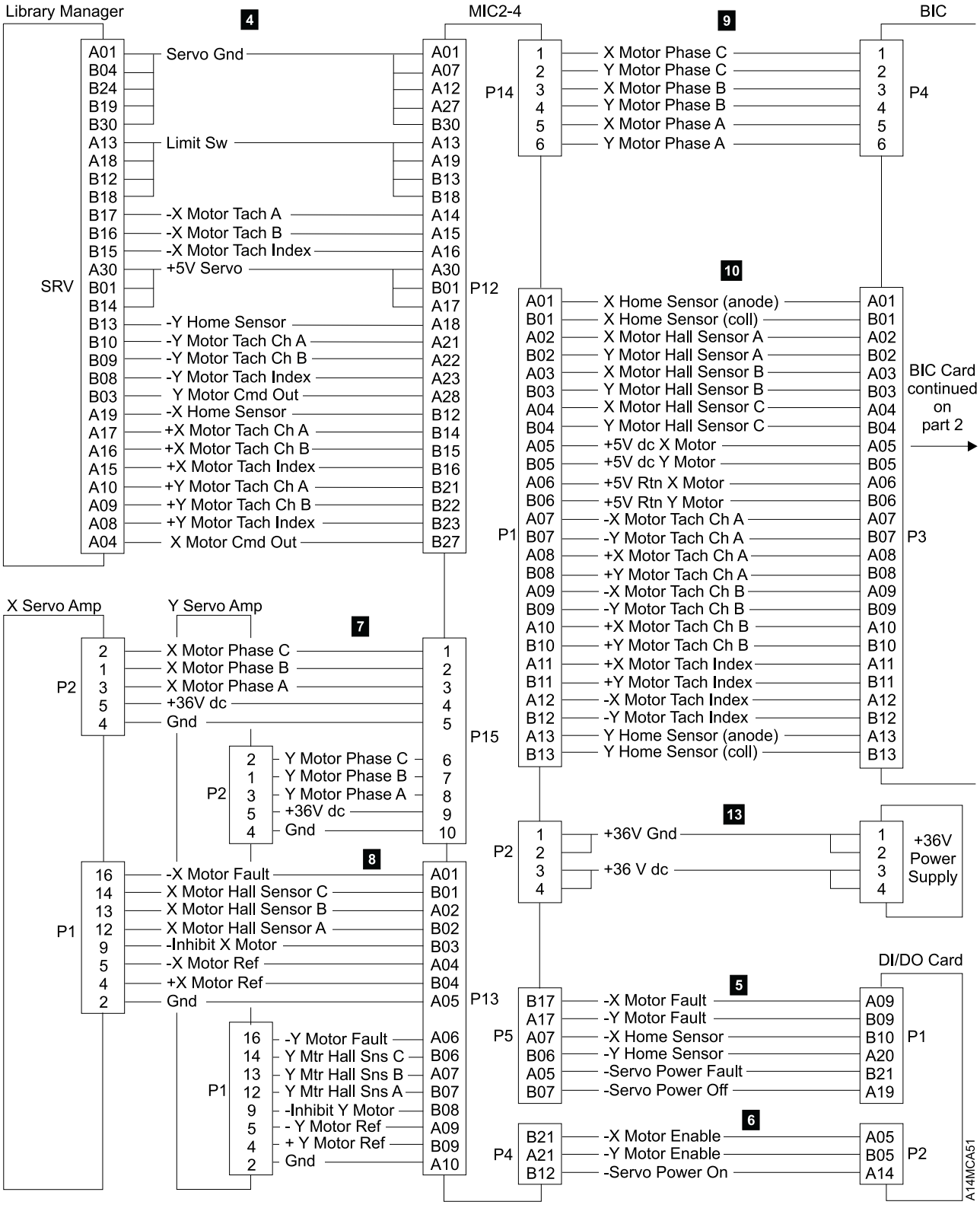

Figure 176 (Part 1 of 2). X/Y-Axis Motor Wiring Diagram with MIC2-4/LPC Card Set

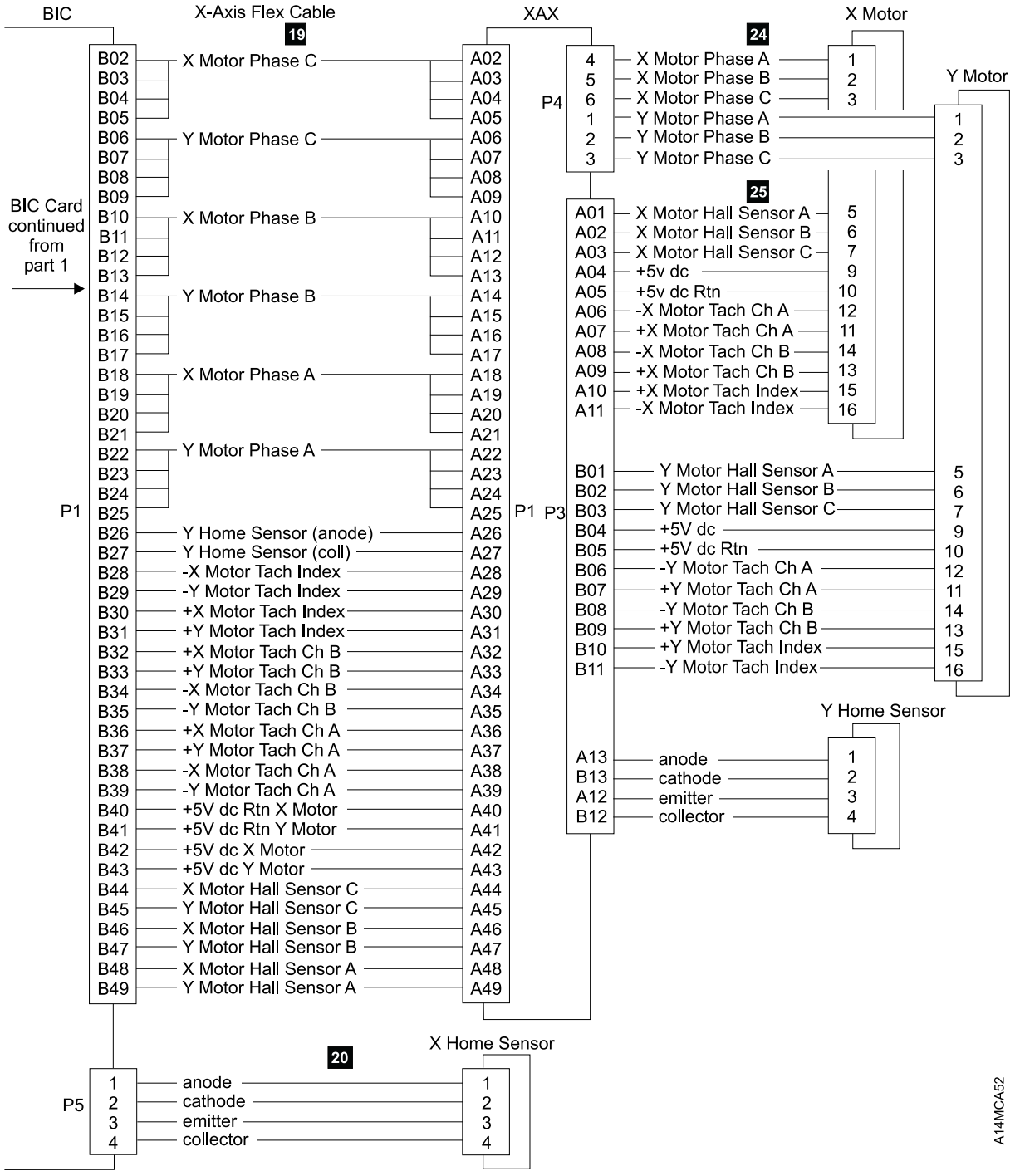

Figure 176 (Part 2 of 2). X/Y-Axis Motor Wiring Diagram with MIC2-4/LPC Card Set

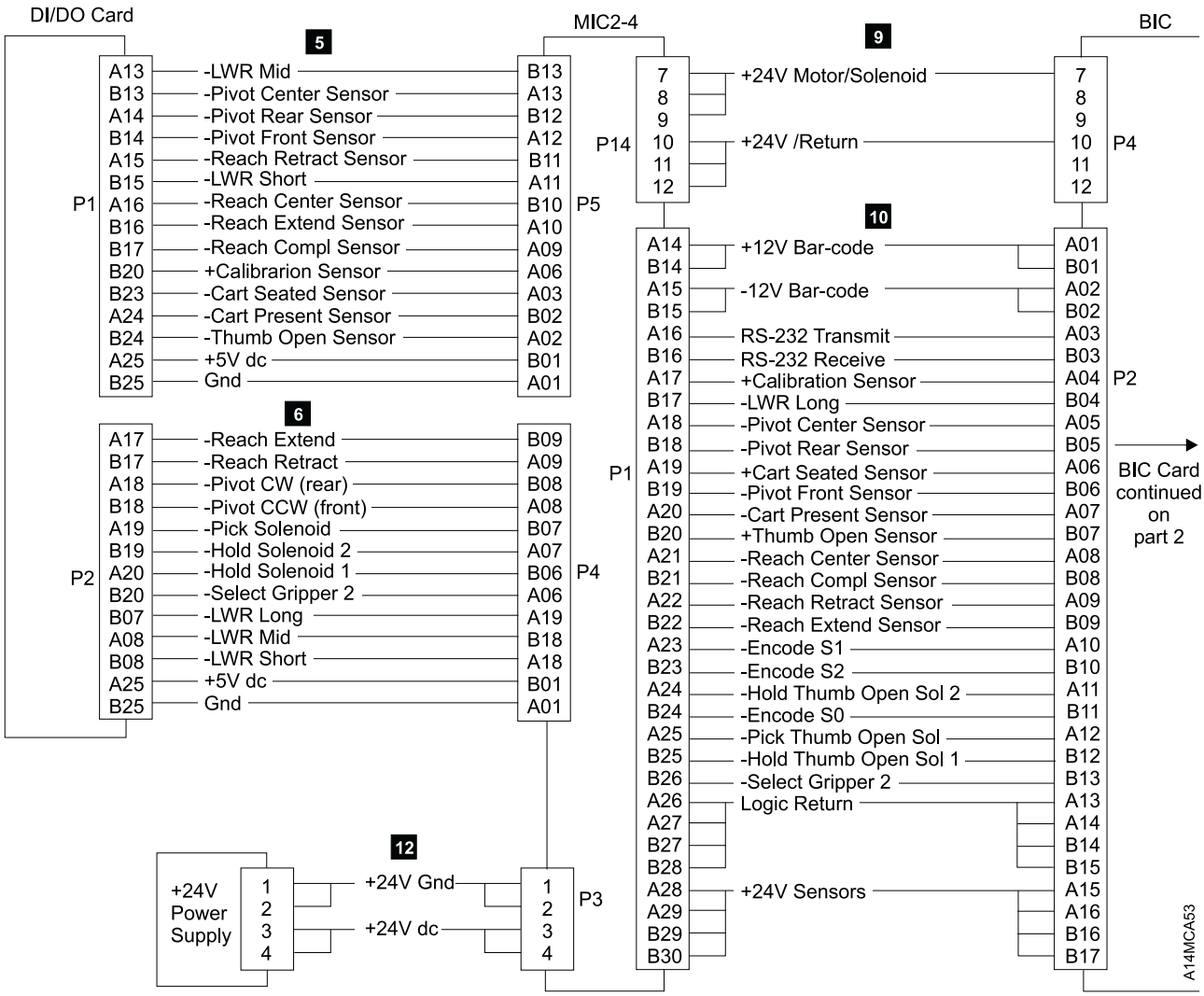

Figure 177 (Part 1 of 4). Picker Assembly Wiring Diagrams

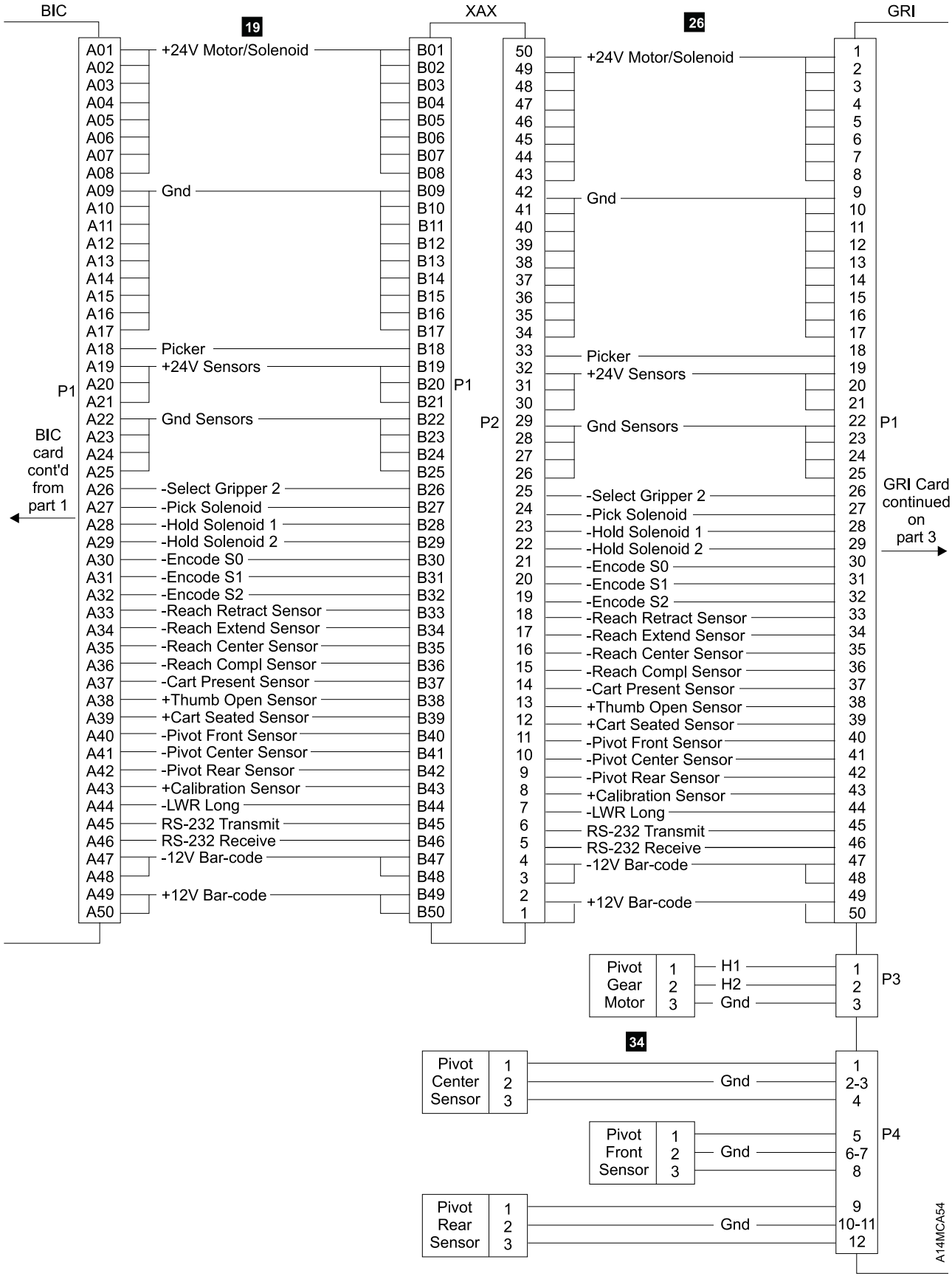

Figure 177 (Part 2 of 4). Picker Assembly Wiring Diagrams

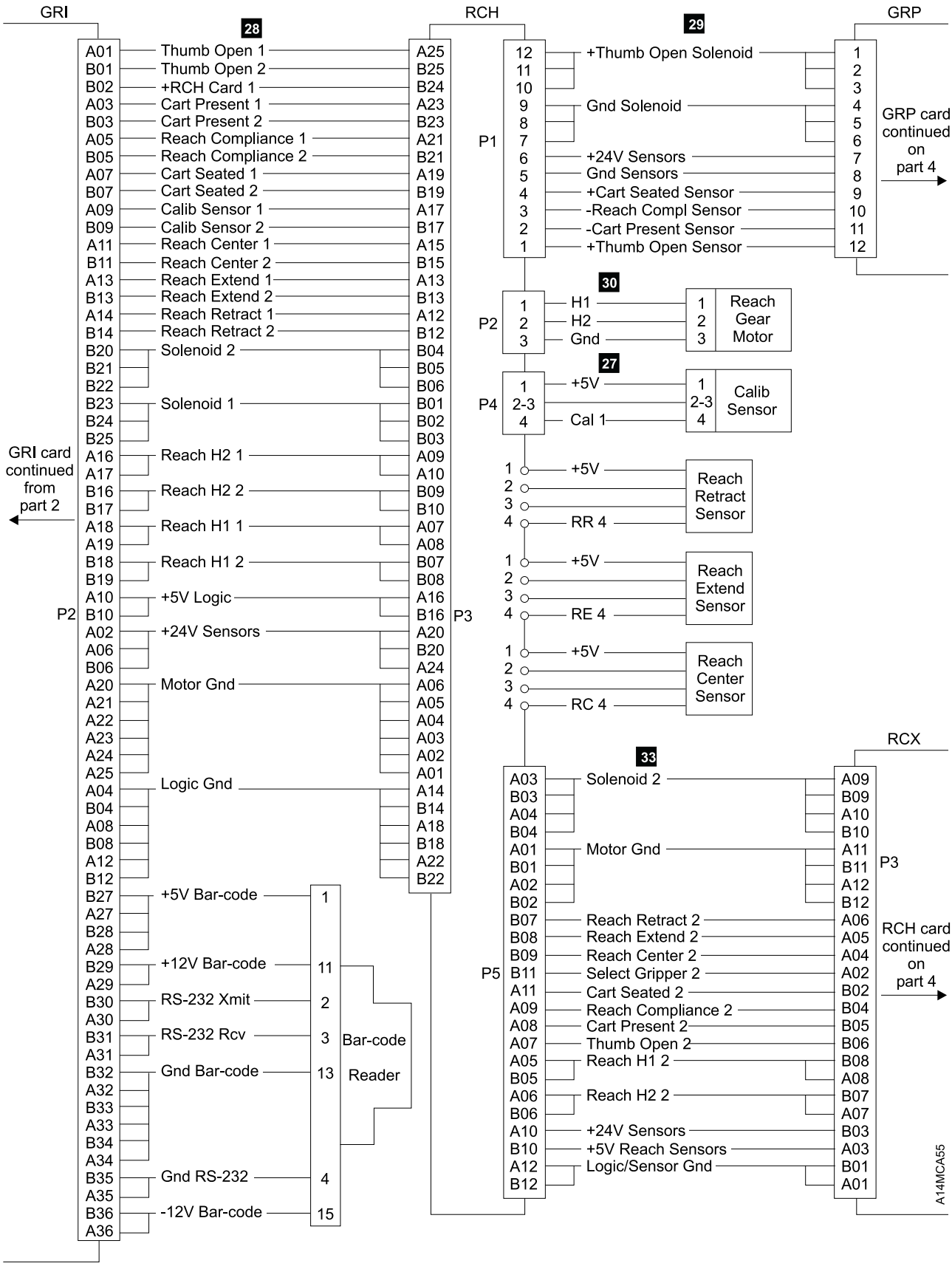

Figure 177 (Part 3 of 4). Picker Assembly Wiring Diagrams

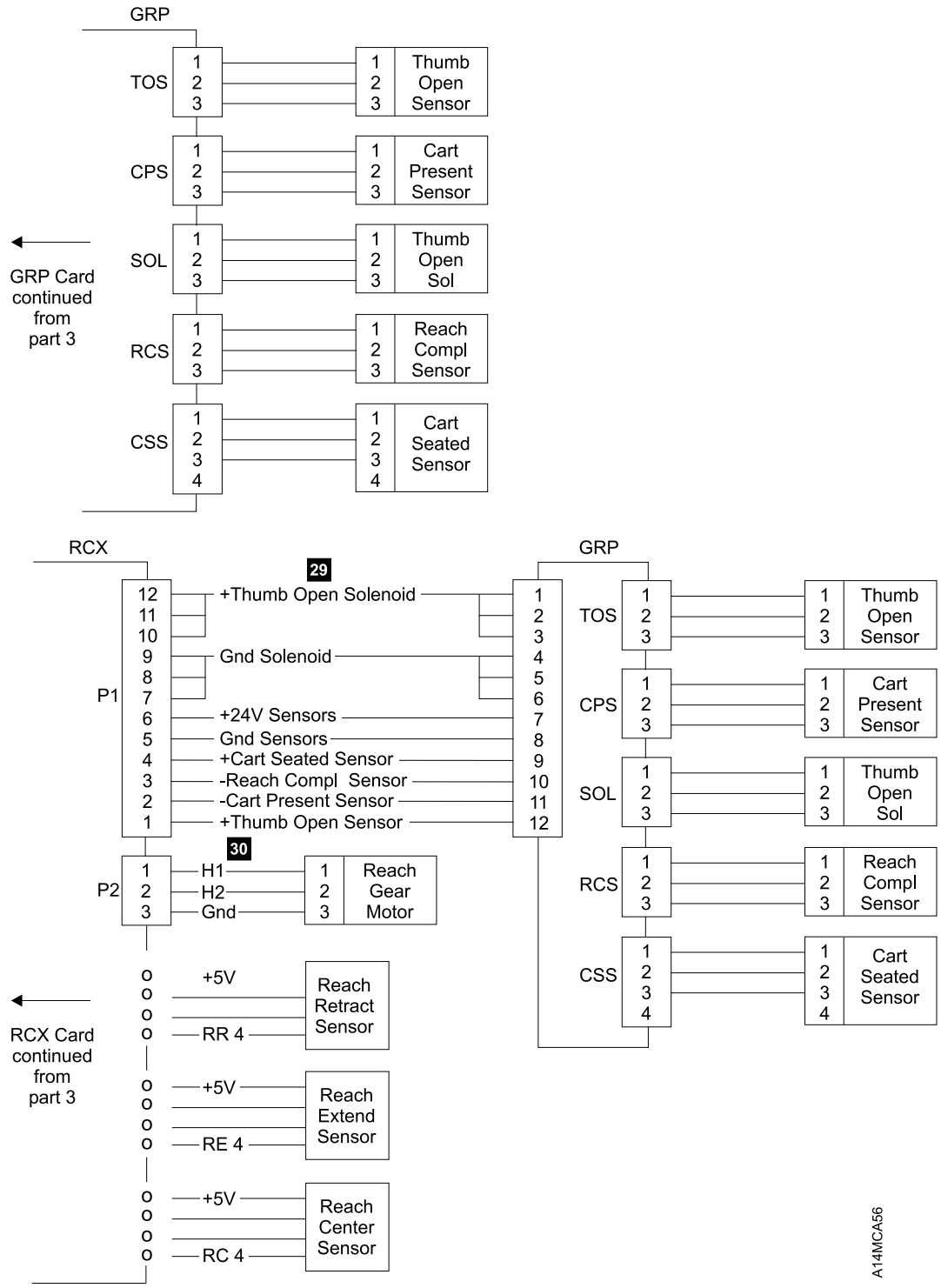

Figure 177 (Part 4 of 4). Picker Assembly Wiring Diagrams

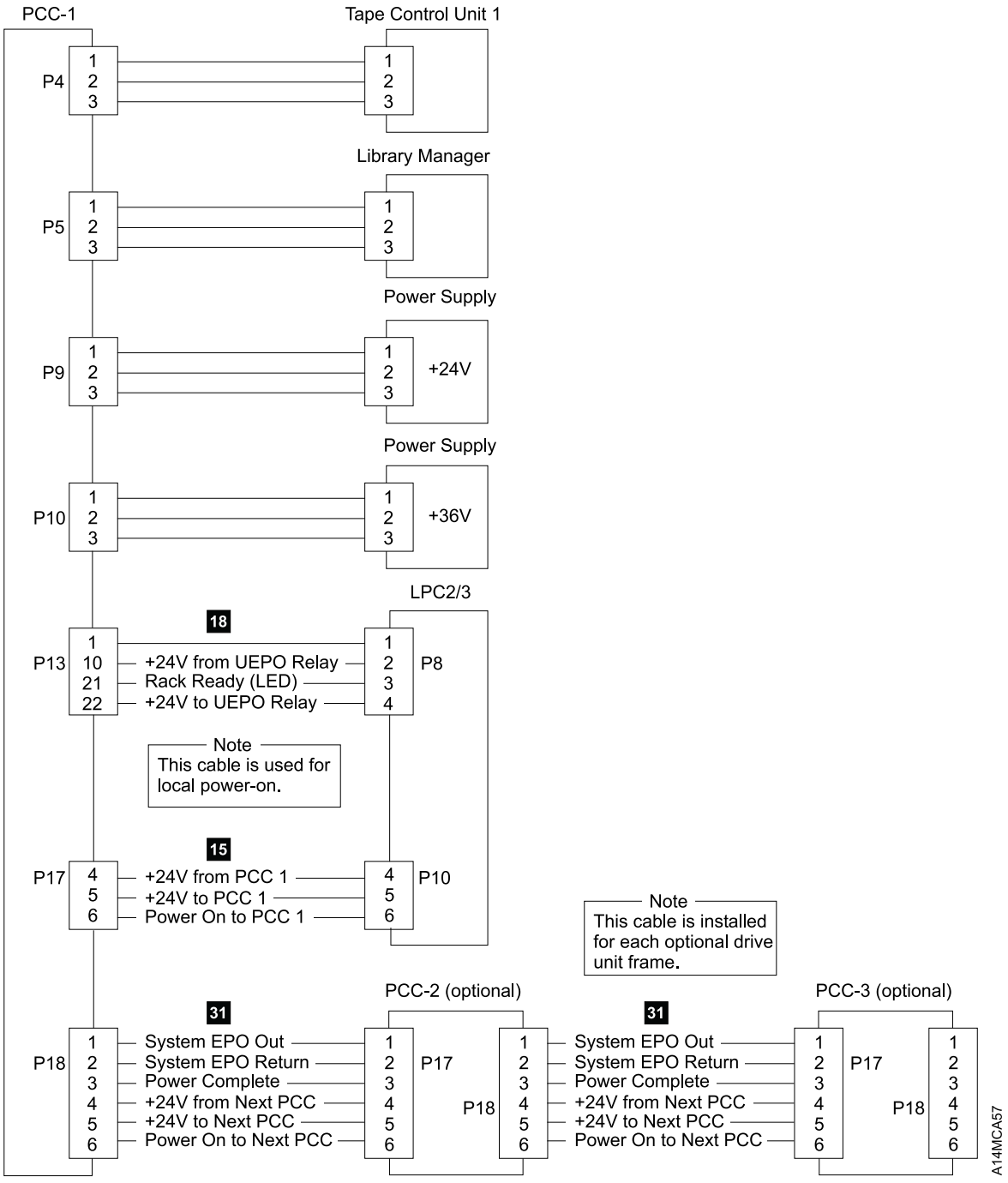

Figure 178. AC Distribution Wiring Diagram with MIC2-4/LPC Card Set

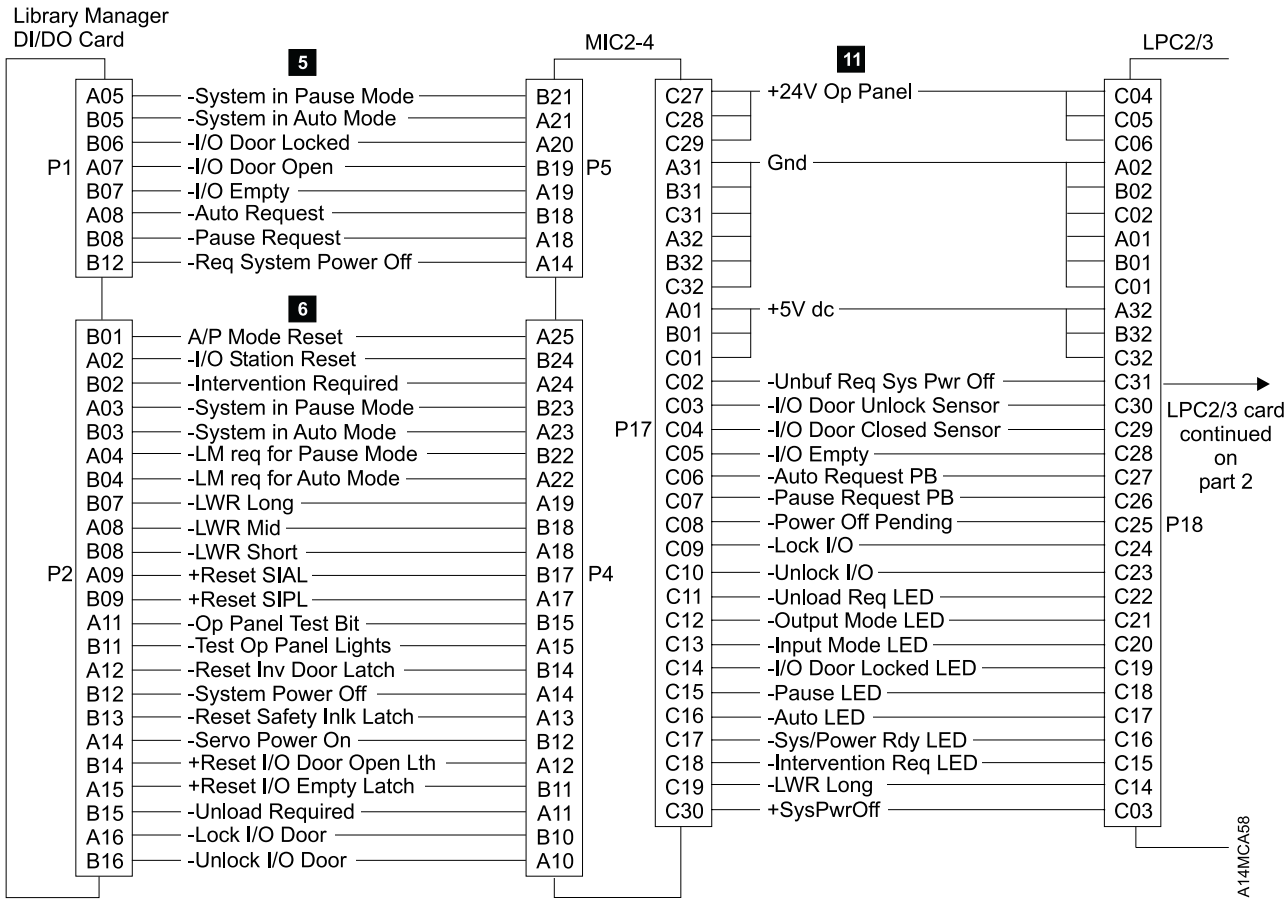

Figure 179 (Part 1 of 2). Operator Panel and Convenience I/O Wiring Diagram with MIC2-4/LPC Card Set

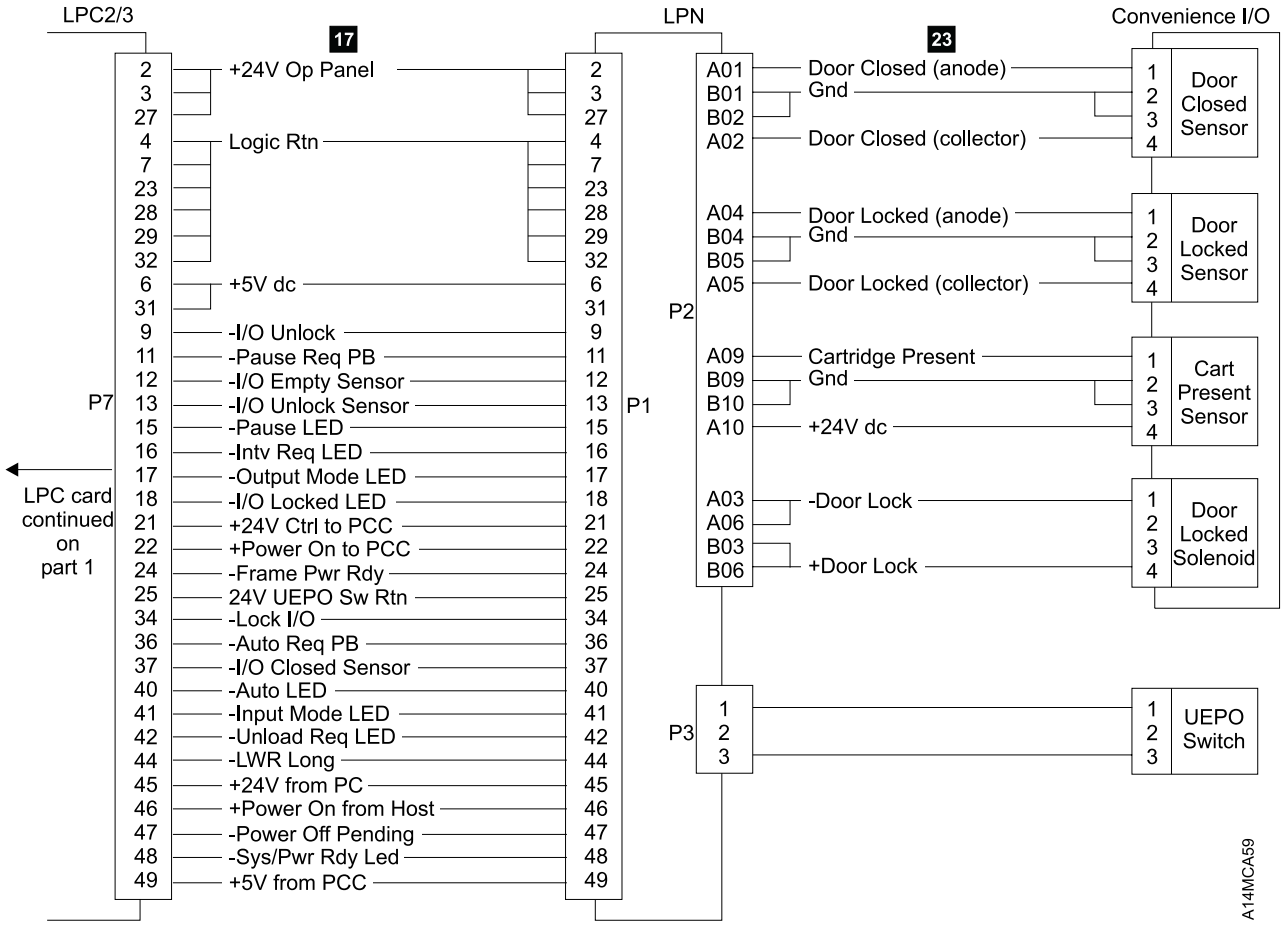

Figure 179 (Part 2 of 2). Operator Panel and Convenience I/O Wiring Diagram with MIC2-4/LPC Card Set

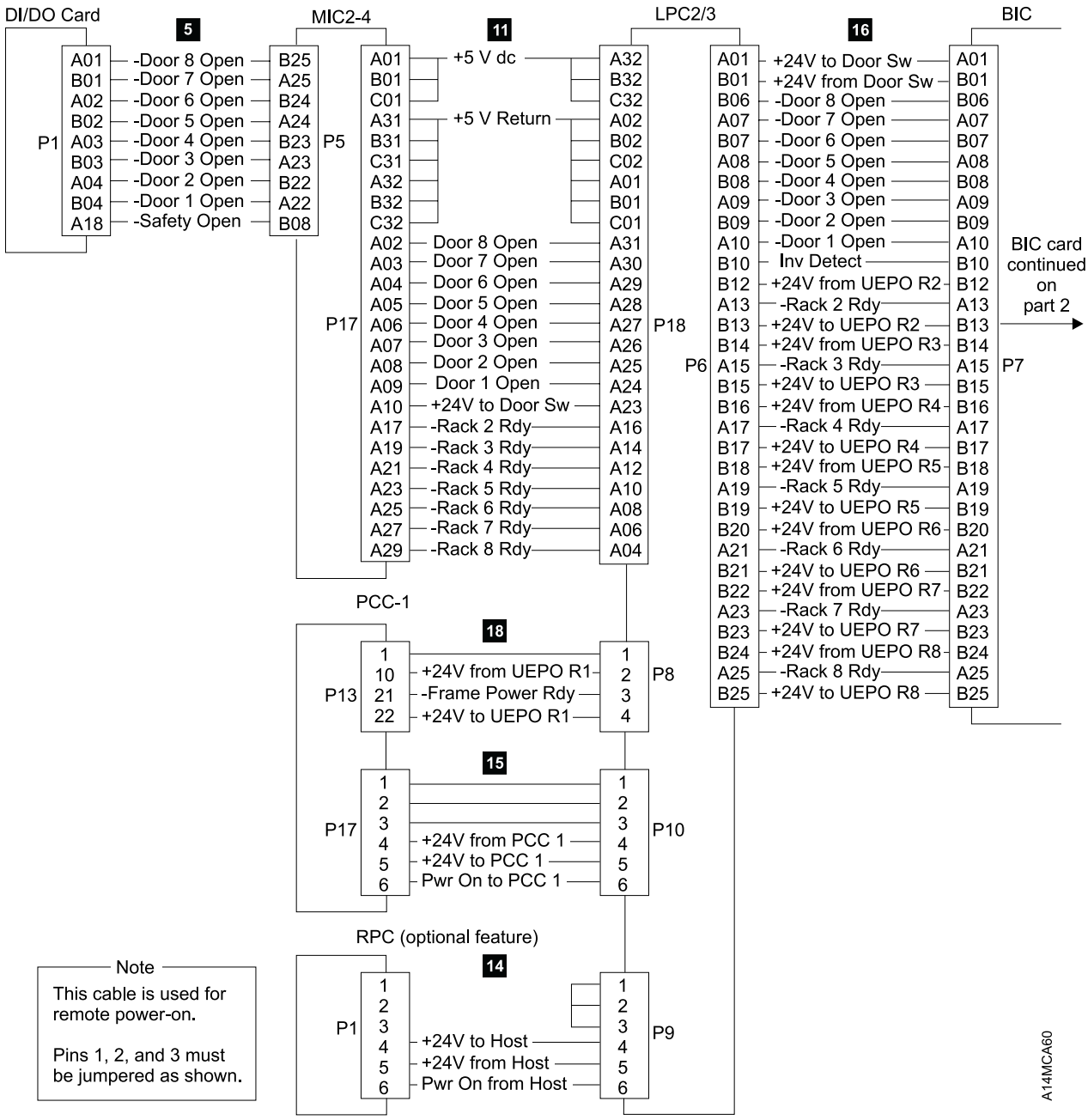

Figure 180 (Part 1 of 2). UEPO and Safety Circuit Wiring Diagram with MIC2-4/LPC Card Set

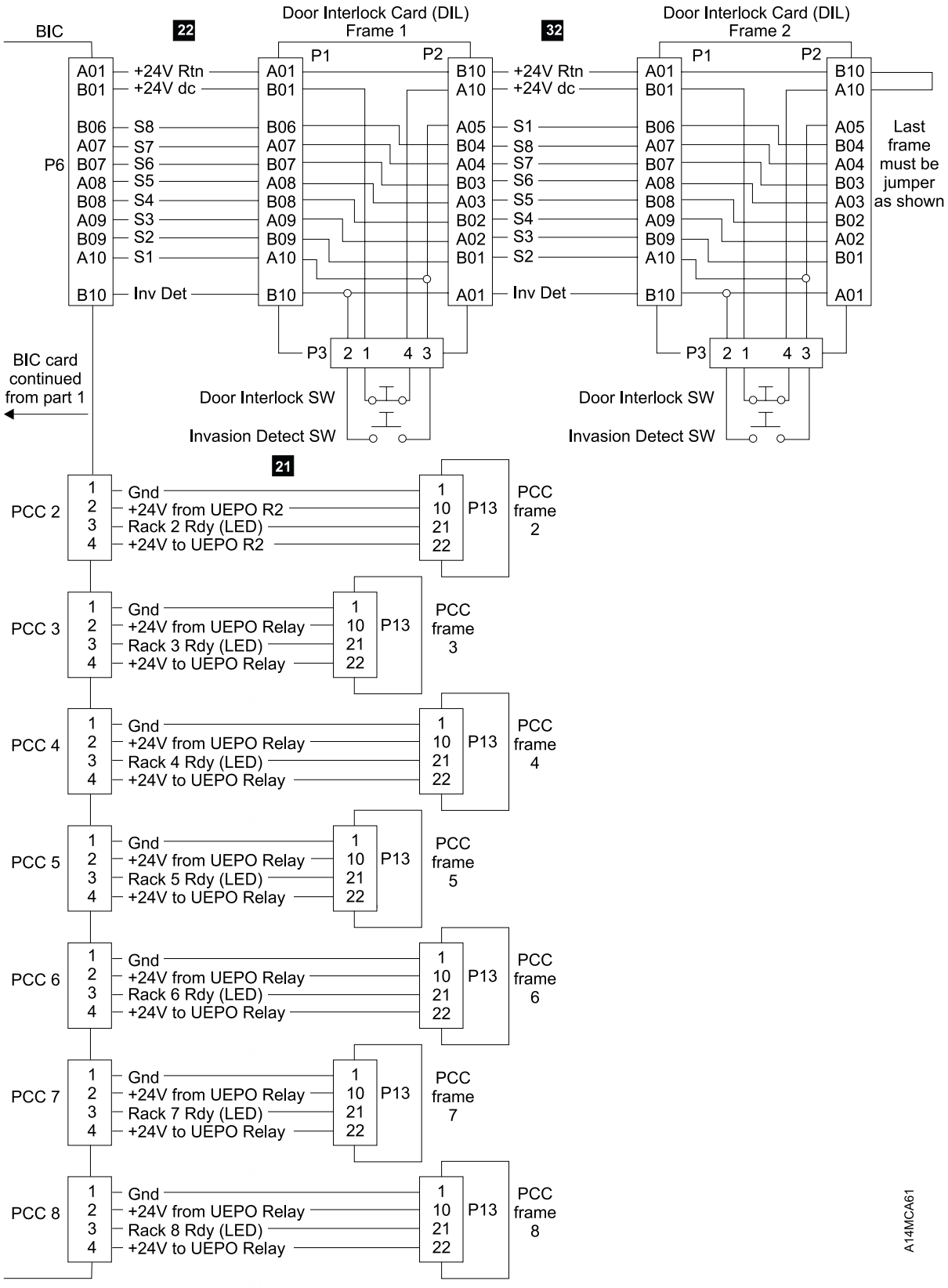

Figure 180 (Part 2 of 2). UEPO and Safety Circuit Wiring Diagram with MIC2-4/LPC Card Set

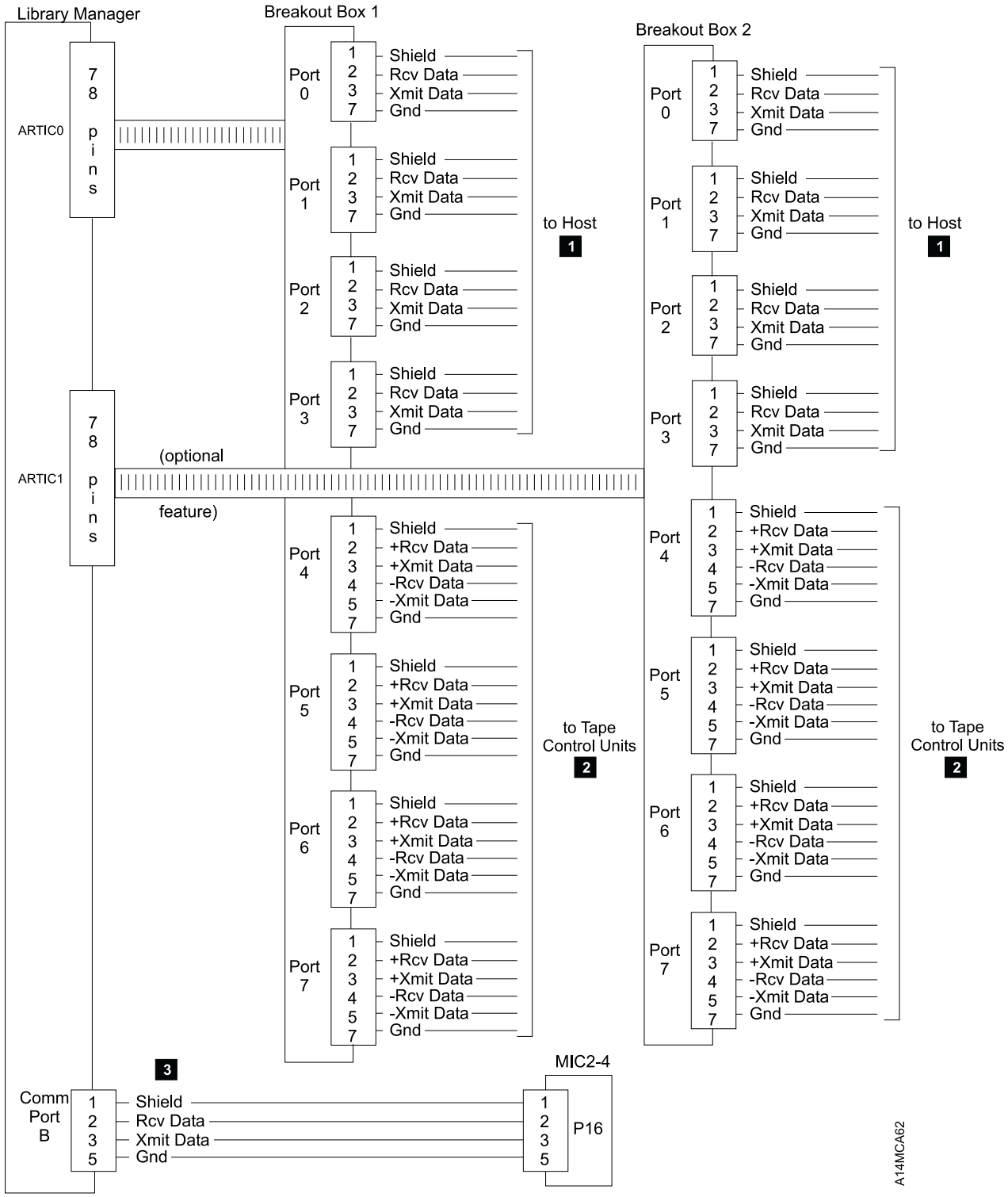

Figure 181. Library Manager Wiring Diagram with MIC2-4/LPC Card Set

UEPO and Safety Cable Diagrams for 9-16 Frame Library

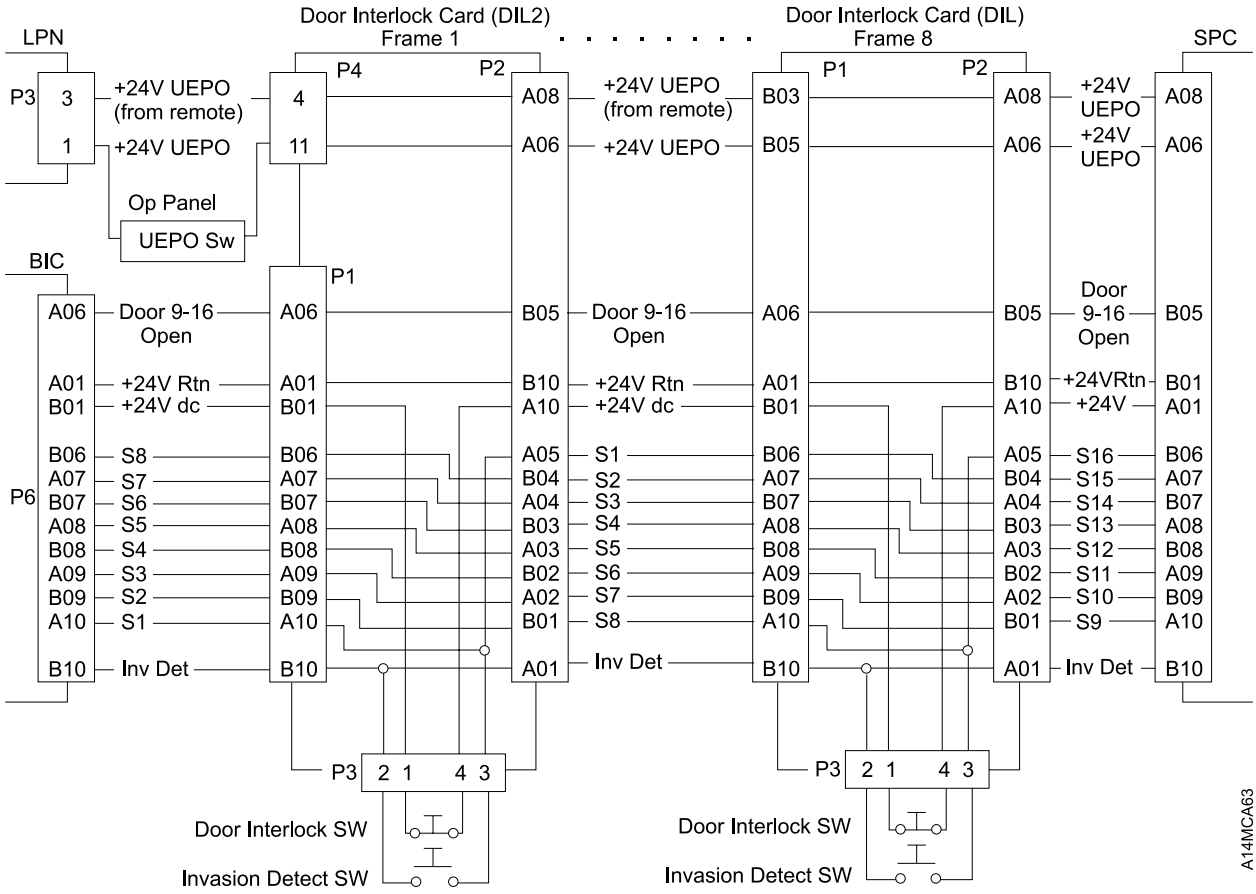

Figure 182 (Part 1 of 4). UEPO and Safety Circuit Wiring Diagram for 9-16 Frame Library

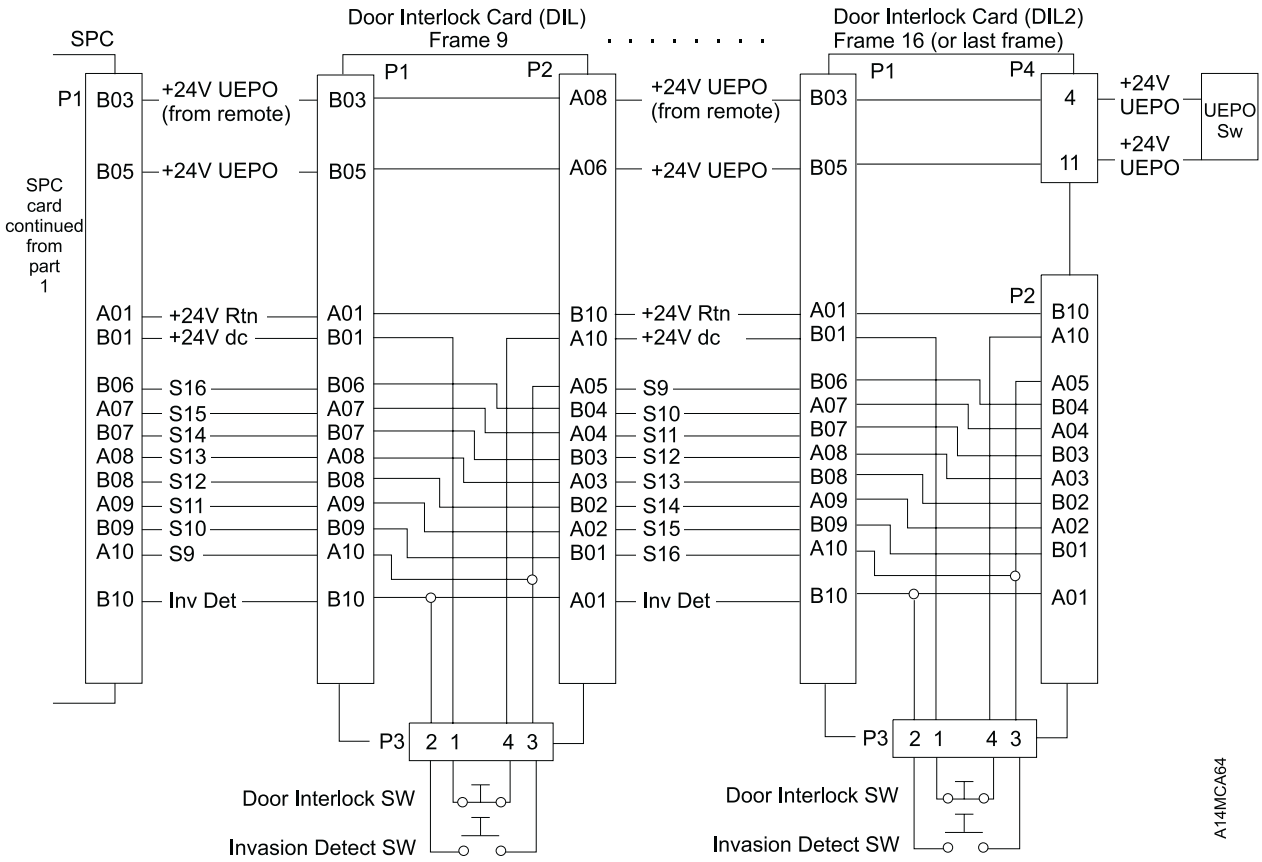

Figure 182 (Part 2 of 4). UEPO and Safety Circuit Wiring Diagram for 9-16 Frame Library

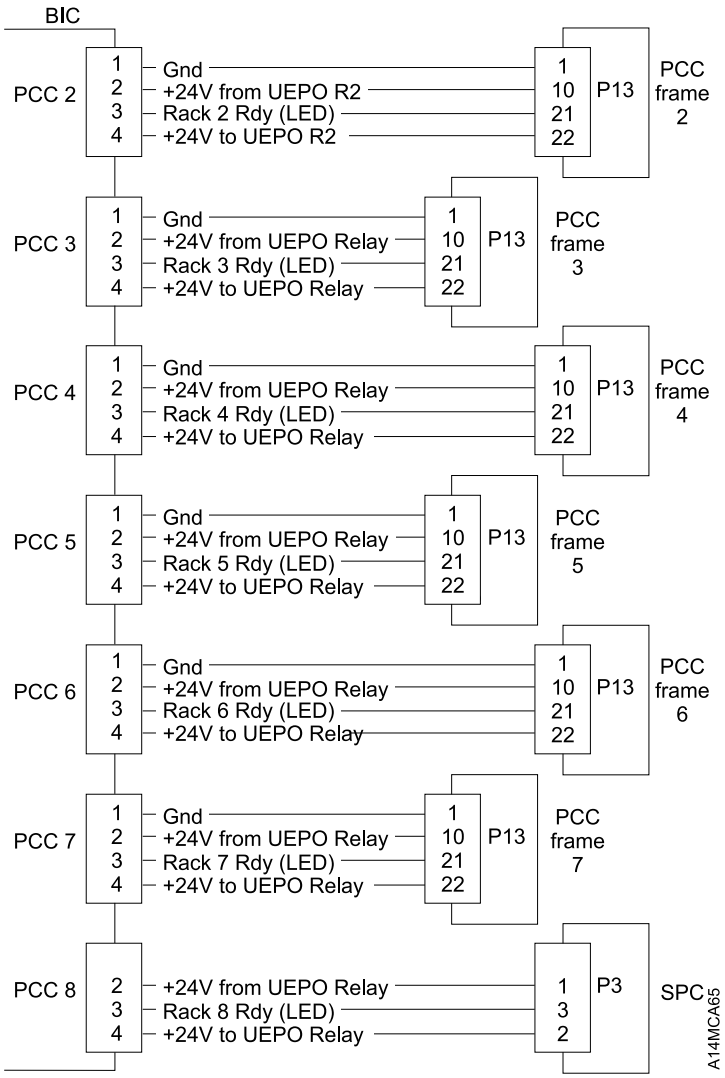

Figure 182 (Part 3 of 4). UEPO and Safety Circuit Wiring Diagram for 9-16 Frame Library

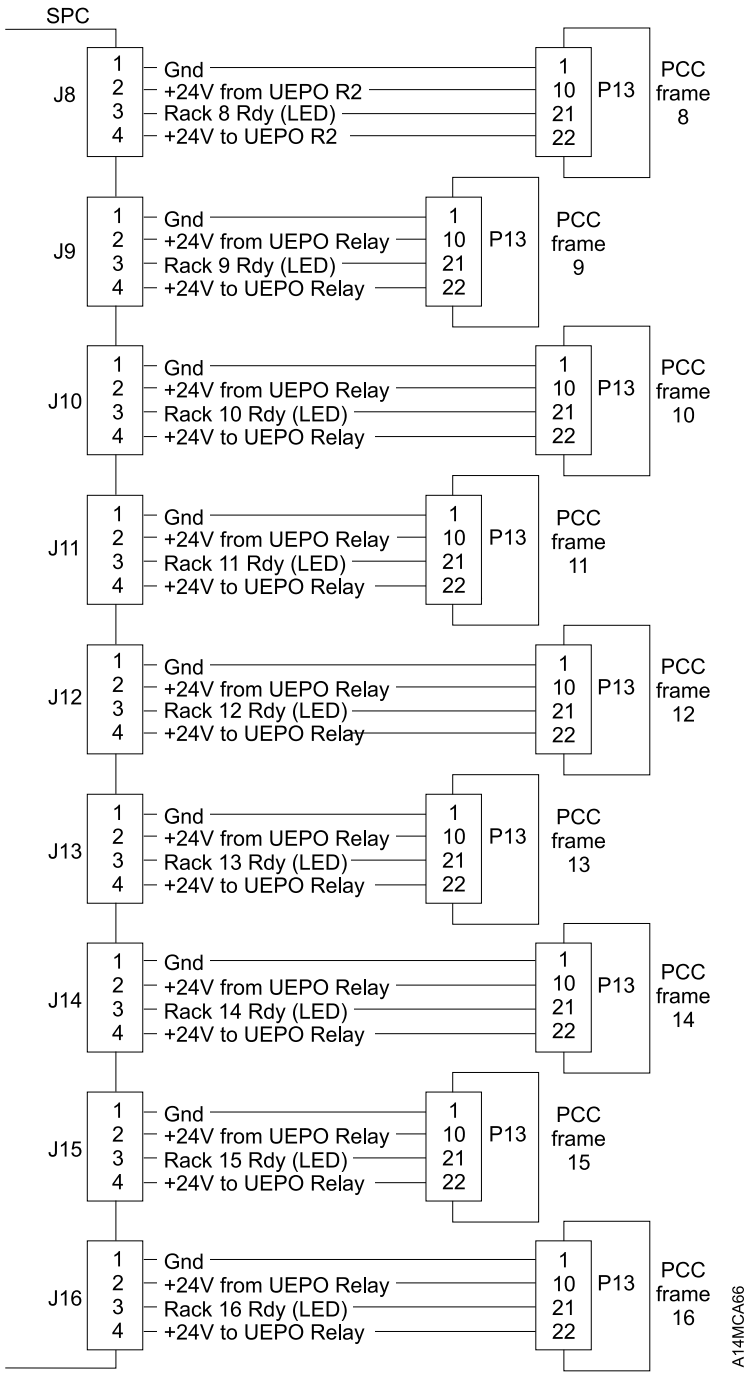

Figure 182 (Part 4 of 4). UEPO and Safety Circuit Wiring Diagram for 9-16 Frame Library

Dual Accessor Cable Diagrams with MIC4/DSW2, UEP2 and DBF2 Card Set

To find the pin-to-pin connections for each cable, see Figure 183 for the page number and Figure 184 on page CABLE-40 for the source and destination of the cables.

For accessor A, the DSW2 card will substitute for the LPC card and for accessor B, the DBF2 card will substitute for the LPC card on all referenced cable diagrams for the dual accessor machine.

Figure 183. Cable Key to Page Number Cross Reference

Cable Key	Page Number	Page Number	Page Number	Page Number
1	CABLE-34			
2	CABLE-34			
3	CABLE-34			
4	CABLE-23			
5	CABLE-23	CABLE-25	CABLE-30	CABLE-32
6	CABLE-23	CABLE-25	CABLE-30	
7	CABLE-23			
8	CABLE-23			
9	CABLE-23	CABLE-25		
10	CABLE-23	CABLE-25		
11	CABLE-30	CABLE-32		
12	CABLE-25			
13	CABLE-23			
14	CABLE-32			
15	CABLE-32			
16	CABLE-32			
17	CABLE-31			
18	CABLE-32	CABLE-29		
19	CABLE-24	CABLE-26		
20	CABLE-24			
21	CABLE-33			
22	CABLE-33			
23	CABLE-31			
24	CABLE-24			
25	CABLE-24			
26	CABLE-26			
27	CABLE-27			
28	CABLE-27			
29	CABLE-27	CABLE-28		
30	CABLE-27	CABLE-28		
31	CABLE-29			
32	CABLE-33			
33	CABLE-27			
34	CABLE-26			
36	CABLE-43	CABLE-44		

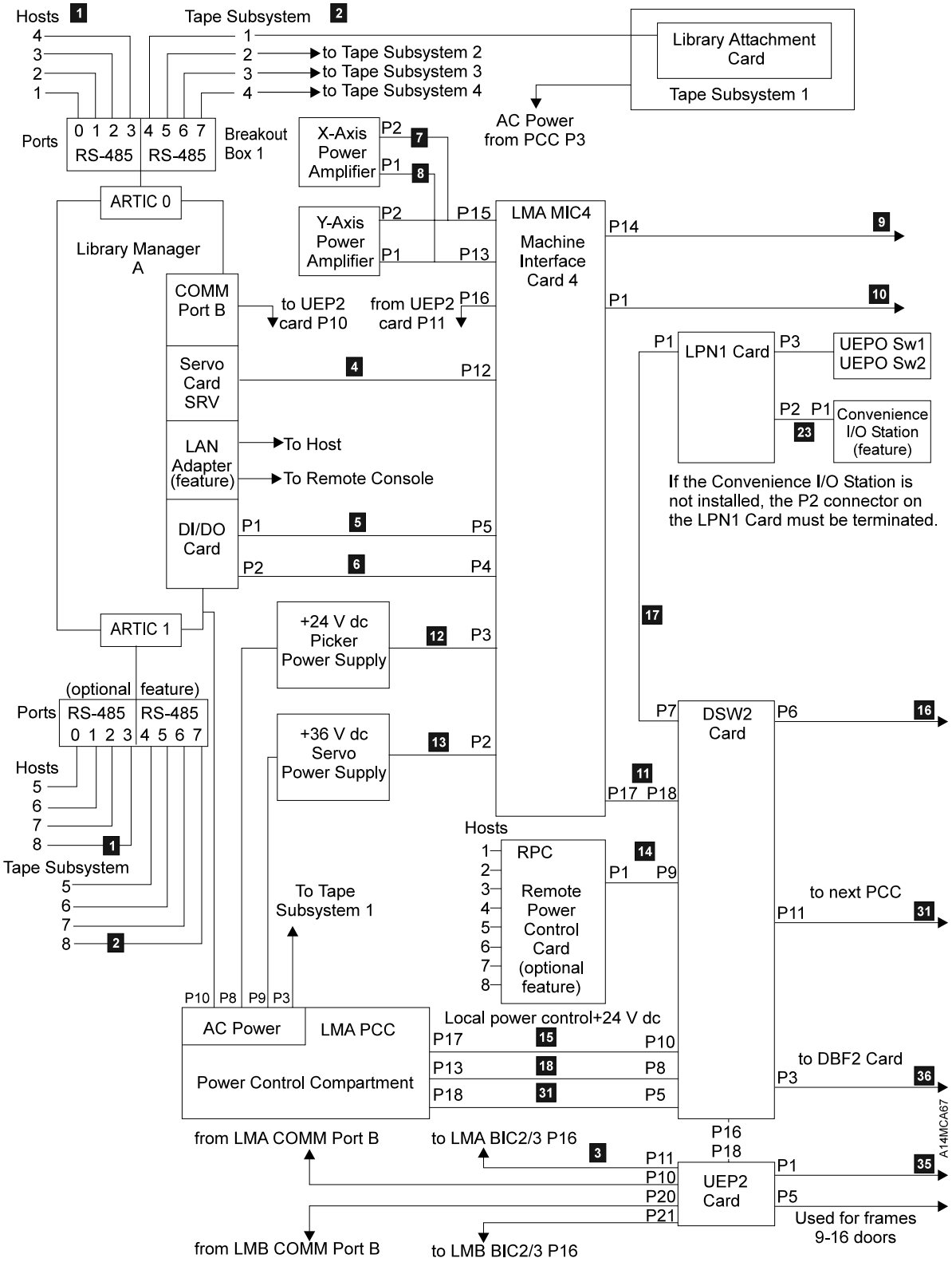

Figure 184 (Part 1 of 3). Dual Accessor Cable Diagram with MIC4/DSW2, UEP2 and DBF2 Card Set

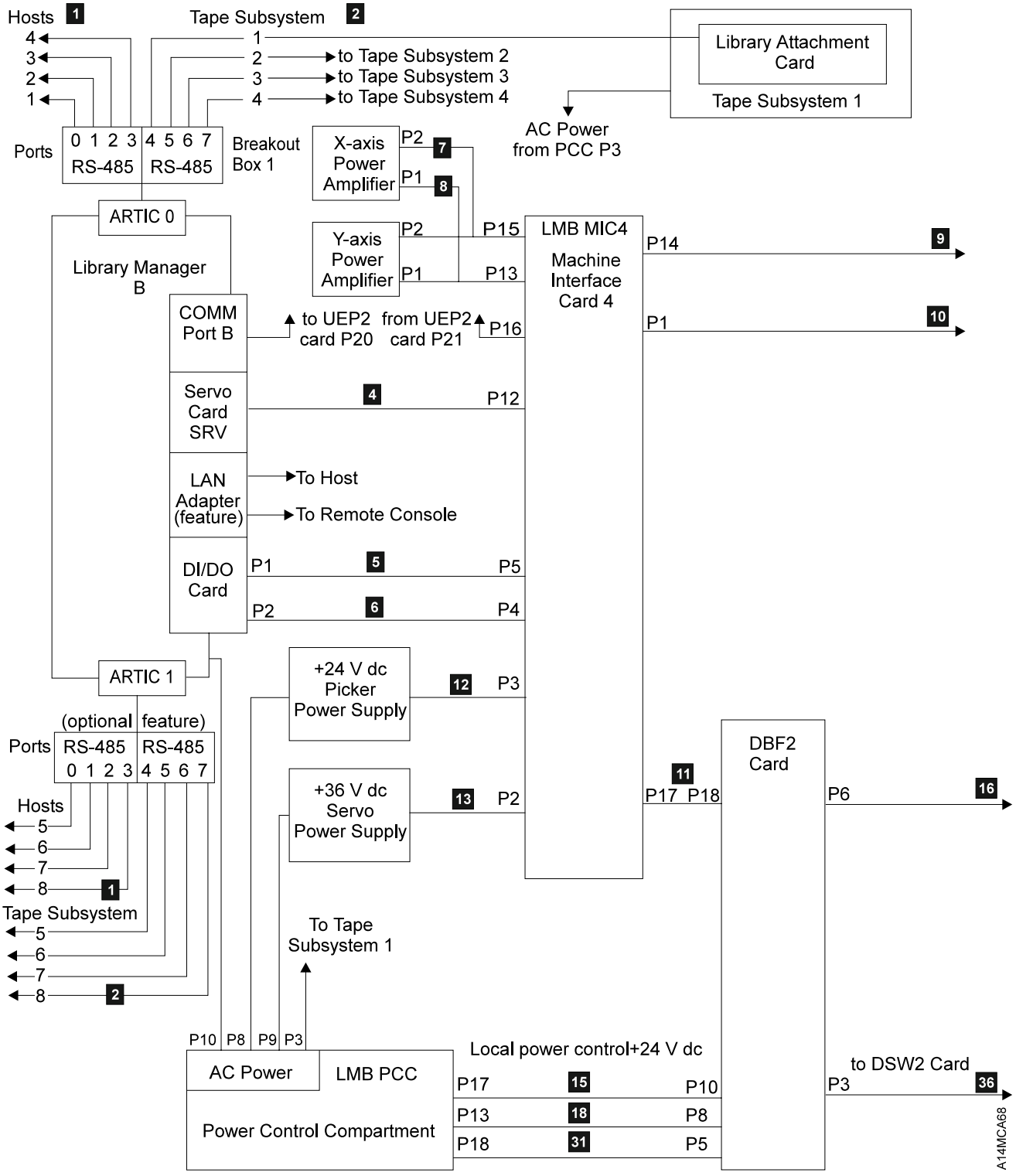

Figure 184 (Part 2 of 3). Dual Accessor Cable Diagram with MIC4/DSW2, UEP2 and DBF2 Card Set

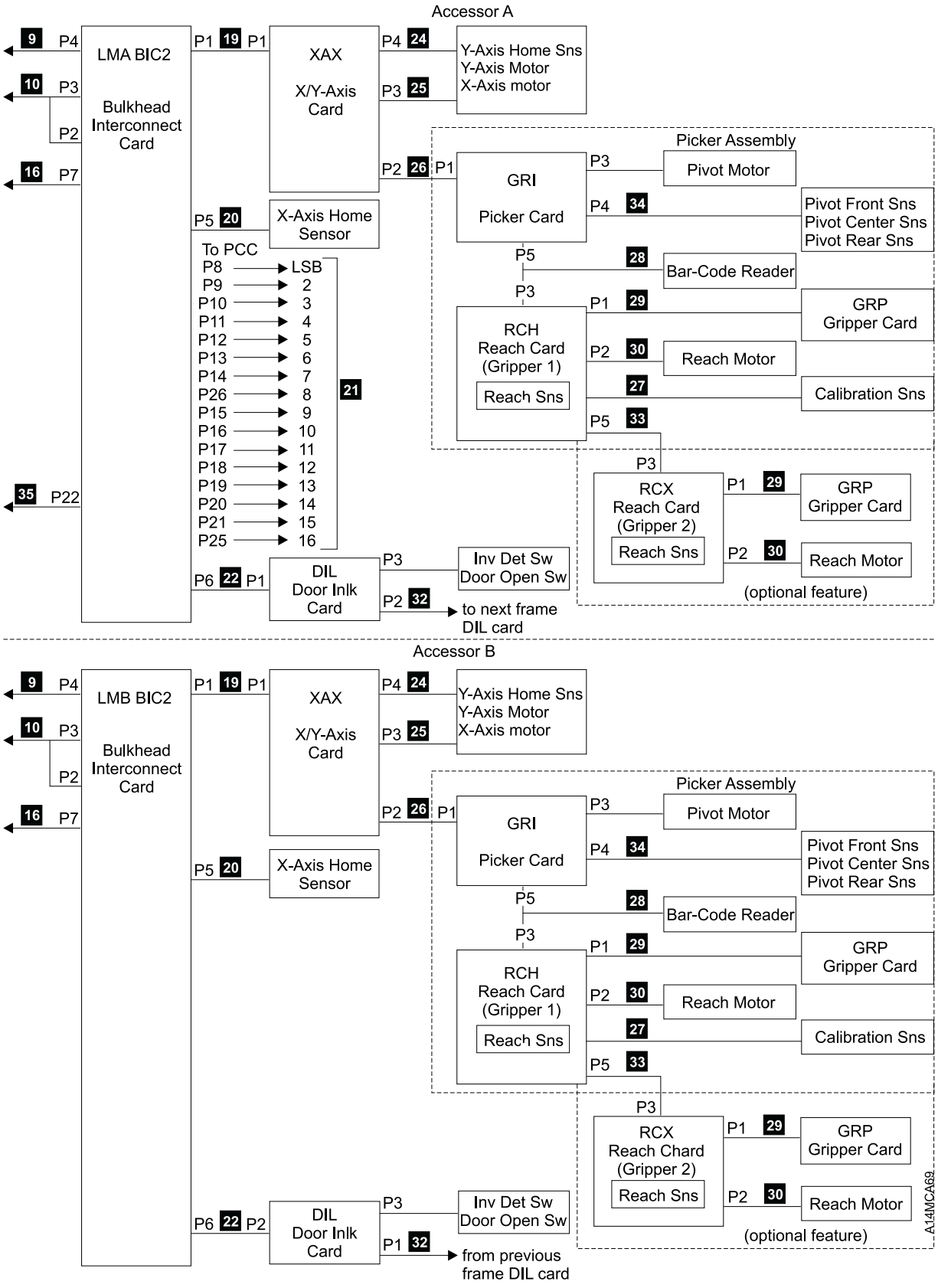

Figure 184 (Part 3 of 3). Dual Accessor Cable Diagram with MIC4/DSW2, UEP2 and DBF2 Card Set

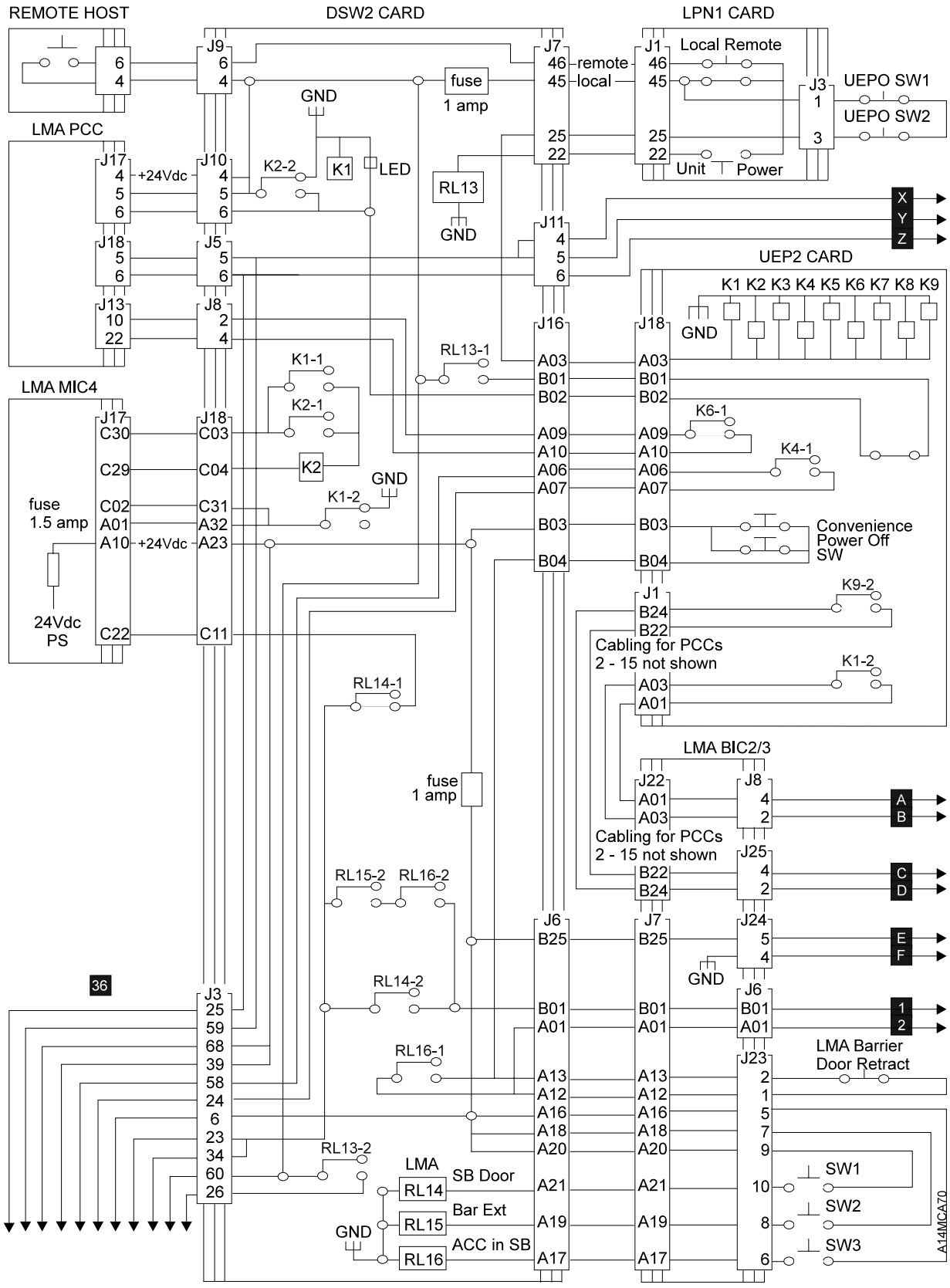

Figure 185 (Part 1 of 3). 3494 Dual Accessor UEPO, Power Control, and Safety Circuit Wiring Diagrams.

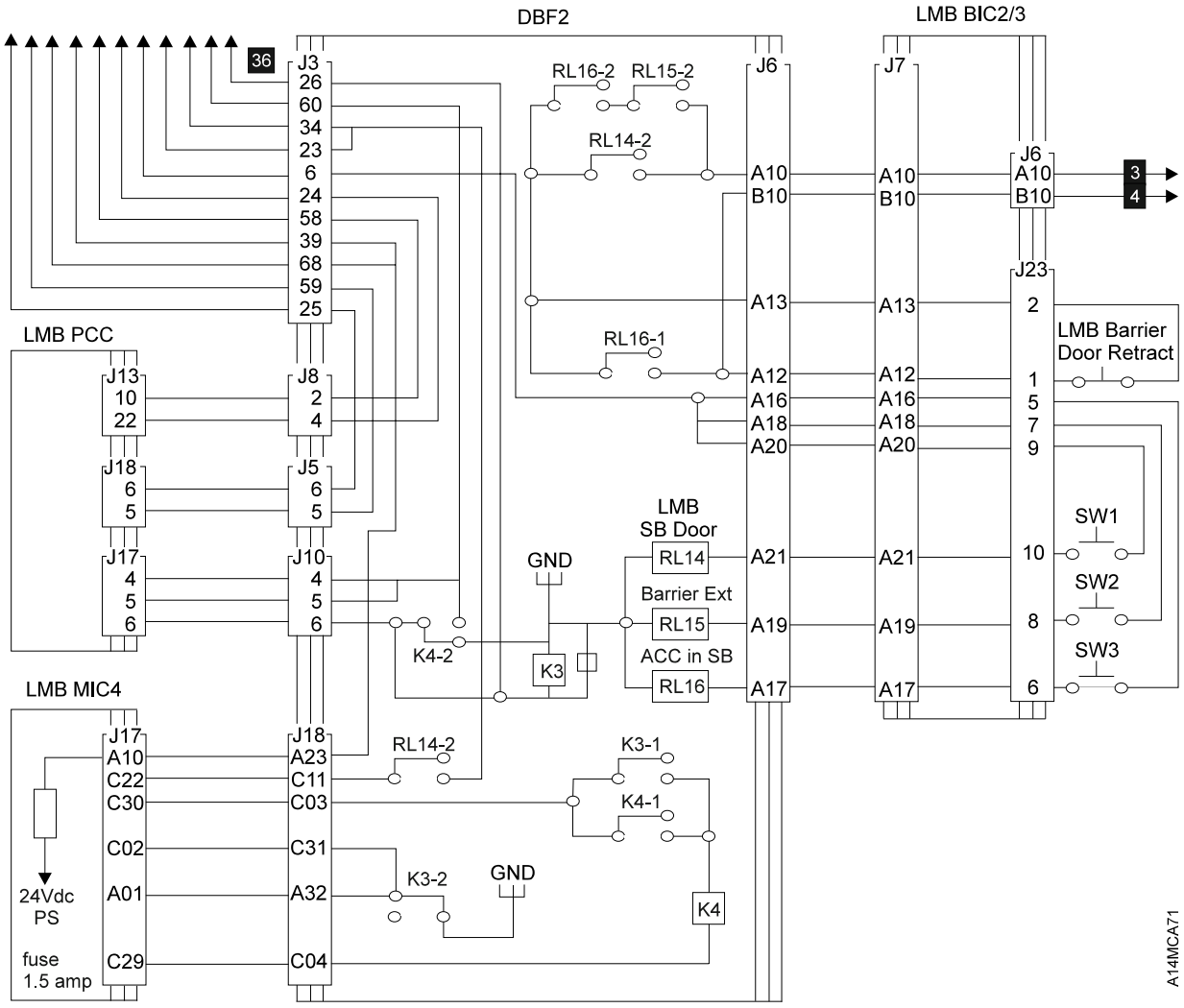

Figure 185 (Part 2 of 3). 3494 Dual Accessor UEPO, Power Control, and Safety Circuit Wiring Diagrams.

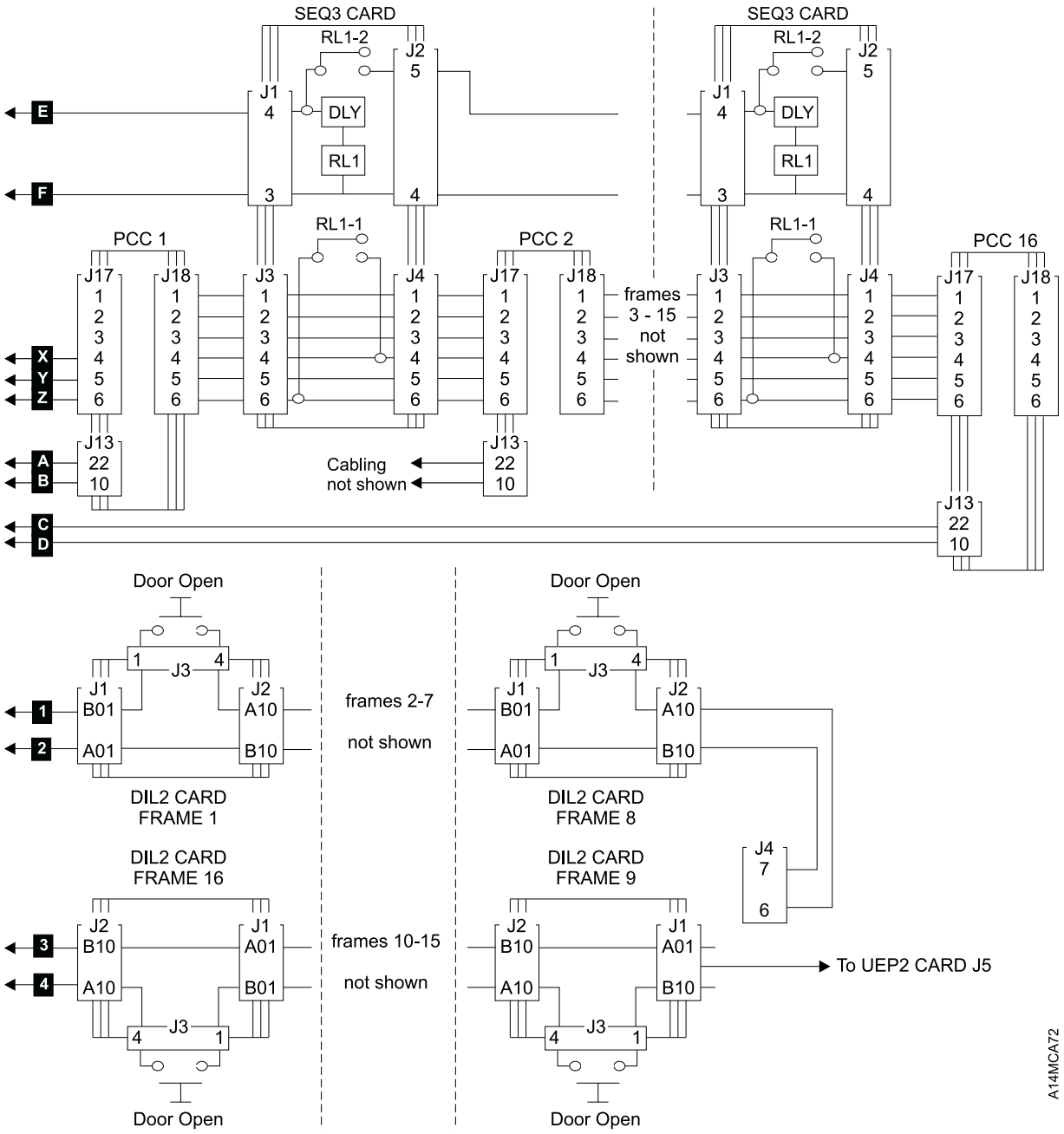

Figure 185 (Part 3 of 3). 3494 Dual Accessor UEPO, Power Control, and Safety Circuit Wiring Diagrams.

Diagnostics

Guided Maintenance

For most maintenance activities, the **Start service call**, **Verify repair**, and **Verify installation** selections on the Service pull-down automatically direct you to the appropriate diagnostics. You may also be directed by the START or CARR sections or by your next level of support to run specific diagnostic tests with specific options to further diagnose or recreate a failure.

“Test Interface” on page DIAG-9, “Exercise Cartridge Accessor” on page DIAG-11,“Service bay tests” on page DIAG-13 , “NVRAM Test” on page DIAG-11, and “Dual library manager link” on page DIAG-10 are the diagnostic tests that you can run from the service pull-down menu. The diagnostics can be run for the following reasons:

- to test a specific library function after an obvious repair
- to observe a library function for an obvious symptom
- to loop a test to recreate an intermittent problem
- to loop a test to verify a repair
- to loop a test to make or verify an adjustment

Dialog boxes allow you to select the appropriate options for the test, and **Help** is available for each test and test option.

Use the **Availability** pull-down to make library components available or unavailable as required during guided or unguided diagnostic activity.

This section includes the library diagnostic tests run from the library manager console. See the appropriate tape subsystem maintenance information manual for tape subsystem diagnosis.

This section also includes the supporting library manager functions on the service action bar. See *IBM 3494 Tape Library Dataserver Operator’s Guide* for the functions on the operator action bar and details about how to operate the library manager.

Service Mode

The Service menu in Figure 186 is displayed when you select Service mode from the library manager Operator menu.

Figure 186. Service Menu

The customer may decide to put the Service menu under password control to prevent operator access to it. If password protection is selected, the Service Password screen is displayed and the user is asked to enter the service password. If the customer did not select password protection or the correct password is entered, the Service Mode screen is displayed. The Service Mode screen provides the following options in addition to the options provided by the Operator menu:

Option	Description
Teach	Configure the library
Service	Access the Service pull-down
Availability	Set functional units to available or not available
Utilities	Access support functions

Teach Pull-Down

Figure 187 shows the teach pull-down options.

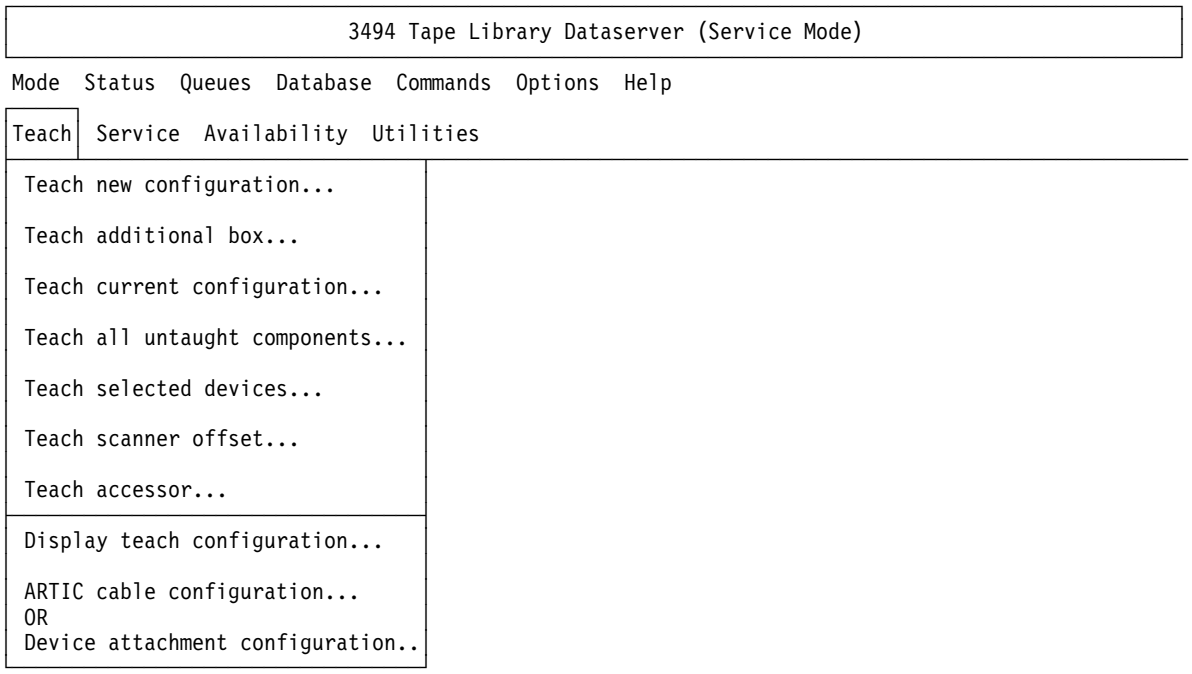

Figure 187. Teach Pull-Down

The teach options are:

Teach New Configuration: Use this option when installing a new 3494.

This option is also used if you are removing a frame from the library.

Note: When this option is run, the customer must run **Inventory new storage** to restore the cartridge inventory. If the library contains cartridges that had been previously inventoried, the category information for the tape volumes will be destroyed. The customer will need to restore the categories when the library is re-inventoried. If a VTS is installed, the logical volume ranges also need to be inserted. Refer to the 3494 Operator's Guide.

You are prompted for the following information:

- 3494 library configuration (number of frames)
- Customer ID
- Plant of manufacture
- Library sequence number
- Device ID for each tape drive
- Number of drives in tape subsystem
- Convenience I/O feature installed
- Dual gripper feature installed
- Default cartridge type (CST, ECCST, or 3590)
- Home cell mode (fixed or floating)
- High-capacity output definition (see “Configuration Options” on page DIAG-7)
- Set password protection (see “Configuration Options” on page DIAG-7)
- Set adjacent frame inventory (see “Configuration Options” on page DIAG-7)

Teach Additional Box: Use this option when you add additional frames to an existing library. This option allows the addition of expansion frames without disturbing the existing cartridge inventory in the existing frames.

In a single accessor library, it is assumed that the new expansion frame(s) is added to the end of the library. If it is not added at the end, you must run **Teach current configuration** before running **Teach additional box** to update the configuration of the existing frame positions.

In a dual accessor library, it is assumed that the new expansion frame is added just before the right service bay frame. In this case, accessor A will teach it's service bay and the new frame, and then accessor B will teach it's service bay and everything accessor A knows about including the previously installed frames. If the new expansion frame is not added just before the right service bay, you must run **Teach current configuration** before running **Teach additional box** to update the configuration of the existing frame positions.

After this option is run, the customer can load cartridges in the new storage cells and run **Inventory new storage**. Only the new frames will be inventoried and the new cartridges will be added to the cartridge inventory.

Teach Current Configuration: Use this option when the Convenience I/O Station feature is added or removed, or if you are upgrading an existing frame in the library (i.e. FC#5300 to FC#5302 MES, L10 to L12 MES, D10 to D12 MES, etc.). This option is also used to modify library configuration information such as password protection, inventory adjacent frame, or high capacity output definition.

You may also use this option when a re-teach of the library is needed following FRU replacement or when intermittent errors are occurring and a re-teach may correct the problem.

Teach All Untaught Components: Use this option to restart an interrupted teach from the point it was interrupted or to complete teach on components that were skipped during the last teach operation.

Teach Selected Devices: Use this option to re-teach tape drives following any maintenance activity where the drive was removed from the sleeve and/or slides, or the loader assembly was removed from the drive. This allows you to re-teach selected drives without impacting customer operation before they are put back online.

The **Teach selected devices** function allows drives to be re-taught while the library is Online in Auto mode. A device must be marked as unavailable to be taught. Use the **Tape Subsystem Availability** option on the **Availability** pulldown menu to make a device unavailable.

The list displays only devices that are marked as unavailable. Highlight the devices to be taught from the device list and then select **Teach drives**. The selected devices will be taught while other accessor actions are performed.

If you have a Model HA1, only the active (or selected) accessor is taught. You must rerun this option to teach the second accessor.

Teach Scanner Offset: This option is available in LM code level 520 or later.

Use this option to teach an accessor after you have replaced or adjusted the barcode reader on the accessor. This option should be run with the library online and the accessor active (either full aisle or dual active) to minimize the impact to operations.

Teach Accessor: Use this option to teach an "untaught" accessor when you want to make it available for use in a dual accessor library. A teach current configuration operation will be performed for the selected accessor on the entire library. At the end of a successful **Teach accessor** operation, the newly taught accessor will be available for use.

You may also use this option when a re-teach of the accessor is needed following FRU replacement or when intermittent errors are occurring and a re-teach may correct the problem.

Display Teach Configuration: This option is available in LM code level 520 or later.

Use this option to display the current teach configuration for each frame in the library.

ARTIC Cable Configuration: This option is available in LM code levels before 518.

Use this option to confirm that you installed the ARTIC cables correctly in “ARTIC Port Assignments” on page INST-98 after you have successfully run Teach on the library. This option will give the ARTIC port assignments for your library based on the information you entered during the Teach operation.

Device Attachment Configuration: This option is available in LM code level 518 or later.

Use this option to confirm that you installed the ARTIC cables correctly in “ARTIC Port Assignments” on page INST-98 after you have successfully run Teach on the library. This option will give the ARTIC port assignments for your library based on the information you entered during the Teach operation.

| This option can also be used to display the IP address for each LAN attached Model B18 VTS or 3590
| Model A60 if any are installed.

Configuration Options: The configuration options are:

High-capacity output

Use this option to define the high-capacity output area located in column A on the control unit door. If the customer does not want the high-capacity output, select **none**. If the customer wants this option, you can select a 10, 20, 40, 80, or full door cartridge high-capacity output area.

Notes:

1. The high-capacity output option reduces the library cartridge storage capacity by 10 to 160 cartridges depending on the option selected.
2. Instead of the high-capacity output area in the L1x frame, you can define a high-capacity input/output area on the back wall of one of the D1x or S10 expansion frames. Refer to “High-Capacity Output or Input/Output Facility” on page INTRO-10.

Password required?

Use this option to activate or deactivate password protection as desired by the customer, for the system administrator and service levels. If password required is **yes**, the service password pop-up window is displayed when service mode is selected on the operator menu and the service password **service** must be entered before the service mode menu is displayed. This password may also be used when the system administrator password (set by the customer) is requested. If password required is **no**, the service mode menu is displayed when service mode is selected on the operator menu.

Adjacent frame inventory update?

Use this option to activate or deactivate an inventory operation as desired by the customer, of the frames next to the frame that had its operator door opened. If adjacent frame inventory is active, the adjacent frames and the frame with the opened door are inventoried when the door is closed and the library is set to auto mode and the online state. If adjacent inventory is inactive, only the frame with the opened door is inventoried.

Service Pull-Down

Figure 188 on page DIAG-8 shows the Service pull-down.

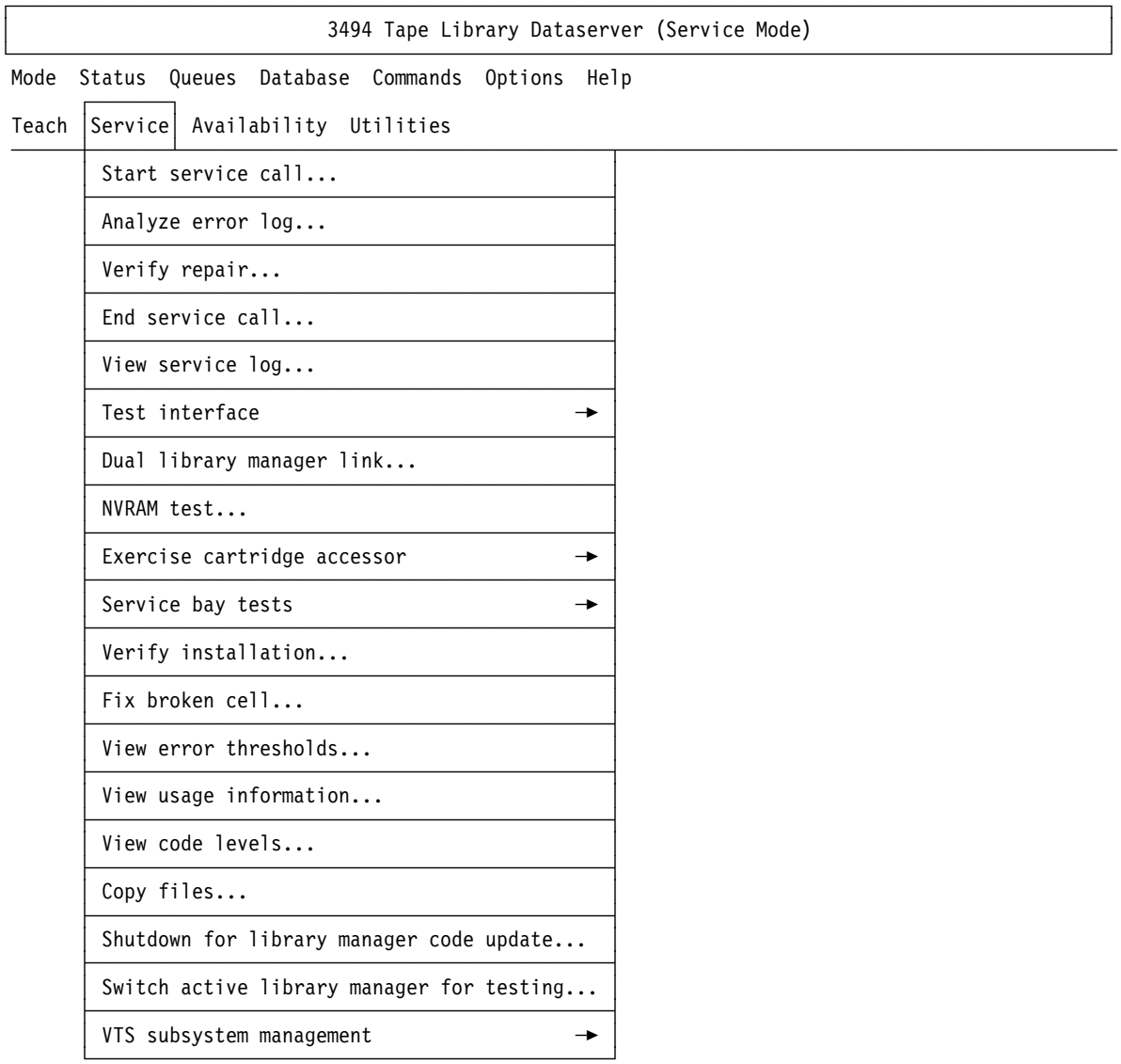

Figure 188. Service Pull-Down

Start Service Call: Select **Start service call** from the Service pull-down for most maintenance activities. You are prompted to verify that the problem is a cartridge library problem. Select **Help** to determine the failing unit. If the problem is in the tape subsystem, you are directed to the Start section of the appropriate tape subsystem maintenance information manual.

The options are:

Start service with fault symptom code (FSC)
The library manager displays the most likely FSC for this service call and selects the FSC. In addition, it displays the previous 4 possible FSCs, if any. You can perform maintenance for the selected FSC (recommended action), select any displayed FSC, or enter an FSC. When you select **OK**, the library manager runs the appropriate service procedure.

Start service for other symptom
The cartridge library visual, noise, odor, or vibration symptoms are displayed. Select **Help** to describe each symptom. When you select **OK**, the library manager runs the service procedure for the selected symptom.

Start service for call-back

The last service log entry is displayed. You are prompted to select **OK** if the symptoms are the same or to return to the previous start service call options. When you select **OK**, the library manager displays the complete FRU group (primary and secondary) for the FSC with the FRUs replaced on the previous calls flagged. If all of the FRUs have not been replaced, you are prompted to select **OK**. When you select **OK**, the library manager runs the appropriate service procedure. If all of the FRUs have been replaced, you are directed to the next level of support and prompted to return to the start service call options screen. You can return to the Service menu or exit service mode.

Resume service after interruption

The library manager analyzes the last service log entry to determine where service was interrupted. It displays the logical resume points and selects the interrupted procedure. You can start at the selected resume point or return to the start service call options. When you select **OK**, the procedure for the selected resume point is run.

Each service log entry for a call contains the following information:

Resume call trace information
Date and time of call start and end
Error code used for call
FRUs replaced for call
TAC code for replaced FRUs
User comments for call

Analyze Error Log: Use this option to analyze the library manager error log entries. This selection identifies the record group for an event, filters out the information records, and displays the error code for the significant error record. All significant error records are displayed for the time period that was selected. The default is for the last 8 hours.

Verify Repair: You can select **Verify repair** from the start service call procedures or from the **Verify repair** option on the Service pull-down. Select this option after making an obvious repair (like seating a loose cable) and verify that the library is functional without doing the start service call procedure.

The most likely FSCs are displayed. You can run the verify procedures for the selected FSC (recommended action), select any displayed FSC, or enter an FSC. If the diagnostics run without error, the end call procedure is run.

End Service Call: You can start the end service call procedure from the start service call procedures, from the verify repair procedure, or from the **End service call** option on the Service pull-down. You can select this option after any unguided maintenance activity.

A blank service log entry is displayed and you are prompted to enter the appropriate information for this call. When you complete the entry and select **OK**, the information is saved. If you do not enter the date and time information, the current date and time is entered for the call end time and the start call time.

View service log: Use this option to view the service log entries for the local assessor.

Test Interface

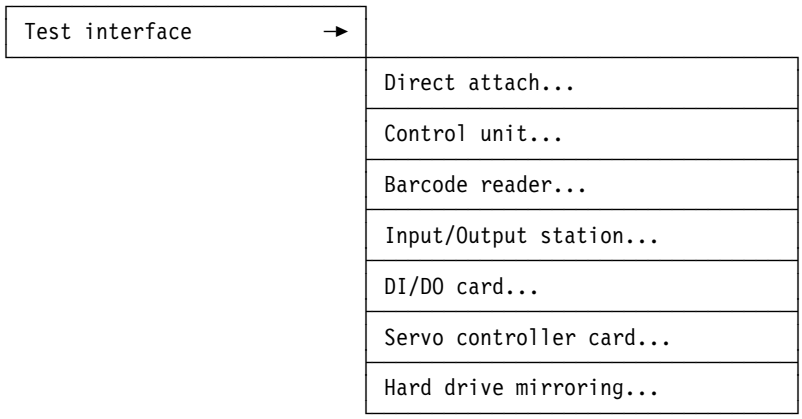

Figure 189. Test Interface Pull-Down

Select **Test Interface** on the Service pull-down to run the library internal interface tests. Each of these tests can be run in pause mode or auto mode. They can be looped to help isolate intermittent failures. The display follows:

Direct Attached Host
Test the library RS-232 or LAN interface to each host. Up to eight hosts can be attached through ARTIC ports 0 through 3 and 8 through B or via a LAN adapter feature. If feature 5228 (Tape Control Unit Expansion) is installed, these ports are converted to tape subsystem ports.

Control unit
Test the library RS-422 interface to each tape subsystem. Up to 16 3490E or 3590 control units or 16 SCSI attached 3590 tape drives can be ARTIC attached if feature 5229 (Expansion Attachment Card) and two feature 5228 (Tape Control Unit Expansion) are installed.

Bar-code reader
Test the library RS-232 interface to the bar-code reader. The bar-code reader is attached to the Comm B serial port on the library manager.

Input/output station
Test the interface to the Convenience Input/Output Station feature. You are prompted to verify the operation of the Convenience I/O station door.

DI/DO card
Test the DI/DO interface to the library accessor. The status of each digital input and digital output is displayed. Short, medium, and long loop-back tests help isolate cable and card failures.

Note: Not all lines are tested.

Servo controller card
Test the servo controls to the library accessor. You can move the accessor left, right, up, or down in increments that you selected or in full axes moves.

Hard drive mirroring
Display the status of the primary and mirror hard drives, and whether mirroring is enabled or disabled. This menu item cannot be selected if mirrored hard drives are not installed.

Dual library manager link: The dual library manager link test pings the other library manager in the Model HA1 configuration on either the primary or alternate ethernet link. The user is prompted for the link to test.

This test can run from either the active or standby library manager.

NVRAM Test: The NVRAM test displays the contents of the non-volatile random access memory used by the Model HA1 dual library manager configuration. If the displayed values are all zero, then the test was unable to read the NVRAM contents.

This test can run from either the active or standby library manager.

Exercise Cartridge Accessor

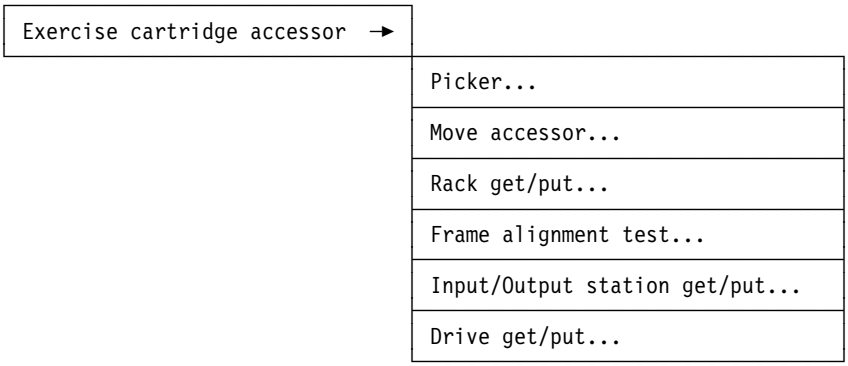

Figure 190. Exercise Cartridge Accessor Pull-Down

These tests require the full library aisle and are primarily used to diagnose problems in a single accessor library.

Select **Exercise cartridge accessor** on the Service pull-down to run the library accessor tests. The 3494 must be in auto mode and offline (except for the Drive get/put) to run these tests. You can loop the tests to help isolate intermittent failures. The options are:

Picker
Exercise the reach, grip, and pivot functions of the picker. You can open and close the cartridge gripper, reach and retract the grip assembly, and pivot the picker. Each function is activated when the picker is in a safe position for the associated move.

Move Accessor
Exercise the accessor by moving it in the vertical and horizontal directions. Movements from home to the full length of each axis for the library configuration are tested.

Frame Alignment Test
This test ensures that the cartridge accessor can put cartridges into and get cartridges from 3 cells in each storage rack of selected frames. The test uses the upper cell next to the fiducial, the lower cell in the A column, and the upper cell in the C column. The cells must be free and the library manager must be in the Offline state and in Auto mode.

Rack Get/Put
Exercise the accessor by removing cartridges from their storage cells and returning them. The default for the test is the CE cartridge in storage cell 1A20. You can select any or all of the storage cells in the library.

Input/Output Station Get/Put
Exercise the accessor by placing the CE cartridge in an input/output station cell and returning it to the CE cartridge storage cell. You can select any or all of the I/O station cells for the test.

Drive Get/Put
Exercise the cartridge accessor by having it place the CE cartridge in a drive, verify that it loads correctly, unload the cartridge from the drive, and return it to the CE cartridge storage cell. You can select any or all of the drives in the library for the test.

You can run this test while the library is in Auto, Online mode concurrent with customer use of the library to check out a tape drive before it is returned to use after service. The tape drive must be re-taught (if needed) and available to the LM. The tape drive should be offline to the hosts and VTS controller.

If the library is online and the drive get/put test fails with the CE cartridge in the drive, pause the library, remove the cartridge and put it into the error recovery cell. When the door is shut and the library is put into auto, it will attempt to put the CE cartridge away. If the CE cartridge is ejected, place it manually into it's CE cell and run Verify installation on the appropriate accessor to correct the database information.

Notes:

1. The correct type of CE cartridge (3490 or 3590) must be in the CE cell for the drives used in the library. If the library has both type of drives, a CE cartridge for each type of drive must be in the library in the appropriate CE cell. Refer to Figure 282 on page INST-120 for the location of the CE cells.
2. With the Dual Gripper feature installed, gripper 2 can be selected if the library is offline. When the library is online, gripper selection is disabled. The gripper used is determined by a performance algorithm.

Service bay tests

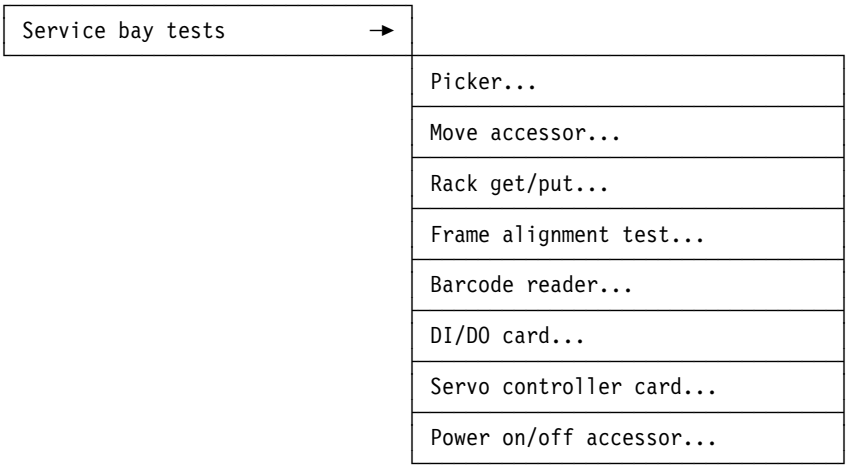

Figure 191. Service Bay Tests Pull-Down

These tests run in the service bay for the accessor and may be used to diagnose accessor problems while the customer continues to use the other accessor.

Note: The service bay tests can not be run if the library is in Manual mode.

Select **Service bay tests** on the Service pull-down to run the library accessor tests. The service bay barrier door and front door must be closed in order to run the tests. You can loop the tests to help isolate intermittent failures. The options are:

Picker
Exercise the reach, grip, and pivot functions of the picker. You can open and close the cartridge gripper, reach and retract the grip assembly, and pivot the picker. Each function is activated when the picker is in a safe position for the associated move.

Move accessor
Exercise the accessor by moving it in the vertical and horizontal directions. Movements from home to the other side of the service bay are tested.

Rack get/put
Exercise the accessor by removing CE cartridges from their storage cells and returning them. The default for the test is the CE cartridge in storage cell 1D20.

Frame alignment test
This test ensures that the cartridge accessor can put cartridges into and get cartridges from cells in each storage rack of the service bay.

Barcode reader
Test the library RS-232 interface to the bar-code reader. The bar-code reader is attached to the serial port B on the library manager.

DI/DO card
Test the DI/DO interface to the library accessor. The status of each digital input and digital output is displayed. Short, medium, and long loop-back tests help isolate cable and card failures.

Note: Not all lines are tested.

Servo controller card
Test the servo controls to the library accessor. You can move the accessor left, right, up, or down in increments that you selected or in full service bay moves.

Power on/off accessor

Power the accessor in the service bay on or off.

Verify Installation: You can start the verify installation procedure from the **Verify installation** option on the Service pull-down. Select this option when a library is installed or upgraded to verify that the library is operating correctly before turning it over to the customer.

When you select this option, you are guided through the complete set of library diagnostics to verify that the interfaces are functional and that the cartridge accessor is operating correctly. If a failure is detected by any of the diagnostics, use the **Start service call** option on the Service menu to determine the appropriate repair action.

Fix Broken Cell: Use this option to search the database to list storage cell locations marked as broken (unusable). You can select storage cells to be made available for use.

View Error Thresholds: Use this option to display the current error counts for all items that have error thresholds maintained.

View Usage Information: Use this option to display the current usage counts for the gripper and distance traveled for the accessor.

View Code Levels: Use this option to display the EC levels of all of the library manager and accessor manager software components.

Copy Files: Use this option to copy selected dump and log files on the library manager hard disk to a diskette in drive A.

Shutdown for library manager code update: Use this option to shutdown the library manager when you want to install an emergency fix (Fix Pack) for the LM code on the standby library manager. The LM will shutdown and display the shutdown window.

Switch active library manager for testing: Use this option to do a temporary switchover to the standby library manager for interface testing from the standby library manager.

VTS subsystem management:

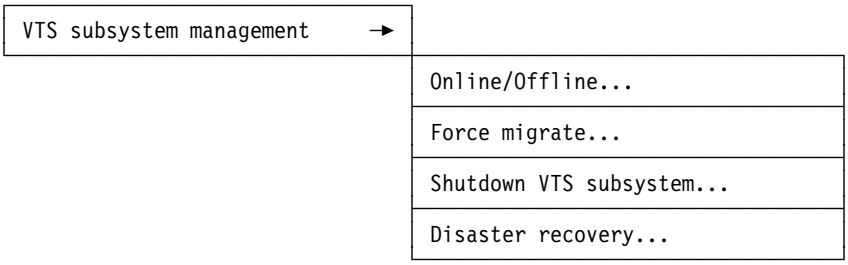

Figure 192. VTS Subsystem Management Pull-Down

A brief description of the VTS subsystem management options is provided in this section. Refer to the *IBM 3494 Model B16 VTS Maintenance Information* manual for information on how and when to use each option. The options are:

Online/Offline
Use this option to take the VTS subsystem offline for service or to put the VTS subsystem back online after completing a service action.

Force migrate
Use this option to initiate a forced migrate of a VTS's data from cache to tape. A migrate completion message will be displayed when the forced migrate has completed.

Shutdown VTS subsystem
Use this option to safely shutdown the 3494 VTS controller. The shutdown option will vary all devices offline, shutdown all code processes, and power off the VTS controller.

Disaster recovery
Use this option in the event that the DASD is replaced or to recover the database in the event of other loss. Follow the instructions on the screens and refer to help as needed to complete the procedure. A disaster recovery message will be displayed when the procedure has completed successfully.

Service Pulldown Active Items: Figure 193 shows the availability of each service function on the Service pulldown for each library manager/local accessor state. **Y** indicates that the function is available. **N** indicates that the function is not available and can not be selected (grayed out).

Figure 193. Service Pulldown Active Items

Function	LM: Active Local Acc: Active	LM: Active Local Acc: Standby	LM: Standby Local Acc: Active	LM: Standby Local Acc: Standby
Start call	Y(1)	Y	N	Y(3)
Analyze error log	Y	Y	Y	Y
Verify repair	Y(1)	Y	Y(3)	Y(3)
End service call	Y	Y	Y	Y
View service log	Y	Y	Y	Y
Test interface	Y(2)	Y for Host/TCU attach	N	N
Dual library manager link	Y if DLM	Y if DLM	Y if DLM	Y if DLM
NVRAM	Y if DLM	Y if DLM	Y if DLM	Y if DLM
Exercise cartridge accessor	Y(2)	Y for all except Picker	N	N
Service bay tests	N	Y if DLM(3)	N	Y if DLM(3)
Verify installation	Y(1)	Y	N	N
Fix broken cell	Y	Y	N	N
View error thresholds	Y	Y	Y	Y
View usage information	Y	Y	Y	Y
View code levels	Y	Y	Y	Y
Copy files	Y	Y	Y	Y
Shutdown for library manager code update	N	N	N	Y
Switch active library manager for testing	Y	Y	N	N
VTS subsystem management	Y	Y	N	N

Notes:

1. You must disable dual active accessors and the library must be in Pause/Offline.
2. You must disable dual active accessors and the library must be in Auto/Offline.
3. The accessor must be marked for service.

Availability Pull-Down

Figure 194 shows the Availability pull-down options.

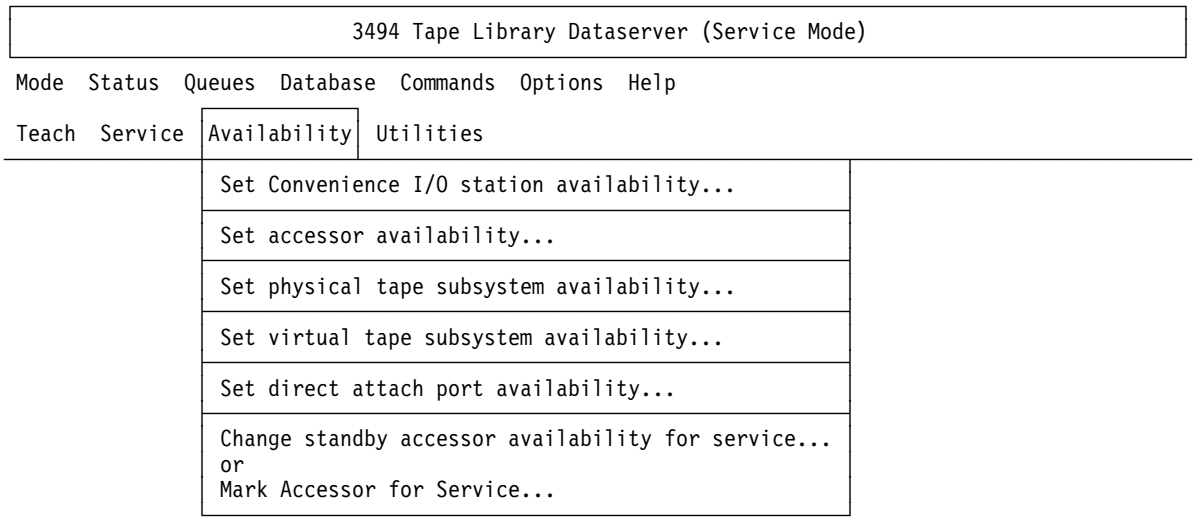

Figure 194. Availability Pull-Down

The Availability options are:

Set Convenience I/O Station Availability: Use this option for setting the convenience I/O station to available or unavailable. This option is not active if the Convenience I/O Station feature is not installed.

Set Accessor Availability: Use this option for setting the cartridge accessor assembly and its components to available or unavailable. This option is only available when the library is in pause or manual mode.

Set Physical Tape Subsystem Availability: Use this option for setting the native tape subsystem ports and tape devices to available or unavailable.

Set Virtual Tape Subsystem Availability: Use this option for setting the VTS virtual devices to available or unavailable.

Set Direct Attach Port Availability: Use this option for setting the direct attach host ports to available or unavailable.

Change standby accessor availability for service: This option is available in LM code level 516 through 519.

Use this option to put the standby accessor into service mode or to return the standby accessor to standby mode after a service action.

Mark Accessor for Service: This option is available in LM code level 520 or later.

Use this option to put an accessor into service mode or to return the accessor to standby or dual active mode after a service action.

Utilities Pull-Down

Figure 195 on page DIAG-18 shows the Utilities pull-down options.

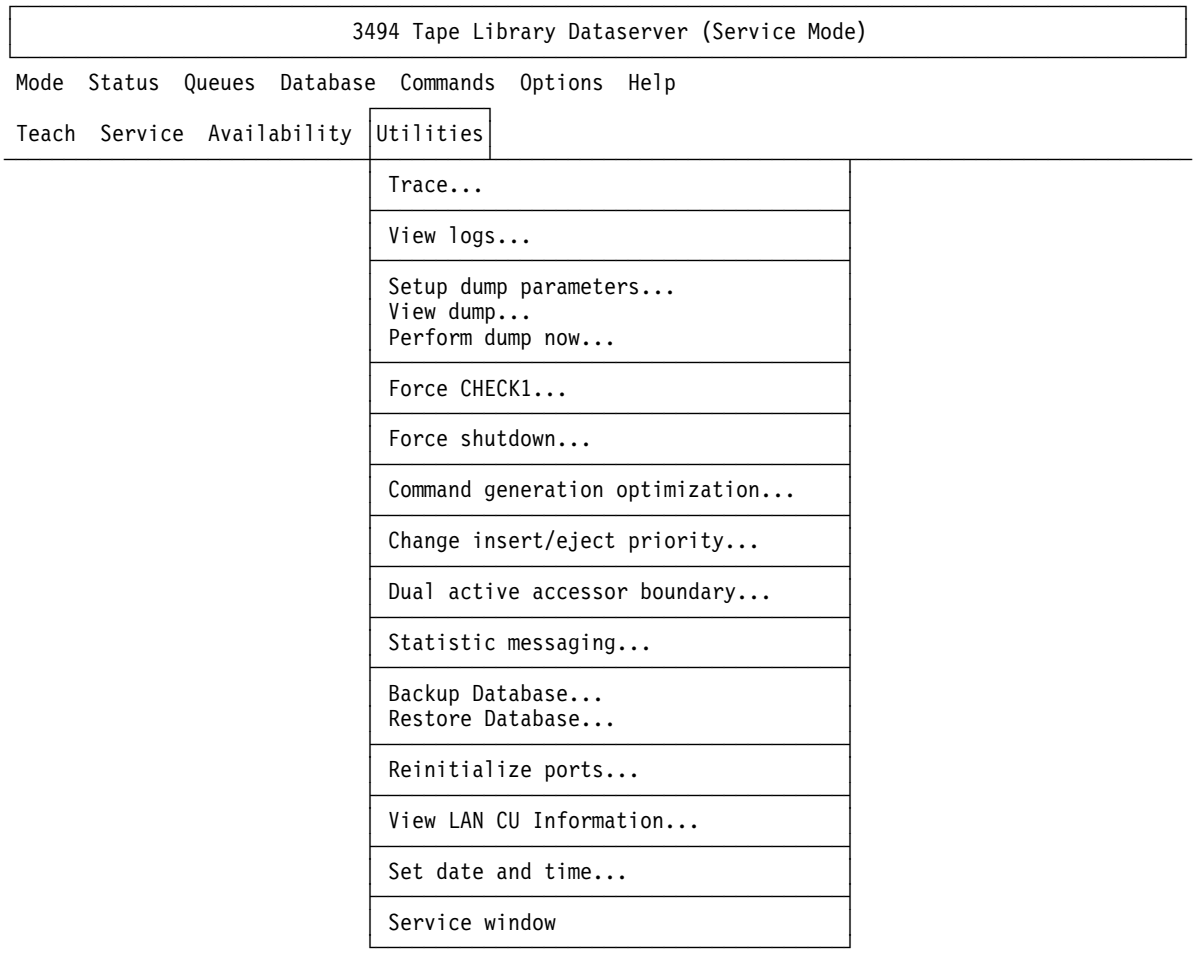

Figure 195. Availability Pull-Down

The Utilities options are:

Trace: Use this option to control the trace features of the library manager. You can set the trace feature on or off, change the trace level, and trace individual library manager components.

View Logs: Use this option to display a list of the error and transaction logs. You can view selected logs.

Set Up Dump Parameters: Use this option to set up the parameters for a dump.

View Dump: Use this option to view any of the normal dump files and the temporary selective dump file. Select which dump file to view from a list of the dump files. This list shows the data and time of the dump, the reason for the dump, and the error code and error recovery procedure code that caused the dump.

Perform Dump Now: Use this option to cause the library manager to dump trace data to a file immediately. This option is the same as pressing the Ctrl+Shift+F12 keys and is commonly called the keystroke dump.

Force CHECK1: Use this option to force a library manager Check 1 error if directed by the support center. The library manager will take a dump, shutdown, and reinitialize.

Force Shutdown: Use this option to force a library manager shutdown if directed by the support center. This option should only be used in case of emergency when the library manager code is in a hang condition.

Command Generation Optimization: Use this option to enable command generation optimization on or off. When Service mode is exited, the optimization is automatically turned on if it has been turned off.

Change Insert/Eject Priority:

Dual active accessors boundary: This option is available on LM code level 520 or later.

This option displays the current location of the accessor boundary and whether the boundary is in fixed or floating mode. Changing the accessor boundary and boundary mode are also allowed from this panel. The library must be in pause when the boundary is changed.

Statistic messaging: This option is available on LM code level 522 or later.

This option allows the user to disable the top-of-the-hour statistic attention message. The message can be disabled while the library is online and operating.

Backup Database to Diskette: This option is available on LM code levels before 520.

Use this option to backup a database to diskette. After confirmation, you are instructed to place blank diskettes into the library manager to backup the database.

Backup Database: This option is available on LM code level 520 or later.

When this option is selected, you are prompted whether to backup the database to diskette or to the hard drive. The backup is a new format that is created using the database export utility. Once the data is exported from the database it is compressed using SAVERAM. This compressed format requires less space for storage of the backup. If you select to save the backup to the hard drive it is saved on the D:\LM\DBK directory if the second hard drive feature is installed. If the second hard drive is not installed it is saved on the C:\LM\DBK directory. The \LM\DBK directory is also used for exporting database tables when the database is backed up to diskette. The library must be in Offline, Pause mode before this backup can be performed.

Restore Database from Diskette: This option is available on LM code levels before 520.

Use this option to restore the database from a diskette. After confirmation, you are instructed to place the backup database copy diskettes into the library manager to restore the database from a previous backup.

Restore Database: This option is available on LM code level 520 or later.

When this option is selected, you are prompted whether to restore the database from diskette or from the hard drive. For a database backup that was performed using LM code level 520 or later, the database export tables are restored from the compressed file to the D:\LM\DBK directory if the second hard drive feature is installed or to the C:\LM\DBK directory if the second hard drive is not installed. These files are then imported back into the database using the database import utilities. The old format of database backup to diskette on LM code levels before 520 is also supported. After the database is restored, the LM must be shutdown to initialize with the restored database.

Reinitialize Ports: Use this option to reinitialize device ports that have gone unavailable. This can be done concurrent with library operation.

View LAN CU Information: Use this option to display basic internal LAN information for each LAN attached control unit.

Set Date and Time: Use this option to set the date and time on the library manager.

If you have VTS subsystems installed, you must use the following procedure to change the date and time:

1. Take the library offline and put it in Pause using the LM Mode pulldown.
2. Take the VTS subsystem(s) offline using the **VTS subsystem management** option on the Service pulldown.
3. Change the Date and Time using this option.
4. Put the VTS subsystem(s) back online.
5. Put the library in Auto mode and Online.

Service Window: This option displays an OS/2 window for your use. You can use this window to work with the operating system and files. This option is generally used under the direction of product engineering.

Library Manager Diagnostics

All the prompts from the library manager are not presented, so if you need details about operating the library manager, see *IBM 3494 Tape Library Dataserver Operator's Guide*.

PS/ValuePoint System Unit Tests

1. The library must be offline. Go to "Single Library Manager Service Preparation" on page CARR-91.
2. Insert the PS/ValuePoint Diagnostics (Type 2) diskette in the library manager diskette drive.
3. Press Ctrl+Alt+Del to IML the library manager.
4. Press Enter at the Logo screen.
5. From the Main menu, select **2 - Test the system** and press Enter.
6. Unless you are going to test the diskette drive, ignore the prompt **Need a blank formatted diskette...** by pressing **Enter**.
7. From the **Select an option** prompt, select **0 - System checkout** and press Enter.
8. Press Enter for a list of devices. The list should be:

   1 System unit
   2 16000KB memory
   3 Keyboard
   6 1 diskette drive
   9 System board parallel port
   11 2 System board serial ports
   17 1 fixed disk drive
   24 Video graphics array
   86 Mouse

   If any item on the list is missing, assume a fault exists and replace the FRU. (Items 1, 9, 11, and 24 are on the system board.) The adapter cards installed in the library manager are not listed.
9. At the **Is the list correct Y/N** prompt, select **Y** and press Enter.
10. At the System Checkout menu, select **0 - Run tests one time**.
11. From the **Select option numbers from list** prompt, select the required test.

1–System Unit: The test should flash **100** to indicate a successful completion.

2–Memory: The test should flash **200** to indicate a successful completion.

3–Keyboard: The test flashes **300** to indicate a successful completion.

6–Diskette Drive: You need a blank formatted diskette for this test. The test flashes **0600** to indicate a successful completion.

9–System Board Parallel Port: This port is not used.

The test flashes **0900** to indicate a successful completion. For any other **09xx** indication, replace the system board.

11–System Board Serial Ports: Select **Y** from the **External wrap test? Y** prompt.

1. At the **Install wrap plug on system board serial port A** prompt, remove the cable from serial port B to make additional room to install the wrap plug. (See “System Unit” on page LOC-34.)
2. Insert wrap plug P/N 72X8546 in communication port A and press Enter.
3. To test serial port B, remove the track ball cable next to communication port B and insert the wrap plug in port B. You may need to push the keyboard cable away from the wrap plug as you insert the wrap plug in port B.
4. Press Enter. The test should flash **1100** to indicate a successful completion.

17–Fixed Disk: Select **5,C** to run all the tests on drive C. The test flashes **1700** at the end of each of the 4 tests to indicate a successful completion.

Select **9** to return to the control program.

24–Video Graphics Array: This test does not work on this model.

86–Mouse: The bottom buttons next to the track ball correspond to the left buttons on the screen.

The top buttons next to the track ball correspond to the right buttons on the screen.

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1. The library manager must be offline.
   a. If you have a single LM, go to “Single Library Manager Service Preparation” on page CARR-91.
   b. If you have a dual LM, go to “Dual Library Manager Service Preparation” on page CARR-91.
2. Insert the Industrial Computer Diagnostics diskette in the library manager diskette drive.
3. Press Ctrl+Alt+Del to IML the library manager.
4. Press Enter at the Logo screen.
5. From the Main menu, select **1 - Test the system** and press **Enter**.
6. Unless you are going to test the diskette drive, type **N** and press **Enter** in response to the prompt, **Would you like to create a Test Diskette?**.
7. Diagnostic programs will be loaded. A message will be displayed briefly indicating that external cache memory is not installed.
8. The following list of detected devices should be displayed:

   1 Processor unit
   2 System board
   3 Keyboard
   4 Pointing device
   5 16MB memory
   6 Super VGA display
   7 System board parallel port
   8 2 System board serial ports
   9 1 Diskette drive
   10 1 or 2 Hard disks

   If any item on the list is missing, assume a fault exists and replace the FRU. The adapter cards installed in the library manager are not listed.

9. At the **Is this list correct** prompt, select **Y** and press **Enter**.
10. At the System Checkout menu, select **1 - Run tests one time**.
11. At the Diagnostic Test Selection menu, enter the test number to toggle on or off the asterisk (*) beside each test number. When each test that you want to run has an asterisk (*) beside the test number, press **Enter**.

    Follow the instructions on the screen to execute each test.

8–System Board Serial Ports

1. Select **1 - Test Serial Port A** and press **Enter**.
2. Type **Y** at **Do you want to run external wrap tests?** prompt.
3. At the **Install wrap plug on system board serial port A** prompt, remove the cable from communication port B and remove the track ball cable next to communication port A. (See Figure 57 on page LOC-35.)
4. Insert wrap plug P/N 72X8546 in communication port A and press **Enter**. You may need to push the keyboard cable away from the wrap plug as you insert the wrap plug in port A.
5. After successful completion, select **2 - Test Serial Port B** and press **Enter**.
6. Type **Y** at **Do you want to run external wrap tests?** prompt.
7. At the **Install wrap plug on system board serial port B** prompt, insert wrap plug P/N 72X8546 in communication port B and press **Enter**.
8. After successful completion, remove the wrap plug. Re-install the communication port B cable and the track ball cable.

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1. The library manager must be offline.
    a. If you have a single LM, go to “Single Library Manager Service Preparation” on page CARR-91.
    b. If you have a dual LM, go to “Dual Library Manager Service Preparation” on page CARR-91.
2. Insert the **QAPlus/PRO** diskette in the diskette drive.
3. Press **Ctrl+Alt+Del** keys to boot the LM.
4. Follow the instructions on the screen to test the LM. Refer to the **Service Information** chapter of the *IBM 7588 Industrial Computer Installation, Operation, Hardware Maintenance* for more information.

Ending Procedure for System Unit Tests

To end the tests and return to normal operation:

1. Remove the diskette from the library manager.
2. Power off using appropriate step:
    a. If you have a single LM, power off using the Unit Power switch on the Operator Panel.
    b. If you have a dual LM, turn off CB1 on the frame's PCC.
3. Wait 30 seconds and power on using the appropriate switch.
4. The library Manager will initialize.

ARTIC Diagnostics

These tests check the ARTIC breakout box and the ARTIC card.

1. The library manager must be offline. If you have a dual LM, you can continue to run with the other LM active unless you need to run the port wrap tests. If you need to run the port wrap tests, you must take the entire library offline.

   a. If you have a single LM, go to “Single Library Manager Service Preparation” on page CARR-91.

   b. If you have a dual LM, go to “Dual Library Manager Service Preparation” on page CARR-91. When ready to run the ARTIC diagnostic, disconnect the ARTIC cable for the LM you are working on at the PMX card in the LSB frame.

2. Insert the IBM Realtime Interface Co-Processor Advanced Diagnostic Diskette in the library manager diskette drive. If you have an ARTIC186 card, you must use Version 1.50. If you have an ARTIC Multiport card, you can use either Version 1.32 or Version 1.50.

3. Power on using the Unit Power switch on the library Op Panel.

4. Select **0 - Run diagnostic routines** and press Enter. The items on the screen should match the following example.

   ARTIC Multiport Card:

Present Card		Card Addr	Stg Size KB	Pwr On Error	L V L	B U S	Ports	Adapter
0	Y	02A0	512		10	8	8	RS232C RS422
1	Y	06A0	512		11	8	8	RS232C RS422

ARTIC186 Card:

Present Card		Card Addr	Stg Size KB	Pwr On Error	L V L	B U S	Ports	Adapter
0	Y	02A0	1024		10	8	8	RS422 RS422
1	Y	06A0	1024		11	8	8	RS422 RS422

Note: Card 1 will show in the list if you have the Expansion Attachment Card feature.

5. At the prompt **Are all real-time interface coprocessors recognized (Y/N)**, select **Y** if the items match the example. If card address 02A0 is not shown or if card 1 is installed but card address 06A0 is not shown, go to step 13c on page DIAG-26.
6. At the **Check the real-time interface coprocessor** prompt, press Enter.
7. At the **Select a card 0, 1, 2, 3, or 9 to exit to the Main menu,** select the card (0 or 1) to be tested.

   The test starts running and fills in the indicated values below to indicate a successful completion.

   ARTIC Multiport Card:

   ```
   A   B   C   D   E   F   G   H   I   J   K   L   M
   *   3F  3F  *   *   *   *   *   *   *   *   *   *
   ```

   ARTIC186 Card:

   ```
   A   B   C   D   E   F   G   H   I   J   K   L   M
   *   77  77  *   *   *   *   *   *   *   *   *   *
   ```

8. At the **Select port to be tested (0–7) or press 9 to skip external wrap test?** prompt, select the port (0–7) you suspect is failing.

   Notes:

   a. If you have a dual LM and other LM is online, DO NOT run the port wrap tests. The ARTIC ports from each LM are dotted at the PMX card in the Left Service Bay and then connected to the breakout box.

   b. If you have a dual LM and the entire library is offline, re-connect the ARTIC cable for the LM you are working on at the PMX card and disconnect the ARTIC cable for the other LM at the PMX card before running the external port wrap test.

9. At the **Is a cable installed in port x (Y/N)?**, answer **Y** even if a cable is not installed in the indicated port. See “ARTIC Breakout Box 1 and 2” on page LOC-33.
10. At the **Do you have a wrap plug for the cable (Y/N)?** prompt, enter **Y**.
11. When prompted, install wrap plug P/N 6425494 in port 0 or 1. For ports 2–7, install wrap plug P/N 09F1799.

    If a cable is on the breakout box port, install the wrap plug on the other end of the cable if it is attached to a 3490E tape subsystem. If it is attached to a 3590 tape subsystem, install the wrap plug on the breakout box.

    If no cable is on the breakout box port, install the wrap plug on the breakout box.

12. Press Enter.

    The prompt **Port x was just tested with no errors. Do you want to test another port (Y/N)?** indicates a successful completion.

When you have completed your testing, remove the diagnostic diskette and power off using the library Unit Power switch on the Op Panel.

After 30 seconds, power on using the library Unit Power switch. The library manager will initialize.

13. The test indicates a failure with the prompt **Remove the cable from the card. Install the wrap connector on the card.**

    a. Remove the ARTIC breakout cable from the rear of the library manager and install the wrap plug P/N 09F1803 on the ARTIC card on the rear of the library manager.

    b. If the test runs OK, the prompt says to replace the cable. Install the wrap plug in the breakout box's failing port if not already done and rerun the test to isolate the failure between the library attach cable (tape subsystem or host) and the breakout box cable(s).

       Note: On a 3494 Model HA1, if the wrap tests fail at the breakout box port and run OK at the ARTIC card connector, you can disconnect the breakout box cable at the PMX card J1 connector, install the wrap plug p/n 09F1803 on the PMX card J1 connector, and re-run the tests to isolate between the breakout box and the PMX card/PMX to LM ARTIC cable.

    c. If the test fails, replace the following FRUs in order:

       - ARTIC RS-422 card (if installed)
       - ARTIC card

    d. Rerun the test and when it completes successfully, remove the diagnostic diskette and power off using the appropriate switch:

       1) If you have a single LM, power off using the Unit Power switch on the Operator Panel.
       2) If you have a dual LM, turn off CB1 on the frame's PCC.

       After 30 seconds, power on using the appropriate switch. The library manager will initialize.

Token Ring Adapter Diagnostics

If your adapter does not have manual switches on it (see Figure 75 on page LOC-53 or Figure 76 on page LOC-53), it is an IBM Auto 16/4 Token-Ring ISA Adapter. Go to "IBM Auto 16/4 Token-Ring ISA Adapter."

If your adapter has manual switches (see Figure 74 on page LOC-52), it is an IBM 16/4 ISA-16 Adapter. Go to "IBM 16/4 ISA-16 Adapter."

IBM 16/4 ISA-16 Adapter: Use the following steps to test the adapter. Refer to the *IBM 16/4 ISA-16 Adapter Installation and Testing Instructions* document provided with the adapter.

1. The library manager must be offline.
   a. If you have a single LM, go to "Single Library Manager Service Preparation" on page CARR-91.
   b. If you have a dual LM, go to "Dual Library Manager Service Preparation" on page CARR-91.
2. Do one of the following:
   a. If your network uses IBM Cabling System data grade media, disconnect the adapter cable from the network. Make sure that the cable is still connected to the adapter.
   b. If your network uses telephone twisted-pair media, disconnect the cable from the adapter. Install a wrap plug (IBM p/n 72X8011, not supplied with the adapter) onto the adapter.
3. Insert the 3.5-inch IBM 16/4 ISA-16 Adapter option diskette in the library manager diskette drive.
4. Power on using the appropriate switch.
5. Follow the instructions on the display and in the adapter manual.

   Use the problem determination information in the adapter manual.
6. When you have completed your testing, remove the adapter diskette and power off using the appropriate switch.

   Reconnect your cable to the network or to the adapter.

   After 30 seconds, power on using the appropriate switch. The library manager will initialize.

IBM Auto 16/4 Token-Ring ISA Adapter: Use the following steps to test the adapter. Refer to the *Options by IBM Auto 16/4 Token-Ring ISA Adapter Installation and Testing Instructions* document provided with the adapter.

1. The library manager must be offline.
   a. If you have a single LM, go to "Single Library Manager Service Preparation" on page CARR-91.
   b. If you have a dual LM, go to "Dual Library Manager Service Preparation" on page CARR-91.
2. Insert the Token-Ring Diagnostics Diskette (P/N 05H7519 or higher) into the diskette drive. The diskette should be in your 3494 LIC binder.
3. After 30 seconds have elapsed from when power was switched off, power on using the appropriate switch.
4. Diagnostics will begin running automatically as the library manager boots up. During testing, the window will say **TESTING IN PROCESS**.
5. If the adapter is connected to the LAN and it tests OK, the display will show **FINISHED TESTING - ADAPTER OK**. Continue at step 9 on page DIAG-28.
6. If the adapter is not connected to the LAN (either you have disconnected the cable or there is a connection failure), the display will show **DIAGNOSTICS INDICATE A FAILURE**.

7. Select Retest by pressing the Enter key to test the adapter in Wrap mode. The display will show **TESTING IN PROGRESS**.
8. When the test is complete, the display will say **FINISHED TESTING - ADAPTER OK** if the adapter is OK.
9. When done, remove the diskette from the diskette drive.
10. Reboot the library manager by pressing the **Ctrl-Alt-Del** keys.

    Note: Make sure the adapter is cabled to the network.

Ethernet Adapter (FC 5220) Diagnostics

These tests check the Ethernet Adapter card.

1. The library manager must be offline.
   a. If you have a single LM, go to “Single Library Manager Service Preparation” on page CARR-91.
   b. If you have a dual LM, go to “Dual Library Manager Service Preparation” on page CARR-91.
2. If you have the Ethernet Diagnostics Diskette (p/n 09L4288 or higher), test your adapter as follows:
   a. Insert the Ethernet Diagnostics Diskette in the LM diskette drive.
   b. Power on using the switch you used for power down.
   c. When the diagnostics diskette boots up, you will be presented with a screen that indicates the diagnostics are about to begin. **Ensure that the Ethernet cable is connected to the LAN adapter card.**
   d. Press the **Enter** key to begin diagnostics.
   e. The IBMLANAID menu will appear for a few moments followed by the LANAID menu.
   f. Use the **Tab** key to select **Diagnostics** and press **Enter** to begin diagnostics.
   g. The test runs for about one second. Afterwards, it should say **Diagnostics Passed** at the bottom of the screen if the adapter tests OK.
3. If you have an older feature and do not have the Ethernet Diagnostics Diskette, use the following steps to test your adapter. Refer to the *IBM ISA Ethernet Adapters–Installation and Testing Instructions* document provided with the adapter.
   a. Insert the 3.5 inch ISA Ethernet Adapter Option Diskette in the library manager diskette drive.
   b. Power on using the appropriate switch.
   c. Press Enter after a caution message is displayed.
   d. The Main Menu of the configuration program appears on the library manager display.
   e. Select the **Diagnostics** option from the Main Menu.

      Follow the instructions on the display and in the adapter manual.

      Use the problem determination information in the adapter manual.
4. When you have completed your testing, remove the diskette and power off using the appropriate switch.

   After 30 seconds, power on using the appropriate switch. The library manager will initialize.

Using Reports

Environmental Record Editing and Printing (EREP) Program

The following topic describes the format and content of the 3490E tape library reports produced by the Environmental Record Editing and Printing (EREP) program. Run all 3490E tape subsystem reports daily. Use of data more than three days old may result in improper diagnosis of errors and exception codes. Shared device control cards are required for 3490E tape systems operating on multiple processing units. See the following manuals for more information on the use of EREP:

- *OS/VS REL2 SYS1.LOGREC Error Record Manual*, GC28-0638
- *OS/VS1 REL3 SYS1.LOGREC Error Record Manual*, GC28-0668
- *OS/VS1 REL3 SYS1.LOGREC Error Record Logic*, SY28-0669
- *OS/VS Environmental Record Editing and Printing (EREP) Program*, GC28-0772
- *OS/VS Environmental Record Editing and Printing (EREP) Program Logic (SU 1)*, SY28-0773
- *OS/VS Independent Component: Environmental Record Editing and Printing (EREP) Program System Information (SU 1)*, GC38-1045
- *OS/VS, DOS/VSE, VM/370 Environmental Record Editing and Printing (EREP) Program*, GC28-1178
- *Environmental Record Editing and Printing Program (EREP) User's Guide and Reference*, GA28-1378

All of the following reports are generated by inserting SYSEXN in the job control language (JCL) selection parameters for EREP. (See the referenced manuals for details.)

EREP Reports for the Tape Library

The EREP reports for the tape library are included in the Subsystem Exception Report for the 3490E. The reports unique to the tape library are identified by "Tape Library" in the report title.

This topic describes information that pertains to only the tape library. The other 3490E detail reports included in the subsystem exception report are described in *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Maintenance Information*.

The detail reports available for the tape library are:

- Permanent and Recovered Error Summary
  - Permanent Error
  - Recovered Error
  - Service Alert
- Error Code Summary Report

Tape Library Permanent and Recovered Error Summary Report: Figure 196 shows a tape library permanent error summary report. Figure 197 shows a tape library recovered error summary report.

Note: Permanent errors are outboard recorder (OBR) format 23 records with the temporary bit off. Recovered errors are OBR format 23 records with the temporary bit on.

Figure 196. Tape Library Permanent Error Summary Example. See Figure 198 on page REPORTS-4 for a description of these fields.

```
PERMANENT / RECOVERED ERROR        SUMMARY        1 REPORT DATE 285 93
          TAPE LIBRARY                              PERIOD FROM 156 92
                                                         TO     156 92

                                              1  11    111111   1   2   222  2  2  2   222  3   3
        2 SENSE BYTES --> 0 1 2   3   4 5 6  7   8  9 0 1 2    3 4 5 6 7 8   9   0   1 2 3  4  5  6   7 8 9  0   1

                                          ERROR CODE                SW  SS           -------CU--------          SENSE
CHP DEVNO                                                           EC  ID   SEQ    IF  SF  EC HW-SER DR         VOLSER
-ID /CUA  DTE   TIME  CPU STATUS  ERA BLK ID  FMT MOD  LM    OTH    VOL SERIAL

 3   4     5     6     7    8      9    10     11  12  13    14        15       16  17   18     19 20  21   22   23 24   25

                                   *****  PERMANENT  ERRORS  *****

60  0810  156 005317  00  00419C  6F  000000  23  03  6236  0000  D7D6D6F2F4F8  07  02  0F4003  FE  BE  56  297247  00  00  P00248
60  0810  156 005317  00  00419C  60  000000  23  03  6236  0000  D6D5D6F2F4F3  07  02  0F4003  FE  BE  56  297247  00  00  ONO243
60  0810  156 005317  00  00419C  62  000000  23  03  6236  0000  D6D4D7F2F9F3  07  02  0F4003  FE  BE  56  297247  00  00  OMP293
60  0810  156 005317  00  00419C  63  000000  23  03  6236  0000  D6D3D7F3F9F8  07  02  0F4003  FE  BE  56  297247  00  00  OLP398
60  0810  156 005317  00  00419C  6B  000000  23  03  6236  0000  D5D2D8F3F8F8  07  02  0F4003  FE  BE  56  297247  00  00  NKQ388
61  0810  156 171237  00  004180  75  000000  23  03  623D  0000  C1C2C3F6F4F1  07  02  0F4003  FE  BE  56  297247  00  00  ABC641
61  0810  156 203549  00  004184  7B  000000  23  03  62A1  0000  D7D8D2F1F2F3  07  02  0F4003  FE  BE  55  297247  00  00  PQK123
61  0810  156 203549  00  004184  70  000000  23  03  62A1  0000  D7D6D3F1F4F3  07  02  0F4003  FE  BE  55  297247  00  00  POL143
61  0810  156 203549  00  004184  71  000000  23  03  62A1  0000  D7D4D9F1F3F3  07  02  0F4003  FE  BE  55  297247  00  00  PMR133

61  0811  156 033355  01  024080  6B  000000  23  00  76E0  0000  D1D2D3F8F5F2  07  02  0F4003  FE  BE  56  297247  11  00  JKL852
```

A05M0017

Figure 197. Tape Library Recovered Error Summary Example. See Figure 198 on page REPORTS-4 for a description of these fields.

```
PERMANENT / RECOVERED ERROR        SUMMARY        1 REPORT DATE 285 93
          TAPE LIBRARY                              PERIOD FROM 156 92
                                                         TO     156 92

                                              1  11    111111   1   2   222  2  2  2   222  3   3
        2 SENSE BYTES --> 0 1 2   3   4 5 6  7   8  9 0 1 2    3 4 5 6 7 8   9   0   1 2 3  4  5  6   7 8 9  0   1

                                          ERROR CODE                SW  SS           -------CU--------          SENSE
CHP DEVNO                                                           EC  ID   SEQ    IF  SF  EC HW-SER DR         VOLSER
-ID /CUA  DTE   TIME  CPU STATUS  ERA BLK ID  FMT MOD  LM    OTH    VOL SERIAL

 3   4     5     6     7    8      9    10     11  12  13    14        15       16  17   18     19 20  21   22   23 24   25

                                   *****  RECOVERED  ERRORS  *****

61  0811  156 211946  00  024084  69  000000  23  00  6B6C  0000  CIC2C3F6F4F9  07  02  0F4003  FE  BE  55  297247  11  00  ABC649
60  0813  156 035026  01  804098  6D  000000  23  00  FB44  0000  E7E8E9F8F8F8  07  02  0F4003  FE  BE  56  297247  33  00  XYZ888
61  0816  156 082617  02  024084  76  000000  23  00  68E2  0000  D1D2D3F3F7F9  07  02  0F4003  FE  BE  56  297247  66  00  JKL379
61  0817  156 215731  01  024084  81  000000  23  00  76FD  0000  D5D1D8F3F8F4  07  02  0F4003  FE  BE  55  297247  77  00  NJQ384
61  0810  156 020013  02  024084  78  000000  23  00  6B12  0000  D1D2D3F7F2F4  07  02  0F4003  FE  BE  56  297247  DD  00  JKL724
77  0823  156 205353  05  024080  73  000000  23  00  6B6C  0000  D8D3D9F7F74F  27  03  0F4003  FE  BE  55  297253  33  00  QLR771
```

A05M0020

Field Definitions: See Figure 196 on page REPORTS-3 and Figure 197 on page REPORTS-3 for locations. For sense byte definitions, see *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Maintenance Information*.

Figure 198. Field Definitions

Key	Name	Description
1	REPORT DATE PERIOD FROM TO	The Julian date the report ran. The Julian date of the earliest record. The Julian date of the latest record.
2	SENSE BYTES	The sense data from the OBR 23 log record.
3	CHPID	The channel path ID obtained from byte 49 (or offset 49 decimal) of the OBR 23 log record.
4	DEVNO/CUA	The device number or the control unit address obtained from the offset (decimal) OBR format 23 log record. Because of the way unsolicited unit checks are handled, this field can contain the address of devices that are not physically present.
5	DTE	The date obtained from bytes 8–11 of the OBR 23 log record.
6	TIME	The time obtained from bytes 12–15 of the OBR 23 log record.
7	CPU	The central processing unit obtained from bytes 20–21 of the OBR 23 log record.
8	STATUS	The status obtained from sense bytes 0–2.
9	ERA	The ERA code obtained from sense byte 3 of the OBR 23 log record.
10	BLK ID	The channel logical block number obtained from sense bytes 4–6 of the OBR 23 log record.
11	FMT	The sense format obtained from sense byte 7 of the OBR 23 log record. Sense byte 7 is 23 to indicate format 23.
12	MOD	The library error modifier obtained from sense byte 8 of the OBR 23 log record.
13	LM	The library manager error code obtained from sense bytes 9–10 of the OBR 23 log record.
14	OTH (Other)	Contains zeros or contains additional information obtained from sense bytes 11–12 of the OBR 23 log record.
15	VOL SERIAL	The volume serial number of sense bytes 13–18 of the OBR 23 log record.
16	SW EC	The software EC level obtained from sense byte 19 of the OBR 23 log record.
17	SS ID	The subsystem ID obtained from sense byte 20 of the OBR 23 log record.
18	SEQ	The encoded serial number of the 3494 library.
19	IF	The control unit channel interface information obtained from sense byte 24 of the OBR 23 log record.
20	SF	The subsystem features obtained from sense byte 25 of the OBR 23 log record.
21	EC	The control unit microcode EC level obtained from sense byte 26 of the OBR 23 log record.
22	HW SER	The control unit hardware information and serial number obtained from sense bytes 27–29 of the OBR 23 log record.
23	DR	The drive address obtained from sense byte 30 of the OBR 23 log record.
24	00	Reserved—obtained from sense byte 31 of the OBR 23 log record.
25	VOLSER	The volume serial number in printable form obtained and converted from sense bytes 13–18 of the OBR 23 log record.

Tape Library Permanent and Recovered Error Summary Report (Service Alerts):

Figure 200 on page REPORTS-6 shows an example of the service alerts contained in the Permanent and Recovered Error Summary Report.

All service alerts are noted by ERA 74 (library information data) in sense byte 3. The ERA modifier field (sense byte 8) specifies which group or category the particular ERA 74 belongs to, while the OTH (Other) field (sense bytes 11 and 12) contains additional information about ERA 74.

The modifier and OTH fields combined with the library manager error code (sense bytes 9 and 10) describe the specific reason for each ERA 74 service alert entry.

See Figure 209 on page SENSE-9 for modifier and other field definitions.

Figure 199 lists the definitions of the OTH field for ERA 74 and addresses component unavailability (modifier byte 01) and component availability (modifier byte 02) for the OTH field.

Figure 199. Descriptions of Component Availability and Unavailability

OTH Field	Definition
0011	The convenience input station is made unavailable or available. (See Note.)
0021	The convenience output station is made unavailable or available. (See Note.)
004X	The hard disk is made unavailable or available. (See Note.) The X is 1 for the primary disk or 2 for the backup disk.
0051	The dual write is made unavailable or available. (See Note.)
0111	The cartridge accessor is made unavailable or available. (See Note.)
021X	The vision system is made unavailable or available. (See Note.) The X is 1 for the bar-code reader.
111X	The grip is made unavailable or available. (See Note.)
Note: Check the modifier where 01 is unavailable and 02 is available.	

Figure 200. Tape Library Service Alert Summary Example. See Figure 201 on page REPORTS-7 for a brief description of these fields.

```
PERMANENT / RECOVERED ERROR       SUMMARY         [1] REPORT DATE 285 93
          TAPE LIBRARY                                PERIOD FROM 156 92
                                                           TO     156 92

                                                      1  11   111111   1   2   222  2  2  2   222  3  3
   [2] SENSE BYTES --> 0 1 2   3   4 5 6  7    8  9 0 1 2  3 4 5 6 7 8  9   0   1 2 3 4  5  6   7 8 9 0  1

                                          ERROR CODE                                   -------CU--------
CHP                                                                SW  SS                                        SENSE
-ID     DTE  TIME   CPU STATUS ERA BLK ID FMT MOD LM   OTH  VOL SERIAL  EC  ID   SEQ    IF  SF  EC HW-SER DR      VOLSER

[3]     [4]  [5]    [6] [7]    [8] [9]    [10][11][12] [13] [14]        [15][16] [17]   [18][19][20][21]  [22][23] [24]

                                     *****  SERVICE ALERTS  *****

OTHER

61      156 091542  01  024080 74  000004 23  00  60B7 0000 C4C3C9F2F5F7 07 02   0F4003 FE  BE  56 297247 AA  00  DCI257
60      156 101802  00  02409C 74  000000 23  00  85EF 0111 D4D7D4F7F3F3 F3 02   0F4003 FE  BF  56 297247 22  00  MPM733

LIBRARY COMPONENT UNAVAILABLE

61      156 092803  00  024080 74  400049 23  01  60B7 0000 D3D1D2F4F8F7 F6 02   0F4003 FE  BE  56 297247 44  00  LJK487

OTHER

61      156 091842  01  024080 74  000000 23  03  60B7 0000 C6C5C8F1F4F7 1F 12   0F4003 FE  BF  56 297247 11  00  FEH147
60      156 101826  00  024098 74  000000 23  03  85EF 1111 D6D2D8F4F0F0 F0 02   0F4003 FE  BE  56 297247 33  00  OKQ400

OTHER

61      156 093415  02  024080 74  000004 23  7F  60B7 0000 C6C9C6F5F5F5 F5 F2   0F4003 FE  BE  56 297247 CC  00  FEH147
61      156 101844  02  024080 74  000000 23  7F  85EF 1112 D8D7D4F3F2F9 F4 02   0F4003 FE  BF  56 297247 33  00  QPM329

PREVENTIVE MAINTENANCE

61      156 101751  00  024080 74  000000 23  80  76F0 0081 E8E8E8F7F6F4 F2 02   0F4003 FE  BF  56 297247 33  00  YYY764
60      156 101900  00  02409C 74  000000 23  80  76F0 0091 D8D1D9F5F3F4 F2 F2   0F4003 FE  BF  56 297247 22  00  QJR534

THRESHOLD EXCEEDED

61      156 101755  00  024080 74  000000 23  81  76F0 0082 E8E5E5F4F5F9 07 02   0F4003 FE  BF  56 297247 11  00  YVV459
60      156 101902  00  024098 74  000000 23  81  76F0 0092 E4E8E9F4F6F6 F6 02   0F4003 FE  BE  56 297247 33  00  UYZ466

OTHER

61      156 101802  00  024080 74  000000 23  FF  85EF 0111 D8D5D4F5F9F9 07 02   0F4003 FE  BF  56 297247 11  00  QNM599

CPU  MODEL    SERIAL NUMBER

00   3090XA     345783
01   3090XA     545783
02   3090XA     445783
```

A05M0018

Field Definitions: See Figure 200 on page REPORTS-6 for locations.

Figure 201. Field Definitions

Key	Name	Description
1	REPORT DATE PERIOD FROM TO	The Julian date the report ran. The Julian date of the earliest record. The Julian date of the latest record.
2	SENSE BYTES	The sense data from the OBR 23 log record.
3	CHPID	The channel path ID obtained from byte 49 (or offset 49 decimal) of the OBR 23 log record.
4	DTE	The date obtained from bytes 8–11 of the OBR 23 log record.
5	TIME	The time obtained from bytes 12–15 of the OBR 23 log record.
6	CPU	The central processing unit obtained from bytes 20–21 of the OBR 23 log record.
7	STATUS	The status obtained from sense bytes 0–2 of the OBR 23 log record.
8	ERA	The ERA obtained from sense byte 3 of the OBR 23 log record.
9	BLK ID	The channel logical block number obtained from sense bytes 4–6 of the OBR 23 log record.
10	FMT	The sense format obtained from sense byte 7 of the OBR 23 log record.
11	MOD	The library error modifier obtained from sense byte 8 of the OBR 23 log record.
12	LM	The library manager error code obtained from sense bytes 9–10 of the OBR 23 log record.
13	OTH	Contains zeros or contains additional information obtained from sense bytes 11–12 of the OBR 23 log record.
14	VOL SERIAL	The volume serial number of the OBR 23 log record.
15	SW EC	The software EC level obtained from sense byte 19 of the OBR 23 log record.
16	SS ID	The subsystem ID obtained from sense byte 20 of the OBR 23 log record.
17	SEQ	The encoded serial number of the 3494 library.
18	IF	The control unit channel interface information obtained from sense byte 24 of the OBR 23 log record.
19	SF	The subsystem features obtained from sense byte 25 of the OBR 23 log record.
20	EC	The control unit microcode EC level obtained from sense byte 26 of the OBR 23 log record.
21	HW SER	The control unit hardware information and serial number obtained from sense bytes 27–29 of the OBR 23 log record.
22	DR	The drive address obtained from sense byte 30 of the OBR 23 log record.
23	00	Reserved—obtained from sense byte 31 of the OBR 23 log record.
24	VOLSER	The volume serial number in printable form obtained and converted from sense bytes 13–18 of the OBR 23 log record.

Tape Library Error Code Summary Report: The Tape Library Error Code Summary Report provides a summary of error codes logged and is listed by control unit address. Figure 202 shows an example of this report.

The error codes can provide an entry into the maintenance information manual for both drive and control unit failures.

Figure 202. Tape Library Error Code Summary Example. See Figure 203 on page REPORTS-9 for a brief description of these fields.

TAPE LIBRARY ERROR CODE SUMMARY REPORT

1 REPORT DATE 285 93
PERIOD FROM 156 92
TO 156 92

SEQ	DEVNO /CUA	CPU	CHR	CUR	CUD	LM	OTH	OCCURRENCES	**** DATE/TIME **** *** LAST ENTRY ***	
2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	
LIBRARY MANAGER										
0F4003	0811	01	D	0	0	60B7	0000	1	156/92	09:18:42:81
0F4003	0814	00	D	0	0	60B7	0000	1	156/92	09:28:03:87
0F4003	081A	01	D	0	0	60B7	0000	1	156/92	09:15:42:58
0F4003	081C	02	D	0	0	60B7	0000	1	156/92	09:34:15:28
0F4003	0810	00	D	1	1	6236	0000	5	156/92	00:53:49:45
0F4003	0810	00	D	0	0	623D	0000	1	156/92	17:12:37:35
0F4003	0810	00	D	0	0	62A1	0000	3	156/92	20:35:49:45
0F4003	0816	02	D	0	0	68E2	0000	1	156/92	08:26:17:57
0F4003	081D	02	D	0	0	6B12	0000	1	156/92	02;19:46:93
0F4003	0811	00	D	0	0	6B6C	0000	1	156/92	21:19:46:93
0F4003	0823	05	D	0	0	6B6C	0000	1	156/92	20:53:53:23
LIBRARY MANAGER										
0F4003	0811	01	D	0	0	76E0	0000	1	156/92	03:33:55:54
0F4003	0813	00	D	0	0	76F0	0081	1	156/92	10:17:51:96
0F4003	0811	00	D	0	0	76F0	0082	1	156/92	10:17:55:96
0F4003	0812	00	D	1	1	76F0	0091	1	156/92	10:19:00:88
0F4003	0813	00	D	1	1	76F0	0092	1	156/92	10:19:02:49
0F4003	0817	01	D	0	0	76FD	0000	1	156/92	21:57:31:75
LIBRARY MANAGER										
0F4003	0812	00	D	1	1	85EF	0111	1	156/92	10:18:02:32
0F4003	0811	00	D	0	0	85EF	0111	1	156/92	10:18:02:32
0F4003	0813	00	D	1	1	85EF	1111	1	156/92	10:18:26:05
0F4003	0813	02	D	0	0	85EF	1112	1	156/92	10:18:44:52
3490 CONTROL UNIT										
0F4003	0813	01	D	1	1	FB44	0000	1	156/92	03:50:26:74

CPU	MODEL	SERIAL NUMBER
00	3090XA	345783
01	3090XA	545783
02	3090XA	445783
03	3090XA	475783
04	3090XA	375783
05	3090XA	575783

A05M0019

Field Definitions: See Figure 202 on page REPORTS-8 for locations.

Figure 203. Field Definitions

Key	Name	Description
1	REPORT DATE PERIOD FROM TO	The Julian date the report ran. The Julian date of the earliest record. The Julian date of the latest record.
2	SEQ	The sequence number obtained from sense bytes 21–23 of the OBR 23 log record.
3	DEVNO/CUA	The device number or the control unit address obtained from the offset (decimal) OBR format 23 log record. Because of the way unsolicited unit checks are handled, this field may contain the address of devices that are not physically present.
4	CPU	The central processing unit obtained from bytes 20–21 of the OBR 23 log record.
5	CHR	Identifies the associated channel adapter to which command the error was reported.
6	CUR	Identifies the control unit reporting the error and refers to sense byte 2, bit 3 of the OBR 23 log record.
7	CUD	Identifies the control-unit-detected error and refers to sense byte 2, bit 4 of the OBR 23 log record.
8	LM	The library manager error code obtained from sense bytes 9–10 of the OBR 23 log record.
9	OTH	Contains zeros or contains additional information obtained from sense bytes 11–12 of the OBR 23 log record.
10	OCCURRENCES	Obtained by adding each of the same values from the error codes.
11	DATE LAST ENTRY and TIME LAST ENTRY	Obtained from bytes 8–11 and 12–15 of the OBR log record.

Operational Log Description

The logs of the 3494 capture error and transaction data. This data is used for error recovery, for debugging software, and for aiding in the development and support of the product. Of these logs, the service representative uses only the error log and, to some extent, the transaction log.

Logs are rotated by using a *push-down* method. The most current log is at the top of the log group of the Service menu. When the log is full, it is pushed down, and the oldest log in the stack is overwritten and rotated to the top of the stack to become the new current log.

View the transaction and error logs by selecting View Logs from the Utilities menu of the library manager.

Transaction Log

Entries are made in the transaction log for all major activities that occur on the external connections with the library manager. Also, some internal operations that may be needed for later recovery or debug are logged. All entries in the error log are repeated in the transaction log.

The service representative uses the error log as the primary logging tool with the maintenance analysis procedures (MAPs) and the maintenance information (MI) manual. The transaction log is used primarily by engineering and is not defined in detail here.

Error Log

An entry is made in the error log when an error condition is detected by the library manager.

As a log fills up, it is saved, and the oldest error log is written over and reused. There is enough error space to log many days of normal activity.

To display an error log, select **Analyze Error Log** from the Service pull-down. Select this option to analyze the library manager error log entries. This selection identifies the record group for an event, separates the information records, and displays the error code for the most important error record. The last five error records are displayed. Depending on the display options selected, the error records are displayed as shown in Figure 204.

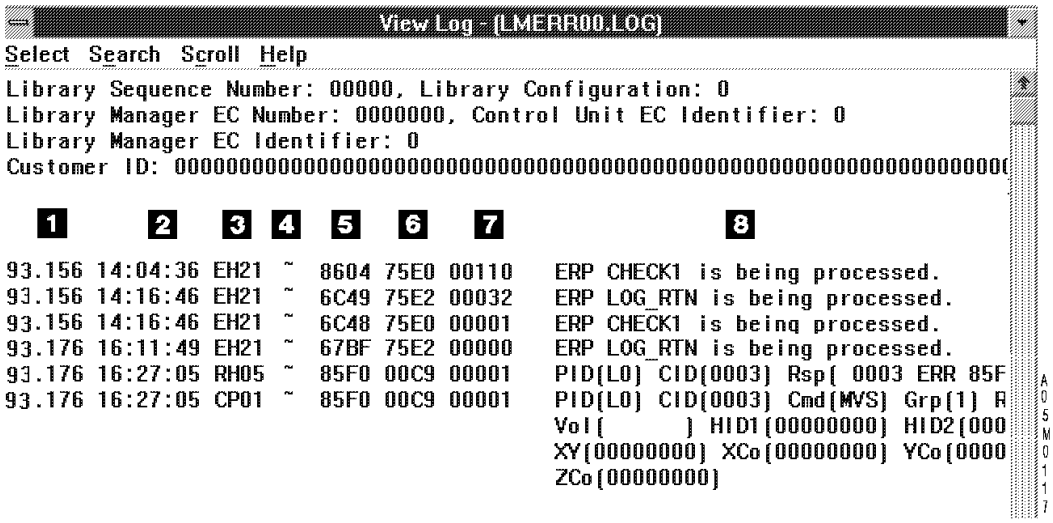


Figure 204. Error Log Display Screen

The standard error log entries are described below:

1 Year and day in Julian format. The year is presented by the last two digits of the year. For example, 1993 appears as 93. The 3-digit Julian date begins with 001 on January 1, and concludes with 365 for December 31 (except on leap year, which has 366 days in the year).

2 Hours, minutes, and seconds. Hours are defined by using the 24-hour clock. Minutes and seconds are 1–60 each. In the actual log entries, a colon (:) is used to separate hours from minutes and minutes from seconds.

3 The first two fields represent the library manager software component that requested that the log entry be created. This entry usually occurs when a component detects an error while running its normal routines.

The next two fields represent user-defined message numbers. A *user* is the requesting component (for example, error handler and logging). Because these 2 fields must have entries, 00 means that the user component is *not* using the number as a reference. Valid reference numbers are 01, 02, ...and so forth.

4 A tilde (˜) is always found before the error code (ECOD) field for all error log entries. A blank occurs for all transaction log entries. This character simplifies location of error log entries when scanning through the transaction log.

5 The error code (ECOD) field represents a 4-digit hexadecimal error code that is associated with a specific error that resulted in the log entry.

6 The error recovery procedure code (ERPC) field is always a 4-digit hexadecimal, and contains the error recovery procedure code defined by the using component. The most common codes are:

```
75E0 = CHECK1
75E2 = LOG_RTN
75E3 = CODE_BUG
```

See Figure 205 for additional information on the ERP fields.

7 This 5-digit field provides additional data to further define the error code. This field is the library manager modifier.

8 The Message (Optional) portion of the log entries provide additional details about the low-level command and which specific volume serial number and gripper were used. More than one line can be required for the entire optional message.

Figure 205 (Page 1 of 3). ERP Field Definitions

ERP	Definitions
0000	No error, no warning; no action required.
0000	Not used.
0001	Cartridge labels are not readable during inventory command. This code is issued as a warning, instead of an error, to prevent the accessor manager from rejecting succeeding commands.
0002	The accessor manager has determined that the slot position should be adjusted. The accessor retry offset provided in the offset data is sent with this message and should be converted into vehicle tach pulses and used to update the database for this slot. This is a warning; therefore, succeeding commands are not rejected and an error reset to the accessor manager is not required.
0003	Not used.
0004	Not used.
0005	The bar-code reader has been turned off with vision off (VOF) commands.
0006	The Inventory command and the volser are blank. This ERP is also returned for Get commands when a blank volser is specified and when volser checking is not required.
0007	A cartridge label is not readable during a Get command. If this is a Get command, the cartridge has been successfully picked and is in the grip. Mark the inventory with an error flag and continue processing the cartridge. The label is either not readable or does not exist.
0008	An informational warning. No action is required by operator.
0010	An unrecoverable error. No error retry. The cartridge accessor should not be moved by library manager. Intervention is required to restore system operation.
0011	An accessor manager code bug. The library manager should attempt to restart the accessor manager in an attempt to clear the problem.
0012	The cartridge label is not readable during a Verify command. If the command was a Verify command, the inventory should be marked with an error flag.

Figure 205 (Page 2 of 3). ERP Field Definitions

ERP	Definitions
0013	The label on the cartridge does not match the label specified in the command. If the command was a Get command, the cartridge has been successfully picked and is in the grip. Mark the inventory with an error flag and eject the cartridge from the system. If the command was a Verify command, the inventory should be marked with an error flag for both this cartridge and the cartridge whose label was actually read.
0014	A Get command failed because no cartridge was present. The operation is stopped. All linked commands requiring this cartridge should be failed by the library manager. An error flag should be set for this inventory position.
0015	A Get command failed even though a cartridge was present. The operation is stopped. All linked commands requiring this cartridge should be failed by the library manager. If the target was a feed slot, the drive should be disabled. Intervention is required to restore normal operation for the drive.
0016	A Put command failed because a cartridge was present in the target location. The cartridge is in the grip and should be put away in an empty library slot by the library manager. If the target was a feed slot, the drive should be disabled. Intervention is required to restore normal operation for the drive.
0017	Not used.
0018	A parameter is not valid or appropriate and the command failed. For example, a get from rack (GFR) command was issued for the grip and the grip currently has a cartridge in it.
0019	A Get command was issued for an already full grip.
0020	A configuration error.
0021	A Put command was issued to an empty grip.
0022	The grip malfunctioned. Retry Put commands and fail Get commands.
0023	A Fxx (Find Fiducial) command failed because the fiducial target could not be located.
0024	Not used.
0025	The bar-code interface cannot communicate with the bar-code reader. The library manager should set vision off by sending a VOF command to the grip (2 VOF commands) to the accessor manager. No further vision commands can be used until the accessor is serviced. Vision use will be restored every time the accessor manager is re-booted.
0026	The accessor manager cannot complete a convenience input/output station command.
0027	Not used.
0028	A Put command and the grip is broken. See also ERP 0022.
0029	Not used.
0030	A Verify or Inventory command was called with vision turned off.
0031	This code indicates that the grip pivot or reach mechanism failed. Recovery was attempted by the accessor manager and failed. Should the failure persist, the grip and accessor should be marked as unavailable with ERA 71 posted.
0032	This code indicates a failure with at least one of the servos. Accessor Manager recovery was not successful and the accessor should be marked as not available.
0033	This code indicates that a label was read upside down. If a cartridge were inserted upside down, a crash possibility exists. This requires operator intervention to insert the cartridge correctly or re-affix the label in the proper orientation.
0034	Servo power is off during motion command.

Figure 205 (Page 3 of 3). ERP Field Definitions	
ERP	**Definitions**
75E0	Check 1 library manager error. Error information is logged and a dump attempted. The process is shut down and then restarted. This ERP is used only in cases where the integrity of the library manager is questionable.
75E1	Dump the library manager and return to caller.
75E2	Log the error and return to the caller.
75E3 (CODEBUG)	A code bug is suspected. This ERP is equated to either 75E0 or 75E1 depending on the setting of the environment variable CODEBUG. Before shipment to the field, CODEBUG points to 75E0. After shipment to the field, CODEBUG is set to 75E1 (DUMP_RTN) to trap code problems in the field without halting the system.
75E4	A secondary disk error. The error handler (EH) logs the error, marks the secondary disk unavailable, queues a message to the host indicating degraded mode, and then returns to the caller.
75E5	A user initiated (UI) keystroke dump
75E6	This code causes a normal shutdown.
75E7	An internal severe error detected by the library manager parent (LP) process.
75E8	The EH component detects an error that is returned to the parent.
75E9	EH and LP, an error occurs that is recoverable.

AS/400 Error Logs

For detailed information about AS/400 error-log messages, see *IBM Application Systems/400 Service: Service Functions*.

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 will be displayed.

There are two procedures depending on which version/release of OS/400 you are running.

OS/400 V3R1

You can access the error logs maintained by the AS/400 operating system by using the System Service Tools function.

1. Type **STRSST** (Start System Tools) command on the command entry line on the AS/400 Main Menu and press **Enter**.
2. Select **Start a service tool**.
3. Select **Error log utility**.
4. Select **Analyze error log**.
5. Specify the time period for searching the error log, then select **Magnetic media**.
6. On the Select Analysis Report Options menu, specify the device type and press **Enter**. Leave the other options at their default value.
7. Use the **Display report** option to display the desired error log entry.

OS/400 V3R6

You can access the error logs maintained by the AS/400 operating system by using the System Service Tools function.

1. Type **STRSST** (Start System Tools) command on the command entry line on the AS/400 Main Menu and press **Enter**.
2. Select **Start a service tool**.
3. Select **Product activity log**.
4. Select **Analyze log**.
5. Specify the time period for searching the error log, then select **Magnetic media** option.
6. On the Select Analysis Report Options menu, specify the device type and press **Enter**. Leave the other options at their default value.
7. Use the Log Analysis Report menu to display the desired error log entry.

   Note: You may use the PF11 function key which will give you a brief description of the error log entry. This could be helpful when scanning the error logs.

RISC System/6000 Error Logs

You can access the error logs maintained by the RISC System/6000 operating system by using the System Management Interface Tool (SMIT) function. Many options are available to review or analyze the error logs.

1. Type **smit** at the AIX command line.
2. Select **Problem Determination** from the System Management menu.
3. Select **Error Log** from the Problem Determination menu.
4. Select **Generate Error Report** from the Error Log menu.
5. Select **filename**, then select **no** from the Single Select list.
6. From the Generate Error Report menu you can select the type of reports you want to view, then press the **Do** icon.
7. You can scroll through the log by using the **Up** or **Down** icons on the menu.

For detailed information about error-log messages generated from library devices, see *AIX Parallel Channel Tape Attachment/6000 Installation and User's Guide*.

Sense Data

Sense Data Description

The library manager checks all tape library operations for errors. Some errors can be corrected by the library software and by error correction circuits. These errors are recorded for analysis later, if necessary. Other errors that cannot be corrected cause an interruption in tape library operation. All available information about the error is recorded as sense data to aid in locating the tape library problem that caused the error.

Tape library sense data is recorded in format 23. Sixteen of the tape library 32 sense bytes (0 through 7 and 24 through 31) is common with several formats of the 32 sense bytes for the 3490E subsystem. This topic defines only format 23.

The 3590 format 23 sense information is compatible with the 3490 sense format 23 to avoid impacting certain existing MVS software components, but it is not identical in all bytes.

A Sense command causes tape library format 23 sense data to be transferred to the host system channel through the tape subsystem control units.

Sense Byte Summary

Figure 206 shows sense bytes 0 through 7 that are common to all tape and tape library sense formats. See “Byte 0” on page SENSE-4 through “Byte 7—Sense Byte Format” on page SENSE-8 for details.

Sense byte 7 determines the format. If sense byte 7 is hexadecimal 23 (format 23), bytes 8 through 23 contain information unique to the tape library format 23. Bytes 24 through 31 is common to tape subsystem formats 19, 20, and tape library format 23.

Figure 206. Common Sense Bytes

Byte	Bit	Meaning	Page
0	0 1 2 3 4 5 6 7	Command reject Intervention required Bus out check Equipment check Data check Overrun Deferred unit check Assigned elsewhere	SENSE-4
1	0 1 2 3 4 5 6 7	Locate failure Drive online to control unit Reserved Record sequence error Beginning of tape (BOT) Write mode Write protect Not capable	SENSE-5
2	0–3 4 5 6 7	Reporting channel path Reporting control unit Cartridge loader active Tape synchronous mode Tape positioning	SENSE-5
3	0–7	Error recovery action (ERA) codes	SENSE-6
4–6	0–7	Channel logic block number	SENSE-8
7	0–7	Format of bytes 8–31	SENSE-8

Sense Format 23 (3490)

Format 23 consists of error and informational conditions for the IBM 3494 Tape Library Dataserver attached to the 3490E control unit. The control unit and the attached library use format 23 to report errors and informational conditions about the library. See *IBM 3490 Magnetic Tape Subsystem Enhanced Capacity Models C10, C11, and C22 Hardware Reference* for other sense format details.

Format 23 (sense byte 7 = X'23') sense bytes are defined in Figure 207.

Figure 207. Format 23 Sense Bytes

Byte	Bits	Meaning	Page
8	0–7	ERA modifier byte	SENSE-9
9, 10	0–7	Library manager error code (the initial error detected by the library manager)	SENSE-11
11, 12	0–7	OTH error code (normally contains all zeros)	SENSE-11
13–18	0–7	Volume serial number (If the serial number is not specified or if the error is not related to a volume, this field contains all blanks.)	SENSE-11
19	0–7	Library manager software engineering change (EC) level identifier	SENSE-11
20	0–7	Tape subsystem ID	SENSE-11
21–23	0–7	Library sequence number (the library sequence number is a right-justified, 5-digit hexadecimal value)	SENSE-11
24	0–3 4–7	Channel adapters installed Data-transfer mode	SENSE-11
25	0 1 2 3 4 5 6 7	Dual Control Unit Communication feature Reserved Library Attachment Facility Interface online Library Attachment Facility installed Improved Data Recording Capability enabled Reserved Upgraded buffer Cartridge loader installed	SENSE-13
26	0–7	Control unit microcode EC level	SENSE-13
27–29	0–3 4–23	Model definition Control unit sequence number	SENSE-13
30	0–3 4–7	Logical drive address Physical drive address	SENSE-13
31	0–7	Reserved (X'00')	SENSE-13

Format 23, Sense Bytes 0–7

Sense Bytes 0–2

Byte	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
0	Command Reject	Intervention Required	Bus Out Check	Equipment Check	Data Check	Overrun	Deferred Unit Check	Assigned Elsewhere
1	Locate Failure	Device Online to Control Unit	Reserved	Record Sequence Error	Beginning of Tape (BOT)	Write Mode	Write Protect	Not Capable
2	Reporting Channel Path				Reporting Control Unit ID	Cartridge Loader Active	Tape Synchronous Mode	Tape Positioning

Sense bytes 0–7 are common to all formats. Bytes 0–2 have the following meaning:

Byte 0

Bit 0—Command reject: Bit 0 is set when:

- An undefined command is issued.
- The control unit receives an invalid command or command parameters.
- A command sequence error is detected.
- A command is issued with command chaining and command chaining is not allowed.
- A command is issued that requires a particular configuration installed and it is not installed.
- A write-type command is issued to a write-protected volume.
- A data block is issued that exceeds the maximum block size allowed for buffered mode.
- A Locate Block command that specifies a block ID on wrap 2 is issued to a subsystem capable of writing 3480-2 XF format, but the drive has a tape mounted that is written with 3480 or 3480 XF format.

Bit 1—Intervention required: Bit 1 is set when the addressed drive is not ready or is not installed in the subsystem.

Bit 2—Bus out check: Bit 2 is set if the data bus from the channel has the wrong parity when a command or data byte is transferred.

Bit 3—Equipment check: Bit 3 is set if the data is associated with a unit check status. The subsystem is detecting a hardware malfunction.

Bit 4—Data check: Bit 4 is set if the data is associated with a unit status check. The subsystem detected an invalid condition in the absence of a detected hardware malfunction.

Bit 5—Overrun: Bit 5 is set if the data is associated with a unit check status. The subsystem detected that the channel data rate is not enough to sustain the data transfer operation in process. The data overrun condition is not sent to the host.

Bit 6—Deferred unit check: Bit 6 is set if the data is associated with a unit check status that is not related to the execution of the current command.

Bit 7—Assigned elsewhere: Bit 7 is set if the data associated with unit check status is generated because the device is disabled by dynamic partitioning on the selected channel path.

Byte 1

Bit 0—Locate failure: Bit 0 is set when the Locate Block command cannot find the data block or tape mark that is requested.

Bit 1—Device online to control unit: Bit 1 is set when the control unit has started communication with the addressed tape drive.

Bit 2—Reserved: Bit 2 is always 0.

Bit 3—Record sequence record: Bit 3 is set when the block ID shows that the block being read is out of sequence.

Bit 4—Beginning of tape (BOT): Bit 4 is set when a cartridge is mounted and the tape is positioned to the beginning of the tape. The tape is positioned to the beginning of the tape if any of the following conditions exist:

- No forward motion commands were run since the tape was mounted.
- The last tape motion command issued was a Rewind command.
- The last tape motion command issued was a Read Backward, Backward Space Block, or Backward Space File command resulting in the generation of unit check status with associated sense data indicating ERA code 39.

Bit 5—Write mode: Bit 5 is set when the write-type command was the most recent command sent to the addressed tape drive. The bit is reset when a read-type command was the most recent command sent to the addressed tape drive or when there is not tape loaded.

Bit 6—Write protect: Bit 6 is set when a tape cartridge that is protected against write operations is inserted in the addressed tape drive. This bit is valid only when sense byte 1 bit 1 (device online to control unit) is set.

Bit 7—Not capable: Bit 7 is set when the tape data cannot read the first block on a tape because the recording-format identification at the beginning of tape is either missing or not readable. This bit is also set when a data block is issued that exceeds the maximum block size allowed for buffered mode.

Byte 2

Bits 0, 1, 2, and 3—Reporting channel path: Bits 0, 1, 2, and 3 identify the subsystem channel path that is presenting the sense or log data.

Bit 4—Reporting control unit: Bit 4 indicates which control unit detected the indicated condition and generated the sense or log data. If bit 4 is 0, control unit 0 is reporting. If bit 4 is 1, control unit 1 is reporting.

Bit 5—Cartridge loader active: Bit 5 is always set to 0.

Bit 6—Tape synchronous mode: Bit 6 is set when the control unit places the drive in tape synchronous mode.

Bit 7—Tape positioning: Bit 7 is set if channel block ID needs to be adjusted to obtain the channel block ID associated with the failing block as follows:

- If the failing channel command was a Read Forward or Write command, decrease the logical block number in the channel block ID by 1 to obtain the logical block number used for repositioning to reissue the failing command.
- If the failing channel command was a Read Backward command, increase the logical block number in the channel block ID by 1 to obtain the logical block number used for repositioning to reissue the failing command.

Sense Byte 3

Byte	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
3	Subsystem Error Recovery Action (ERA) Code							

Byte 3 contains the subsystem Error Recovery Action (ERA) code. It describes the action that the host system takes to recover from an error in the subsystem.

Figure 208 shows a summary of the ERA codes and the software recovery activity. The outboard recorder (OBR) column in the table shows whether an OBR record is logged in the error recording data set (ERDS) file as:

P Permanent error
T Temporary error
– No

The miscellaneous data recording (MDR) column shows whether an MDR record is logged in the ERDS file as:

Y Yes, send message to the console.
– No, do not send a message to the console.

The MSG column shows whether a console message is written as:

Y Yes
– No

Figure 208 (Page 1 of 3). ERA Codes and Software Recovery for an MVS Operating System

ERA Code	ERA Name	Software Recovery	OBR	MDR	MSG
27	Command reject	Permanent error	—	—	Y
29	Function incompatible	Permanent error	—	—	Y
57	Global status intercept	Reissue	—	—	—
60	Library attachment facility equipment check	Permanent error	P	—	Y
62	Library manager offline to subsystem	Permanent error	P	—	Y
63	Control unit and library manager incompatible	Permanent error	P	—	Y
64	Library volser in use	Permanent error	—	—	—
65	Library volume reserved	Permanent error	—	—	—

Figure 208 (Page 2 of 3). ERA Codes and Software Recovery for an MVS Operating System

ERA Code	ERA Name	Software Recovery	OBR	MDR	MSG
66	Library volser not in library	Permanent error	—	—	—
67	Library category empty	Permanent error	—	—	—
68	Library order sequence check	Permanent error	—	—	—
69	Library output stations full	Reissue[2]	T	—	Y
6B	Library volume misplaced	Permanent error[1] Reissue[2]	— P	— —	Y —
6C	Library misplaced volume found	Reissue[2]	T	—	—
6D	Library drive not unloaded	Rewind/Unload Reissue	T	—	—
6E	Library inaccessible volume restored	Reissue[2]	T	—	—
6F	Library vision failure	Permanent error[1] Reissue[2]	— P	— —	Y Y
70	Library manager equipment check	Reissue[2]	P	—	Y
71	Library equipment check	Reissue[2]	P	—	Y
72	Library not capable—manual mode	Permanent error	—	—	—
73	Library intervention required	Reissue[2]	T	—	Y
74	Library informational data	Reissue[2]	T	—	—
75	Library volume inaccessible	Permanent error[1] Reissue[2]	— P	— —	Y —
76	Library all cells full	Reissue[2]	T	—	Y
77	Library duplicate volser ejected	Reissue[2]	T	—	Y
78	Library duplicate volser left in input station	Reissue[2]	T	—	Y
79	Library unreadable or invalid volser left in input station	Reissue[2]	T	—	Y
7A	Read library statistics	Reissue[2]	—	—	—
7B	Library volume manually ejected	Permanent error	P	—	Y
7C	Library out of cleaner volumes	Reissue[2]	—	—	Y
7F	Library category in use	Permanent error	—	—	—
80	Library unexpected volume ejected	Reissue[2]	T	—	Y
81	Library input/output station door open	Reissue[2]	T	—	Y
82	Library manager program exception	Reissue[2]	T	—	—
83	Library drive exception	See Note[3]	—	—	—
84	Library drive failure	See Note[3]	—	—	—
86	Library all categories reserved	Permanent	—	—	T

Figure 208 (Page 3 of 3). ERA Codes and Software Recovery for an MVS Operating System

ERA Code	ERA Name	Software Recovery	OBR	MDR	MSG
88	Damaged cartridge ejected	Reissue[2]	T	—	Y

Notes:

[1]The ERA code was reported by presenting ending status unit check.

[2]The ERA code was reported by an unsolicited unit check.

[3]See *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Maintenance Information* for more information on this ERA code.

Sense Bytes 4–7

Byte	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
4–6	Channel Block Logical Number							
7	Sense Byte Format							

Bytes 4–6—Channel Block Logical Number: Bytes 4–6 indicate a response from a Read Block ID command.

Byte 7—Sense Byte Format: Byte 7 contains the tape library format ID 23.

Format 23, Sense Bytes 8–23

Byte	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
8	ERA Modifier Byte							
9, 10	Library Manager Error Code							
11, 12	OTH Error Code							
13–18	Volser							
19	Library Manager Software EC Level							
20	Tape Subsystem ID							
21–23	Library Sequence Number							

Byte 8—ERA Modifier Byte

Byte 8 contains an ERA modifier for the tape library. ERA codes listed in Figure 209. This modifier byte is only valid for the following ERAs.

Note: Ignore values in the modifier byte (byte 8) for ERA codes other than those listed in Figure 209.

Figure 209 (Page 1 of 2). ERA Codes and Descriptions

ERA Code Hex	ERA Modifier Hex	Modifier Description	Software Recovery Action
27		The modifier provides additional information about this ERA code to the system programmer. Call your next level of support.	1. Write a console message: `COMMAND REJECT`. 2. Signal a permanent error.
29	01 02–03	The Library Attachment Facility is not installed. The modifier provides additional information about this ERA code to the system programmer. Call your next level of support.	1. Write a console message: `FUNCTION INCOMPATIBLE`. 2. Signal a permanent error.
63	00 01 02	Microcode levels incompatible Subsystem sequence number mismatch Message incompatible	1. Log a permanent OBR record in ERDS file. 2. Write a console message: `LIBRARY MANAGER INCOMPATIBILITY`. 3. Signal a permanent error.
64		The modifier provides additional information about this ERA code to the system programmer. Call your next level of support.	Signal a permanent error.
65		If the volser specified in certain requests of a specific command is reserved, the control unit displays unit check status with associated sense data indicating ERA code 65. Sense byte 8 indicates the following reasons for being reported: **Value** — **Description** **X'00'** — Reserved **X'01'** — Volser specified is assigned to the cleaner-volume category. **X'02'–X'FF'** — Reserved	Signal a permanent error.

Figure 209 (Page 2 of 2). ERA Codes and Descriptions

ERA Code Hex	ERA Modifier Hex	Modifier Description	Software Recovery Action
74	00 01 02 03–0F 10 11 12 13–20 21 22 23–7F 80 81 82–FF	Reserved A library component has become unavailable. A library component previously unavailable has become available. Reserved A device clean operation has been performed based on a time of day value. A device clean operation has been performed based on the number of mounts. A device clean operation has been performed based on SARS request. Reserved A device has been made unavailable through the library manager console. A previously unavailable device has been made available through the library manager console. Reserved Preventive maintenance message Error threshold exceeded Reserved	1. Log a temporary OBR in the ERDS file. 2. Reissue the failing CCW. **Note:** When ERA 74 is used to report that a device has been cleaned or to report a change in device availability, the unsolicited unit check is generated only for the device address.
81	00 01 02 03–FF	Reserved The input station door is open. The output station door is open. Reserved	1. Log a temporary OBR in the ERDS file. 2. Write a console message: `LIBRARY I/O STATION DOOR OPEN`. 3. Reissue the failing CCW. **Note:** The CCW to be reissued is the Perform Subsystem Function command that was attempting to read an unsolicited message and was presented unsolicited unit check status.
88		When the library determines that a problem exists with the cartridge or tape and that the tape has ejected to an input station, the control unit displays an unsolicited attention message, (Volume Exception) with an unsolicited unit check and with associated sense data indicating ERA code 88. Sense byte 8 indicates why the cartridge was ejected: **Value** — **Description** **X'00'** — Reserved **X'01'** — Either the cartridge is missing a leader block or the tape has become detached from the leader block. **X'02–FF'** — Reserved	1. Log a temporary OBR in the ERDS file. 2. Write a console message: `DAMAGED CARTRIDGE EJECTED`. 3. Reissue the failing CCW. **Note:** The CCW to be reissued is the Perform Subsystem Function command that was attempting to read an unsolicited attention message and was presented unsolicited unit check status.

Bytes 9 and 10—Library Manager (LM) Error Code

Bytes 9 and 10 contain the initial error detected by the tape library.

Bytes 11 and 12—Other (OTH) Error Code

Bytes 11 and 12 normally contain all zeros.

The error code OTH field can be used for certain ERA codes, such as ERA 74. For byte 3 ERA 74 (library component unavailable), the OTH field is only used when the modifier field is 01.

See “Tape Library Permanent and Recovered Error Summary Report (Service Alerts)” on page REPORTS-4 for additional information on the OTH error code field that includes ERA 74.

Bytes 13 through 18—Volser

Bytes 13 through 18 contain the volume serial number, in EBCDIC, associated with the error data. The serial number is left-justified and padded with blanks. If the serial number is not specified or if the error is not related to a volume, this field contains all blanks.

Byte 19—Library Manager Software EC Level

Byte 19 is set to a unique (hex) value for each level of the microcode.

Byte 20—Tape Subsystem ID

Byte 20 contains, in hex, the 3490E subsystem IDs in the library. There is always at least one subsystem ID.

Bytes 21 through 23—Library Sequence Number

Bytes 21 through 23 are right-justified, 5-digit hexadecimal values.

Format 23, Sense Bytes 24–31

Byte	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
24	Channel Adapters Installed				Data-Transfer Mode			
25	Dual Control Unit Communi-cation Feature	Reserved	Library Attachment Facility Interface Online	Library Attachment Facility Installed	Improved Data Recording Capability Enabled	Reserved	Upgraded Buffer	Cartridge Loader Installed
26	Control Unit Microcode EC Level							
27–29	Model Definitions				Control Unit Sequence Number			
30	Logical Drive Address (Low-Order)				Physical Drive Address			
31	Reserved X'00'							

Byte 24—Channel Adapters Installed

Byte 24 indicates that the channel adapter is installed and active on the control unit and the channel type to which the active channel adapter is set on the control unit panel.

Bit	Bit Definition
0	Channel adapter A installed
1	Channel adapter B installed
2	Channel adapter C installed
3	Channel adapter D installed
4–7	Data-transfer mode **Value** **Description** **X'0'** Parallel unthrottled interlock **X'1'** Parallel 1.5MB per second interlock (non-data-streaming) mode **X'5'** Parallel 2.0MB per second data-streaming mode **X'6'** Parallel 3.0MB per second data-streaming mode **X'7'** Parallel 4.5MB per second data-streaming mode **X'E'** ESCON 9.0MB per second mode An RPQ is available to enhance the control unit to support up to 9MB per second data rate when an ESCON adapter is used; it is 4.5MB per second without this enhancement. **X'F'** ESCON 4.5MB per second mode

Byte 25—Control Unit/Drive Features

Bit	Bit Definition
0	Dual Control Unit Communication coupler
1	Reserved
2	Library Attachment Facility Interface online
3	Library Attachment Facility installed
4	Improved Data Recording Capability enabled
5	Reserved
6	Upgraded buffer
7	Cartridge loader installed

Byte 26—Control Unit Microcode EC Level

Byte 26 represents the design level of the microprogram used on the subsystem.

Byte 27–29—Model Definitions

Bytes 27–29 contain information about the configuration of the subsystem.

Bit	Bit Definition
0–3	Model definition
4–23	Control unit sequence number

Byte 30—Drive Address

Bits 0 through 3—Logical Drive Address: The logical drive address indicates the device address used when selecting the device over the host channel interface. It can be reassigned by the operator.

Bits 4 through 7—Physical Drive Address: The physical drive address identifies the drive within the subsystem.

Byte 31—Reserved

Must be X'00'.

Sense Format 23 (3590)

The 3590 sense format 23 is intended to match 3490 sense format 23 in the following bytes: 3, 7-8, 13-18. The information in these bytes is identical to avoid impacting existing software components.

3590 format 23 bytes 20-22 contain the same information as bytes 21-23 of the 3490 format 23.

Refer to “Sense Format 23 (3490)” on page SENSE-3 for a description of the library sense bytes and to *IBM 3590 High Performance Tape Subsystem Hardware Reference* for a detailed description of all of the 3590 sense.

Safety and Inspection

General Instructions

The safety checklist procedures in this topic ensure that a 3494 not under an IBM maintenance agreement has the necessary safety items installed and that no changes made it unsafe. Each 3494, 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 3494 must be considered unsafe until the presence and condition of all checklist items are 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 frame can cause serious or lethal electrical shock.
- Explosive. For example, damaged or expanding capacitors can cause serious injury.
- Mechanical hazards, such as missing safety covers, can cause injury to service personnel.

Education

Service personnel must be trained on the general maintenance agreement qualification (MAQ), tailored maintenance agreement qualification, and changed machine safety inspection procedures as part of the electrical safety course. In addition, service personnel must also be trained on the 3494.

Danger and Caution Notices

Danger indicates the presence of a hazard that has the potential of causing death or serious personal injury.

Caution indicates the presence of a hazard that has the potential of causing moderate or minor personal injury.

Each entry contains a reference number; CXX for Caution or DXX for Danger. You can use this reference number to check the translation.

Note: The notices and messages are translated into selected languages. See *IBM 3494 Tape Library Dataserver Maintenance Information Safety Translations* manual.

C01 **CAUTION:**
The 3494 must be powered off with the power cable disconnected.

C02 **CAUTION:**
If any of the conditions in the following text are not as described, stop. Contact the customer to have the improper voltage or resistance conditions corrected before proceeding.

C03 **CAUTION:**
When wearing the ESD grounding wrist strap, ensure that the ground strap remains connected. Failure to keep the ground strap connected creates a safety exposure when working on live exposed electrical circuits.

C04 **CAUTION:**
Because of laser radiation, do not stare into the beam.

D01 **DANGER**

Use only test probes to touch the shell of a metal outlet until the customer corrects any improper voltage or resistance.

D02 **DANGER**

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

D03 **DANGER**

Do not power on the power control compartment (PCC) unless it is installed in a frame.

The PCC does not contain any field serviceable parts. The PCC is sealed for your protection. Do not remove the cover from the PCC.

Inspection Procedure

This topic provides the inspection procedures needed to ensure that the 3494 has the necessary safety items installed and that no changes made it unsafe.

Preparation

The following reference items are useful during the inspection:

- The LOC section of this manual
- Copies of safety service memorandums (SMs) and engineering change announcements (ECAs) for this machine type
- Parts catalog
- 3494 history
- *Electrical Safety for IBM Customer Engineers*

Branch Circuit CB Switched Off Check

__ 1. Have the customer locate and switch off the circuit breaker (CB) for the 3494 branch circuit that supplies voltage to each receptacle.

__ 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.

- If this is a metal clad connector, perform the “Safe-to-Handle Check” and the “Disconnect Precautions” procedures in *Electrical Safety for IBM Customer Engineers*. (These procedures are described under “Miscellaneous Safety Tips.”)
- 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.*

__ 4. **DANGER**

> **Hazardous voltages are present. Do not touch the internal parts (pins and sockets) of the outlet. D02**

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.

Branch Circuit CB Switched On Check

__ 1. Have the customer switch on the CB that supplies voltage to each receptacle for the library.

__ 2. **DANGER**

> **Hazardous voltages are present. Do not touch the internal parts (pins and sockets) of the outlet. D02**

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.

Record the voltages for future reference in the checklist shown in Figure 210.

__ 3. Have the customer switch off the branch circuit CB before connecting the machine power cord into the outlet.

Figure 210. Voltage Checklist

Date	Description of Circuits Checked	Voltage Values	Comments	Name

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 211 on page INSP-7. Make any necessary corrections. See *IBM 3494 Tape Library Dataserver Parts Catalog* for part numbers of labels in the various languages.

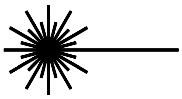
The general caution symbol

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 3494 contains a laser device. The bar-code reader contains the laser, which is a Class II laser.

CAUTION:
Because of laser radiation, do not stare into the beam. C04

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 L1x and HA1 RSB Frame: Figure 211 shows the approximate locations of the following:

1. Laser caution label, bar-code reader
2. Laser caution label, on both sides of the cable guide
3. Hazardous area label, bulkhead
4. Hazardous area label, power supply
5. Hazardous area label, power supply
6. Hazardous area label, power control compartment (PCC)
7. Ground wire, PCC to frame member
8. High grounding current warning label
9. Multiple line cord hazard label

The following labels are for the 3490 tape subsystem. See the maintenance information manual for your tape or DASD subsystems for information on the subsystems in your library.

10. Hazardous area label, 3490E
11. Hazardous area label, 3490E
12. Excessive weight caution label, 3490E

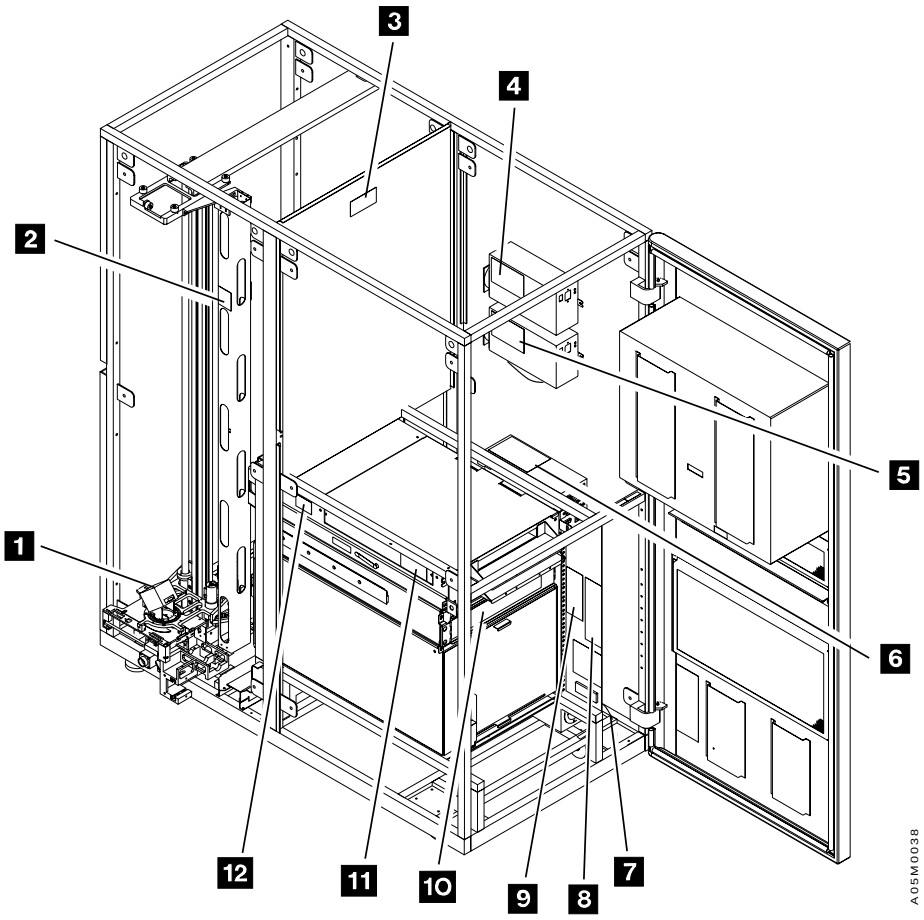


Figure 211. Safety Labels and Grounds for the Control Unit Frame

Safety Labels and Grounds for the Model B16, D1x, and HA1 LSB Frame: Use Figure 211 on page INSP-7 keys 6 through 8 and 10 through 12 for the locations of the safety labels and grounds in the drive unit frame.

Safety Labels and Grounds for the Model S10 Frame: The storage unit frame does not contain safety labels or grounds.

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

CAUTION:
The 3494 must be powered off with the power cable disconnected. C01

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 line cords are not frayed or damaged.

__ 4. All ac line cords have the correct part number.

Note: See *IBM 3494 Tape Library Dataserver Parts Catalog* for the correct part number for the power cables. See also *IBM 3494 Tape Library Dataserver Introduction and Planning Guide*.

__ 5. All ground jumpers (normally green and yellow) are tightly attached. Check that all covers, housings, and metal box sides have proper ground continuity (less than 0.1 ohm).

__ 6. All ground connections are tightly attached.

__ 7. Check from the library manager chassis to the control unit frame for proper ground continuity (less than 0.1 ohm).

__ 8. The resistance from the library manager line cord ground pin to the frame and to the power supply covers must not be more than 0.1 ohm. For the ground connection locations, see Figure 211 on page INSP-7.

__ 9. All safety covers (operator and service areas) are in place including those protecting mechanical devices and hot surfaces. No sharp corners or edges should be unprotected.

- All access covers must be in place.

__ 10. The customer's circuit breakers and circuit panels for the 3494 frames are identified as 3494 branch circuits.

__ 11. All ac output safety covers are installed.

__ 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. The ac power supplies are attached tightly in place.

__ 16. The ac line cords have no frayed or damaged wiring at the PCCs.

__ 17. The resistance from the line cord ground pins and housings to all frames and to all power assembly grounds are:

- Line cord ground pin to frame ground resistance must not be more than 0.1 ohm.
- Line cord housing to frame ground resistance must not be more than 0.1 ohm.

__ 18. All power wiring does not have frayed or damaged wires.

__ 19. The dc power supplies are attached tightly in place.

__ 20. All circuit breakers are the correct size. See *IBM 3494 Tape Library Dataserver Parts Catalog*.

__ 21. All cables, connections, and plugs do not have frayed or damaged wiring.

__ 22. All latches or clamps are in acceptable condition.

Completion Report and Signature

- Safety inspection for machine type 3494
- General safety inspection
- Maintenance agreement qualification (MAQ)

After the inspection, sign and date the checklist and store it with the maintenance agreement inspection.

_____ _____
Name Date

Safety Hazards

List all safety hazards. If there are none, write none.

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

Installation

Before Installation

The floor requirements for the 3494 are specified in the *IBM 3494 Tape Library Dataserver Introduction and Planning Guide*, GA32-0279. The maximum out-of-level condition must not exceed 25.4 mm (1 in) over the entire length and width.

Configurations can include up to 16 frames. A library configuration plan defining the frame layout must be completed before you start the installation. The control unit frame (model L1x) is always on the left and additional frames are always added to the right side. If a model B16 frame is included in the library, it must be positioned to the right of (and attached to) the model D12 frame that houses the 3590 B1A drives that it uses.

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

The 3494 requires at least 1 cleaner cartridge and 1 CE cartridge for each type of tape subsystem installed in the library (i.e. 3490E and 3590). In addition, the 3590's require a 3590 data cartridge for code backup. These cartridges are shipped with the 3494.

__ 1. Check off the installation steps in this procedure as you complete them. When you have completed a section of the procedure, go to the next section in the procedure except when you are specifically instructed to skip it.

__ 2. Familiarize yourself with these instructions. When installing more than 1 frame, especially understand how to align the frames. The correct initial positioning of the the L1x frame is critical for a successful installation.

__ 3. If the customer has existing tape subsystems that must be installed in the library, familiarize yourself with the installation instructions in the Maintenance Information manual for your tape subsystem.

Unpacking

This topic does not give the complete unpacking instructions. For complete instructions, see the unpacking instructions with your 3494 frame.

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

Refer to Figure 215 on page INST-9.

__ 1. Move the L1x control unit (CU) frame in place. If it is installed on a raised floor, ensure the hole cut-out is placed under the rear of the frame. (The rear is the side that contains the library manager.)

__ 2. Locate the set of keys taped to the door handle.

__ 3. Open the front door **2**.

__ 4. Remove the foam from around the bottom of the cartridge accessor **3** by cutting the plastic ties.

__ 5. Cut the plastic tie from the top of the accessor assembly **1**.

__ 6. Remove the packing material from the library manager display and keyboard.

| __ 7. Open the rear door and remove the packing material from the library manager system unit **4**. If
| your LM is secured with plastic ties, cut the ties. If your LM is secured with metal bracket P/N
| 34L3619, remove the bracket and store it with the library tools.

| If you have a 3494 Model HA1, repeat the steps above for the Right Service Bay frame.

__ 8. Keep all the parts in a safe place to keep them from being damaged.

__ 9. Remove the shipping carton from each expansion frame and remove the parts packed in the labeled cardboard filler panel.

__ 10. Remove the expansion frame shipping braces and packing materials per the unpack instructions.

3494 Special Tools

See the Maintenance Information manual shipped with your tape subsystems for the special tools supplied with the tape subsystem.

Figure 212. 3494 Special Tools shipped with Library

Part Number	Tool Description	Usage
05H1901	3490 cleaner cartridge	Clean tape path for 3490E tape drives
05H3895	9-25 pin interposer	Used with wrap plug 39F3884 on the 3590 drives
05H4434	3590 data cartridge	3590 code backup
05H7308	Bumper Safety Guard	Model HA1 Left Service Bay Bumper Safety Guard
05H7355	3490 CE cartridge	3490 diagnostics, Model HA1 label CE_001
05H7539	3590 CE cartridge	3590 diagnostics, label CE_999
05H7540	3590 cleaner cartridge	Clean tape path for 3590 tape drives
05H7831	Frame alignment bar	Set frame spacing during expansion frame install
05H7999	Frame skate (2)	Move expansion frame against previous frame
05H8048	Line level	Check floor before library expansion
05H8049	Plumb bob	Check frame vertical alignment
05H8052	Magnet	Check frame vertical alignment
05H8417	3590 CE cartridge	3590 diagnostics, Model HA1 label CE_998
05H8486	5/16" hex bit	Adjust leveling pads (requires 3/8" ratchet P/N 6428140 (not supplied))
05H9163	SCSI wrap tool	Wrap the 3490/3590 SCSI ports on the tape drives
09F1799	Wrap plug	Wrap the ARTIC 25-pin connectors, breakout box ports 2-7
09F1803	Wrap plug	Wrap the ARTIC 78-pin connectors in the library manager
34G8395	Masonry string	String for frame alignment and leveling
34G9459	Cartridge labels	Spare CE cartridge labels and volume labels units
39F3884	Wrap plug	Verify the library attachment facility in the tape control units
50G0387	3490 CE cartridge	3490E Diagnostics, label CE_000
50G0405	Bearing shaft clamp tool	Install bearing shafts in X-rail assemblies
50G0406	Rack alignment tool	Align X-rail assemblies between frames
62G1324	3490 SCSI wrap tool	Wrap the 3490 SCSI ports on the control unit
6425494	Wrap plug	Wrap the ARTIC 25-pin connectors, breakout box ports 0-1

Figure 213. 3494 Secondary Tools (not shipped with library after EC F23244)

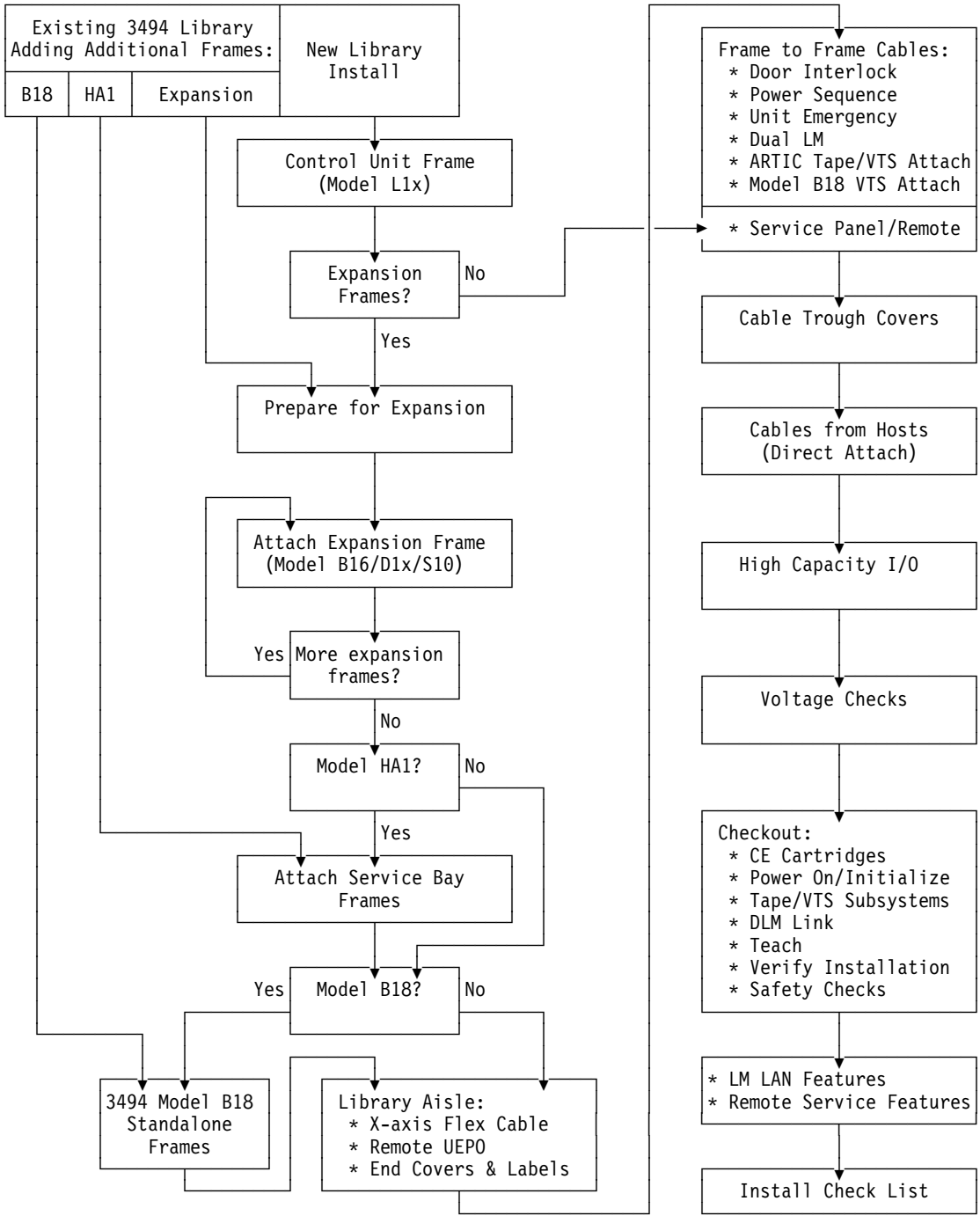
Part Number	Tool Description	Usage
05H7998	Frame adapter	Set expansion frame spacing to frame without alignment rod
34G8419	C-clamp (2)	C-clamps used to attach frame adapter

Notes:

1. If you are installing an old expansion frame without the alignment rod on a newer library with EC F23244, order the Secondary Tools. See Figure 213.
2. The 3490 Model CxA Drive Install Tool P/N 50G0407 was shipped with libraries before EC F23244. If you need to install a 3490 Model CxA tape subsystem in a newer library, borrow the drive install tool from an older 3494 installation.

3494 Install Flowchart

This flowchart is provided to show the general overall flow of the 3494 library install procedure. It is intended to be used as a refresher for experienced install personnel and is not to be used to replace the detailed instruction steps.



| *Figure 214. 3494 Install flowchart*

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Adding Additional Frames

__ 1. If you are adding additional library expansion frames (3494 Model B16, D10, D12, D14, or S10) to an existing library, go directly to“Prepare for Expansion” on page INST-10 and complete the remainder of the instructions as appropriate.

Notes:

a. Pay particular attention to the Teach step in the Checkout procedure to ensure that you get the library reconfigured correctly and preserve the customer's existing volume inventory.

b. It is best to add the new expansion frame(s) at the right end of the existing library frames to avoid extra Teach operations. In a Model HA1 library, the new frames are added between the last existing library expansion frame and the right service bay frame. Only a Teach additional box is required to pick up the new frame(s).

c. In a Model HA1 library, the right service bay frame must be removed before the expansion frame is installed. After the new expansion frame is installed, reinstall the service bay using the procedure in “Right Service Bay” on page INST-44.

d. If the customer wants to put the new expansion frame in the middle of an existing library, you must remove all of the library frames to the right of the point where the new frame will be inserted. After the new expansion frame is installed, reinstall the frames that were removed using the appropriate procedure in “Attach Expansion Frame” on page INST-13 and in “Right Service Bay” on page INST-44 (if installed). An extra Teach operation is required to update the current teach configuration before running the Teach additional box for the new library frame position(s).

__ 2. If you are installing Model HA1 service bay frames on an existing library, go directly to “Attach Service Bay Frames” on page INST-36. A Teach new configuration is required after the frames are installed.

__ 3. If you are installing a Model B18 standalone frame for an existing library, go directly to “3494 Model B18 Standalone Frame” on page INST-51. A Teach new configuration is required after the frame is installed.

__ 4. If you are installing a new library, continue with “Control Unit Frame” on page INST-8.

Control Unit Frame

See Figure 215 on page INST-9.

__ 1. If the 3494 is installed on a raised floor, have the customer supply you with a floor cutout for the L1x control unit (CU) frame.

__ 2. Loosen the locknuts on the leveling pads and lower them to the floor.

__ 3. Position the L1x control unit frame by measuring from the floor to the bottom of the frame **5** on all the corners. Use your rachet wrench with the 5/16" hex bit supplied with the 3494 (or 5/16" allen wrench supplied with libraries before EC F23244) to adjust the leveling pads so that the clearance from the floor to the bottom of the frame is 74 mm (2.9 in.). The frame should be approximately level and parallel with the floor, and the casters should be off the floor.

Note: If you are installing a L1x frame with the alignment rod and you will be adding expansion frames to it, you can set the frame height to 84 mm (3.3 in.). Refer to step 4 on page INST-10.

__ 4. If you are not adding expansion frames at this time, tighten the locknuts on the leveling pads.

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

__ 6. If you are installing the customer's existing 3490E C10, C11, C22 or 3590 B11 tape subsystem, install the MES that converts a 3490 Model C10, C11, or C22 to a Model C1A or C2A or a 3590 Model B11 to a Model B1A.

If the tape subsystems were not factory installed (field merge), see *IBM 3490 Models C10, C11, C1A, C22, and C2A Maintenance Information*, *IBM 3490 Model F01, F11, F1A Maintenance Information*, or *IBM 3590 Maintenance Information* to install the tape drives and/or tape controller in the frame, and then return to step 9 on page INST-9. **Do not perform the tape subsystem Installation Checkout or attach the host cables until you are so instructed in this instruction.**

Note: Some versions of the 3490E Model CxA Maintenance Information have an incorrect hole count for the front slide mounting bolts on a 3494 D10 frame. The front hole count should be the same as the hole count for the 3494 L10. Change your 3490E Model CxA Maintenance Information manual as follows before you start installing your tape subsystem:

INST-14 In Figure 51, change 3494 DU hole location **A** from 4 to 3.
INST-14 In Figure 51, change 3494 DU hole location **B** from 9 to 8.
INST-15 In Figure 52, change 3494 DU hole location **F** from 15F/40R to 14F/40R.
INST-15 In Figure 52, change 3494 DU hole location **G** from 24 to 23.
INST-15 In Figure 52, change 3494 DU hole location **H** from 41 to 40.

__ 7. If the control unit (CU) frame has a 3490 tape subsystem already installed, put the front cover of the tape drive in place. See "3490 Model CxA Tape Drive Front Cover" on page INST-70 and then return here.

__ 8. Open the front door of the control unit frame and locate the door pin in the upper right corner of the door opening. If the door pin is mounted with bolts, check the door pin adjustment as follows:

__ a. Close the front door and check that the door support bracket is touching the door pin. Use a flashlight and look through the left side window. If it is touching, go to step 9 on page INST-9.

__ b. Open the front door and loosen the door pin mounting bolts.

__ c. Remove the right side cover (refer to step 1 on page INST-10).

__ d. Close and lock the front door.

__ e. From the right side of the frame, push the door pin up until it touches the door support bracket and tighten the bolts.

__ f. Re-install the right side cover if you are not adding expansion frames.

__ 9. If you are installing any drive unit (model D1x), storage unit (model S10), or virtual tape server control unit (model B16) frames, go to “Prepare for Expansion” on page INST-10.

__ 10. If no other frames are being installed, go to “Service Panel and Cables” on page INST-107.

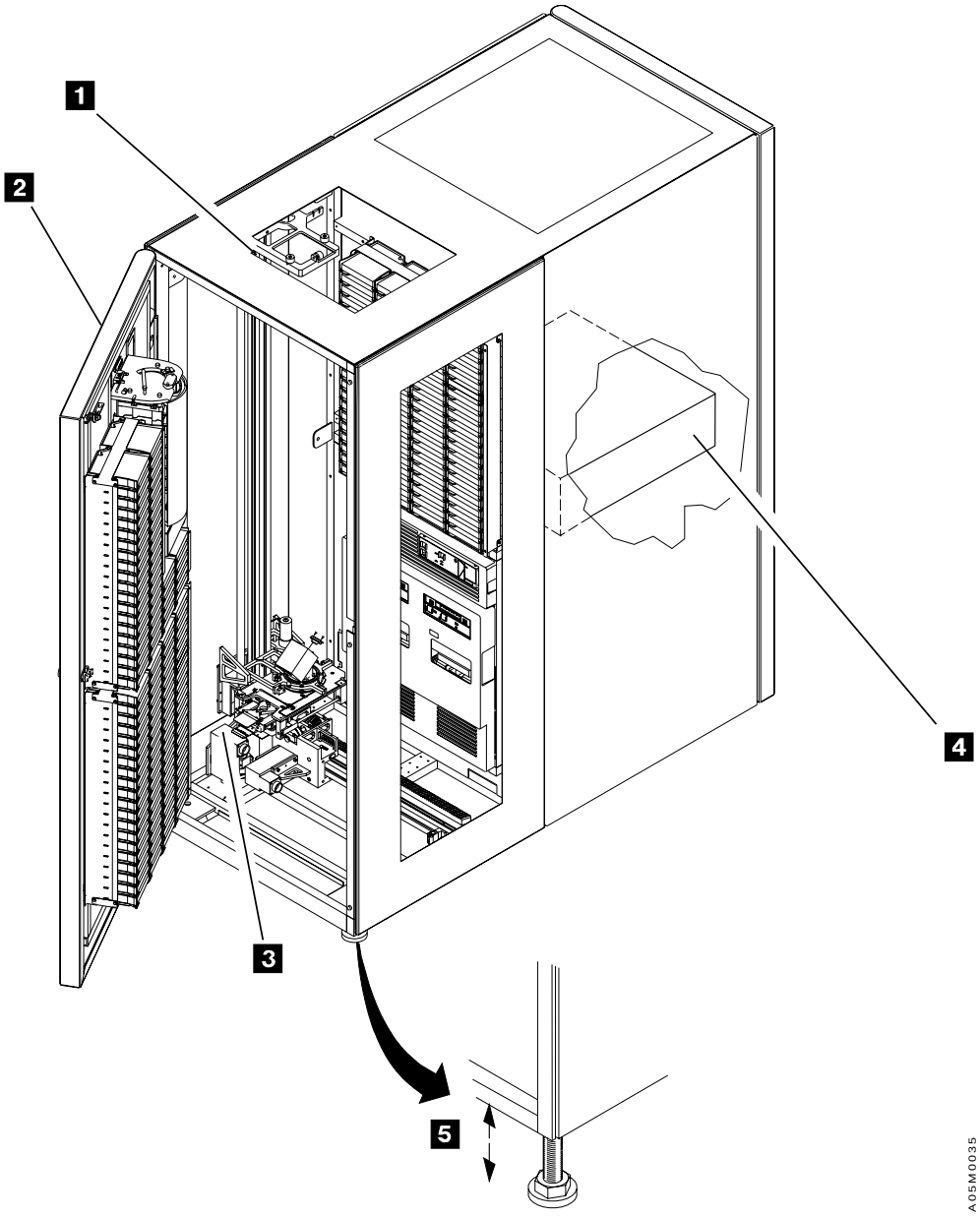


Figure 215. Control Unit Frame

Prepare for Expansion

The following steps will check the floor and prepare the control unit (or last frame) for expansion. See Figure 216 on page INST-11.

__ 1. On the L1x frame or the end frame in the library, remove the six screws from the right front side cover (with window) **3** , then remove the cover and set it aside. Also, if you are expanding a single accessor library that is longer than 8 frames, remove the remote UEPO switch assembly and set it aside. You will re-install these parts after the new frames are installed.

__ 2. Ensure that the L1x frame (or previous frames) is parallel with the line the customer wants the library to follow. Cut a piece of string double the length the library will be and loop the mid-point of the string around the left end of the X-rail assembly in the L1x frame. Pull the two ends of the string out the right side and stretch them tight so they are parallel to (just touch) each side of the blue gear rack of the X-rail assembly and ensure that the alignment strings are on the line you want the library to follow. Re-position the frame(s) as necessary.

__ 3. Roll the string up and place it in the installed frame. It will be used to ensure the expansion frames are straight as they are installed. If you are installing a library that **does not** have the alignment rod **10** below the X-axis rail on any of the frames, go to step 15 on page INST-12. (Refer to **8** in Figure 221 on page INST-23 for a picture of a frame with the alignment rod.)

__ 4. If you are installing a new L1x frame with the round alignment rod **10** below the X-axis rail, raise the L1x frame until the clearance from the floor to the bottom of the frame on all the corners is 84 mm (3.3 in.). Refer to **5** in Figure 215 on page INST-9.

__ 5. Use the plumb bob and adjust the leveling pads as required to ensure the right-side vertical frame member **8** at the back of the library aisle of the L1x frame (or last frame) is straight up and down as follows. Ensure that the front door is closed if the last frame is a S10.

   __ a. Cut a 2 meter (6.5 ft) piece of string and attach one end to the plumb bob. Tie the other end around the magnet so that the tip of the plumb bob will hang just above the lower frame member when the magnet is placed on top of the frame approximately at **11** .
   __ b. The tip of the plumb bob should align with the right-side of the lower frame member.
   __ c. The distance from the front edge of the rear aisle frame member **8** to the string should be the same at the top and bottom of the frame. You can mark the point you want to use for this measurement with a pencil on the top and bottom frame member of each expansion frame to make it easier to determine.

__ 6. Tighten the locknuts on the leveling pads.

__ 7. If the leveling pad screws are 150 mm (6.0 in.) long, skip the following steps and continue at step 15 on page INST-12.

__ 8. Check the floor using a string, line level, and measuring device as follows:

   __ a. Work with the customer to determine what the maximum length of the library is expected to be and place some object (chair, stool, post, etc.) at that point.
   __ b. Run the string on top of the X-axis rack **9** , out the right end of the library, and tie it to the object. Use the line level to ensure that the string is level.

__ c. Measure from the floor to the string at each frame junction point, every 0.8 m (30 in), and record the measurements starting with the right-side of the L1x frame (or last frame):

L1x=	2=	3=	4=	5=	6=	7=	8=
9=	10=	11=	12=	13=	14=	15=	16=

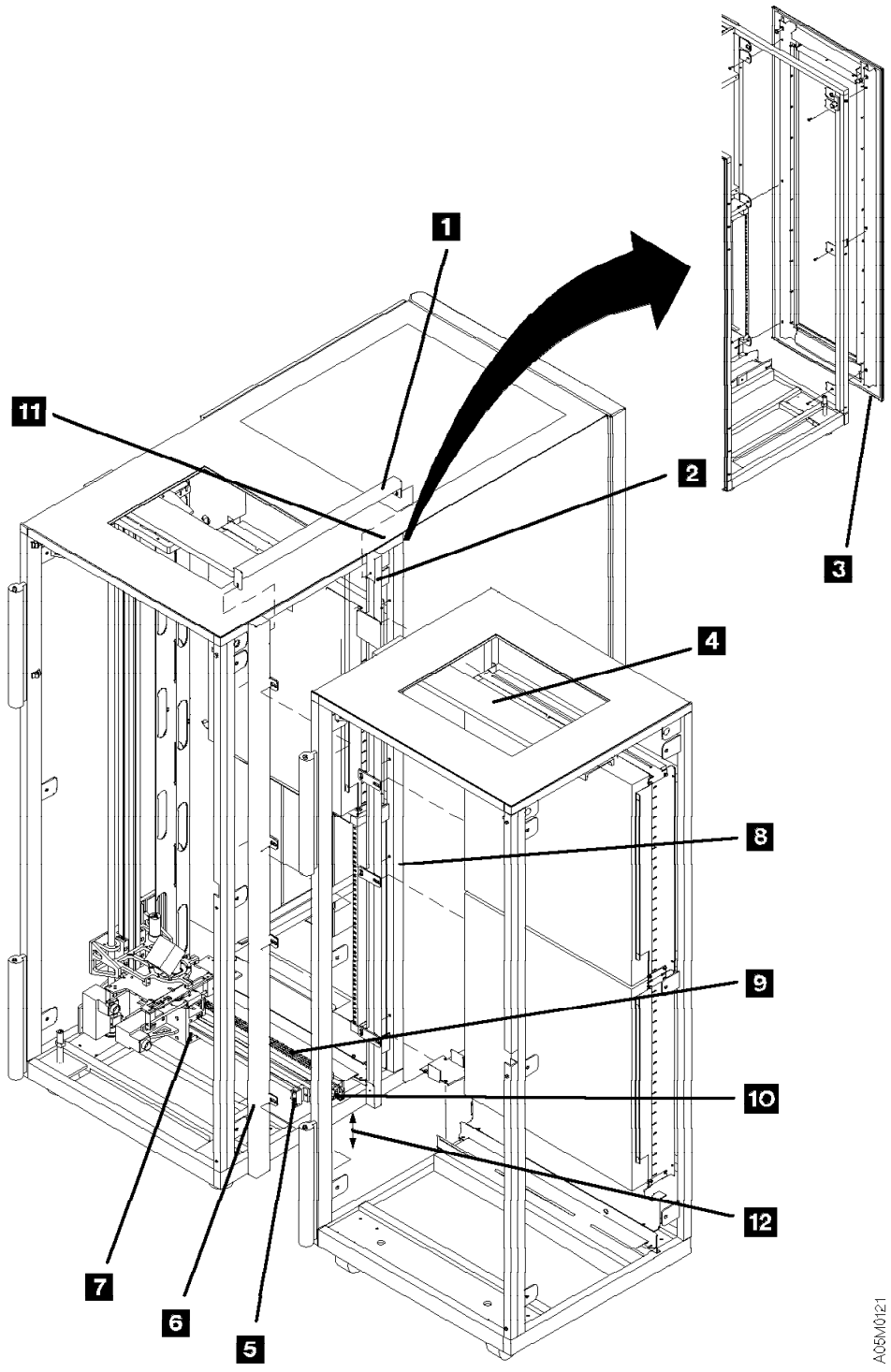


Figure 216. Prepare for Expansion

__ d. Measure from the floor to the bottom of the frame member on the L1x frame (or last frame) at the point **12** below the X-axis rail assembly and record the measurement.

L1x (or last frame) height = _____

__ 9. Using the measurements recorded in step 8c on page INST-11, fill in the following values in each of the equations in step 10. **The L1x (or last installed frame) value may also be the highest and/or lowest value.**

Put the L1x (or last installed frame) value in **a**.
Put the highest value in **b**.
Put the lowest value in **c**.

__ 10. Calculate **x**, **y**, and **z**.

b(_____) – c(_____) = x(_____)

b(_____) – a(_____) = y(_____)

a(_____) – c(_____) = z(_____)

__ 11. If **x** in step 10 is greater than 25.4 mm (1 in), stop the install and contact your field manager and customer.

__ 12. Get the **y** and **z** values from step 10 and calculate the adjustment.

z(_____) – y(_____) = (_____) ÷ 2 = (_____) adjustment.

__ 13. If this is a new library install, re-adjust the L1x frame height by the adjustment calculated in step 12. If the adjustment value is positive, raise the L1x frame. If the adjustment value is negative, lower the L1x frame. Ensure that the right-side of the frame is still plumb (refer to step 5 on page INST-10).

__ 14. If you are adding expansion frames to an existing library, adjust the position of the installed frames as follows:

__ a. Get the last frame height from step 8d and put it in **lf**, get the **y** and **z** values from step 10, and calculate the expansion frame high and low position.

lf(_____) + y(_____) = (_____) high position.

lf(_____) – z(_____) = (_____) low position.

__ b. The adjustment range from the floor to the bottom of the 3494 frames is approximately 72 mm (2.8 in) to 97 mm (3.8 in). If the high and low expansion frame position calculated in step 14a is between 72 mm (2.8 in) and 97 mm (3.8 in), **do not** adjust the library height and go to step 15.

__ c. If the high expansion frame position is above 97 mm (3.8 in), calculate the library height adjustment.

97 mm – high(_____) = (_____) adjustment.

__ d. If the low expansion frame position is below 72 mm (2.8 in), calculate the library height adjustment.

72 mm – low(_____) = (_____) adjustment.

__ e. Re-adjust the library height by the adjustment calculated in step 14c or step 14d. If the adjustment value is positive, raise the library. If the adjustment value is negative, lower the library. Ensure that the right-side of the last frame is still plumb (refer to step 5 on page INST-10).

__ 15. If you do not have a location line on the floor for the library to follow, you can tape a string to the floor.

Attach Expansion Frame

The expansion frame alignment hardware, alignment tools, and install procedure are designed to help you achieve a successful installation. The 3494 X-axis rail and upper guide rail alignment is critical for trouble-free library operation. Each X-axis rail assembly at the bottom of the library aisle must be aligned vertically and horizontally, and the upper guide rail at the top of the library aisle must be aligned from side-to-side. In addition, the frames should be approximately level and straight when you have completed the install.

Because of frame tolerance buildup and floor variations, some additional adjustments may be required to install your frame that are not specifically covered in the instructions. For example, in some cases, the X-rail alignment may be off slightly even with the alignment rod engaged. If it is shifted to the front or back, you must push the expansion frame forward or backward by kicking the frame (or hitting the leveling pads with a hammer) until the X-rail assemblies are aligned. If it is high or low, you must re-adjust the leveling pads until the X-rail assemblies and upper rails are aligned and you have the best compromise between frame-to-frame spacing and expansion frame leveling.

There are three types of expansion frames used in the 3494 library: Drive Unit frames (model D1x), Storage Unit frames (model S10), and the Virtual Tape Server Control Unit frame (model B16). The basic steps for installing expansion frames are the same, except, that the storage unit frames do not have external power cables or power sequence cables.

If a model B16 frame is included in the library, it must be positioned to the right of (and attached to) the model D12 frame that houses the 3590 B1A drives that it uses.

An alignment rod was added to the expansion frames on EC C35019. This rod is located under the X-rail assembly and spans the width of each frame. It interlocks the frames and provides a reference point for the alignment. Refer to **8** in Figure 221 on page INST-23. If your expansion frame has an alignment rod on the lower left side of the frame, go to section “Frames with Alignment Rod” on page INST-22 and follow the steps to install the frame on the library.

If you are installing an older frame without the alignment rod, continue at “Frames without Alignment Rod” on page INST-14 and follow the steps to install the frame on the library.

Frames without Alignment Rod

Use the following steps to install all the expansion frames that do not have the alignment rod. See Figure 217 on page INST-15.

__ 1. If the 3494 is installed on a raised floor, have the customer supply you with floor cutouts for the drive unit (DU) frames.

__ 2. Move the cartridge accessor assembly to the left side of the CU frame and insert an allen wrench or a screw driver in the hole in the X-rail assembly **7** (service position). Doing this step ensures that the accessor assembly is not accidentally moved off the X-rail assembly.

__ 3. Install the front (wide) spacer P/N 61G9888 **6** with screws P/N 1624790 on the control unit frame (or the last frame installed). Put the vertical adjustment slots on the left (installed) frame. Do not tighten the screws.

__ 4. Install the rear (narrow) spacer P/N 61G9887 **2** with screws P/N 1624790 on the control unit frame (or the last frame installed). Put the vertical adjustment slots on the left (installed) frame. Do not tighten the screws.

__ 5. Install the top spacer P/N 61G9889 **1** with screws P/N 1624767 on the front and rear spacers installed in steps 3 and 4. Align the top of the spacers and tighten the 2 screws.

__ 6. If you have already installed an expansion frame during this installation, skip this step and go to step 7 on page INST-16.

If you are installing the first expansion frame, remove the X-axis (horizontal) right side bumper **5** from the control unit frame (or the end frame) by loosening the center screw and sliding the assembly to the right. Save the X-axis bumper for later assembly in the last expansion frame.

Note: If you are installing the high availability model HA1, this bumper is not used.

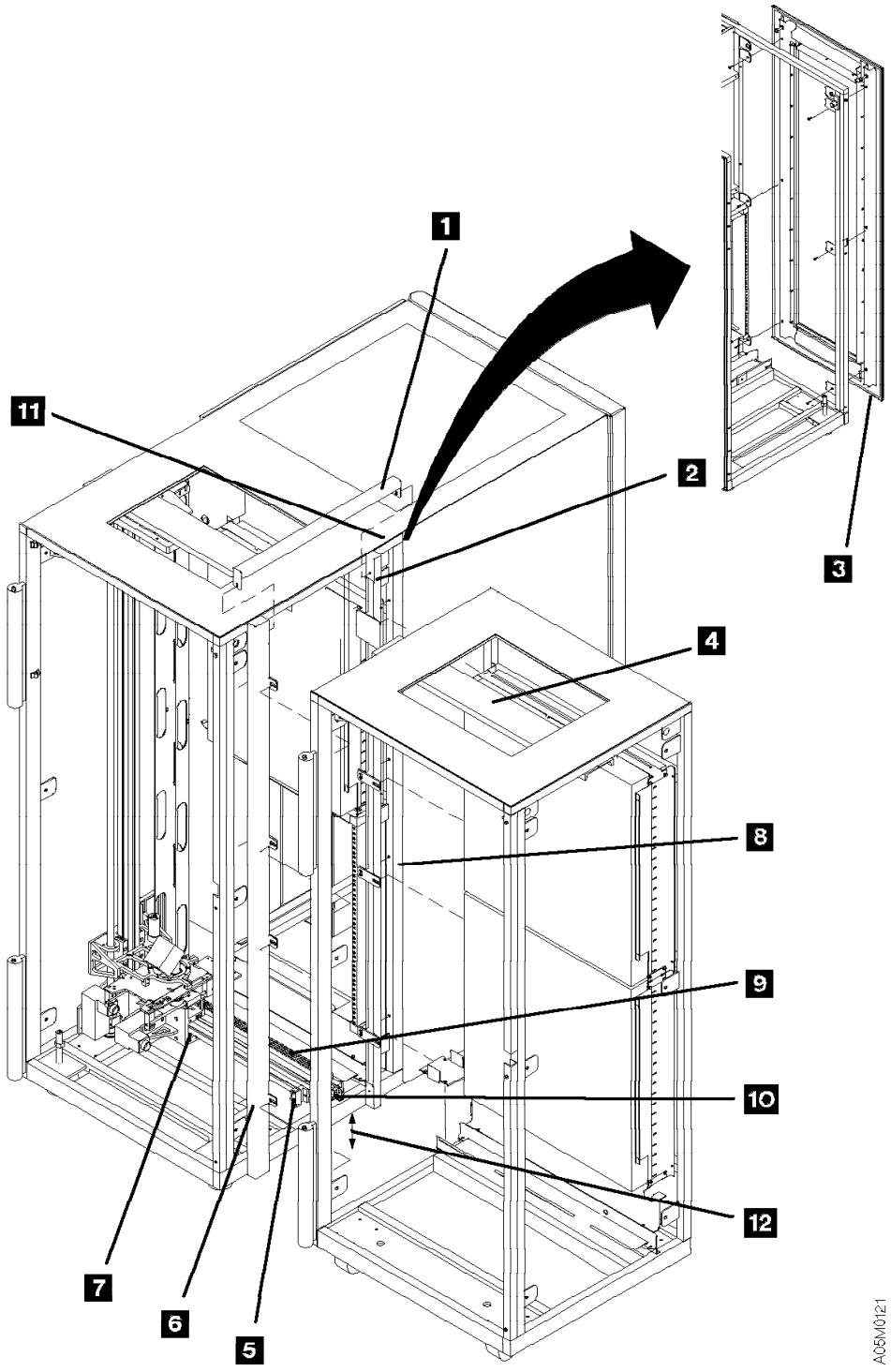


Figure 217. Frame-to-Frame Spacer Install

__ 7. Install the upper rail guide 4 as follows: (Refer to Figure 217 on page INST-15 for the location.)

See Figure 218 on page INST-17.

__ a. If you have the new-style upper rail guide P/N 05H7816 4 and it is not installed, install the upper rail guide P/N 05H7816 4 with locking tab P/N 05H7817 2 on the expansion frame with screws P/N 1624767 and washers P/N 0047242. Put the locking tab between the upper rail guide and the top left frame member so the tab will slide out of the left side of the expansion frame. Leave the screws loose and slide the upper rail and locking tab to the right into the frame.

__ b. If you have the old-style upper rail guide P/N 61G9839 3 and it is not installed, install the upper rail guide on the expansion frame with screws P/N 1624767. Install the upper rail so that it will extend into the control unit frame (or the last frame installed). Keep the screws in the center of the adjustment range and do not tighten fully.

__ c. If the upper rail guide (either old-style 3 or locking type 4) is already installed in the expansion frame, loosen the screws and slide it to the right into the frame.

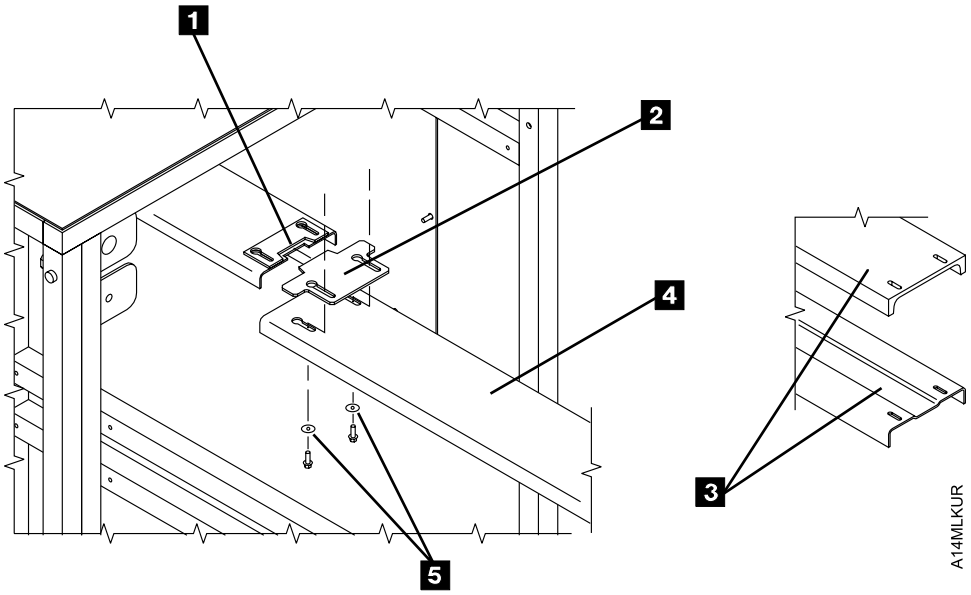


Figure 218. Locking Upper Rail Guide

Use Figure 219 on page INST-19 for the instructions on this page.

Caution

Do not move the Storage Unit (SU) around with the door open. Keep the door closed and locked when you are moving the SU into place.

__ 8. Move the expansion frame in place and verify that the installed frames are positioned correctly. The casters on the control unit frame should be just off the floor on all four corners and each corner should be equal distance above the floor.

__ 9. Put the plastic trays P/N 62G2070 under the leveling pads on the expansion frame. You may need to reposition the casters for the plastic trays to be installed. Loosen the locknuts on the leveling pads and lower them to the plastic trays.

__ 10. Use your adjustable wrench or the 5/16" allen wrench shipped with the 3494 to adjust the leveling pads. **The following steps are critical** to ensure that the cartridge accessor does not bind during horizontal movement. Position the expansion frame following these steps:

__ a. Push the expansion frame up tight against the left (installed) frame. Ensure that the front and back spacer tabs are inside the frame members and not binding.

__ b. Raise the expansion frame by adjusting the leveling pads evenly, a small amount at a time, until the bottom of the frame is approximately even with the bottom of the left frame.

__ c. Verify that the expansion frame is tight against the left frame, that both frames are parallel with each other, and that the front of the frames is parallel with the location line on the floor.

__ d. Install the 2 short T-nuts P/N 34G9647 **5** in the holes on the expansion frame with screws P/N 1621534. Install the T to the front with the small part of the bevel to the front. Do not tighten the screws.

__ e. Slide the X-rail assembly P/N 34G9611 **3** through the 2 T-nuts installed in step 10d until it touches the X-rail assembly in the left frame. The x-rail assembly should slide freely into the next frame. **Do not force the X-rail assembly into the next frame**.

__ f. Check the alignment of the X-rail assemblies to ensure they are aligned horizontally and vertically. Adjust the expansion frame as required until the X-rail assemblies slide together. Refer to the **Hints** box in step 10k on page INST-20. **When sliding the X-rail, ensure that it is tight against the mounting surfaces on the back and bottom.**

__ g. Ensure that the spacers **1** and **6** are pushed up and out of the way.

__ h. Push the upper rail guide **2** in the expansion frame to the left until it touches the upper rail guide in the left frame. **Do not tighten the screws.** Verify that the expansion frame is tight against the left frame, that both frames are parallel with each other.

__ i. Tighten the 2 short T-nuts **5**. Pull the two ends of the alignment string tight out the right side along each side of the X-rail assemblies and ensure that they are all aligned (i.e. straight). If required, re-position the frame.

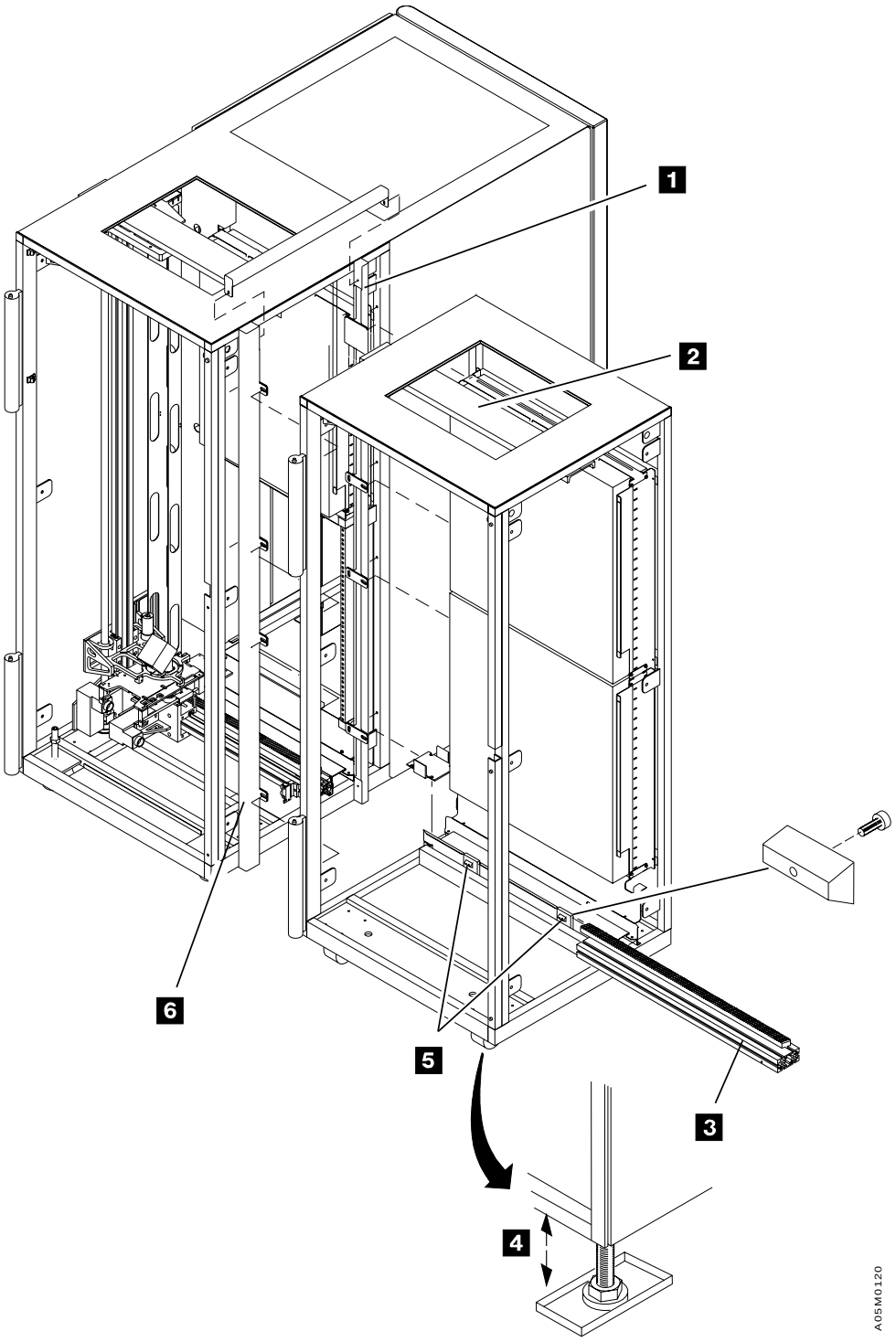


Figure 219. Frame-to-Frame Guide Rail and X-Rail Install

Use Figure 220 on page INST-21 for the instructions on this page.

__ j. Install screws P/N 1624790 in the spacers 1 and 3 on the expansion frame. **Do not tighten the screws.**

__ k. Adjust the leveling pads until the upper rail guides of the 2 frames are aligned 4 on the outside edges. **Ensure that the X-rail still slides easily into the previous X-rail.**

Hints

- If you need to raise the unit, start the adjustment using the left side pads and then bring the right side up to level. If you need to lower the unit, start with the right side pads and then bring the left side down to level.
- Observe the upper rail position to determine which leveling pad (front or rear) to start your adjustment with.
- When the right end of the upper rail is flush with the right side and the left end is touching the previous rail, the frame is approximately level with the previous frame.
- Align the SU frames with the front door closed. The weight of the front door can cause the top of the SU frame to shift when the frame is empty and the door is opened.

__ l. Lock the upper rail as follows: Use Figure 218 on page INST-17 for this step only.

__ 1) If you have an old-style upper rail guide 3 in the left frame that does not have a slot for the locking tab 2, align the edges of the upper rails and tighten the screws.

__ 2) If the upper rail guide in the left frame has a slot 1 for the locking tab, loosen the screws in the right end of the upper rail in the left frame. Slide the locking tab 2 until it is fully engaged in the left frame upper rail slot 1 and tighten the upper rail screws in both frames. **The locking tab should cover the notch in the left frame upper rail guide.**

__ m. Insert an M8 bolt P/N 1695159 through the bottom front cover bolt tab of the left frame 2 and through the corresponding cover bolt tab of the right frame and hand-tighten nut P/N 1622406 on the bolt. Repeat for each corner cover bolt tab 2 in the accessor aisle. Do not use the upper cover hanger with the large hole.

Note: Some SU frames do not have cover tabs on the left side. If your frame does not have cover tabs, go to step 11.

__ n. Start with the bottom bolts. Tighten the bolts one at a time until the frames are pulled against the spacer. **Do not overtighten and bend the tabs.**

Note: On DU frames, you will need to push the frames together and then tighten the bolts to hold it in place.

__ o. Check the upper rail guides to ensure they remain in alignment 4. If they are misaligned, loosen the screws, re-align the rails using the adjustment allowed by the screw slot size, and tighten the screws. If you can not align the upper rail guides, return to step 10k.

__ p. Re-adjust the leveling pads to ensure they are snug to the floor.

__ 11. Align the front and back spacers 1 and 3 as appropriate and tighten the screws evenly starting on the left frame. **Check the upper rail guide alignment 4 as you tighten the screws to ensure they stay even**.

Note: Tighten the screws until they are just snug to the spacer. **Do not overtighten**. The spacers are used only to fill the gap in the frames and are not used to hold the frames together.

__ 12. Tighten the locknuts on the leveling pads. If the rear locknuts cannot be tightened, leave them loose.

Continue at "X-Rail Assembly" on page INST-34 to complete the install of this frame.

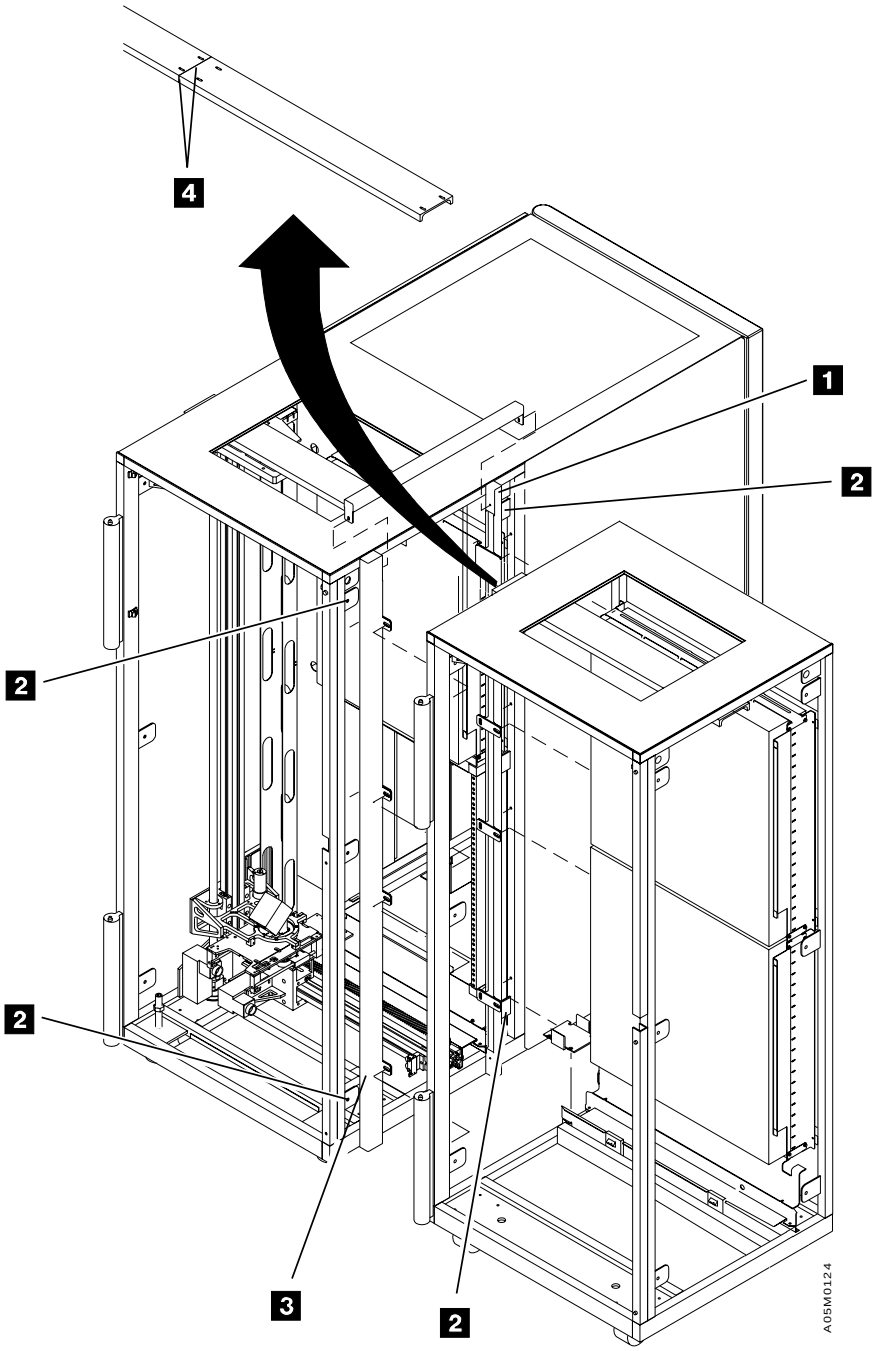


Figure 220. Frame-to-Frame Leveling

Frames with Alignment Rod

Use the following steps to install all the library expansion frames that have the alignment rod **8** . See Figure 221 on page INST-23.

__ 1. If the 3494 is installed on a raised floor, have the customer supply you with floor cutouts for the D1x and B1x frames.

__ 2. Move the cartridge accessor assembly to the left side of the CU frame and insert an allen wrench or a screw driver in the hole in the X-rail assembly **7** (service position). Doing this step ensures that the accessor assembly is not accidentally moved off the X-rail assembly.

__ 3. The frame to frame spacers **1** **2** **6** may be pre-installed on the left side of your expansion frame. If they are installed, loosen the 4 screws holding the front and back spacers and go to step 4. If they are not pre-installed, install them using the following steps:

   __ a. Install the wide spacer P/N 05H7828 **6** with two screws P/N 1624790 on the front frame member of the control unit frame (or the last frame installed). Put the horizontal adjustment slots on the left (installed) frame. Do not tighten the screws.

   __ b. Install the narrow spacer P/N 05H7829 **2** with two screws P/N 1624790 on the rear aisle frame member of the control unit frame (or the last frame installed). Put the horizontal adjustment slots on the left (installed) frame. Do not tighten the screws.

   __ c. Install the top spacer P/N 05H7830 **1** with screws P/N 1624767 on the front and rear spacers installed in steps 3a and 3b. Align the top of the spacers and tighten the 2 screws.

__ 4. If you have already installed an expansion frame during this installation, skip this step and go to step 5.

   If you are installing the first expansion frame, remove the X-axis (horizontal) right side bumper **5** from the control unit frame (or the end frame) by loosening the center screw and sliding the assembly to the right. Save the X-axis bumper for later assembly in the last expansion frame.

   Note: If you are installing the high availability model HA1, this bumper is not used.

__ 5. Loosen the four screws holding the upper rail guide **4** in the expansion frame and slide it to the right into the frame.

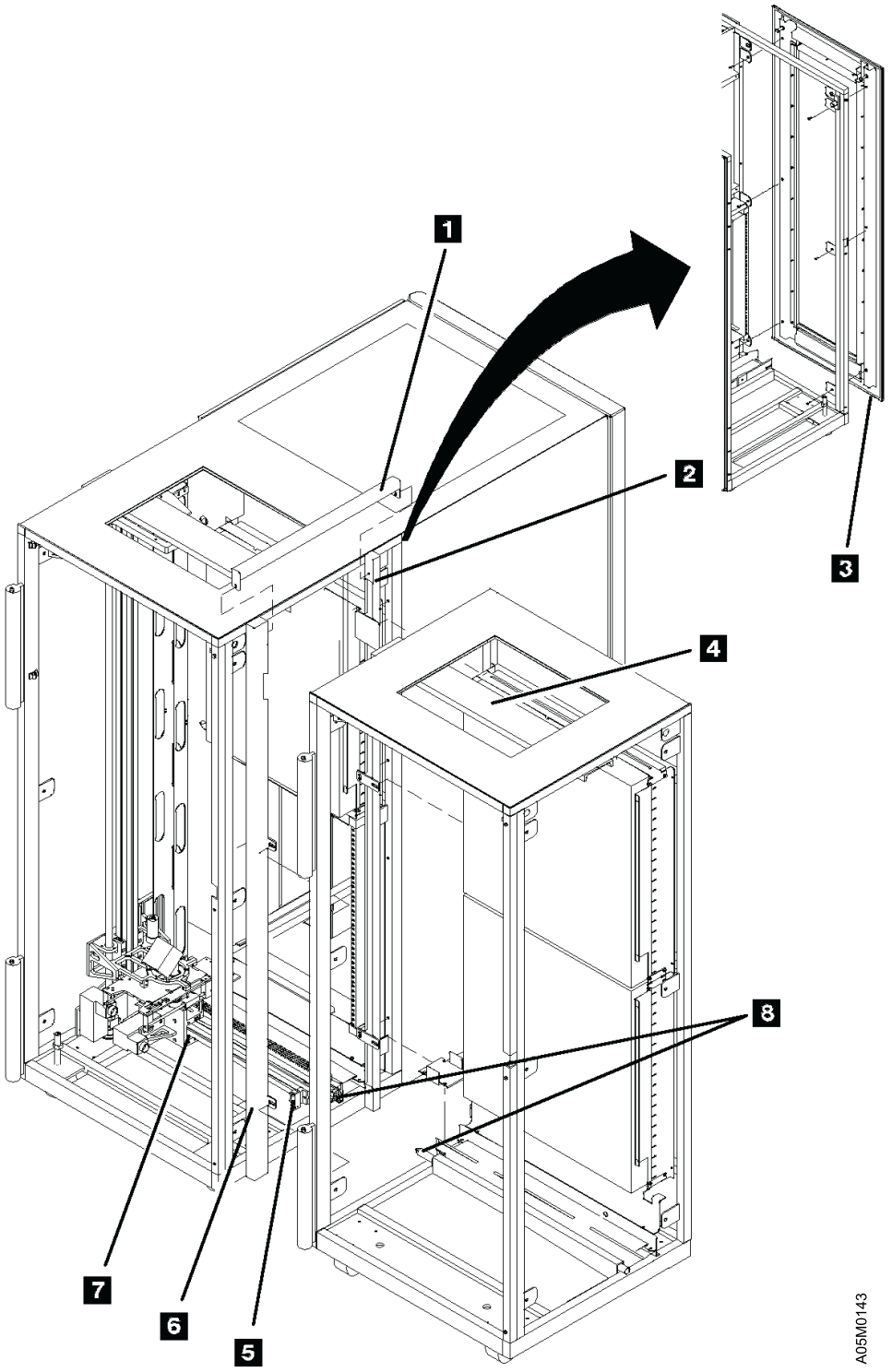


Figure 221. Frame-to-Frame Spacer Install

Use Figure 222.

__ 6. Install a frame alignment bar P/N 05H7831 **1** with screws P/N 1264795 (stored in the threaded holes on the bar) on the rear aisle wall of the expansion frame above the upper storage rack or drives. **Push the alignment bar tight against the right side 2 of the expansion frame and tighten the screws.**

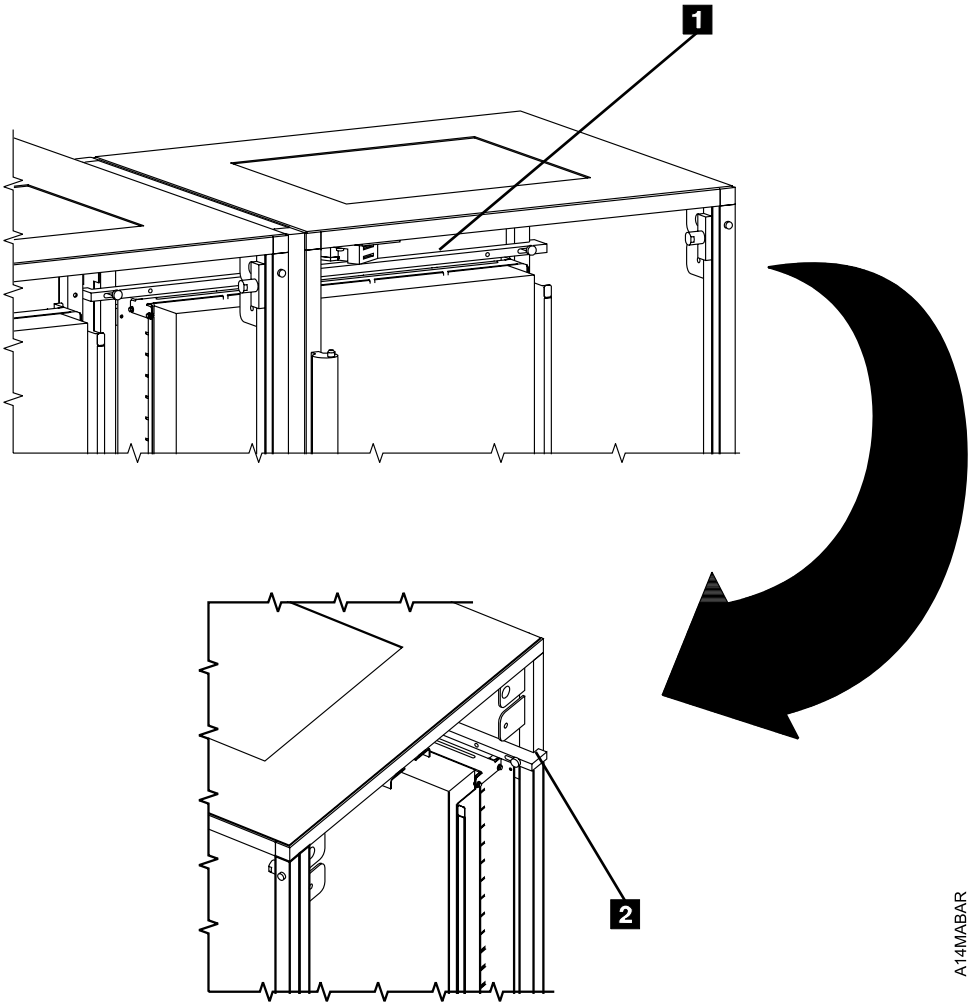


Figure 222. Frame Alignment Bar

Use Figure 223.

__ 7. If you are attaching this frame to a frame that has the alignment rod **3**, skip this step and continue at step 8 on page INST-26. If you are attaching this frame to a frame that does not have the alignment rod below the X-rail assembly, install the frame adapter P/N 05H7998 **1** on the floor of the expansion frame as follows:

Note: Starting with EC F23244, the frame adapter and C-clamps are no longer shipped with new libraries. If you are installing an old frame without the alignment rod in a new library with this EC and you must attach a frame with the alignment rod to it, you should either order the Secondary Tools (see Figure 213 on page INST-4) or borrow the frame adapter and clamps from an older 3494 installation before you begin the install.

__ a. Place the long end **6** of the frame adapter at the left side of the expansion frame with the pin down and push the frame adapter to the left and rear. Ensure the right pin is against the expansion frame **4** and the rear edge is against the X-rail support member **4**.

__ b. Position two C-clamps P/N 34G8419 **2** in the recessed area to the front side of the frame adapter so they will not interfere with the X-rail assembly and clamp the frame adapter to the lower frame member of each side of the expansion frame. **Ensure that the C-clamps are centered left to right 5 on the lower frame member to support the weight of the frame.**

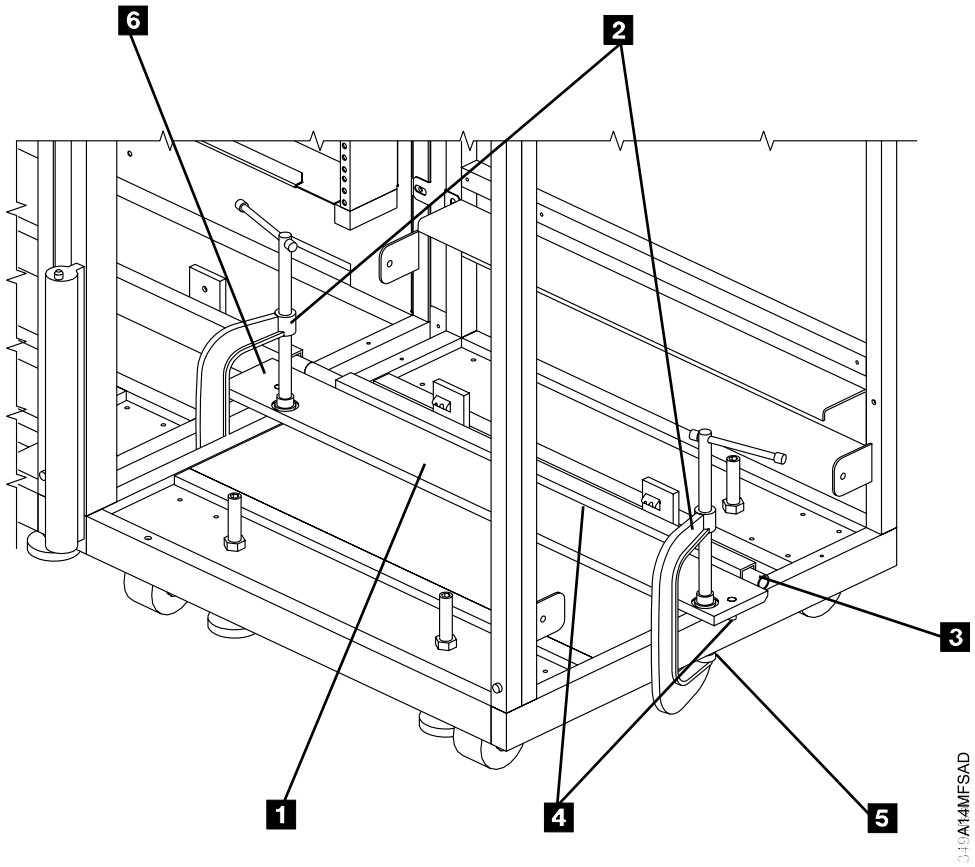


Figure 223. Frame Adapter

Use Figure 224 on page INST-27 for the instructions on this page.

Caution

Do not move the Storage Unit (SU) around with the door open. Keep the door closed and locked when you are moving the SU into place.

__ 8. Move the expansion frame in place.

__ 9. Loosen the locknuts on the expansion frame leveling pads and unscrew the locknuts until they are flush with the top of the screw.

Use your rachet wrench with the 5/16" hex bit shipped with the 3494 (or 5/16" allen wrench supplied with libraries before EC F23244) to adjust the leveling pads.

__ 10. Position the expansion frame following these steps:

__ a. The X-rail assembly **3** may be pre-installed in your expansion frame. If it is, loosen the 2 T-nuts **5** and go to step 10b. If it is not pre-installed, install the X-rail assembly using the following steps:

__ 1) Install the 2 short T-nuts P/N 34G9647 **5** in the holes on the expansion frame with screws P/N 1621534. Install the T to the front with the small part of the bevel to the front. Do not tighten the screws.

__ 2) Slide the X-rail assembly P/N 34G9611 **3** over the 2 T-nuts.

__ b. Pull the X-rail back about 150 mm (6 in.) from the left side and tighten the T-nuts **5**.

__ c. Push the expansion frame against the left (installed) frame until the alignment rod **9** (or the frame adapter **4** if installed) is touching and the front doors are approximately even.

__ d. Place a frame skate P/N 05H7999 under each of the leveling pads on the left side of the expansion frame and lower the leveling pads into the recessed area or onto the rubber pad (depending on the type of skate you have) on top of the frame skate. The skates should be positioned so they will roll toward the left frame. On a S10 frame, you will need to turn the casters so they do not interfere with the skates.

__ e. Raise the left side of the expansion frame by adjusting the left-side leveling pads evenly until the alignment rod is aligned with the hole in the rod of the left (installed) frame.

__ 1) If you are attaching this frame to a frame that does not have the alignment rod, the frame adapter **4** should be positioned so it will slide between the lower frame member and the X-rail assembly of the left frame.

__ f. Push the expansion frame against the left frame until the alignment rod **9** is fully engaged in the rod of the left frame. The front of the frame should be parallel with the location line on the floor.

__ 1) If you are attaching this frame to a frame that does not have the alignment rod, push the frame until the frame adapter dowel **6** is touching the bottom frame member of the left frame and the back side of the frame adapter is against the X-rail support member under the X-rail assembly.

__ g. Insert an M8 bolt P/N 1621592 through the bottom front cover bolt tab **8** on the left frame and through the corresponding cover bolt tab of the right frame and finger-tighten nut P/N 1622406 on the bolt. Repeat for the bottom rear corner cover bolt tab **8** in the accessor aisle.

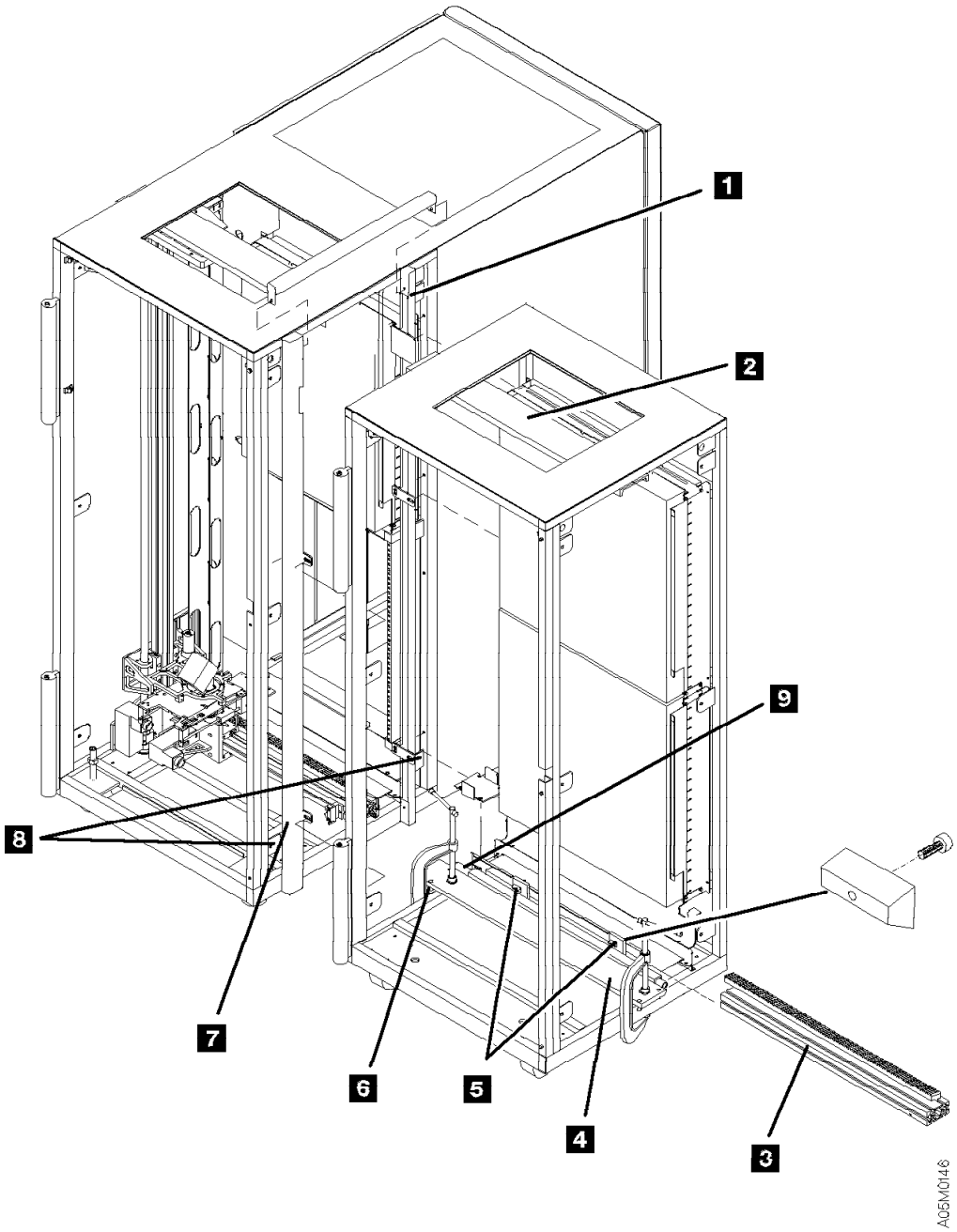


Figure 224. Frame-to-Frame Attachment

Note: The frame adapter 4 shown in this figure is only used when you are attaching this frame to a frame without the alignment rod.

Use Figure 225 on page INST-29 for the instructions on this page.

Note: If you are installing on carpet, put a plastic tray P/N 62G2070 or P/N 05H7004 under each of the leveling pads when you lower them in the following steps.

__ h. Raise the left-side leveling pads of the expansion frame off the frame skates so the weight of the expansion frame is on the alignment rod (or frame adapter) and remove the frame skates. This allows you to align the frames using the two leveling pads on the right side of the expansion frame and the alignment rod (or frame adapter) support point.

Do not leave the frame skates on the floor when you remove them. Put them in a safe place so no one will step on them.

__ i. Align the expansion frame using the following steps. The frame will be in position when the frame alignment bar is touching the left frame and the upper rail is aligned on the outside edges.

__ 1) Pull the alignment strings out the right side along each side of the blue gear rack and position the frame so the X-rail assemblies are aligned (i.e. straight).

__ 2) Observe the position of the upper rail as you raise the right side of the expansion frame.

__ 3) Adjust the front leveling pad until the edges of the upper rail **2** of the expansion frame are approximately 12 mm (0.5 in) past alignment with the edges of the upper rail in the left frame.

__ 4) Stop adjusting the front leveling pad and go to the back pad to bring that corner of the frame up even with the front corner where the edges of the upper rails are aligned.

__ 5) Repeat the above steps using smaller increments as required until the alignment bar is just touching the left frame and the upper rail is aligned.

__ j. Turn the left-side leveling pads by hand until they are snug to the floor, then tighten them 1/4 turn. **Do not overtighten and raise the library.**

__ k. Loosen the bolts in the alignment bar so you can slide it back and forth. When you slide it to the left, each end should touch the right side of both frames.

__ l. Using the plumb bob, check the right-side vertical frame member at the back of the library aisle to ensure that it is straight up and down from right to left and from front to back. Refer to step 5 on page INST-10.

__ m. Pull the two ends of the alignment string tight out the right side along each side of the blue gear rack and ensure that the X-rails are all aligned (i.e. straight).

__ n. Loosen the 2 T-nuts **5** and check the alignment of the X-rail assemblies to ensure they are aligned horizontally and vertically. Adjust the expansion frame leveling pads and slide the frame as required until the X-rail assembly in the expansion frame slides freely into the slot in the previous X-rail assembly. **When sliding the X-rail, ensure that it is tight against the mounting surfaces on the back and bottom. Do not force the X-rail assembly into the previous X-rail assembly.**.

__ 11. Check the expansion frame alignment as follows:

a. The alignment pin is fully engaged in the socket of the previous frame.
b. The X-rails are aligned, slide together easily, and are straight.
c. The upper rails are aligned from side to side.
d. You have the best compromise between the right-side vertical frame member being plumb and the alignment bar touching the right side of both frames.

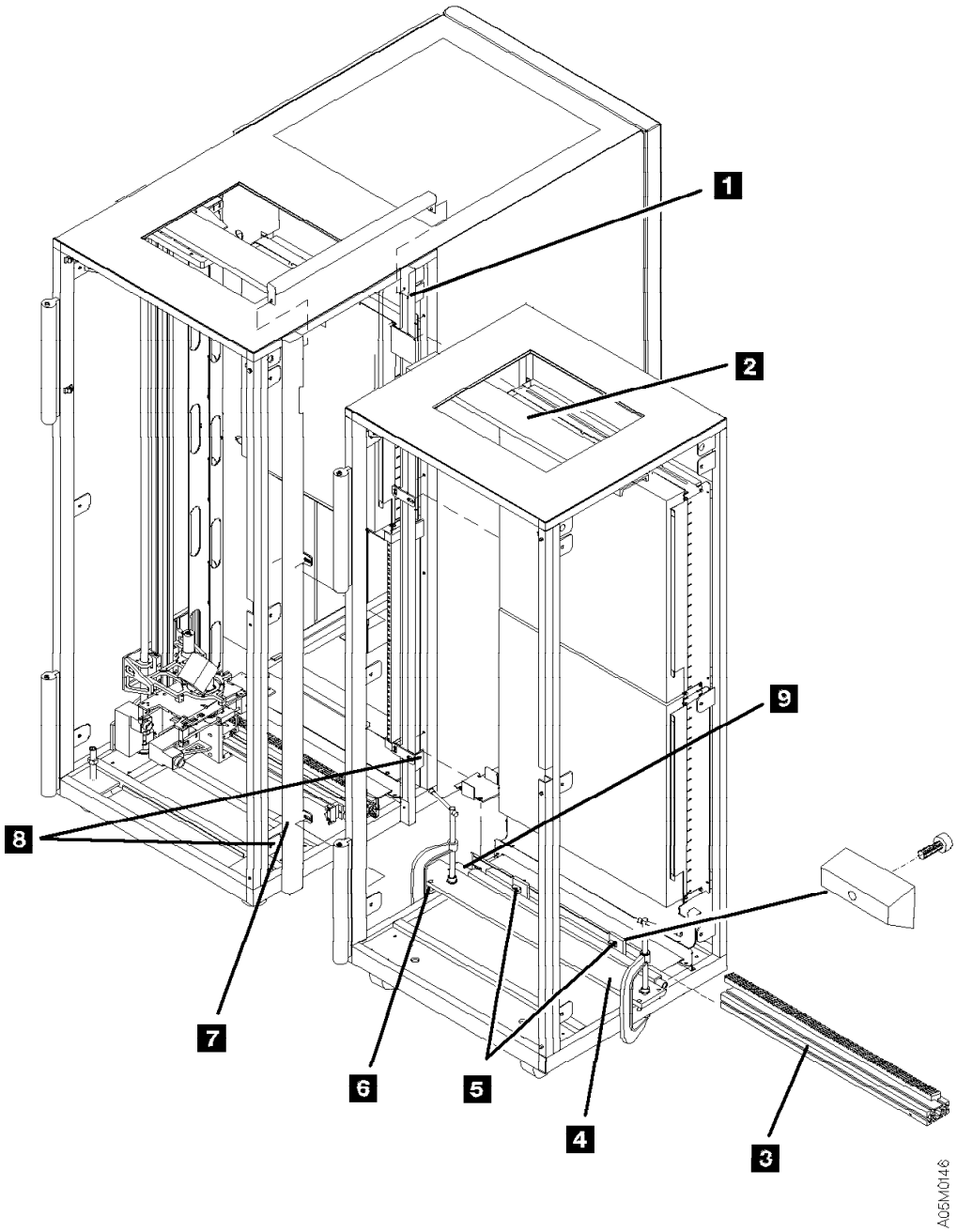


Figure 225. Frame-to-Frame Attachment

Note: The frame adapter 4 shown in this figure is only used when you are attaching this frame to a frame without the alignment rod.

Use Figure 226 on page INST-31 for the instructions on this page.

__ 12. Tighten the locknuts on the leveling pads. If the rear locknuts on a S10 frame cannot be tightened, leave them loose.

__ 13. Open the front door of the left (installed) frame and slide the expansion frame upper rail to the left until it is touching the upper rail in the left frame.

Notes:

a. If the upper rail in the expansion frame is against the upper rail in the left frame and it will not slide to the left or right when all of the screws are loose, you are out of adjustment. You need to shift the upper rail to the left starting with the first frame in the library. Open the door on the first frame and loosen the upper rail screws in both ends and in the left end of the upper rail in the next frame. Slide the upper rail to the left as far as it will go and tighten the screws. Repeat this adjustment in each frame and re-engage the locking tabs.

b. If you have run out of upper rail adjustment and you have installed less than 8 frames, the frame to frame spacing at the top is not correct. Ensure that you have installed the alignment bar correctly on each frame (refer to Figure 222 on page INST-24) and that the frame attachment brackets (refer to Figure 227 on page INST-32) are installed correctly on each frame.

__ 14. Loosen the screws in the right end of the upper rail of the left frame, slide the upper rail locking tab **5** until it is engaged in the left frame upper rail slot, and tighten the upper rail screws in both frames. The locking tab should fully cover the notch in the left frame upper rail section.

Note: If you have an old-style upper rail in the left frame that does not have a slot for the locking tab (refer to **3** in Figure 218 on page INST-17), align the edges of the upper rails and tighten the screws.

__ 15. Tighten the two M8 bolts located in bottom corners **2** of the accessor aisle until they are just snug. **Do not overtighten and bend the tabs.**

__ 16. Connect the two middle expansion frame attachment brackets P/N 05H7832 **6** to the left frame with screw P/N 1624790 and tighten the screws.

__ 17. Install four more screws P/N 1624790 in the spacers **1** and **3** and tighten the screws on both frames.

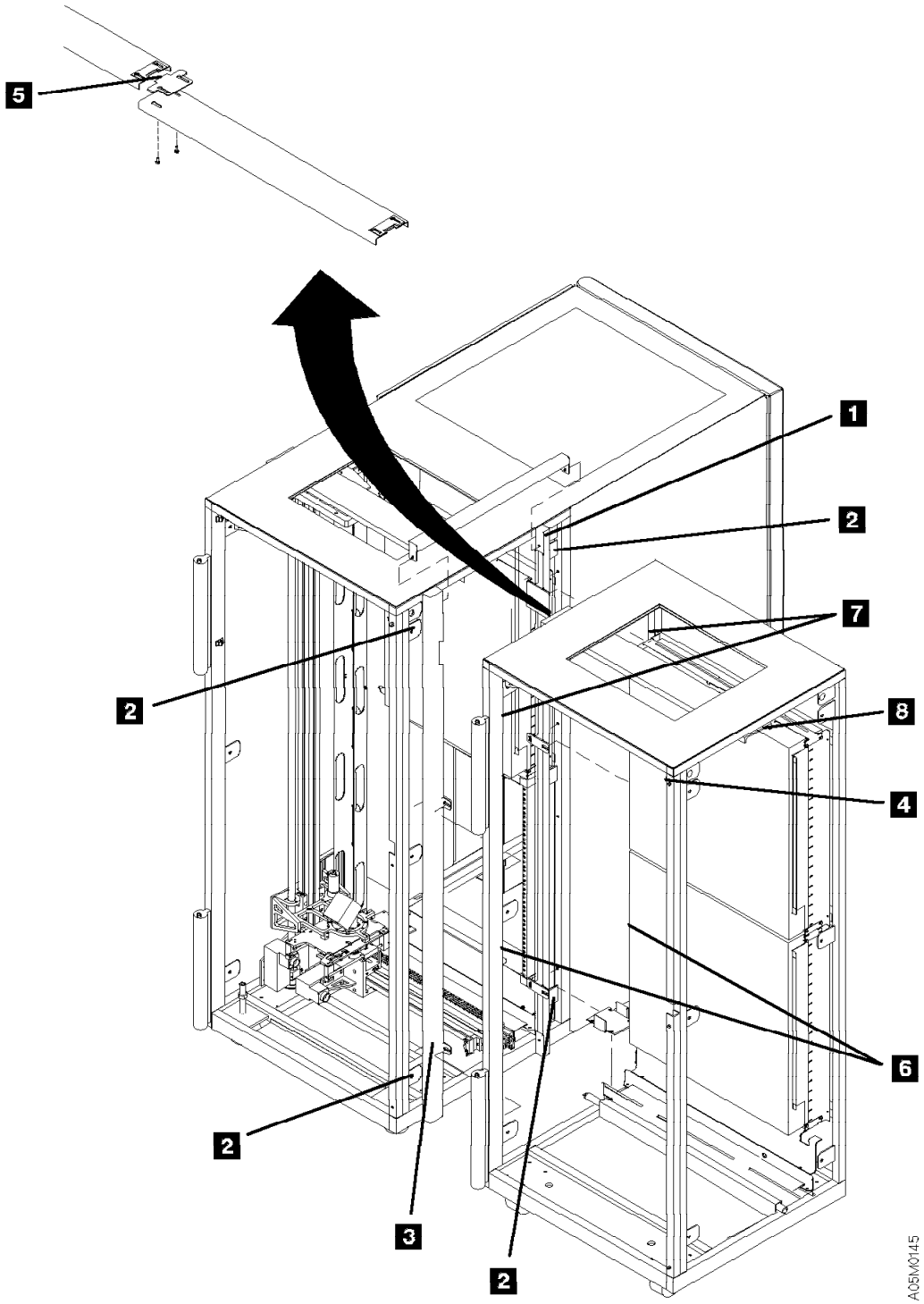


Figure 226. Frame-to-Frame Attachment

Use Figure 228 on page INST-33 for the instructions on this page.

__ 18. Remove the frame alignment bar and the frame adapter (if installed). Put the screws into the storage holes on the alignment bar and set it aside for use on the next expansion frame.

__ 19. Install an expansion frame attachment bracket P/N 05H7832 on the left-side vertical frame member in the same hole **7** that was used by the frame alignment bar as follows:

__ a. Refer to Figure 227 and install the frame attachment bracket **1** to the expansion frame with shoulder screw P/N 05H7840 **3** and tighten the screw. The thin end of the attachment bracket should be on the shoulder screw with the notch toward the frame.

__ 20. Connect the two top frame attachment brackets **7** to the left frame with screw P/N 1624790 **2** and tighten the screw.

__ 21. Open the front door of the expansion frame and locate the door pin **4** in the upper right corner of the door opening. If the door pin has vertical slots and mounting bolts, adjust the door pin as follows:

__ a. Loosen the mounting bolts for the door pin, close the front door and lock it.

__ b. From the right side of the frame, push the door pin up until it touches the door bracket and tighten the bolts.

Continue at "X-Rail Assembly" on page INST-34.

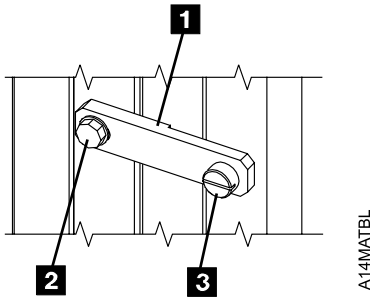


Figure 227. Expansion Frame Attachment Bracket

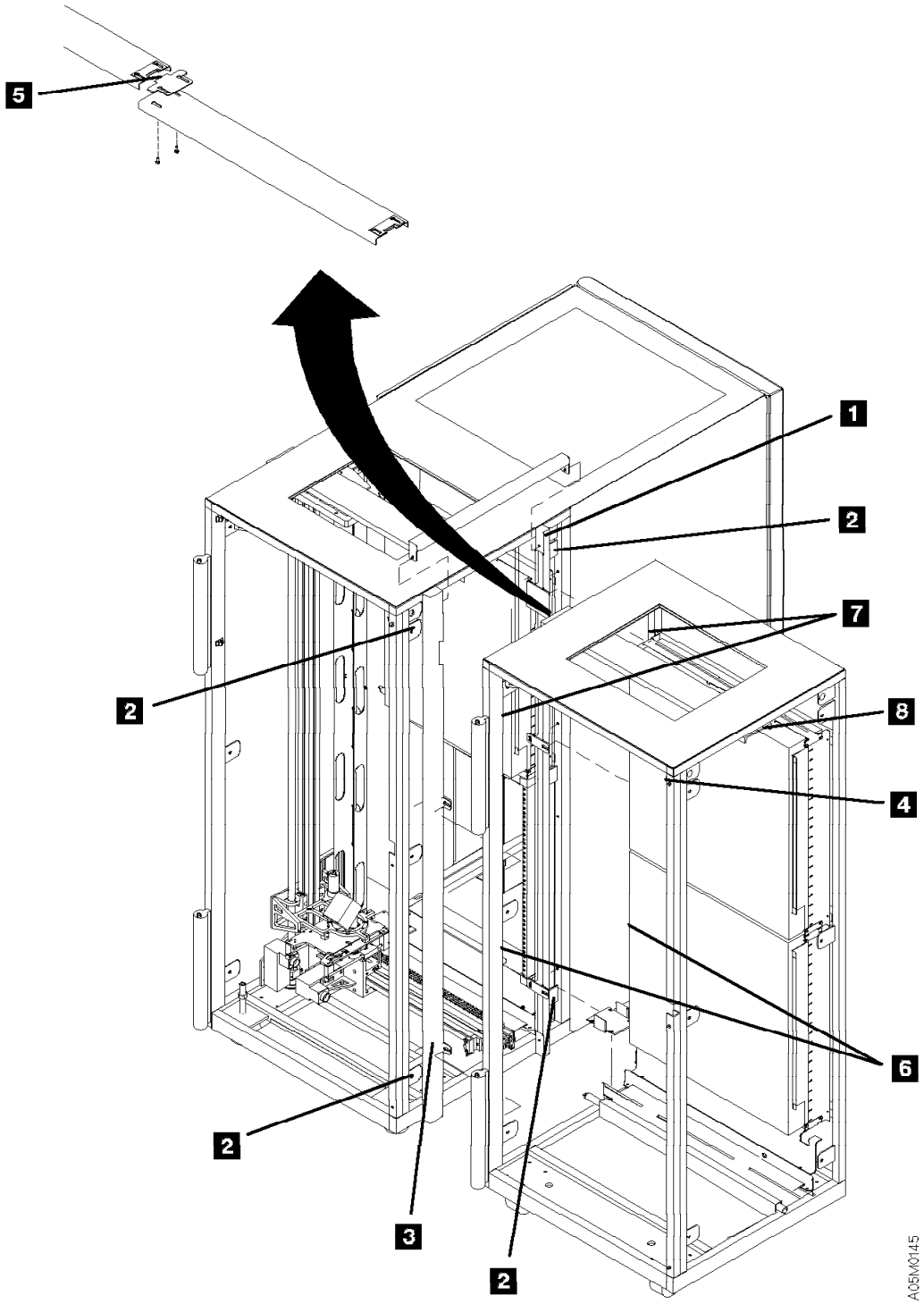


Figure 228. Frame-to-Frame Attachment

X-Rail Assembly

See Figure 229 on page INST-35.

__ 1. Loosen the 2 short T-nuts **2** and slide the X-rail assembly in the expansion frame back to the right to allow room to insert the long T-nuts.

__ 2. If one of the frames does not have the alignment rod, insert 2 long T-nuts P/N 34G9644 **1** approximately halfway into the openings of the X-rail assembly of the left frame.

__ 3. If both of the frames have alignment rods, insert only 1 long T-nut P/N 34G9644 **1** approximately halfway into the opening on the front side of the X-rail assembly of the left frame.

__ 4. Tighten the setscrew on the left side of the long T-nut(s).

__ 5. Slide the X-rail assembly **3** in the expansion frame back to the left on to the long T-nut(s) until the gear teeth of the mating surfaces touch. The X-rail assembly should slide freely into the next frame. **Do not force the X-rail assembly into the next frame**. Do not tighten the T-nuts now.

__ 6. Put the rack alignment tool **5** on the junction of the 2 gear racks.

__ 7. Press 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.**

__ 8. Tighten the short T-nuts **2** in the frame.

__ 9. Tighten the setscrew(s) on the right side of the long T-nut(s) **1**.

__ 10. Place the 2 bearing shafts P/N 34G9622 **4** in their slots against the X-rail assembly bearing shafts in the last frame. One bearing shaft goes on top and the other bearing shaft goes on the bottom of the X-rail assembly.

__ 11. Press the shafts in place with the bearing shaft clamp tool **6**. **Ensure the bearing shafts between frames are touching.** 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.

Note: You can use a plastic hammer to seat the upper bearing shaft. This will make it a little easier to install the lower bearing shaft with the clamp tool.

Check

Verify that the shafts are fully seated by clamping the tool on the existing bearing shafts and comparing that adjustment to the bearing shafts you are installing.

If the bearing shafts do not seat fully, adjust the bearing shaft clamp tool.

__ 12. Move the cartridge accessor across the junctions of the upper guide rail and the lower bottom rail. If you can feel any binds, correct the alignment of the frame before continuing.

Attention: Do not move the cartridge accessor far enough to fall off the rack.

__ 13. If you are installing the tape subsystem in this frame (field merge), see step 6 on page INST-8 and return here.

__ 14. Install all of the expansion frames by returning to section “Attach Expansion Frame” on page INST-13.

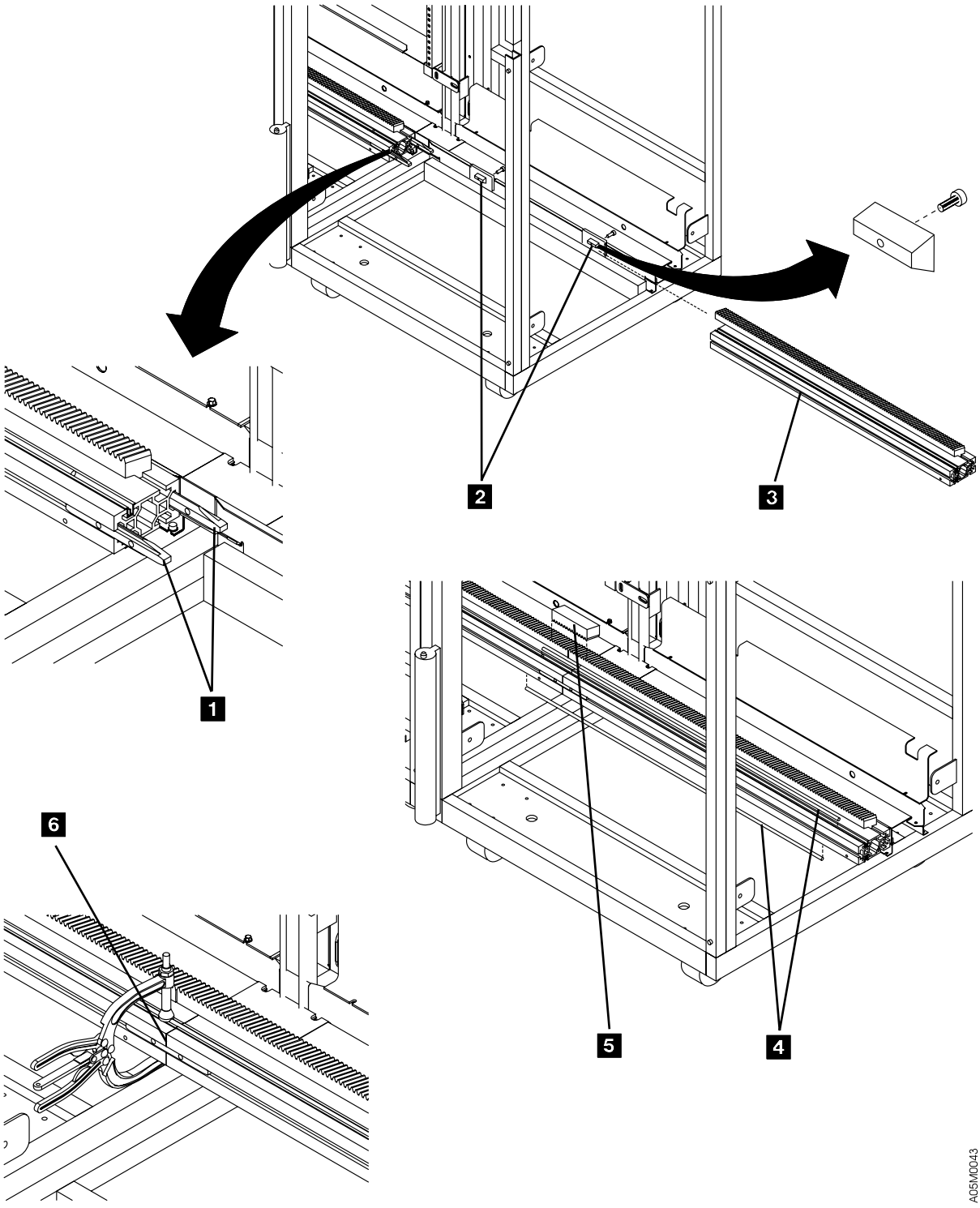


Figure 229. Control Unit Frame with Storage Unit Frame

Attach Service Bay Frames

If you are not installing a 3494 Model HA1 and you are installing a 3494 Model B18 on your library, go to “3494 Model B18 Standalone Frame” on page INST-51. If you are not installing a 3494 Model B18 or HA1, go to “Library Aisle” on page INST-52.

Two service bay frames are provided with the 3494 Model HA1; Left Service Bay (LSB) and Right Service Bay (RSB). The alignment of these frames is not as critical as the library expansion frames; although, each accessor must be able to enter and exit the service bay frame without binding.

__ 1. If the 3494 is installed on a raised floor, have the customer supply you with floor cutouts for the service bay frames.

Left Service Bay

Use the following steps to install the left service bay (LSB) frame. The LSB frame is the service bay frame shipped without an accessor.

__ 1. If the 2 side covers are installed on the left side of the L1x frame, remove the 6 screws that hold each cover in place. Remove the covers and set them aside.

__ 2. Swap the X-rail assembly in the L1x frame and the LSB frame using the following steps.

   See Figure 229 on page INST-35.

   __ a. Move the accessor in the L1x frame into the next expansion frame.

   __ b. Unplug the X-axis home sensor cable, loosen the 2 T-nuts **2** holding the X-rail assembly **3**, and loosen 1 setscrew in the long T-nut **1** between the X-rails. If the L1x frame does not have an alignment rod, you will have 2 long T-nuts **1** in the front and rear of the rail.

   __ c. Using a screw driver in the slot between the X-rail assemblies, pry the X-rail in the L1x frame back so you insert your screw driver into the slot between the bearing rods **4** and the long T-nut **1** and pry the rods up (or down) until the ends are popped out of the L1x frame X-rail.

   __ d. Slide the L1x frame X-rail **3** off of the T-nuts and out of the frame. Set it aside for later use in the LSB frame.

   __ e. Loosen the 2 T-nuts **2** holding the X-rail in the LSB frame and slide it out of the frame.

   __ f. Re-install the X-rail assembly removed in step 2e in the L1x frame. Use the rack alignment tool to set the gear rack spacing and the bearing shaft clamp tool to re-seat the bearing rods. Refer to “X-Rail Assembly” on page INST-34.

   __ g. Move the accessor between the L1x frame and the expansion frame to ensure that it still moves freely and quietly with no binding.

__ 3. If you are installing the Model HA1 on an existing library, replace the BIC card in the L1x frame with the BIC2 card P/N 05H8247 (supplied) and re-install the cables. The remainder of the new cards will be installed later.

   Note: Do not force the cable into connector J22. Ensure that it is aligned correctly with the connector before plugging the cable.

See Figure 230.

__ 4. Loosen the shipping screw holding the barrier door extended switch bracket **4** on the right front frame member of the LSB frame, rotate the switch assembly down, and fasten it to the frame using screw P/N 1624765. Tighten the screws.

__ 5. Remove the middle bolt in the upper front door hinge of the L1x frame and set it aside.

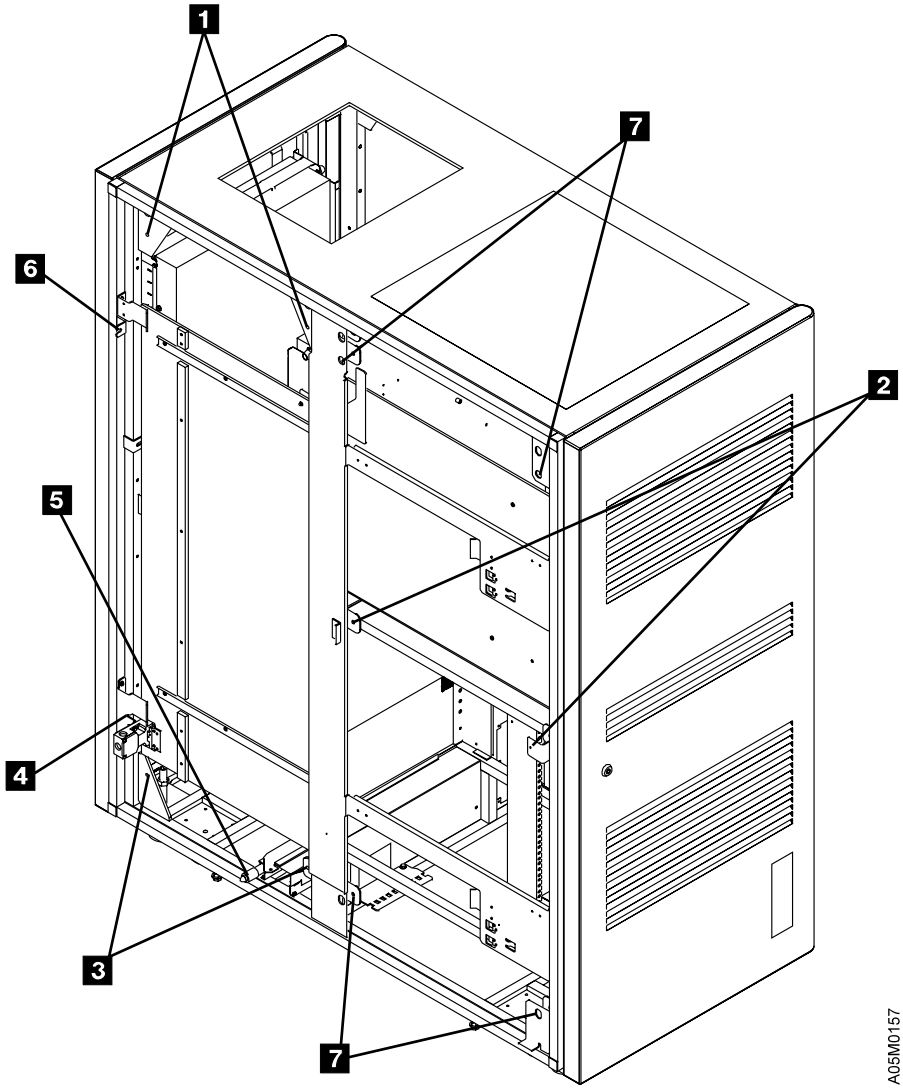


Figure 230. Left Service Bay Switch

See Figure 231 on page INST-39.

__ 6. Push the LSB frame into position against the L1x frame at the left end of the library.

__ 7. If the L1x frame has an alignment rod below the X-rail, align the LSB frame using the following steps. If the L1x frame does not have an alignment rod, go to step 8 on page INST-40 to align the frame.

__ a. Place a frame skate P/N 05H7999 under each of the leveling pads on the right side of the LSB frame and lower the leveling pads into the recessed area or onto the rubber pad (depending on the type of skate you have) on top of the frame skate. The skates should be positioned so they will roll toward the L1x frame.

__ b. Raise the right side of the LSB frame by adjusting the right-side leveling pads evenly until the alignment rod is aligned with the hole in the rod of the L1x frame.

__ c. Push the LSB frame against the L1x frame until the alignment rod **5** is fully engaged in the rod on the L1x frame.

__ d. Insert an M8 bolt P/N 1621592 through the bottom front corner cover bolt tab **3** of the LSB frame and through the corresponding cover bolt tab of the L1x frame and finger-tighten nut P/N 1622406 on the bolt. Repeat for the bottom rear corner cover bolt tab **3** in the accessor aisle.

__ e. Raise the right-side leveling pads of the LSB frame so the weight of the expansion frame is on the alignment rod and remove the frame skates.

__ f. Align the LSB frame using the following steps. The frame will be in position when the upper rail is aligned on the outside edges and the top barrier door frame member is against the L1x frame.

__ 1) Observe the position of the upper rail as you raise the left side of the LSB frame.

__ 2) Adjust the front leveling pad until the edges of the upper rail of the LSB frame are approximately 12 mm (0.5 in.) past alignment with the edges of the upper rail in the L1x frame.

__ 3) Stop adjusting the front leveling pad and go to the back pad to bring that corner of the frame up even with the front corner where the edges of the upper rails are aligned.

__ 4) Repeat the above steps using smaller increments as required until the top barrier door frame member is touching the L1x frame and the upper rail is aligned.

__ g. Turn the right-side leveling pads by hand until they are snug to the floor, then tighten them 1/4 turn. **Do not overtighten and raise the library.**

__ h. Insert an M8 bolt P/N 1621592 through the top front corner cover bolt tab **1** of the LSB frame and through the corresponding cover bolt tab of the L1x frame and finger-tighten nut P/N 1622406 on the bolt. Repeat for the top rear corner cover bolt tab **1** in the accessor aisle.

__ i. Continue at step 9 on page INST-42.

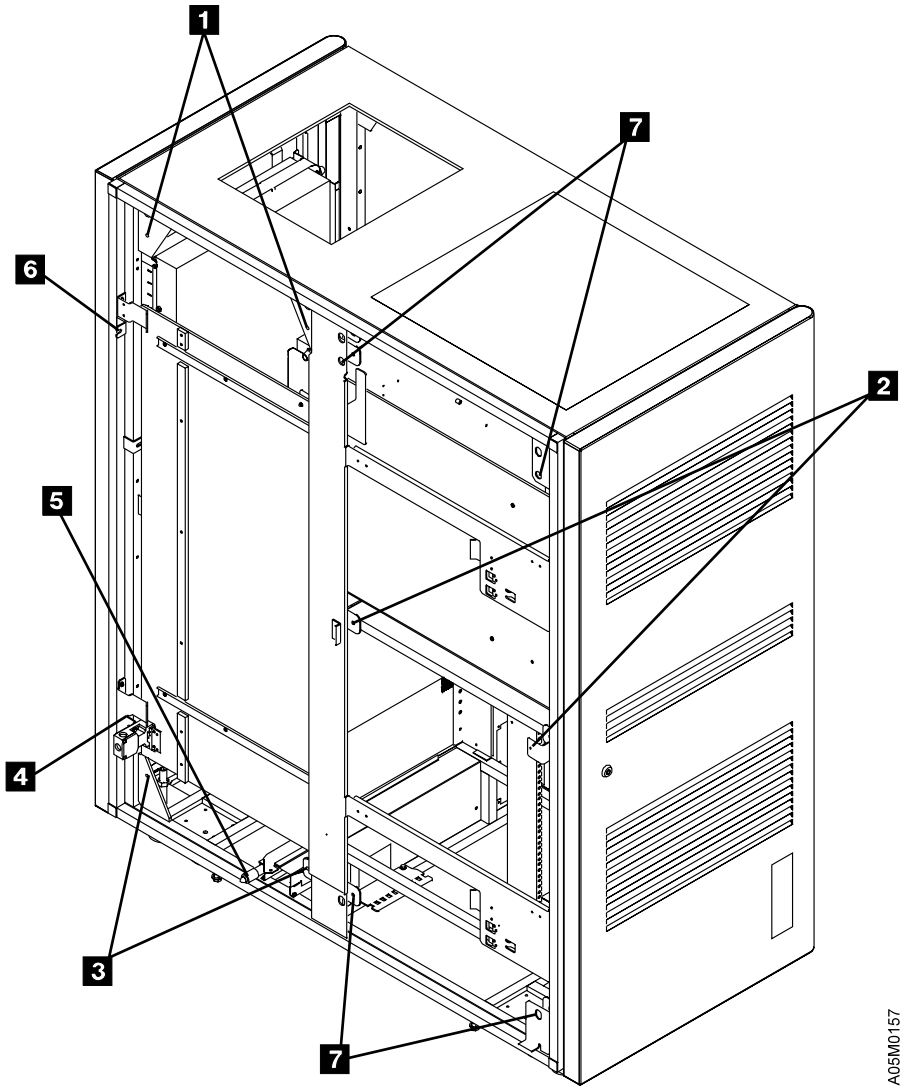


Figure 231. Left Service Bay Frame, Rear View

See Figure 232 on page INST-41.

__ 8. If the L1x frame does not have an alignment rod, use the following steps to align the frame.

__ a. Push the LSB frame against the L1x frame. Ensure that the middle front barrier door frame tab **6** is inside the L1x frame member.

__ b. Put the plastic trays P/N 62G2070 or P/N 05H7004 under the leveling pads on the LSB frame. Loosen the locknuts on the leveling pads and lower them to the plastic trays.

__ c. Raise the LSB frame by adjusting the 4 leveling pads evenly, a small amount at a time, until the bottom of the frame is approximately even with the bottom of the L1x frame.

__ d. Push the LSB frame tight against the side of the L1x frame. Ensure that it is parallel to the L1x frame.

__ e. Slide the X-rail assembly over the 2 T-nuts until it touches the X-rail assembly in the L1x frame. The X-rail assembly should slide freely into the X-rail assembly in the L1x frame. **Do not force the X-rail assembly into the L1x X-rail.**

__ f. Adjust the leveling pads and slide the frame until the X-rail assemblies are aligned vertically and horizontally and slide together freely. **When sliding the X-rail, ensure that it is tight against the mounting surfaces of the back and bottom.**

__ g. Adjust the leveling pads as required to align the upper rail on the outside edges.

__ h. Insert an M8 bolt P/N 1621592 through the bottom front cover bolt tab **3** of the LSB frame and through the corresponding cover bolt tab of the L1x frame and finger-tighten nut P/N 1622406 on the bolt. Repeat for the other 3 corner cover bolt tabs **1** **3** in the accessor aisle.

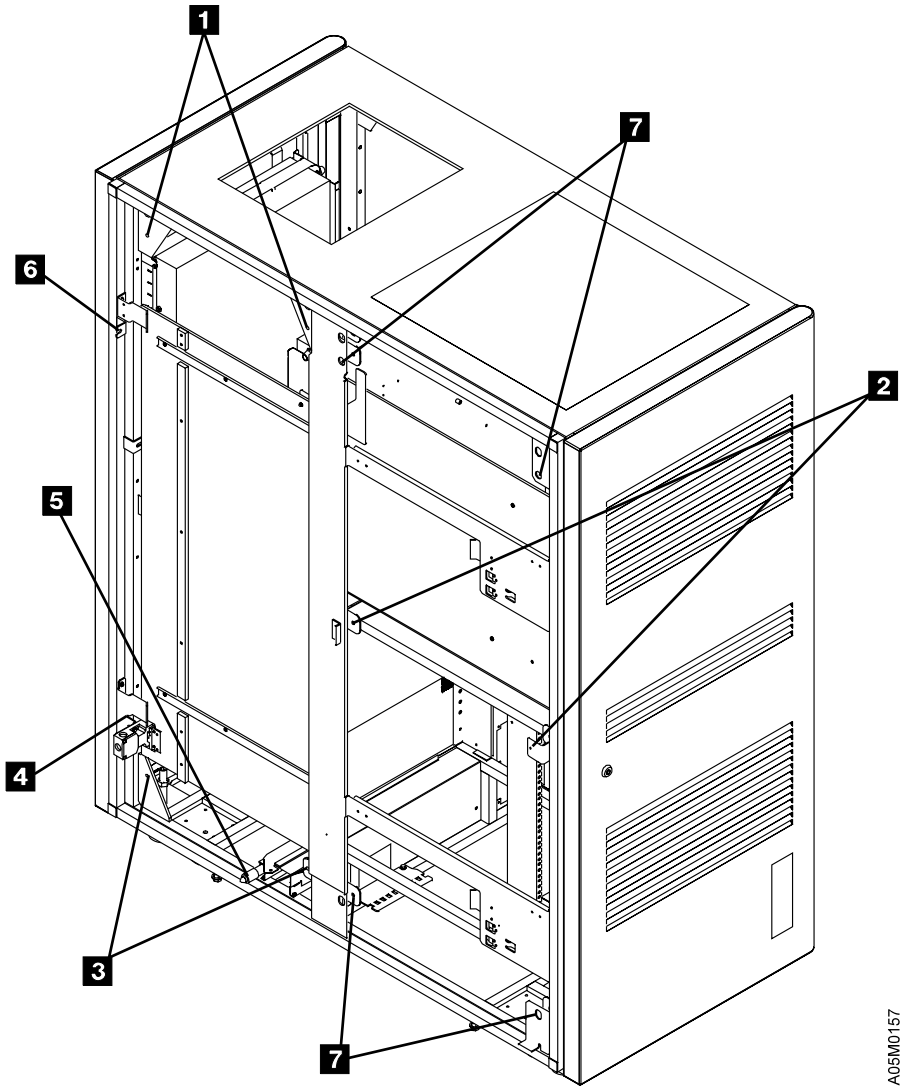


Figure 232. Left Service Bay Frame, Rear View

See Figure 233 on page INST-43.

__ 9. Put washer P/N 0003550 under the lock washer on the middle door hinge bolt and re-install it. The middle barrier door frame tab **6** at the front should be under the bolt and washers.

__ 10. Slide the X-rail assembly over the 2 T-nuts and into the X-rail assembly in the L1x frame. If they do not slide freely together, adjust the leveling pads and slide the frame as required to align the X-rail assemblies horizontally and vertically. Ensure that the upper rail is still aligned on the outside edges.

__ 11. Loosen the upper rail screws in the LSB frame and the left upper rail screws in the L1x frame, slide the upper rail locking tab in the LSB frame until it is engaged in the L1x frame upper rail slot, and tighten the upper rail screws in both frames.

Note: The locking tab should fully cover the notch in the L1x frame upper rail section and the left end of the upper rail should be flush with the left side of the LSB frame.

__ 12. From the rear of the L1x frame, install 1 M6x20mm bolt P/N 1624793 in the middle cover bolt tab near the bulkhead and install 1 M6x10mm bolt P/N 1624789 in the middle cover bolt tab at the rear and tighten the bolts. They should screw into threaded tabs **2** in the barrier door frame. You may need to push the library manager Industrial PC toward the left side to insert the bolts.

__ 13. Tighten the middle door hinge bolt on the L1x frame onto the middle barrier door frame tab **6**.

__ 14. Tighten the 4 M8 bolts on each corner **1** **3**. **Do not overtighten and bend the tabs.**

__ 15. Re-install the X-rail assembly removed in step 2d on page INST-36 in the LSB frame. Use the rack alignment tool to set the gear rack spacing and the bearing shaft clamp tool to re-seat the bearing rods. Refer to “X-Rail Assembly” on page INST-34.

__ 16. Move the accessor between the L1x frame and the LSB frame to ensure that it moves freely and quietly with no binding.

__ 17. Place the bumper safety guard P/N 05H7308 on the clip in the lower left corner of the left service bay.

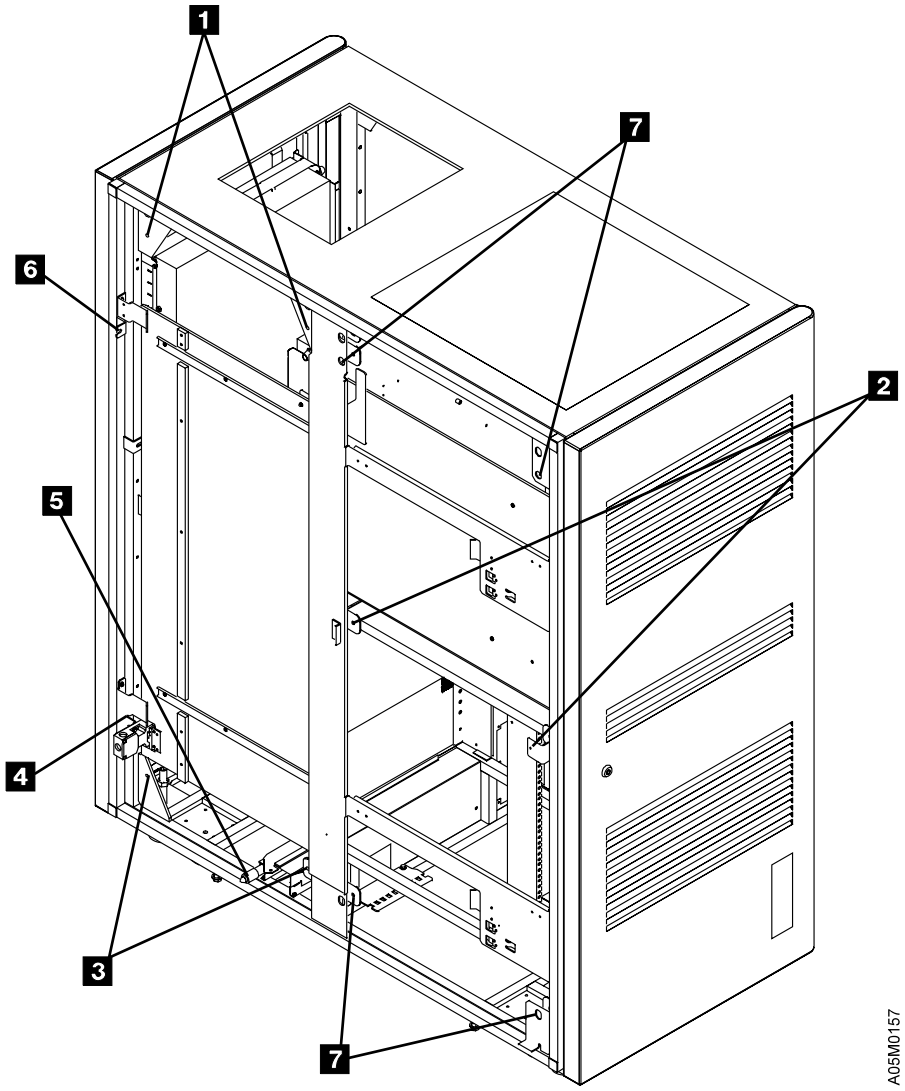


Figure 233. Left Service Bay Frame, Rear View

Right Service Bay

Use the following steps to install the right service bay (RSB) frame. The RSB frame is the service bay frame shipped with an accessor.

See Figure 234 on page INST-45.

__ 1. If any side covers are installed on the right side of the end library frame, remove the 6 screws that hold each cover in place. Remove the covers and set them aside.

Note: To remove the Model B16 rear side cover, remove the 5 cover screws that are accessible from the rear of the frame. Pull the cover out from the frame as far as it will go so you can get to the top front cover screw and remove it. Remove the cover.

__ 2. If the end library frame is a S10 frame, install the left rear side cover **3** (supplied) on the right service bay frame as follows:

__ a. Remove 4 bolts and nuts **5**.

__ b. Attach the cover and barrier door frame using 6 cover bolts **2** **5**.

__ 3. If a X-axis bumper is installed on the X-rail of the end frame, loosen the T-nut and remove the bumper assembly.

__ 4. Run Accessor B out the left side of the RSB frame and put it on the X-rail of the end frame. Ensure that the X-rail rollers are on the top and bottom bearing rods and the upper rollers are on the outside edges of the upper rail. Push the accessor into the next frame so it is out of the way.

__ 5. Unplug the X-axis home sensor cable from the home sensor.

__ 6. Loosen the 2 T-nuts holding the X-rail assembly in the RSB frame and remove it.

__ 7. Remove the upper and lower bearing rods.

__ 8. Push the RSB frame into position against the end frame at the right end of the library.

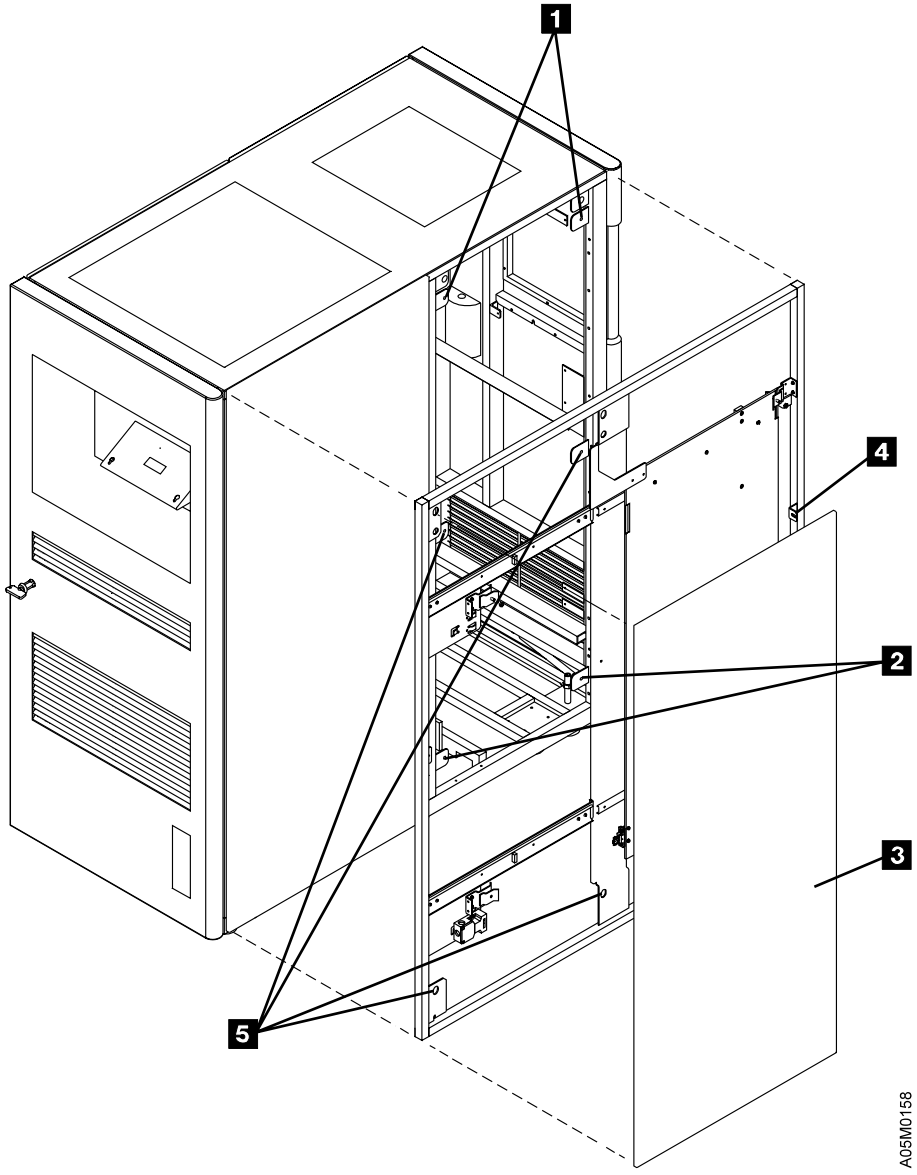


Figure 234. Right Service Bay, Rear View

__ 9. If the end library frame has an alignment rod below the X-rail, align the RSB frame using the following steps. If the end frame does not have an alignment rod, go to step 10 on page INST-48 to align the frame.

See Figure 235 on page INST-47.

__ a. Place a frame skate P/N 05H7999 under each of the leveling pads on the left side of the RSB frame and lower the leveling pads into the recessed area or onto the rubber pad (depending on the type of skate you have) on top of the frame skate. The skates should be positioned so they will roll toward the end frame.

__ b. Raise the left side of the RSB frame by adjusting the left-side leveling pads evenly until the alignment rod is aligned with the hole in the rod of the end frame.

__ c. Push the RSB frame against the end frame until the alignment rod is fully engaged in the rod on the end frame.

__ d. Insert an M8 bolt P/N 1621592 through the bottom front corner cover bolt tab **2** of the RSB frame and through the corresponding cover bolt tab of the end frame and finger-tighten nut P/N 1622406 on the bolt. Repeat for the bottom rear corner cover bolt tab **2**.

__ e. Raise the left-side leveling pads of the RSB frame so the weight of the expansion frame is on the alignment rod and remove the frame skates.

__ f. Align the RSB frame using the following steps. The frame will be in position when the upper rail is aligned on the outside edges and the top barrier door frame member is against the end frame.

__ 1) Observe the position of the upper rail as you raise the right side of the RSB frame.

__ 2) Adjust the front leveling pad until the edges of the upper rail of the RSB frame are approximately 12 mm (0.5 in.) past alignment with the edges of the upper rail in the end frame.

__ 3) Stop adjusting the front leveling pad and go to the back pad to bring that corner of the frame up even with the front corner where the edges of the upper rails are aligned.

__ 4) Repeat the above steps using smaller increments as required until the top barrier door frame member is touching the end frame and the upper rail is aligned.

__ g. Turn the left-side leveling pads by hand until they are snug to the floor, then tighten them 1/4 turn. **Do not overtighten and raise the library.**

__ h. Insert an M8 bolt P/N 1621592 through the top front corner cover bolt tab **1** of the RSB frame and through the corresponding cover bolt tab of the end frame and finger-tighten nut P/N 1622406 on the bolt. Repeat for the top rear corner cover bolt tab **1**.

__ i. Continue at step 11 on page INST-50.

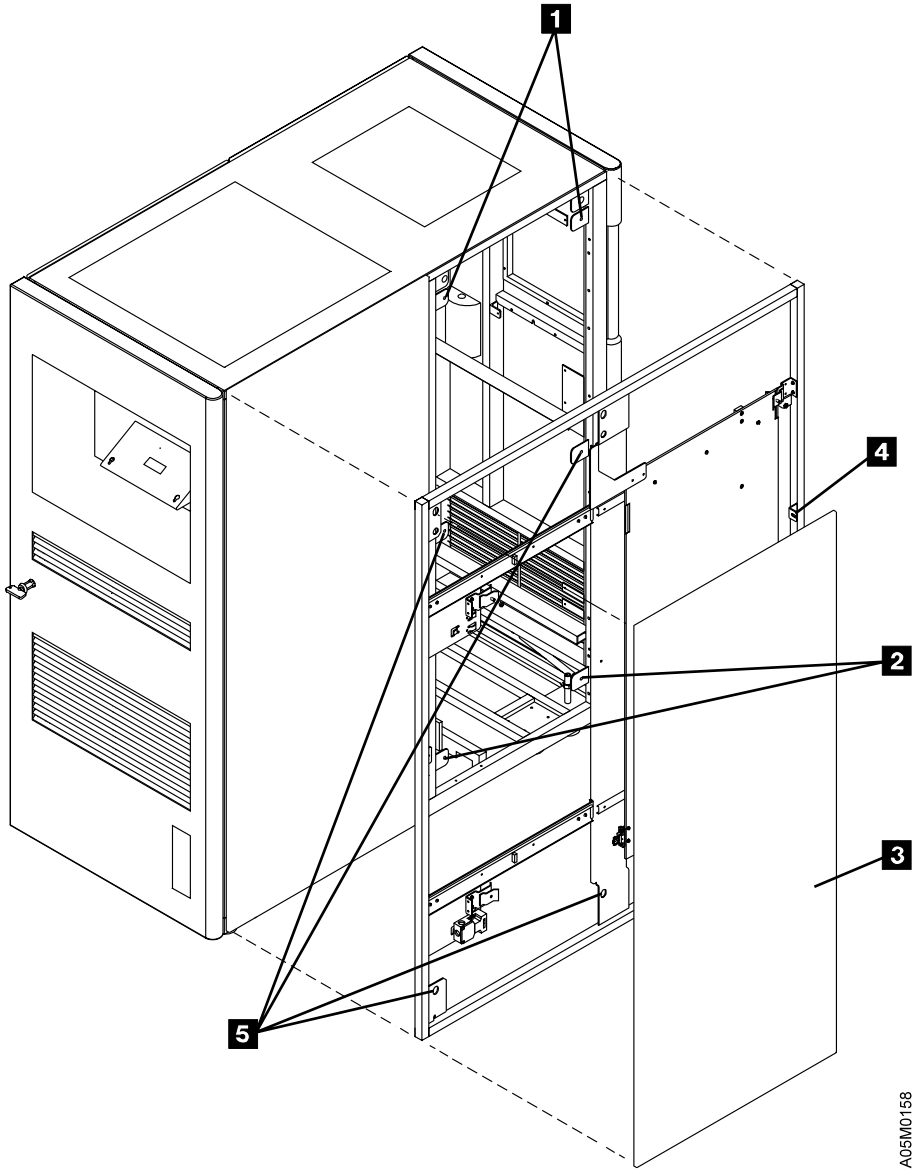


Figure 235. Right Service Bay, Rear View

__ 10. If the end library frame does not have an alignment rod, use the following steps to align the frame.

See Figure 236 on page INST-49.

__ a. Push the RSB frame against the end frame. Ensure that the middle rear barrier door frame tab is inside the end frame member.

__ b. Put the plastic trays P/N 62G2070 or P/N 05H7004 under the leveling pads on the RSB frame. Loosen the locknuts on the leveling pads and lower them to the plastic trays.

__ c. Raise the RSB frame by adjusting the 4 leveling pads evenly, a small amount at a time, until the bottom of the frame is approximately even with the bottom of the end frame.

__ d. Push the RSB frame tight against the side of the end frame. Ensure that it is parallel to the end frame.

__ e. Slide the X-rail assembly over the 2 T-nuts until it touches the X-rail assembly in the end frame. The X-rail assembly should slide freely into the X-rail assembly in the end frame. **Do not force the X-rail assembly into the end X-rail.**

__ f. Adjust the leveling pads and slide the frame until the X-rail assemblies are aligned vertically and horizontally and slide together freely. **When sliding the X-rail, ensure that it is tight against the mounting surfaces of the back and bottom.**

__ g. Adjust the leveling pads as required to align the upper rail on the outside edges.

__ h. Insert an M8 bolt P/N 1621592 through the bottom front cover bolt tab **2** of the RSB frame and through the corresponding cover bolt tab of the end frame and finger-tighten nut P/N 1622406 on the bolt. Repeat for the other 3 corner cover bolt tabs **1** **2** in the accessor aisle.

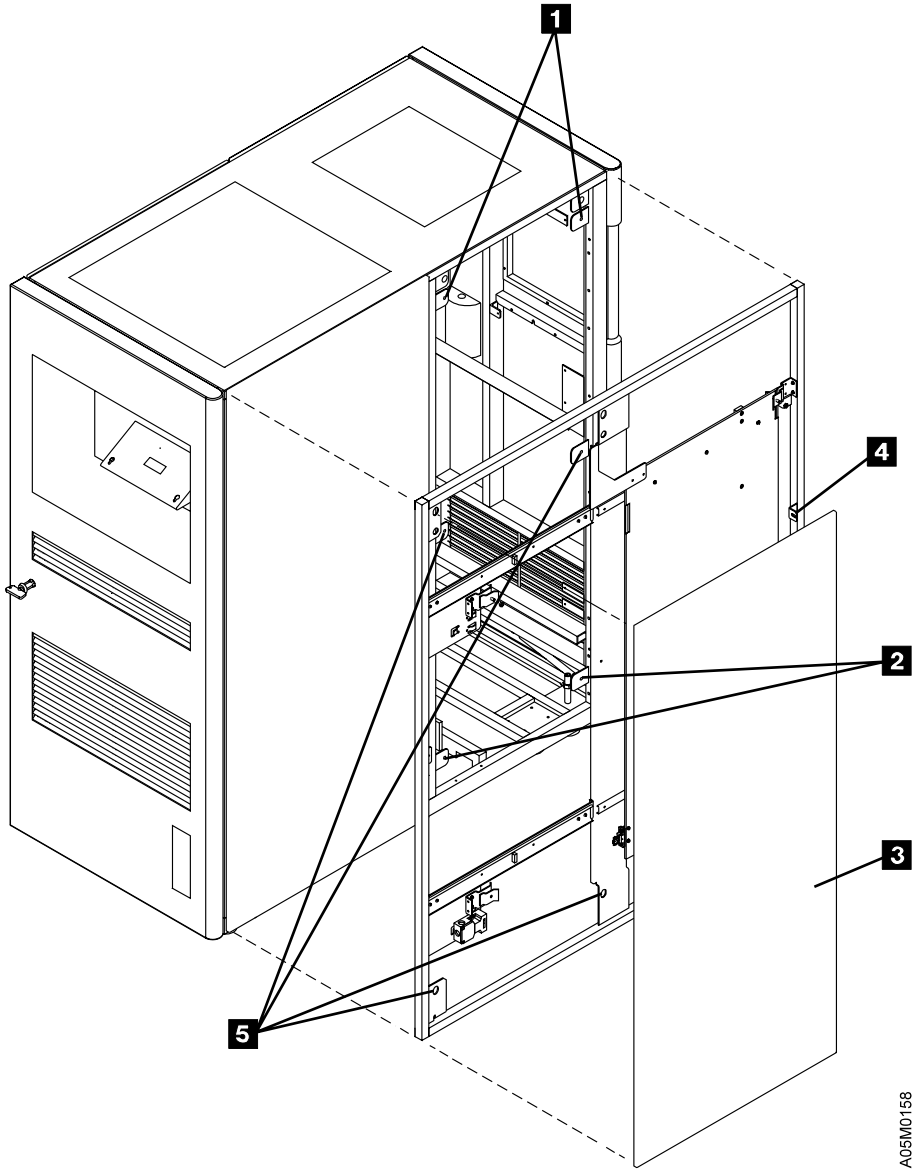


Figure 236. Right Service Bay, Rear View

See Figure 236 on page INST-49.

__ 11. Slide the X-rail assembly over the 2 T-nuts into the X-rail assembly in the end frame. If they do not slide freely together, adjust the leveling pads and slide the frame as required to align the X-rail assemblies horizontally and vertically. Ensure that the upper rail is still aligned on the outside edges.

__ 12. Loosen the upper rail screws in the RSB frame and the right upper rail screws in the end frame, slide the upper rail locking tab into the end frame until it is engaged in the end frame upper rail slot, and tighten the upper rail screws in both frames.

Note: The locking tab should fully cover the notch in the end frame upper rail section.

__ 13. Install bolt P/N 1624790 in the middle barrier door frame tab at the front of the library aisle and tighten it.

__ 14. Tighten the 4 M8 bolts on each corner **1** **2**. **Do not overtighten and bend the tabs.**

__ 15. Install the X-rail assembly in the RSB frame. Use the rack alignment tool to set the gear rack spacing and the bearing shaft clamp tool to seat the bearing rods. Refer to “X-Rail Assembly” on page INST-34.

__ 16. Move the accessor between the end frame and the RSB frame to ensure that it moves freely and quietly with no binding.

See Figure 237.

__ 17. Adjust the X-axis home sensor mounting block **3** on the X-rail assembly **4** in the RSB frame so the end of the block is flush with the right side **2** of the lower right frame member **1**.

__ 18. Plug the X-axis home sensor cable into the home sensor. Ensure that it does not interfere with the accessor.

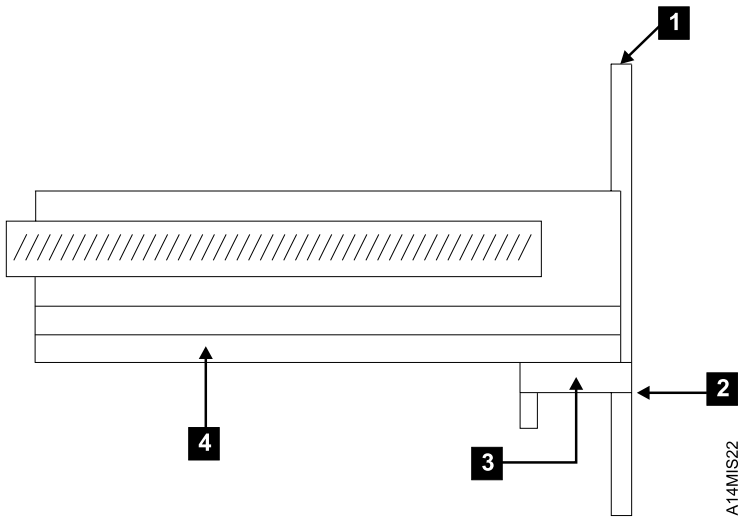


Figure 237. RSB X-axis Home Sensor Adjustment

3494 Model B18 Standalone Frame

If you are not installing a 3494 Model B18 standalone frame, go to “Library Aisle” on page INST-52.

The 3494 Model B18 standalone frame is not physically attached to the 3494 library. The only restriction on the location of this frame is that it must be placed within 14 meters (46 feet) of the 3494 Model D12 frame that will be associated with it. A maximum of two Model B18 subsystems can be installed in a 3494 library.

Note: If your library contains a 3494 Model B16 and the VTS Model B16 control unit code is not at PGA-4 or later, the Model D12 frame associated with the Model B18 must be located down the string (i.e. to the right) from the Model B16 frame.

Use the following steps to install the 3494 Model B18 standalone frame(s).

__ 1. If the 3494 is installed on a raised floor, have the customer supply you with floor cutouts for the Model B18 frame(s).

__ 2. Move the frame carefully into position within 14 meters (46 feet) of the frame that contains it's associated 3590 tape drives.

__ 3. Open the front door and install tip plate P/N 05H3104 on the tabs provided below the lower front frame member using 2 bolts P/N 1621573 and 2 washers P/N 1622309.

__ 4. Open the rear door and install tip plate P/N 05H3104 on the tabs provided below the lower rear frame member using 2 bolts P/N 1621573 and 2 washers P/N 1622309.

__ 5. If you are installing two 3494 Model B18 VTS subsystems on this library, repeat step 2 through step 4 for the second Model B18 frame.

__ 6. If this is a new library install, skip the following steps and continue at “Library Aisle” on page INST-52.

__ 7. If you are installing the Model B18 on an existing library, install the LAN switch and SCSI extender features as follows:

   __ a. Install 3494 L1x/HA1 FC 5232 Attachment Concentrator using Installation Instructions P/N 05H8866. The LAN switch is installed in the Model L1x frame of a single accessor library or in the LSB frame of a dual accessor library.

   __ b. Install 3494 D12 FC 5233 SCSI Extender using Installation Instructions P/N 05H8867. The SCSI extenders are located in the Model D12 frame associated with the Model B18.

   __ c. If you installed any library expansion frames, continue at “Library Aisle” on page INST-52. If you only installed 3494 Model B18 frames, continue at “Upgrade Previously Installed Frames” on page INST-67.

Library Aisle

__ 1. If you have installed all of the expansion frames, remove the alignment string and location line (if used).

__ 2. If you have an older library without the Y-mast clamp (Figure 116 on page CARR-65), it is recommended that you order Y-mast Clamp Kit p/n 08L5872 and install the clamp.

__ 3. If you did not install the high availability model HA1, re-install the X-axis bumper on the last X-rail assembly at the right end of the library. Use the following procedure to adjust the bumper.

__ a. Place a cartridge in the last column of cartridge cells. Move the accessor to the right end of the library, rotate the picker toward the cartridge, and extend the gripper until it almost touches the cartridge.

__ b. If your X-axis bumper assembly has a locator pin, check the adjustment as follows:

1) Push the accessor to the right until it touches the X-axis bumper and ensure that the center of the grip assembly is to the right of the center of the last column of cartridge cells. ***Do not depress the X-axis bumper with the accessor.***

2) If the X-axis bumper allows the picker to access the last column of cartridge cells, no additional adjustment is required.

3) If the center of the reach assembly is not past the center of the cartridge cells, continue with the following adjustment steps.

__ c. Loosen the screw securing the X-axis bumper assembly to the X-rail assembly so that the bumper will slide freely on the X-rail. ***If your X-axis bumper assembly has a locator pin, the bumper will be slightly cocked.***

__ d. Slide the X-axis bumper assembly until the face of the bumper (left side) is 70 mm (2.75 in.) from the right edge of the frame and tighten the screw that secures the bumper to the X-rail.

__ e. Push the accessor to the right until it touches the X-axis bumper and ensure that the center of the grip assembly is to the right of the center of the last column of cartridge cells. ***Do not depress the X-axis bumper with the accessor.***

Notes:

1) Ensure that the calibration sensor on the right side of the picker assembly is past the far side of both fiducials (white labels) on the storage racks before the accessor touches the X-axis bumper.

2) Ensure that the right X-axis lubrication pad for the X-rail rod is not off the end of the rod when the accessor is against the bumper. If it is, adjust the X-axis bumper assembly to the left until the lubrication pad stays on the rod.

__ f. If the picker cannot access the last column of cartridge cells, check the installation of each expansion frame to ensure that each frame is aligned properly against the previous frame. Correct the alignment of the frames and re-adjust the X-axis bumper.

__ g. If the frames are aligned properly and the picker cannot access the last column of cartridge cells, call your next level of support for guidance.

See Figure 238.

__ 4. If the library has the dual gripper feature (FC 5215), the two upper rows (1 and 2) and the two lower rows (39 and 40) of storage cells should be blocked with metal inserts. Install the cartridge storage inserts as follows:

__ a. Usually, the metal inserts are installed in the factory in the L1x, B1x, and D1x frames. Ensure that the metal inserts are fully seated in their cells in each frame.

__ b. If you have installed any S10 frames or have added any expansion frames to an existing library, install the metal inserts P/N 05H4207 **1** and P/N 05H4105 **2** in rows 1, 2, 39, and 40 on each wall.

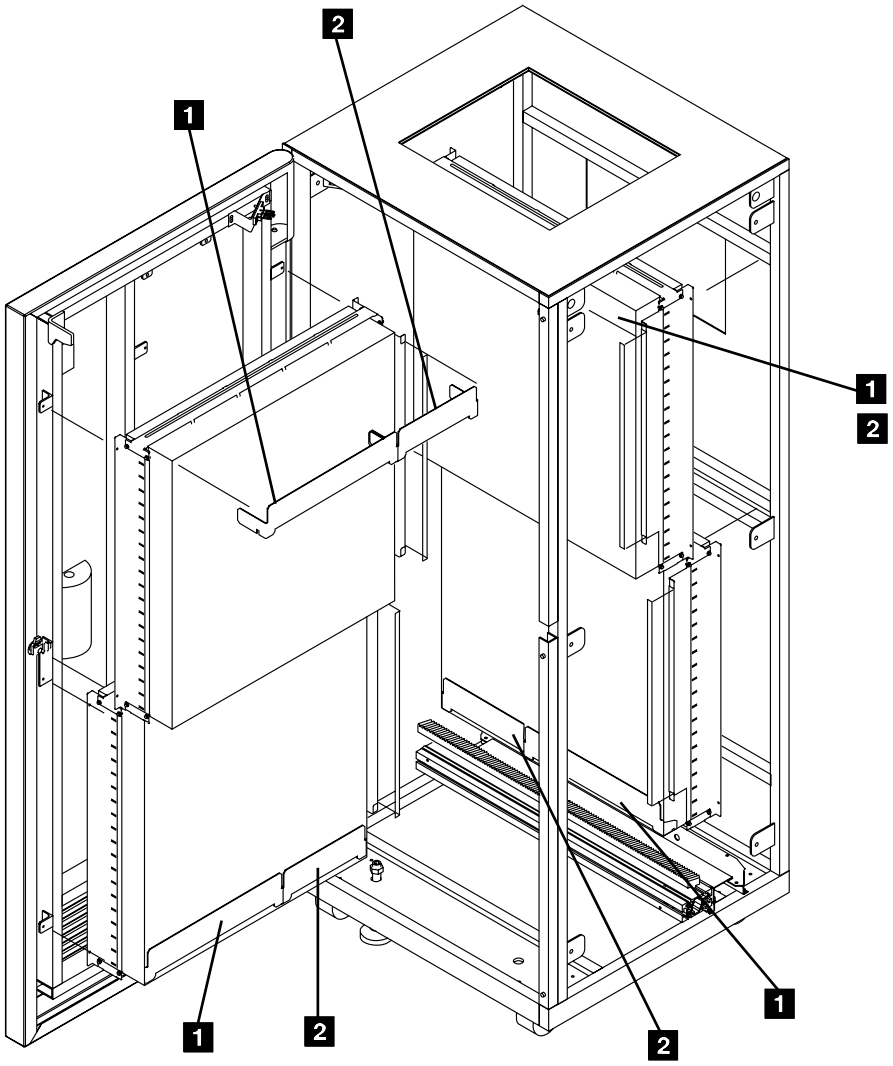


Figure 238. Cartridge Storage Insert

See Figure 240 on page INST-55.

__ 5. If your library has 1-2 frames, skip the following steps and go to “End Covers and Wall Labels” on page INST-66.

__ 6. If you are installing a new library and you have a X-axis flex cable with a plastic track, skip the following steps and go to step 9 on page INST-56.

__ 7. If the library has an old-style X-axis flex cable with a metal support band, install the X-axis cable channel spacers as follows.

__ a. Install the X-axis cable channel spacer (P/N 50G0384 **1** with screws P/N 1621190 or the clamp-in version P/N 05H7247 **2**). A channel spacer is **not installed** between the frames where the mid-cable clamp is attached. Each X in the examples below show where the cable is clamped to the frame. The spacer is not needed for a 2-frame configuration.

Notes:

1) Each expansion frame is shipped with a spacer, so discard the extra spacer if it is not installed.

2) Two versions of channel spacers are used: the original version **1** is installed with screws and the new version **2** clamps into the cable channel. They can be used interchangeably.

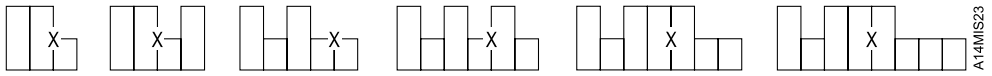


Figure 239. Positions without spacers

__ b. If you have installed a 5 frame library, store the two long cable supports P/N 05H7248 **3** with the 3494 manuals and tools for future use if the library is expanded.

__ c. If you have installed a 6 to 8 frame library, install the long cable support P/N 05H7248 **3** in place of the cable channel spacer between frame 5 and 6 and between frame 6 and 7. In a 6 frame library, save the second support for future expansion.

__ 8. If you are adding frames 9-16 to an existing library, remove the long cable support between frames 5 and 6 and frames 6 and 7.

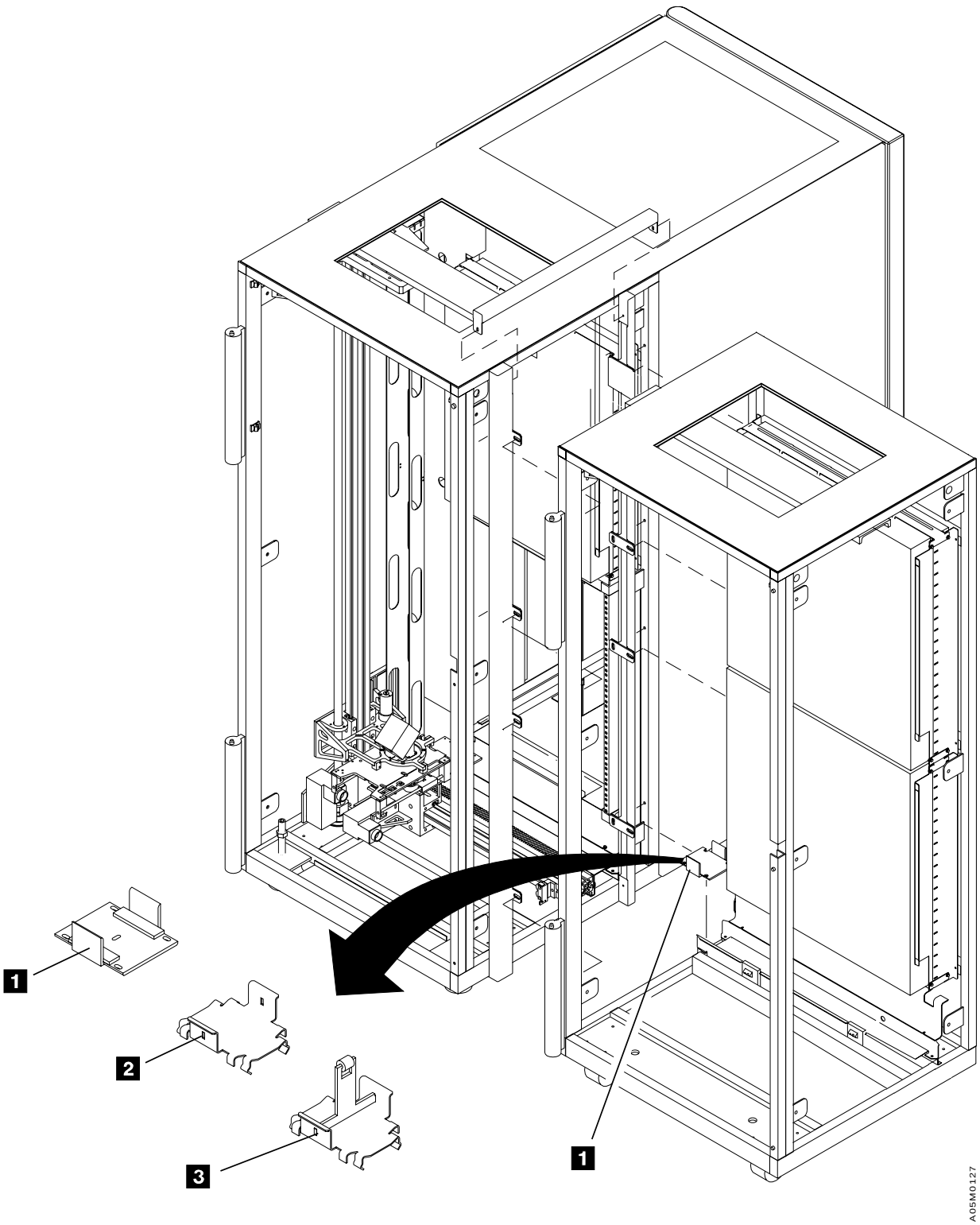


Figure 240. Cable Channel Spacer

__ 9. Move each accessor assembly slowly to each end of the library and observe the top guide rail rollers. The accessor(s) should move freely without binding. The front and rear rollers should lightly touch the sides of the guide rail and the bottom (center) rollers should **not** touch the guide rail. If needed, adjust the rollers as follows:

   __ a. To adjust the front and rear rollers, loosen the 1.5mm set screws for the front rollers, turn each front roller shaft until the front and rear rollers are just touching the guide rail, and tighten the set screw.

   __ b. To adjust the bottom rollers, loosen the 1.5mm set screw, turn the roller shaft until there is a 1mm gap at the closest point along the length of the library, and tighten the set screw.

__ 10. Figure 241 shows the different X-axis flex cables used depending on the configuration. Refer to Figure 253 on page INST-77 for the high availability configurations.

Figure 241. X-axis Flex Cables

P/N	Description	P/N	Description
05H7280	12 frame dual accessor	05H7361	1-2 frame single accessor
05H7281	10 frame dual accessor	05H8040	9-16 frame single accessor 16 frame dual accessor
05H7282	8 frame dual accessor	50G1047	1-2 frame single accessor (old-style)
05H7283	5-8 frame single accessor 6 frame dual accessor	62G1191	3-4 frame single accessor (old-style)
05H7284	3-4 frame single accessor 4 frame dual accessor	62G1192	5-8 frame single accessor (old-style)
05H7285	3 frame dual accessor		

If you are expanding a library past a cable boundary, a new X-axis flex cable will be provided with your expansion frame(s). If the library has dual accessors or you are adding a Model HA1 to an existing library, you will receive 2 cables.

__ 11. If you are adding expansion frames to an existing library and you are replacing the old X-axis flex cable(s), remove the old X-axis flex cable(s). Refer to procedure “X-Axis Flex Cable” on page CARR-52 and then return here.

__ 12. If you are installing a cable assembly with a metal band, use procedure “X-axis Flex Cable with Metal Band” on page INST-58.

__ 13. If you are installing a cable assembly with a plastic track, use procedure “X-axis Flex Cable with Plastic Track” on page INST-60.

X-axis Flex Cable with Metal Band

See Figure 242 on page INST-59.

__ 1. Lay the X-axis cable in the cable trough **2**. Put the metal band end of the cable (metal band on top) at the left end of the library with the connector for the XAX card sticking out the left end of the library about 300 mm (12 in.).

Warning: The length of the cable and the support band can make it difficult to control. It is fragile and can be damaged if you nick or put a kink in the band. Handle with extra care.

__ 2. Run the right half of the cable assembly (end without the metal band) back under the cable trough **7** using the following steps. The cable will be looped around the right end of the cable trough **6** in frame 2 (3-4 frame library) or frame 4 (5-8 frame library).

__ a. Slide the cable in the trough **2** until the mid-cable clamp **3** is positioned at the right end of the trough in frame 2 (3-4 frame library) or frame 4 (5-8 frame library).

__ b. Run the right end of the cable **5** through the opening **6** between frame 2 and 3 (3-4 frame library) or frame 4 and 5 (5-8 frame library) and back under the trough **7** toward the control unit frame (left end of the library).

__ c. Feed the cable under the trough in each frame until you reach the left end of the control unit frame **5** where the BIC card is located.

__ 3. Fold the BIC card end **5** of the X-axis cable toward the wall (BIC card) and under the trough. Plug the cable into the BIC P1 connector **8**.

__ 4. Loosely attach the mid-cable clamp **3** to the right end of the cable trough of the 2nd frame (3-4 frame library) or the 4th frame (5-8 frame library) with 2 screws P/N 1621513. Center the cable band in the trough and tighten the mid-cable clamp **3** mounting screws.

__ 5. Move the cartridge accessor to the left over the X-axis cable. Loop the XAX card end (accessor end) of the cable around the end of the accessor **4** and plug it in to the XAX P1 connector. Attach the X-axis cable clamp to the accessor **1** with 2 screws P/N 1621513.

__ 6. Move the accessor assembly along the length of the X-axis flex cable and verify that the cable remains reasonably centered between the guides and does not lean into the tape drive cover or the X-axis gear rack. If it does not track evenly between the guides:

__ a. Move the accessor to the position where the cable leans excessively to one side.
__ b. Adjust the rotation of the cable clamp on the accessor (XAX card) to move the cable back toward the center of the trough.
__ c. Move the accessor several times from one end of the library to the other and verify that the cable remains reasonably centered in the cable trough. If not, check the mid-cable clamp adjustment in step 4 and then go to step 6a to repeat the cable adjustment.

Continue at "End Covers and Wall Labels" on page INST-66.

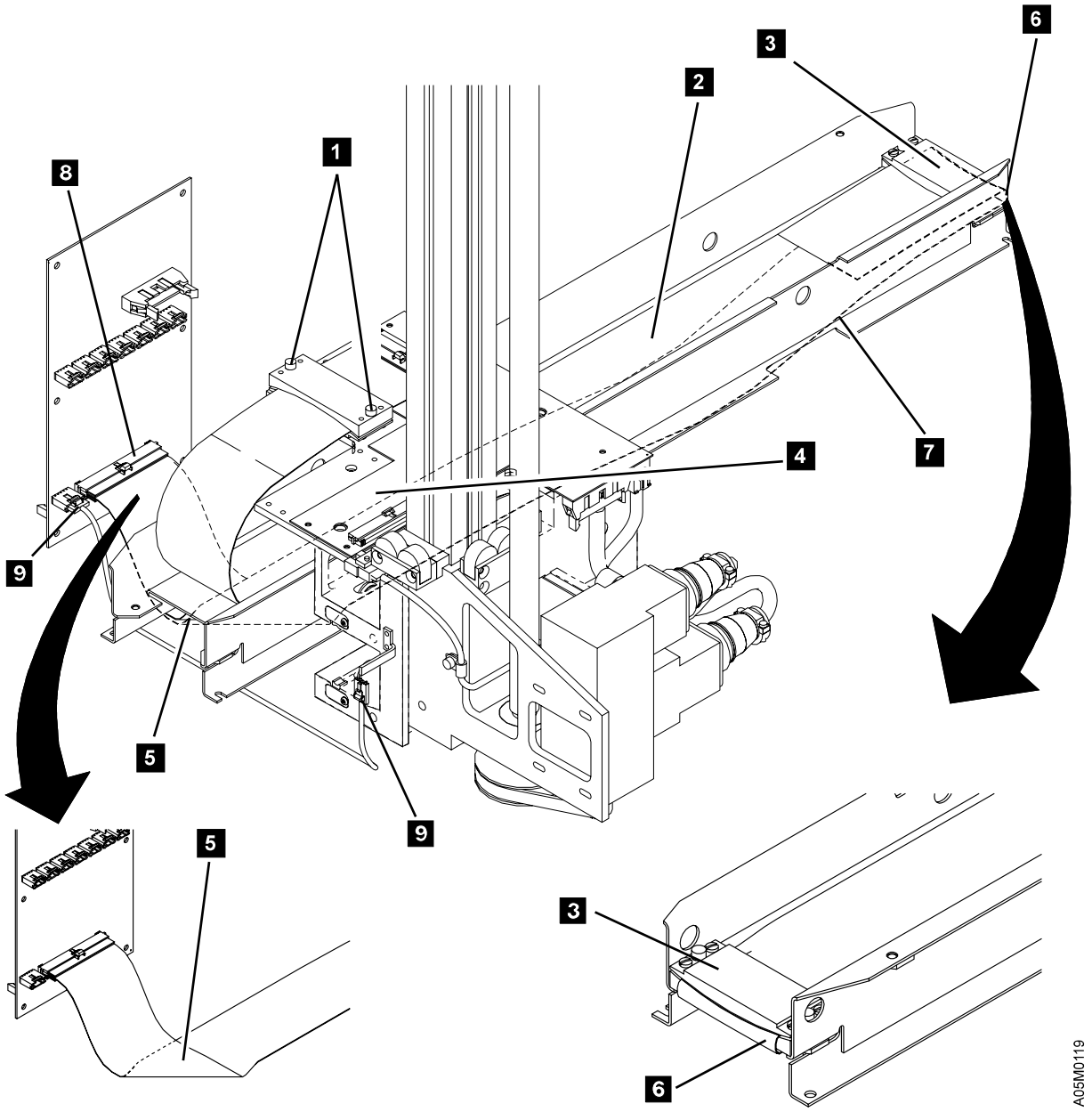


Figure 242. X-Axis Cable with Metal Band

X-axis Flex Cable with Plastic Track

See Figure 243 on page INST-61.

Notes:

1. This procedure is used for both single and dual accessor libraries.
2. If you have a single accessor library, the accessor home position is at the left end of the library.
3. If you have a dual accessor library, the home position for accessor A is at the left end and the home position for accessor B is at the right end of the library.
4. If you have a dual accessor library, start with the cable for accessor A and then repeat the procedure for accessor B.

__ 1. If you are expanding an existing library that had a metal band and your accessor **does not** have a notch **6** in the lower Y-axis cable trough bracket for the X-axis cable trough cover, modify the accessor using the following steps.

   Note: EC C35021 modified the accessor to accept the cable trough cover.

   __ a. Unplug the cables connected to XAX card connectors P2 **1**, P3 **3**, and P4 **5**.

   __ b. Loosen the 8 screws (4 at the top **11** and 4 at the bottom **8**) that secure the Y-axis cable trough to the XAX card mounting plate.

   __ c. Lift and remove the Y-axis cable and trough **10** and place them vertically in the left corner of the library control unit frame.

   __ d. Remove the 4 screws **9** that secure the XAX card and mounting plate **7** to the X-axis assembly and remove the card and plate as one assembly.

   __ e. Replace the 2 Y-axis cable trough brackets **6** on the mounting plate with the new notched brackets P/N 62G1199.

   __ f. Re-install the XAX card mounting plate on the X-axis assembly and tighten the 4 screws.

   __ g. Re-install the Y-axis cable and trough **10** and tighten the 8 screws **8** **11**.

   __ h. Re-plug the cables in P2 **1**, P3 **3**, and P4 **5** on the XAX card.

__ 2. If you are installing a Model HA1 on a 3 frame library, replace the X cable trough in the middle frame of the library with cable trough P/N 05H6998 (supplied).

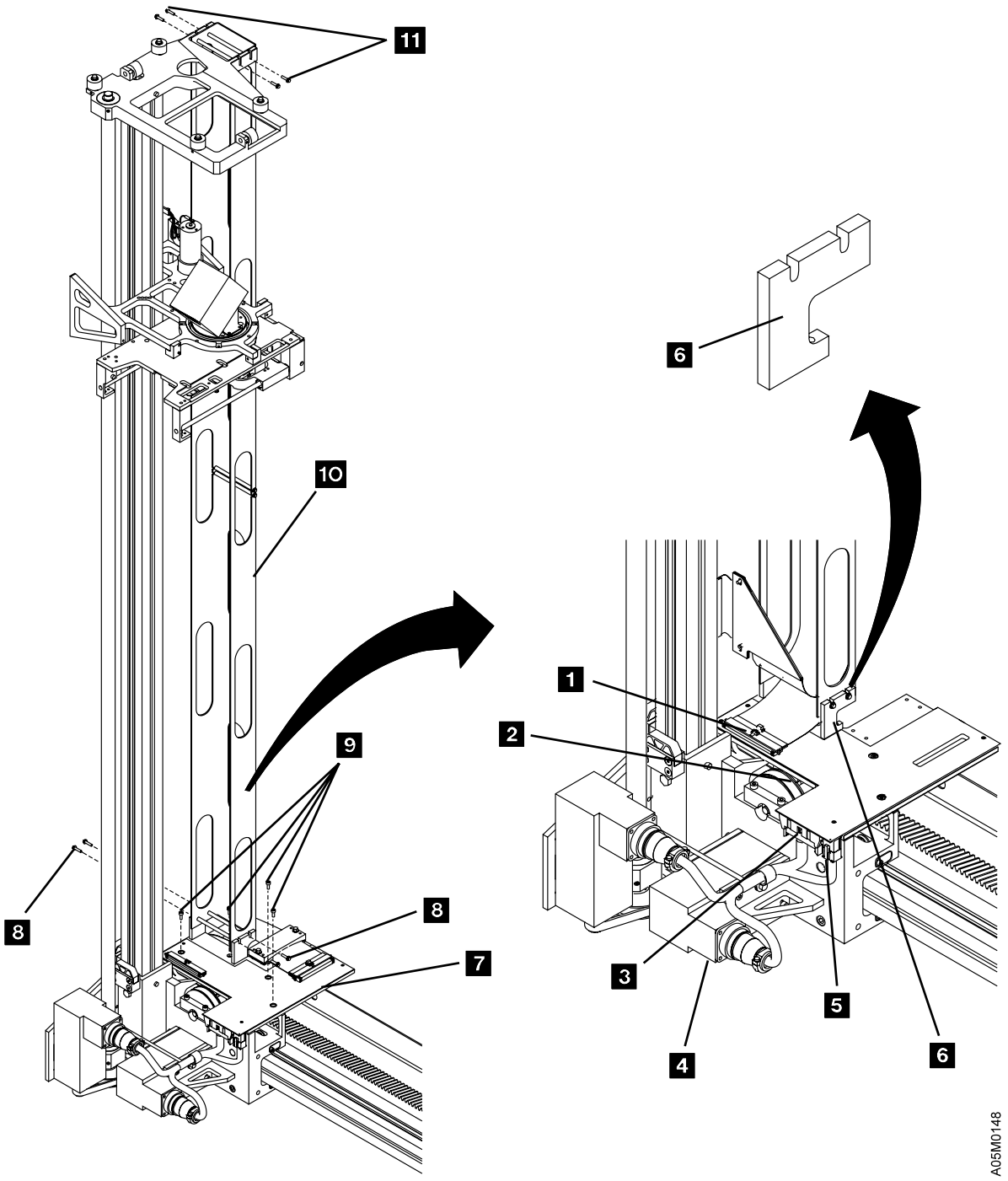


Figure 243. Y-Axis Cable Trough Bracket

See Figure 244 on page INST-63.

__ 3. Lay the X-axis cable **7** in the cable trough **2**. Put the end with the plastic track (plastic track up **1**) at the accessor home position end of the library with the connector for the XAX card sticking out of the accessor home position end about 300 mm (12 in).

__ 4. Run the end without the plastic track **3** back under the cable trough using the following steps. The cable will be looped around the end of the cable trough in frame 1 (1-2 frames), 3 (3-4 frames), 4 (5-8 frames) or 8 (9-16 frames) for a single accessor library or in the middle of the library for a dual accessor library **4**.

Note: If you are installing a Model HA1 on a 3 frame library, the cable will loop back at the opening in the center of the middle library frame.

__ a. Slide the cable in the trough until the end of the plastic track is positioned at the end of the trough in the frame it attaches to **5**.

__ b. If you have a single accessor library that is longer than 8 frames, pull the cable out of the plastic track at the mid-cable point to the notch in the plastic track (back one frame length). Pull the end of the plastic track **6** back over itself into frame 8 so you can access the opening in the trough between frame 8 and 9 **4**. The cable will feed through the opening between frame 8 and 9 and the plastic track will attach to the right end of the trough in frame 9.

__ c. Run the end of the cable through the opening between the frames and back under the trough towards the accessor home position end of the library.

__ d. Feed the cable under the trough in each frame until you reach the accessor home position end where the BIC card is located.

__ 5. Fold the BIC card end of the X-axis cable toward the wall (BIC card) and under the trough. Plug the cable into the BIC P1 connector. (See **8** in Figure 242 on page INST-59.)

__ 6. Attach the mid-cable end of the cable track **6** to the trough using the following steps:

See Figure 245 on page INST-63.

__ a. Remove the cable mounting block **3** from the end of the cable track **2**.
__ b. Attach the cable mounting block **3** to the end of the trough in the frame you are attaching the cable to **5** with 2 screws P/N 1621510 and tighten the screws.
__ c. Re-attach the cable **2** to the cable mounting block **3** and tighten the screws **1**.

__ 7. Move the accessor over the X-axis cable. Loop the accessor end of the cable **7** around the end of the accessor and plug it into the XAX P1 connector. Attach the X-axis cable bracket to the accessor with 2 screws P/N 1621510.

__ 8. If you have a dual accessor library, repeat steps 3 through 7 to install the accessor B cable.

__ 9. If you have a single accessor library, install the X-axis trough liner P/N 05H7979 **8** in frames 10-16 for a 9-16 frame library, frames 5-8 for a 5-8 frame library, frame 4 for a 4 frame library, or frame 2 in a 2 frame library using the following steps. This liner is used to raise the base of the trough to the height of the plastic track in the previous frames. A liner is not required in a 3 frame library.

__ 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 2 screws P/N 1621510.

Notes:

a. Due to manufacturing logistics, you may receive an extra trough liner. This liner is not needed and may be discarded when you finish the install.
b. You will install the trough covers after the frame to frame cables are installed.
c. Trough liners are not used for dual accessor libraries.

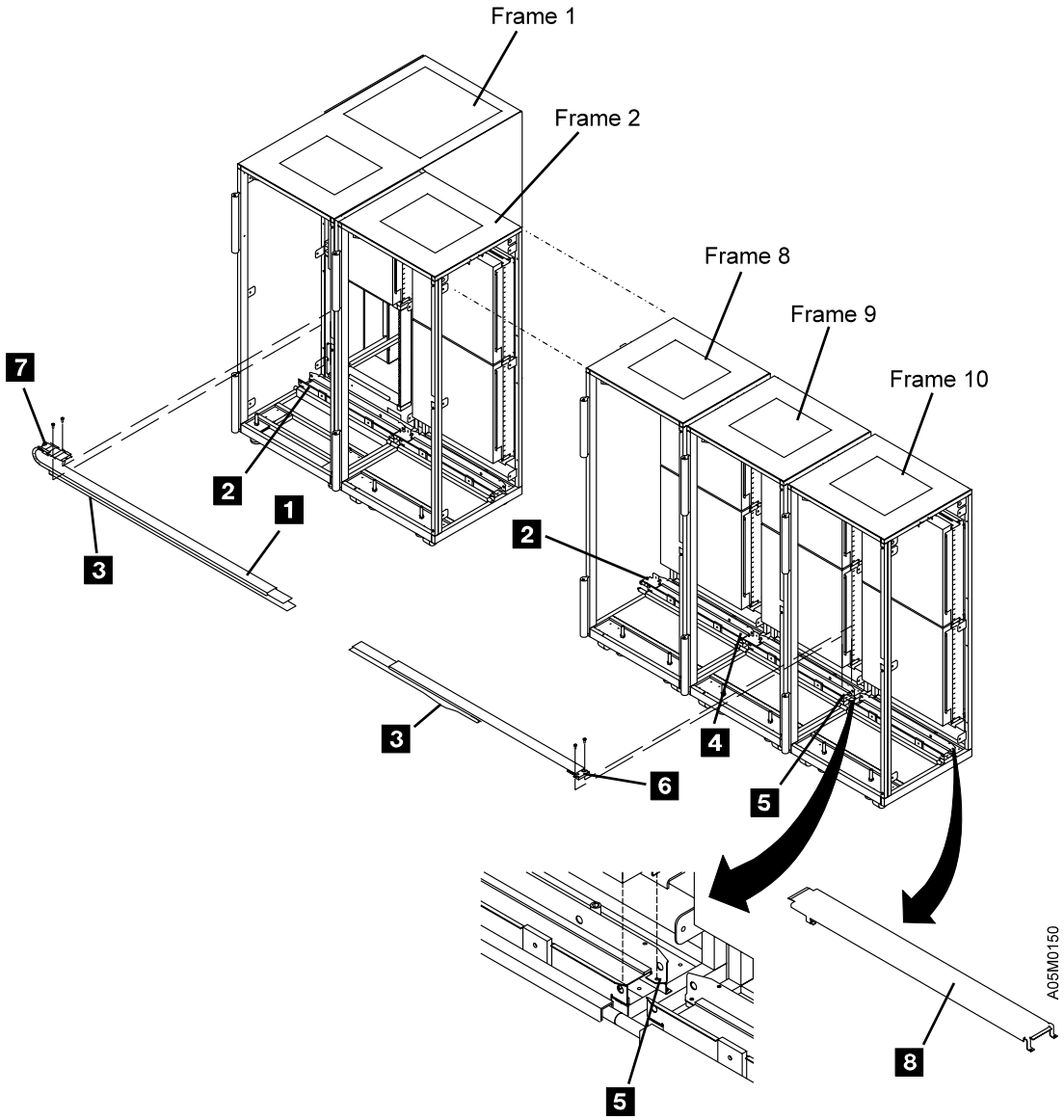


Figure 244. X-Axis Cable with Plastic Track

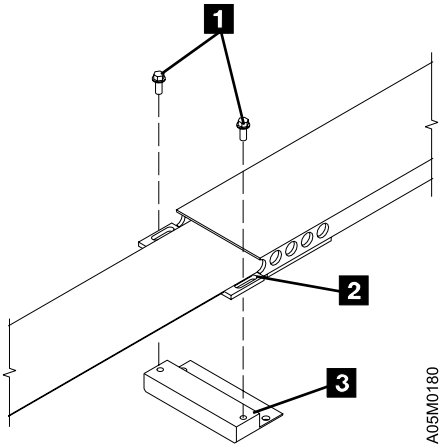


Figure 245. Cable Mounting Block

See Figure 246.

__ 10. If you have a dual accessor library, install the X-axis cable shield using the following steps:

- __ a. Move both accessors into their service bay and locate the mid-cable trough opening where the X-axis cables go back under the trough.
- __ b. The gap **A** between the plastic track of each cable should be 75 to 90 mm (3.0 to 3.5 inches). If necessary, re-adjust the gap by loosening 4 mid-cable clamp screws **2** (2 on each cable).
- __ c. Bend the cable shield P/N 05H8787 **1** slightly with your fingers and insert each end of the shield into the end of the plastic track **3** on each cable.
- __ d. Let the shield straighten out **4** and ensure that it does not come out as you slide it back and forth.

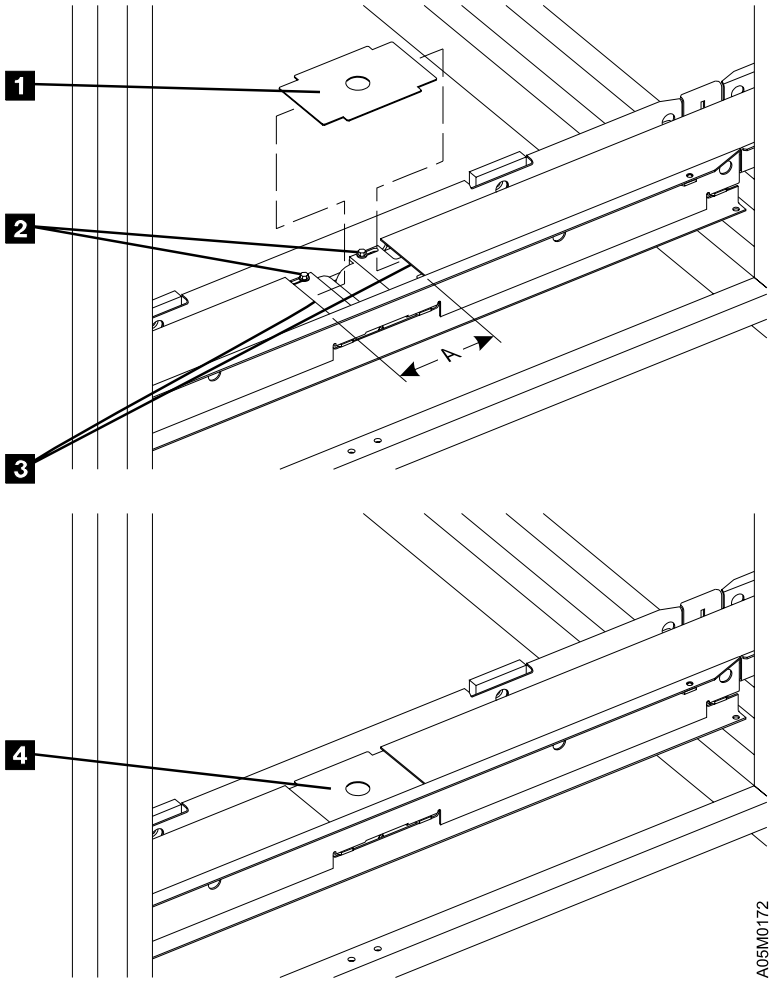


Figure 246. Model HA1 X-Axis Cable Shield

Remote Unit Emergency Switch Assembly

See Figure 247.

__ 1. If the library has a single accessor and is longer than 8 frames, install the remote unit emergency switch assembly using the following steps:

__ a. Install the unit emergency front spacer and switch assembly P/N 05H8134 **1** with 4 screws P/N 1624790 on the front aisle vertical frame member of the last frame. Do not tighten the screws.

__ b. Install the unit emergency rear spacer P/N 05H8018 **3** with 4 screws P/N 1624790 on the rear aisle vertical frame member of the last frame. Do not tighten the screws.

__ c. Install a unit emergency horizontal spacer P/N 05H8019 **2** with 4 screws P/N 1624767 at the top of the front and rear spacers installed in steps 1a and 1b. Align the top surface of the spacers and tighten the screws.

__ d. Install a unit emergency horizontal spacer P/N 05H8019 **2** with 4 screws P/N 1624767 at the bottom of the front and rear spacers installed in steps 1a and 1b. Align the bottom surface of the spacers and tighten the screws.

__ e. Align the top of the unit emergency spacer assembly with the top of the last frame and tighten the 8 screws holding it to the vertical frame members.

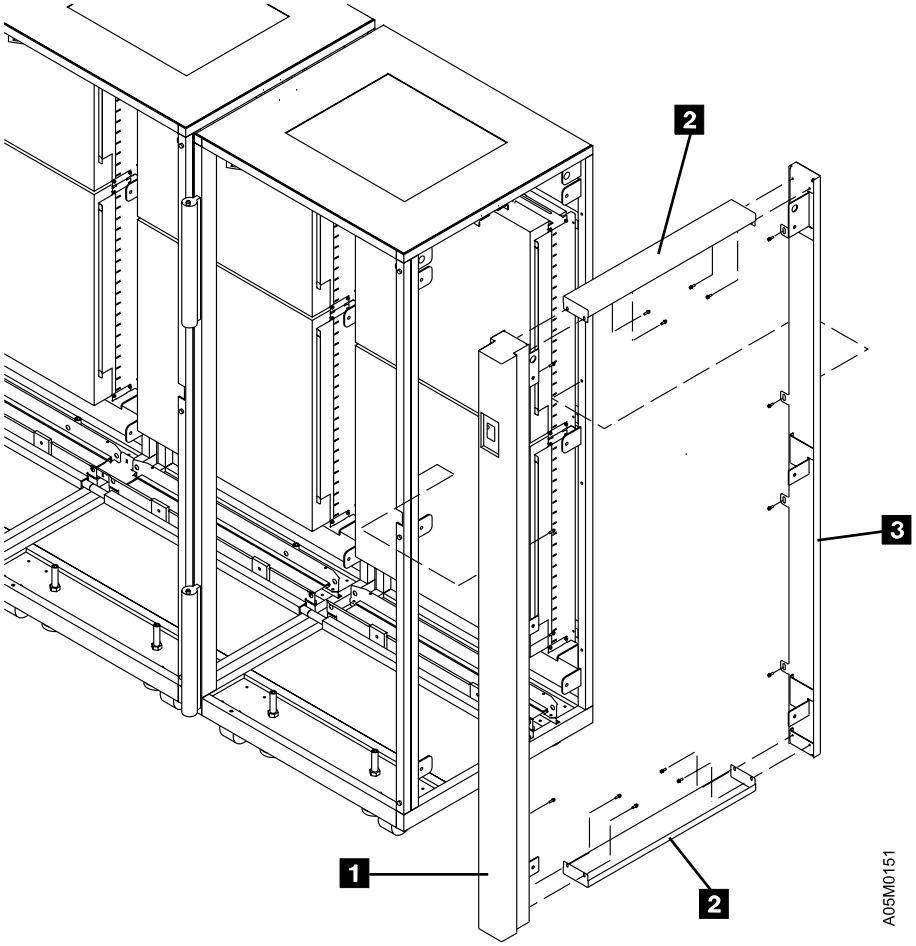


Figure 247. Remote Unit Emergency Switch Assembly

End Covers and Wall Labels

__ 1. Install the left end cover on the first frame, if removed, and the right end cover that you removed on the last installed frame. If the rear center screw is difficult to install, leave it out.

__ 2. Install the wall labels P/N 62G1551 or 94F6844 on all the library expansion frames. All the operator doors are even-numbered walls starting with the control unit frame door (wall 2). The next expansion frame door is wall 4, and so on. The odd-numbered walls are in the back of the frames and have numbers starting at the control unit frame (wall 1). Put the labels in the same position as they are located on the CU frame walls. See “Cartridge Storage” on page INTRO-9 for an example of wall, column, and row numbering.

Note: If you have a dual accessor library, do not put labels on the walls of the service bay frames at each end of the library.

Upgrade Previously Installed Frames

If you did not install a 3494 Model B18 or HA1 on an existing library and you did not expand an existing library past 8 frames, skip this section and continue at “Frame to Frame Cables” on page INST-72.

__ 1. If you have expanded an existing library past 8 frames and you are not installing the high availability option, you may need to replace some of the library cards. Check the cards in the following list and replace them with the new cards (supplied) only if your library does not have this version (or later) of each card.

   __ a. LPC3 P/N 05H8143 (Refer to “Model L1x Frame (Rear View)” on page LOC-10 for location)

   __ b. MIC3 P/N 05H8144 (Refer to “Model L1x Frame (Rear View)” on page LOC-10 for location)

   __ c. XAX2 P/N 05H8142 (Refer to “X-Axis and Y-Axis Assemblies” on page LOC-6 for location)

__ 2. If you have installed a 3494 Model B18 on an existing library, you may need to replace or upgrade the library manager PC and the MIC card. Use 3494 L1x SC 9020, 3494 B18 VTS Attachment, Installation Instructions P/N 05H8868 to upgrade the existing library.

   Note: Before powering the library up to restore and migrate the LM Database or to configure the LM, complete the cabling as described in the following sections:

   a. “Power Sequence Cables for D1x/B1x Frames” on page INST-78.
   b. “Model B18 VTS Subsystem Cables and 3590 Model A60 LAN Attach” on page INST-105.
   c. “Service Panel and Cables” on page INST-107.

__ 3. If you installed the high availability option Model HA1 on an existing library, you will need to install new cards (supplied) in the L1x frame and new parts (supplied) on the old accessor as follows:

__ a. Replace the MIC1/2/3 card with the MIC4 card. (if required)

Note: If your old library manager was a PS/VP or 7585 Industrial Computer, a new mounting plate for the MIC card/bracket assembly is provided. See the Installation Instruction for the 7588 Industrial Computer for the mounting instructions.

__ 1) If you have the MIC1/LCC card set, install the MIC4 card/bracket assembly P/N 05H9840 in place of the MIC1 card and remove the LCC card.

__ 2) If you have the MIC2-3/LPC card set, replace the MIC card with MIC4 card P/N 05H8784.

__ b. Replace the LPC card with the DSW2 card P/N 05H8237. If you have just installed the MIC4 card/bracket, install the DSW2 card on the bracket below the MIC4 card.

__ c. Install the UEP2 card P/N 05H8241 as follows:

__ 1) Locate the UEP2 card at the left of the DSW2 card and install 2 nylon spacers P/N 34G8117 in holes at the top middle and bottom middle of the card.

__ 2) Plug the UEP2 card into the socket on the DSW2 card and install the card using screw P/N 05H1509.

__ d. Replace the XAX1 card **4** with the XAX2 card P/N 05H8142. (if required)

__ e. If the old Y-axis assembly has an uncoated steel leadscrew, replace it with Y-axis assembly P/N 05H8063 that uses a teflon coated leadscrew. Refer to “Y-Axis Assembly” on page CARR-60.

__ f. If the old picker assembly does not have EC D19249, replace it with Picker Assembly P/N 05H7197. Refer to “Picker Assembly” on page CARR-28. The picker assembly has EC D19249 if the distance between the front and middle sensors on the Reach Card is 55 mm (2.2 in).

__ 1) If the dual gripper feature is installed, replace Reach Assembly 2 with P/N 05H7196. Refer to “Reach Assembly 2 (Optional Feature)” on page CARR-40.

__ g. Replace the library manager in the Model L1x frame with the new IBM 7588 Industrial Computer using the instructions provided. The MIC card/bracket assembly is moved up on a new mounting plate so the 7588 can be moved toward the bulkhead to clear the keyboard compartment on the rear door. The ARTIC cables at the back of the 7588 must be bent at a tight radius due to the limited space between the 7588 and the bulkhead.

__ h. Install the in-bay switch magnet and bracket on the L1x accessor as follows:

__ 1) Install the magnet P/N 05H7268 **1** with 2 screws P/N 50G0108 on the mounting bracket P/N 05H8593 **2**. The magnet should be mounted on the rear leg of the bracket.

__ 2) Insert the T-nut P/N 34G9647 **3** in the slot on the right side of the Y-axis shaft. The spring loaded ball should keep it from sliding down the slot.

__ 3) Install the magnet mounting bracket with screw P/N 1621527 loosely on the T-nut.

__ 4) Slide the bracket up the shaft until it is tight against the upper guide casting and tighten the screw.

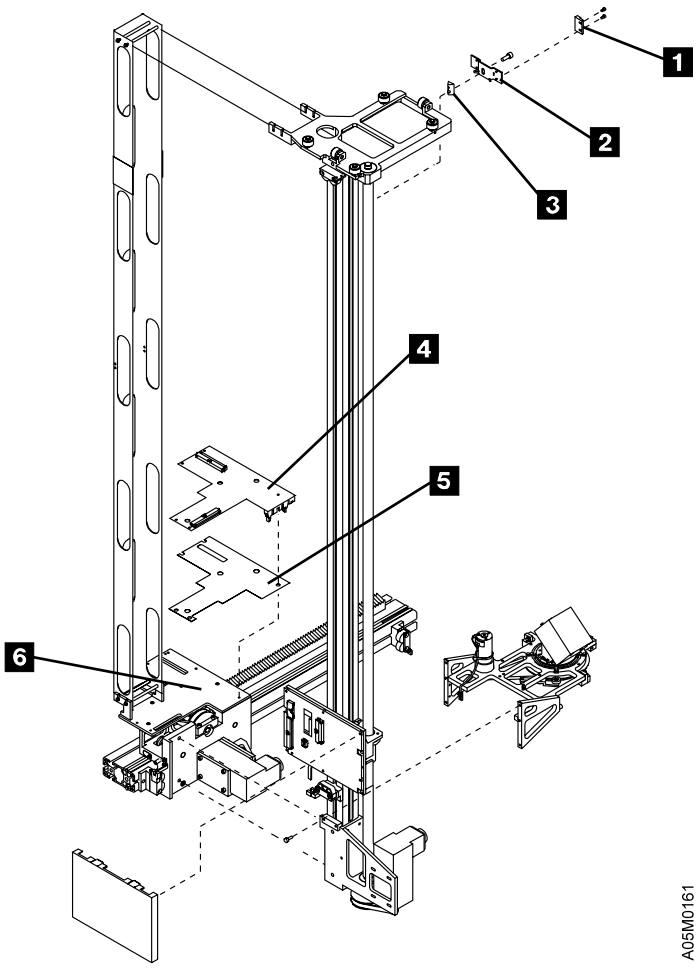


Figure 248. Model L1x Accessor with Model HA1

3490 Model CxA Tape Drive Front Cover

If you do not have any 3490 Model CxA tape subsystems or if you have only added a Storage Unit to an existing library, go to “Frame to Frame Cables” on page INST-72.

If you have any 3490E Model CxA tape subsystems, perform this procedure if the front cover on the tape subsystem is not installed. See Figure 249 on page INST-71.

__ 1. From the rear of the frame, loosen the 4 screws **1** that hold the screen that covers the fans, then remove the screen by sliding the screen up and out of the sleeve.

__ 2. Remove the 4 retaining screws **2** from the sleeve.

Note: The retaining screws **2** and the screen will be reinstalled after you check out the tape subsystem.

__ 3. If this is the control unit frame, put the cartridge accessor in the X and Y service position. See “X-Axis Service Position (Single Accessor)” on page CARR-8 and “Y-Axis (Vertical) Service Position” on page CARR-8.

__ 4. From the front of the frame, remove the 4 shipping screws **6**. Store the screws in the bottom front corner of the frame. They may be needed if the library is relocated or discontinued.

__ 5. Pull the tape drive out to the extended position, then remove the top cover screw **4**.

__ 6. Remove the top cover by lifting the front of the cover up **3** slightly and then sliding the cover toward you until the tabs on the rear of the cover are clear.

__ 7. Put the bottom tabs of the front cover in the matching slots **7** in the tape drive sleeve and pivot the cover top to the rear to allow you to connect each of the message display cables to the message display extension cables, p/n 88F1356.

Note: Route the message display cable and its ferrite over the left hand loader mounting bracket.

__ 8. Position the front cover against the tape drive sleeve. Do not catch any cables in the cover.

__ 9. Install the 2 screws P/N 1621210 **5** that hold the front cover. Ensure the cover is fully seated before you tighten the screws.

__ 10. Reinstall the top cover removed in step 6.

__ 11. Push the tape drive assembly into its closed position.

__ 12. Ensure that the functional diskette is installed in the tape control unit, then install the front cover **8** on the tape control unit.

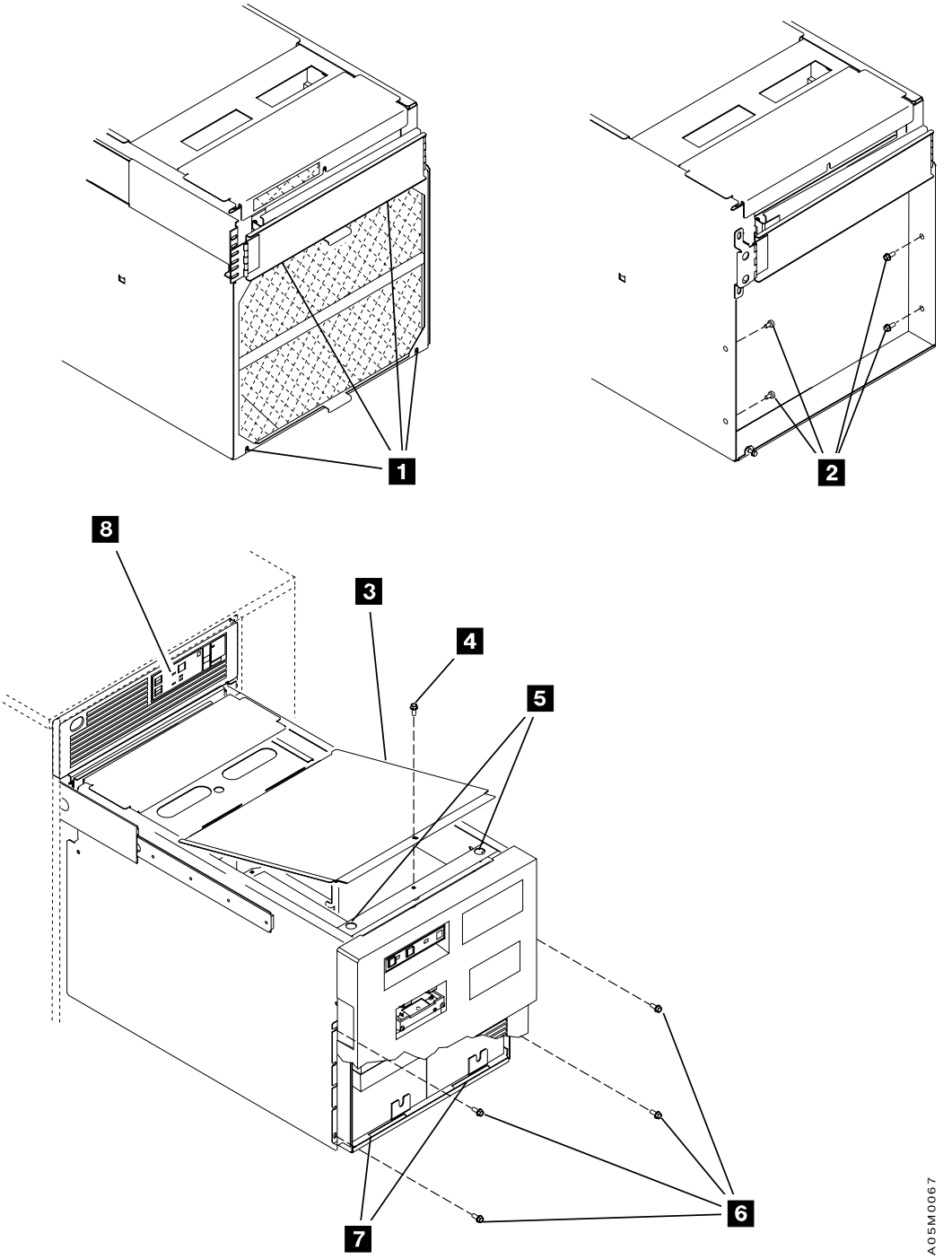


Figure 249. 3490E Tape Drive Assembly (Service Position)

Frame to Frame Cables

Door interlock cables, power sequence control cables, unit emergency cables, and tape subsystem cables connect to the control unit frame.

Each drive unit (D1x) or tape server control unit (B16) frame has cable clamps to be installed in the field. The cables that lay on the floor of the frames must be clamped in place when you route them to other frames.

The clamps are located on the floor under the tape subsystem. They can be reached through the back of the frame. See Figure 250 for the location of the cable clamp area in the control unit (CU) frame. The cables are clamped at the same place in the expansion frames.

Notes:

1. Overtightening the cable clamps can damage the cables. Hand tighten only.
2. If required, you can put several cables in each cable clamp.

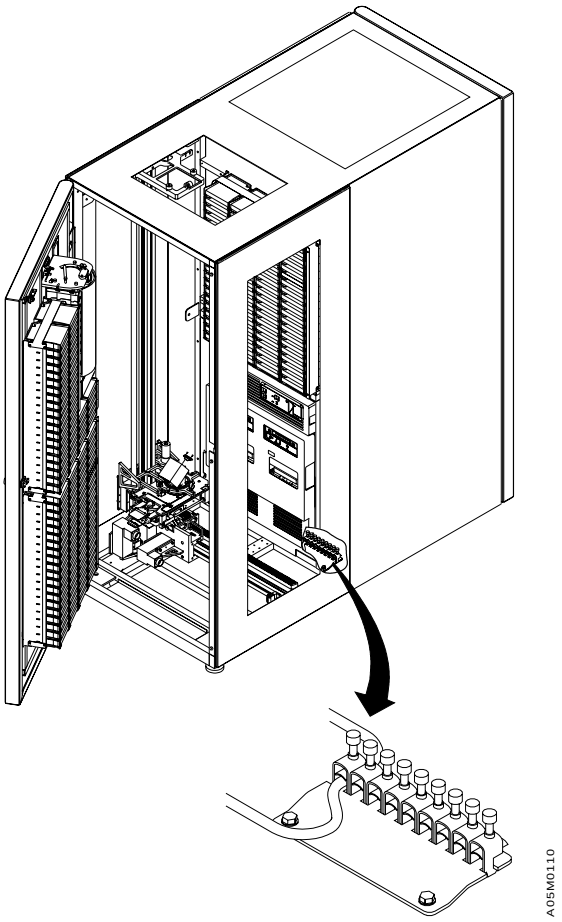


Figure 250. Cable Clamp Area

Door Interlock Cables

If your library has 2 to 8 frames and a single accessor, go to “2 - 8 Frame Library” to install the door interlock cables.

If your library has more than 8 frames and a single accessor, go to “9 - 16 Frame Library” on page INST-74 to install the SPC card and the door interlock cables.

If your library has dual accessors, go to “ Dual Accessor Library” on page INST-76.

2 - 8 Frame Library: See Figure 251.

__ 1. Remove the door interlock jumper (terminator) **2** from the door interlock card **1** (DIL2 card shown) in the control unit frame.

__ 2. Install the door interlock jumper (terminator) **6** in the door interlock card **5** (DIL1 card shown) in the last frame in the configuration.

__ 3. Plug the cable **3** from each frame into the adjacent frame’s door interlock card. Put the cable in the channel **4** in the top of each frame.

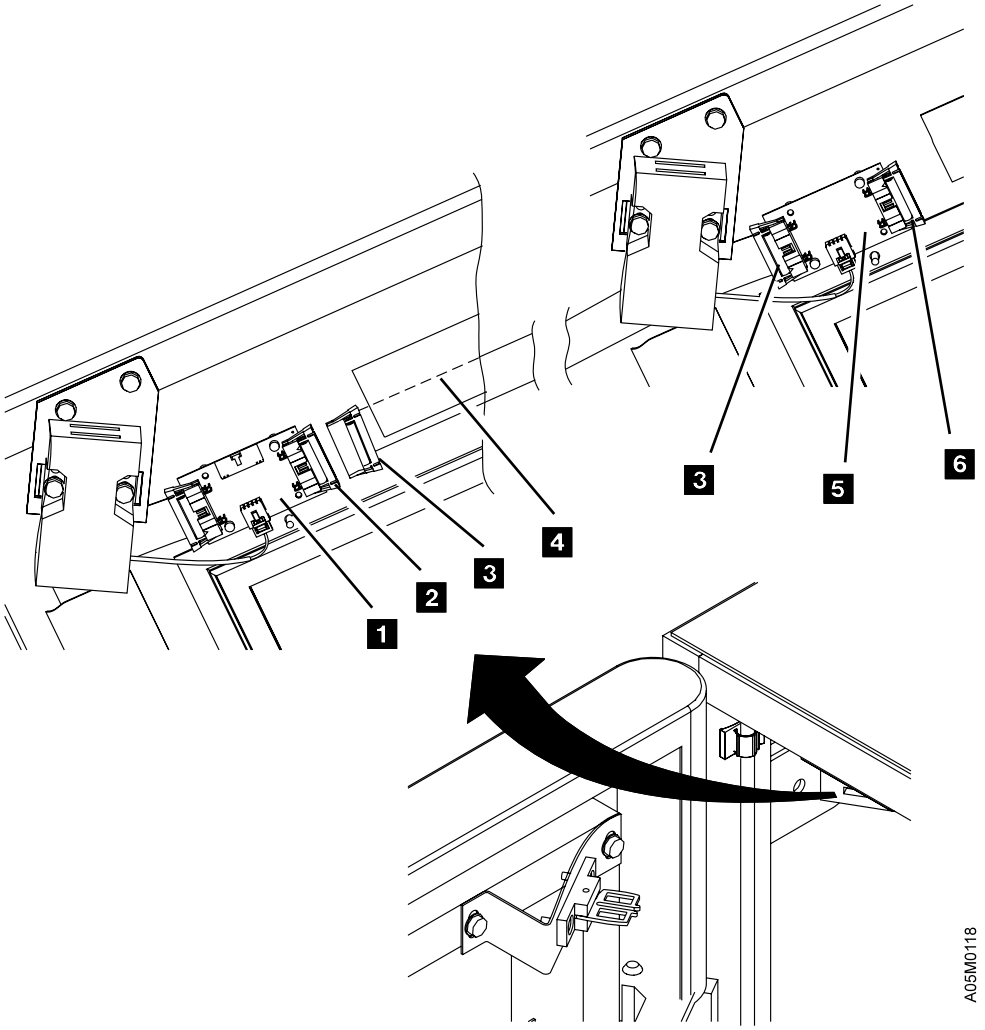


Figure 251. Door Interlock Cables, 2 - 8 Frames

9 - 16 Frame Library: See Figure 252 on page INST-75.

__ 1. If the DIL card in the library control unit frame (see **1** in Figure 251 on page INST-73) has only 3 cable connectors on it, replace it with the new DIL2 card P/N 05H7875. The new card must be installed in the same orientation with the new connector J4 toward the door.

__ 2. If the DIL card in the last expansion frame (see **5** in Figure 251 on page INST-73) has only 3 cable connectors on it, replace it with the new DIL2 card P/N 05H7875. The new card must be installed in the same orientation with the new connector J4 toward the door.

__ 3. Install the SPC card assembly P/N 05H8141 **2** between frames 8 and 9 using the following steps:

   __ a. Loosen the lower 2 screws **3** in the rear frame spacer.

   __ b. Hook the SPC card bracket **1** over the middle rear expansion frame attachment bracket and slide the 2 notches in the card bracket down over the lower frame spacer screws **3**.

   __ c. Tighten the 2 lower rear frame spacer screws **3** onto the card bracket and install and tighten screw P/N 1624766 at the top of the card bracket **1** to secure it to the frame attachment bracket.

__ 4. Remove the top frame spacer **9** and disconnect the upper rear expansion frame attachment bracket by removing the left screw in the bracket. (See Figure 227 on page INST-32 and Figure 228 on page INST-33.)

__ 5. Plug the SPC cable P/N 05H8086 in J1 and J2 on the SPC card and run it up over the upper guide rail **6**.

__ 6. Push the SPC cable **7** into the rear frame spacer and re-attach the upper expansion frame attachment bracket.

__ 7. Place the cable retainer bracket P/N 05H8131 **8** above the upper rail guide and under the cable so the screw hole in the bracket is toward the front of the library.

__ 8. Re-install the top frame spacer **9** and push the cables into it along the top of the aisle.

__ 9. Attach the cable retainer bracket **8** on the front upper frame spacer screw and tighten the screws. The bracket should rest on the upper rail guide.

__ 10. Remove the terminator from J2 on the DIL card in the library control unit frame (or last previously installed frame) and install it in J2 on the DIL card in the last frame.

__ 11. Plug the long end of the SPC cable (from J1 on the SPC card) into J2 on the DIL card in frame 8 **5**. Put the cable in the channel in the top of the frame.

__ 12. Plug the short end of the SPC cable (from J2 on the SPC card) into J1 on the DIL card in frame 9 **4**.

__ 13. Run the frame-to-frame cable in frames 1 to 8 and 9 to 16 from J2 on the DIL card in the left frame to J1 on the DIL card in the next frame. Put the cables in the channel in the top of each frame. The cable shipped with the frames in position 8 and the last position is not used. (See Figure 251 on page INST-73.)

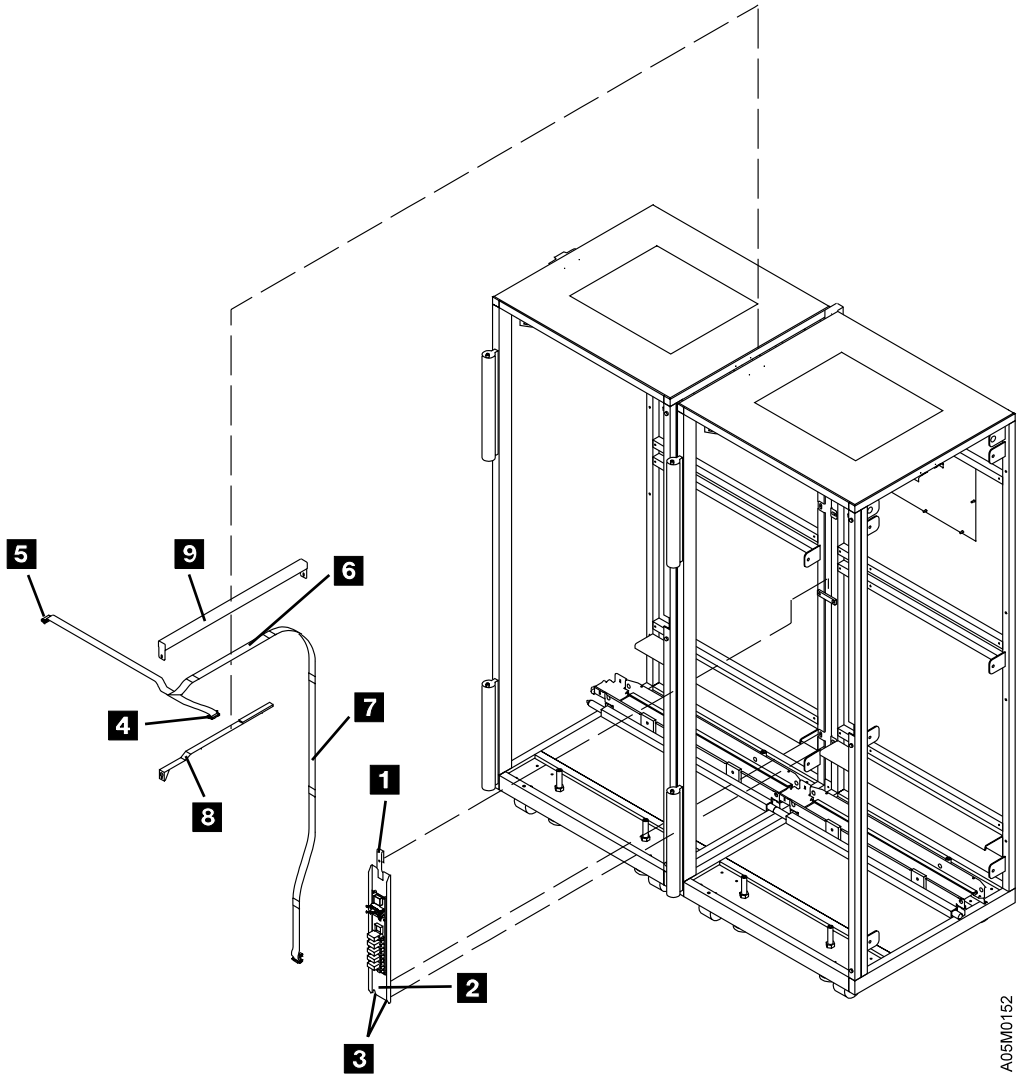


Figure 252. Door Interlock Cables, 9 - 16 Frames

Dual Accessor Library

See Figure 251 on page INST-73.

__ 1. Remove the door interlock jumper (terminator) **2** from the door interlock card **1** in the L1x frame. This terminator is not used.

__ 2. For library frame number 1-8 and 10-16 in a high availability configuration (refer to Figure 253 on page INST-77 for the library frame numbers), plug the cable **3** from each frame into the adjacent frame's door interlock card J2. Put the cable in the channel **4** in the top of each frame.

__ 3. If your library has more than 8 library frames (not counting the service bay frames), install the following cables:

See Figure 252 on page INST-75.

__ a. Remove the top frame spacer **9** between frames 8 and 9 and disconnect the 2 rear expansion frame brackets.

__ b. Run cable P/N 05H8267 from frame #9 DIL2 J1 over the upper rail guide, down the rear frame spacer to the bottom of frame, behind the X cable trough to frame #1 (L1x), through the hole in the rear wall of the L1x frame to UEP2 J5. Ensure that the cable does not interfere with the accessors or tape subsystem.

__ c. Push the cable into the rear frame spacer and re-attach the 2 rear expansion frame brackets.

__ d. Place the cable retainer bracket P/N 05H8131 **8** above the upper rail guide and under the cable so the screw hole in the bracket is toward the front of the library.

__ e. Re-install the top frame spacer **9** and push the cable into it along the top of the aisle.

__ f. Attach the cable retainer bracket **8** on the front upper frame spacer screw and tighten the screws. The bracket should rest on the upper rail guide.

__ g. Run cable P/N 08L5796 from frame #8 DIL2 J2 through the cable holes to frame #9 DIL2 J4.

__ 4. Run cable P/N 05H2916 connected to the RSB (right service bay) frame BIC2 J6 to the last library frame DIL2 J2. Fold the cable per the fold lines and put it in the channel at the top of the frame.

__ 5. Plug cable P/N 05H8259 from the LSB (left service bay) frame into frame #1 (L1x) BIC2 J23. This cable should be connected to the 4 service bay switches: Barrier Door Closed, Barrier Door Open, Accessor In-Bay switch, and Door Interlock switch. Ensure that the cable does not interfere with the accessor or barrier door.

__ 6. Run cable P/N 05H2915 connected to the LSB frame X home sensor to the L1x frame BIC2 J5. Ensure that the cable does not interfere with the accessor or barrier door.

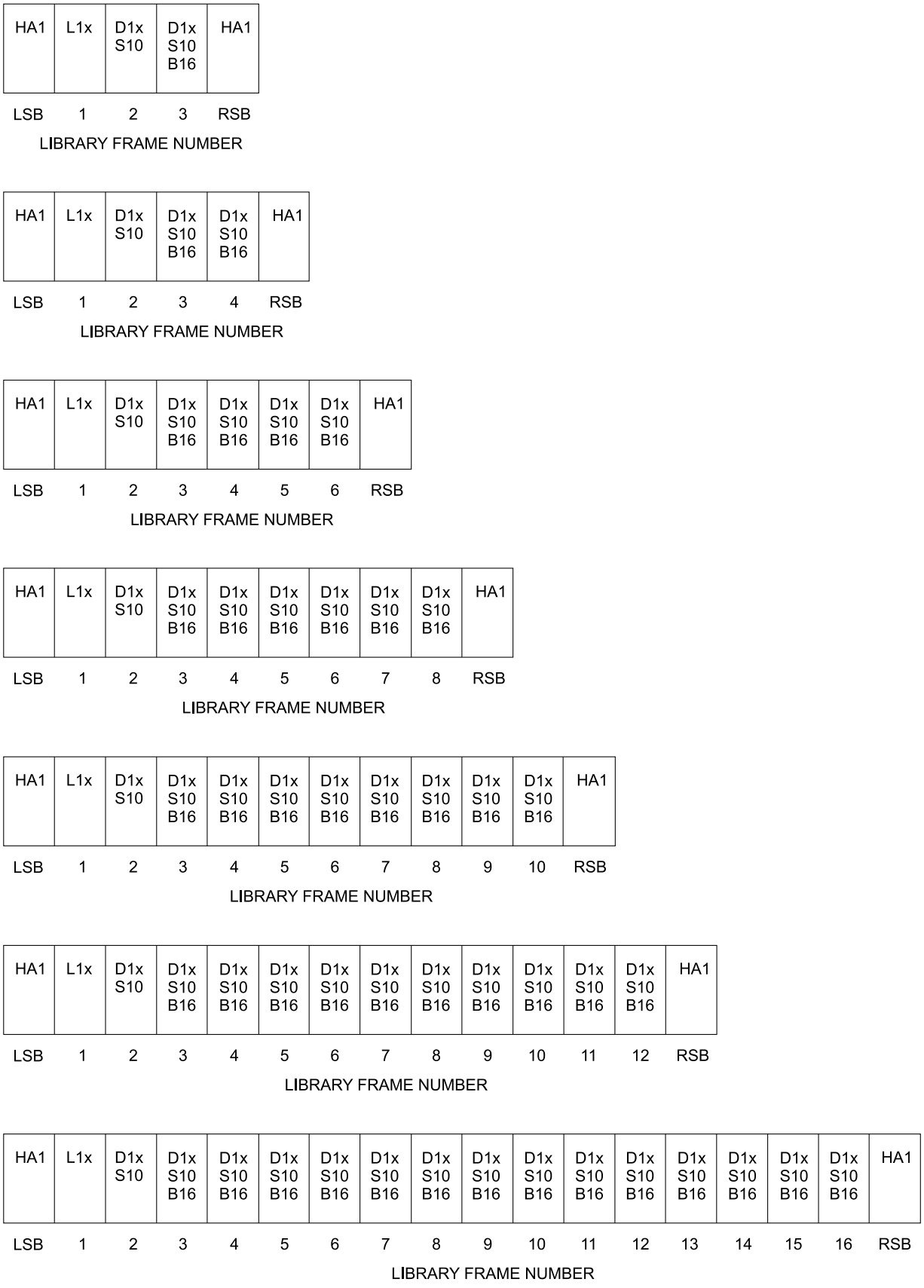


Figure 253. High Availability Library Configurations

Power Sequence Cables for D1x/B1x Frames

If you did not install a D1x or B1x frame during this installation, go to “Service Panel and Cables” on page INST-107.

If your library has a single accessor, go to “Single Accessor Library” to install the cables.

If your library has a dual accessor, go to “Dual Accessor Library” on page INST-80 to install the cables.

Single Accessor Library: A power sequence cable is shipped in each D1x or B16 frame. It is attached to the Power Control Compartment (PCC) connector P17 and is grounded at the bulkhead area. See Figure 254 on page INST-79. If D1x or B16 frames are installed:

__ 1. Locate the cable P/N 62G1202 from P17 on the PCC in the last installed frame that contains a PCC.

__ 2. Route the cable from the last D1x or B16 frame's PCC connector P17 **2** to the next frame (to the left) that has a PCC. (On early machines you may have to remove the strain relief from the cable connector to get the cable through the hole in the bulkhead.)

__ 3. Connect the cable to PCC connector P18 **1**. Loop the excess cable length in this frame.

Note: For these cables, always store the excess cable length in the next frame to the left that has a PCC (the frame where you connect the cable to P18).

__ 4. Remove the shrink tubing from the cable at the clamp area **3** and clamp the braided area of the cable. Get the clamp from the frame that the cable came from. If there are no more unused clamps in the frame, you can put up to three cables in one clamp. Refer to Figure 250 on page INST-72.

__ 5. Repeat steps 1 through 4 for the next frame that has a PCC.

Notes:

a. A terminator plug is not required on the last frame's PCC P18.

b. PCC connector P17 in the control unit frame is connected to the MIC card.

__ 6. If you have a Model B18 frame, install the cables for the frame using the following steps:

__ a. Run cable P/N 05H8595 from the B18 frame SEQ J3 under the floor to PCC J18 of the last library frame with a PCC. The SEQ card is mounted behind the rear door (door with the UEPO switch) below the control unit.

__ b. If not factory installed, run cable P/N 05H8772 from SEQ J4 to PCC J17 in the B18 frame.

__ 7. If you have two B18 frames, install the cables for the second frame using the following steps:

__ a. Run cable P/N 05H8595 from the second B18 frame SEQ J3 under the floor to PCC J18 of the first B18 frame.

__ b. If not factory installed, run cable P/N 05H8772 from SEQ J4 to PCC J17 in the second B18 frame.

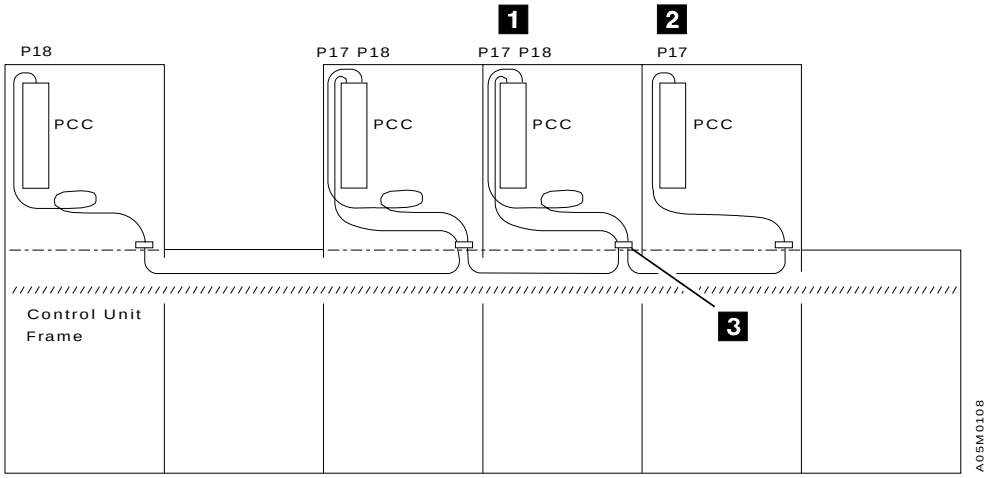


Figure 254. Cables from PCC P17 to PCC P18

Dual Accessor Library

Refer to Figure 255 on page INST-82.

__ 1. If not pre-installed, run cable P/N 05H7180 from PCC J18 in the L1x frame to DSW2 J5.

__ 2. Run cable P/N 05H7322 from the LSB frame PCC J17 under the barrier door in the rear of the frame to the L1x frame DSW2 J11.

__ 3. If the SEQ3 card and bracket assembly is not installed above the PCC in each library D1x or B16 frame, install the card as follows:

   __ a. Install the SEQ3 card and bracket assembly P/N 05H9629 onto the rack member so it is positioned just above the PCC using 2 bolts P/N 1624776. The bottom hole of the SEQ mounting bracket should be at hole 58 from the bottom of the frame.

   __ b. Install cable tie bracket P/N 67X8910 on the middle cover bolt near the SEQ card.

For each D1x/B16 frame in the library, do the following:

__ 4. If you are adding the Model HA1 to an existing library and cable P/N 62G1202 from the previous frame is connected to PCC J17, unplug it from PCC J17 and connect it to SEQ3 J3. Put the cable in the cable tie bracket.

   Note: When viewed from the rear of the library as in Figure 255 on page INST-82, the previous frame is the frame to the right of the frame you are working on.

__ 5. Install cable P/N 62G1202 as follows:

   __ a. If this is the first B16/D1x frame beyond the L1x frame, run cable P/N 62G1202 from SEQ3 J3 to the LSB frame PCC J18.

   __ b. If this is not the first B16/D1x frame in the library, run cable P/N 62G1202 from SEQ3 J3 to the previous frame that has a PCC and plug it into PCC J18. Loop the excess cable in the previous frame and clamp the cable in the clamp area (refer to Figure 250 on page INST-72).

__ 6. If not pre-installed, run cable P/N 05H6970 from PCC J17 to SEQ3 J4. Put the cable in the cable tie bracket.

__ 7. Install cable P/N 05H6987 as follows:

   __ a. If this is the first B16/D1x frame in the library, run cable P/N 05H6987 connected to SEQ3 J1 to L1x frame BIC2 J24. Loop the excess cable in the B16/D1x frame and clamp the cable in the clamp area.

   __ b. If this is not the first B16/D1x frame in the library, run cable P/N 05H6987 connected to SEQ3 J1 to SEQ3 J2 in the previous D1x/B16 frame. Loop the excess cable in the previous D1x/B16 frame and clamp the cable in the clamp area.

If a B18 frame is installed, do the following:

__ 8. Run cable P/N 05H8595 from the last B16/D1x library frame PCC J18 under the floor to the first B18 frame SEQ J3.

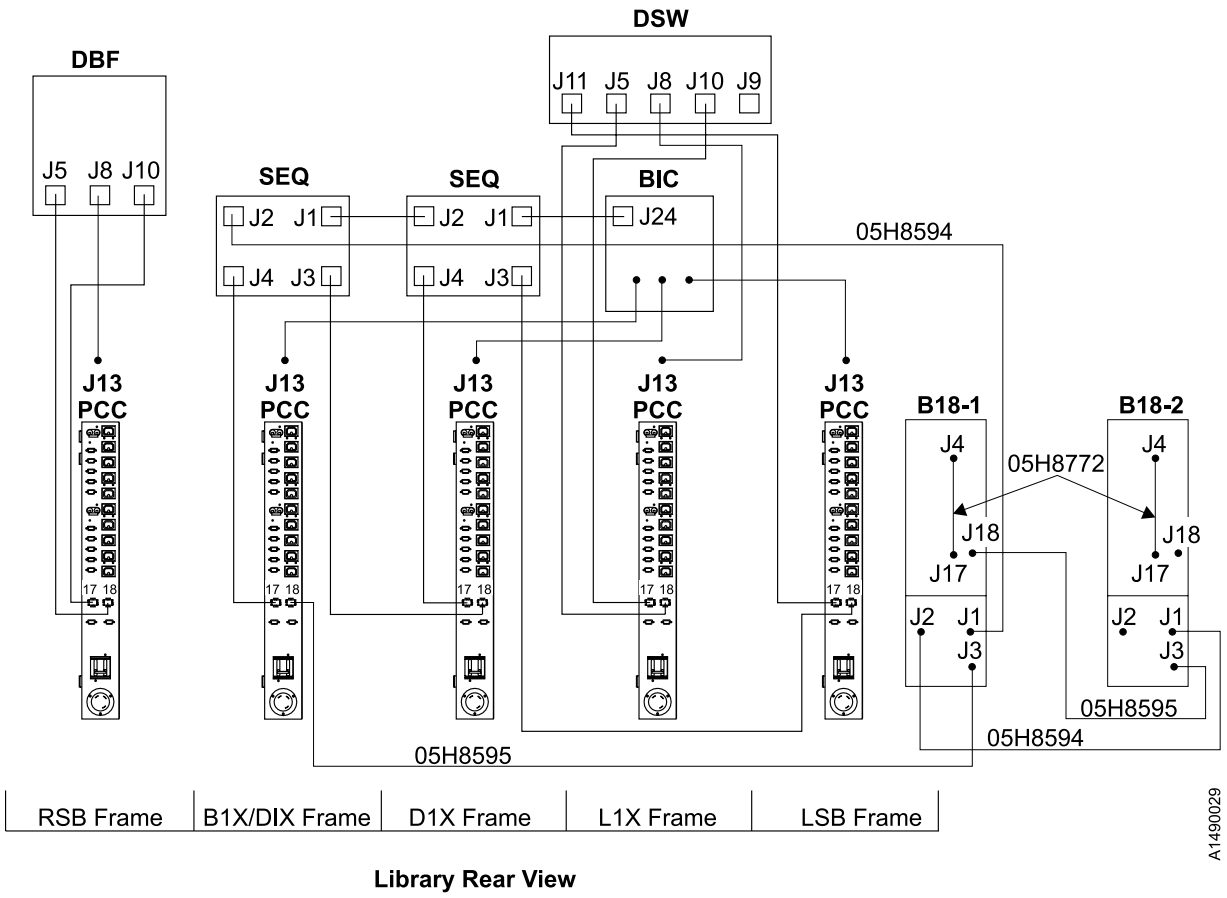
__ 9. If not factory installed, run cable P/N 05H8772 from the B18 SEQ J4 to the B18 PCC J17.

__ 10. Run cable P/N 05H8594 from the last B16/D1x library frame SEQ J2 under the floor to the B18 frame SEQ J1.

__ 11. If a second B18 frame is installed, run cable P/N 05H8595 from the first B18 frame PCC J18 under the floor to the second B18 frame SEQ J3.

__ 12. If not factory installed, run cable P/N 05H8772 from the B18 SEQ J4 to the B18 PCC J17.

__ 13. Run cable P/N 05H8594 from the first B18 frame SEQ J2 under the floor to the second B18 frame SEQ J1.



Library Rear View

Figure 255. Model HA1 Power Sequence Cables

Unit Emergency Cables from Control Unit Frame to D1x / B16 Frames

If you only installed a 3494 Model B18 standalone frame on an existing library, skip the following sections and continue at “Model B18 VTS Subsystem Cables and 3590 Model A60 LAN Attach” on page INST-105.

Unit emergency cables are required for all D1x and B16 frames that are attached to the control unit frame.

If your library has 2 - 8 frames and a single accessor, go to “2 - 8 Frame Single Accessor Library.”

If your library has 9 - 16 frames and a single accessor, go to “9 - 16 Frame Single Accessor Library” on page INST-85.

If your library has a dual accessor, go to “Dual Accessor Library” on page INST-87.

2 - 8 Frame Single Accessor Library:

See Figure 256 on page INST-84.

__ 1. Locate the cable from P13 on the PCC **2** in the first (or next) D1x or B16 frame. The connector is labeled **BIC PCCx**.

__ 2. Route the cable to the control unit frame and connect the cable to the BIC card **1** at the appropriate connector.

PCC2	Drive unit 1
PCC3	Drive unit 2
PCC4	Drive unit 3
PCC5	Drive unit 4
PCC6	Drive unit 5
PCC7	Drive unit 6
PCC8	Drive unit 7

Note: Remove the jumper P/N 62G1195 in the BIC card PCC connector and store it in the control unit. The jumper may be necessary to help isolate PCC problems or for library reconfiguration.

__ 3. Clamp the cable in the loop-type cable clamp, which is near the base of the control unit frame.

__ 4. Loosen the clamp **3** in the D1x or B16 frame and pull the excess cable into the frame. Refer to Figure 250 on page INST-72.

__ 5. Tighten the clamp on the cable.

Notes:

a. These cables are not shielded.

b. For these cables, always loop the excess cable in the D1x or B16 frames.

__ 6. Repeat steps 1 through 5 for the next D1x or B16 frame.

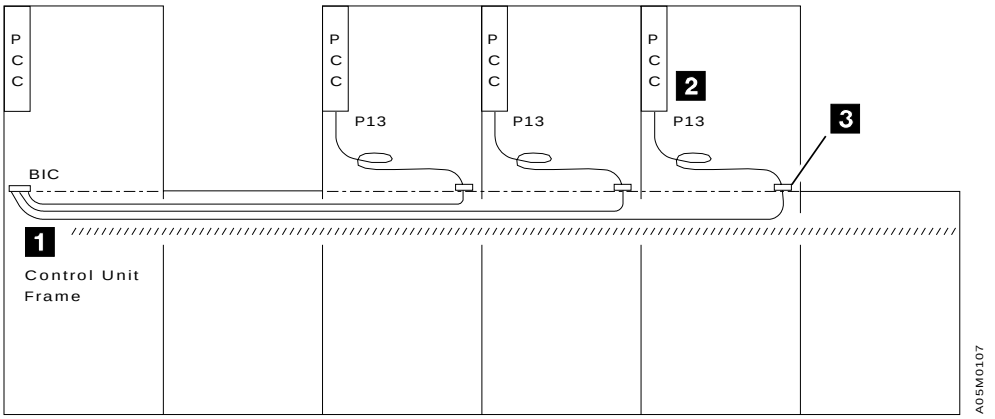


Figure 256. Unit Emergency Cables, 2-8 Frame Library

9 - 16 Frame Single Accessor Library

See Figure 257 on page INST-86.

__ 1. Run cable P/N 05H8087 from J4 on the DIL card in the library control unit frame to P3 on the op panel card and to the unit emergency switch as follows:

   __ a. Connect the cable to J4 on the DIL card.

   __ b. Remove the op panel card cover and unplug the unit emergency switch cable connector in P3 on the op panel card and connect it to the appropriate cable connector.

   __ c. Connect the cable to P3 on the op panel.

   __ d. Re-install the op panel card cover and put the cable in the upper corner cable retainer. Ensure that the front door will open and close without pulling or pinching the cable.

__ 2. Run cable P/N 05H8085 from J4 on the DIL card in the last frame to the remote unit emergency switch. Feed the end of the cable through the large cover hole in the frame and through the cable hole in the front unit emergency spacer to the switch. Push the cable into the cable channel at the top of the frame.

__ 3. Run cable P/N 05H8088 from PCC8 on the BIC card in frame 1 (CU) to J3 on the SPC card between frames 8 and 9. Lay this cable in the cable area behind the X-axis cable trough.

__ 4. Locate the cable from P13 on the PCC **2** in each D1x or B16 frame. The cable connector is labeled **BIC PCCx**.

__ 5. Route the PCC cables from the frames in positions 2-7 to the BIC card **1** in the library control unit frame and connect them per their frame position in the library. (i.e. connect PCC in frame 4 to PCC4)

__ 6. Route the PCC cables from the frames in positions 8-16 to the SPC card between frame 8 and 9 and connect them per their frame position in the library. (i.e. connect PCC in frame 13 to J13)

__ 7. Ensure that a jumper P/N 62G1195 is installed in all unused PCC connectors on the BIC card and SPC card.

__ 8. Loosen the PCC cable clamp **3** in each D1x and B16 frame, pull the excess cable into the frame, and re-tighten the clamp. Refer to Figure 250 on page INST-72.

Note: When you connect a cable, remove the jumper in the BIC card or SPC card connector and store it in the library control unit. The jumper may be necessary to help isolate PCC problems or for library reconfiguration.

EXAMPLE:

Frame Type	PCC P13 Cable Connection
Frame 2 = DU	Connect cable to BIC PCC2.
Frame 3 = SU	Leave jumper (supplied) in BIC PCC3.
Frame 4 = DU	Connect cable to BIC PCC4.
Frame 5 = B16	Connect cable to BIC PCC5.
Frame 6 = SU	Leave jumper (supplied) in BIC PCC6.
Frame 7 = DU	Connect cable to BIC PCC7.
Frame 8 = DU	Connect cable to SPC J8.
Frame 9 = DU	Connect cable to SPC J9.
Frame 10 = SU	Leave jumper (supplied) in SPC J10.
Frame 11 = DU	Connect cable to SPC J11.
Frame 12 = SU	Leave jumper (supplied) in SPC J12.
Frame 13 = DU	Connect cable to SPC J13.
Frame 14 = DU	Connect cable to SPC J14.
Frame 15 = SU	Leave jumper (supplied) in SPC J15.
Frame 16 = SU	Leave jumper (supplied) in SPC J16.

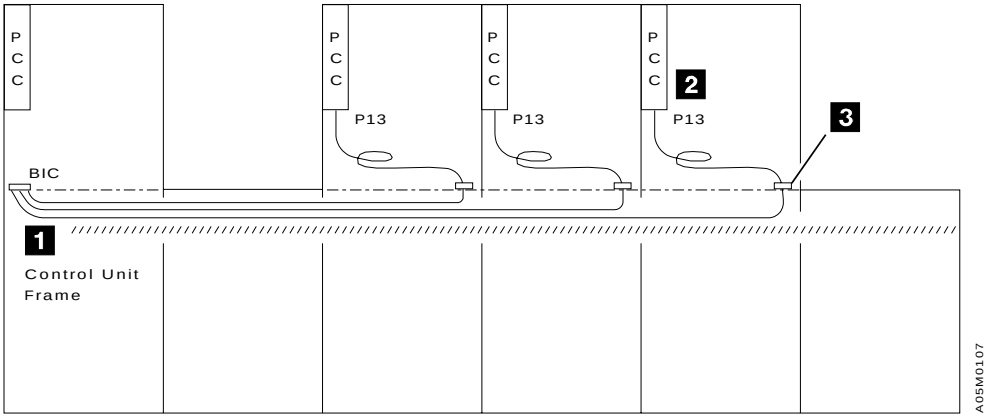


Figure 257. Unit Emergency Cables, 9-16 Frame Library

Dual Accessor Library

__ 1. Run cable P/N 05H8260 connected to the UEPO switch in the RSB frame behind the X cable trough to the UEPO switch and LPN P3 in the L1x frame. Route the cable through the cable clamps in the LSB frame up the rear wall over the upper rail and through the cable holes into the L1x frame.

__ 2. Tie the cable to the Op Panel cable so there is enough slack to open the door and the cable is out of the way of the operators.

__ 3. Run cable P/N 62G1208 connected to J13 on each of the PCC's in the first 8 LSB/D1x/B1x expansion frames (not L1x or RSB frames) to its L1x BIC2 PCC connector. See Figure 258 for the BIC2 PCC connector assignments. Refer to Figure 253 on page INST-77 for the library frame numbers.

Notes:

a. Remove the jumper P/N 62G1195 from the connector and store it in the L1x frame. The jumper may be needed to help isolate PCC problems or for library reconfiguration.

b. If you have any S10 expansion frames, leave jumper P/N 62G1195 in it's PCC connector.

c. PCC J13 for the frames containing the library managers (L1x and RSB) is connected directly to the DSW2 or DBF2 card respectively in the factory. The cable connections are L1x PCC J13 to L1x DSW J8 and RSB PCC J13 to RSB DBF J8.

d. The unit emergency LEDs on the UEP2 card correspond to the connectors on the BIC2 card; therefore, if you connect them as shown in Figure 258 it will be easier to diagnose problems.

__ 4. Run cable P/N 05H6972 from each of the PCC's in the second 8 D1x/B1x expansion frames (not RSB frame) to its L1x BIC2 PCC connector. See Figure 258 for the BIC2 PCC connector assignments. Refer to Figure 253 on page INST-77 for the library frame numbers.

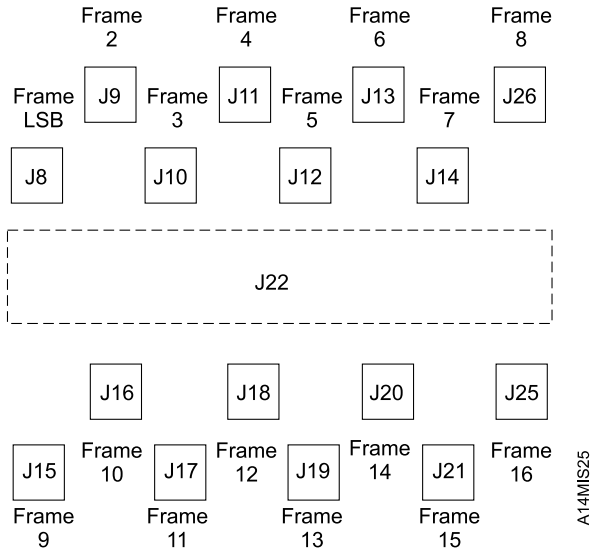


Figure 258. BIC2 Card PCC Connector Assignments

Dual Library Manager Cables

If you have a single accessor library, skip this section and continue at “ARTIC Adapter Cables” on page INST-89.

__ 1. Install the dual LM ethernet LAN cables using the following steps. Route the cables through the library aisle walls behind the X cable trough and pull the excess cable into the RSB frame.

__ a. Install the primary link ethernet cable P/N 05H2914 between LM A slot 2 and LM B slot 2. Use tape to label each end of the cable "Dual LM Primary Link".

__ b. If you are not installing a Model B18 frame with this library, install the alternate link ethernet cable P/N 05H2914 between LM A slot 1 and LM B slot 1. Use tape to label each end of the cable "Dual LM Alternate Link".

Note: If you are installing a Model B18 frame with this library, the alternate link cable will be connected in “Model B18 VTS Subsystem Cables and 3590 Model A60 LAN Attach” on page INST-105.

__ 2. Connect the ARTIC cards in LM A and LM B to the PMX cards located in the LSB frame using the following steps:

Note: Refer to the label on the PMX card bracket for the ARTIC cable connector locations.

__ a. Run cable P/N 05H8261 from ARTIC 0 PMX2 J3 to LM A ARTIC 0 (slot 6).

__ b. Run cable P/N 05H8262 from ARTIC 0 PMX2 J2 to LM B ARTIC 0 (slot 6). Route the cable through the aisle walls behind the X cable trough.

__ c. Connect the breakout box 1 cable to ARTIC 0 PMX2 J1.

__ d. Run cable P/N 05H8261 from ARTIC 1 PMX2 J3 to LM A ARTIC 1 (slot 7).

__ e. Run cable P/N 05H8262 from ARTIC 1 PMX2 J2 to LM B ARTIC 1 (slot 7). Route the cable through the aisle walls behind the X cable trough.

__ f. Connect the breakout box 2 cable to ARTIC 1 PMX2 J1.

__ 3. Run cable P/N 05H8265 from RSB frame LM B Serial Port B to L1x frame UEP2 J20. Route the cable through the aisle walls behind the X cable trough.

__ 4. Run cable P/N 05H8266 from RSB frame MIC3 J16 to L1x frame UEP2 J21. Route the cable through the aisle walls behind the X cable trough.

__ 5. Run cable P/N 49G6459 from RSB frame DBF2 J3 to L1x frame DSW2 J3. Route the cable through the aisle walls behind the X cable trough.

Note: If you don't have enough room for the cables in the wall hole of the L1x frame, you may route them into the LSB frame, through the hole and back under the barrier door to the L1x frame.

ARTIC Adapter Cables

The ARTIC card in the 3494 library manager is used to communicate with the tape subsystems (control unit and/or standalone drives), the Model B16 VTS subsystem control unit and associated tape drives, the Netstore control unit, and may also be used to communicate with direct attached hosts. See Figure 6 on page INTRO-16.

The Model B18 VTS subsystem uses a LAN instead of ARTIC ports for internal communications. If your library has a Model B18 VTS subsystem (control unit and associated tape drives) and does not have any native tape or Model B16 subsystems, skip this section and continue at “Model B18 VTS Subsystem Cables and 3590 Model A60 LAN Attach” on page INST-105.

| The 3590 Model A60 tape control unit can be attached to the library manager through an ARTIC
| connection or through an internal ethernet LAN connection. If you have 3494 L1x/D1x Feature Code 9060,
| your 3590 Model A60 is setup for LAN attach. If you have 3494 L1x/D1x Feature Code 9061, your 3590
| Model A60 is setup for RS-422 ARTIC attach. If all of your tape subsystems have a 3590 Model A60 and
| all of the frames have FC 9060, skip this section and continue at “Model B18 VTS Subsystem Cables and 3590 Model A60 LAN Attach” on page INST-105. If you have any non-VTS tape subsystems without a
| 3590 Model A60, complete this section to connect them to the ARTIC card(s).

The ARTIC cables for the native tape subsystems and the Model B16 VTS subsystem will be connected in this section. If the customer is using ARTIC RS-232 ports for any of the hosts attached to the library, they will be connected in “Cables from Hosts” on page INST-115. If the customer is using LAN connections for any of the hosts, they will connected in “Library Manager Features” on page INST-129.

Read the following sections before you start connecting the ARTIC cables. There are many configuration options, so find the configuration that the customer wants to use, complete the appropriate port assignment table in “ARTIC Port Assignments” on page INST-98 for your library configuration, and then connect your cables.

ARTIC Cards: The original ARTIC Multiport card was replaced by the ARTIC186 8 Port Adapter in all 3494 Model HA1 libraries and in single accessor libraries built after 01 July 1998. The port configurations and the required converters vary depending on the type of card you have in your library. If you are unsure which card is installed in your library, remove the cover on your library manager and refer to Figure 64 on page LOC-43 and Figure 70 on page LOC-49.

The ARTIC Multiport card and it's associated RS-422 daughter card provides 4 RS-232 ports (0-3) and 4 RS-422 ports (4-7). Converter P/N 62G2057 is used to convert RS-422 ports 4-7 to RS-232 ports and converter P/N 50G0947 is used to convert RS-232 ports 0-3 to RS-422 ports when required by the library configuration.

The ARTIC186 8 Port Adapter provides 8 ports that can be configured as either RS-232 or RS-485 (RS-422 compatible) ports by jumpering pins on the card. In a 3494 library with a Model HA1, all of the ports are configured as RS-485 ports to allow dotting of the ARTIC interfaces from each library manager to the internal subsystems and direct attached hosts. In a library with a Model HA1, converter P/N 62G2057 is used to convert the RS-485 ports to RS-232 ports as required by the library configuration.

In a single accessor library, the ARTIC186 8 port adapter is set-up in the factory with ports 0-3 jumpered as RS-232 ports and ports 4-7 jumpered as RS-485 ports. If your library requires a different configuration, refer to Figure 64 on page LOC-43 and move the jumpers for the ports that you want to change. Ensure that you record your port configuration in Figure 273 on page INST-101.

ARTIC Port Configurations: The ARTIC port configuration you are using will be setup during the teach operation later in these instructions. The configuration options are defined in this section. Determine the configuration the customer wants to use and mark it in the appropriate table in “ARTIC Port Assignments” on page INST-98 to help you make the correct selections during cabling and Teach.

The ARTIC breakout box(es) for the library manager are located behind the rear door of the 3494 L1x library control unit on the left side panel above the library manager. They are mounted with ARTIC breakout box 1 at the top and breakout box 2 (if installed) below.

The base configuration has 4 direct attached host connections and 4 control unit connections. In a dual accessor library, converter P/N 62G2057 is required for the direct attached host connections. The ports are assigned as follows:

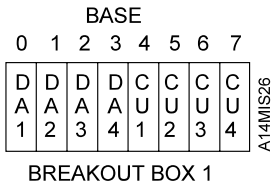


Figure 259. Base Configuration

A second ARTIC card and breakout box is added when feature 5229 is installed. This feature adds 4 more RS-232 ports for direct attached hosts and 4 more RS-422 ports for control unit connections in a single accessor library. In a dual accessor library, 8 more RS-485 ports along with 4 RS-422 to RS-232 converters P/N 62G2057 are added. With this feature, the ports are assigned as follows:

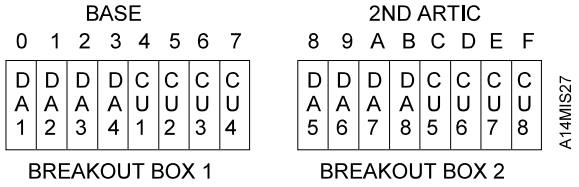


Figure 260. Base Configuration with FC 5229

The direct attach host ports are changed to control unit ports if feature 5228 is installed on the ARTIC breakout box. In a single accessor library with an ARTIC Multiport Card, this feature provides 4 RS-232 to RS-422 converters P/N 50G0947. If the library has 2 ARTIC cards, 1 or 2 5228 features may be installed allowing up to 16 control unit connections. If the library has 1 5228 feature and the 5229 feature, the 5228 feature can be installed on either breakout box. With the ARTIC186 Card, the 5228 feature is not required and the control units are connected directly to the breakout box. With this feature, the ports are assigned as follows:

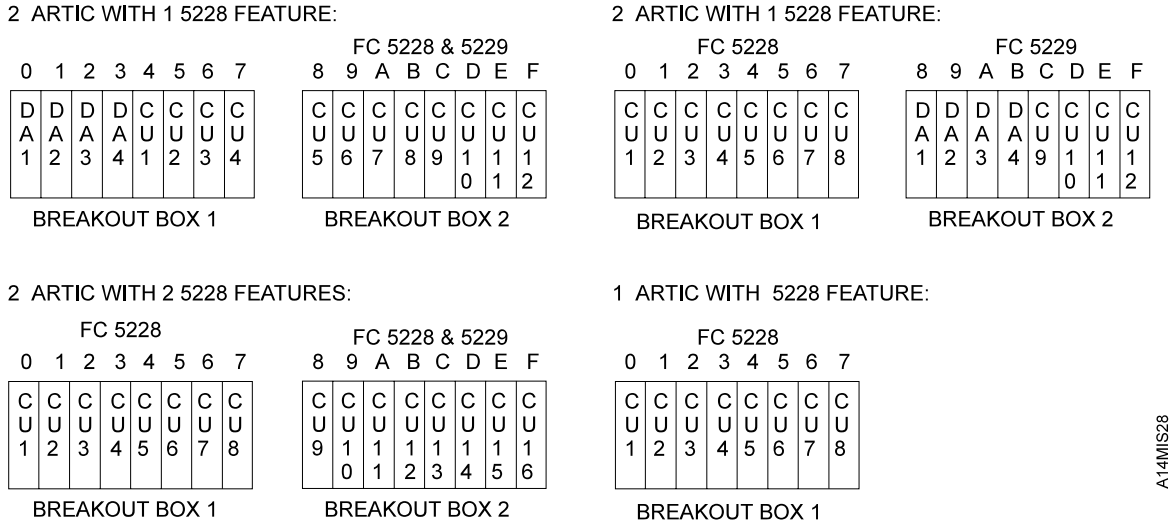


Figure 261. Base Configurations with FC 5228

Starting with the LM 513.xx level of code, a variable number of direct access ports (from 1 to 4) were allowed on the first ARTIC breakout box if the second ARTIC feature (5229) was installed along with 2 5228 features as shown in Figure 262. This was again relaxed in the LM 520.xx level of code to allow a variable number of DA ports on the first breakout box while the second breakout box has the standard configuration (4 DA, 4 CU).

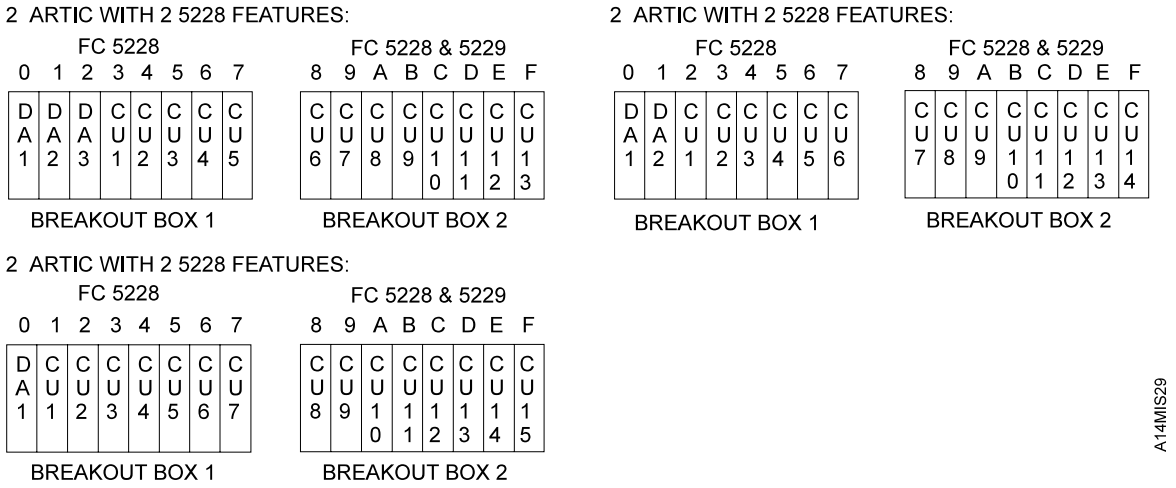


Figure 262. Variable Number of Direct Access Ports

The 3494 B16 VTS unit also has a breakout box located behind the rear door on the right side of the 7133 DASD drawers. The port assignments for the B16 breakout box are as follows:

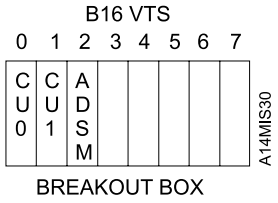


Figure 263. 3494 Model B16 Port Assignments

ARTIC Port Connection Rules: There are two basic rules for connecting the tape/VTS control units and standalone drives to the ARTIC breakout box(es). They are:

1. The control units and standalone drives must be connected in the same order as they are physically located in the library.
2. All control units and standalone drives in the library must be connected consecutively on the ARTIC control unit ports that are configured, starting with the first configured control unit port. There can be no gaps between the cable connections on CU ports.

The tape/VTS subsystem connections required to an ARTIC control unit port are defined as follows:

- 3494 L10, D10: 1 connection to the 3490 CxA control unit or 1 connection for each 3490 F1A drive.

  Note: Also, 1 RS-232 direct attach host port for the 3490 F1A controller if installed.

- 3494 L12, D12: 1 connection for each 3590 drive (including Model B16 VTS drives).
- 3494 L14, D14: 1 connection to the 3590 Axx controller.
- 3494 B16: 1 connection for VTS CU port 0 (B16 breakout port 0) and 1 connection for CU port 1 (B16 breakout port 1).

  Note: Also, 1 RS-232 direct attach host port for ADSM (B16 breakout port 2) to ARTIC port 0.

The library frames are numbered starting with the L1x frame on the left end of the library and counting to the right. Within a L12/D12 frame, the drives are numbered starting with the lower left drive. See Figure 8 on page INTRO-22.

If you have a 3494 B16 VTS in your library, it is important to note that all of the RS/6000 ports are actually RS-232 interfaces.

- In a single accessor library with ARTIC Multiport Card(s), if any Model B16 VTS cable is assigned to ARTIC ports 0-3 or 8-B (0-3 on ARTIC breakout box 2), it must be connected directly to the breakout box connector (i.e. remove the RS-232 to RS-422 converter P/N 50G0947 if installed). If either Model B16 VTS control unit 0 and 1 cable is assigned to ARTIC ports 4-7 or C-F (4-7 on ARTIC breakout box 2), an RS-422 to RS-232 converter P/N 62G2057 must be installed on the ARTIC port connector before the cable is connected. Two P/N 62G2057 converters are shipped with each 3494 B16 VTS unit in case they are needed. If you have spare converters, save them with the 3494 tools for possible future use if the library configuration is changed.
- In a single accessor library with ARTIC186 Card(s), the ports assigned to Model B16 VTS control unit ports (including ADSM) must be jumpered as RS-232 ports on the ARTIC186 card and the cables are connected directly to the breakout box.
- In a dual accessor library, all of the Model B16 VTS control unit connections, including the ADSM connection to port 0, must use the RS-422 to RS-232 converter P/N 62G2057 on the breakout box port.

Following are four examples of library configurations and the associated ARTIC port connections.

Example 1: Mixed Single Accessor Library with either ARTIC Card. See Figure 264 on page INST-94.
Example 2: VTS Model B16 Mixed Single Accessor Library with ARTIC Multiport Card. See Figure 266 on page INST-95.
Example 3: VTS Model B16 Mixed Single Accessor Library with ARTIC186 Card. See Figure 268 on page INST-96.
Example 4: Dual Accessor Library with ARTIC186 Card. See Figure 270 on page INST-97.

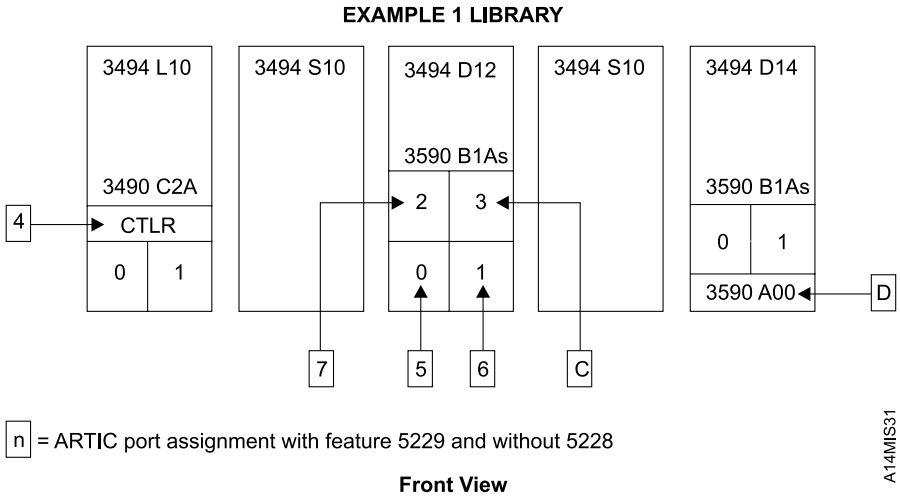


Figure 264. Example 1: Mixed Single Accessor Library with either ARTIC card

Figure 265. Example 1 ARTIC Breakout Box Port Assignments

ARTIC 1 Port/Type	ARTIC 2 Port/Type	Teach Configuration (1)	Library Frame # /Model	Device Type	Converter Required (2)
0/RS-232		DA1			
1/RS-232		DA2			
2/RS-232		DA3			
3/RS-232		DA4			
4/RS-422		CU1	1/L10	3490 C2A	None
5/RS-422		CU2	3/D12	3590 B1A 0	None
6/RS-422		CU3	3/D12	3590 B1A 1	None
7/RS-422		CU4	3/D12	3590 B1A 2	None
	8/RS-232	DA5			
	9/RS-232	DA6			
	A/RS-232	DA7			
	B/RS-232	DA8			
	C/RS-422	CU5	3/D12	3590 B1A 3	None
	D/RS-422	CU6	5/D14	3590 A00	None
	E/RS-422	CU7			
	F/RS-422	CU8			

Note:

1. Refer to “ARTIC Port Configurations” on page INST-90.
2. Refer to “ARTIC Port Connection Rules” on page INST-93.

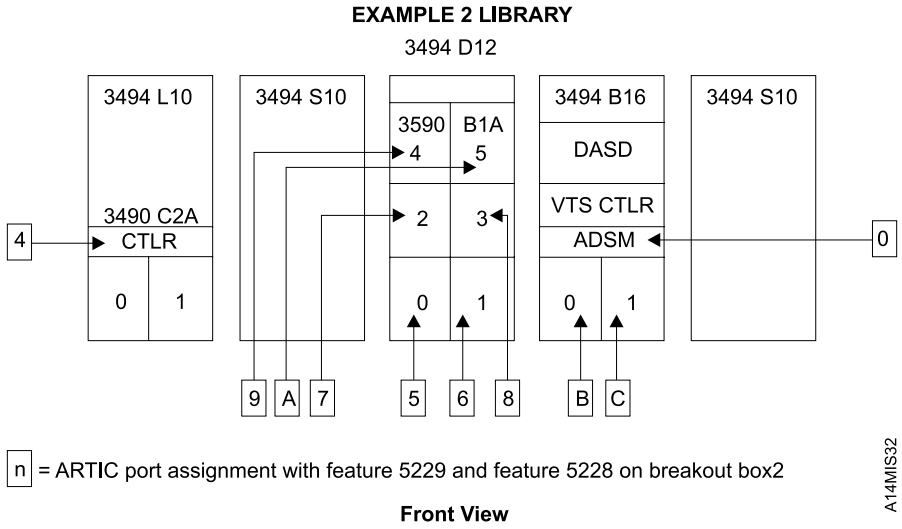


Figure 266. Example 2: VTS Model B16 Mixed Single Accessor Library with ARTIC Multiport Card

Figure 267. Example 2 ARTIC Breakout Box Port Assignments

ARTIC 1 Port/Type	ARTIC 2 Port/Type	Teach Configuration (1)	Library Frame # /Model	Device Type	Converter Required (2)
0/RS-232		DA1	4/B16	ADSM	None
1/RS-232		DA2			
2/RS-232		DA3			
3/RS-232		DA4			
4/RS-422		CU1	1/L10	3490 C2A	None
5/RS-422		CU2	3/D12	3590 B1A 0	None
6/RS-422		CU3	3/D12	3590 B1A 1	None
7/RS-422		CU4	3/D12	3590 B1A 2	None
	8/RS-232	CU5	3/D12	3590 B1A 3	50G0947
	9/RS-232	CU6	3/D12	3590 B1A 4	50G0947
	A/RS-232	CU7	3/D12	3590 B1A 5	50G0947
	B/RS-232	CU8	4/B16	VTS CU0	None
	C/RS-422	CU9	4/B16	VTS CU1	62G2057
	D/RS-422	CU10			
	E/RS-422	CU11			
	F/RS-422	CU12			

Note:

1. Refer to “ARTIC Port Configurations” on page INST-90.
2. Refer to “ARTIC Port Connection Rules” on page INST-93.

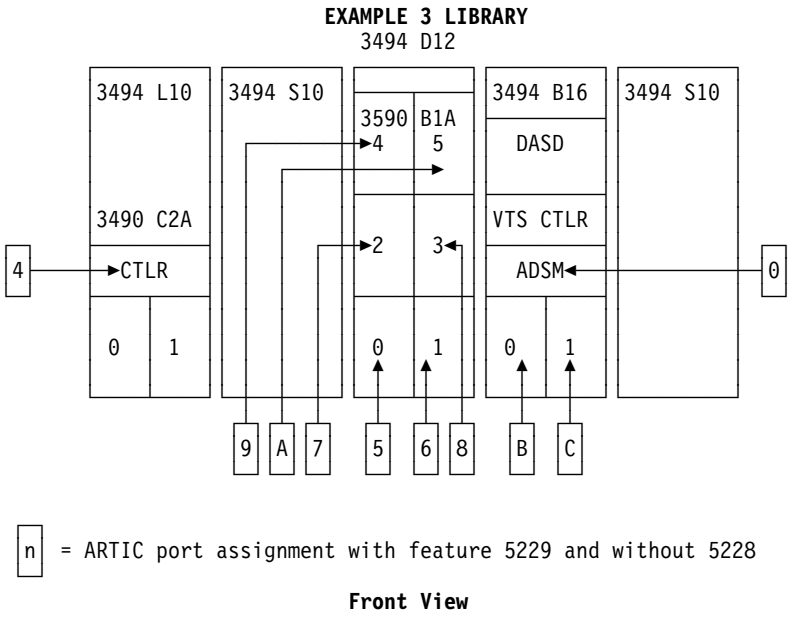


Figure 268. Example 3: VTS Model B16 Mixed Single Accessor Library with ARTIC186 Card

Figure 269. Example 3 ARTIC Breakout Box Port Assignments

ARTIC 1 Port/Type	ARTIC 2 Port/Type	Teach Configuration (1)	Library Frame # /Model	Device Type	Converter Required (2)
0/RS-232		DA1	4/B16	ADSM	None
1/RS-232		DA2			
2/RS-232		DA3			
3/RS-232		DA4			
4/RS-485		CU1	1/L10	3490 C2A	None
5/RS-485		CU2	3/D12	3590 B1A 0	None
6/RS-485		CU3	3/D12	3590 B1A 1	None
7/RS-485		CU4	3/D12	3590 B1A 2	None
	8/RS-485	CU5	3/D12	3590 B1A 3	none
	9/RS-485	CU6	3/D12	3590 B1A 4	none
	A/RS-485	CU7	3/D12	3590 B1A 5	none
	B/RS-232	CU8	4/B16	VTS CU0	None
	C/RS-232	CU9	4/B16	VTS CU1	none
	D/RS-485	CU10			
	E/RS-485	CU11			
	F/RS-485	CU12			

Note:

1. Refer to “ARTIC Port Configurations” on page INST-90.
2. Refer to “ARTIC Port Connection Rules” on page INST-93.

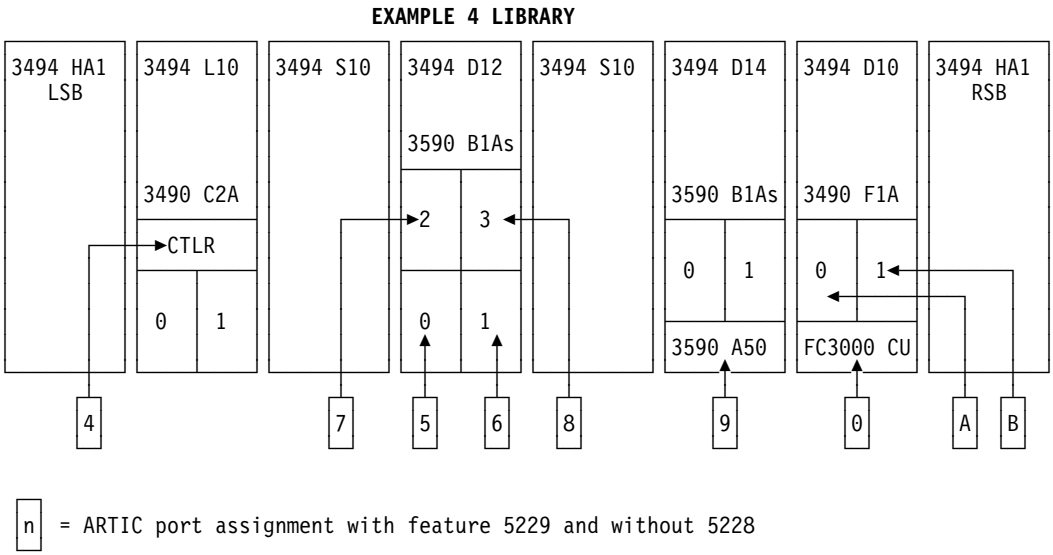


Figure 270. Example 4: Dual Accessor Library with ARTIC186 card

Figure 271. Example 4 ARTIC Breakout Box Port Assignments

ARTIC 1 Port/Type	ARTIC 2 Port/Type	Teach Configuration (1)	Library Frame # /Model	Device Type	Converter Required (2)
0/RS-485		DA1	6/D10	3490 F1A CU	62G2057
1/RS-485		DA2			
2/RS-485		DA3			
3/RS-485		DA4			
4/RS-485		CU1	1/L10	3490 C2A	None
5/RS-485		CU2	3/D12	3590 B1A 0	None
6/RS-485		CU3	3/D12	3590 B1A 1	None
7/RS-485		CU4	3/D12	3590 B1A 2	None
	8/RS-485	CU5	3/D12	3590 B1A 3	none
	9/RS-485	CU6	5/D14	3590 A50	none
	A/RS-485	CU7	6/D10	3490 F1A 0	none
	B/RS-485	CU8	6/D10	3490 F1A 1	none
	C/RS-485	CU9			
	D/RS-485	CU10			
	E/RS-485	CU11			
	F/RS-485	CU12			

Note:

1. Refer to “ARTIC Port Configurations” on page INST-90.
2. Refer to “ARTIC Port Connection Rules” on page INST-93.

ARTIC Port Assignments: If you have a dual accessor library, go to "Dual Accessor Library" on page INST-102. If you have a single accessor library with the ARTIC Multiport Card, continue at "Single Accessor Library with ARTIC Multiport Card." If you have a single accessor library with the ARTIC186 Card, continue at "Single Accessor Library with ARTIC186 Card" on page INST-100.

Single Accessor Library with ARTIC Multiport Card

Complete the table in Figure 272 on page INST-99 for the single accessor library configuration you are installing.

__ 1. Fill in the library teach configuration port assignments from "ARTIC Port Configurations" on page INST-90.

__ 2. If you have a 3494 B16 VTS control unit, fill in the following information on the ARTIC 1 Port 0 line:

   __ a. Put (frame #)/B16 in the Library Frame #/Model field.

   __ b. Put **ADSM** in the Device Type field.

   __ c. Put **None** in the Converter Required field.

__ 3. If you have any 3490 F1A controllers, fill in the following information on a Direct Attach Port line for each controller:

   __ a. Put (frame #)/(model #) in the Library Frame #/Model field.

   __ b. Put **3490 F1A CU** in the Device Type field.

   __ c. Put **None** in the Converter Required field.

__ 4. Fill in the following information on the line for the first CU port in your Teach Configuration:

   __ a. Put in the frame #/Model of the first library frame containing a tape CU, standalone device, or Model B16 VTS drive.

   __ b. Put in the device type of the first tape CU, standalone device, or Model B16 VTS drive in the library.

   __ c. If the first CU port in your Teach Configuration is a RS-232 type port, put **50G0947** in the Converter Required field.

   __ d. If the first CU port in your Teach Configuration is a RS-422 type port, put **None** in the Converter Required field.

__ 5. Fill in the information for the next tape/B16 VTS CU, standalone device, or Model B16 VTS drive in the library (or frame) on the line for the next CU port in your Teach Configuration.

   Notes:

   a. If it is a Model B16 VTS CU and the port type is RS-422, put converter **62G2057** in the Converter Required field.

   b. If it is a Model B16 VTS CU and the port type is RS-232, put **None** in the Converter Required field.

   c. If it is a tape CU, standalone tape drive, or Model B16 VTS drive and the port type is RS-232, put converter **50G0947** in the Converter Required field.

   d. If it is a tape CU, standalone tape device, or Model B16 VTS drive and the port type is RS-422, put **None** in the Converter Required field.

__ 6. Complete the table for the remaining tape/B16 VTS control units, standalone drives, or Model B16 VTS drives in the library.

Figure 272. 3494 ARTIC Breakout Box Port Assignments, Single Accessor Library

ARTIC 1 Port/Type	ARTIC 2 Port/Type	Teach Configuration (1)	Library Frame # /Model	Device Type	Converter Required (2)
0/RS-232					
1/RS-232					
2/RS-232					
3/RS-232					
4/RS-422					
5/RS-422					
6/RS-422					
7/RS-422					
	8/RS-232				
	9/RS-232				
	A/RS-232				
	B/RS-232				
	C/RS-422				
	D/RS-422				
	E/RS-422				
	F/RS-422				

Note:

1. Refer to “ARTIC Port Configurations” on page INST-90.
2. Refer to “ARTIC Port Connection Rules” on page INST-93.

Single Accessor Library with ARTIC186 Card

Complete the table in Figure 273 on page INST-101 for the single accessor library configuration you are installing.

__ 1. Fill in the library teach configuration port assignments from “ARTIC Port Configurations” on page INST-90.

__ 2. If you have a 3494 B16 VTS control unit, fill in the following information on the ARTIC 1 Port 0 line:

   __ a. Put **232** in the ARTIC Port/Type field.

   __ b. Put (frame #)/B16 in the Library Frame #/Model field.

   __ c. Put **ADSM** in the Device Type field.

   __ d. Put **None** in the Converter Required field.

__ 3. If you have any 3490 F1A controllers, fill in the following information on a Direct Attach Port line for each controller:

   __ a. Put **232** in the ARTIC Port/Type field.

   __ b. Put (frame #)/(model #) in the Library Frame #/Model field.

   __ c. Put **3490 F1A CU** in the Device Type field.

   __ d. Put **None** in the Converter Required field.

__ 4. Fill in the following information on the line for the first CU port in your Teach Configuration:

   __ a. Put in the frame #/Model of the first library frame containing a tape CU, standalone device, or Model B16 VTS CU/drive.

   __ b. Put in the device type of the first tape CU, standalone device, or Model B16 VTS CU/drive in the library.

   __ c. If the device is a Model B16 VTS CU, put **232** in the ARTIC Port/Type field.

   __ d. If the device is a 3490/3590 tape drive or controller, put **485** in the ARTIC Port/Type field.

   __ e. Put **None** in the Converter Required field.

__ 5. Complete the table as described in the previous step for the remaining tape/B16 VTS control units, standalone drives, or Model B16 VTS drives in the library.

__ 6. Fill in the ARTIC Port/Type field for unused ports as follows:

   __ a. Enter **232** if it is designated a Direct Attach (DA) port.

   __ b. Enter **485** if it is designated a Control Unit (CU) port.

Figure 273. 3494 ARTIC Breakout Box Port Assignments, Single Accessor Library

ARTIC 1 Port/Type	ARTIC 2 Port/Type	Teach Configuration (1)	Library Frame # /Model	Device Type	Converter Required (2)
0/RS-					
1/RS-					
2/RS-					
3/RS-					
4/RS-					
5/RS-					
6/RS-					
7/RS-					
	8/RS-				
	9/RS-				
	A/RS-				
	B/RS-				
	C/RS-				
	D/RS-				
	E/RS-				
	F/RS-				

Note:

1. Refer to “ARTIC Port Configurations” on page INST-90.
2. Refer to “ARTIC Port Connection Rules” on page INST-93.

Dual Accessor Library

Complete the table in Figure 274 on page INST-103 for the dual accessor library configuration you are installing.

__ 1. Fill in the library teach configuration port assignments from “ARTIC Port Configurations” on page INST-90.

__ 2. If you have a 3494 B16 VTS control unit, fill in the following information on the ARTIC 1 Port 0 line:

   __ a. Put (frame #)/B16 in the Library Frame #/Model field.

   __ b. Put **ADSM** in the Device Type field.

   __ c. Put **62G2057** in the Converter Required field.

__ 3. If you have any 3490 F1A controllers, fill in the following information on a Direct Attach Port line for each controller:

   __ a. Put (frame #)/(model #) in the Library Frame #/Model field.

   __ b. Put **3490 F1A CU** in the Device Type field.

   __ c. Put **62G2057** in the Converter Required field.

__ 4. Fill in the following information on the line for the first CU port in your Teach Configuration:

   __ a. Put in the frame #/Model of the first library frame containing a tape CU, standalone device, or Model B16 VTS drive.

   __ b. Put in the device type of the first tape CU, standalone device, or Model B16 VTS drive in the library.

   __ c. Put **None** in the Converter Required field.

__ 5. Fill in the information for the next tape/B16 VTS CU, standalone device, or Model B16 VTS drive in the library (or frame) on the line for the next CU port in your Teach Configuration.

   Notes:

   a. If it is a Model B16 VTS CU, put converter **62G2057** in the Converter Required field.

   b. If it is a tape CU, standalone tape device, or Model B16 VTS drive, put **None** in the Converter Required field.

__ 6. Complete the table for the remaining tape/B16 VTS control units, standalone drives, or Model B16 VTS drives in the library.

Figure 274. 3494 ARTIC Breakout Box Port Assignments, Dual Accessor Library

ARTIC 1 Port/Type	ARTIC 2 Port/Type	Teach Configuration (1)	Library Frame # /Model	Device Type	Converter Required (2)
0/RS-485					
1/RS-485					
2/RS-485					
3/RS-485					
4/RS-485					
5/RS-485					
6/RS-485					
7/RS-485					
	8/RS-485				
	9/RS-485				
	A/RS-485				
	B/RS-485				
	C/RS-485				
	D/RS-485				
	E/RS-485				
	F/RS-485				

Note:

1. Refer to “ARTIC Port Configurations” on page INST-90.
2. Refer to “ARTIC Port Connection Rules” on page INST-93.

ARTIC Cable Procedure: See Figure 275.

__ 1. If you have a single accessor library with ARTIC186 cards and you have modified the base configuration (port 0-3 = RS-232 and port 4-7 = RS-485), remove the card(s) from the library manager, change the port jumpers to match the ARTIC Port/Type assignments in Figure 273 on page INST-101, and re-install the card(s). Refer to “ARTIC186 8 Port Adapter” on page LOC-42 for the jumper positions.

__ 2. Locate the cable connected to the first (or next) tape/B16 VTS CU, standalone drive, or Model B16 VTS drive **2** and route the cable to the ARTIC breakout box **1** in the L1x library control unit. Ensure that the cable does not interfere with the tape drive sleeve.

Note: Carefully push the existing cables to the side and work the cable connector through the L1x frame hole **3**. 15 tape subsystem ARTIC and service cables will just fit through the 30 mm (1.2 in) by 75 mm (3 in) hole in L1x frames built before November 1996.

__ 3. If required, install the converter defined in Figure 272 on page INST-99 in the breakout box port for this unit.

__ 4. Connect the cable to the ARTIC port assigned in Figure 272 on page INST-99 for this unit. See Figure 55 on page LOC-33 for the breakout box location.

Notes:

a. Use extension cable P/N 05H3256 for each 3590 Axx, standalone 3590 B1A/E1A, 3490 CxA, and 3490 F1A located in frames 9-16.

b. Use extension cable P/N 05H7878 for each 3490 FC 3000 control unit located in frames 9-16. Use null modem P/N 05H7876 to connect this cable to the control unit cable.

__ 5. Coil and store the excess cable length in the L1x frame.

__ 6. Remove the shrink tubing from the cable at the clamp area **3** and clamp the braided area of the cable. Get the clamp from the frame that the cable came from. If there are no more unused clamps in the D1x or B1x frame, you can put up to three cables in one clamp. Refer to Figure 250 on page INST-72.

__ 7. Repeat steps 2 through 6 for the next unit.

__ 8. Put the tape drives in their closed positions.

__ 9. Put the cables in the appropriate cable clamps provided along the side of the L1x frame. Ensure that they do not interfere with the movement of the tape subsystem units.

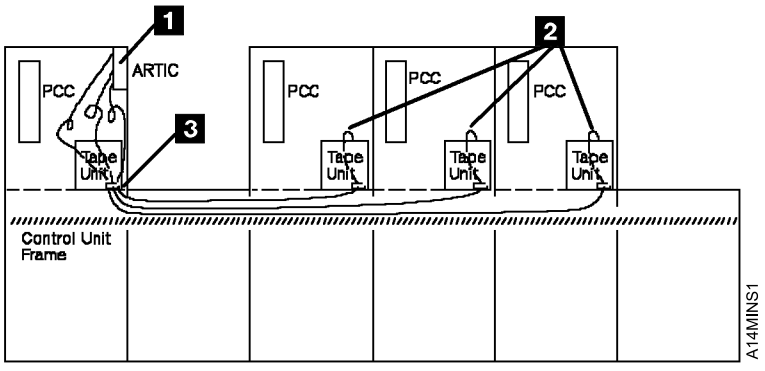


Figure 275. Cables from ARTIC Adapter to Tape Subsystems

Model B18 VTS Subsystem Cables and 3590 Model A60 LAN Attach

If your library does not have a Model B18 VTS subsystem or a LAN attached 3590 Model A60, skip this section and continue at "Service Panel and Cables" on page INST-107.

The internal ethernet LAN switch is located in either the Model L1x frame of a single LM library or the Model HA1 Left Service Bay (LSB) frame of a dual LM library. It is behind the rear door on a shelf at the top of the frame.

See Figure 276 on page INST-106.

__ 1. If you have a Model HA1 and the LAN switch **2** is installed in the Model L1x frame, relocate the LAN switch as follows:
   __ a. Unplug the switch power cord and LM A EtherJet cable.
   __ b. Remove 2 screws securing the switch support plate to the support brackets and slide the switch support plate out of the frame. Do not remove switch from plate.
   __ c. Loosen 2 screws in each support bracket and remove the 2 support brackets.
   __ d. Reinstall the support brackets in the same location in the LSB frame.
   __ e. Reinstall the switch support plate. Adjust the support brackets to align the holes. Ensure the 2 plate tabs are slide under the brackets before reinstalling the 2 screws to secure the plate.
   __ f. Plug the switch power cord into the LSB frame PCC and switch.

__ 2. If not factory installed, install cable P/N 05H8712 or P/N 09L4478 as follows:

   __ a. If you have a single LM library, run the supplied cable from the Etherjet card in slot 1 of the library manager **3** to port 1x on the ethernet LAN switch **2** and coil the excess cable so it does not interfere with access to the cards or service panel.

   __ b. If you have a dual LM library, run the supplied cable from the Etherjet card in slot 1 of the library manager **3** in the L1x frame to port 1x on the ethernet LAN switch in the Model HA1 Left Service Bay frame. Ensure that the cable does not interfere with the barrier door.

Label the ethernet cables with the ethernet LAN switch port position and the unit it is coming from as you install them.

__ 3. If you have a 3494 Model B18, connect the LAN ports are follows:
   __ a. Run cable P/N 05H8596 from port 3x on the ethernet LAN switch **2** under the raised floor to the ethernet card in the VTS controller **1** of the Model B18 frame.
   __ b. If you have two Model B18 VTS subsystems, run cable P/N 05H8596 from port 4x on the ethernet LAN switch **2** under the raised floor to the ethernet card in the VTS controller **1** of the second Model B18 frame.

__ 4. If you have LAN attached 3590 Model A60 control units, run cable P/N 05H8596 from each control unit ethernet card under the raised floor to the next available port (5x - 24x) on the LAN switch.

__ 5. If you have a Model HA1, run cable P/N 05H8596 from port 2x on the ethernet LAN switch **2** under the raised floor to the Etherjet card in slot 1 of the library manager (LM B) in the Model HA1 Right Service Bay frame.

See Figure 277 on page INST-106.

__ 6. Run cable P/N 49G6459 from SCSI port 0 on the VTS control unit **1** in the Model B18 frame under the floor to the associated Model D12 frame and connect it to SCSI extender 0 **2**. Put the cable behind the cable clamps on the left side of the Model D12 frame as viewed from the rear.

__ 7. Run cable P/N 49G6459 from SCSI port 1 on the VTS control unit **1** in the Model B18 frame under the floor to the associated Model D12 frame and connect it to SCSI extender 1 **3**. Put the cable behind the cable clamps on the left side of the Model D12 frame as viewed from the rear.

__ 8. If you have two Model B18 VTS subsystems, repeat step 6 and step 7 for the second VTS subsystem.

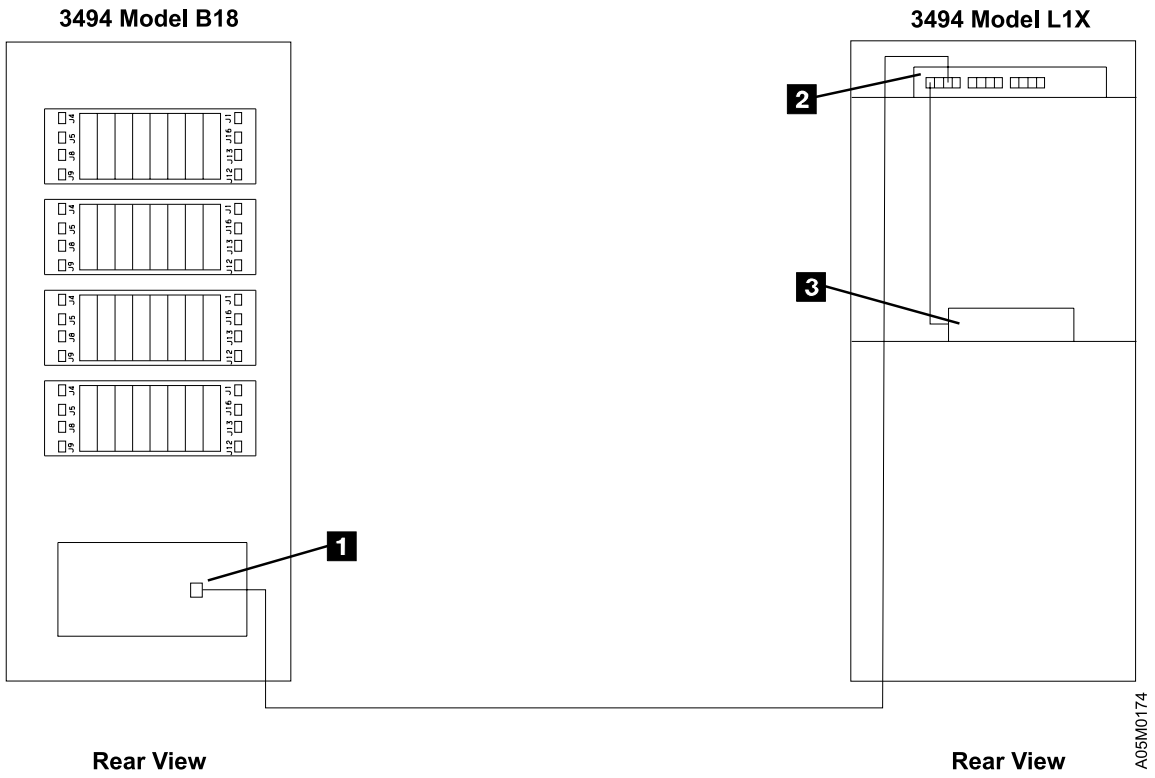


Figure 276. Model B18 Internal LAN Cables

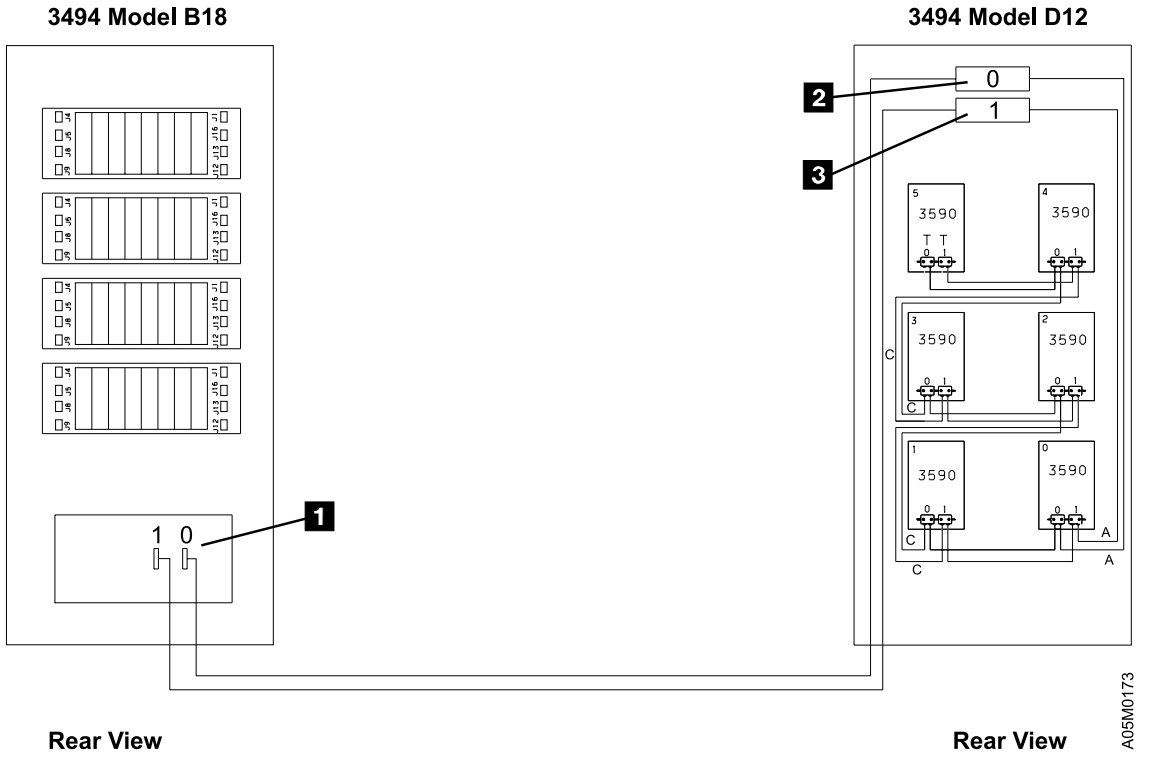


Figure 277. Model B18 SCSI Cables

Note: The VTS controller SCSI ports **1** are shown reversed for drawing clarity.

Service Panel and Cables

The 3494 Library Manager in the L1x frame may be used as a terminal to service the 3590 Model A00 tape controller or the Virtual Tape Server controller if they are installed in the library. Service cables from each controller will be run to a service panel that is installed in the L1x frame.

__ 1. Prepare the 3590 controller service panel using the following steps. This panel may be factory installed or shipped with the first B1x/D14 frame attached to the library if the L1x frame does not have the panel.

   Refer to Figure 279 on page INST-109.

   __ a. If the 3590 controller service panel **1** is not installed in the L1x frame, install the service panel P/N 05H8035 **1** above the library manager approximately mid-way between the rear of the frame and the bulkhead by sliding the service panel brackets over the top of the frame right and left side panels. The labeled side of the panel should face the rear of the frame with the FR1 position on the right side and the FR17 position on the left side as viewed from the rear of the frame.

   __ b. If your library does not have any L14, D14, or B1x frames, skip the following steps and continue at step 14 on page INST-110.

Refer to Figure 278 on page INST-108.

__ 2. Loosen the screws in the brackets so you can slip the service panel off to attach the service cables.

__ 3. If you have a L14 frame with a 3590 A00/A50 tape controller, verify that the service cable is connected to the FR1 position of the service panel. If not, run the cable up the left side of the L14 frame (as viewed from the rear of the frame), across the cable channel on the back-side of the service panel, and connect it to position FR1 using the suppled kit P/N 34G8307 (stand-off/stud, nut, and lock washer). The stand-off should be on the outside (labeled side) of the panel.

__ 4. Locate the service cable **2** connected to the first (or next) D14 or B16 library frame and route the cable to the Service Panel **1** in the L1x frame. Ensure that the cable does not interfere with the tape subsystem(s).

   Notes:

   a. Carefully push the existing cables to the side and work the cable connector through the CU frame hole **3**. 15 tape subsystem ARTIC and service cables will just fit through the 30 mm (1.2 in) by 75 mm (3 in) hole in L1x frames built before December 1996.

   b. If you have a 9-16 frame library, an extra cable P/N 05H7878 is provided for each of the B16/D14 frames in positions 9-16. Connect the two cables together using the supplied kit P/N 34G8307 to reach the service panel.

   c. If the library contains a B16 frame, two service cables are connected to the Virtual Tape Server controller. Connect the service cable from Serial Port 1 to the position on the Service Panel for the B16 frame and the service cable from Serial Port 2 to the position for the D12 frame. Example: If the D12 is the 4th frame and the B16 is the 5th frame in the library, connect the first service cable to the FR5 position and the second to the FR4 position on the service panel.

   d. If you have a B18 VTS subsystem, you may need to remove the ethernet LAN switch and shelf from the L1x frame in order to connect the cables to the service panel.

__ 5. Run the cable up the left side of the L14 frame (as viewed from the rear of the frame), across the cable channel on the back-side of the service panel, and connect it to the back of the Service Panel **1** using the supplied kit P/N 34G8307 (stand-off/stud, nut, and lock washer) according to the library frame number that it is coming from (i.e. if the D14 is the third frame in the library, connect the service cable to the FR3 position on the Service Panel). The stand-off should be on the outside (labeled side) of the panel.

__ 6. Coil and store the excess cable in the L1x frame.

__ 7. Remove the shrink tubing from the cable at the clamp area **3** and clamp the braided area of the cable. Get the clamp from the frame that the cable came from. If there are no more unused clamps in the D14 or B16 frame, you can put up to three cables in one clamp. Refer to Figure 250 on page INST-72.

__ 8. Repeat step 4 on page INST-107 through step 7 for the next D14 or B16 library frame.

__ 9. If you have any B18 frames, run cable P/N 05H8743 from each B18 VTS control unit S1 port under the floor to the next available service panel position in the L1x frame and connect the cable(s) to the panel.

__ 10. Put the cables in the cable retainers in the service panel cable channel and place the service panel in the location you want.

__ 11. Dress the cables along the left-side of the frame as appropriate using cable retainers and/or cable ties.

Note: During service or library expansion, you may need to move the service panel out of the way. Leave enough slack in the cable bundle to allow the service panel to be lifted up off of the side walls and rotated down along the left side.

__ 12. Tighten the screws in the service panel brackets.

__ 13. Put the tape drives in their closed positions.

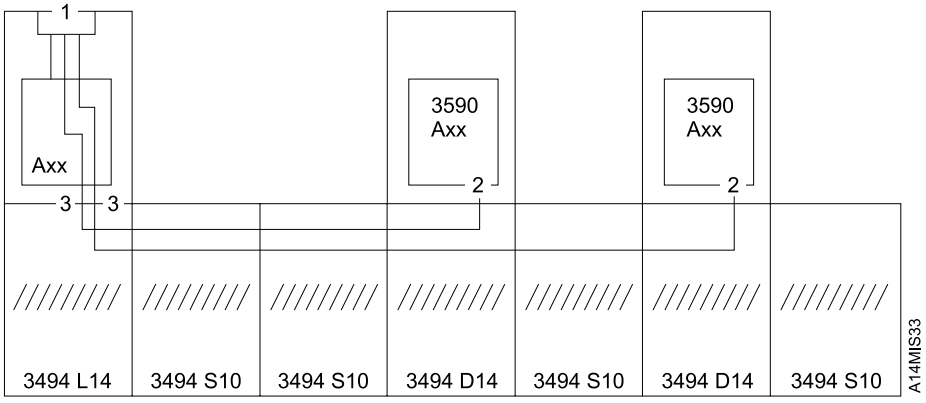


Figure 278. Service Cables

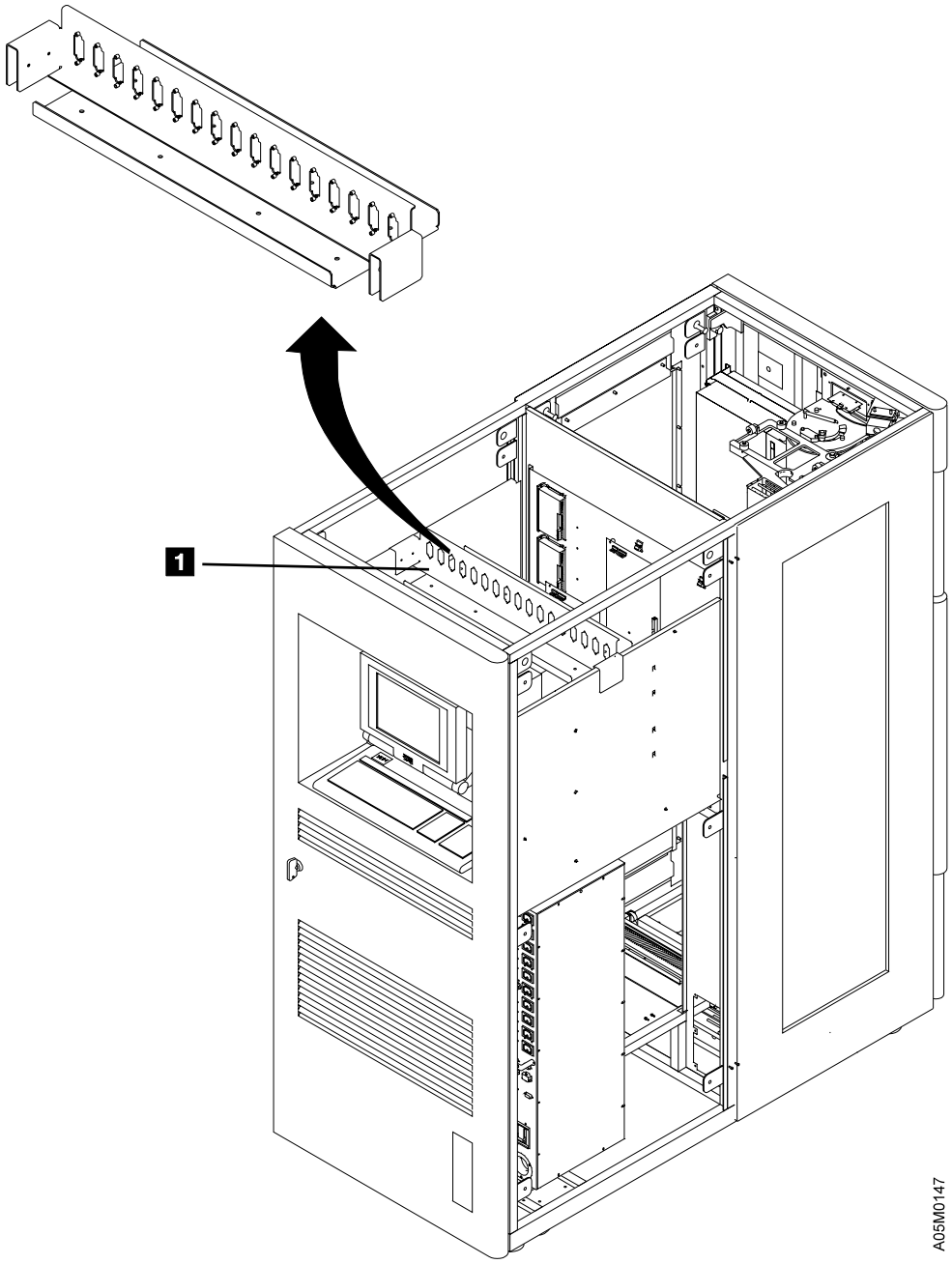


Figure 279. Service Panel in L1x Frame

__ 14. If you are installing a remote service feature, the modem and switch should be placed external to the library in a location convenient to the customer's phone line and local power.

__ 15. Connect the remote service cables for the library manager (LM) as shown in Figure 280 on page INST-112 using the gender changer P/N 05H7939 (supplied).

__ a. If the switch is not used, connect the LM directly to the modem using the appropriate connectors.

__ b. If you have a single LM, connect it to Port 2 of the switch as shown.

__ c. If you have a dual LM, connect LM A to Port 2 and LM B to Port 3 of the switch.

__ d. A Null Modem Adapter P/N 05H7876 is also provided if you want to use the library manager as a service terminal for the tape/VTS controllers. Store this adapter in the Service Panel tray for future use.

Note: The remote support connections for the tape subsystem control units and the virtual tape subsystem control units are described in the appropriate maintenance information manuals supporting the subsystems in your library. These connections will be completed during the installation checkout of the subsystems.

If your X cable has a plastic track, continue at "Cable Trough Cover" on page INST-113. Otherwise, continue at "Cables from Hosts" on page INST-115.

Key List for Figure 280 on page INST-112:

1 Adapter LDRJ-9F (9 pin to RJ45) P/N 05H9745

2 Gender Changer (25 pin F-F) P/N 05H7939

3 Cable (9 pin to 25 pin) P/N 05H3299

4 Cable (8 conductor RJ45) 150 foot P/N 05H9744

5 Cable (25 pin to 25 pin) if L1x use P/N 05H8038; if D1x/B16 use P/N 05H7878.

6 Adapter LDRJ-25M (25 pin to RJ45) P/N 05H9746

8 Y Cable P/N 32F4128 or 31F4126

9 Cable (6 conductor RJ12) 100 foot P/N 05H3352

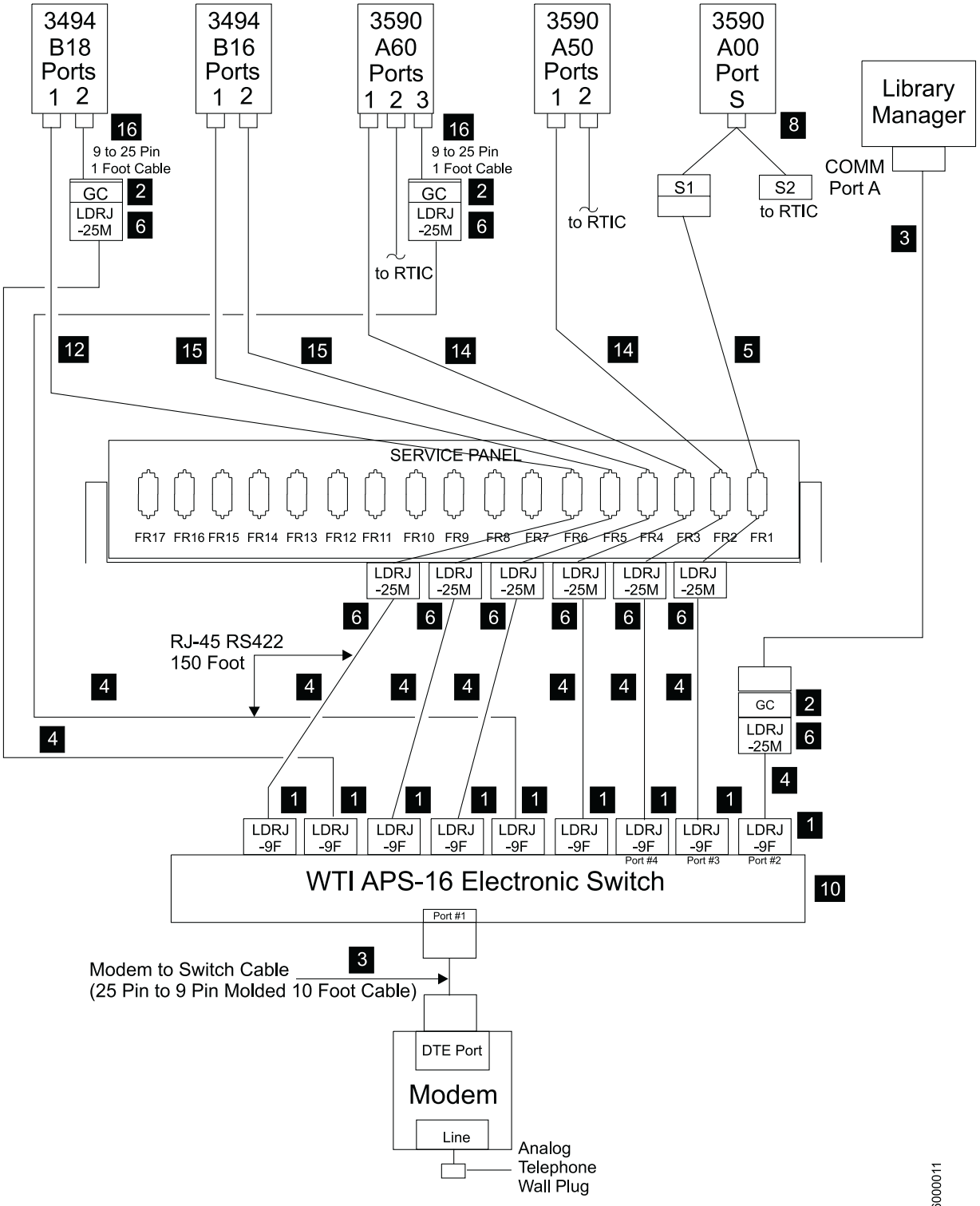
10 WTI Data Switch Model APS-16 P/N 05H9742

12 Cable (9 pin to 25 pin) P/N 05H8743

14 Cable (9 pin to 25 pin) P/N 05H2943

15 Cable (25 pin to 25 pin) P/N 05H7878

16 Cable (9 pin to 25 pin) 1 foot P/N 40H6328



Remote Assistance Feature Using WTI APS-16 Data Switch

Figure 280. Remote Service Connections

Cable Trough Cover

If your X cable does not have a plastic track, go to “Cables from Hosts” on page INST-115.

__ 1. Install cable trough cover P/N 05H7964 **1** in the left end frame (LSB or L1x frame) using the following steps. This cover is 690 mm (27.2 in) long and it **does not** have a tab on the left end.

__ a. Move the accessor to the right into frame 2.

__ b. Start 2 screws P/N 1624766 in the cover holes on the back wall of the cable trough.

__ c. Slip the slotted trough cover mounting holes over the screws, slide the cover back against the screws, and tighten the 2 screws.

__ d. Move the accessor into the frame and ensure that the cover is not touching the accessor and that the accessor can move freely.

__ 2. Install the expansion frame cable trough cover P/N 05H7965 **2** in the remaining frames (starting with frame 2) using the following steps. This cover is 750 mm (29.5 in) long and it has a tab on the left end.

__ a. If you have dual accessors, move accessor B into the previous frame after you have installed the trough cover in the previous frame.

__ b. Start 2 screws P/N 1624766 in the cover holes on the back wall of the cable trough.

__ c. Slip the slotted mounting holes over the screws and slide the cover back against the screws until the cover tab slot is aligned with the hole in the previous cover.

__ d. Install screw P/N 1624763 in the cover tab and tighten the 3 screws.

Note: Ensure that the short screw P/N 1624763 is used in the cover tab so it does not protrude through the cover and damage the X-axis cable.

__ 3. Move the accessor(s) from one end of the library to the other and ensure that the accessor(s) does not rub on the cover in any frame.

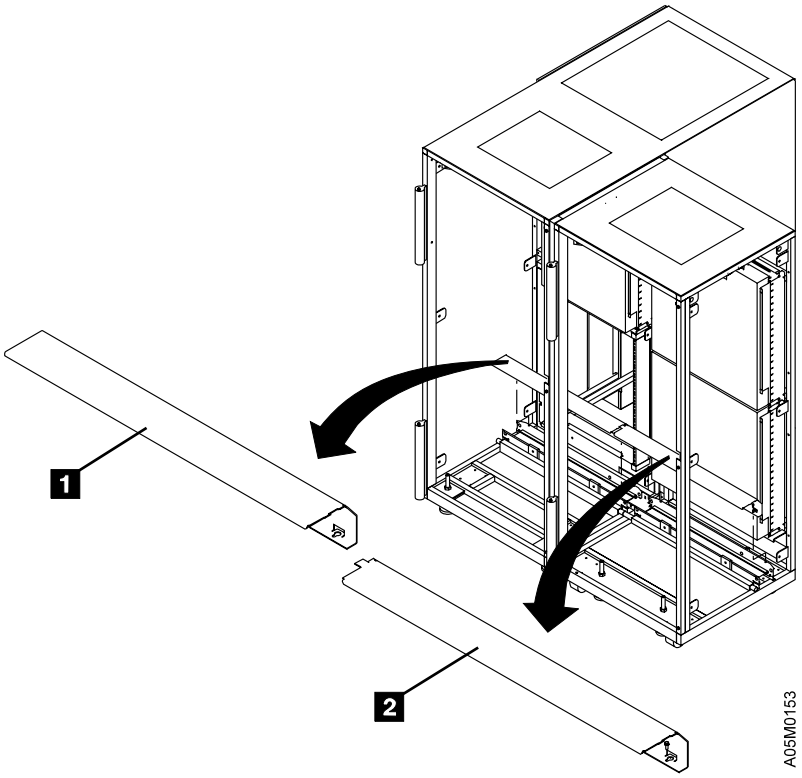


Figure 281. Cable Trough Cover

Cables from Hosts

If you only installed a Storage Unit frame on an existing library, go to “Checkout” on page INST-120.

The 3 types of cables that connect the host and the 3494 (depending on the features you are installing) are:

- Host to Tape Subsystem:
  - Parallel channel
  - ESCON channel
  - SCSI attachment
- Host to 3494 Library Manager:
  - RS-232 host attachment
  - LAN host attachment
- AS/400 Remote Power Control

Host to Tape Subsystem: The host cables to the tape subsystems will be attached during the tape subsystem checkout in the **Checkout** section of these instructions.

Host to 3494 Library Manager: If you are not installing an RS-232 or a LAN host attachment feature, go to “AS/400 Remote Power Control” on page INST-117.

__ 1. Give the library device driver software package to the customer for installation on the host systems. Each package contains a User’s Guide and software (diskettes or tape).

__ 2. If a LAN adapter feature was ordered with the library, the feature package should be included in the box containing the manuals and tools. The features will be installed after the base library has been installed and checked out.

__ 3. If you are not installing an RS-232 host attachment, go to “AS/400 Remote Power Control” on page INST-117. Connect the cables to the host RS-232 ports assigned by the customer for the 3494 attachment.

__ a. If you have the RISC System/6000 Host Attachment feature (FC 5212), connect the host end of the 15-m (50-ft) cable to the host S2 connector (serial port cable).

Note: A screw kit P/N 34G8307 is supplied with the cable to convert the cable plug to attach to the host connector.

__ b. If you have the Sun Host Attachment feature (FC 5217), a gender-changer is required to connect the cable to the Sun host. Install the gender-changer (supplied with the feature) before connecting the cable.

__ c. If you have the AS/400 Host Attachment feature (FC 5211), connect the host end of the 15-m (50-ft) cable to the (black) 25-pin cable (P/N 21F5148, 21F9348, or 22F0149) that connects to the AS/400 RS-232 IOP. The (black) cable is required because it swaps some signals around for the AS/400 IOP.

__ d. If you have the Extended Length RS-232 AS/400 Host Attachment feature (FC 5213), connect the RS-232 side of the converter to the host (black) cable connector (see previous step) and the host end of the 122-m (400-ft) cable to the RS-422 side of the converter.

__ 4. Run the cable from each host to the 3494 control unit frame. Route the cables through the cable clamps provided for the ARTIC cables. The clamps and the ARTIC breakout box are located inside the rear door of the control unit frame on the left side.

__ 5. Connect the cable from each host to the ARTIC breakout box. The ARTIC ports are assigned as follows:

Port 0 Host 1
Port 1 Host 2
Port 2 Host 3
Port 3 Host 4
Port 8 Host 5 (Port 0 on Breakout Box 2) (feature)
Port 9 Host 6 (Port 1 on Breakout Box 2) (feature)
Port A Host 7 (Port 2 on Breakout Box 2) (feature)
Port B Host 8 (Port 3 on Breakout Box 2) (feature)

__ a. Write the host ID and the 3494 port number on the cable label in the space provided.

__ b. If you have the 15-m (50-ft) cable, connect the 3494 port end to the ARTIC port connector as follows:

__ 1) If you have a single library manager, connect the cable directly to the breakout box connector.

__ 2) If you have a dual library manager, install the RS-422 side of converter P/N 62G2057 (supplied) on the breakout box connector, then connect the cable to the converter.

__ c. If you have the 122-m (400-ft) cable, connect the 3494 port end to the ARTIC port connector as follows:

__ 1) If you have a single library manager, install the RS-232 side of the converter P/N 50G0947 (supplied) on the ARTIC port connector, then connect the cable to the converter.

__ 2) If you have a dual library manager, connect the cable directly to the breakout box connector.

Notes:

a. If feature 5228 is installed, ports 0-3 and/or ports 8-B are used for tape subsystem connections instead of host connections.

b. If a B16 frame is in the library, port 0 is used for the Virtual Tape Server ADSM port.

c. If there are any 3490 F1A controllers in the library, each of them must be connected to a direct attach host port.

AS/400 Remote Power Control: If you are not installing the AS/400 Remote Power Control Sequence feature, go to "High-Capacity Output or Input/Output."

__ 1. Connect the host end of the cable to the controlling AS/400 9406 or 9309 rack as requested by the customer. See host documentation for PCC location and type.

   __ a. If you have a Stage 1 Power Control Compartment (PCC), connect the host end of the cable to J10.

   __ b. If you have a Stage 2 Power Control Compartment (PCC), connect the host end of the cable to J18.

   __ c. Connect the cable ground strap to the lower PCC mounting bracket using the existing mounting screw and washers.

__ 2. Run the cable from each host to the 3494 control unit frame. The cable should be 122 m (400 ft) long if you installed FC 5213 and 15 m (50 ft) long if you installed FC 5211.

__ 3. Eight host connectors (host 1–8) are provided on the 3494 RPC card. Write the host number assigned for each host cable on the cable label in the space provided. Assign the host cables in order, starting with host 1.

__ 4. Connect the 3494 RPC end of the cable to the appropriate J9 connector (host 1–8) on the RPC card located behind the rear door of the control unit frame at the right side of the PCC.

__ 5. Connect each cable ground strap to the associated frame ground point by using the screw and star washer supplied with the cable.

High-Capacity Output or Input/Output

If the customer does not want a High-Capacity Output or Input/Output Station defined, go to "Voltage Checks" on page INST-118.

Two different types of high-capacity cartridge handling facilities may be defined: high-capacity output facility or high-capacity input/output facility. Only one high-capacity cartridge handling facility can be defined in the library. Refer to "High-Capacity Output or Input/Output Facility" on page INTRO-10 for a description of each type.

If the customer is defining a high-capacity output area on the control unit frame door, go to step 1.

If the customer is defining a high-capacity input/output area in an expansion frame, go to step 2.

__ 1. Label the High-Capacity Output cells on the door that the customer wants reserved (10, 20, 40, 80, or full door). Use labels P/N 94F6844 provided with each control unit frame. Start with '1' on the side of the top cartridge cell 2A1 and continue down the side of the A column cells reserved for output, numbering them consecutively. The label number on each cell should match the row number of the cell. Refer to the *3494 Operator's Guide* if you need more information on the High-Capacity Output Facility.

__ 2. Note the number of cells to be reserved and their location._____

Voltage Checks

The 3494 is designed for connection to IT (impedance-grounded neutral) power subsystems.

Warning: High grounding conductor current. Grounding circuit continuity is vital for safe operation of machine. Never operate machine with grounding conductor disconnected.

__ 1. Determine the type of connector on the customer receptacle.

Note: In some World Trade countries no connector is used and the cable is wired directly to the building power source.

CAUTION:
If any of the conditions in the following text are not as described, *do not proceed with the installation and do not allow anyone to come into contact with the metal parts*. Contact the customer to have the improper voltage or resistance conditions corrected before proceeding. (C02)

DANGER

Use only test probes to touch the shell of a metal outlet until the customer corrects any improper voltage or resistance. (D01)

__ 2. If the outlet case is conductive (metal), measure for 0 V ac from building ground to the outlet case. For details, see “Safe-to-Handle Check” under “Miscellaneous Safety Tips” in *Electrical Safety for IBM Customer Engineers*.

__ 3. Measure for 0 V ac from the ground pin of the outlet to building ground. For details, see “Power Receptacle Safety Check” in *Electrical Safety for IBM Customer Engineers*.

__ 4. Measure for less than 1-ohm resistance from the ground pin of the outlet to building ground and from the ground pin of the machine power cord to each frame in the library.

Note: Digital meters may give unstable readings if leakage current is flowing in the building ground circuit. If the reading is unstable or is greater than 1 ohm, contact your installation planning representative.

__ 5. Measure the customer-supplied voltage. The nominal voltage is single-phase 200 to 240 V ac. The minimum is 180 V ac and the maximum is 259 V ac RMS. Write the voltage here:

L1x: _____ V ac

__ 6. Repeat the previous steps for each of the expansion frames. Write the voltages here:

LSB: _____ V ac	Frm 2: _____ V ac	Frm 3: _____ V ac	Frm 4: _____ V ac
Frm 5: _____ V ac	Frm 6: _____ V ac	Frm 7: _____ V ac	Frm 8: _____ V ac
Frm 9: _____ V ac	Frm10: _____ V ac	Frm11: _____ V ac	Frm12: _____ V ac
Frm13: _____ V ac	Frm14: _____ V ac	Frm15: _____ V ac	Frm16: _____ V ac
RSB: _____ V ac	B18-1: _____ V ac	B18-2: _____ V ac	: _____ V ac

__ 7. Have the customer switch off the branch circuit CBs before connecting the machine power cord into the outlets.

__ 8. Connect customer power to the L1x frame, the B1x/D1x expansion frames, and the HA1 service bay frames as follows:

  __ a. Ensure that the CB1 circuit breaker on the Power Control Compartment (PCC) located behind the rear door is set to Off.

  __ b. Ensure that the power cord is locked into the PCC socket.

  __ c. Connect the power cord to the customer's outlet.

__ 9. Have the customer switch on the branch circuit CBs.

Checkout

__ 1. Install the CE cartridge(s) in the control unit frame for a single accessor library or in the service bay frames for a dual accessor library. The correct type of CE cartridge (3490 or 3590) must be installed for the type of tape drives in the library. If you have one type of tape drive, you will have one CE cartridge for each accessor. If you have both types of tape drives, you will have two CE cartridges for each accessor.

   Put the CE cartridge(s) in the cartridge location shown in Figure 282 for your library configuration.

Figure 282. CE Cartridge Locations by Library Configuration

CE Cartridge Type/Label	1 Accessor 3490 only	1 Accessor 3590 only	1 Accessor 3490 & 3590	2 Accessors 3490 only	2 Accessors 3590 only	2 Accessors 3490 & 3590
3490/CE_000	1A20	---	1A20	A1D20	---	A1D20
3490/CE_001	---	---	---	B1D20	---	B1D20
3590/CE_998	---	---	---	---	B1D20	B1D19
3590/CE_999	---	1A20	1A19	---	A1D20	A1D19

Note: See Figure 4 on page INTRO-9 for the library storage cell numbering.

Notes:

a. The CE cartridge labels shipped with a new library are shown in the table. Different labels may be used, but there can not be any duplicate labels in your library.

b. If you are upgrading an existing library and have removed all of the 3490E tape subsystems, replace the 3490 CE cartridge in cell 1A20 for a single accessor library or in cells A1D20 and B1D20 for a dual accessor library with the new 3590 CE cartridge(s).

c. If you are adding 3590 tape subsystems an existing library and a customer volume is in cell 1A19, remove the customer volume and place it in an empty storage cell. Do not place the cartridge in the error recovery cell (1A1 or 1A3) or a high capacity output cell.

d. The 3490 CE cartridges may have a media type label of 1 or E. The 3590 CE cartridges can have a media type label of J or K.

__ 2. Take the cartridge accessor out of its service position, and close and lock the front doors of the library.

__ 3. Put the power switch for each 3590 tape drive in the **Off** position and ensure that the power cord is fully seated in the socket at the rear of the drive. The 3590 drives will be powered on during the checkout in step 10 on page INST-121.

__ 4. Set the PCC circuit breakers to ON in all frames.

__ 5. Set the power switch on the 24V and the 36V power supplies to On.

__ 6. Set the Unit Emergency switch(es) to On. If you have a 3494 Model HA1 or 9-16 frames, you will have 2 Unit Emergency switches, one at each end of the library.

__ 7. Set the Local/Remote switch to Local and the Unit Power switch to Power On.

   The library manager system unit should power on. If it does not power on, set the system unit power switch to On. The library manager (LM) will initialize. Initialization takes several minutes.

   If you have the high availability model with two LM's, both LM's should initialize and LM A (in the L1x frame) should normally become the active LM with LM B (in the right service bay frame) in standby. If LM A cannot initialize, LM B may initialize as the active LM.

Note: If a LM cannot initialize, the local accessor (accessor A for LM A and accessor B for LM B) cannot be used. The failing LM should be repaired before continuing with the teach and checkout.

__ 8. Wait for the prompt on the active library manager display (normally LM A on the rear of the L1x frame), to set the mode.

__ 9. Select **Pause** and **Offline** modes. See *IBM 3494 Tape Library Dataserver Operator's Guide* for details. If you do not respond to the prompt, the library manager uses the default settings, which are Auto mode and the Offline (Online if taught) state. If the System Summary window indicates Auto mode, select **Pause** and **Offline** from the Operator menu Mode pull-down.

__ 10. Checkout the tape subsystems, set the addresses (or IDs) and attach the host cables as requested by the customer, and connect the remote support attachments. See "Installation Checkout" in the maintenance information manuals supporting your tape subsystems.

__ a. If you have a Model B16 or B18 Virtual Tape Server Control Unit, checkout the DASD and tape subsystems, set the addresses and connect the host cables, and connect the remote support attachments. See the instructions in the installation section of the appropriate VTS subsystem maintenance information manual and then return here to complete the checkout of the library.

Note: The IBM 8271 NWays Ethernet LAN Switch used by the 3494 Model B18 is configured in the factory. If you have communication problems, refer to the **LAN Port Activate** procedure in the IBM 3494 Model B18 Virtual Tape Server MI.

__ b. If you have a 3466 Network Storage Manager, checkout the tape subsystems using the instructions in the "Installation Checkout" section of the *IBM 3590 High Performance Tape Subsystem Maintenance Information* manual and then return here to complete the checkout of the library.

__ 11. Return the tape subsystems to their operating positions. If you have any 3490E Model CxA tape subsystems, install the retaining screws removed in step 2 on page INST-70, then reinstall the screen removed in step 1 on page INST-70.

__ 12. On the active LM, select **Service** menu from the Mode pull-down. See Figure 283 for a sample pulldown. Additional functions may be available in later code levels.

Figure 283. Mode Pull-Down Sample

__ 13. If the service password prompt is displayed, enter **service** and select **OK**.

__ 14. If you have installed a 3494 Model HA1, test the dual library manager links using the following steps:

__ a. Select **Service** and then select **NVRAM** on the Service pulldown. If the displayed values are NOT all zero, the test was successful.

__ b. Select **Dual library manager link** on the Service pulldown. Test the primary and alternate links between the library managers to ensure they can communicate.

__ 15. Select the **Teach** option on the Service action bar and follow the instructions on the screen or in **Help**. Record the teach parameters for your library configuration in Figure 284 on page INST-124.

Read this complete step with your configuration in mind before proceeding. The information provided here is intended to give additional guidance for many of the library configurations. If Teach asks for information not specifically covered here, refer to **Help** for guidance.

If this is a new library installation, select **Teach new configuration**. If you are adding D1x or S10 frames to the end of an existing library or between the last library frame and the right service bay of a Model HA1, select **Teach additional box**. If you are adding Model B1x or HA1 frames to an existing library, select **Teach new configuration**. If you have removed a frame from an existing library (shortened the library), select **Teach new configuration**. Follow the instructions on the teach screens. **Help** is available on each screen if needed.

Notes:

a. If you have installed a model D1x frame with no drives and 400 storage cells (4 5x20 racks), select storage unit (SU) instead of drive unit for the frame on the teach screen.

b. If you have installed a model D1x frame that has 'holes' for drives but you have not installed the drives, select the drive configuration that matches the number of drives and holes in your frame and enter addresses (ID's) for each drive and hole. When teach fails to find the fiducial for the not-installed drives, select **Current position** on the Teach Error screen to bypass it. Ensure that you mark the missing devices as unavailable using the Availability pulldown after the teach completes.

c. If you add a new library frame in the middle of existing library frames (e.g. old library = CU, DU; add SU, new library = CU, SU, DU), you will need to run **Teach current configuration** to configure the new frame in the existing position (in position 2 of the example). When it completes, you will need to run **Teach additional box** to configure the new frame position(s) (in position 3 of the example). See “Teach Additional Box” on page DIAG-5 for additional information.

d. If Teach does not find a fiducial for one of the library components, a screen is displayed allowing you enter a correction in millimeters in the X and/or Y direction. Observe where the sensor beam is located in relation to the fiducial during a retry before you enter the correction to find it. If a correction is needed on a component in the middle of a long library, you will need to view the component through the top window.

e. If you have a 3490 F1A FC3000 controller, you must reconfigure the drives in the controller after the 3494 Teach is completed to update the drive ID's. Refer to the 3490 FC3000 MI Install section.

The following information is requested:

Library sequence number

Enter the sequence number as follows:

- If the library does not include a 3494 B1x unit, one sequence number is entered. The number can be chosen by the customer. If the customer does not have a preference, enter the last 5 digits of the 3494 L1x serial number.
- If the library only includes a 3494 Virtual Tape Server (i.e. 1 3494 D12, 1 3494 B16 or B18, and no other tape subsystems in any frame), one sequence number is entered. If 2 VTS subsystems are included, a sequence number for each subsystem is entered. The number can be chosen by the customer. If the customer does not have a preference, enter the last 5 digits of the 3494 B16 or B18 serial number.
- If the library includes a 3494 B1x unit with it's associated 3494 D12 unit AND additional native tape subsystems in any other unit, the library is a mixed configuration that requires

multiple sequence numbers, one for the native tape subsystem and one for each VTS subsystem. The numbers can be chosen by the customer. If the customer does not have a preference, enter the last 5 digits of the 3494 L1x unit for the native tape library number and the last 5 digits of the 3494 B16 and/or B18 unit for each VTS library number.

Plant of manufacture
Enter the prefix from the machine serial number, for example 13 for San Jose.

Customer identifier
Enter the name of the customer.

Password required
Enter the customer's choice as to whether some screens are to be protected, for example the Service menu. The default password is *service*.

Dual Grippers
Enter whether you have dual grippers installed.

Adjacent frame inventory update
Enter the customer's choice as to whether the 3494 should inventory just the frame that had its operator door opened, or to also inventory the frames next to the frame that had its door opened.

Default Cartridge Type
Enter the customer's preference.

Home Cell Mode
Enter the customer's preference.

High-capacity I/O Facility
Enter the customer's choice for high-capacity output or input/output area. Your choice should match the number of cells marked in step 2 on page INST-117.

RTIC Card Configuration
Select the configuration that matches the teach configuration defined in Figure 272 on page INST-99.

Convenience I/O
Enter whether the control unit frame contains this feature.

Box Type and CU/DU Devices
Select the type of unit for each box (frame) in the library and the number of tape drives installed in each L1x or D1x unit. If you have empty 'holes' for drives that you have not installed yet, include them in the drive count.

Device Identifiers
Enter the tape drive addresses or IDs (for example, 180 and 181, or 000 and 001). Using the customer's address or ID for each drive makes the drive easier to identify if a problem occurs.

Virtual Device Identifiers
If you have a 3494 B16 VTS control unit in your library, you are asked to enter the virtual device identifiers for the VTS subsystem. Follow the instructions on the screen and enter the virtual device identifiers the customer wants to use.

Figure 284 (Page 1 of 2). Teach Configuration

Teach Parameter	**Value for Library S/N _____**
Total number of boxes	
High-Capacity I/O Facility	_____, Rack ____, ____ cells
RTIC Card Configuration	Card 1 - ____DAs ____CUs, Card 2 - ____DAs ____CUs
Box 1	Model L_____-_____ ____RTIC ____LAN
Box 2	Model _____-_____ ____RTIC ____LAN
Box 3	Model _____-_____ ____RTIC ____LAN
Box 4	Model _____-_____ ____RTIC ____LAN
Box 5	Model _____-_____ ____RTIC ____LAN
Box 6	Model _____-_____ ____RTIC ____LAN
Box 7	Model _____-_____ ____RTIC ____LAN
Box 8	Model _____-_____ ____RTIC ____LAN
Box 9	Model _____-_____ ____RTIC ____LAN
Box 10	Model _____-_____ ____RTIC ____LAN
Box 11	Model _____-_____ ____RTIC ____LAN
Box 12	Model _____-_____ ____RTIC ____LAN
Box 13	Model _____-_____ ____RTIC ____LAN
Box 14	Model _____-_____ ____RTIC ____LAN
Box 15	Model _____-_____ ____RTIC ____LAN
Box 16	Model _____-_____ ____RTIC ____LAN
Non-VTS Library sequence number	
VTS 1 Library sequence number	
VTS 2 Library sequence number	
Plant of manufacture	13
Customer Identifier	
Dual Grippers	____Installed ____Not Installed
Default Cartridge Type	____CST ____ECCST ____HPCT ____EHPCT ____None
Convenience I/O	____Installed (10) ____Installed (30) ____Not Installed
Password required?	____Yes ____No
Home Cell Mode	____Fixed ____Floating
Dual Accessors	____Installed ____Not Installed
Adjacent frame inventory update?	____Yes ____No

Figure 284 (Page 2 of 2). Teach Configuration

Teach Parameter	**Value for Library S/N _____**
Device Identifiers:	
Box 1	0_____ 1_____
Box 2	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 3	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 4	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 5	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 6	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 7	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 8	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 9	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 10	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 11	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 12	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 13	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 14	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 15	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
Box 16	0_____ 1_____ 2_____ 3_____ 4_____ 5_____
VTS 1 Virtual Device Identifiers:	
Virtual Subsystem 1	0 _____
Virtual Subsystem 2	0 _____
Virtual Subsystem 3	0 _____
Virtual Subsystem 4	0 _____
VTS 2 Virtual Device Identifiers:	
Virtual Subsystem 1	0 _____
Virtual Subsystem 2	0 _____
Virtual Subsystem 3	0 _____
Virtual Subsystem 4	0 _____

__ 16. After the data is entered, the library manager may take several minutes to an hour (depending on library size) to configure the library, to locate each component, and to update the database. The library manager will shutdown and restart after the teach completes.

__ 17. Verify that all the front doors on all the frames are closed. The System Summary window display **Enclosure doors** item on the active LM should indicate **Closed**.

__ 18. Put the active library manager in Pause and Offline and select Service using the Operator menu **Mode** pulldown. If the password is requested, enter **service** and select **OK**.

__ 19. If you have a 30 cartridge convenience I/O station, check the door adjustment and adjust the shutter as follows:

__ a. The clearance at the bottom of the lower CIO door should be 0.5mm (0.02 in.) to 0.75mm (0.03 in.). If not, re-adjust the CIO door as follows:

__ 1) Open the CIO door.

__ 2) From the front of the CIO station, loosen the 2 bearing bolts at the top of the lower CIO door and the 2 bearing bolts at the bottom of the lower CIO door. Do not remove the bolts.

__ 3) Slide the lower CIO door down until the bottom of the door just clears the bottom ledge of the door opening and tighten the bolts. The bottom gap should be approximately 0.63mm (0.025 in.).

__ 4) Open and close the lower CIO door to ensure that it does not rub on the door frame.

__ b. Loosen the shutter screws and slide it to the right until the green light on the cartridge present sensor goes out.

__ c. Then slide the shutter to the left until the green light comes back on and tighten the screws.

__ 20. Verify that the library can perform all functions correctly using the appropriate following steps.

Notes:

a. Ensure that you have completed the entire installation checkout procedure for each tape drive as instructed in step 10 on page INST-121 before you run Verify Installation. The tape drives must be setup for the library and the interfaces must be enabled before all of the tests can be run.

b. Ensure that you select all of the installed tape subsystem ports and/or drives when the menu for the control unit interface test and the drive get/put test is displayed.

__ a. If you have a single accessor library, select **Verify installation** from the Service pull-down and run the tests as directed until the prompt indicates that Verify installation is complete.

Continue at step 21 on page INST-127

__ b. If you have a dual accessor library, normally at this point LM A will be the active LM and the library will be in pause and offline.

__ c. Go to LM A and select **Switch active library to standby** on the Mode pulldown. LM B should become the active LM.

__ d. Go to LM B:

__ 1) If both accessors are active, select **Disable Dual Active Accessors** under **Accessor** on the Mode pulldown and then select accessor B to be active.

__ 2) If both accessors are not active and accessor B is not the active accessor, select **Switch active accessor to standby** under **Accessor** on the Mode pulldown. Accessor B should become the active accessor.

__ e. On LM B, put the library in Pause and Offline and select Service using the **Mode** pulldown. If the password is requested, enter **service** and select **OK**.

__ f. On LM B, select **Verify installation** from the Service pulldown and run the tests as directed until the prompt indicates that Verify installation is complete.

__ g. On LM B, put the library in Pause and Offline and Switch active library to standby using the **Mode** pulldown. LM A should become the active LM.

__ h. Go to LM A:

__ 1) If both accessors are active, select **Disable Dual Active Accessors** under **Accessor** on the Mode pulldown and then select accessor A to be active.

__ 2) If both accessors are not active and accessor A is not the active accessor, select **Switch active accessor to standby** under **Accessor** on the Mode pulldown. Accessor A should become the active accessor.

__ i. On LM A, put the library in Pause and Offline and select Service using the **Mode** pulldown. If the password is requested, enter **service** and select **OK**.

__ j. On LM A, select **Verify installation** from the Service pulldown and run the tests as directed until the prompt indicates that Verify installation is complete.

__ 21. Check the door interlocks using the following steps. **Do not put the library online until this check has been completed successfully on all of the library frame doors.**

__ a. Close the front doors on the library frames and put the library in **Auto** and **Offline** using the **Mode** pulldown on the LM.

__ b. Open the front door on the first (or next) library frame.

__ c. Ensure that:

- the accessor servo power drops,
- the library goes into **Pause** mode,

and

- the enclosure door status on the LM System Summary window is **Open**.

__ d. Repeat step 21a through step 21c for each library frame door.

Note: This test is not required for the 3494 Model B18 standalone frames.

__ e. If the results in step 21c are not correct for any door, return to “Door Interlock Cables” on page INST-73 and verify that the door interlock cables are installed correctly before you continue the checkout.

__ 22. If you have a dual accessor library, check the barrier door interlocks and accessor in bay sensors as follows. **Do not put the library online until this check has been completed successfully.**

__ a. Put the library in **Pause** and **Offline** using the **Mode** pulldown on the active LM.

__ b. On the active LM, select **Test interface** on the Service pulldown and then select **DI/DO card**.

__ c. With both barrier doors retracted, select the **Barrier Door Status** button on the DI/DO screen. The barrier door status should change to **Not Extended** and **Retracted** for both doors.

__ d. Push both barrier doors mid-way into the aisle and select the **Barrier Door Status** button on the DI/DO screen. The barrier door status should change to **Not Extended** and **Not Retracted** for both doors.

__ e. Push both barrier doors until they are closed and select the **Barrier Door Status** button on the DI/DO screen. The barrier door status should change to **Extended** and **Not Retracted** for both doors.

__ f. Pull both barrier doors back until they are fully retracted and select the **Barrier Door Status** button on the DI/DO screen. The barrier door status should change to **Not Extended** and **Retracted** for both doors.

__ g. On the active LM, go to the third DI/DO test screen (Digital Inputs - Register 5/6) and locate status bits **+ACC_A_IN_BAY** and **+ACC_B_IN_BAY**.

__ h. Verify that status bits **+ACC_A_IN_BAY** and **+ACC_B_IN_BAY** are equal to **1** when both accessors are in their service bay.

__ i. Open the front service bay doors and move both accessors out of their service bay.

__ j. Verify that status bits **+ACC_A_IN_BAY** and **+ACC_B_IN_BAY** change state and are equal to **0** when both accessors are out of their service bay.

__ k. If the correct status was not displayed on any step, correct the problem before continuing. Refer to Figure 185 on page CABLE-43 for the connections.

__ l. Select the **Cancel** button to end the test on both LM's.

__ 23. End Service mode by selecting **Operator menu** on the Mode pull-down of the LM(s). If FC 5050 Dual Active Accessors is installed, select **Accessors** on the Mode pulldown and then select **Enable Dual Active Accessors**.

__ 24. If the AS/400 Remote Power Sequence feature is installed, set the Local/Remote switch on the operator panel to **Remote** and verify that the library powers on/off when a controlling host is powered on/off.

Note: If you cannot power the host up and down, set the library Local/Remote switch to **Remote** and verify that the library remains powered on if a controlling host is powered on.

__ 25. Installation Instructions and diskettes for factory installed LM features (i.e. FC 5050 Dual Active Accessors, 5214 2nd Disk Drive, 5219 Token Ring Adapter, 5220 Ethernet Adapter, and 5229 Expansion Attachment Card) are shipped with the library in the L1x frame ship group. They are required if the LM code has to be reloaded in the future. If your library has one or more of these features installed, locate the diskette(s) and instructions and put them in the white 3494 LIC (Licensed Internal Code) binder. Store the binder with the library for future use.

__ 26. The install of the base library is complete. Continue with “Library Manager Features” on page INST-129 to complete the installation of the library features for your library.

Library Manager Features

If your library DOES NOT have any of the following features, go to “Library Manager Code” on page INST-133:

- LAN features 5219 or 5220
- Remote console feature 5226
- Remote service features 2710, 2711, or 2712

LAN Features

If you are not installing library manager LAN features 5219 or 5220, go to “Remote Service Features” on page INST-132.

If the LAN adapter card was not installed in your library manager in the factory, install the feature as follows:

__ 1. Install the feature using the feature installation instructions provided with the feature.

__ 2. Put the feature installation instructions and diskettes in the 3494 Licensed Internal Code binder. If an adapter manual is provided, store it with the 3494 manuals.

__ 3. Go to “Remote Service Features” on page INST-132.

If the LAN adapter card is installed in your library manager, complete the feature installation using the following instructions.

Note: Two types of LAN addresses can be assigned to the Library Manager adapter, Universally Administered Address (UAA) or Locally Administered Address (LAA).

UAA A unique address "burned into" each LAN adapter card.
LAA A locally assigned address setup when the adapter is configured. Valid addresses are 400000000000 to 7FFFFFFFFFFF.

The UAA can be used to address the Library Manager on the network, but if the adapter card is replaced for any reason, each host communicating with the LM must be updated with the new adapter's UAA. It is recommended that the customer assign a Locally Administered Address (LAA) for the Library Manager. This will allow the adapter to be replaced without updating all of the attached hosts. If you have dual library managers, you will need to assign two different LAA's, one for each LM.

__ 1. When the Ethernet LAN feature (5220) or Token-ring LAN feature (5219) is installed in the factory, it is setup for the adapter card's Universally Administered Address (UAA). If the customer has defined a Locally Administered Address (LAA) for the library manager, modify the configuration using the following steps. If the customer does not want to use a LAA, go to step 2 on page INST-130 If you have a token-ring feature or an an ethernet feature go to step 3 on page INST-130.

   __ a. Shutdown the active library manager by selecting the **Shutdown** option from the Mode pulldown menu.

   __ b. When the shutdown completes, open a Service Window by selecting **Service Window** button on the 3494 Tape Library Dataserver Shutdown panel. If asked for, type the password **service**.

   __ c. Insert the appropriate LAN Attachment Feature Diskette into the diskette drive. This diskette should be located in your 3494 LIC (licensed Internal Code) binder or in the feature package.

- P/N 09L0885 for FC 5219, Token-Ring LAN.
- P/N 09L4286 for FC 5220, Ethernet LAN.

__ d. Type **a:lanstep1** at the prompt and press the **Enter** key.

__ e. Follow the instructions on the screen. When asked for the LAA, enter it at the prompt and press the **Enter** key. Record the LAA below and in Figure 287 on page INST-139 for future reference.

LAA - _____

__ f. When LANSTEP1 is complete, type **lanstep2** at the prompt and press the **Enter** key.

__ g. When LANSTEP2 is complete, type **exit** at the prompt and press the **Enter** key.

__ h. Select **Shutdown computer for power-off**.

__ i. If you have a 3494 Model HA1, go to the standby library manager and select the **Shutdown** option from the Mode pulldown menu. Repeat step 1b on page INST-129 through step 1h.

__ j. Wait until the screen says it is OK to power the library manager down and use the Unit Power switch on the operator panel to power the library down.

__ k. If you have a Token-Ring LAN feature (5219), go to step 2. If you have an Ethernet LAN feature (5220), go to step 3.

__ 2. When the Token-ring LAN feature (5219) is installed in the factory, the speed is set to 16 MBits. If the customer's LAN runs at 4 MBits, change the configuration using the following steps. If the customer's LAN runs at 16MBits, go to step 4 on page INST-131.

__ a. If the library power is on, power the library off using the **Unit Power** switch on the Operator panel.

__ b. Insert the ***Token-ring Configuration Diskette*** P/N 09L0886 into the diskette drive of the active library manager (i.e.the LM you started with if you have a 3494 Model HA1 and you defined a LAA in the previous step).

__ c. If you have a 3494 Model HA1, go to the standby LM frame and put CB1 in the Off position.

__ d. Power up the library using the **Unit Power** switch. The active LM should power up.

__ e. The Token-ring configuration program will bootup and ask you to select the speed of the customer's Token-ring LAN. After you select the speed, it will issue a warning that you may ignore. Type **1** to select 4 MBits.

__ f. The screen will indicate a warning that the interrupt level is in conflict. Ignore this warning. It is expected.

__ g. When the configuration program is complete, remove the diskette from the diskette drive.

__ h. If you have a 3494 Model HA1, insert the Token-Ring Configuration Diskette into the standby LM diskette drive and put CB1 of the standby LM frame in the On position. The standby LM should power up. Repeat step 2e through step 2g on the standby LM.

__ i. Go to step 4 on page INST-131.

__ 3. When the Ethernet LAN feature (5220) is installed in the factory, it is set up for the telephone Category 3, 4, or 5 cable with RJ-45 connectors (10Base-T). If the customer uses RG-58 coaxial cable with BNC connectors (10Base2) or shielded twisted-pair drop cable with AUI connectors, change the configuration using the following steps. If the customer's LAN uses telephone RJ-45 media, go to step 4 on page INST-131.

__ a. If the library power is on, power the library off using the **Unit Power** switch on the Operator panel.

__ b. Insert the ***Ethernet Configuration Diskette*** P/N 09L4287 into the diskette drive of the active library manager (i.e.the LM you started with if you have a 3494 Model HA1 and you defined a LAA in the previous step).

__ c. If you have a 3494 Model HA1, go to the standby LM frame and put CB1 in the Off position.

__ d. Power up the library using the **Unit Power** switch. The active LM should power up.

__ e. Follow the instructions on the screen to select the correct configuration for your installation.

__ f. When the configuration program is complete, remove the diskette from the diskette drive.

__ g. If you have a 3494 Model HA1, insert the Ethernet Configuration Diskette into the standby LM diskette drive and put CB1 of the standby LM frame in the On position. The standby LM should power up. Repeat step 3e through step 3f on the standby LM.

__ h. Go to step 4.

__ 4. Power the library off as follows:

__ a. If you did not boot the LAN configuration diskette to change the configuration, power the library off using the **Unit Power** switch on the Operator panel.

__ b. If you did boot the configuration diskette, power down using the **Unit Emergency** switch on the library Operator Panel.

__ 5. Connect the customer's LAN cable to the LAN adapter:

__ a. Loosen the screw holding the braided strap to the metal stiffener around the MIC2-4/LPC cards (or to the MIC1 card) and disconnect the strap.

__ b. Open the cable clamps that secure the library manager cables and remove the cables from the clamps.

__ c. Pull the library manager system unit out until you can reach the LAN connectors on the back of the library manager.

__ d. If you have an Ethernet Adapter, connect the customer's cable to the appropriate connector on the back of the library manager. Run the cable so it does not interfere with the tape subsystem service positions. Go to step 5g.

__ e. If you have a Token-ring Adapter and the customer is using telephone cable, plug the customer's LAN cable into the RJ-45 connector on the back of the library manager. Run the cable so it does not interfere with the tape subsystem service positions. Go to step 5g.

__ f. If you have a Token-ring Adapter and the customer is using the IBM cabling system, connect the IBM Token-ring Network PC Adapter Cable (P/N 6339098, supplied) to the D-Shell connector on the LAN card. Run the cable so it does not interfere with the tape subsystem service positions.

Note: Some versions of the Token-ring Adapter only have a RJ-45 connector. Use the IBM RJ-45 STP/D-Shell Conversion cable (P/N 60G1066, supplied) to connect the LAN cable.

__ g. Push the library manager back in place and re-connect the braided strap. Secure the library manager cables in their cable clamps.

__ h. Connect the LAN cable to the customer's network.

__ 6. Put the **Unit Emergency** switch on the library Operator Panel in the **On** position and power on the library using the **Unit Power** switch.

__ 7. If you are connecting host systems to the library manager using the LAN, locate the ***Installation Instructions for Feature Code 5219 or Feature Code 5220...*** (P/N 05H4083). Install 3494 Host Device Driver features using the instructions provided in Appendix A and add the necessary LAN hosts to the Library Manager using the instructions in Appendix B. These instructions may be with the feature package or in the 3494 LIC (Licensed Internal Code) binder.

__ 8. If you are installing the Remote Console feature (5226), locate the ***Installation Instructions for Feature Code 5226...*** (P/N 05H4084, supplied with the feature) and follow the instructions to install the feature.

__ 9. Check the LAN feature installation as follows:

   __ a. Select **Service** from the Mode pulldown. If asked, enter password **service**.

   __ b. Select **Service window** from the Utilities pulldown of the Service action bar on the active library manager.

   __ c. Type **lancheck** at the command prompt.

   __ d. Follow the instructions on the screen.

   __ e. Select **Operator menu** from the Mode pulldown of the LM(s) to end service mode.

__ 10. Put the feature installation instructions and diskettes in the 3494 LIC (Licensed Internal Code) binder. If an adapter manual is provided, store it with the 3494 manuals.

Remote Service Features

If you are not installing a remote service feature, go to “Library Manager Code” on page INST-133.

__ 1. The library manager should be connected as described in step 15 on page INST-110.

__ 2. Select **Commands** on the library manager operator action bar.

__ 3. Select **Service access** on the Commands pulldown.

__ 4. If you are asked for the storage administrator password, enter **service**.

__ 5. Select **Enable service access**.

__ 6. If the modem for this installation has not been initialized, initialize the modem as follows:

   Most installations will have a modem and a switch. The customer may set-up password control in the modem, in the switch, and/or in the library manager (normal service and storage administrator passwords). Refer to “Remote Support Access Security” on page INTRO-31.

   __ a. If the customer does not require special password control, initialize the modem using procedure “Modem Initialization without Modem Password” on page CARR-143, then return to step 7.

   __ b. If the customer wants password control in the modem, set-up EBTERM in the library manager using procedure “Setting up EBTERM for Setting Modem Password” on page CARR-144, then initialize the modem using procedure “Modem Initialization with Modem Password” on page CARR-146. After you have completed the procedures, return to step 7.

__ 7. If the WTI Electronic Switch has not been set-up, set-up and test the switch as follows:

   __ a. Locate the "Setup" switches on the back of the WTI Electronic Switch Model MDS-16 or on the bottom of the WTI Electronic Switch Model APS-16. Set the switches as follows:

      __ 1) If you have the WTI Model MDS-16, set switches 1-2-3-7 **up** and the remaining switches **down**.

__ 2) If you have the WTI Model APS-16, set switches 2-4-5-6-7 **on** and switches 1-3-8 **off**.

__ b. Check and set the line voltage on the back of the WTI Switch to the proper voltage for your installation (115V or 230V).

__ c. Power on the switch. Press and hold both the **SET** button and the **CLEAR** button on the front of the switch. Release only the **CLEAR** button, and then release the **SET** button.

__ d. Ensure that the library manager cable is connected to switch port 2 and the modem is connected to switch port 1 as shown in Figure 280 on page INST-112.

__ e. Set-up and test the switch using procedure "WTI Switch Set-up and Testing" on page CARR-148. If the customer wants a switch password, it is set during this procedure.

Library Manager Code

__ 1. If you added Model B1x/D1x/S10 library expansion frames to an existing single accessor library, update the LM code as appropriate. See "Library Manager Software Revision Installation" on page CARR-125.

__ a. If your library does not have a CD-ROM drive in the LM, see "C-drive BackUp Procedure" on page CARR-100 and create a C-drive backup file if your library meets the criteria.

__ 2. If you added a Model HA1 to an existing library, install the new LM code as directed by the Feature 9040 Installation Instructions. Ensure that you create the delta image if asked by LMINST. If you have the mirrored hard drive card (see Figure 61 on page LOC-39), the mirror image is created automatically.

__ 3. If you installed new features (e.g. remote console) that were not installed by the factory and you do not have mirrored hard drive, you should have been asked to create a delta image during the install procedure. If you did not create the delta image, see "DELTAIMG" on page CARR-130 and update the delta image.

__ 4. If you installed a new library, verify that the LM code is at the current level. If it is not at the current level, update the code as appropriate. See "Library Manager Software Revision Installation" on page CARR-125.

Library Information Tables

The following library information tables are provided to record vital library information for off-shift or covering CE's that may not be familiar with this account.

__ 1. Complete the following general information tables for this library:

__ a. Figure 285 on page INST-135
__ b. Figure 286 on page INST-137
__ c. Figure 287 on page INST-139

__ 2. Place the following sheets (or a copy) in the clear plastic envelope P/N 1470207 located inside the Model L1x rear door on the top of the display compartment along with any appropriate local information:

__ a. ARTIC Port Assignments. See "ARTIC Port Assignments" on page INST-98.
__ b. Teach Configuration. See Figure 284 on page INST-124.
__ c. General Library Information. See Figure 285 on page INST-135.
__ d. Remote Support Information. See Figure 286 on page INST-137.
__ e. LAN Information. See Figure 287 on page INST-139.

Continue at “3494 Library Install Check List” on page INST-141.

Figure 285. General Library Information

Description	**Library S/N** ____________
Optional LM Features:	FC 5050, Dual Active Accessor --------- Yes____ No____ FC 5214, 2nd Disk Drive for LM ----- Yes____ No____ FC 5219, Token Ring Adapter ---------- Yes____ No____ FC 5220, Ethernet Adapter -------------- Yes____ No____ FC 5226, LM Remote Console -------- Yes____ No____ FC 5229, Expansion Attachment Card - Yes____ No____ FC _____ FC _____ FC _____
3494 Manuals/Tools:	
3494 Operator's Guide	Location:
3494 LIC	Location:
3494 MI	Location:
3494 VTS MI	Location:
3494 Tool Kits	Location:
3490 _____ MI	Location:
3490 _____ MI	Location:
3590 _____ MI	Location:
3590 _____ MI	Location:
ECA's Installed	ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments: ECA ______ Date __________ Comments:

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Figure 286. Remote Support Information

Description	**Library S/N** _____
Remote Support Modem	Type: _____ Location: _____ Phone Number: _____ Password: _____ (if used)
Remote Support Switch	Type: WTI APS-16 or _____ Location: _____ Password: _____ (if used) Port Connections: Port 1: Modem Port 2: LM A or _____ Location: _____ Port 3: LM B or _____ Location: _____ Port 4: Type _____ Location: _____ Port 5: Type _____ Location: _____ Port 6: Type _____ Location: _____ Port 7: Type _____ Location: _____ Port 8: Type _____ Location: _____ Port 9: Type _____ Location: _____ Port 10: Type _____ Location: _____ Port 11: Type _____ Location: _____ Port 12: Type _____ Location: _____ Port 13: Type _____ Location: _____ Port 14: Type _____ Location: _____ Port 15: Type _____ Location: _____ Port 16: Type _____ Location: _____

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Figure 287. LAN Information

Description	**Library S/N** _____
LAN Feature Installed Library Manager A Library Manager B	Token-ring FC 5219 _____ or Ethernet FC 5220 _____ Feature Diskette Location: _____ Card UAA _____ or LAA _____ Card UAA _____ or LAA _____ Type = APPC _____ or TCP/IP _____ If APPC: Network ID _____ Network Location _____ If TCP/IP: IP Address _____ Subnet mask _____ Hostname _____ Domain name (if any) _____ Router (if any) _____ Nameserver address (if any) _____
Remote Console FC 5226	Installed Yes _____ No _____ Feature Diskette Location: _____ If installed, type = APPC _____ or TCP/IP _____
LAN Attached Hosts	Yes _____ No _____ Host: Host: Host: Host: Host: Host: Host: Host: Host: Host: Host: Host: Host: Host: Host: Host: Host:

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3494 Library Install Check List

Use the following checklist to verify that the library is installed correctly and ready for customer use.

__ 1. All leveling pads are snug against the floor.
__ 2. The X-rail in each frame is aligned vertically and horizontally.
__ 3. The X-rail is straight and level within 3 mm over 4 frames.
__ 4. The X-rail upper and lower bearing rods on each frame are touching the previous rods.
__ 5. The rear aisle frame member of the end frames is plumb within 4 mm.
__ 6. Four frame attach brackets are installed between each expansion frame.
__ 7. All frame spacer bolts are installed between each expansion frame.
__ 8. The upper rail in each frame is locked and aligned from side-to-side.
__ 9. The center upper rail rollers do not touch the rail in any frame.
__ 10. The accessor can reach the last column of cartridges on each side without touching the X-axis bumper.
__ 11. The accessor moves freely and quietly along the length of the library.
__ 12. The lower and middle storage arrays are sitting down tight against the support bracket or drive sleeve.
__ 13. The upper storage arrays are sitting down tight against the lower storage array (or bracket).
__ 14. There is no gap between the upper and lower storage array side brackets on either side.
__ 15. The storage array cells in each frame are not damaged or nicked and all empty cell labels are present.
__ 16. If the library has a dual gripper, storage inserts are installed and fully seated in the upper and lower two rows of each frame.
__ 17. All screw heads behind the storage array fiducials are covered with a black plastic sleeve.
__ 18. The door pin (if adjustable) touches the door support bracket on each frame when the door is closed. All doors should open and close freely.
__ 19. Each door latch is adjusted so the door is tight against the frame when the door is locked.
__ 20. If your library has an X cable with a metal band, ensure the X-axis cable tracks correctly without touching the drive covers, cable trough edge, or X-rail.
__ 21. Each 3490 CxA deck is pulled forward in the sleeve and the retaining screws are tight.
__ 22. Each 3490 CxA drive sleeve has a retaining screw installed in the rack at the rear of the sleeve.
__ 23. Each 3490 F1A drive has both slide retaining screws installed.
__ 24. Each 3590 drive has a slide retaining screw installed at the rear of the drive.
__ 25. Verify that the distance between the front of the picker reach platform and the cartridge label surface is 35 mm or less on each frame at the drive unload point and at the storage rack.
__ 26. All screw heads behind the 3490 drive fiducials are black.
__ 27. All fiducials were located successfully during the Teach operation.
__ 28. The library manager microcode and all microcode in the 3490 and/or 3590 tape subsystems is at the latest released level.
__ 29. The Verify Installation tests ran successfully on each new frame and drive.
__ 30. If the customer does not need the library immediately, run 10 cycles of the Frames Alignment test with all new frames selected and 5 cycles of the Drive Get/Put test with all new drives selected. Check the logs for errors after each test completes.

After Installation

The library is installed.

The customer may load the storage racks with cartridges and perform an inventory operation by using **Inventory new storage** on the Commands pull-down.

If you have added a frame to an existing library or converted a frame in an existing library and used **Teach additional box** or **Teach current configuration** to reconfigure the library, the inventory information for the existing customer volumes will be preserved when **Inventory new storage** is run.

If you removed a frame from or added a Model B16/HA1 to an existing library and used **Teach new configuration** to reconfigure the library, the customer's existing volumes will be re-inventoried and placed in the **insert** category. The customer will have to re-establish the correct categories after **Inventory new storage** is run.

Notes:

1. Ten spare volume labels are included with the 3494 tools. If the customer's labeled cartridges have not arrived, you may want to label a few cartridges for customer use to checkout the library and test their host hardware and software.
2. A media type label may also be required on the cartridges. Refer to “Tape Cartridge” on page INTRO-18 for a description of the options available to the customer.

__ 1. Give the customer the front door key, which is the key with the round opening.

__ 2. Give the customer the tape drive cleaning cartridge(s) that were shipped with the library. These cartridges are labeled with the default cleaning mask **CLN...**. If you setup the library during Teach to use **CLN** as the cleaning mask, the customer may enter the supplied cartridges in the library. If the customer asked you to setup a different cleaning mask during Teach, the customer must install new labels on the cartridges before they can be entered into the library.

__ 3. Complete the installation records. The serial number of the 3494 is on the control unit frame rear cover and the rear frame member.

__ 4. Ensure that the Licensed Internal Code (LIC) backup diskettes and library manager diagnostic diskettes are stored in the supplied binder SA37-0300.

__ 5. Store the 3494 tools and books. Keep them close to the library for service activity.

__ 6. If external surfaces of the library require cleaning, use a mild detergent solution. Do not use abrasives, solvents, or alcohol based cleaners.

Relocation/Discontinuance

Relocation or Discontinuance

Use these instructions if you are relocating or discontinuing a complete library. If you are removing a 3494 Model D1x, B1x, or S10 expansion frame from a library and are relocating it to another library or discontinuing it, the customer must order the appropriate RPQ(s) to ensure that the proper hardware is provided for each new library configuration.

Start Preparation

1. Before starting, verify that **all** customer cartridges have been removed from the library.
2. If you have a VTS subsystem, contact your next level of support to clear the VTS tables.
3. Clear the LM database as follows:
   a. From the LM Mode pulldown, select **Shutdown**.
   b. When the Shutdown window is displayed, select **Service window**. Enter the service password **service** if requested.
   c. Insert LM diskette 1 into the diskette drive.
   d. Clear the database as follows:
      1) If you DO NOT have a CD-ROM drive, type **a:cleardb** at the **C:** prompt.
      2) If you have a CD-ROM drive, type **a:dropem** at the **C:** prompt.
   e. When the database is cleared, remove the diskette.
   f. Close the Service window and select **Shutdown for power off**.
   g. If you have dual LM, repeat this procedure on the second LM.
4. Remove all power from the library.
   a. Set the Unit Power switch to the off position. Wait for the library to power off, and then set the Unit Emergency switch to the off position.
   b. Unplug the L1x frame power cord, and then unplug the power cord for each B1x and/or D1x frame.

Cables

1. Disconnect the following cables:
   a. RS-232 Host attachment cables from the ARTIC break-out box in the L1x frame. See “Cables from Hosts” on page INST-115.
   b. Subsystem cables from the ARTIC break-out box in the L1x frame to the B1x and/or D1x frame and coil them in each frame. See Figure 275 on page INST-104.
   c. Unit Emergency cables from the L1x frame to each B1x and/or D1x frame and coil them in each frame. Install jumpers on the BIC card PCC connectors. See Figure 256 on page INST-84. If this is a 9-16 frame library, also remove the BIC card to SPC card cable and the SPC card to B1x and/or D1x frame cables.
   d. Power sequence cables from the L1x frame to each B1x and/or D1x frame and coil them in each frame. See Figure 254 on page INST-79.
   e. Service cables from the L1x service panel to each D14 and/or B1x frame and coil them in each frame. See Figure 278 on page INST-108.

f. Door interlock cables from frame to frame. Remove the terminator from the DIL card in the last frame and install it on the DIL card in the control unit frame. See Figure 251 on page INST-73. If this is a 9-16 frame library, also remove the SPC card to DIL 8/9 card cable and remove the SPC card/bracket assembly.

g. LAN cables from the LAN Adapter card in the library manager.

h. Parallel, ESCON, or SCSI host cables to the tape subsystems and/or VTS controller.

X-Axis Flex Cable: If the library has more than 2 frames, remove the X-axis flex cable using the following steps. See Figure 242 on page INST-59 or Figure 244 on page INST-63.

1. Disconnect connector P1 on the BIC card.
2. Remove the cable trough covers (if installed). See Figure 281 on page INST-114.
3. Disconnect the mid-cable clamp and pull the P1 connector end of the cable back through and out of the cable trough.
4. Disconnect the cable from the XAX card.
5. Roll the cable up taking care not to damage the metal band or the plastic track depending on the type of cable you have.

Remove Expansion Frames

Starting with the frame on the right end of the library, remove the expansion frames one at a time using the following steps.

See Figure 229 on page INST-35.

1. Loosen the set screw(s) on the long T-nut(s) **1**.
2. Loosen the short T-nuts **2** in the expansion frame you are about to remove.
3. Gently pry the X-rail assemblies **3** apart at the gap between them and pull the end frame X-rail assembly back to the right while working it up and down until the rods come out of the previous X-rail assembly, then remove the X-rail assembly.

See Figure 220 on page INST-21 if your frame does not have an alignment rod or Figure 226 on page INST-31 if your frame has an alignment rod.

4. Remove the M8 bolts (if installed) that were inserted through the cover bolt tabs of the left frame **2** and through the corresponding cover bolt tab of the end frame.

   Note: You may have a bolt in all four corners, a bolt in the bottom two corners, or no bolts depending when the expansion frame was installed.

5. Loosen the upper rail **4** or **5** screws in both the end frame and the frame to the left.
6. Within the end frame, remove the screws in the spacers **1** and **3**. Do not remove the screws in the left frame.
7. Loosen the locknuts on the leveling pads on the end frame you are about to remove.
8. If installed, remove the screws on the left frame connecting the four expansion frame attachment brackets **6** and **7**. Do not remove the shoulder screws.
9. Pull the end frame away from the left frame by sliding it on its' pads.
10. Raise the four leveling pads to lower the frame onto the casters and move it aside. Raise the pads as far as they will go and tighten the locknuts.
11. Remove the screws in the spacers **1** and **3** on the left frame and remove them.

12. Remove the top spacer from spacers 1 and 3 and put the spacers with the expansion frame that was just removed.
13. When you have removed the last expansion frame from the library, loosen the locknuts on the L1x frame leveling pads and raise the leveling pads to lower the L1x frame onto the casters. Raise the pads as far as they will go and tighten the locknuts.

Ship/Re-Install Library Frames

If you are re-installing the library locally, move the frames to their new location and use the **Installation** section of this manual to re-install the library.

If you are shipping the library to a new location or discontinuing it, use the packing instructions with the relocation/discontinuance kit or the following sections as appropriate to prepare the library frames for shipping.

Pack 3490 Tape Subsystem: Use Figure 249 on page INST-71 for the 3490 tape drive procedure.

1. From the rear of the drives, remove the screen and 4 retaining screws 1.
2. Pull the tape drive out to the extended position and remove the top cover 3.
3. Remove 2 screws 5 that hold the drive cover, unplug the message display cables, and remove the drive top cover. Wrap the cover with bubble wrap and tape it in the tailgate cavity.
4. Remove the control unit cover, wrap it in air cap P/N 6934015, and place it behind the library manager LCD display or tape it with the drive unit cover in the tailgate cavity.
5. Wrap the message display cable connector with air cap P/N6934015 and tape it to the front of the drive.
6. Replace the top cover and push the tape drive closed.
7. From the front of the drive, install 4 shipping screws 6.
8. From the rear of the drive, install 4 retaining screws 1. Then install the screen and tighten the 4 screws.

Pack 3590 Tape Subsystem: Refer to the 3590 Maintenance Information for more detail if required.

1. Pull the drive out into the service position. See Figure 144 on page CARR-163.
2. Remove the deck cover by removing 2 screws at the rear of the drive. Slide the cover back toward the rear to disengage the hooks and lift it off.
3. Install the orange head protector P/N 05H4778.
4. Re-install the deck cover.
5. Install two slide retaining screws 2.
6. Ensure that the display is secured in the front cover.
7. If a 3590 A00 tape controller is installed, ensure that the retaining bracket is tightened down.

Pack VTS Controller and 7133 DASD

1. Ensure that the RS/6000 retaining bracket is tightened down.
2. Ensure that each drive is seated and latched in the drawer.
3. Ensure that the drawer brackets are tightened down.

Pack L1x Frame

1. Move the accessor to the left end of the control unit frame and rotate the picker assembly counterclockwise until it detents into place.
2. Raise the picker assembly, place foam blocks **2** P/N 50G0938 and 50G0939 under the picker assembly, and then lower the picker assembly. See Figure 288 on page RELOC-6.
3. Use plastic cable ties **1** and **5** to hold the accessor and picker assembly in place and to secure the top of the accessor to the frame. See Figure 288 on page RELOC-6.
4. Place foam block **3** P/N 50G1058 between the lead screw **4** and the accessor assembly upright and tie wrap. See Figure 288 on page RELOC-6.

   Note: Do not remove the X-rail assembly or guide channel rail from the control unit frame.
5. If required, remove the bumper **6** from the end of the X-rail assembly in the last frame of the library and install it on the L1x frame. See Figure 217 on page INST-15.
6. If required, install the right end cover from the last frame on the right end of the L1x frame. See Figure 217 on page INST-15.
7. Roll up the power cord and tape it in 2 places and place it next to the control unit PCC.
8. Wrap the library manager system unit keys in micro foam P/N 7332979 and tape them to the front of the system unit cover.
9. Move the library manager system unit toward the back of the shelf. Use micro foam **1** P/N 7332979, make a pad and tape in place. See Figure 289 on page RELOC-7.
10. Slide a tie wrap **2** under the shelf and around the library manager and tighten. See Figure 289 on page RELOC-7.
11. Pack the tool kit and manuals in a box. Put the box on top of the library manager and place 2 tie wraps through the tie wrap holding the library manager system unit and tighten around the tool kit.
12. Tape a roll of air cap P/N 6934015, approximately 5 in. in diameter and tape it across the front of the LCD display. **Do not place tape directly on the face of the display**.
13. Pack all loose hardware in a small box and tape it to the base of the frame.
14. Close the front door and lock it.
15. Close a tie wrap into a circle approximately 19.05 mm (0.750 in) and place it between the front door hinge cylinder and the door **6**. Tape the tie wrap to the door. See Figure 289 on page RELOC-7.
16. Close the rear door and lock it.
17. Wrap the library manager keyboard with air cap P/N 6934015 and tape it in place.
18. Wrap the door keys in micro foam P/N 7332979 and place them behind the door handle and tape across the handle to secure the keys.
19. Wrap tape around the L1x frame, once about 18 in. from the top and again about 24 in. from the bottom.
20. Place a poly bag **3** P/N 50G0928 over the L1x frame and then tape corner boards **4** P/N 7354990 in place on all 4 corners. See Figure 289 on page RELOC-7.

21. Wrap tape around the L1x frame about 18 in. from the top and again about 24 in. from the bottom.
22. Place the packing instructions in the envelope provided P/N 72X5891 and stick it on the machine poly bag **5** . See Figure 289 on page RELOC-7.

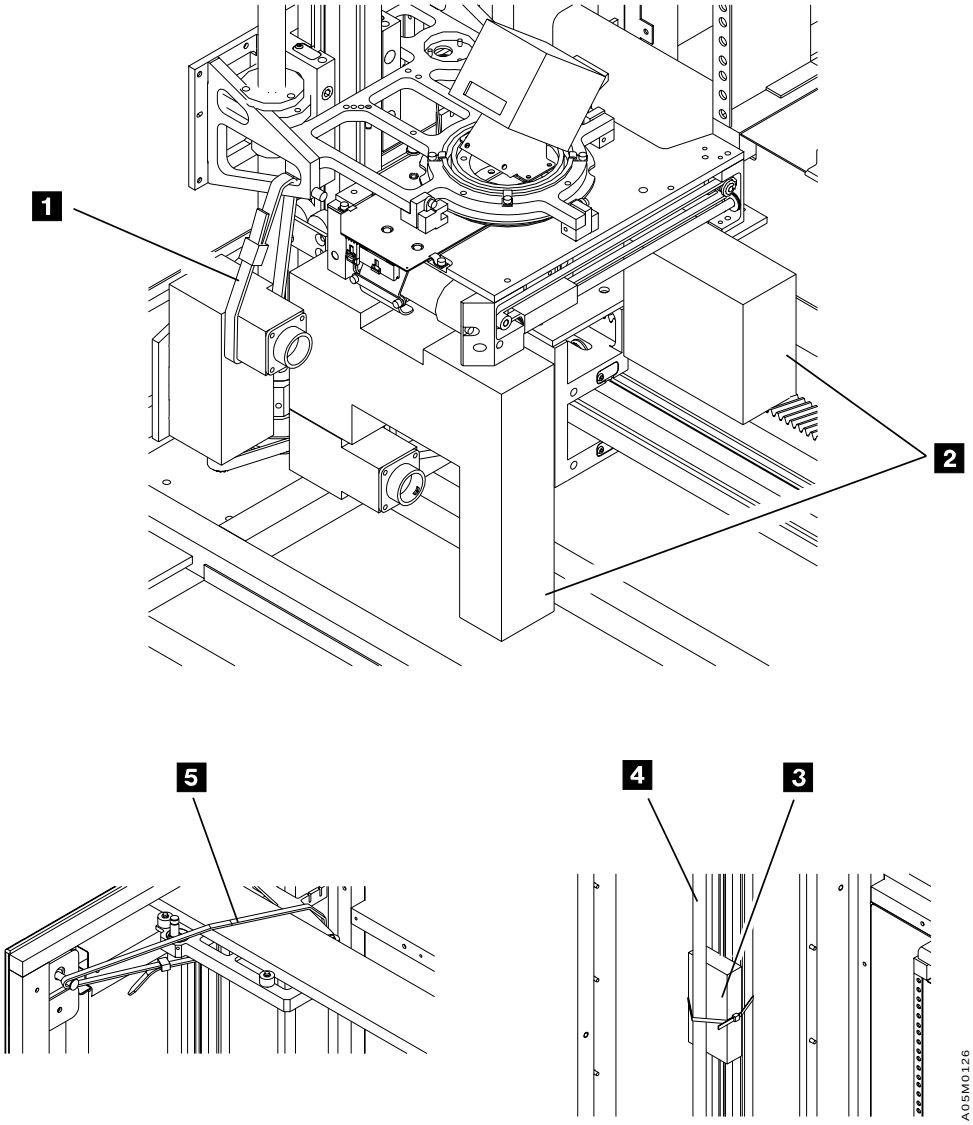

Figure 288. Control Unit Packing

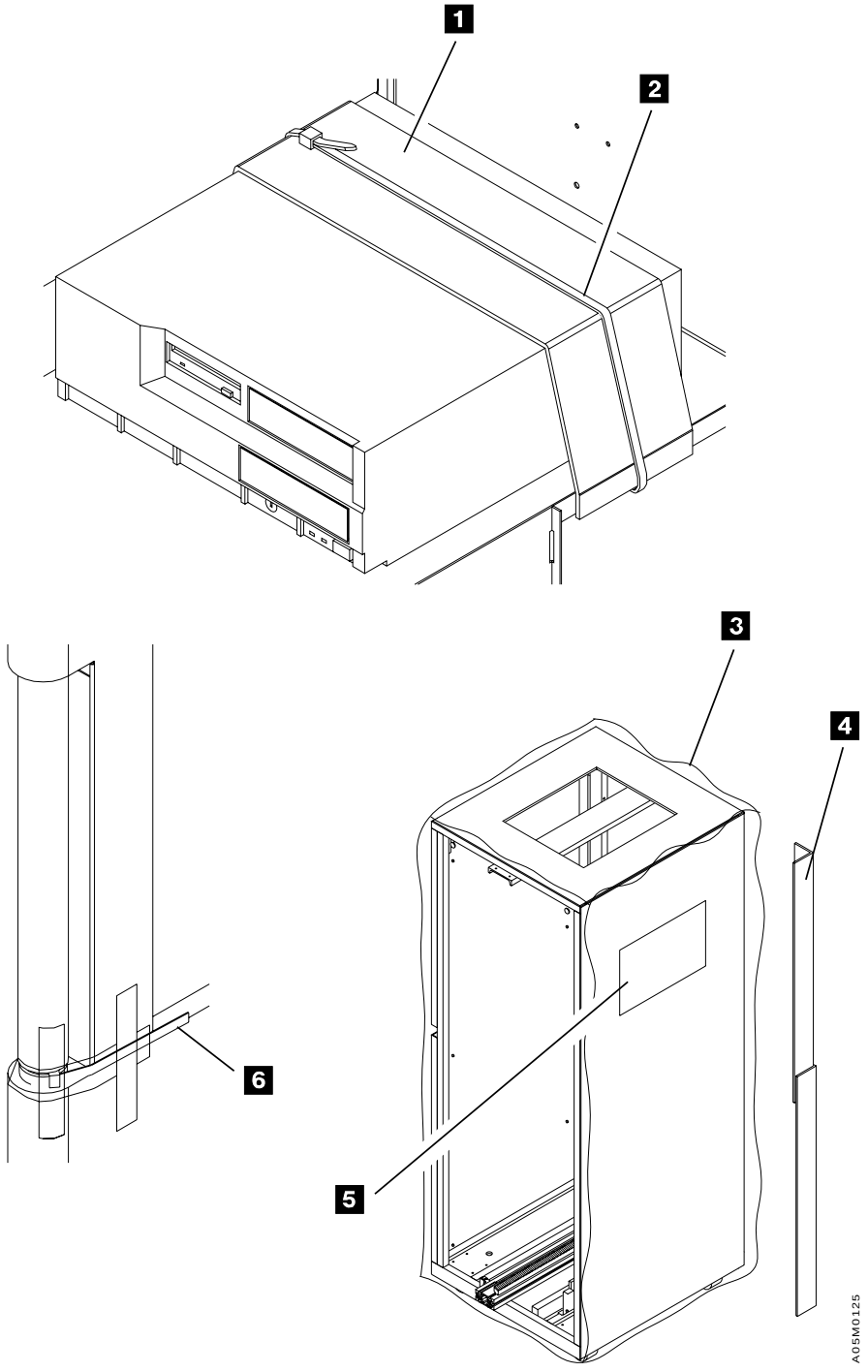

Figure 289. All Frames Packing

Pack B1x or D1x Frame

1. Tighten the upper rail guide screws. Wrap bubble wrap around the end of the rail that sticks out of the frame and tape it in place.
2. If the frame has an alignment rod, wrap bubble wrap or foam around the end of the rod that sticks out of the frame and tape it in place.
3. Wrap the X-rail assembly in bubble wrap and tape it to the base of the frame.
4. Wrap the frame spacers in bubble wrap and tape them inside the frame.
5. Pack all loose hardware in a small box and tape it to the base of the frame.
6. Close the rear door and lock it.
7. Close the front door and lock it.
8. Close a tie wrap into a circle approximately 19.05 mm (0.750 in.) and place it between the front door hinge cylinder and the door **6**. Tape the tie wrap to the door. See Figure 289 on page RELOC-7.
9. Wrap the keys for the frame in bubble bag P/N 7320020, put them behind the door handle, and tape over the door handle to secure the keys.
10. Place a poly bag P/N 50G0928 over the frame and tape corner boards on each corner. Then wrap tape around the top of the frame about 45.720 cm (18 in.) down from the top. See Figure 289 on page RELOC-7.
11. Wrap tape around the bottom of the frame about 60.960 cm (24 in.) up from the bottom.
12. Repeat this procedure for each B1x or D1x frame attached to the library.

Pack S10 Frame

1. Tighten the upper rail guide screws. Wrap bubble wrap around the end of the rail that sticks out of the frame and tape it in place.
2. If the frame has an alignment rod, wrap bubble wrap or foam around the end of the rod that sticks out of the frame and tape it in place.
3. Wrap the X-rail assembly in bubble wrap and tape it to the base of the frame.
4. Wrap the frame spacers in bubble wrap and tape them inside the frame.
5. Pack all loose hardware in a small box and tape it to the base of the frame.
6. Close the front door and lock it.
7. Close a tie wrap into a circle approximately 19.05 mm (0.750 in.) and place it between the door hinge cylinder and the door **6**. Tape the tie wrap to the door. See Figure 289 on page RELOC-7.
8. Place door keys in a bubble bag P/N 92X9783 and put them behind the door handle. Tape over the door handle to secure keys.
9. Place poly bag P/N 50G0928 over the frame and tape corner boards on each corner of the frame. See Figure 289 on page RELOC-7.
10. Tape around the top of the frame, about 45.720 cm (18 in.) down from the top and again around the bottom of the frame, about 60.960 cm (24 in.) up from the bottom.
11. Repeat this procedure for each S10 frame attached to the library.

Glossary

This glossary defines the special terms, abbreviations, and acronyms used in this publication. If you do not find the term you are looking for, refer to the index or to *IBM Dictionary of Computing*, ZC20-1699. The *IBM Dictionary of Computing* is also available from New York: McGraw-Hill, 1994.

An asterisk following a term indicates that the term requires a trademark.

Numerics

3490E. A magnetic tape subsystem with enhanced capability. Models C1A and C2A are IBM 3490 Magnetic Tape Subsystem Enhanced Capability models.

3494 Tape Library Dataserver. An automated tape library consisting of mechanical mechanisms, cartridge storage frames, IBM tape subsystem, and controlling hardware and software.

A

accessor manager component. The software component of the 3494 that controls the cartridge accessor, the bar-code reader assembly, and the convenience input/output station.

action bar. In the library manager application, the area at the top of the primary window that contains keywords that give users access to actions available in that window. After users select a choice in the action bar, a pull-down extension is displayed.

active window. In the library manager, the window that is in current use and which receives keyboard input.

aisle. The area within the frames that contains the cartridge accessor and the cartridge storage cells.

American National Standard Code for Information Interchange. See *ASCII.*

ARTIC. A real-time interface coprocessor.

ASCII. American National Standard Code for Information Interchange. The standard code, using a coded character set consisting of 7-bit coded characters (8-bits including parity check) used for information interchange among data processing systems.

audit. A process by which a specified volser location in the tape library is physically verified.

auto mode (3494). One of the three operational modes for the tape library. In this mode, the attached host systems direct the operation of the tape library without operator interaction. See also *manual mode (3494)* and *pause mode (3494)*

available. The term used to indicate that a component is available for use by the library manager. Components in the tape library (cartridge accessor, picker, convenience input/output station, and tape drives) are either available or unavailable for use. Compare with *online*.

B

basic input/basic output system (BIOS). A layer of software that is built into your computer. It translates instructions from other layers of software into code the computer can understand.

bar code. A code representing characters by sets of parallel bars of varying thickness and separation that are read optically by scanning.

bar-code reader. A class II laser bar-code reader used to identify tape cartridge labels and other features in the 3494.

baud. The unit of modulation rate for the transmission of data.

BIC. Bulkhead interconnection card.

BIOS. See *basic input/basic output system.*

bulkhead. The panel that separates the operator area and the service area in the control unit frame and the drive unit frame.

C

cable trough. The cable guide adjacent to and parallel with the X-rail assembly. Also called the cable channel.

calibration sensor. A sensor that mounts on the picker and provides a means to locate certain positions within the library during the teach operation. All other positions are calculated from these locating positions.

carrier. The platform that provides mounting attachments for the cartridge accessor and X axis drive.

cartridge. Term used to refer to either the IBM Cartridge System Tape or the IBM Enhanced Capacity Cartridge System Tape.

cartridge accessor. The physical mechanisms, within the tape library, that identify, retrieve, and move tape cartridges. It consists of a picker, a bar-code reader, a calibration sensor, and an accessor mechanism.

cartridge automation. The process where the tape library automatically performs actions for inserting, ejecting, mounting, demounting, loading, and unloading of tape cartridges.

Cartridge System Tape. The base tape cartridge media that is used with 3480, 3490, and 3490E Magnetic Tape Subsystems.

category. A grouping of volumes that have a common attribute, such as volumes to eject, volumes newly added to the library, and volumes to clean devices.

Caution notice. A special note in text that calls attention to a situation that is potentially hazardous to people because of some existing situation. See also *Danger notice*. Contrast with *Warning notice*.

CCW. channel command word.

cell. See *storage cell*.

channel command. An instruction that directs a data channel, control unit, or device to perform an operation or set of operations.

channel command word. A double-word at the location in main storage specified by the channel address word. One or more CCWs make up the channel program that directs data channel operations.

check box. On the library manager screen, a control that consists of a displayed square box and selectable text. It acts like a switch.

Check 1. An error from which there is no recovery. A Check 1 error is so serious that recovery is not possible or safe because the reliable operation of the 3490E subsystem or the library manager is not possible without a complete restart.

click. With the library manager, the act of pressing a pointing device button while holding the pointing device pointer on the selected text. See also *double-click*.

client area. The area in the center of a window that contains the main information of the window.

code. The term used to refer to the internal programs that comprise the library manager application. See *microcode*.

command. A control signal that initiates an action or the beginning of a sequence of actions.

component. A part of a functional unit; for example, the grip assembly is a component of the cartridge accessor.

control program. The program in the host system that schedules and supervises the execution of application programs.

control unit frame. The frame that contains a 3490E Model C1A or Model C2A, the library manager, the cartridge accessor, up to 240 cartridges, and if installed, the Convenience Input/Output Station feature. See also *drive unit frame* and *storage unit frame*.

convenience input. The term used when loading small numbers of tape cartridges into the tape library using the convenience input/output station.

convenience input/output station. The part of the tape library used to load or unload small numbers of cartridges into the tape library.

convert. To change the representation of data from one form to another, without changing the information they convey.

CU. Control unit frame.

D

Danger notice. A special note in text that calls attention to a situation that is potentially lethal or extremely hazardous to people. See also *Caution notice*. Contrast with *Warning notice*.

database. A collection of data that can be accessed by a data processing system for a specific purpose.

default value. A value assumed when no value has been specified.

deferred unit check. A condition in which the 3490E subsystem or library manager returns a unit check indication for an event that occurred asynchronously with the channel commands.

demount. (1) A host command to unload a cartridge from a tape drive. (2) The act of unloading a cartridge from the tape drive.

dialog box. With the library manager, a moveable window, fixed in size, that requests information from the user.

DI/DO. Digital input/digital output.

diskette. A thin, flexible magnetic disk and a protective jacket, in which the disk is permanently enclosed. See also *hard disk*.

door. The opening to gain access into a frame.

double-click. With the library manager, the act of pressing a mouse button twice within a time limit while holding the mouse pointer on the selected text. See also *click*.

drive unit frame. The frame that contains a 3490E Model C1A or Model C2A and up to 300 cartridges. See also *control unit frame* and *storage unit frame*.

DU. Drive unit frame.

dump. To record data, at a particular instant, for the purpose of safeguarding or analyzing.

E

eject. The operation of moving a cartridge to an output station in the tape library.

emergency motion off (EMO). A condition by which servo power to the X-and Y-axis motors is removed. For example, opening an operator door while the library manager is in auto mode causes this condition.

Emergency Power Off (EPO). A switch that removes all power from the equipment in the 3494 but does not affect power to lighting circuits.

enable. To provide the means or opportunity. The modification of system, control unit, or device action through the change of a software module or a hardware switch (circuit jumper) position.

Enhanced Capacity Cartridge System Tape. Cartridge system tape with increased capacity that can be used with 3490E enhanced capability models only. Visually identified by a two-tone cartridge case.

EMO. See *emergency motion off*.

EPO. See *Emergency Power Off*.

ERA. See *error recovery action*.

ERAP. See *error recording analysis procedure*.

EREP. Environmental Record Editing and Printing Program. A program that makes the data contained in the system recorder file available for further analysis.

ERP. See *error recovery procedure*.

error recording analysis procedure (ERAP). An IBM-supplied program that processes and records errors related to the system.

error recovery action (ERA). A code in the 3490E subsystem or library manager sense bytes that identifies a host performed recovery action.

error recovery procedure (ERP). Procedures designed to help isolate and, where possible, to recover from errors in equipment.

F

fiducial. See *standard reference*.

file protected. Pertaining to a tape volume from which data can be read only. Data cannot be written on or erased from the tape.

frame. (1) The basic unit from which the library is constructed. See *control unit frame, drive unit frame*, and *storage unit frame*. (2) The hardware support structure, covers, and all parts mounted therein that are packaged as one entity for shipping.

FRU. Field replaceable unit. A unit or part that can be replaced by a service representative.

G

get. The moving of the cartridge accessor and the mechanical transfer of a tape cartridge from a cell to the grip. See also *put*.

grip. A part attached to the picker of the cartridge accessor that loads or unloads cartridges from storage cells, the convenience I/O station, or the tape drive.

H

hard disk. A rigid magnetic disk such as the internal disk used in personal computers. See also *diskette*.

high-capacity output facility. The part of the tape library used to unload large numbers of cartridges from the library.

host system. A data processing system that is used to prepare programs and the operating environments for use on another computer or controller.

I

icon. A pictorial representation of an object or a selection choice. Icons can represent objects that users want to work on or actions that users want to perform. See *system menu icon*.

improved data recording capability (IDRC). A data recording mode that, if installed and enabled on the 3490E Magnetic Tape Subsystem, can increase the effective cartridge data capacity and the effective data rate if invoked.

initial program load (IPL). The initialization procedure that causes an operating system to commence operation.

insert. The operation of adding cartridges to the tape library. See also *eject*.

install. (1) To add a program, program option, or software to a system in such a way so that it runs and interacts correctly with all programs in the system. (2) To connect hardware to a system; to mount in position, correctly attached and connected.

inventory. The operation of identifying the location of each tape cartridge contained in the tape library.

invoke. To start a command, procedure or program. The request for a feature or function to be used in future processing activities by using software or hardware commands.

IPL. Initial program load.

L

Library Attachment Facility. The Library Attachment Facility consists of a card and associated microcode that when installed in a 3490E tape control unit, allows host communication with the tape library.

library manager. (1) The controller for the 3494. It manages the location of tape cartridges, monitors performance, issues commands to the hardware, displays status, and performs other functions. It communicates with host systems through the tape control unit in each 3494 and provides operator and service panel functions. (2) The software component of the 3494 that controls the interfaces to the 3490E tape subsystem, interfaces to the host, cartridge inventory, and the interfaces to the accessor manager software component. See also *accessor manager component*.

load. (1) The process, performed by an operator or by the cartridge accessor, of placing a cartridge into a location within the tape library for later use or retrieval. (2) The term used when describing the action of the tape transport when it removes the leader block from a cartridge and threads the media through the internal tape path.

log. The action of writing information to a file. See also *trace*.

LPN card. Operator panel card.

M

manual mode (3494). One of the three modes of operation in the tape library. In this mode, the operator, under the direction of the library manager, manually locates and moves tape cartridges to and from storage cells and tape drives. This mode allows data to be retrieved when normal tape library operations are interrupted by unexpected conditions. See also *auto mode (3494)* and *pause mode (3494)*.

menu. A panel containing a list of functions available for selection.

mirrored hard drive. Library manager hardware and code that automatically maintains a mirror image of the primary hard drive on the secondary hard drive. This mirror image is used to restore the primary hard drive in the event of a failure.

mount. A host command to load the cartridge into a tape drive.

MVS. Multiple Virtual Storage. Implies MVS/370, MVS/XA*, and MVS/ESA*.

O

offline. Pertaining to the operation of a unit when not under the direct control of a host system. Compare with *unavailable*. Contrast with *online*.

OK. With the library manager, a standard push button that causes the application to accept any changed information and close the dialog box.

online. Pertaining to the operation of a unit when under the direct control of a host system. Compare with *available*. Contrast with *offline*.

P

panel. (1) A control area on a machine that allows user interaction with the machine. (2) The information that is displayed on a screen.

pause mode (3494). One of the three modes of operation for the tape library. In this mode, all host commands that require movement of cartridges are queued until the tape library is returned to auto mode. See *auto mode (3494)* and *manual mode (3494)*.

PCC. Power control compartment.

picker assembly. The picker provides a mounting platform for the grip assembly and the bar-code reader. The picker is the part of the cartridge accessor that picks the cartridges.

pivot sensors. Sensors located on the reach assembly used to verify the front, center, and rear position of the grip assembly.

pop-up window. On the library manager, a selectable window, in which users provide information that is required by an application so it can continue a user's request.

POST. See *power-on self-test*

power-on self test. An automatic test that is run on the library manager when power is applied.

primary window. The window on the library manager screen in which the main dialog between users and the library manager takes place.

pull-down. An extension of the action bar that displays a list of choices available for a selected choice in the action bar. When an action bar selection is made the pull-down appears. Additional pop-up windows can appear from pull-down choices.

push button. On the library manager screen, a shaded rectangle, containing text and used in pop-up windows to initiate actions. Selecting a push button causes an action to take place immediately.

put. The moving of the cartridge accessor and the mechanical transfer to a tape cartridge from the gripper to a cell. See also *get*.

R

radio button. On the library manager screen, a control that consists of a circle and text. Radio buttons are combined to show users a fixed set of choices that are mutually exclusive. Clicking on a radio button causes that choice to be selected and all others in its group to be de-selected.

reserved storage cell. A cell in the control unit frame that is reserved for use by the service representative.

RS-232C. An EIA standard for serial interfaces between computers and communication equipment, using serial data interchange.

RS-422. An EIA standard for serial interfaces between computers and communication equipment, using serial data interchange.

S

screen. The viewing area of a workstation's display.

secondary window. A window, on the library manager, that is movable and sizeable and is always associated with a primary window.

selection list. On the library manager screen, a control that contains choices from which users can select one choice.

snooze. A library manager function provided to conserve power and to increase the reliability of the display hardware. If the library is powered on and the display is off, the operator can press any key on the keyboard to activate the display.

standard reference. A common point of reference against which other parts of the subsystem are measured.

storage. (1) A device into which recorded information can be entered, retained, and processed, and from which it can be retrieved. (2) The action of placing data into a storage device. (3) A facility in which data can be retained.

storage unit frame. The frame that contains up to 400 cartridges. See also *control unit frame* and *drive unit frame*.

storage cell. A location in the tape library where a cartridge can be loaded or unloaded. This includes the storage cells in a storage frame and the convenience input/output station.

SU. Storage unit frame.

synchronization. The state of having events in coexistence.

system menu. On the library manager screen, the pull-down in the top left-hand corner of a window that allows users to restore, close, move, size, minimize, and maximize the window. The system menu is referenced by the system menu icon.

system menu icon. The term for the symbol found in the top left-hand corner of some windows that is used to control the presence and appearance of those windows. See *system menu*.

T

tape control unit. A unit that controls tape drives and communicates with the host processors. See also *tape drive*.

tape drive. A device that is used for moving magnetic tape and includes the mechanisms for writing and reading data to and from tape. See also *tape control unit* and *transport*.

tape library. A term used to refer to the customer's collection of tapes. Within the 3494, it is the set of cartridges contained within the enclosure.

title bar. The area at the top of each window that contains the window title and system-menu icon. When appropriate, it also contains the minimize, maximize, and restore icons.

trace. The action of recording a sequence of events in memory (not to a file). See also *log*.

track ball. A ball, rotating about its center, that is used as an input device, normally as a locator.

transport. The mechanism inside a tape drive that moves tape media. It is comprised of loading, threading and guiding mechanisms and motors.

U

unavailable. A term used to indicate that a component in the tape library (for example, the cartridge accessor) is unavailable for use by the library manager. Compare with *offline*. Contrast with *available*.

unit. (1) An entity capable of accomplishing a specific purpose; for example, a 3490E tape drive. (2) An individual piece of the tape library that can be added or deleted from a tape library configuration, for example: 3490E tape drive, storage unit frame, drive unit frame, or I/O station.

Unit Emergency Power Off (UEPO). The switch that, when operated in an emergency, shuts power down in the control unit frame and all attached drive unit frames.

Unit Power Off (UPO). A switch that removes all power from a specific unit of the tape library. For example, a 3490E UPO removes power from a 3490E subsystem.

unload. To remove cartridges from a 3490E drive.

V

vision system. See *bar-code reader*.

volser. Volume serial identifier. The physical label on the cartridge. Also, the same or different identifier encoded on the magnetic tape.

volume. See *cartridge*.

W

Warning notice. A special note in text that calls attention to the possibility of damage to a program, device, system, or data. Contrast with *Caution notice*.

X

X-axis assembly. The axis that allows the cartridge accessor to move horizontally along the rail system.

Y

Y-axis assembly. The axis that allows the cartridge accessor to move vertically within the library.

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Special Characters

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