RS/6000

# Adapters, Devices, and Cable Information for Micro Channel Bus Systems

**Seventh Edition (November 2000)**

Before using this information and the product it supports, read the information in Appendix A, "Notices" on page A-1.

# Contents

# Laser Safety Information

The optical drive is a laser product. The optical drive has a label that identifies its classification. The label, located on the drive, is shown below.

```
CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL À LASER DE CLASSE 1
TO IEC 825:1984//CENELEC HD 482 S1.
```

The optical drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 (1st edition 1984) and CENELEC EN 60 825:1991 for Class 1 laser products.

**CAUTION:**
**A class 3 laser is contained in the device. Do not attempt to operate the drive while it is disassembled. Do not attempt to open the covers of the drive as it is not serviceable and is to be replaced as a unit.**

Class 1 laser products are not considered to be hazardous. The optical drive contains internally a Class 3B Gallium Arsenide laser that is nominally 5 Milliwatts at 760 t0 810 Nanometers. The design incorporates a combination of enclosures, electronics, and redundant interlocks such that there is no exposure to laser radiation above a Class 1 level during normal operation, user maintenance, or servicing conditions.

# About This Book

The adapters, devices and cable information in this book is common to many Micro Channel® Bus systems. Care needs to be exercised in that not all adapters and devices apply to all system units. It can be used to help identify an adapter, and designing or servicing cabling layouts for the system. Also included are removal and replacement procedures for some disk drive logic cards and stuck tape removal procedures for some tape drives.

## Audience Description

This book is used by service representatives specifically trained on the system unit being serviced and by persons planning for system installation.

## Overview of Contents

This book provides information to help service representatives and to help persons planning to install systems. It contains the following chapters:

- Chapter 1, "Adapter Information" on page 1-1 presents information on many Micro Channel adapters used with the system units.

- Chapter 2, "Devices Information" on page 2-1 presents information on devices used with the system units.

- Chapter 3, "Cables and Cabling" on page 3-1 presents information on cabling that can be used with the system units.

- Chapter 4, "SCSI Cabling" on page 4-1 presents information on cabling that can be used with the SCSI products with your system.

- Chapter 5, "Cable Assembly and Pin-Outs" on page 5-1 provides pin-out charts for cables you may want to build yourself or have built by a vendor.

## ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

## Online Publications

RS/6000® publications are available online. To access the online books, visit our Web site at: `http://www.rs6000.ibm.com/resource/hardware_docs/`

## Related Publications

The following is a list of publications that provide information on systems and related products.

- *5080 Graphics System Installation, Operation, and Problem Determination* manual, Order Number GA23-2063.

- *7235 POWER GtO® Installation and Service Guide*, Order Number SY66-0216.

- *7250 POWER GXT1000™ GRAPHIC Accelerator Service Guide*, Order Number SY66-0219.

- *AIX Versions 3.2 and 4 Asynchronous Communications Guide*, Order Number SC23-2488.

- *Block Multiplexer Channel Adapter User's Guide and Service Information*, Order Number SC23-2427 for more detailed information on planning for, installing, and operating the adapter.

- *Block Multiplexer/6000 User's Guide and Programming Reference*, Order Number SC28-2824 for cabling information.

- *DirectTalk/6000™ Problem Solving Guide*, Order Number SC22-0105.

- *Enterprise System Connection™ Adapter User's Guide and Service Information*, Order Number SC23-2474.

- *ESCON® Link Planning*, Order Number GA23-0367.

- *FDDI Adapter User's Guide and Programming Reference*, Order Number SC23-2426.

- *FDDI Introduction and Planning Guide*, Order Number GA27-3892, for more information about jumper cables, planning, design or installation of FDDI systems.

- *FDDI Optical Fiber Planning and Installation Guide*, Order Number GA27-3943 for information regarding FDDI optical systems.

- *Fiber Optic Link Maintenance*, Order Number SY27-2597

- *Planning for Enterprise System Connection Links*, Order Number GA23-0367.

- *Diagnostic Information for Micro Channel® Bus Systems* , Order Number SA38-0532.

- *Site and Hardware Planning Information*, Order Number SA38-0508 is a planning and site preparation guide.

- *7133 SSA® Disk Subsystem Hardware Technical Information*, Order Number SA33-3261.

- *SSA 4-Port RAID Adapter: Technical Reference*, Order Number SA33-3270.

- *System/360, System/370, 4300, 9370 and ES/9000® Processors Input Output Equipment Installation Manual—Physical Planning*, Order Number GC22-7064, for information as some devices may require additional cable length calculations and for details and restrictions regarding channel cabling.

- *System/360™ and System/370® Power-Control Interface Original Equipment Manufacturers' Information*, Order Number GA22-6906.  The remote power interface as described above is not supported on the system.

- Token-Ring IEEE 802.5 requirements

- *Token-Ring Network Introduction and Planning Guide*, Order Number GA27-3677.

- *A Building Planning Guide for Communication Wiring*, Order Number G320-8059.

- *Cabling System Planning and Installation Guide*, Order Number GA27-3361.

- *Using the Cabling System with Communication Products*, Order Number GA27-3620.

## Ordering This Publication

To order additional copies of this book, contact your sales representative and use Order Number SA38-0533.

## Trademarks

The following are Registered Trademarks of the International Business Machines Corporation in the United States, and other countries, or both.

| | |
|---|---|
| AIX | AIXwindows |
| DirectTalk/6000 | Enterprise Systems Architecture/390 |
| Enterprise Systems Connection | ESCON |
| ES/3090 | GXT150L |
| GXT150M | GXT1000 |
| IBM | LANStreamer |
| Micro Channel | Portmaster |
| POWER GtO | POWER Gt1 |
| POWER Gt3 | POWER Gt3i |
| POWER Gt4 | POWER Gt4e |
| POWER Gt4i | POWER Gt4x |
| POWER Gt4xi | RS/6000 |
| SSA | S/370 |
| System/360 | System/370 |
| TURBOWAYS | Ultimedia |

Other company, product, and service names may be trademarks or service marks of others.

# Chapter 1. Adapter Information

## Description of the Adapter Information

This chapter contains service and connector data for the adapters installed within system units. The specific information about these adapters is updated for most versions of the diagnostic programs.

## How to Use the Adapter Information

The information about adapters contained in this book is used during non-directed service activities and for new system installations. The information in this chapter is used to:

- Identify an adapter.
- Find specific technical information about an adapter.
- Show signal names for the output pins of most of the adapter connectors.
- Where applicable, show the settings for switches or jumpers.

When a "Microcode file name" is given for an adapter, the file is located in the */etc/microcode* directory unless the complete path name is given. The italic *x* within a file name represents a variable name or number, such as the version number or the release number.

The adapters are labeled to identify the adapter type. If you know the adapter type number, use the Adapter Identification Label Cross-Reference List on the following page to find the name of the adapter. You can also use the About Your Machine listing shipped with your system unit to identify an adapter.

This drawing shows how an adapter is labeled.

**Adapter Type
Label**

**Note:** The end brackets of non-OEM SCSI-2 differential adapters also carries the label, "Differential".

OEM SCSI-1 or SCSI-2 single-ended, SCSI-2 differential, and SCSI single ended / low voltage differential controllers may carry one of the following ANSI icons:
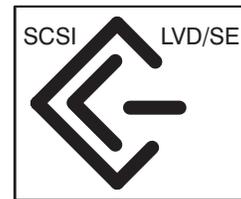
| SCSI          SE | SCSI          DIFF | SCSI          LVD/SE |
|:---:|:---:|:---:|
| Single-Ended | Differential | Low Voltage Differential/ Single-Ended |

# CSU/CE Feature Installation

**Attention**: The following information indicates which features on various RS/6000 systems/models are intended to be installed by the customer and which features are to be installed by a Customer Engineer/Customer Service Representative (CE/CSR) as part of a Miscellaneous Equipment Specification (MES). This information is for RS/6000 systems/models available as of 09-2000.

**Notes:**

1. The acronym CSU means Customer Set-Up.
2. For description of Feature Codes listed below see page 1-3.
3. The 7013 Model J30 was announced as CSU.  U.S. practice has been for CE installation.

| Machine Type | Model | System CSU [1] | Features/Options [2] | |
|---|---|---|---|---|
| | | | **CE Install** | **Customer Install** |
| 7006 | (All) | Yes | All Features | None |
| 7007 | (All) | Yes | All Features | None |
| 7008 | (All) | Yes | All Features | None |
| 7009 | (All) | Yes | All Features | None |
| 7010 | (All) | Yes | All Features | None |
| 7011 | (All) | Yes | All Features | None |
| 7012 | (All) | Yes | All Features | None |
| 7013 | (All) [3] | No | All Features | None |
| 7015 | (All) | No | All Features | None |
| 7017 | (All) | No | All Features | None |
| 7024 | (All) | Yes | FC 6309 | All Other Features |
| 7025 | (All) | Yes | FC 2856, 6309, 6549 | All Other Features |
| 7026 | (All except B80) | No | All Other Features | FC 2901, 2908, 2909, 2911, 2913, 3071, 3072, 3074, 3078, 3079, 3083 |
| 7026 | (B80) | Yes | FC 4361, 4362, 4363 | All Other Features |
| 7027 | (All) | No | All Other Features | FC 2616, 3080, 3083, 3084, 3090, 6142, 6147, 3133, 3134, 3137, 3138, 6153, 6294, 6295 |
| 7043 | (All) | Yes | FC 2856 & 6309 | All Other Features |
| 7044 | (All) | Yes | FC 2856 & 6309 c.All Other Features | |
| 7046 | (All) | Yes | FC 2856 & 6309 | All Other Features |
| 7236 | (All) | No | All Features | None |
| 7248 | (All) | Yes | FC 2856 | All Other Features |
| 7317 | (All) | No | All Features | None |
| 7318 | (All) | No | All Features | None |
| 7319 | (All) | No | All Features | None |

| Feature Code | Feature Code Description |
|---|---|
| 2616 | Internal CD-ROM 2/4X/Tray Loading, 600KB/s |
| 2856 | PCI/Short/32bit/3.3 or 5V, 7250 Attach Adapter |
| 2901 | 4.5GB F/W Ultra SCSI DASD Module |
| 2908 | 9.1GB Ultra SCSI DASD Module |
| 2909 | 18.2GB Ultra SCSI DASD Module |
| 2911 | 9.1GB F/W Ultra SCSI DASD Module |
| 2913 | 9.1GB F/W Ultra Module, 1" High |
| 3071 | 4.5GB SSA DASD Module, 1" High |
| 3072 | 9.1GB SSA DASD Module, 1.6" High |
| 3074 | 9.1GB SSA DASD Module, Hot Swap |
| 3078 | 9.1GB SSA DASD Module, 10K |
| 3079 | 9.1GB SSA DASD Module, 10K |
| 3080 | 4.5GB F/W SCSI DASD Module |
| 3083 | 2.2GB F/W SCSI DASD Module |
| 3084 | 4.5GB F/W SCSI DASD Module |
| 3090 | 9.1GB F/W SCSI DASD Module |
| 3133 | Cable SCSI, 3M, to F/W MC SCSI Adapter (SE OR Diff) |
| 3134 | Cable SCSI, 6M, to F/W MC SCSI Adapter (SE OR Diff) |
| 3137 | Cable SCSI/DIFF, 12M, to F/W MC SCSI Adapter |
| 3138 | Cable SCSI/DIFF, 18M, to F/W MC SCSI Adapter |
| 4361 | 1-Way 375MHz POWER3-II Processor Card |
| 4362 | 2-Way 375MHz POWER3-II Processor Card |
| 4363 | 2-Way 375MHz POWER3-II Processor Card (8MB L2/Processor) |
| 6142 | Internal 4mm 4/8GB Tape |
| 6147 | 8mm 5/10GB VDAT Tape |
| 6153 | 4mm Tape Drive + Autoloader, Horizontal |
| 6294 | Optional AC Power Supply for 7027 SCSI Drawers |
| 6295 | Optional bifurcated (Y-cable) Power Cord for 7027 SCSI Drawers |
| 6309 | Digital Trunk Quad Adapter, PCI/Long/32Bit/5V |
| 6549 | Additional Power Supply for 2nd and 3rd 6-Pks on Model F40 |

# Adapter Identification Reference List for IHV Supplied Adapters

**Note:** The following adapters are supplied by Indpendent Hardware Vendors (IHVs). They are presented here as a service aid.

| Type Label | Description | FRU Part Number |
|---|---|---|
| 9-M | Eicon ISDN DIVA MCA Adapter for PowerPC Systems | 93H5497 |

# Adapter Identification Label Cross-Reference List

**Note:** This chapter is arranged by adapter type number.

**Note:** Adapters shown with a * do not have an assigned adapter type.

# FC (2770) Color Graphics Display Adapter (Type 1-1)

This adapter provides a way to attach the 5081 and 6091 displays to the system units.

Note: Be Sure the Cable Plug Aligns
Correctly With the Connector .
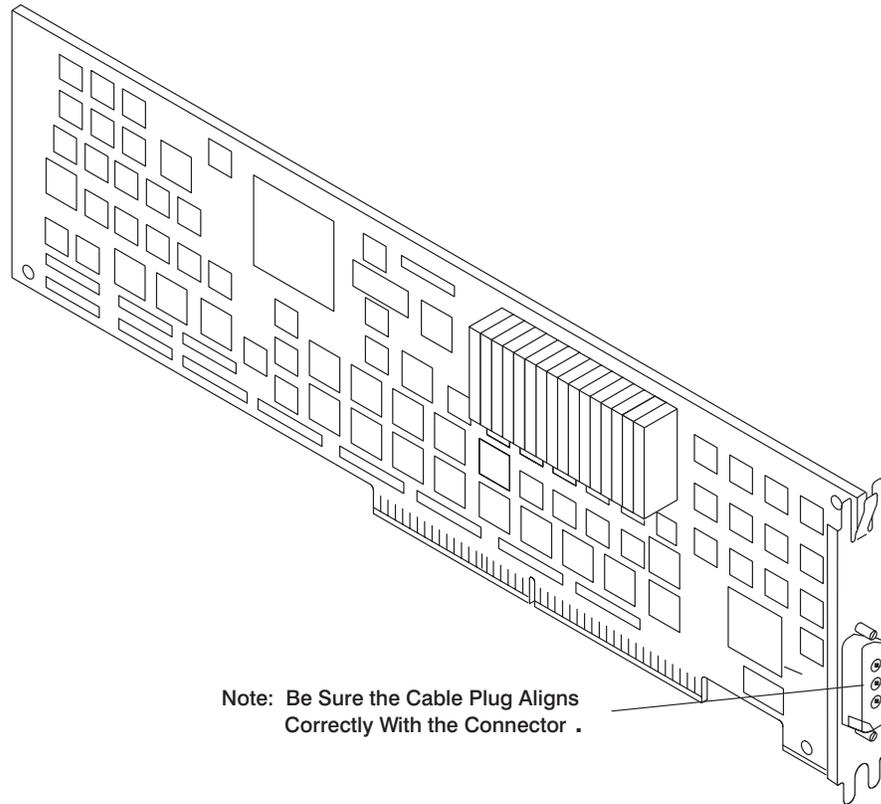
## Color Graphics Display Adapter Specifications

FRU Number              71F1223
Resolution              1280 X 1024
Colors                  16M (256 active)
Bus architecture        Micro Channel
Adapter size            Type5
Busmaster               Yes
Maximum number          2
Connector               3-position video
Cables                  Part number 58F2903.

## Color Graphics Display Adapter 3-Position RGB Video Connector

Position 1 - Red

Position 2 - Green

Position 3 - Blue
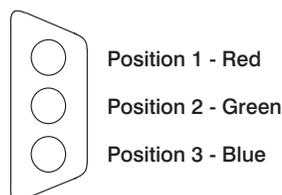
# FC (2760) Grayscale Graphics Display Adapter (Type 1-2)

This adapter provides a way to attach the 8508 Monochrome Display to the system units.
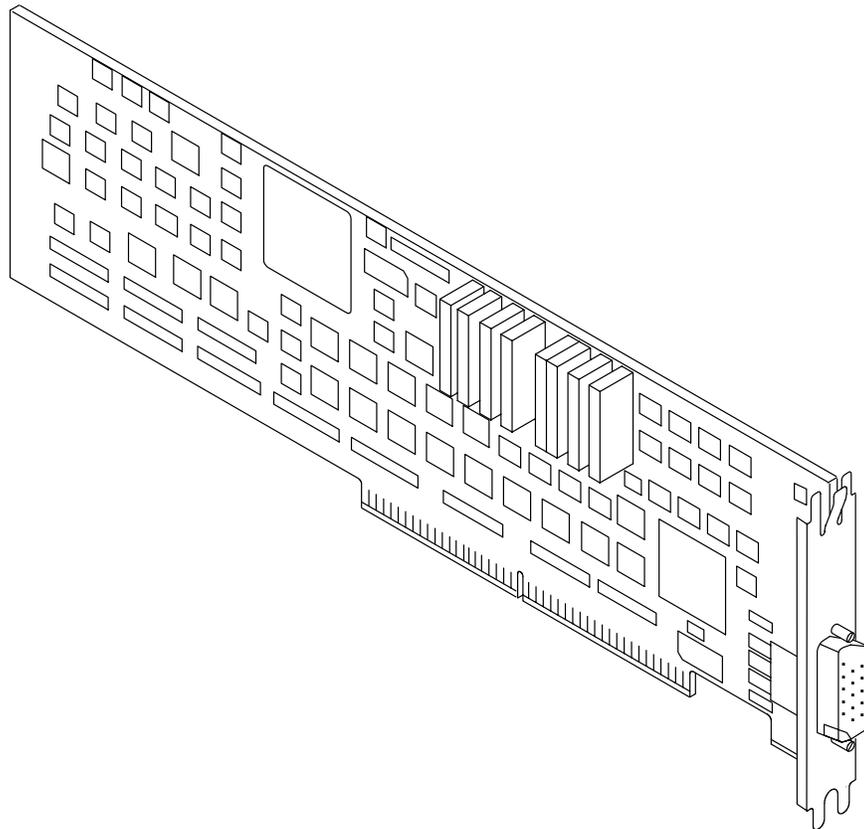
## Grayscale Graphics Display Adapter Specifications

| | |
|---|---|
| FRU Number | 71F1224 |
| Resolution | 1280 X 1024 |
| Shades of gray | 256 (16 active) |
| Bus architecture | Micro Channel |
| Adapter size | Type5 |
| Busmaster | Yes |
| Maximum number | 2 |
| Connector | 15-position, D-shell |
| Cables | Attached to the display (two toroid kits, part number 59F4585, are required). |

# Grayscale Graphics Display Adapter 15-Position HD-15 Connector
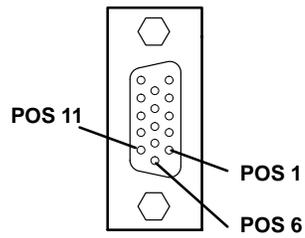


| Position | Signal Name |
|----------|-------------|
| 1 | Reserved |
| 2 | Video |
| 3 | Reserved |
| 4 | Reserved |
| 5 | Signal ground |
| 6 | Reserved |
| 7 | Video return |
| 8 | Reserved |
| 9 | Reserved |
| 10 | Sync return |
| 11 | Reserved |
| 12 | Reserved |
| 13 | Horizontal sync |
| 14 | Vertical sync |
| 15 | Reserved |

# FC (2780) 8-Bit 3D Color Graphics Processor (Type 1-3)

This adapter provides a high-function graphics adapter for the 5081 and 6091 displays.

The high-performance 8-bit 3D graphics processor requires two adjacent adapter slots. The optional Z-buffer solid rendering option attaches to the video interface card.

**Note:** Be sure each end of the connectors are latched behind the latch bar.

Latch Bar

Base Card (MGE2)

Z-Buffer Option (MZB1)

Video Card (MR V2)

8-Bit Card (MDE1)

Not Used

Note: Be Sure the Cable Plug Aligns
Correctly With the Connector

## 8-Bit 3D Color Graphics Processor Specifications

| | |
|---|---|
| FRU Numbers | Base card part number 42F6842 (MGE2) |
| | Z-buffer option part number 42F6889 (MZB1) |
| | Video card part number 71F1151 (MRV2) |
| | 8-bit card part number 71F1117 (MDE1) |
| | Connector cable (wide) part number 53F3271 |
| | Connector cable (narrow) part number 53F3272 |
| Resolution | 1280 X 1024 |
| Colors | 256 out of 16M |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 2 |
| Microcode filename | 8ee6.xx.xx |
| Connector | 3-position video |
| Cables | Part number 58F2903. |

## 8-Bit 3D Color Graphics Processor 3-Position Video Connector

Position 1 - Red

Position 2 - Green

Position 3 - Blue
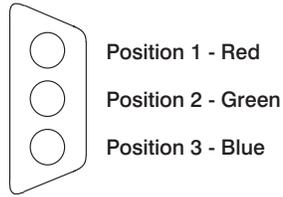
# FC (2781) 24-Bit 3D Color Graphics Processor (Type 1-3)

This adapter provides a high-function graphics adapter for the 5081 and 6091 displays. The high-performance 24-bit 3D color graphics processor requires two adjacent adapter slots. The optional 24-bit Z-buffer solid rendering option attaches to the video interface card.

**Note:** Be sure each end of the connectors are latched behind the latch bar.



Latch Bar

Base Card (MGE2)

Z-Buffer Option (MZB1)

Video Card (MRV2)

24-Bit Card (MEV2)

Not Used

Note: Be sure the cable plug aligns correctly with the connector.

# 24-Bit 3D Color Graphics Processor Specifications

| | |
|---|---|
| FRU Numbers | Base card part number 42F6842 (MGE2) |
| | Z-buffer option part number 42F6889 (MZB1) |
| | Video card part number 71F1151 (MRV2) |
| | 24-bit card part number 71F1114 (MEV2) |
| | Connector cable (wide) part number 53F3271 |
| | Connector cable (narrow) part number 53F3272 |
| Resolution | 1280 X 1024 |
| Colors | 256 out of 16M |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 2 |
| Microcode filename | 8ee6.xx.xx |
| Connector | 3-position video |
| Cables | Part number 58F2903. |

## 24-Bit 3D Color Graphics Processor 3-Position Video Connector

Position 1 - Red

Position 2 - Green

Position 3 - Blue
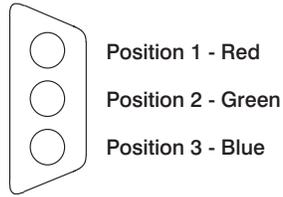
# FC (4350) Graphics Subsystem Adapters (Type 1-4)

There are two types of graphic subsystem adapters labeled 1-4.

This adapter is some times referred to as the GtO Accelerator Adapter.

The first type (not shown) is used only in the 7016 system unit.  It has two internal connectors to attach the graphics subsystem card cage cables and an external 3-position video connector to attach the display.

The second type (shown below) attaches the 7235 POWER GtO to a system unit.  The display attaches to the 7235.  See the *"7235 POWER GtO Installation and Service Guide",* SY66-0216 for additional information about the 7235.  This adapter is part of the GtO system.

This adapter comes with the GtO system.
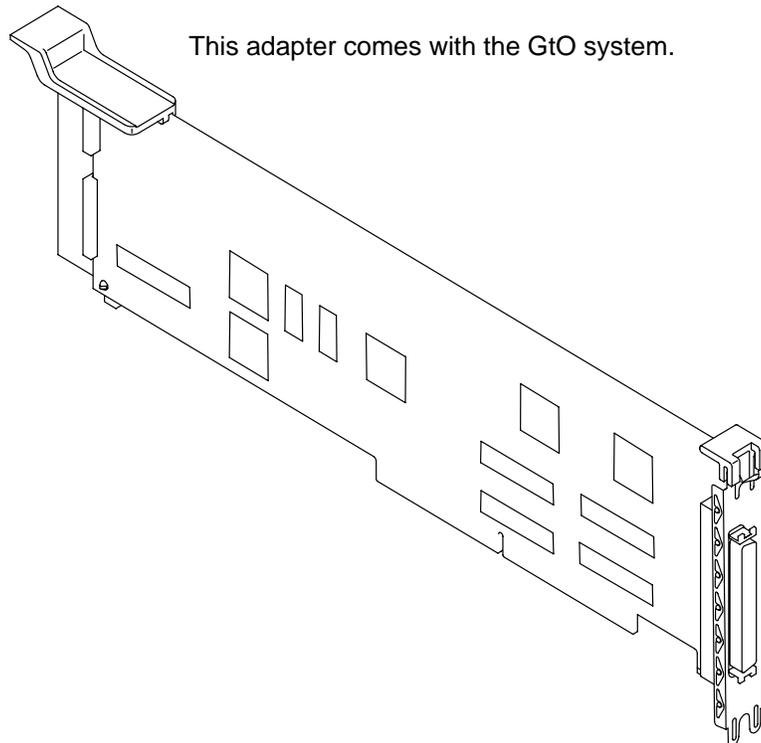
# Graphics Subsystem Adapters Specifications

| | |
|---|---|
| FRU Numbers | First type for 7016, 53F6532 |
| | Second type, 74F3158 |
| Resolution | 1280 X 1024 |
| Colors | 16M (256 active) |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 1 |
| Microcode file names | 8ffdc2.xx.xx |
| | 8ffdgt.xx.xx |
| | 8ffdgu.xx.xx |
| | 8ffdgv.xx.xx |
| | 8ffdsh.xx.xx |
| | 8ffdvp.xx.xx |
| | c25bif.bin |
| | g2c25all.bin |
| | p3gcpbat.bin |
| External connectors | 3-position video (first type) |
| | 68-position D-shell (second type) |
| Cables | First type, part number 58F2903 |
| | Second type, part number 74F3102. |

# Graphics Subsystem Adapter (First type) 3-Position RGB Video Connector

Position 1 - Red

Position 2 - Green

Position 3 - Blue
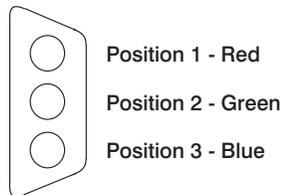
# Graphics Subsystem Adapter (Second type) 68-Position Connector
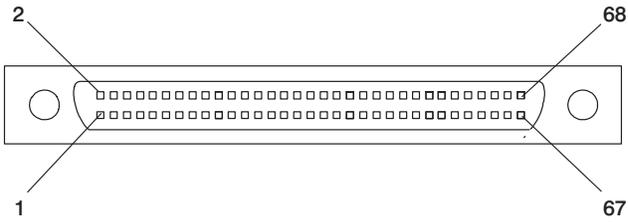


| Position | Signal Name | Position | Signal Name |
|----------|-------------|----------|-------------|
| 1 | Ground | 35 | AD5 |
| 2 | -cblcdsel | 36 | AD6 |
| 3 | Power on | 37 | AD7 |
| 4 | -cblcmd | 38 | Ground |
| 5 | -cbldack | 39 | AD8 |
| 6 | -cbladl | 40 | AD9 |
| 7 | Jumper / ground | 41 | AD10 |
| 8 | -cblbusy | 42 | AD11 |
| 9 | -cbltc | 43 | Ground |
| 10 | cbldefault | 44 | AD12 |
| 11 | -cblend | 45 | AD13 |
| 12 | cblsuspend | 46 | AD14 |
| 13 | cblack | 47 | AD15 |
| 14 | Ground | 48 | Ground |
| 15 | cblwtrd | 49 | AD16 |
| 16 | -cblint | 50 | AD17 |
| 17 | -cblstrobe | 51 | AD18 |
| 18 | cblrst | 52 | AD19 |
| 20 | -cblbe0 | 53 | Ground |
| 19 | -cblbe1 | 54 | AD20 |
| 21 | -cblbe2 | 55 | AD21 |
| 22 | -cblbe3 | 56 | AD22 |
| 23 | Ground | 57 | AD23 |
| 24 | cbldpar0 | 58 | Ground |
| 25 | cbldpar1 | 59 | AD24 |
| 26 | cbldpar2 | 60 | AD25 |
| 27 | cbldpar3 | 61 | AD26 |
| 28 | Ground | 62 | AD27 |
| 29 | AD0 | 63 | Ground |
| 30 | AD1 | 64 | AD28 |
| 31 | AD2 | 65 | AD29 |
| 32 | AD3 | 66 | AD30 |
| 33 | Ground | 67 | AD31 |
| 34 | AD4 | 68 | Ground |

## FC (2795, 2790) POWER Gt4 and POWER Gt4x 8-Bit Graphics Subsystem (Type 1-5)

This adapter provides a high-function graphics adapter for the 5081 and 6091 displays.

The high-performance 8-bit graphics subsystem requires two adjacent adapter slots. In addition, a performance option card can be attached to the processor card. Addition of this option card changes the name of the subsystem to POWER Gt4x.

**Note:** Be sure the ends of *all* connectors are latched behind the latch clips. Remove two-position cables first when installing or removing cards. Be sure that all plugs and connectors align correctly.
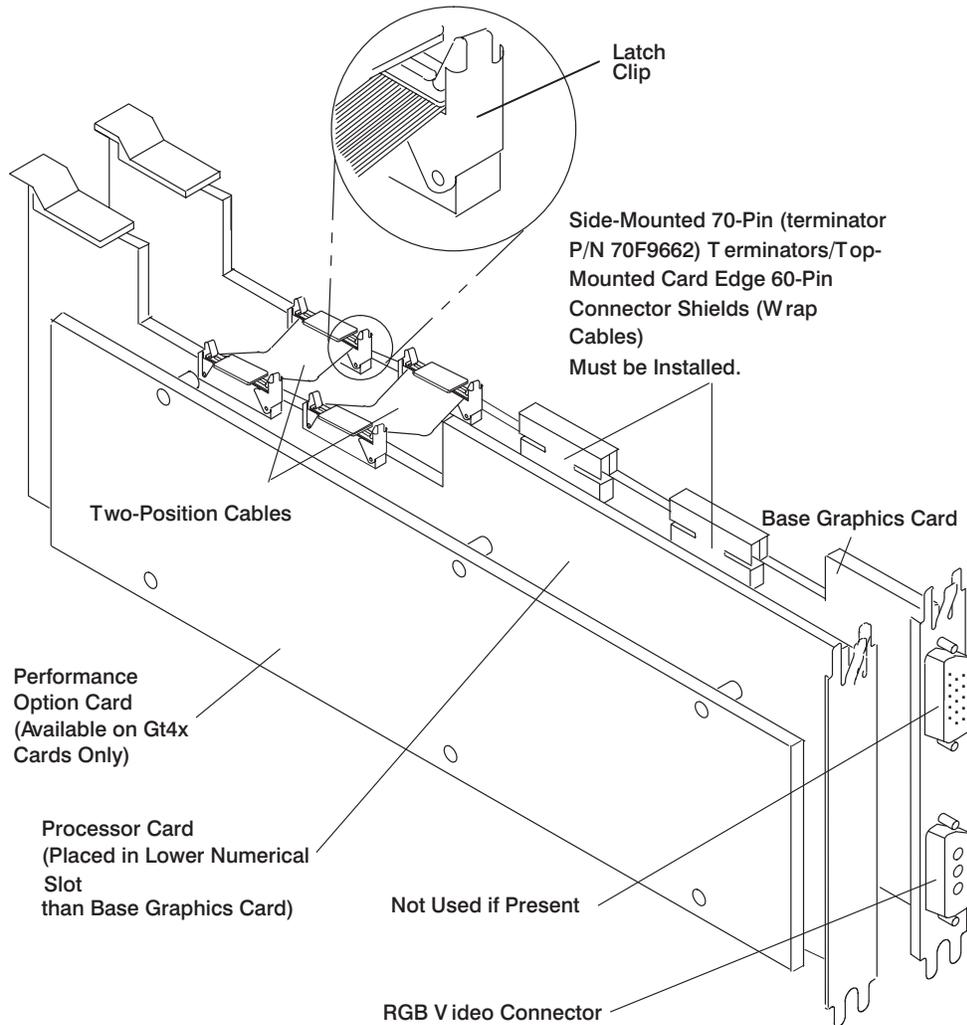
## POWER Gt4 and POWER Gt4x 8-Bit Graphics Subsystem Specifications

FRU Numbers                   Base Graphics card  41F0499
Processor card 41F0489
Performance option card 70F9664
Connector cable (two-position) part number 51G9225

**Note:** This FRU contains two cables, one with black connectors, 51G9224, and one with brown connectors, 71F0253.  If either of the connectors in the cable being replaced is brown, the replacement cable with the brown connectors must be used; if neither of the connectors in the cable being replaced is brown, the replacement cable with the black connectors must be used.

| | |
|---|---|
| Resolution | 1280 X 1024 |
| Colors | 256 out of 16M |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 2 |
| Microcode filenames | with performance option     8ee3.xx.xx |
| | without performance option  8ee3n.xx.xx |
| Other | 8ee3p4d1.xx.xx  to 8ee3pd5.xx.xx |
| | 8ee3xb.xx.xx |
| | 8ee3nb.xx.xx |
| Connector | 3-position video (RGB) |
| Cables | RGB, part number 58F2903. |
| Wrap Cable | 70F9662. |
| Slot Positioning | The processor card must be placed in the lowest numerical slot available, with the graphics card placed in the adjacent, numerically higher slot. |

**Note:** The default refresh rate of this adapter is 60 Hz; a 77 Hz refresh rate can be selected through system software.  If video problems are encountered, determine if the display has a 60 Hz-77 Hz refresh rate switch.  If so, you may be able to solve the video problem by selecting a different refresh rate.

## POWER Gt4 and POWER Gt4x 8-Bit Graphics Subsystem RGB Video Connector

Position 1 - Red

Position 2 - Green

Position 3 - Blue
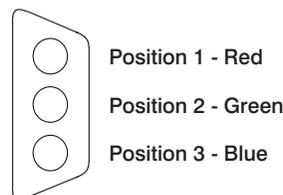
## FC (2796, 2791) POWER Gt4 and POWER Gt4x 24-bit Graphics Subsystem (Type 1-5)

This adapter provides a high-function graphics adapter for the 5081 and 6091 displays. The high performance 24-bit graphics subsystem requires three adjacent adapter slots. For more function, a performance option card can be attached to the processor card. Addition of this option card changes the name of the subsystem to POWER Gt4x.

**Note:** Be sure to install adapters in the configuration illustrated. Be sure the ends of *all* connectors are latched behind the latch clips. Remove two- and three-position cables first when installing or removing cards. Be sure that all plugs and connectors align correctly.
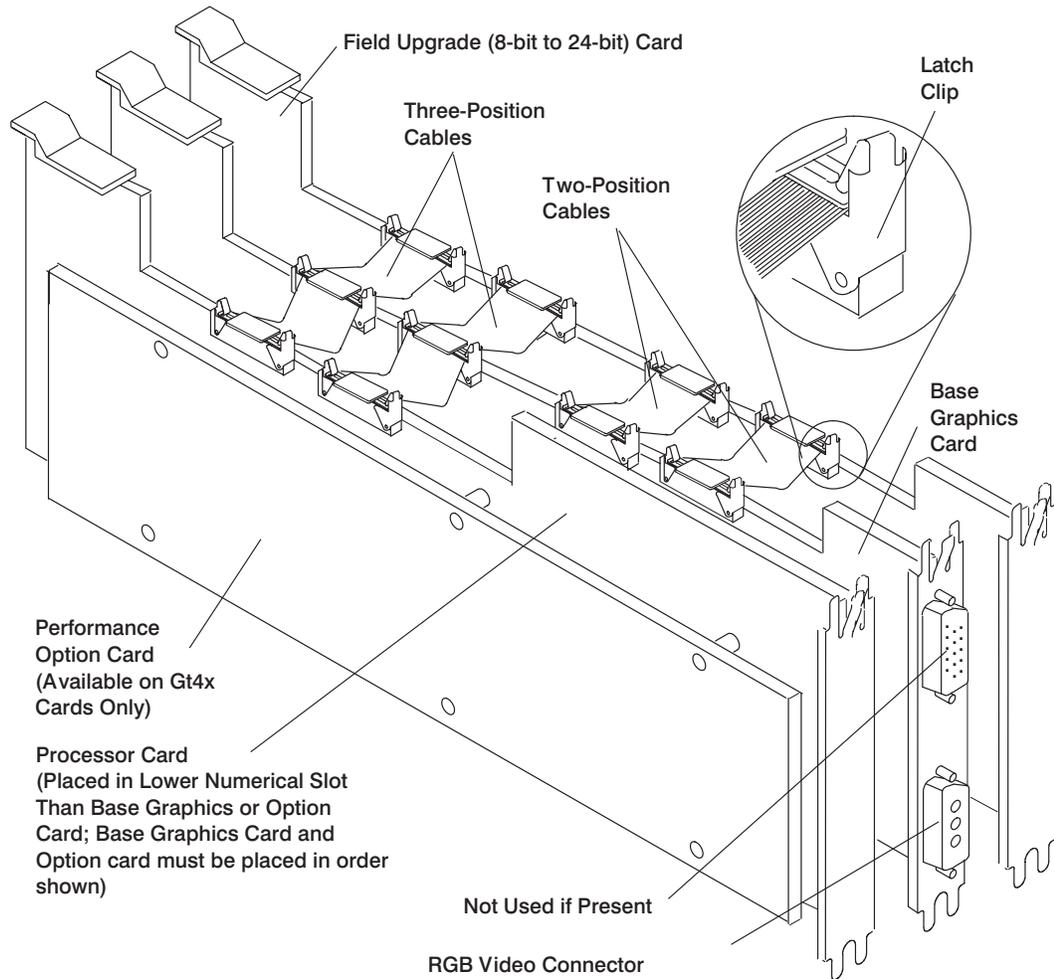
# POWER Gt4 and POWER Gt4x 24-Bit Graphics Subsystem Specifications

| | |
|---|---|
| FRU Numbers | Base graphics card, 41F0499 |
| | Field Upgrade (8- to 24-bit) card,  41F0503 |
| | Processor card,  41F0489 |
| | Performance option card   70F9664 |
| | Connector cable (two-position) part number 51G9225 |
| | Connector cable (three-position) part number 51G9227 |

> **Note:** This FRU contains two cables, one with black connectors, 51G9226, and one with brown connectors, 71F0254.  If either of the connectors in the cable being replaced is brown, the replacement cable with the brown connectors must be used; if neither of the connectors in the cable being replaced is brown, the replacement cable with the black connectors must be used.

| | |
|---|---|
| Resolution | 1280 X 1024 |
| Colors | to 16M |
| Bus architecture | Micro Channel |
| Busmaster | yes |
| Maximum number | 2 |
| Microcode filenames | with performance option card  8ee3.xx.xx |
| | without performance option card  8ee3n.xx.xx |
| Other | 8ee3p4d1.xx.xx  to 8ee3pd5.xx.xx |
| | 8ee3xb.xx.xx |
| | 8ee3nb.xx.xx |
| Connectors | 3-position video (RGB) |
| Cables | RGB, Part number 58F2903. |
| Slot Positioning | The processor card must be placed in the lowest numerical slot available, with the graphics card and option card, *in that order,* in the adjacent, numerically higher slots. |

> **Note:** The default refresh rate of this adapter is 60 Hz; a 77 Hz refresh rate can be selected through system software.  If video problems are encountered, determine if the display has a 60 Hz-77 Hz refresh rate switch.  If so, you may be able to solve the problem by selecting a different refresh rate.

# POWER Gt4 and POWER Gt4x 24-Bit Graphics Subsystem RGB Video Connector



Position 1 - Red

Position 2 - Green

Position 3 - Blue
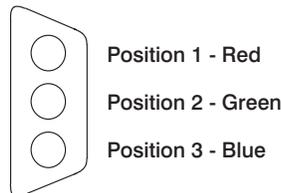
# FC (2711) POWER Gt4xi 8-bit Graphics Subsystem (Type 1-5)

This adapter provides a high-function graphics adapter for the 5081 and 6091 displays. The high performance 8-bit graphics subsystem requires two adjacent adapter slots.

**Note:**

1. Take note when changing the base graphics card. The 41F0499 (first illustration below) has top edge mounted wrap cables. The 52G4123 (second illustration below) does not. Always replace the defective card with one of a similar design.

2. Be sure to install adapters in the configuration illustrated. Be sure the ends of *all* connectors are latched behind the latch clips. Remove the two-position cables first when installing or removing cards. Be sure that all plugs and connectors align correctly.
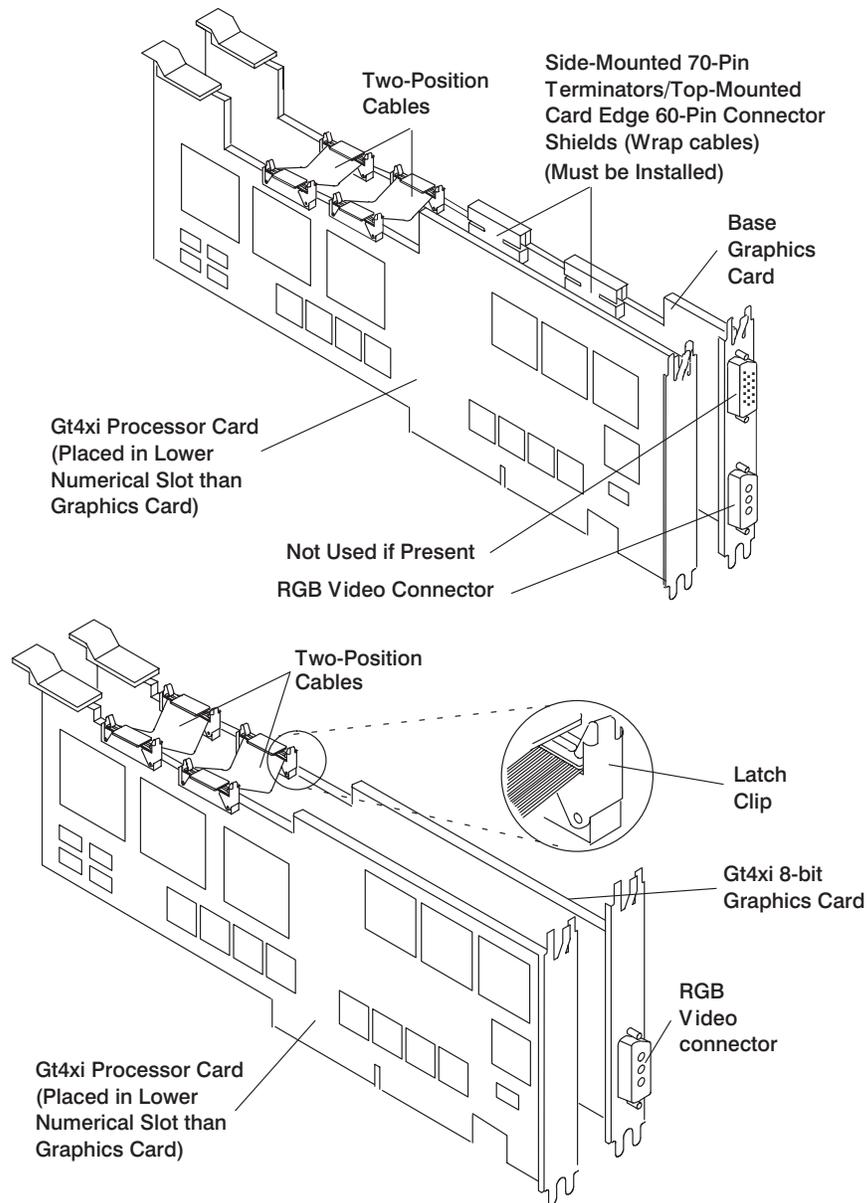
# POWER Gt4xi 8-Bit Graphics Subsystem Specifications

FRU Numbers                    POWER Gt4xi 8-bit graphics card, 41F0499
POWER Gt4xi 8-bit graphics card, 52G4123
POWER Gt4xi Processor card,  52G1343
Connector cable (two-position) part number 51G9225

> **Note:** This FRU contains two cables, one with black connectors, 51G9224, and one with brown connectors, 71F0253.  If either of the connectors in the cable being replaced is brown, the replacement cable with the brown connectors must be used; if neither of the connectors in the cable being replaced is brown, the replacement cable with the black connectors must be used.

|  |  |
|---|---|
|  | Connector cable (two-position) part number 71F0253 |
| Resolution | 1280 X 1024 |
| Colors | 256 out of 16M |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 2 |
| Microcode filenames | 8ee3.xx.xx |
| Other | 8ee3p4d1.xx.xx to 8ee3p4d5.xx.xx |
|  | 8ee3xb.xx.xx |
|  | 8ee3nb.xx.xx |
| Connectors | 3-position video (RGB) |
| Cables | RGB, Part number 58F2903. |
| Cable wrap | 70F9662 |
| Slot Positioning | The processor card must be placed in the lowest numerical slot available, with the graphics card, *in that* order, in the adjacent, numerically higher slots. |

> **Note:** The default refresh rate of this adapter is 60 Hz; a 77 Hz refresh rate can be selected through system software.  If video problems are encountered, determine if the display has a 60 Hz-77 Hz refresh rate switch.  If so, you may be able to solve the problem by selecting a different refresh rate.

# POWER Gt4xi 8-Bit Graphics Subsystem RGB Video Connector

Position 1 - Red

Position 2 - Green

Position 3 - Blue

## FC (2712) POWER Gt4xi 24-bit Graphics Subsystem (Type 1-5)

This adapter provides a high-function graphics adapter for the 5081 and 6091 displays. The high performance 24-bit graphics subsystem requires two adjacent adapter slots.

**Note:** Be sure to install adapters in the configuration illustrated. Be sure the ends of all connectors are latched behind the latch clips. Remove the two-position cables first when installing or removing cards. Be sure that all plugs and connectors align correctly.



**Note:** The default refresh rate of this adapter is 60 Hz; a 77 Hz refresh rate can be selected through system software. If video problems are encountered, determine if the display has a 60 Hz-77 Hz refresh rate switch. If so, you may be able to solve the problem by selecting a different refresh rate.

# POWER Gt4xi 24-Bit Graphics Subsystem Specifications

FRU Numbers             POWER Gt4xi Processor card,  52G1343
                                        Connector cable (two-position) part number 51G9225

> **Note:** This FRU contains two cables, one with black connectors, 51G9224, and one with brown connectors, 71F0253.  If either of the connectors in the cable being replaced is brown, the replacement cable with the brown connectors must be used; if neither of the connectors in the cable being replaced is brown, the replacement cable with the black connectors must be used.

| | |
|---|---|
| Resolution | 1280 X 1024 |
| Colors | Up to 16M |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 2 |
| Microcode filenames | 8ee3.xx.xx |
| Other | 8ee3p4d1.xx.xx to 8ee3p4d5.xx.xx |
| | 8ee3xb.xx.xx |
| | 8ee3nb.xx.xx |
| Connectors | 3-position video (RGB) |
| Cables | RGB, Part number 58F2903. |
| Slot Positioning | The processor card must be placed in the lowest numerical slot available, with the graphics card, *in that order,* in the adjacent, numerically higher slots. |

# POWER Gt4xi 24-Bit Graphics Subsystem RGB Video Connector

Position 1 - Red

Position 2 - Green

Position 3 - Blue
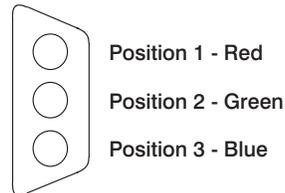
## FC (2713) POWER Gt4i 24-bit Graphics Subsystem (Type 1-5)

This adapter provides a high-function graphics adapter for the 5081 and 6091 displays. The high performance 24-bit graphics subsystem requires two adjacent adapter slots.

**Note:** Be sure to install adapters in the configuration illustrated. Be sure the ends of *all* connectors are latched behind the latch clips. Remove the two-position cables first when installing or removing cards. Be sure that all plugs and connectors align correctly.
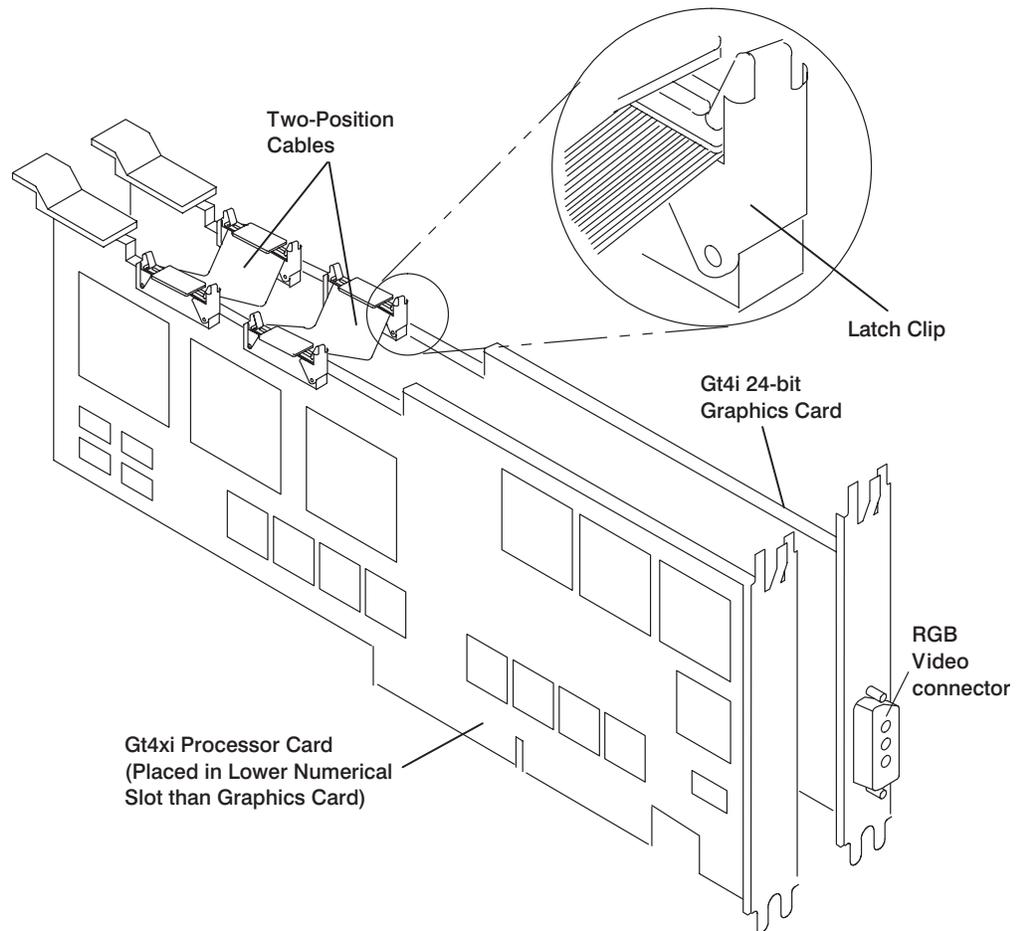
# POWER Gt4i 24-Bit Graphics Subsystem Specifications

FRU Numbers                      POWER Gt4i 24-bit graphics card, 52G4128
                                           POWER Gt4i Processor card,  52G1338
                                           Connector cable (two-position) part number 51G9225

> **Note:** This FRU contains two cables, one with black connectors, 51G9224, and one with brown connectors, 71F0253.  If either of the connectors in the cable being replaced is brown, the replacement cable with the brown connectors must be used; if neither of the connectors in the cable being replaced is brown, the replacement cable with the black connectors must be used.

| | |
|---|---|
| Resolution | 1280 X 1024 |
| Colors | Up to 16M |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 2 |
| Microcode filenames | 8ee3n.xx.xx |
| Other | 8ee3p4d1.xx.xx to 8ee3p4d5.xx.xx |
| | 8ee3xb.xx.xx |
| | 8ee3nb.xx.xx |
| Connectors | 3-position video (RGB) |
| Cables | RGB, Part number 58F2903. |
| Slot Positioning | The processor card must be placed in the lowest numerical slot available, with the graphics card, *in that order,* in the adjacent, numerically higher slots. |

> **Note:** The default refresh rate of this adapter is 60 Hz; a 77 Hz refresh rate can be selected through system software.  If video problems are encountered, determine if the display has a 60 Hz-77 Hz refresh rate switch.  If so, you may be able to solve the problem by selecting a different refresh rate.

# POWER Gt4i 24-Bit Graphics Subsystem RGB Video Connector

Position 1 - Red

Position 2 - Green

Position 3 - Blue
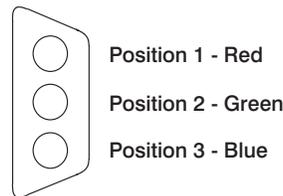
# FC (2777) POWER Gt3 Graphics Subsystem (Type 1-6)

Base Graphics Card

Processor Card
(Solder Side)
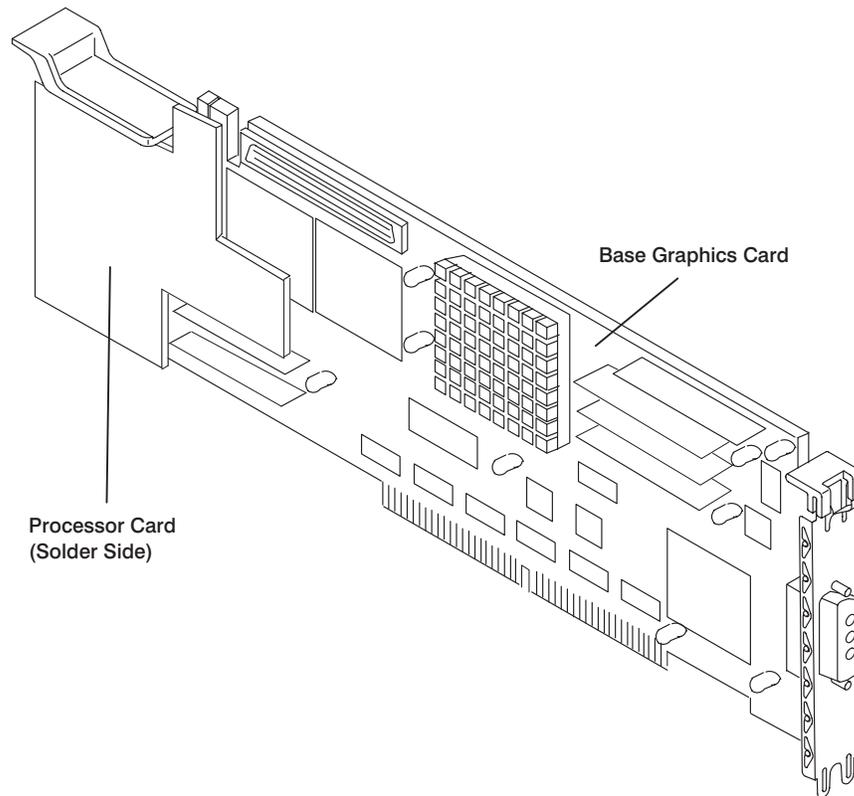
## POWER Gt3 Graphics Subsystem Specifications

| | |
|---|---|
| FRU Numbers | Base graphics card, 00G1117 |
| | Processor card, 00G2916 |
| Resolution | 1280 X 1024 |
| Colors | Up to 256 |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 4 |
| Microcode filenames | 8ee3l.xx.xx |
| | 8ee3ld1.xx.xx to 8ee3ld5.xx.xx |
| | 8ee3lb.xx.xx |
| Connectors | 3-position video (RGB) |
| Cables | RGB - Part number 58F2903. |

## POWER Gt3 Graphics Subsystem RGB Video Connector

Position 1 - Red

Position 2 - Green

Position 3 - Blue
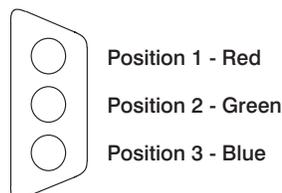
# FC (2776) POWER Gt4e Graphics Subsystem (Type 1-8)
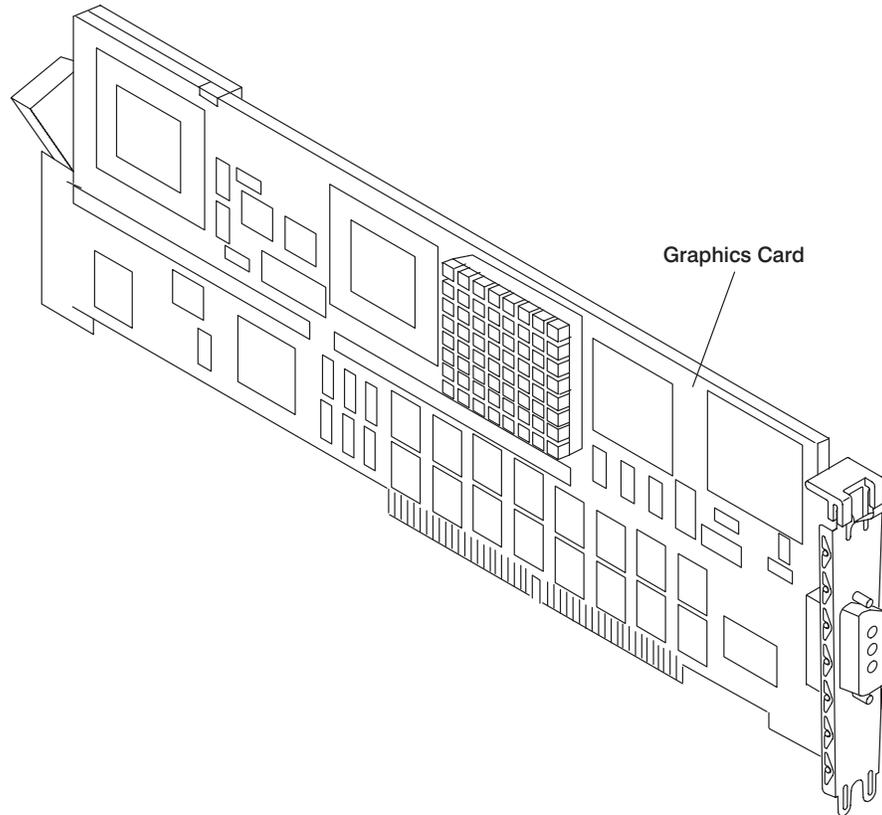


Graphics Card

## POWER Gt4e Graphics Subsystem Specifications

FRU Number            Base graphics card, 51G8022
Resolution            1280 X 1024
Colors                Up to 256
Bus architecture      Micro Channel
Busmaster             Yes
Maximum number        4
Microcode filenames   8ee3l3.xx.xx
                      8ee3ld1.xx.xx to 8ee3ld5.xx.xx
                      8ee3lb.xx.xx
Connectors            3-position video (RGB)
Cables                RGB - Part number 58F2903.

## POWER Gt4e Graphics Subsystem RGB Video Connector



Position 1 - Red

Position 2 - Green

Position 3 - Blue
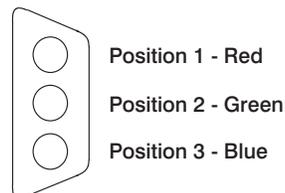
# FC (2768) POWER Gt3i Graphics Subsystem (Type 1-9)
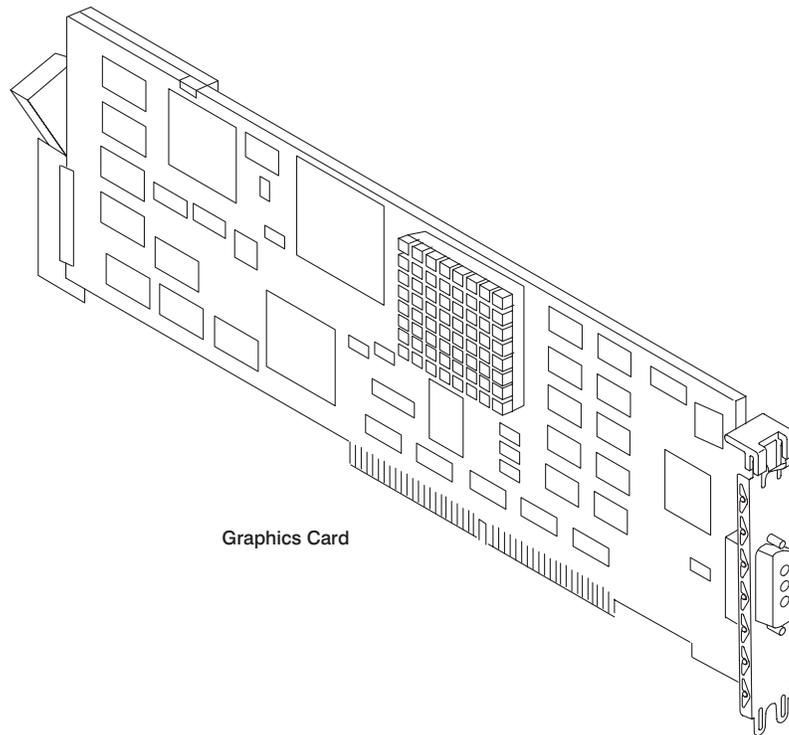
Graphics Card

## POWER Gt3i Graphics Subsystem Specifications

| | |
|---|---|
| FRU Number | Base graphics card, 43G0681 |
| Resolution | 1280 X 1024 |
| Colors | Up to 256 |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 4 |
| Microcode filenames | 8ee3l2.xx.xx |
| | 8ee3ld1.xx.xx to 8ee3ld5.xx.xx |
| | 8ee3lb.xx.xx |
| Connectors | 3-position video (RGB) |
| Cables | RGB - Part number 58F2903. |

## POWER Gt3i Graphics Subsystem RGB Video Connector

Position 1 - Red

Position 2 - Green

Position 3 - Blue
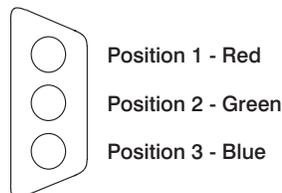
# FC (2820) POWER GXT1000® Graphics Accelerator Attachment Adapter for Attachment of the 7250 (Type 1-A)

The attachment adapter feature allows connection of the system unit to the 7250.
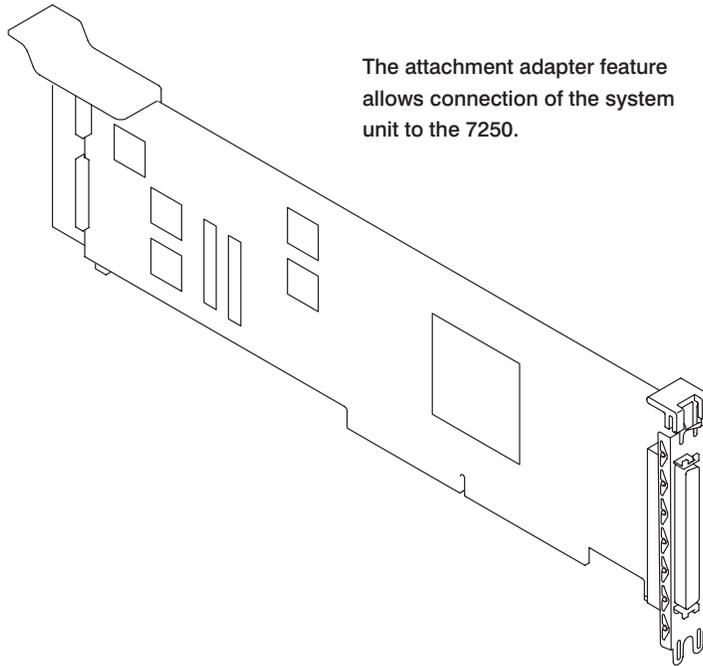
## POWER GXT1000 Graphics Accelerator Attachment Adapter Specifications

| | |
|---|---|
| FRU Number | 7250 POWER GXT1000 Graphics Adapter 65G4886 |
| Resolution | N/A |
| Colors | N/A |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 1 for Models 7006, 7009, and 7011 |
| | 2 for Models 7012, 7013, and 7030 |
| Microcode filenames | There are no microcode filenames for this adapter.  Refer to the *"7250 POWER GXT1000 Graphic Accelerator Service Guide",* order number SY66-0219 |
| Attachment adapter call out | 908 |
| Connectors | 80 pin |
| Adapter Cable | Length 2m (6.5 ft) 65G4892 |

# POWER GXT1000 Graphics Accelerator Attachment Adapter Connector
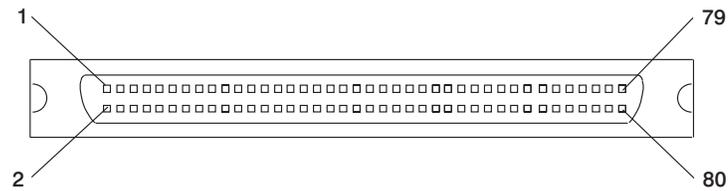


| Position | Signal Name | Position | Signal Name |
|----------|-------------|----------|-------------|
| 1 | addr00 | 41 | -req |
| 2 | addr01 | 42 | -ccmrom |
| 3 | addr02 | 43 | trans64/32 |
| 4 | addr03 | 44 | cpdmatc0 |
| 5 | addr04 | 45 | sedmatc0 |
| 6 | addr05 | 46 | -breq |
| 7 | addr06 | 47 | -rdy |
| 8 | addr07 | 48 | avail |
| 9 | addr08 | 49 | data00 |
| 10 | addr09 | 50 | data01 |
| 11 | addr10 | 51 | data02 |
| 12 | addr11 | 52 | data03 |
| 13 | addr12 | 53 | data04 |
| 14 | addr13 | 54 | data05 |
| 15 | addr14 | 55 | data06 |
| 16 | addr15 | 56 | data07 |
| 17 | addr16 | 57 | data08 |
| 18 | addr17 | 58 | data09 |
| 19 | addr18 | 59 | data10 |
| 20 | addr19 | 60 | data11 |
| 21 | addr20 | 61 | data12 |
| 22 | addr21 | 62 | data13 |
| 23 | addr22 | 63 | data14 |
| 24 | addr23 | 64 | data15 |
| 25 | addr24 | 65 | data16 |
| 26 | addr25 | 66 | data17 |
| 27 | addr26 | 67 | data18 |
| 28 | addr27 | 68 | data19 |
| 29 | addr28 | 69 | data20 |
| 30 | addr29 | 70 | data21 |
| 31 | addr30 | 71 | data22 |
| 32 | addr31 | 72 | data23 |
| 33 | -reset | 73 | data24 |
| 34 | -busy | 74 | data25 |
| 35 | -int | 75 | data26 |
| 36 | poweron | 76 | data27 |
| 37 | -chchk | 77 | data28 |
| 38 | rw | 78 | data29 |
| 39 | -strobe | 79 | data30 |
| 40 | -bgnt | 80 | data31 |

## FC (2650) POWER GXT150M™ Graphics Subsystem (Type 1-D)

The POWER GXT150M graphics subsystem is designed for superior 2D performance.  It has excellent line drawing and Bit Block Transfer operation on top of its enhanced graphics capabilities.  This adapter is available for Micro Channel models.



Display Switch

Switches shown
in On (O) Position

Note: Switch settings determine which
monitor is attached to this adapter.  For
more information refer to the display
switch setting table.
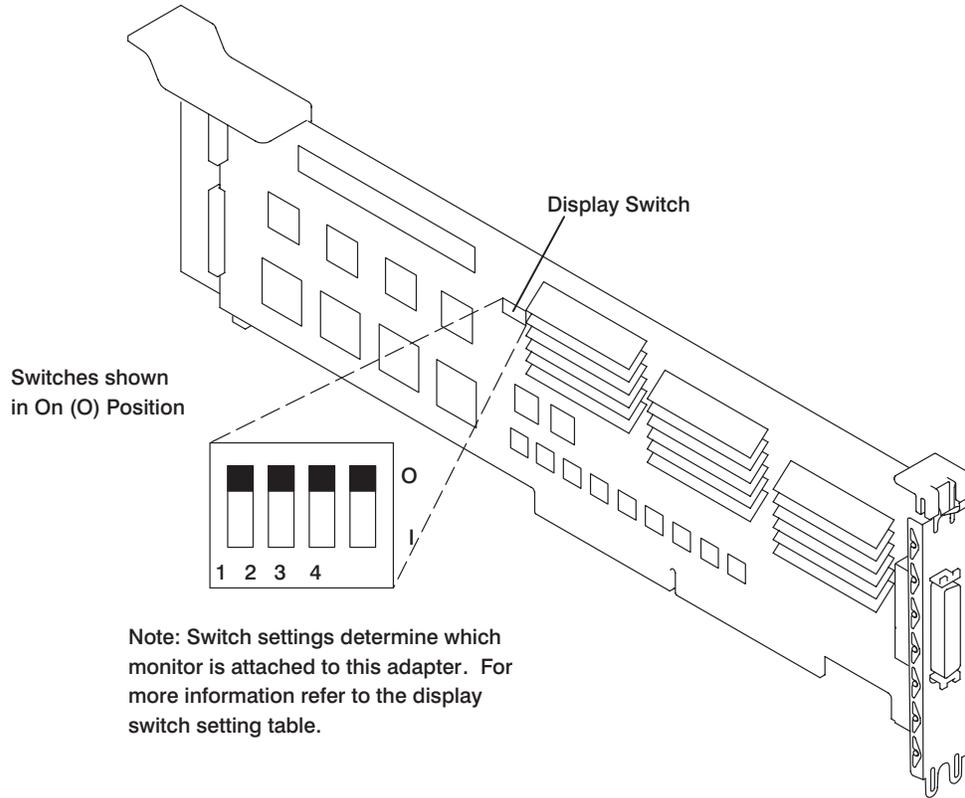
## POWER GXT150M Graphics Subsystem Specifications

| | |
|---|---|
| FRU Number | Base card 66G4162 |
| Resolution | 1280 X 1024 |
| Colors | 16M (256 active) |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 2 |
| Connector | 13W3 D-shell |
| Cables | 09G3539 |

# POWER GXT150M Graphics Subsystem Display Switch Position Table

**Note:** In the following table, Display Switch position 1 is Off; Display Switch position 0 is On.

| Display Type | Screen Resolution (Non-Interlaced) | Refresh Freq (Hz) | Display Switch 1 2 3 4 | Display Cable | Display Mode Switch |
|---|---|---|---|---|---|
| 6317 Color<br>6324 Color<br>6325 Color<br>9524 Color<br>9525 Color | 1280 x 1024 | 60 | 1 0 1 0 | 51G7826 | |
| 1091-051 Color<br>POWERdisplay 16S | 1280 x 1024 | 72 | 1 1 1 1 | 09G3589 | |
| 5081-16 Color | 1280 x 1024 | 60 | 1 1 1 1 | 09G3539 | - |
| 6091-16 Color<br>POWERdisplay 16 | 1280 x 1024 | 60 | 1 1 1 1 | 09G3539 | out (1) |
| | | 77 | 1 1 0 1 | 09G3539 | in (2) |
| 6091-19 Color | 1280 x 1024 | 60 | 1 1 1 1 | 09G3539 | 2 |
| | | 67 | 1 1 1 0 | 09G3539 | 3 |
| 6091-19i Color<br>POWERdisplay 19 | 1280 x 1024 | 60 | 1 1 1 1 | 09G3539 | 2 |
| | | 77 | 1 1 0 1 | 09G3539 | - |
| POWERdisplay 20 | 1280 x 1024 | 60 | 1 1 1 1 | 09G3539 | 2 |
| | | 77 | 1 1 0 1 | 09G3539 | - |
| 6091-23 Color | 1280 x 1024 | 60 | 1 1 1 1 | 09G3539 | - |
| POWERdisplay 17 Color | 1280 x 1024 | 60 | 1 1 1 1 | 09G3539 | - |
| | | 77 | 1 1 0 1 | 09G3539 | - |
| | | 74 | 0 1 1 0 | 09G3539 | - |
| Other Displays | 1280 x 1024 | 60 | 0 1 1 1 | 09G3539 | - |
| | | 74 | 0 1 1 0 | 09G3539 | - |

# POWER GXT150M Graphics Subsystem 13W3 13-Position Connector
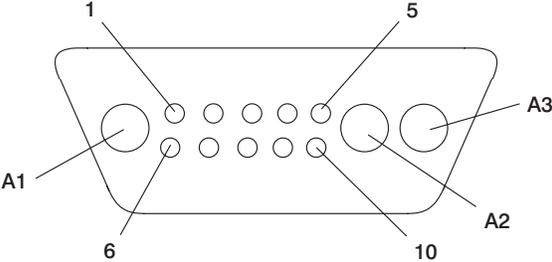


| Position | Signal Name |
|----------|-------------|
| A1 | Red |
| A2 | Green |
| A3 | Blue |
| 1 | Card RST |
| 2 | ROM EM |
| 3 | GND |
| 4 | VSYNC GND |
| 5 | HSYNC |
| 6 | CARD EN |
| 7 | INTR RST |
| 8 | (No Connect) |
| 9 | VSYNC |
| 10 | HSYNC GND |

# FC(2850) POWER GXT800M 3D Graphics Adapter W/Texture Memory (Type 1-Q)

The POWER GXT800M 3D Graphics Adapter with texture memory is a single card adapter. The adapter provides 3D graphics and texture acceleration.

The GXT800M covers three Micro Channel slot positions.
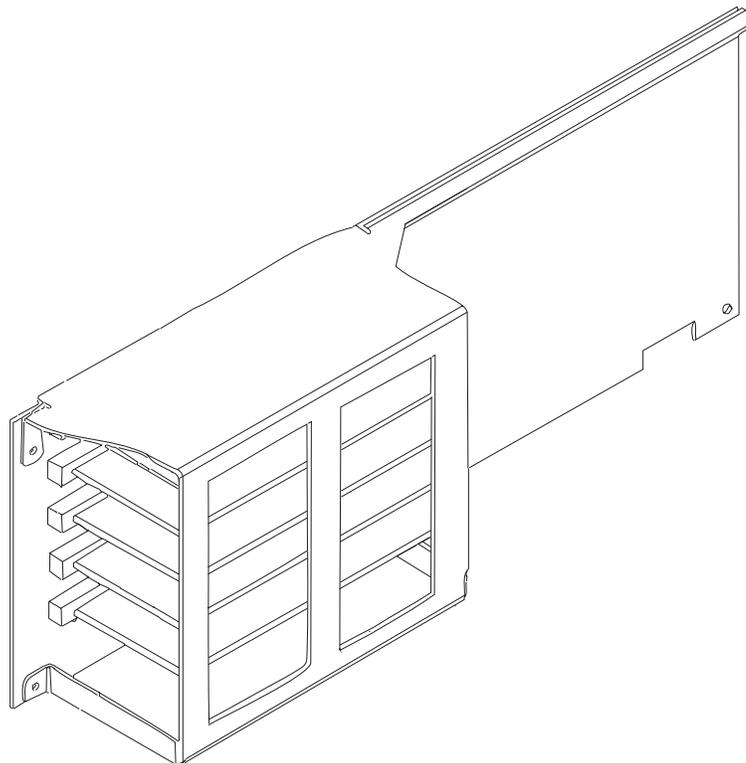


The memory DIMMS stand about two inches above the card.

## POWER GXT800M 3D Graphics Adapter W/Texture Memory Specifications

| | |
|---|---|
| FRU Number | Base card 93H9297 |
|   Memory | DIMM - 93H6057 |
| Systems supported | 7012-397, and 7013-595 or check with your Marketing Representative for systems supported |
| Bus architecture | Micro Channel |
| Bus width | 32-bit |
| Maximum number | 1 |
| Number of colors supported | 24-bit, 16.7 million |
| Screen resolutions | 1024x768 at 60 - 85 Hz vertical refresh |
| | 1280x1024 at 60 - 85 Hz vertical refresh |
| Display Power Management | Supports Video Electronics Standards Association (VESA). Display Power Management Signalling (DPMS). |
| Connectors | 15-pin D-shell (HD-15) connector |
| | 3.5 mm Stereo Jack |

**The POWER GXT800M Adapter with Texture Memory Supports:**

- 8 and 24 bit double-buffered color
- 8 bit double-buffered alpha
- 8 bit single-buffered overlay
- 8 bits of window ids
- 24 bit Z-buffer
- 4 bit stencil
- OpenGL, PEX, graPHIGS, and GL 3.2 API's
- 3D Acceleration:
  - Depth Buffering
  - Antialiasing
  - Gouraud shading
  - Fog and Atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering.
- Display resolution: 1280x1024 and 1024x768 (includes monitors that comply with ISO 9241, Part 3 Std.)
- Stereo viewing
- The POWER GXT800M with base and texture supports HW acceleration of trilinear mipmapped textures up to 512 x 512.

# POWER GXT800M 3D Graphics Adapter 15-pin D-Shell (HD-15) Connector
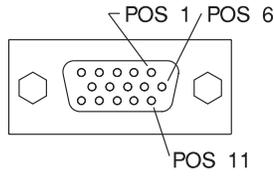


| Position | Signal Name |
|----------|-------------|
| 1 | RED |
| 2 | GREEN |
| 3 | BLUE |
| 4 | F_MONITOR_ID (2) |
| 5 | IOGND (ground) |
| 6 | RED_RTN |
| 7 | GREEN_RTN |
| 8 | BLUE_RTN |
| 9 | IOGND (ground) |
| 10 | IOGND (ground) |
| 11 | F_MONITOR_ID (0) |
| 12 | F_MONITOR_ID (1) |
| 13 | H_SYNC |
| 14 | V_SYNC |
| 15 | F_MONITOR_ID (3) |

## FC (2980) - Ethernet High-Performance LAN Adapter Type (2-1)

This adapter provides a way for the system units to attach to a carrier sense multiple access/collision detection (CSMA/CD) Ethernet network. This adapter attaches to either the IEEE-802.3 type network or the ethernet version 2 network. The adapter has connectors for both 10Base5 (thick) type and 10Base 2 (thin) connections. Only one connector can be used at a time.



10Base5
15-Position
Connector

10Base2
BNC Connector
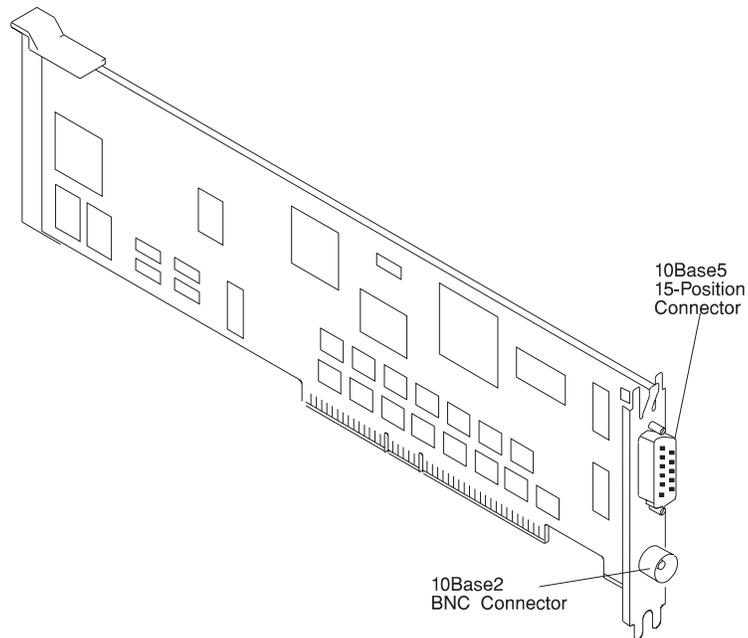
## Ethernet High-Performance LAN Adapter Specifications

| | |
|---|---|
| FRU Number | 31F4075 |
| I/O addresses | 7280-728A; 7290-729A; 7680-768A |
| | 7690-769A; 7A80-7A8A; 7A90-7A9A |
| | 7E80-7E8A; 7E90-7E9A |
| Interrupt levels | 9, 10, 11, 12 |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 4 |
| Connectors | BNC coaxial |
| | 15-position D-shell |
| Cables | Customer supplied (Use a Y type connection) |
| Adapter wrap plugs | 15-position D-shell, part number 70F9625 |
| | BNC, 25-ohm terminator, part number 70F9626 |
| Tranceivers | Thin, part number 02G7437 |
| | Twisted-Pair, part number 02G7431 |
| Tranceiver cable | Adapter-to-transceiver, thick and thin, |
| | part number 02G7434 |
| Tranceiver wrap plugs | Thin, part number 02G7433 |
| | Twisted-Pair, part number 00G2380 |

# Ethernet High-Performance LAN Adapter 15-Position Connector

POS 1

POS 9

| Position | Mnemonic | Signal Name |
|----------|----------|-------------|
| 1 | CI-S | Control in circuit-shield |
| 2 | CI-A | Control in circuit-A |
| 3 | DO-A | Data out circuit-A |
| 4 | DI-S | Data in circuit-shield |
| 5 | DI-A | Data In circuit-A |
| 6 | Vc | Voltage common |
| 7 | CO-A | Control out circuit-A |
| 8 | CO-S | Control out circuit-shield |
| 9 | CI-B | Control in circuit-B |
| 10 | DO-B | Data out circuit-B |
| 11 | DO-S | Data out circuit-shield |
| 12 | DI-B | Data in circuit-B |
| 13 | VP | Voltage plus |
| 14 | VS | Voltage shield |
| 15 | CO-B | Control out-B |
| Shell | PG | Protective ground (conductive shell) |

## FC (2970) Token-Ring High-Performance Network Adapter (Type 2-2)

This adapter provides a way for the system units to attach to a token-ring local-area network (LAN). This adapter uses the IEEE-802.5 standard for communications.

Use This Label to Identify
This High-Performance
Adapter

FCC Class A
See manual.     16/4
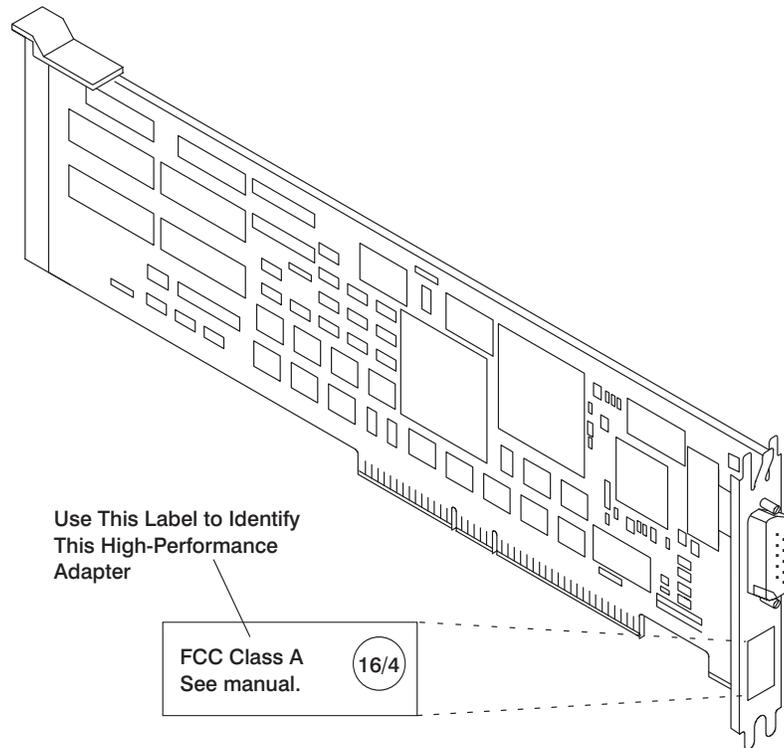
## Token-Ring High-Performance Network Adapter Specifications

| | |
|---|---|
| FRU Number | 00G2652 |
| I/O addresses | 86A0-86AF |
| | 96A0-86AF |
| | A6A0-A6AF |
| | B6A0-B6AF |
| | C6A0-C6AF |
| | D6A0-D6AF |
| | E6A0-E6AF |
| | F6A0-F6AF |
| Interrupt levels | 2, 3, 4, 5, 7, 10, 11, 12 |
| Bit rate | 4M bits or 16M bits per second (set by program) |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | 4 |
| Microcode file names | 8fc8m.xx.xx |
| | 8fc8p.xx.xx |
| | 8fcap.xx.xx |
| Connector | 9-position, D-shell |
| Cables | Token-ring cable, 3.04 m (10 ft.), part number 6339098 |
| | Token-ring cable, 6.08 m (20 ft.), part number 53F3930. |

# Token-Ring High-Performance Network Adapter 9-Position Connector

POS 1

POS 6
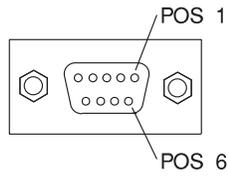
| Position | Signal Name |
|:---:|---|
| 1 | Ring In 1 (red) |
| 2 | DC Common |
| 3 | +5 V dc |
| 4 | DC Common |
| 5 | Ring Out 2 (black) |
| 6 | Ring In 2 (green) |
| 7 | DC Common |
| 8 | DC Common |
| 9 | Ring Out 1 (orange) |

# FC (2700) 4-Port Multiprotocol Communications Controller (Type 2-3)

This adapter provides a way to attach the system units to several types of synchronous communications networks. The adapter consists of the multiprotocol base card and the multiprotocol interface card. This combination provides four individually-addressable synchronous communications channels.

Each of the four ports can only be attached to and operate with one network type. The software configuration and network connection must match to operate correctly. See Chapter 3, "Cables and Cabling" on page 3-1 for additional information.
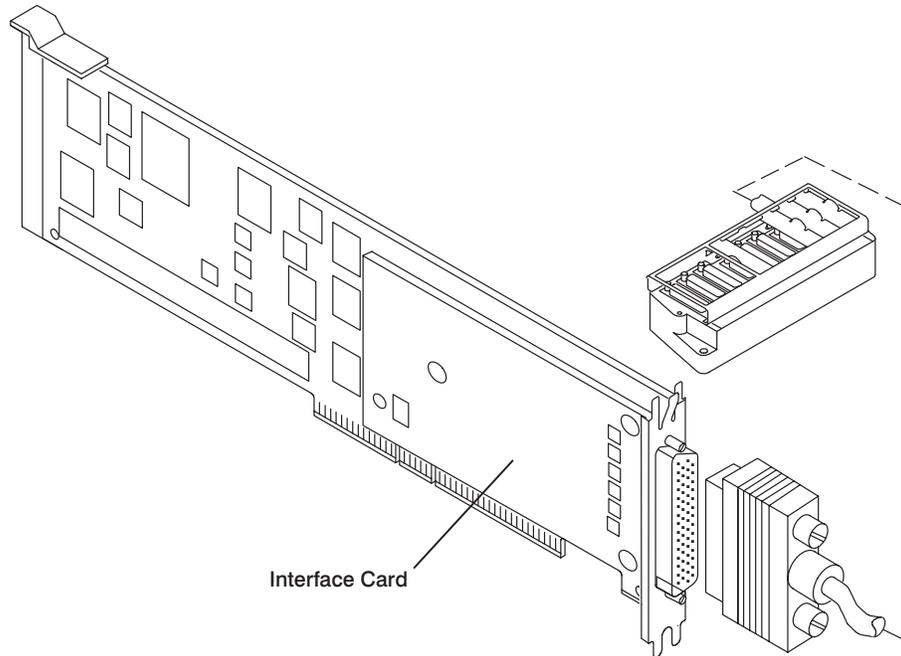


Interface Card

## 4-Port Multiprotocol Communications Controller Specifications

| | |
|---|---|
| FRU Numbers | Base card 52G4322 |
| | Interface card 11H5676 (order separately) |
| I/O addresses | 02A0-1EA0 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Bus architecture | Micro Channel |
| Busmaster | Set to No at power on, set to Yes by program |
| Maximum number | 8 |
| Microcode file name | /etc/asw/mpqpasw  (use for 3.1.x releases) |
| | /usr/lib/asw/mpqpqsw  (use for 3.2.x releases) |
| Connector | 78-position, D-shell |
| Wrap plugs | 78-position, part number 40F9902 |
| | X.21, part number 40F9904 |
| | V.35, part number 40F9900 |
| | EIA-232D, part number 40F9903 |
| | EIA-422A, part number 53F3886 |
| Cables | 4-port multiprotocol interface cable, part number 53F2622/40F9897 |
| | 4-port multiprotocol rack jumper cable, part number 81F8570. |

# 4-Port Multiprotocol Communications Controller 78-Position Connector
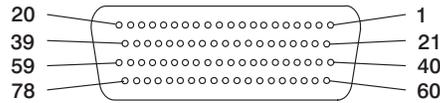


| Mnemonic | Signal Name (Type of Interface) | Port 0 | Port 1 | Port 2 | Port 3 |
|---|---|---|---|---|---|
| -TXD | Transmit Data (EIA232D) | 40 | 04 | 66 | 69 |
| -RXD | Receive Data (EIA232D) | 02 | 64 | 28 | 31 |
| +RTS | Request To Send (EIA232D, V.35) | 01 | 63 | 27 | 30 |
| +CTS | Clear To Send (EIA232D, V.35) | 61 | 25 | 48 | 51 |
| SG | Signal Ground | 43 | 07 | 08 | 67 |
| +DCD | Data Carrier Detect (EIA232D, V.35) | 22 | 45 | 09 | 12 |
| -RCLKIN | Receive Clock (EIA232D) | 62 | 26 | 10 | 17 |
| +DTR | Data Terminal Ready (EIA232D, V.35) | 60 | 24 | 47 | 50 |
| +DSR | Data Set Ready (EIA232D, V.35) | 42 | 06 | 68 | 71 |
| +HRS | Data Rate Selector (EIA232D) | 21 | 44 | 11 | |
| +RI | Ring Indicator (EIA232D) | 03 | 65 | 29 | 32 |
| -TCLKIN | Transmit Clock (EIA232D) | 23 | 56 | 70 | 75 |
| -DTECLK | DTE Clock (EIA232D) | 15 | 34 | 54 | 73 |
| +TxD (A) | +Transmit Data (V.35) | 36 | 49 | | |
| -TxD (B) | -Transmit Data (V.35) | 53 | 14 | | |
| +TDATA (A) | +Transmit Data (EIA422A- X.21) | 37 | | 13 | |
| -TDATA (B) | -Transmit Data (EIA422A- X.21) | 76 | | 52 | |
| +RxD (A) | +Receive Data (V.35, EIA422A- X.21) | 19 | 78 | 33 | |
| -RxD (B) | -Receive Data (V.35, EIA422A- X.21) | 58 | 35 | 72 | |
| +TCLK (A) | +Transmit Clock (V.35, EIA422A) +Indicate (Port 0, X.21) | 18 | 39 | | |
| -TCLK (B) | -Transmit Clock (V.35, EIA422A) Indicate (Port 0, X.21) | 57 | 16 | | |
| +RCLK (A) | +Receive Clock (V.35, EIA422A- X.21) | 38 | 74 | | |
| -RCLK (B) | -Receive clock (V.35, EIA422A- X21) | 77 | 55 | | |
| +C (A) | +Control (Port 0, X.21) | 20 | | | |
| -C (B) | -Control (Port 0, X.21) | 59 | | | |
| | Reserved (any port) | 05 | | | |
| | Reserved (any port) | 46 | | | |
| | Reserved (any port) | 41 | | | |

## FC (2960) X.25 Interface Co-Processor/2 (Type 2-4)

This adapter provides a way to attach the system units to a serial network. Use this adapter, the correct software, and the correct cable to communicate on a X.21, V.24, or V.35 network.
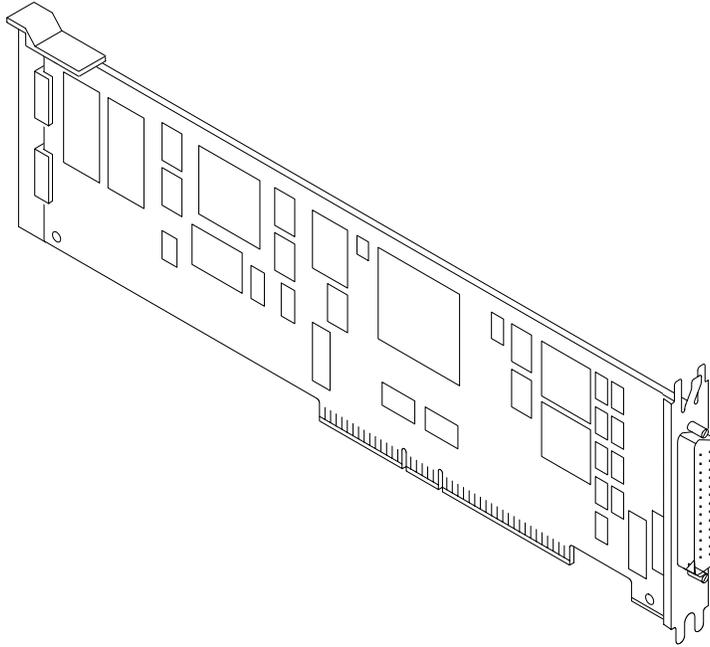
## X.25 Interface Co-Processor/2 Specifications

| | |
|---|---|
| FRU/Option Numbers | Base card 51G9060 |
| | Memory DRAM SIP 68X5706 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Bus architecture | Micro Channel |
| Busmaster | No |
| Maximum number | 4 |
| Microcode file names | f0efd.xx.xx |
| | /etc/microcode/icaaim.com  (use for 3.1.x releases) |
| | /usr/lib/microcode/icaaim.com  (use for 3.2.x releases) |
| | /etc/asw/x25a.exe |
| Connector | 37-position, D-shell |
| Wrap plugs | 37-position, part number 07F3132/16F1884 |
| | X.21, part number 07F3153/16F1890 |
| | X.24, part number 07F3163/16F1891 |
| | V.35, part number 07F3173/16F1861 |
| Cables | X.25 Attachment Cable - X.21, P/N 07F3151/07F3150 - 3 m |
| | X.25 Attachment Cable - X.21, P/N 53F3926/NA - 6 m |
| | X.25 Attachment Cable - V.24, P/N 07F3161/07F3160 - 3 m |
| | X.25 Attachment Cable - V.24, P/N 53F3927/NA - 6 m |
| | X.25 Attachment Cable - V.35, P/N 07F3171/07F3170 - 3 m |
| | X.25 Attachment Cable - V.35, P/N 53F3928/NA - 6 m |

# X.25 Interface Co-Processor/2 37-Position Connector
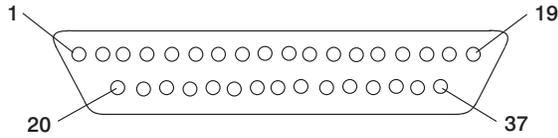


| Posi-tion | Signal Name [Mnemonic] | Posi-tion | Signal Name (Mnemonic) |
|---|---|---|---|
| 1 | Reserved | 21 | Remote loopback test [RLBT] |
| 2 | Transmitted data [TXD] | 22 | Call indicate [CI] |
| 3 | Received data [RXD] | 23 | Reserved |
| 4 | Request to send [RTS] | 24 | Transmit clock [TX CLK] |
| 5 | Clear to send [CTS] | 25 | Test indicate [TI] |
| 6 | Data set ready [DSR] | 26 | Receive clock [RX CLK] |
| 7 | Signal ground [GND] | 27 | Local loopback test [LLBT] |
| 8 | Carrier detect [CD] | 28 | Transmitted data (B) [T (B)] |
| 9 | Cable ID 0 [ID0] | 29 | Control (B) [C (B)] |
| 10 | Transmitted data (A) [T (A)] | 30 | Received data (B) [R (B)] |
| 11 | Control (A) [C (A)] | 31 | Indication (B) [I (B)] |
| 12 | Received data (A) [R (A)] | 32 | Transmit clock (B) [S (B)] |
| 13 | Indication (A) [I (A)] | 33 | Reserved |
| 14 | Transmit clock (A) [S (A)] | 34 | Receive clock (A) [RX CLK (A)] |
| 15 | Cable ID 1 [ID1] | 35 | Transmitted data (A) [TXD (A)] |
| 16 | Receive clock (B) [RX CLK (B)] | 36 | Transmit clock (A) [TX CLK (A)] |
| 17 | Transmitted data (B) [TXD (B)] | 37 | Received data (A) [RXD (A)] |
| 18 | Transmit clock (B) [TX CLK (B)] | | |
| 19 | Received data (B) [RXD (B)] | | |
| 20 | Data terminal ready [DTR] | | |

# FC (2720) Fiber Distributed Data Interface (FDDI) Single Ring Adapter (Type 2-6)

Crossover Cable Connector to FDDI
Dual Ring Upgrade Kit Adapter

Transceiver Key
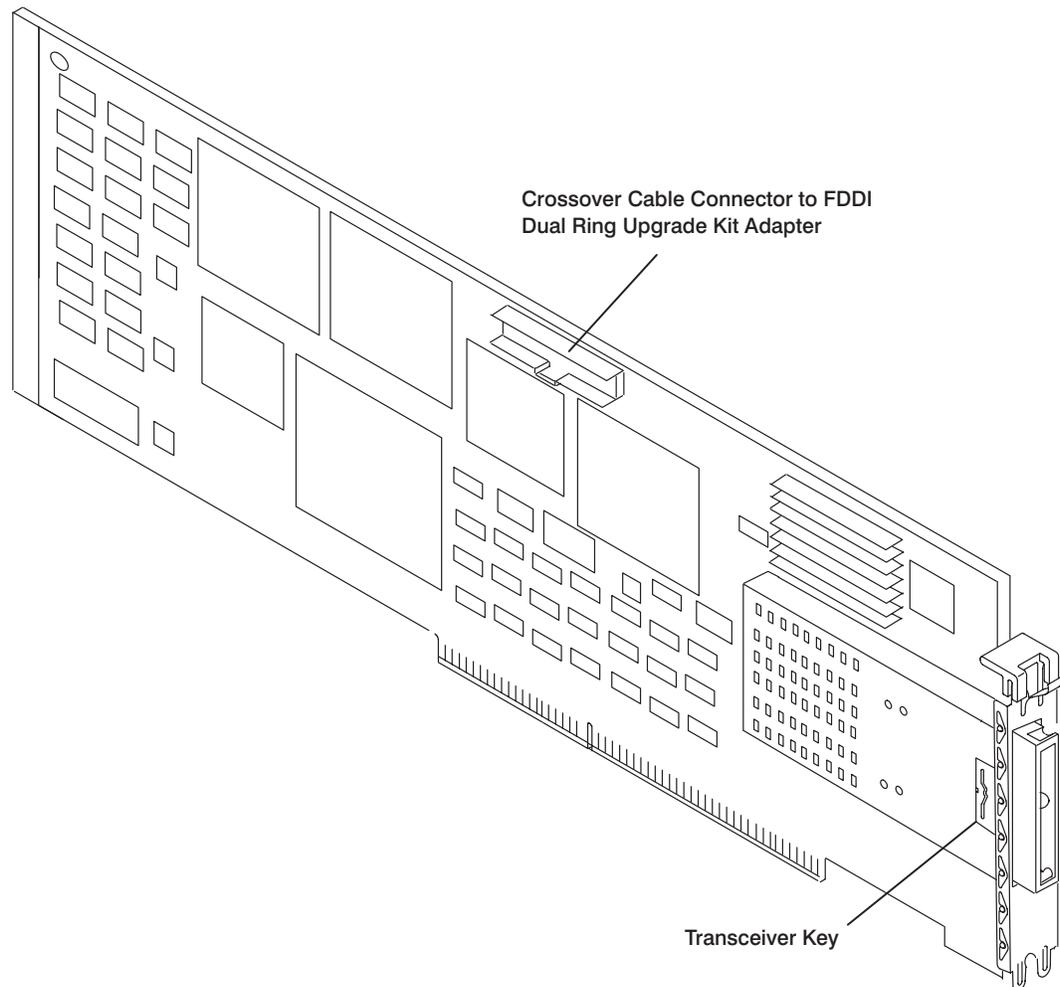
## FDDI Single Ring Adapter Specifications

| | |
|---|---|
| FRU number | 81F9003 |
| Maximum number | 7 (7013/7016) |
| | 4 (7012) |
| Bus architecture | Micro Channel |
| Connector | Media Interface Connector (MIC) |
| Jumper Cables | Fiber optic, customer-provided, available from distributors. |
| Crossover Cable | 81F9012 |
| Microcode filenames | 8ef4m.xx.xx |
| | fddi.diag |
| Wrap Plug | 92F9003 |

## FC (2722) Fiber Distributed Data Interface (FDDI) Dual Ring Upgrade Adapter (Type 2-7)

Connector to FDDI Single Ring Adapter (2±6)

Crossover Cable

Transceiver Key
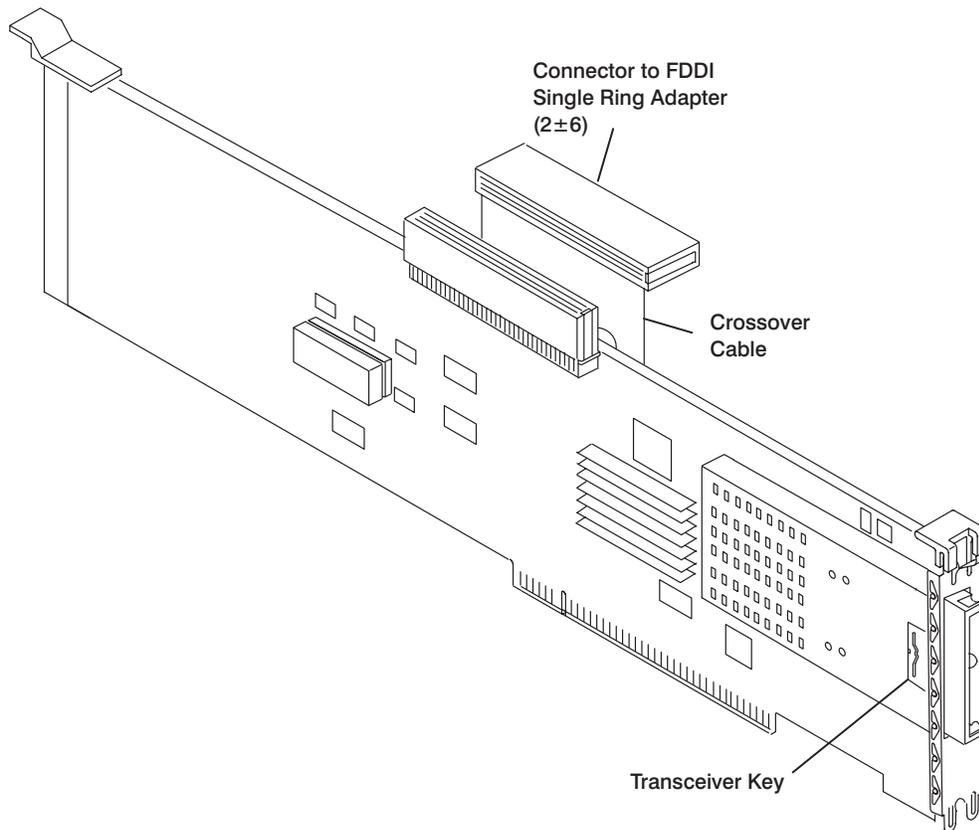
## FDDI Dual Ring Upgrade Kit Adapter Specifications

| | |
|---|---|
| FRU number | 81F9014 |
| Maximum number | 3 (7013/7016) |
| | 2 (7012) |
| Bus architecture | Micro Channel |
| Connector | Media Interface Connector (MIC) |
| Jumper Cables | Fiber optic, customer-provided, available from distributors. |
| Crossover Cable | 81F9012 |
| Microcode filenames | 8ef4m.xx.xx |
| | fddi.diag |
| Wrap Plug | 92F9003. |

# FC (7002 or 7004 and 7022) 4-Port EIA-232-C Multiport/2 Adapter (Type 2-C)



Interface Card

## 4-Port EIA-232-C Multiport/2 Adapter  Specifications

FRU/Option Numbers      0 Memory Base card (512 KB Label), 09F1888/NA
                        0 Memory Base card (  1 MB Label), 09F1962/NA
                        Base card (512 KB), 85F0255/09F1897
                        Base card (  1 MB), 16F1824/16F1820
                        Interface card (order separately), 91F7976/09F1955
                        256 KB memory module (512 KB card), 16F2267
                        512 KB memory module (1 MB card), 04G5834
Bus architecture        Micro Channel
I/O addresses           02A0 - 1EA7
Interrupt levels        3, 4, 7, 9, 10, 11, 12
Maximum number          8
Microcode filename      /usr/lib/microcode/icaaim.com   (use for releases 3.2.x)
Connector               78-position, D-shell, female
Wrap plugs              78-position, part number 09F1803/16F2478
                        25-position, ports 0 and 1, 6425494
                        25-position, ports 2 through 3, 09F1799
Cables                  4P/8P Multiport/2 interface cable, 00F5524/00F5531

# 4-Port EIA-232-C Multiport/2 Adapter  78-Position and 25-Position Connectors
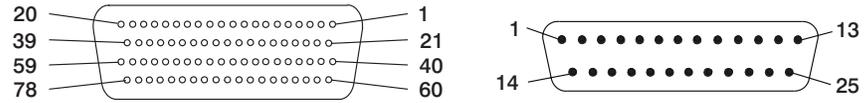
| Mnemonic | Port 0 | Port 1 | Port 2 | Port 3 | 25-Position Connector |
|---|---|---|---|---|---|
| TxD | 40 | 04 | 66 | 69 | 02/BA-103 |
| RxD | 02 | 64 | 28 | 31 | 03/BB-104 |
| RTS | 01 | 63 | 27 | 30 | 04/CA-105 |
| CTS | 61 | 25 | 48 | 51 | 05/CB-106 |
| DTECLK | 41 | 05 | -- | -- | 24/DA-113 |
| SG | 07 | 08 | 11 | 43 | 07/AB-102 |
| DCD | 22 | 45 | 09 | 12 | 08/CF-109 |
| RxCLKIN | 62 | 26 | -- | -- | 17/DD-115 |
| DTR | 60 | 24 | 47 | 50 | 20/CD-108.2 |
| DSR | 42 | 06 | 68 | 71 | 06/CC-107 |
| HRS | 21 | 44 | -- | -- | 23/CH-111 |
| RI | 03 | 65 | 29 | 32 | 22/CE-125 |
| TxCLKIN | 23 | 46 | -- | -- | 15/DB-114 |

# FC (7002 or 7004 and 7026) 8-Port EIA-232-C Multiport/2 Adapter (Type 2-D)



Interface Card

## 8-Port EIA-232-C Multiport/2 Adapter Specifications

| | |
|---|---|
| FRU/Option Numbers | 0 Memory Base card (512 KB Label), 09F1888/NA |
| | 0 Memory Base card ( 1 MB Label), 09F1962/NA |
| | Base card (512 KB), 85F0255/09F1897 |
| | Base card ( 1 MB), 16F1824/16F1820 |
| | Interface card (order separately), 91F7974/09F1952 |
| | 256 KB memory module (512 KB card), 16F2267 |
| | 512 KB memory module (1 MB card), 04G5834 |
| Bus architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA7 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Maximum number | 8 |
| Microcode file name | /usr/lib/microcode/icaaim.com  (use for releases 3.2.x) |
| Connector | 78-position, D-shell, female |
| Wrap plugs | 78-position, part number 09F1803/16F2478 |
| | 25-position, ports 0 and 1, 6425494 |
| | 25-position, ports 2 through 7, 09F1799 |
| Cables | 4P/8P Multiport/2 interface cable, 00F5524/00F5531 |

# 8-Port EIA-232-C Multiport/2 Adapter 78-Position and 25-Position Connectors

| Mnemonic | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|---|---|---|---|---|---|---|---|---|---|
| TxD | 40 | 04 | 66 | 69 | 73 | 55 | 76 | 58 | 02/BA-103 |
| RxD | 02 | 64 | 28 | 31 | 54 | 75 | 57 | 78 | 03/BB-104 |
| RTS | 01 | 63 | 27 | 30 | 34 | 16 | 37 | 19 | 04/CA-105 |
| CTS | 61 | 25 | 48 | 51 | 15 | 36 | 18 | 39 | 05/CB-106 |
| DTECLK | 41 | 05 | -- | -- | -- | -- | -- | -- | 24/DA-113 |
| SG | 07 | 08 | 11 | 43 | 67 | 70 | 67 | 70 | 07/AB-102 |
| DCD | 22 | 45 | 09 | 12 | 74 | 56 | 77 | 59 | 08/CF-109 |
| RxCLKIN | 62 | 26 | -- | -- | -- | -- | -- | -- | 17/DD-115 |
| DTR | 60 | 24 | 47 | 50 | 35 | 17 | 38 | 20 | 20/CD-108.2 |
| DSR | 42 | 06 | 68 | 71 | 72 | 33 | 53 | 14 | 06/CC-107 |
| HRS | 21 | 44 | -- | -- | -- | -- | -- | -- | 23/CH-111 |
| RI | 03 | 65 | 29 | 32 | 49 | 52 | 10 | 13 | 22/CE-125 |
| TxCLKIN | 23 | 46 | -- | -- | -- | -- | -- | -- | 15/DB-114 |

# FC (7002 or 7004 and 7024) 6-Port Synchronous EIA-232-C Multiport/2 Adapter (Type 2-E)



Interface Card

## 6-Port Synchronous EIA-232-C Multiport/2 Adapter Specifications

| | |
|---|---|
| FRU/Option Numbers | 0 Memory Base card (512 KB Label), 09F1888/NA |
| | 0 Memory Base card (  1 MB Label), 09F1962/NA |
| | Base card (512 KB), 85F0255/09F1897 |
| | Base card (  1 MB), 16F1824/16F1820 |
| | Interface card (order separately), 91F7963/15F8861 |
| | 256 KB memory module (512 KB card), 16F2267 |
| | 512 KB memory module (1 MB card), 04G5834 |
| Bus architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA7 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Maximum number | 8 |
| Microcode file name | /usr/lib/microcode/icaaim.com   (use for releases 3.2.x) |
| Connector | 78-position, D-shell, female |
| Wrap plugs | 78-position, part number 15F8856/15F8859 |
| | 25-position, ports 0 through 5, part number 33F8968 |
| Cables | 6P synchronous Multiport/2 interface cable, 15F8867/05F2028 |

# 6-Port Synchronous EIA-232-C Multiport/2 Adapter 78-Position and 25-Position Connectors

| Mnemonic | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | 25-Position Connector |
|---|---|---|---|---|---|---|---|
| TxD | 40 | 04 | 66 | 69 | 73 | 55 | 02/BA-103 |
| RxD | 02 | 64 | 28 | 31 | 54 | 75 | 03/BB-104 |
| RTS | 01 | 63 | 27 | 30 | 34 | 16 | 04/CA-105 |
| CTS | 61 | 25 | 48 | 51 | 15 | 36 | 05/CB-106 |
| DTECLK | 41 | 05 | 19 | 20 | 10 | 13 | 24/DA-113 |
| SG | 43 | 07 | 08 | 67 | 11 | 70 | 07/AB-102 |
| DCD | 22 | 45 | 09 | 12 | 74 | 56 | 08/CF-109 |
| RxCLKIN | 62 | 26 | 57 | 77 | 18 | 53 | 17/DD-115 |
| DTR | 60 | 24 | 47 | 50 | 35 | 17 | 20/CD-108.2 |
| DSR | 42 | 06 | 68 | 71 | 72 | 33 | 06/CC-107 |
| HRS | 21 | 44 | 76 | 37 | 38 | 58 | 23/CH-111 |
| RI | 03 | 65 | 29 | 32 | 49 | 52 | 22/CE-125 |
| TxCLKIN | 23 | 46 | 78 | 59 | 39 | 14 | 15/DB-114 |

## FC (7002 or 7004 and 7030) 4-Port EIA-232-C/4-Port EIA-422-A Multiport/2 Adapter (Type 2-F)



Interface Card

## 4-Port EIA-232-C/4-Port EIA-422-A Multiport/2 Adapter Specifications

| | |
|---|---|
| FRU/Option Numbers | 0 Memory Base card (512 KB Label), 09F1888/NA |
| | 0 Memory Base card ( 1 MB Label), 09F1962/NA |
| | Base card (512 KB), 85F0255/09F1897 |
| | Base card ( 1 MB), 16F1824/16F1820 |
| | Interface card (order separately), 91F7966/09F1958 |
| | 256 KB memory module (512 KB card), 16F2267 |
| | 512 KB memory module (1 MB card), 04G5834 |
| Bus architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA7 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Maximum number | 8 |
| Microcode file name | /usr/lib/microcode/icaaim.com  (use on releases 3.2.x) |
| Connector | 78-position, D-shell, female |
| Wrap plugs | 78-position, part number 09F1803/16F2478 |
| | 25-position, ports 0 and 1, 6425494 |
| | 25-position, ports 2 through 7, 09F1799 |
| Cables | 4P/8P Multiport/2 interface cable, 00F5524/00F5531 |

## 4-Port EIA-232-C/4-Port EIA-422-A Multiport/2 Adapter 78-Position and 25-Position Connectors (EIA-232-C Assignments)

| Mnemonic | Port 0 | Port 1 | Port 2 | Port 3 | 25-Position Connector |
|---|---|---|---|---|---|
| TxD | 40 | 04 | 66 | 69 | 02/BA-103 |
| RxD | 02 | 64 | 28 | 31 | 03/BB-104 |
| RTS | 01 | 63 | 27 | 30 | 04/CA-105 |
| CTS | 61 | 25 | 48 | 51 | 05/CB-106 |
| DTECLK | 41 | 05 | -- | -- | 24/DA-113 |
| SG | 43 | 07 | 08 | 67 | 07/AB-102 |
| DCD | 22 | 45 | 09 | 12 | 08/CF-109 |
| RxCLKIN | 62 | 26 | -- | -- | 17/DD-115 |
| DTR | 60 | 24 | 47 | 50 | 20/CD-108.2 |
| DSR | 42 | 06 | 68 | 71 | 06/CC-107 |
| HRS | 21 | 44 | -- | -- | 23/CH-111 |
| RI | 03 | 65 | 29 | 32 | 22/CE-125 |
| TxCLKIN | 23 | 46 | -- | -- | 15/DB-114 |

## 4-Port EIA-232-C/4-Port EIA-422-A Multiport/2 Adapter 78-Position and 25-Position Connectors (EIA-422-A Assignments)

| Mnemonic | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|---|---|---|---|---|---|
| TxD+ | 73 | 55 | 76 | 58 | 02/TXA |
| TxD- | 34 | 16 | 37 | 19 | 04/TXB |
| RxD+ | 54 | 75 | 57 | 78 | 03/RXA |
| RxD- | 15 | 36 | 18 | 39 | 05/RXB |
| SG | 11 | 70 | -- | -- | 07 |

# FC (7002 or 7004 and 7028) 8-Port EIA-422-A Multiport/2 Adapter (Type 2-G)

Interface Card

## 8-Port EIA-422-A Multiport/2 Adapter Specifications

| | |
|---|---|
| FRU/Option Numbers | 0 Memory Base card (512 KB Label), 09F1888/NA |
| | 0 Memory Base card ( 1 MB Label), 09F1962/NA |
| | Base card (512 KB), 85F0255/09F1897 |
| | Base card ( 1 MB), 16F1824/16F1820 |
| | Interace card (order separately), 15F8858/15F8852 |
| | 256 KB memory module (512 KB card), 16F2267 |
| | 512 KB memory module (1 MB card), 04G5834 |
| Bus architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA7 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Maximum number | 8 |
| Microcode file name | /usr/lib/microcode/icaaim.com  (use on releases 3.2.x) |
| Connector | 78-position, D-shell, female |
| Wrap plugs | 78-position, part number 09F1803/16F2478 |
| | 25-position, ports 2 through 7, 09F1799 |
| | 25-position, ports 0 and 1, 6425494 |
| Cables | 4P/8P Multiport/2 interface cable, 00F5524/00F5531 |

# 8-Port EIA-422-A Multiport/2 Adapter 78-Position and 25-Position Connectors
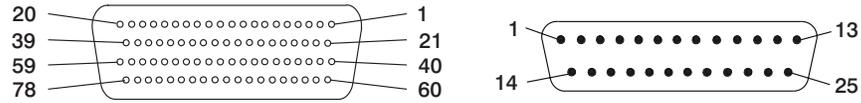


| Mnemonic | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|---|---|---|---|---|---|---|---|---|---|
| TxD+ | 40 | 04 | 66 | 69 | 73 | 55 | 76 | 58 | 02/TxA |
| TxD- | 01 | 63 | 27 | 30 | 34 | 16 | 37 | 19 | 04/TxB |
| TxCLK+ | 21 | - - | -- | -- | -- | -- | -- | -- | 23/TxCLKA |
| TxCLK- | 41 | - - | -- | -- | -- | -- | -- | - - | 24TxCLKB |
| RxD+ | 02 | 64 | 28 | 31 | 54 | 75 | 57 | 78 | 03/RxA |
| RxD- | 61 | 25 | 48 | 51 | 15 | 36 | 18 | 39 | 05/RxB |
| RxCLK+ | 03 | - - | -- | -- | -- | -- | -- | -- | 22/RxCLKA |
| RxCLK- | 62 | - - | -- | -- | -- | -- | -- | -- | 17/RxCLKB |
| SG | 43 | 07 | 08 | 67 | 11 | 70 | -- | -- | 07/GRD |

# FC (7006 or 7008 and 7042) 8-Port EIA-232-D Portmaster® Adapter/A (Type 2-H)



Interface Card

## 8-Port EIA-232-D Portmaster Adapter/A  Specifications

| | |
|---|---|
| FRU/Option Numbers | Base card (0MB), 53F2603/NA |
| | 1 MB Base card, 53F2660/53F2604 |
| | 2 MB Base card, 53F2664/53F2607 |
| | 1 MB Memory SIMM, 53F2662 |
| | 2 MB Memory SIMM, 53F2666 |
| | Interface card (order separately), 53F2612/53F2610 |
| Bus architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA7 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Busmaster | Set to No at power on; optionally set to Yes by customer's program |
| Maximum number | 8 |
| Connector | 100-position, D-shell, female |
| Wrap plugs | 100-position, part number 68F7208/15F8848 |
| | 25-position, ports 0 - 7, 33F8985 |
| Cables | 8P Portmaster interface cable, 33F8962/53F2619 |

# 8-Port EIA-232-D Portmaster Adapter/A 100-Position and 25-Position Connectors



| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|---|---|---|---|---|---|---|---|---|---|---|
| TxD | O | 51 | 54 | 07 | 10 | 13 | 16 | 94 | 48 | 02/BA |
| RxD | I | 02 | 05 | 83 | 86 | 89 | 92 | 46 | 74 | 03/BB |
| RTS | O | 01 | 04 | 82 | 85 | 88 | 91 | 45 | 73 | 04/CA |
| CTS | I | 77 | 80 | 34 | 37 | 40 | 43 | 71 | 24 | 05/CB |
| DCD | I | 28 | 31 | 59 | 62 | 65 | 68 | 21 | 99 | 08/CF |
| DTR | O | 76 | 79 | 33 | 36 | 39 | 42 | 70 | 23 | 20/CD |
| DSR | I | 53 | 56 | 09 | 12 | 15 | 18 | 96 | 50 | 06/CC |
| HRS | I | 27 | 30 | 58 | 61 | 64 | 67 | 20 | 98 | 23/CI |
| RI | I | 03 | 06 | 84 | 87 | 90 | 93 | 47 | 75 | 22/CE |
| TxCLKIN | I | 29 | 32 | 60 | 63 | 66 | 69 | 22 | 100 | 15/DB |
| TxCLK | O | 52 | 55 | 08 | 11 | 14 | 17 | 95 | 49 | 24/DA |
| RxCLK | I | 78 | 81 | 35 | 38 | 41 | 44 | 72 | 25 | 17/DD |
| SGND | -- | 19 | 19 | 26 | 26 | 57 | 57 | 97 | 97 | 07/AB |
| FGND | Cable Shield | | | | | | | | | 01/AA |

# FC (7006 or 7008 and 7044) 8-Port EIA-422-A Portmaster Adapter/A (Type 2-I)



Interface Card

## 8-Port EIA-422-A Portmaster Adapter/A Specifications

| | |
|---|---|
| FRU/Option Numbers | Base card (0 MB), 53F2603/NA |
| | 1 MB Base card, 53F2660/53F2604 |
| | 2 MB Base card, 53F2664/53F2607 |
| | 1 MB Memory SIMM, 53F2662 |
| | 2 MB Memory SIMM, 53F2666 |
| | Interface card (order separately), 53F2615/53F2613 |
| Bus architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA7 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Busmaster | Set to No at power on; optionally set to Yes by customer's program |
| Maximum number | 8 |
| Microcode Filename | /usr/lib/microcode/icarcm.com |
| Connector | 100-position, D-shell, female |
| Wrap plugs | 100-position, part number 68F7208/15F8848 |
| | 25-position, ports 0 - 7, 33F8964 |
| Cables | 8P Portmaster interface cable, 33F8962/53F2619 |

# 8-Port EIA-422-A Portmaster Adapter/A 100-Position and 25-Position Connectors



| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|---|---|---|---|---|---|---|---|---|---|---|
| TxD | O | 51 | 54 | 07 | 10 | 13 | 16 | 94 | 48 | 02/SDA |
| | O | 52 | 55 | 08 | 11 | 14 | 17 | 95 | 49 | 24/SDB |
| RxD | \| | 02 | 05 | 83 | 86 | 89 | 92 | 46 | 74 | 03/RDA |
| | \| | 78 | 81 | 35 | 38 | 41 | 44 | 72 | 25 | 17/RDB |
| -RTS | O | 01 | 04 | 82 | 85 | 88 | 91 | 45 | 73 | 04/RSA |
| | O | 76 | 79 | 33 | 36 | 39 | 42 | 70 | 23 | 20/RSB |
| -CTS | \| | 77 | 80 | 34 | 37 | 40 | 43 | 71 | 24 | 05/CSA |
| | \| | 53 | 56 | 09 | 12 | 15 | 18 | 96 | 50 | 06/CSB |
| TxCLK | \| | 28 | 31 | 59 | 62 | 65 | 68 | 21 | 99 | 08/STA |
| | \| | 03 | 06 | 84 | 87 | 90 | 93 | 47 | 75 | 22/STB |
| RxCLK | \| | 29 | 60 | 60 | 63 | 66 | 69 | 22 | 100 | 15/RTA |
| | \| | 27 | 58 | 58 | 61 | 64 | 67 | 20 | 98 | 23/RTB |
| SGND | -- | 19 | 19 | 26 | 26 | 57 | 57 | 97 | 97 | 07/GND |
| FGND | Cable Shield | | | | | | | | | 01/FGND |

# FC (7006 or 7008 and 7046) 6-Port V.35 Portmaster Adapter/A (Type 2-J)

Interface Card

## 6-Port V.35 Portmaster Adapter/A  Specifications

| | |
|---|---|
| FRU/Option Numbers | Base card (0MB), 53F2603/NA |
| | 1 MB Base card, 53F2660/53F2604 |
| | 2 MB Base card, 53F2664/53F2607 |
| | 1 MB Memory SIMM, 53F2662 |
| | 2 MB Memory SIMM, 53F2666 |
| | Interface card (order separately), 72F0164/72F0163 |
| Bus architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA7 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Busmaster | Set to No at power on; optionally set to Yes by customer's program |
| Maximum number | 8 |
| Microcode Filename | /usr/lib/microcode/icarcm.com |
| Connector | 100-position, D-shell, female |
| Wrap plugs | 100-position, part number 72F0168 |
| | 25-position, ports 0 - 5, 72F0167 |
| Cables | 6P V.35 Portmaster interface, 72F0162/72F0165 |

## 6-Port V.35 Portmaster Adapter/A 100-Position and 25-Position Connectors



| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | 25-Position Connector |
|----------|-----|--------|--------|--------|--------|--------|--------|----------------------|
| TxDA | O | 94 | 21 | 47 | 71 | 72 | 23 | 02 |
| TxDB | O | 70 | 46 | 22 | 95 | 96 | 48 | 14 |
| RxDA | I | 08 | 54 | 58 | 29 | 28 | 57 | 03 |
| RxDB | I | 33 | 78 | 82 | 04 | 03 | 81 | 16 |
| TxCA IN | I | 76 | 06 | 77 | 56 | 27 | 55 | 15 |
| TxCB IN | I | 52 | 31 | 53 | 80 | 02 | 79 | 12 |
| RxCA | I | 20 | 41 | 38 | 19 | 32 | 30 | 17 |
| RxCB | I | 45 | 16 | 13 | 44 | 07 | 05 | 09 |
| TxCA OUT | O | 24 | 73 | 98 | 25 | 99 | 26 | 24 |
| TxCB OUT | O | 49 | 97 | 74 | 50 | 75 | 51 | 11 |
| RTS | O | 42 | 43 | 92 | 93 | 37 | 39 | 04 |
| CTS | I | 15 | 65 | 86 | 87 | 59 | 09 | 05 |
| DCD | I | 89 | 40 | 62 | 61 | 35 | 84 | 08 |
| DTR | O | 18 | 91 | 69 | 68 | 14 | 12 | 20 |
| DSR | I | 66 | 90 | 88 | 64 | 60 | 85 | 06 |
| SGND | -- | 34 | 17 | 63 | 67 | 01 | 83 | 07 |
| FGND | | -- | 100 | | Shield | | | 01 |

# FC (7006 or 7008 and 7048) 6-Port X.21 Portmaster Adapter/A (Type 2-K)

Interface Card

## 6-Port X.21 Portmaster Adapter/A  Specifications

| | |
|---|---|
| FRU/Option Numbers | Base card (0MB), 53F2603/NA |
| | 1 MB Base card, 53F2660/53F2604 |
| | 2 MB Base card, 53F2664/53F2607 |
| | 1 MB Memory SIMM, 53F2662 |
| | 2 MB Memory SIMM, 53F2666 |
| | Interface card (order separately), 04G5500/72F0176 |
| Bus architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA7 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Busmaster | Set to No at power on; optionally set to Yes by customer's program |
| | |
| Maximum number | 8 |
| Microcode Filename | /usr/lib/microcode/icarcm.com |
| Connector | 78-position, D-shell, female |
| Wrap plugs | 78-position, part number 85F0205/04G1972 |
| | 25-position, ports 0 - 5, 85F0206/04G1973 |
| Cables | 6P X.21 Portmaster  interface, 04G1974/05F2028 |

# 6-Port X.21 Portmaster Adapter/A 78-Position and 25-Position Connectors

| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | 25-Position Connector |
|---|---|---|---|---|---|---|---|---|
| T(A) | O | 40 | 04 | 66 | 69 | 73 | 55 | 02 |
| T(B) | O | 41 | 05 | 19 | 20 | 10 | 13 | 24 |
| R(A) | I | 02 | 64 | 28 | 31 | 54 | 75 | 03 |
| R(B) | I | 62 | 26 | 57 | 77 | 18 | 53 | 17 |
| C(A) | O | 01 | 63 | 27 | 30 | 34 | 16 | 04 |
| C(B) | O | 60 | 24 | 47 | 50 | 35 | 17 | 20 |
| I(A) | I | 61 | 25 | 48 | 51 | 15 | 36 | 05 |
| I(B) | I | 42 | 06 | 68 | 71 | 72 | 33 | 06 |
| X(A) | O | 22 | 45 | 09 | 12 | 74 | 56 | 08 |
| X(B) | O | 03 | 65 | 29 | 32 | 49 | 52 | 22 |
| S(A) | I | 23 | 46 | 78 | 59 | 39 | 14 | 15 |
| S(B) | I | 21 | 44 | 76 | 37 | 38 | 58 | 23 |
| SG | -- | 43 | 07 | 08 | 67 | 11 | 70 | 07 |

# FC (2959) Multiprotocol Adapter/A (MP/A) (Type 2-P)

There are two types of Multiprotocol Adapter/A. This one is the single port.

The Multiprotocol Adapter/A provides the System with one-port Synchronous Data Link Control (SDLC) Connection to a SDLC protocol communications network.
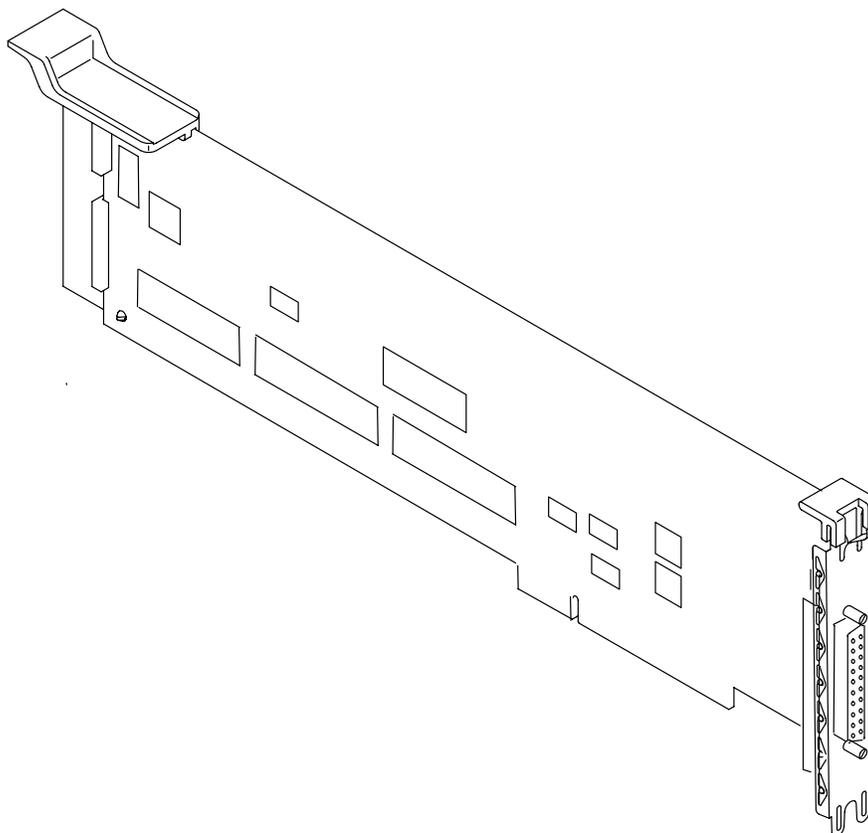
## Multiprotocol Adapter/A Specifications

| | |
|---|---|
| FRU Number | 43G0656 part number |
| I/O addresses | 0380 - 0390 or 03A0 - 03B0 |
| Interrupt levels | 3 and 4 are used on each installed card |
| Bus architecture | Micro Channel |
| Busmaster | No |
| Maximum number | 1 |
| POS ID | FFDE |
| Connector | 25-position, D-shell |
| Wrap plug | 25-position, EIA-232D, part number 62X1083 or 72X8546 |
| Cable | EIA-232D serial cable, part number 1502067, 71F0165 or 6323741 |

# Multiprotocol Adapter/A 25-Position Connector

POS 14   POS 1

POS 14   POS 1

| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Pin (Male) |
| Shell | Shield Ground | 1, Shell |
| 2 | TxD | 2 |
| 3 | RxD | 3 |
| 4 | RTS | 4 |
| 5 | CTS | 5 |
| 6 | DSR | 6 |
| 7 | Signal Ground | 7 |
| 8 | CD | 8 |
| 15 | Tx CLK | 15 |
| 17 | Rx CLK | 17 |
| 20 | DTR | 20 |
| 22 | RI | 22 |
| 23 | HRS | 23 |

# FC (2724) FDDI-Fiber Single Ring Adapter (Type 2-R)



Transceiver Key
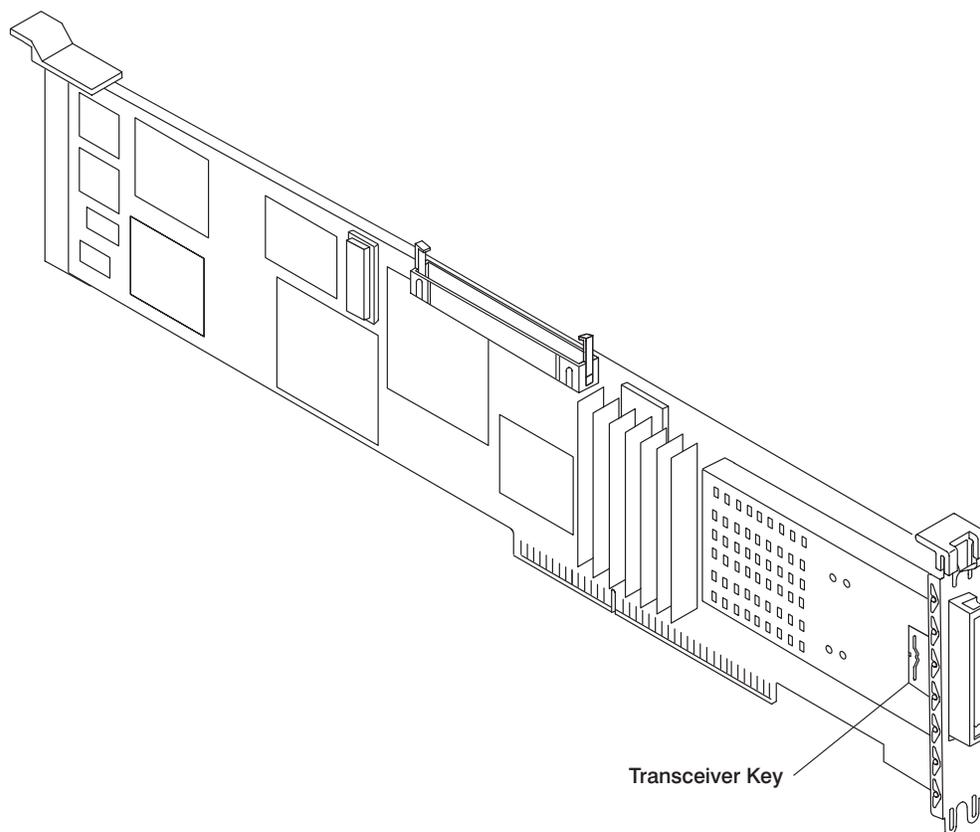
## FDDI-Fiber Single Ring Adapter Specifications

| | |
|---|---|
| FRU number | 65G1879 |
| Maximum number | 2 (7011) |
| | 4 (7012) |
| | 6 (7013/7016) |
| Bus architecture | Micro Channel |
| Connector | Media Interface Connector (MIC) |
| Jumper Cables | Fiber optic, customer-provided, available from distributors. |
| Microcode filenames | 8ef4m.xx.xx |
| | fddi.diag |
| Wrap Plug | 81F9016 |

## FC (2723) FDDI-Fiber Dual Ring Upgrade Kit Adapter (Type 2-S)
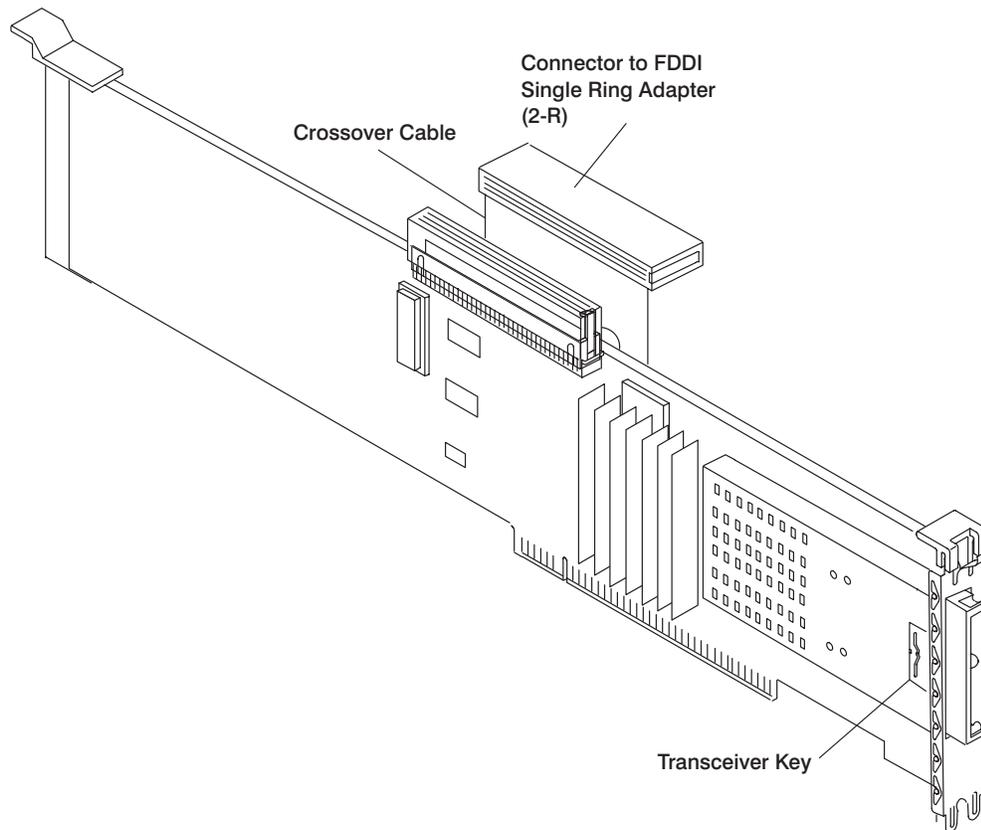


## FDDI-Fiber Dual Ring Upgrade Kit Adapter Specifications

| | |
|---|---|
| FRU number | 43G0856 |
| Maximum number | 1 (7011) |
| | 2 (7012) |
| | 3 (7013/7016) |
| Bus architecture | Micro Channel |
| Connector | Media Interface Connector (MIC) |
| Jumper Cables | Fiber optic, customer-provided, available from distributors. |
| Crossover Cable | 93F1162 |
| Wrap Plug | 81F9016 |

> **Note:** The cross over cable is too short if the two dual ring adapters are in some slots. If this is the case, move the adapters to different slots.

# FC (2725) FDDI-STP Single Ring Adapter (Type 2-T)
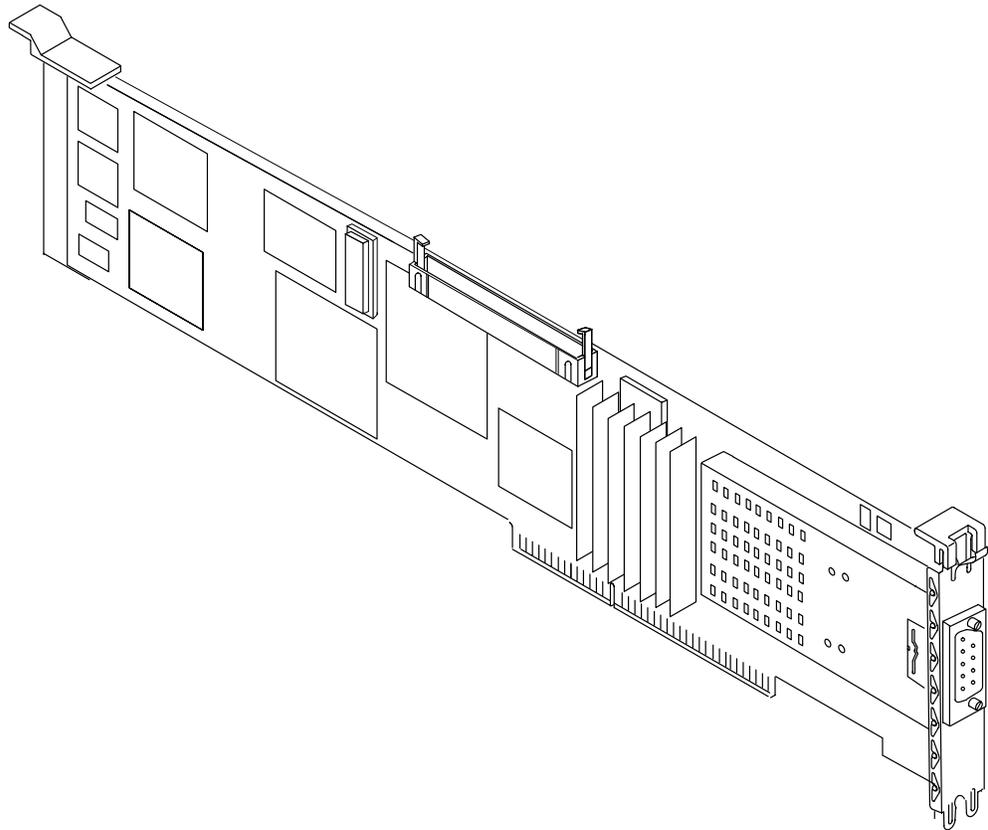


## FDDI-STP Single Ring Adapter Specifications

| | |
|---|---|
| FRU number | 65G1878 |
| Maximum number | 2 (7011) |
| | 4 (7012) |
| | 6 (7013/7016) |
| Bus architecture | Micro Channel |
| Connector | 9-pin D-shell |
| Jumper Cables | FDDI-STP adapter cable, 33G2761 |
| Microcode filenames | 8ef4m.xx.xx. |
| | fddi.diag |
| Wrap Plug | 33G2759. |

## FDDI-STP Single Ring Adapter 9-Position Connector
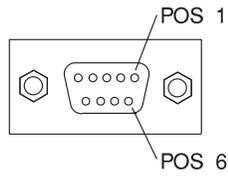


| Position | Signal Name |
|----------|-------------|
| 1 | Receive + |
| 2 | Not Used |
| 3 | Not Used |
| 4 | Not Used |
| 5 | Transmit + |
| 6 | Receive - |
| 7 | Not Used |
| 8 | Not Used |
| 9 | Transmit - |

# FC (2726) FDDI-STP Dual Ring Upgrade Kit Adapter (Type 2-U)

Crossover Cable

Connector to FDDI
Single Ring Adapter
(2-T)
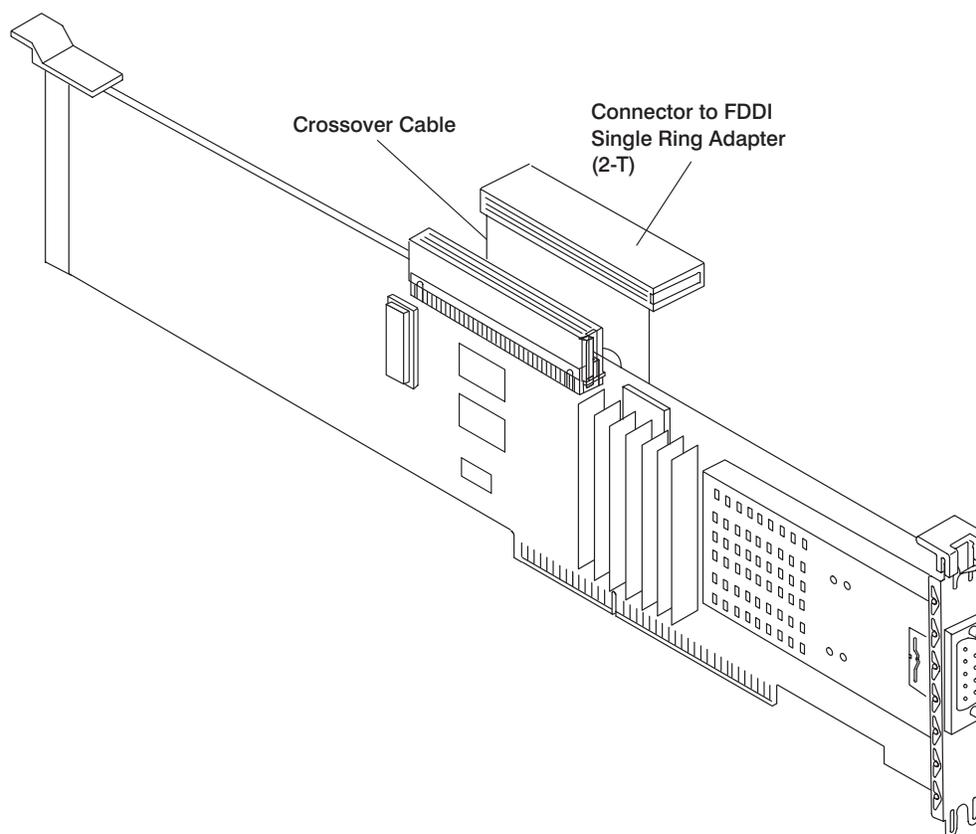
## FDDI-STP Dual Ring Upgrade Kit Adapter Specifications

FRU number                  43G0876
Maximum number              1 (7011)
                            2 (7012)
                            3 (7013/7016)
Bus architecture            Micro Channel
Connector                   9-pin D-shell
Jumper Cables               FDDI-STP reversing cable adapter, 33G2762
Crossover Cable             93F1162
Wrap Plug                   33G2759

> **Note:** The cross over cable is too short if the two dual ring adapters are in some slots. If this is the case, move the adapters to different slots.

# FDDI-STP Dual Ring Upgrade Kit Adapter 9-Position Connector
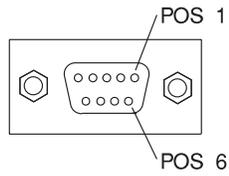


| Position | Signal Name |
|----------|-------------|
| 1 | Receive + |
| 2 | Not Used |
| 3 | Not Used |
| 4 | Not Used |
| 5 | Transmit + |
| 6 | Receive - |
| 7 | Not Used |
| 8 | Not Used |
| 9 | Transmit - |

# FC (2930, 2940, 2950) 8-Port Async Adapters (Types 3-1, 3-2, 3-3)

Each of these three adapters provide eight individually-addressable communicatio channels. When the multiport interface cable is attached to one of these adapter it provides eight EIA-232, EIA-422A, or MIL-STD 188 type communication ports.
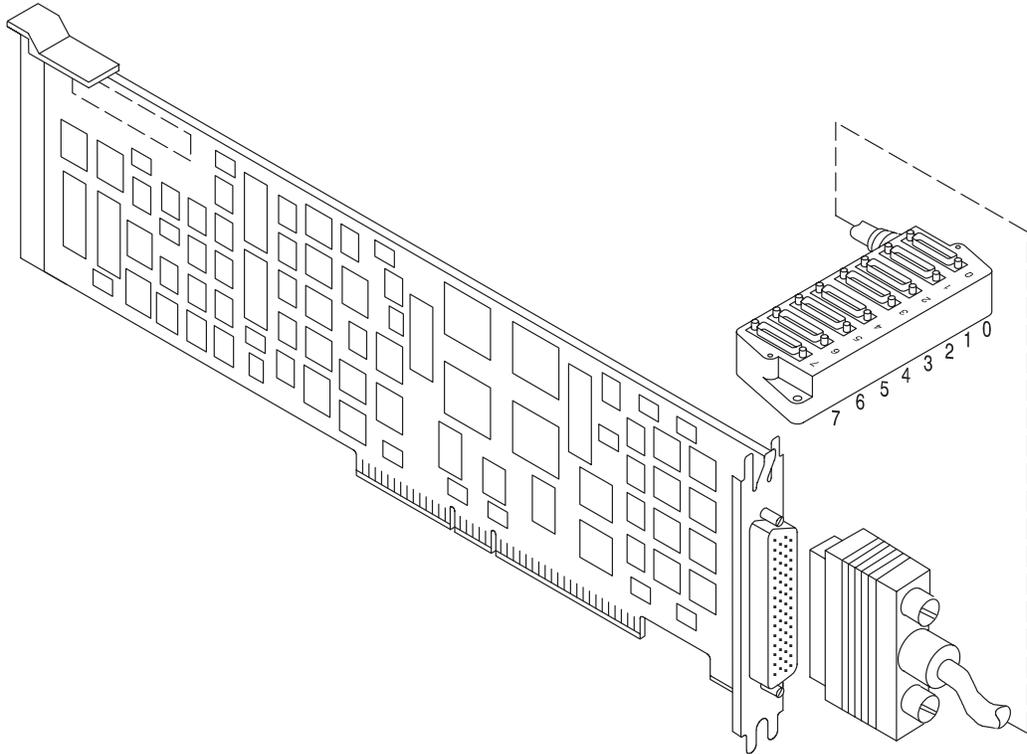


## Specifications for the 8-Port Async Adapters

| | |
|---|---|
| FRU Numbers | Type 3-1, EIA-232, part number 11H8607 |
| | Type 3-2, EIA-422A, part number 52G4757 |
| | Type 3-3, MIL-STD 188, part number 51G9246 |
| I/O addresses | Assigned by the program within the 8100 - FD5F range |
| Interrupt levels | 3, 5, 9, 10, 11, 12, 14, 15 |
| Bit rate | 50 - 38400 (set by the program) |
| Bits per character | 5, 6, 7, 8 (set by the program) |
| Bus architecture | Micro Channel |
| Busmaster | No |
| Maximum number | 8 (including 16-port adapters) |
| Connector | 78-position, D-shell |
| Wrap plugs | 78-position, part number 22F9694 |
| | EIA-232D 25-position, part number 6298964 |
| | EIA-422A 25-position cable, part number 30F9159 |
| Cables | Multiport interface cable, part number 00F5524 |
| | 8/16-port rack extension cable, part number 53F3048. |

## 78-Position Connector on the 8-Port Async EIA-232 and MIL-STD 188 Adapter
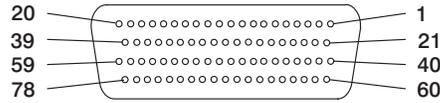


| Position | Mnemonic | Port Number | | Position | Mnemonic | Port Number |
|---|---|---|---|---|---|---|
| 1 | RTS | 0 | | 41 | +5 V dc | |
| 2 | RxD | 0 | | 42 | DSR | 0 |
| 3 | RI | 0 | | 43 | Sig Gnd | 3 |
| 4 | TxD | 1 | | 44 | Reserved | |
| 5 | Reserved | | | 45 | DCD | 1 |
| 6 | DSR | 1 | | 46 | Reserved | |
| 7 | Sig Gnd | 0 | | 47 | DTR | 2 |
| 8 | Sig Gnd | 1 | | 48 | CTS | 2 |
| 9 | DCD | 2 | | 49 | RI | 4 |
| 10 | RI | 6 | | 50 | DTR | 3 |
| 11 | Sig Gnd | 2 | | 51 | CTS | 3 |
| 12 | DCD | 3 | | 52 | RI | 5 |
| 13 | RI | 7 | | 53 | DSR | 6 |
| 14 | DSR | 7 | | 54 | RxD | 4 |
| 15 | CTS | 4 | | 55 | TxD | 5 |
| 16 | RTS | 5 | | 56 | DCD | 5 |
| 17 | DTR | 5 | | 57 | RxD | 6 |
| 18 | CTS | 6 | | 58 | TxD | 7 |
| 19 | RTS | 7 | | 59 | DCD | 7 |
| 20 | DTR | 7 | | 60 | DTR | 0 |
| 21 | Reserved | | | 61 | CTS | 0 |
| 22 | DCD | 0 | | 62 | Reserved | |
| 23 | Reserved | | | 63 | RTS | 1 |
| 24 | DTR | 1 | | 64 | RxD | 1 |
| 25 | CTS | 1 | | 65 | RI | 1 |
| 26 | Reserved | | | 66 | TxD | 2 |
| 27 | RTS | 2 | | 67 | Sig Gnd | 4,6 |
| 28 | RxD | 2 | | 68 | DSR | 2 |
| 29 | RI | 2 | | 69 | TxD | 3 |
| 30 | RTS | 3 | | 70 | Sig Gnd | 5,7 |
| 31 | RxD | 3 | | 71 | DSR | 3 |
| 32 | RI | 3 | | 72 | DSR | 4 |
| 33 | DSR | 5 | | 73 | TxD | 4 |
| 34 | RTS | 4 | | 74 | DCD | 4 |
| 35 | DTR | 4 | | 75 | RxD | 5 |
| 36 | CTS | 5 | | 76 | TxD | 6 |
| 37 | RTS | 6 | | 77 | DCD | 6 |
| 38 | DTR | 6 | | 78 | RxD | 7 |
| 39 | CTS | 7 | | | | |
| 40 | TxD | 0 | | | | |

# 78-Position Connector on the 8-Port Async EIA-422A Adapter

| Position | Mnemonic | Port Number | Position | Mnemonic | Port Number |
|----------|----------|-------------|----------|----------|-------------|
| 1 | + TxD | 0 | 41 | Reserved | |
| 2 | - RxD | 0 | 42 | Reserved | |
| 3 | Reserved | | 43 | Sig Gnd | 0 |
| 4 | - TxD | 1 | 44 | Reserved | |
| 5 | Reserved | | 45 | Reserved | |
| 6 | Reserved | | 46 | Reserved | |
| 7 | Sig Gnd | 1 | 47 | Reserved | |
| 8 | Sig Gnd | 2 | 48 | + RxD | 2 |
| 9 | Reserved | | 49 | Reserved | |
| 10 | Reserved | | 50 | Reserved | |
| 11 | Sig Gnd | 4 | 51 | + RxD | 3 |
| 12 | Reserved | | 52 | Reserved | |
| 13 | Reserved | | 53 | Reserved | |
| 14 | Reserved | | 54 | - RxD | 4 |
| 15 | + RxD | 4 | 55 | - TxD | 5 |
| 16 | + TxD | 5 | 56 | Reserved | |
| 17 | Reserved | | 57 | - RxD | 6 |
| 18 | + RxD | 6 | 58 | - TxD | 7 |
| 19 | + TxD | 7 | 59 | Sig Gnd | 7 |
| 20 | Reserved | | 60 | Reserved | |
| 21 | Reserved | | 61 | + RxD | 0 |
| 22 | Reserved | | 62 | Reserved | |
| 23 | Reserved | | 63 | + TxD | 1 |
| 24 | Reserved | | 64 | - RxD | 1 |
| 25 | + RxD | 1 | 65 | Reserved | |
| 26 | Reserved | | 66 | - TxD | 2 |
| 27 | + TxD | 2 | 67 | Sig Gnd | 3 |
| 28 | - RxD | 2 | 68 | Reserved | |
| 29 | Reserved | | 69 | - TxD | 3 |
| 30 | + TxD | 3 | 70 | Sig Gnd | 5 |
| 31 | - RxD | 3 | 71 | Reserved | |
| 32 | Reserved | | 72 | Reserved | |
| 33 | Reserved | | 73 | - TxD | 4 |
| 34 | + TxD | 4 | 74 | Reserved | |
| 35 | Reserved | | 75 | - RxD | 5 |
| 36 | + RxD | 5 | 76 | - TxD | 6 |
| 37 | + TxD | 6 | 77 | Sig Gnd | 6 |
| 38 | Reserved | | 78 | - RxD | 7 |
| 39 | + RxD | 7 | | | |
| 40 | - TxD | 0 | | | |

## FC (2955) 16-Port Async Adapter - EIA-232-D (Type 3-4)

This adapter provides 16 individually-addressable communication channels. Earlier versions of this adapter consisted of a base card and an electronics interface card. The base adapter and the electronics interface card combination are a single FRU. The latest version of this card is a single adapter. When the 16-port interface cable - EIA-232 is attached to this adapter, it provides 16, EIA-232-D communication ports.

**Note:** This adapter *does not* support all of the modem control signals. This adapter only provides the following signals: TxD, RxD, DCD, and DTR. The RTS signal line is pulled high at the interface cable.



This illustration shows the two card version of the 16-Port Async Adapter. There is also a single card version.
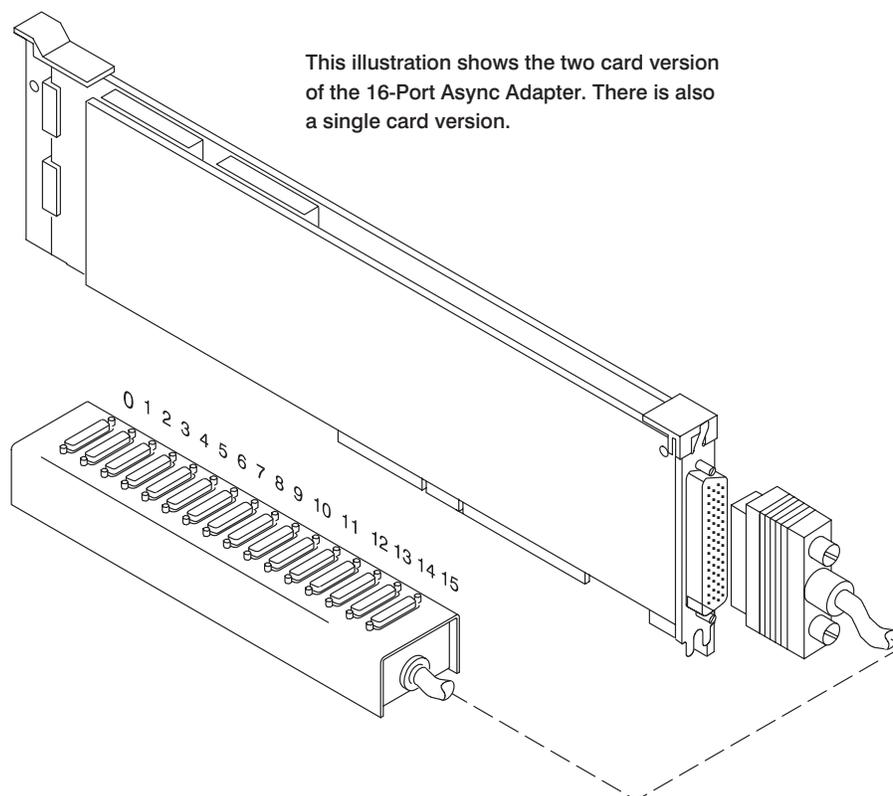
## 16-Port Async Adapter - EIA-232-D Specifications

| | |
|---|---|
| FRU Numbers | Single card FRU 11H5762 |
| | Double card FRU 8184411 |
| I/O addresses | Assigned by the program within the 8100 - FD5F range |
| Interrupt levels | 3, 5, 9, 10, 11, 12, 14, 15 |
| Bit rate | 50 - 38400 (set by the program) |
| Bits per character | 5, 6, 7, 8 (set by the program) |
| Bus architecture | Micro Channel |
| Busmaster | No |
| Maximum number | 8 (including 8-port adapters) |
| Connector | 78-position, D-shell |
| Wrap plugs | 78-position, part number 53F3312 |
| | 25-position, part number 6298964 |
| Cables | 16-port interface cable - EIA-232, part number 43G0463 |
| | 8/16-port rack extension cable, part number 53F3048. |

# 16-Port Async Adapter - EIA-232 78-Position Connector
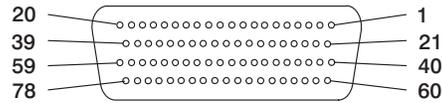


| Position | Mnemonic | Port Number | Position | Mnemonic | Port Number |
|----------|----------|-------------|----------|----------|-------------|
| 1 | TxD | 01 | 41 | Reserved | |
| 2 | TxD | 00 | 42 | RxD | 02 |
| 3 | DCD | 02 | 43 | Reserved | |
| 4 | DCD | 01 | 44 | DCD | 03 |
| 5 | Reserved | | 45 | DTR | 05 |
| 6 | RxD | 03 | 46 | Reserved | |
| 7 | TxD | 05 | 47 | TxD | 07 |
| 8 | DCD | 04 | 48 | TxD | 06 |
| 9 | DTR | 06 | 49 | TxD | 08 |
| 10 | DTR | 08 | 50 | Sig Gnd | 04 |
| 11 | DTR | 07 | 51 | DCD | 09 |
| 12 | RxD | 10 | 52 | DCD | 11 |
| 13 | RxD | 09 | 53 | DCD | 10 |
| 14 | RxD | 11 | 54 | DTR | 12 |
| 15 | TxD | 13 | 55 | Sig Gnd | |
| 16 | TxD | 12 | 56 | RxD | 14 |
| 17 | DCD | 14 | 57 | DTR | 15 |
| 18 | DCD | 13 | 58 | + 12 V dc | |
| 19 | TxD | 15 | 59 | Sig Gnd | |
| 20 | Sig Gnd | | 60 | DCD | 00 |
| 21 | RxD | 01 | 61 | DTR | 02 |
| 22 | RxD | 00 | 62 | DTR | 01 |
| 23 | TxD | 02 | 63 | RxD | 04 |
| 24 | TxD | 04 | 64 | TxD | 03 |
| 25 | DTR | 03 | 65 | DCD | 05 |
| 26 | Sig Gnd | | 66 | DTR | 04 |
| 27 | RxD | 05 | 67 | RxD | 07 |
| 28 | Sig Gnd | | 68 | RxD | 06 |
| 29 | DCD | 06 | 69 | RxD | 08 |
| 30 | DCD | 08 | 70 | TxD | 10 |
| 31 | DCD | 07 | 71 | TxD | 09 |
| 32 | DTR | 09 | 72 | TxD | 11 |
| 33 | DTR | 11 | 73 | Sig Gnd | |
| 34 | DTR | 10 | 74 | DCD | 12 |
| 35 | RxD | 13 | 75 | DTR | 14 |
| 36 | RxD | 12 | 76 | DTR | 13 |
| 37 | TxD | 14 | 77 | DCD | 15 |
| 38 | Sig Gnd | | 78 | + 12 V dc | |
| 39 | RxD | 15 | | | |
| 40 | DTR | 00 | | | |

**Note:** +12 V dc serves as a power source for the modem control lines that are generated at the fan-out box.

# FC (2957) 16-Port Async Adapter - EIA-422A (Type 3-5)

This adapter provides 16 individually-addressable communication channels. This adapter consists of a base card and an electronics interface card. The base adapter and the electronics interface card combination are a single FRU. When the 16-port interface cable EIA-422A is attached to this adapter, it provides 16 EIA-422A communication ports.
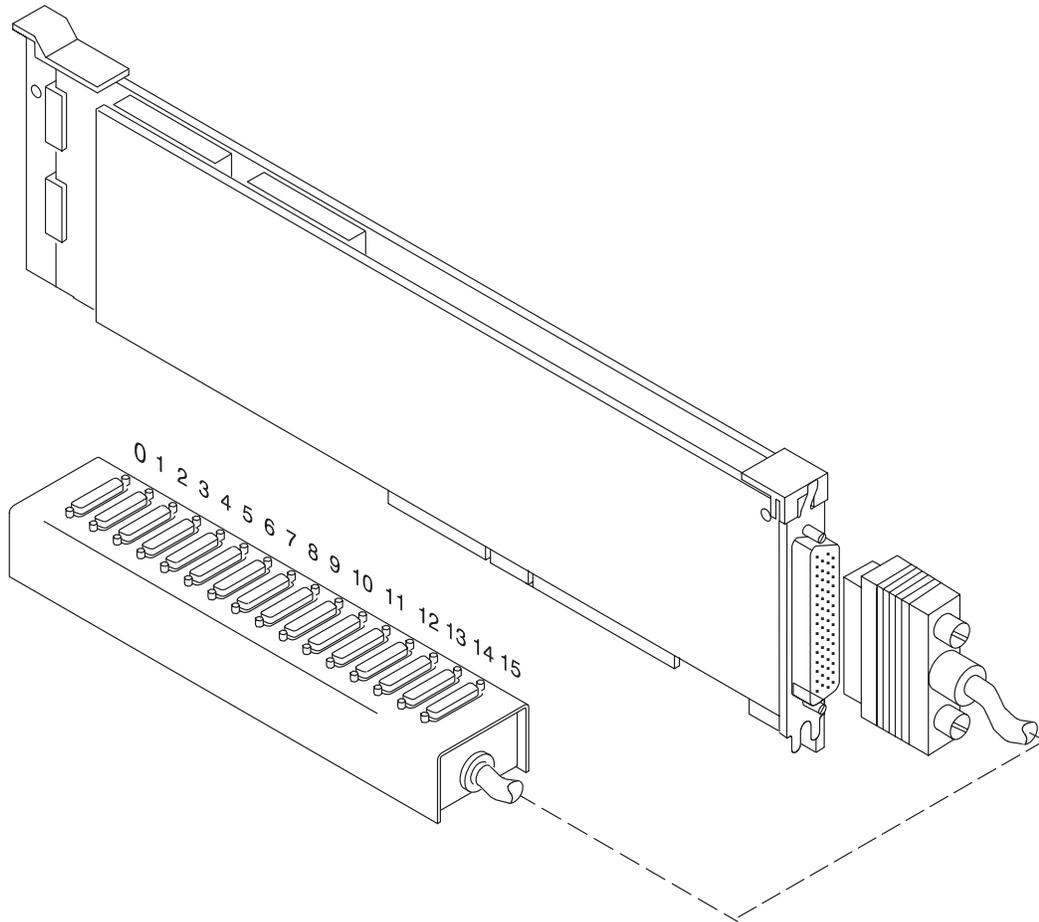


## 16-Port Async Adapter - EIA-422A Specifications

| | |
|---|---|
| FRU Number | 52G4739 |
| I/O addresses | Assigned by the program within the 8100 - FD5F range |
| Interrupt levels | 3, 5, 9, 10, 11, 12, 14, 15 |
| Bit rate | 50 - 38400 (set by the program) |
| Bits per character | 5, 6, 7, 8 (set by the program) |
| Bus architecture | Micro Channel |
| Busmaster | No |
| Maximum number | 8 (including 8-port adapters) |
| Connector | 78-position, D-shell |
| Wrap plugs | 78-position, part number 53F3312 |
| | 25-position , part number 30F9159 |
| Cables | 16-port interface cable - EIA-422A, part number 43G0462 |
| | 8/16-port rack extension cable, part number 53F3048. |

# 16-Port Async Adapter - EIA-422A 78-Position Connector
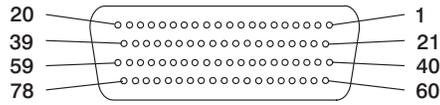


| Position | Mnemonic | Port Number | Position | Mnemonic | Port Number |
|----------|----------|-------------|----------|----------|-------------|
| 1 | TxA | 01 | 41 | Reserved | |
| 2 | TxA | 00 | 42 | RxA | 02 |
| 3 | RxB | 02 | 43 | Reserved | |
| 4 | RxB | 01 | 44 | RxB | 03 |
| 5 | Reserved | | 45 | TxB | 05 |
| 6 | RxA | 03 | 46 | Reserved | |
| 7 | TxA | 05 | 47 | TxA | 07 |
| 8 | RxB | 04 | 48 | TxA | 06 |
| 9 | TxB | 06 | 49 | TxA | 08 |
| 10 | TxB | 08 | 50 | Sig Gnd | 04 |
| 11 | TxB | 07 | 51 | RxB | 09 |
| 12 | RxA | 10 | 52 | RxB | 11 |
| 13 | RxA | 09 | 53 | RxB | 10 |
| 14 | RxA | 11 | 54 | TxB | 12 |
| 15 | TxA | 13 | 55 | Sig Gnd | |
| 16 | TxA | 12 | 56 | RxA | 14 |
| 17 | RxB | 14 | 57 | TxB | 15 |
| 18 | RxB | 13 | 58 | Reserved | |
| 19 | TxA | 15 | 59 | Sig Gnd | |
| 20 | Sig Gnd | | 60 | RxB | 00 |
| 21 | RxA | 01 | 61 | TxB | 02 |
| 22 | RxA | 00 | 62 | TxB | 01 |
| 23 | TxA | 02 | 63 | RxA | 04 |
| 24 | TxA | 04 | 64 | TxA | 03 |
| 25 | TxB | 03 | 65 | RxB | 05 |
| 26 | Sig Gnd | | 66 | TxB | 04 |
| 27 | RxA | 05 | 67 | RxA | 07 |
| 28 | Sig Gnd | | 68 | RxA | 06 |
| 29 | RxB | 06 | 69 | RxA | 08 |
| 30 | RxB | 08 | 70 | TxA | 10 |
| 31 | RxB | 07 | 71 | TxA | 09 |
| 32 | TxB | 09 | 72 | TxA | 11 |
| 33 | TxB | 11 | 73 | Sig Gnd | |
| 34 | TxB | 10 | 74 | RxB | 12 |
| 35 | RxA | 13 | 75 | TxB | 14 |
| 36 | RxA | 12 | 76 | TxB | 13 |
| 37 | TxA | 14 | 77 | RxB | 15 |
| 38 | Sig Gnd | | 78 | Reserved | |
| 39 | RxA | 15 | | | |
| 40 | TxB | 00 | | | |

# FC (6400) 64-Port Async Controller (Type 3-6)

This adapter provides the control function and connectors to attach four 16-port async concentrators. When all four concentrators are attached, this combination provides 64, EIA-232 communication ports.
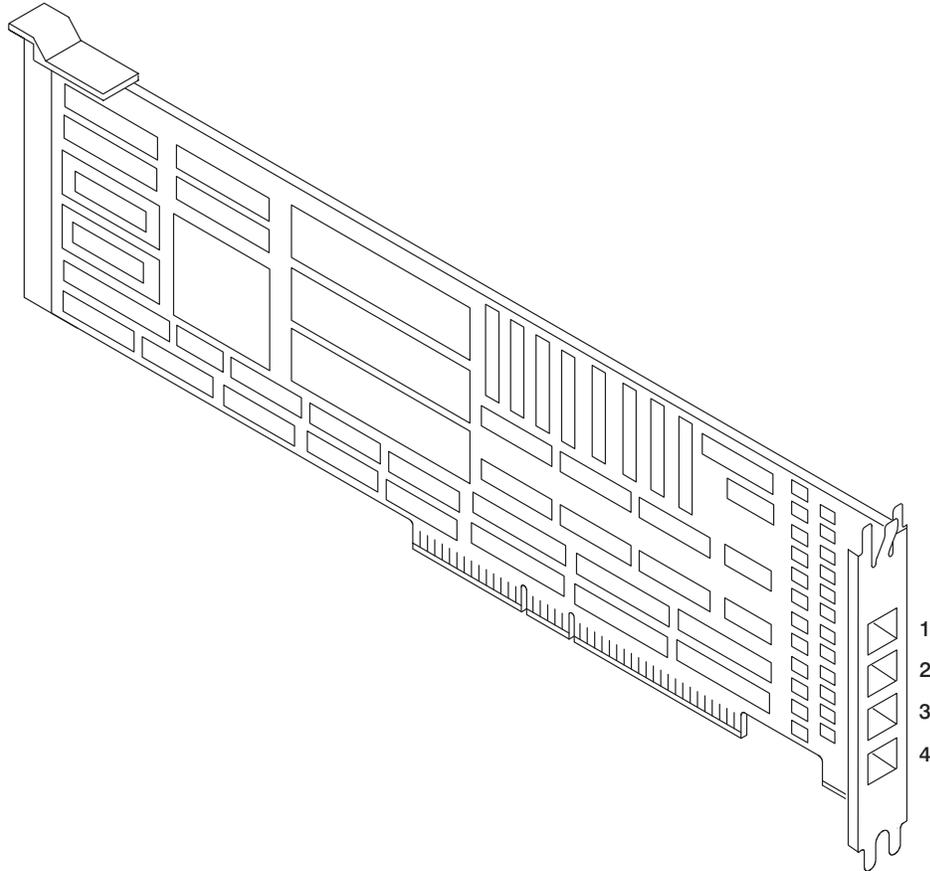


## 64-Port Async Controller Specifications

| | |
|---|---|
| FRU Number | 32G1412 |
| Memory addresses | 256K Bytes of continuous non-shared memory space (four 64K byte blocks) |
| Interrupt levels | 3, 4, 5, 7, 10, 11, 12, 15 |
| Bit rate | 75 to 38400 bps (set by the program) |
| Bits per character | 5, 6, 7, 8 (set by the program) |
| Parity | Odd, even, or none |
| Stop bits | 1, 1.5, 2 |
| Bus architecture | Micro Channel |
| Busmaster | No |
| Maximum number | 8 |
| Connectors | Four, RJ-45 connectors |
| Wrap plug | Part number 53F3623 |
| Cable | 7.6 m (25 feet) controller cable, part number 53F3368. |

# 8-Position RJ-45 Controller Connector

The signals and connector position numbers are the same for each of the controller connectors.
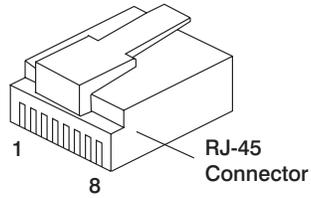


| Position | Signal Name |
|----------|-------------|
| 1 | Transmit data - A |
| 2 | Transmit data - B |
| 3 | No connection |
| 4 | Transmit clock - B |
| 5 | Transmit clock - A |
| 6 | Shield |
| 7 | Receive data - B |
| 8 | Receive data - A |

# FC (6401) 16-Port Async Concentrator

The 16-port async concentrator attaches to the 64-port async controller. Four of these concentrators can be attached to a single 64-port async controller. This combination provides a total of 64 communications ports. When the RJ-45 to DB-25 converter cable is attached to a port, the port is an EIA-232 compatible connection refer to ("Cable N" on page 5-22 for cabling information).

The 16-port async concentrator can be located up to 762 meters (2500 feet) from the controller.
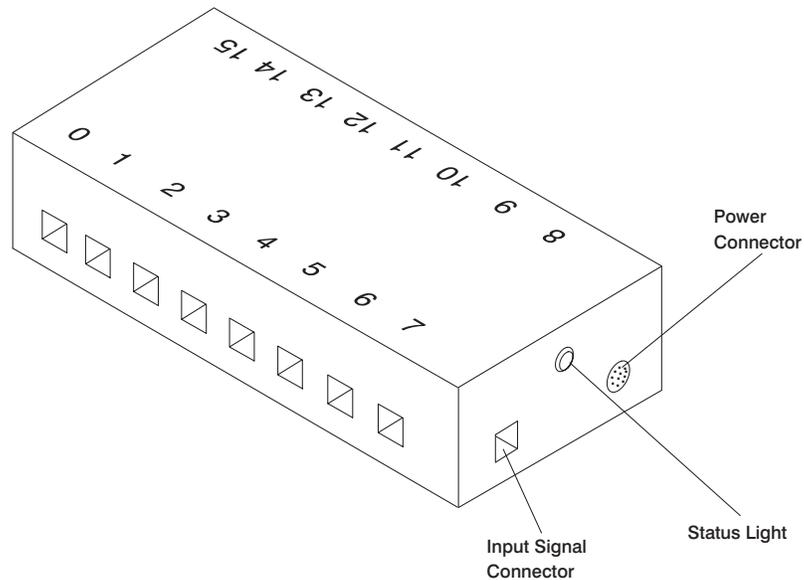


## 16-Port Async Concentrator Specifications

| | |
|---|---|
| FRU Number | 43G0893 |
| Connectors | Seventeen, 8-position RJ-45 connectors |
| Wrap plugs | Input cable, part number 53F3205 |
| | Output connector, part number 53F3624 |
| Cables | 7.6 m (25 feet) controller cable, part number 53F3368 |
| | RJ-45 to DB-25 converter cable, part number 53F3367 |
| | (Available only in four-cable kit, 59F3432). |

## 16-Port Async Concentrator 8-Position RJ-45 Input and Output Connectors

The connector positions and signals for each RJ-45 connector is the same. See 5-24 for information on the Concentrator-to-Device cables.
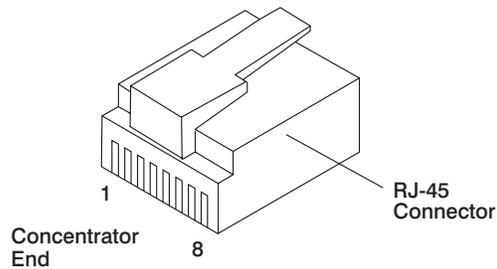
| Positions | Mnemonic (Signal Name) |
|:---:|:---|
| 1 | GND (concentrator chassis ground) |
| 2 | RTS (request to send) |
| 3 | RxD (receive data) |
| 4 | CD (carrier detect) |
| 5 | Sig Gnd (signal ground) |
| 6 | TxD (transmit data) |
| 7 | DTR (data terminal ready) |
| 8 | CTS (clear to send) |

# 16-Port Async Concentrator Power Transformers

There are two types of power transformers for the 16-port async concentrator. The outlet mounted type only comes in the 115 - 127 V ac range and the transformers with a removable power cord. The tables on pages 1-84 and 1-85 list available transformers and removable power cables.
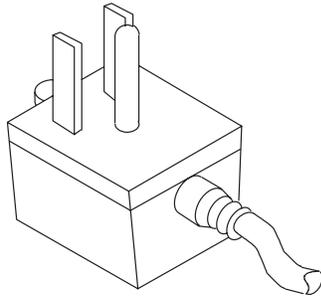
115 - 127 V ac
Outlet-mounted
Transformer

Removable Power Cable
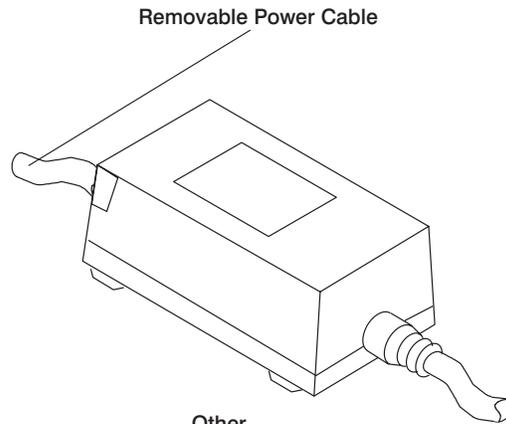
Other
Transformers

| Voltage Range and Frequency | Removable Power Cable | Part Number |
|---|---|---|
| 115 - 127 V ac at 50 or 60Hz | No | 70F9938 |
| 100 - 110 V ac at 50 or 60Hz | Yes | 70F9937 |
| 200 - 220 V ac at 50 or 60Hz | Yes | 70F9939 |
| 230 - 240 V ac at 50 or 60Hz | Yes | 70F9940 |

# 16-Port Async Concentrator Removable Power Cables



| Index | Part Number | Country |
|-------|-------------|---------|
| 1 | 1838574 | Bahamas, Barbados, Bolivia, Canada, Costa Rica, Dominican Republic, El Salvador, Ecuador, Guatemala, Honduras, Jamaica, Japan, Netherlands Antilles, Panama, Peru, Trinidad, Philippines, Taiwan, Thailand, Venezuela |
| 2 | 6952300 | Bolivia, Dominican Republic, Ecuador, Guyana, Honduras, Jamaica, Japan, Korea, Netherlands Antilles, Philippines, Surinam, Taiwan, U.S.A.  (except Chicago), Venezuela |
|   | 62X1045 | Chicago, U.S.A. |
| 3 | 6952311 | Argentina, Australia, New Zealand |
| 4 | 13F9979 | Austria, Belgium, Botswana, Bulgaria, Croatia, Egypt, Finland, France, Hungary, Iceland, Korea, Luxemburg, Poland, Romania, Sweden, West Germany |
| 5 | 13F9997 | Denmark |
| 6 | 14F0015 | Bangladesh, Burma, India, Pakistan, South Africa,  Sri Lanka |
| 7 | 14F0033 | Bahrain, Bermuda, Brunei, China, Ghana, Hong Kong, Iraq, Ireland, Jordan, Kenya, Kuwait, Malawi, Macao, Malaysia, Nigeria, Oman, Qatar, Singapore, Tanzania, Uganda, United Arab Emirates, U.K., Zambia |
| 8 | 14F0051 | Switzerland |
| 9 | 14F0069 | Chile, Ethiopia, Italy |
| 10 | 14F0087 | Israel |
| 11 | 6952291 | Colombia, Uruguay |

# FC (8128) 128-Port Async Controller (Type 3-7)

This adapter provides the control function and connectors to attach eight 16-port remote async nodes. When all eight nodes are attached, this combination provides 128, EIA-232-D communication ports. The remote async nodes are described in the following topic. More information pertaining to the 128-Port Async Controller can be found in the following publication *AIX Versions 3.2 and 4 Asynchronous Communications Guide* order number SC23-2488.
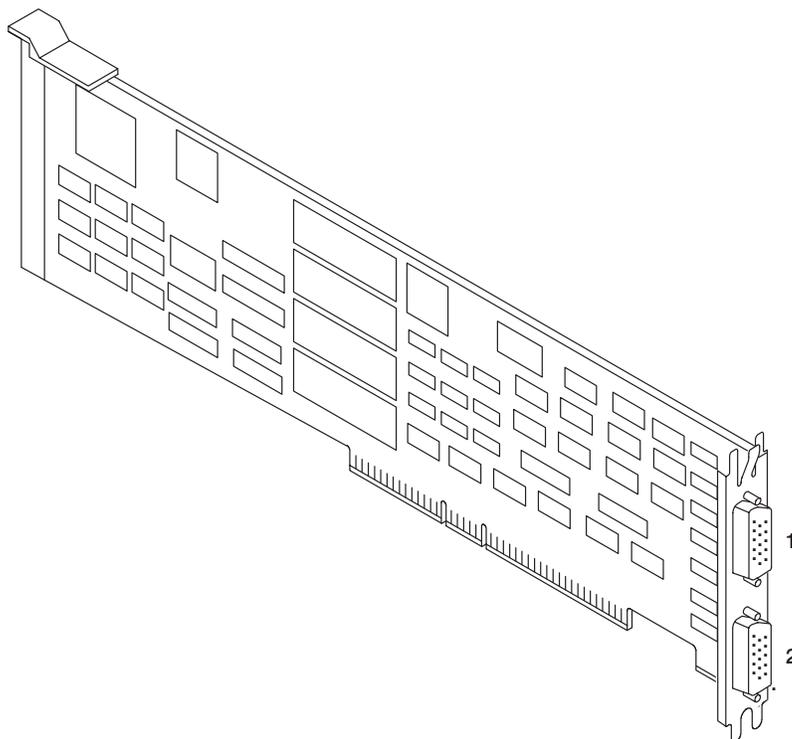
## 128-Port Async Controller Specifications

| | |
|---|---|
| FRU Number | 52G4894 |
| Memory addresses | 512K Bytes of continuous non-shared memory space (sixteen 32K Byte blocks) |
| Interrupt levels | 3, 4, 5, 7, 10, 11, 12, 15 |
| Bit rate | 75 to 57,600 bps (set by the program) |
| Bits per character | 5, 6, 7, 8 (set by the program) |
| Parity | Odd, even, or none |
| Stop bits | 1, 2 |
| Bus architecture | Micro Channel |
| Busmaster | No |
| Maximum number | 7 |
| Connectors | Two, HD-15 connectors |
| Terminator plugs | HD-15, part number 43G0938 |
| Cables | 0.2 m (9 inches) controller cable, part number 43G0936 |
| | 4.6 m (15 feet) controller cable, part number 43G0937 |

# 128-Port Async Controller 15-Position HD-15 Connector

The signals and connector position numbers are the same for each of the controller connectors.
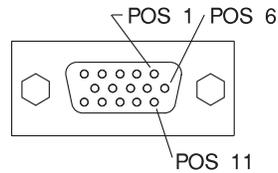


Controller Connector (female)

| Position | Mnemonic |
|----------|----------|
| 1 | RxD- |
| 2 | RxD+ |
| 3 | Reserved |
| 4 | RxC- |
| 5 | RxC+ |
| 6 | TxD- |
| 7 | TxD+ |
| 8 | Reserved |
| 9 | TxC- |
| 10 | TxC+ |
| 11 | Reserved |
| 12 | GND (chassis) |
| 13 | Reserved |
| 14 | Reserved |
| 15 | Reserved |

# Autoconfiguration

The 128-port async subsystem autoconfigures with the following settings when initially installed. Hardware reconfiguration must be done through SMIT.

- 8-wire cabling
- 1,200,000 bps controller line speed
- no sync modems

# Remote Async Nodes

The 16-port original or enhanced remote async node (RAN) attaches to a 128-port async controller.  Eight remote async nodes can be attached to a single 128-port async controller.  This combination provides a total of 128 communications ports.  The original async nodes and enhanced RANs can be used in any combination.  For RAN to device data rates when mixing original RANs and Enhanced RANs. See "Cabling the adapter and the four different Remote Async Nodes" on page 5-28.  When the RJ-45 to DB-25 converter cable is attached to a port, the port is an RS-422 or EIA-232 compatible connection.  More information pertaining to the remote async nodes can be found in the publication, *AIX Versions 3.2 and 4 Asynchronous Communications Guide* order number SC23-2488.

The last 16-port remote async node on a controller line can be located up to 300 meters (1000 feet) from the controller when configured at the maximum controller line data rate.  Distances up to 1200 meters (3930 feet) are supported at lower controller line data rates.  See controller line data rates table in "Line Length, 8-wire" on page 5-30.  Remote async nodes may also be remotely located via either RS-422 or EIA-232 synchronous modems.

## FC (8130, 8137, and 8138) Remote Async Nodes 16-Port  Box Style



RJ±45 Async Ports

Box Style Remote
Async Node
(Rear  View)

OUT Connector

IN  Connector

Power

On/Off
Switch
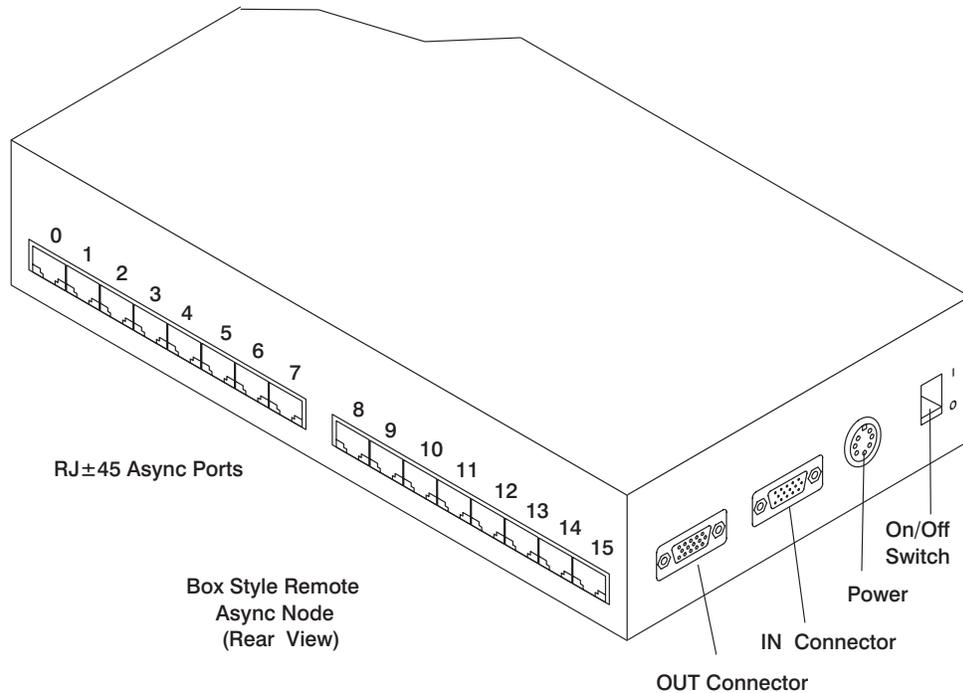
| Feature code | RAN Description |
|--------------|-----------------|
| 8130 | EIA-232 original |
| 8137 | EIA-232 enhanced |
| 8138 | RS-422 enhanced |

# FC (8136) Remote Async Node 16-Port EIA-232 Rack Style

The 16 Ports of EIA-232 on the rack style RAN have the same characteristics as those of the box style RAN. The operator panel on the rack style is the same and is used the same as the one on the box style. Also, the cabling of the box and rack styles is the same. The main difference between the box style RAN and the rack style is the form factor and the power supply. The physical shape is seen to be different. The box style is powered by a transformer that supplies low voltage to the RAN while the rack style is powered directly from the wall AC outlet at 100 or 200 volts AC.

The rack style of RAN comes with brackets (not shown) to enable mounting the unit in a rack. The rack style RAN is one EIA unit high. The front of the rack has the 16 EIA-232 RJ-45 connectors and the operator panel.

Front of Rack Style Remote Async Node

16 ± RJ-45 Async Ports   Do not plug telephone equipment into these connectors   Operator Panel

Operator Panel Detail
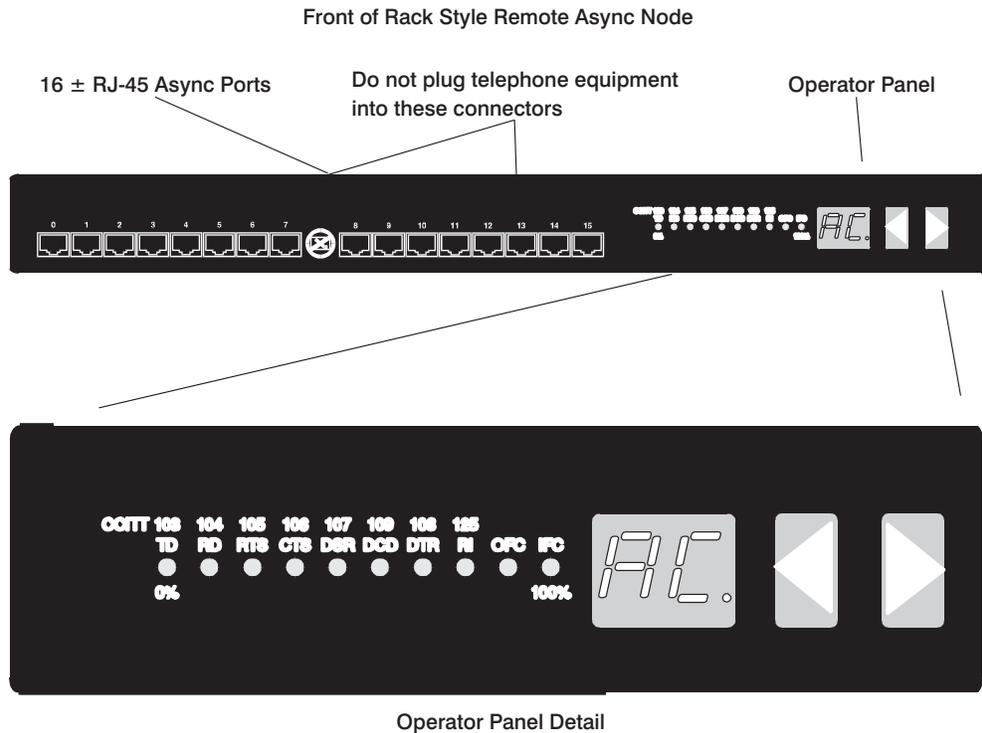
The back of the rack style unit has the AC power connector and switch and also the connectors for cabling the adapter and RANs together.
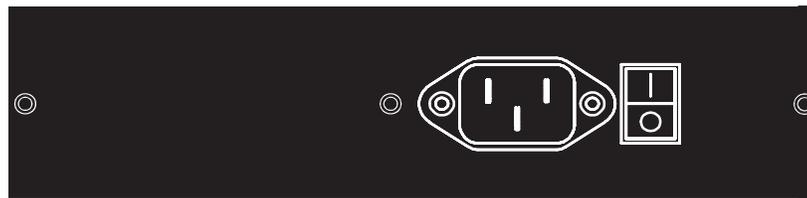
Power Connector and Power Switch
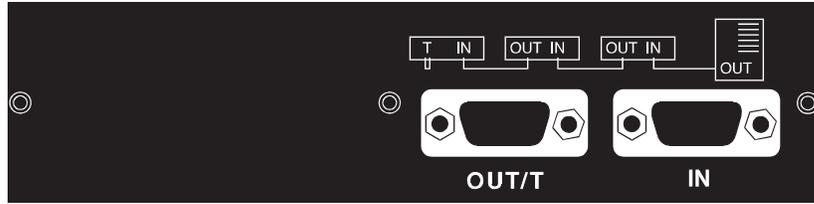
Connectors for Cabling Adapter and RANs Together

## 16-Port Remote Async Node Specifications

| Item | Feature Code | FRU Number | Description |
|------|--------------|------------|-------------|
| Box Style | 8130<br>8137<br>8138 | 88G3842<br>93H6549<br>93H6563 | Original RAN<br>* Enhanced RS-232 RAN<br>* Enhanced RS-422 RAN |
| Rack Style | 8136 | 40H2589 | Rack Style RAN |
| Connectors | | | Sixteen,10 position RJ-45 connectors<br>One 15-position male HD-15 connector<br>One 15-position female HD-15 connector |
| Wrap plug | | 43G0928 | RJ-45 |
| Terminator | | 43G0926 | HD-15 |
| Cables | | | See "FC 8128 (128-Port Async Controller)" on page 3-8 |

* Enhanced RANs require AIX 4.1.5 plus the latest PTFs in order to work on a Micro Channel System Unit.

# Remote Async Node Front Panel

The front panel is used to monitor system activity and to program the Remote Async Node with a unique node number. This node number is used by the 128-Port Async Controller to identify each Remote Async Node on a controller line.
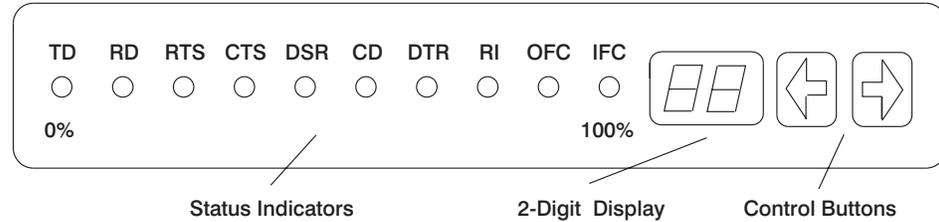


## During Boot, the Following Actions Occur:

- Status indicators and the two-digit display are cycled, indicating that the remote async node POST is in progress.

- P0 in the two-digit display indicates the final POST stages.

- P1 in the two-digit display indicates POST is complete.

- P4 in the two-digit display indicates that microcode is being received.

Following a successful boot, system activity is displayed and the status indicators cycle at a rate proportional to async traffic. The following display modes can be viewed in the two-digit display by using the left and right arrow buttons on the front panel:

| Two-Digit Display/Mode | Description |
| --- | --- |
| AC | Activity; status indicators cycle proportionally to async traffic. |
| 0-15 | Port monitor; two-digit displays shows current async port being monitored; status indicators operational (OFC shows output flow control active; IFC shows input flow control active). |
| PC | Packet count; status indicators show binary representation of total packets transmitted or received. |
| EC | Error count; status indicators show binary representation of error counts on the controller line. |
| PU | Processor utilization; status indicators act as bar graph showing percentage of time that the remote async node microprocessor is being used. |
| LU | Line utilization; status indicators act as bar graph showing percentage of time that the controller line is being used. |
| Ed | RAN Error, RAN is Defective |
| 1n, 2n, . . . .8n | Node number; two-digit display shows the node number currently programmed into the remote async node. |

# Programming the Remote Async Node

Each remote async node must be programmed with a "Node Number" prior to system IPL. The remote async node front panel is used to perform the following programming steps.

**Note:** Only four remote async nodes can be attached to each connector on the controller; only node numbers 1 through 4 are valid.

```
                    ┌────────┐   ┌────────┐   ┌────────┐   ┌────────┐
                    │ Node 1 │   │ Node 2 │   │ Node 3 │   │ Node 4 │
┌──────────┐        └────────┘   └────────┘   └────────┘   └────────┘
│          │        ┌────────┐   ┌────────┐   ┌────────┐   ┌────────┐
└──────────┘        │ Node 1 │   │ Node 2 │   │ Node 3 │   │ Node 4 │
  128-Port          └────────┘   └────────┘   └────────┘   └────────┘
  Controller
```
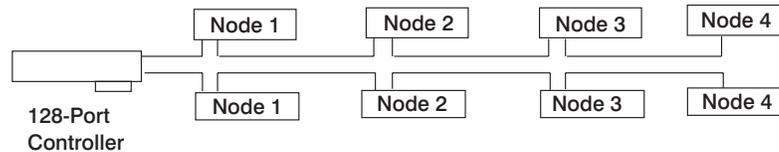
1. Perform a system shutdown, and then power-off the system.

2. Power-on the remote async node; the Power-On Self Test (POST) begins. During the POST, the characters PO appear in the two-digit display.

3. When the POST is complete, P1 appears in the two-digit display and the remote async node is ready for the following programming steps:

```
┌──────────────────────────────────────────────────────────────────────────┐
│   TD   RD  RTS  CTS  DSR  CD  DTR  RI  OFC  IFC    ┌──┐    ┌──┐   ┌──┐     │
│   ○    ○   ○    ○    ○    ○   ○    ○   ○    ○      │  │    │ ⇦ │   │ ⇨ │    │
│   0%                              100%            └──┘    └──┘   └──┘     │
└──────────────────────────────────────────────────────────────────────────┘
          Status Indicators            2-Digit  Display    Control Buttons
```
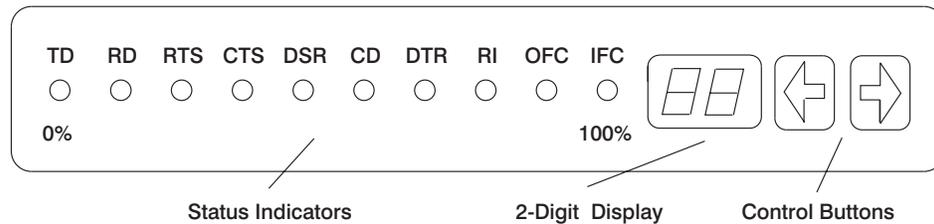
   a. Press the left arrow button to enter the programming mode. The current node number appears in the two-digit display.

   b. Press the right arrow button repeatedly until the desired node number is displayed. Continued pressing of this button cycles the two-digit display through 8 and back to 1.

      **Note:** Node numbers should be assigned in ascending order on each controller line, beginning with the remote async node closest to the controller. That is, the remote async node closest to each controller connector would be assigned number 1. Numbers greater than 4 are not configured.

   c. Press the left arrow to select the node number entered in the previous step. Pn appears momentarily in the two-digit display, meaning that the node has been successfully programmed. The display then returns to P1 and awaits microcode download from the controller.

4. The system IPL may be performed now. The characters AC in the two-digit display indicate that IPL is complete and remote access node programming successfully completed without error.

5. If En appears in the two-digit display, the remote async node has been improperly programmed in one of the following ways:

   • The remote async nodes have not been programmed in ascending order. That is, the remote async node displaying the En has been programmed to a lower number than the preceding node.

   • Two or more remote async nodes have been programmed assigned the same number. The remote async node displaying the En has been programmed to the same number as another node on the same controller connector.

# 16-Port Remote Async Node 10-Position RJ-45 Input and Output Connectors

### For EIA-232 Remote Async Nodes

The connector positions and signals for each RJ-45 connector on the Remote Async Node are the same (see table below).  Chapter 5 "Cable Assembly and Pin-outs" contains the information to build converter cables (Cable NK) and cables that can go directly from the Remote Async Node to EIA-232 devices (cables NL and NM).  See "Remote Async Node-to-Device Cables" on page 5-37.
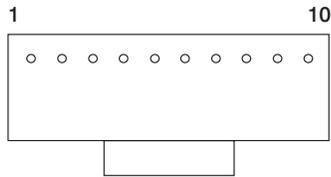


This is the rear view.

| Positions | Mnemonic (Signal Name) |
|-----------|------------------------|
| 1 | RI (ring indicator) |
| 2 | DSR (data set ready) |
| 3 | RTS (request to send) |
| 4 | GND (chassis ground) |
| 5 | TxD (transmit data) |
| 6 | RxD (receive data) |
| 7 | SG (signal ground) |
| 8 | CTS (clear to send) |
| 9 | DTR (data terminal ready) |
| 10 | DCD (data carrier detect) |

## For RS-422 Remote Async Nodes

The connector positions and signals for each RJ-45 connector on the Remote Async Node are the same (see table below).  Chapter 5 "Cable Assembly and Pin-outs" contains the information to build converter cables and cables that can go directly from the Remote Async Node to RS-422 devices (cable NP).  See "Cable NP" on page 5-43.  Six wires are required to connect the RAN to a RS-422 device.

```
1                          10

 o  o  o  o  o  o  o  o  o  o
```
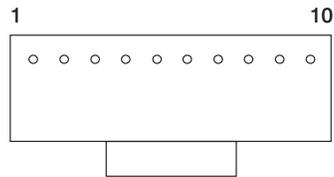
This is the rear view.

| Positions | Mnemonic (Signal Name) |
|-----------|------------------------|
| 1 | Reserved |
| 2 | Reserved |
| 3 | TxD + (+ transmit data) |
| 4 | GND (chassis ground) |
| 5 | TxD - (- transmit data) |
| 6 | RxD - (- receive data) |
| 7 | SG (signal ground) |
| 8 | RxD + (+ receive data) |
| 9 | Reserved |
| 10 | Reserved |

# 16-Port Remote Async Node Power Supplies

## Box Style Power

The box style remote async nodes use a transformer as shown below.

Removable Power Cable
(for 100 ± 250 V Power)
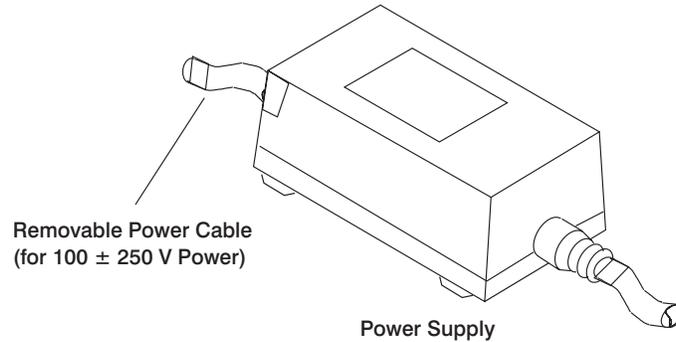
Power Supply

The following table lists the power supply and the table on the next page lists the removable power cables for the 16-port remote async node.

| Feature Code | Voltage Range and Frequency | Removable Power Cable | Power Supply Part Number |
|---|---|---|---|
| 8130 | 100 - 250 V ac at 50 or 60Hz | Yes | 40H3611/93H7091 |
| 8137 | 100 - 250 V ac at 50 or 60Hz | Yes | 93H7091 |
| 8138 | 100 - 250 V ac at 50 or 60Hz | Yes | 93H7091 |

## Rack Style Power

The rack style remote async nodes use a removable power cable and are powered directly by 100 - 250 V ac at 50 or 60Hz.

# 16-Port Remote Async Node Removable Power Cables



| Index | Part Number | Country |
|---|---|---|
| 1 | 1838574 | Bahamas, Barbados, Bolivia, Canada, Costa Rica, Dominican Republic, El Salvador, Ecuador, Guatemala, Honduras, Jamaica, Japan, Netherlands Antilles, Panama, Peru, Trinidad, Philippines, Taiwan, Thailand, Venezuela |
| 2 | 6952300 | Bolivia, Dominican Republic, Ecuador, Guyana, Honduras, Jamaica, Japan, Korea, Netherlands Antilles, Philippines, Surinam, Taiwan, U.S.A. (except Chicago), Venezuela, Canada |
| | 62X1045 | Chicago, U.S.A. |
| 3 | 6952311 | Argentina, Australia, New Zealand |
| 4 | 13F9979 | Austria, Belgium, Botswana, Bulgaria, Croatia, Egypt, Finland, France, Hungary, Iceland, Korea, Luxemburg, Poland, Romania, Sweden, West Germany |
| 5 | 13F9997 | Denmark |
| 6 | 14F0015 | Bangladesh, Burma, India, Pakistan, South Africa,  Sri Lanka |
| 7 | 14F0033 | Bahrain, Bermuda, Brunei, China, Ghana, Hong Kong, Iraq, Ireland, Jordan, Kenya, Kuwait, Malawi, Macao, Malaysia, Nigeria, Oman, Qatar, Singapore, Tanzania, Uganda, United Arab Emirates, U.K., Zambia |
| 8 | 14F0051 | Switzerland |
| 9 | 14F0069 | Chile, Ethiopia, Italy |
| 10 | 14F0087 | Israel |
| 11 | 6952291 | Colombia, Uruguay |

# FC (2828, 2835) SCSI Single-Ended High-Performance Internal/External I/O Controller (Type 4-1)

**Note:** Small Computer Systems Interface is abbreviated as SCSI in this publication. Refer to Chapter 4, "SCSI Cabling" on page 4-1 for SCSI cabling information.
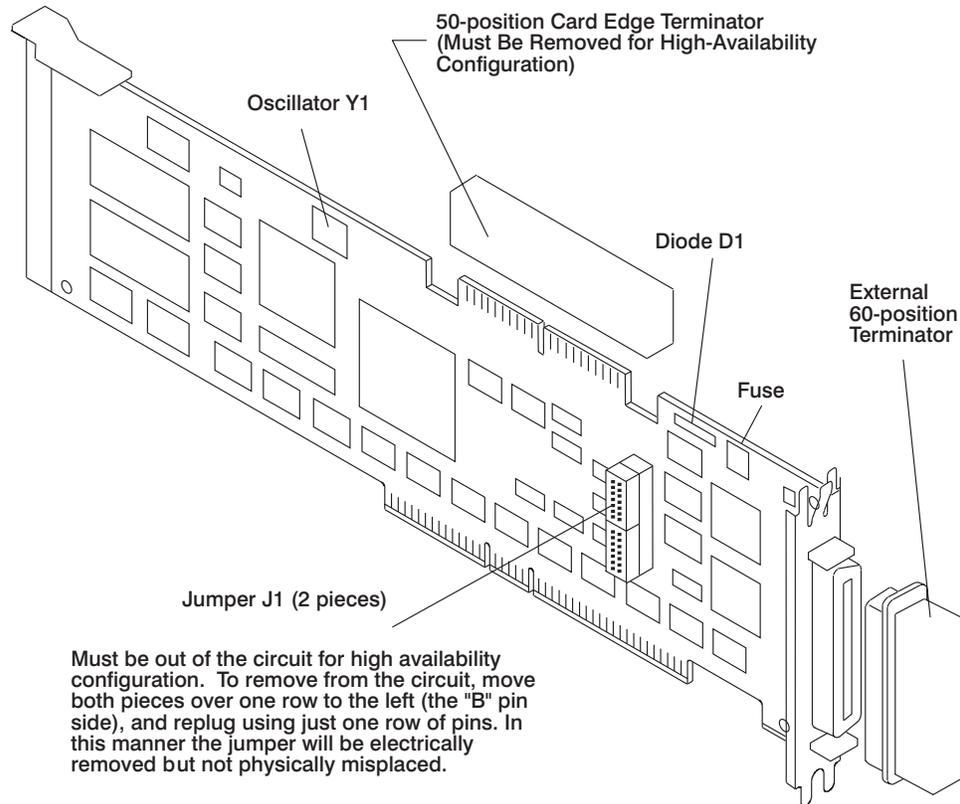


## SCSI Single-Ended High-Performance Internal/External I/O Controller Specification

FRU number                   51G9425
Interrupt levels           3, 4, 5, 7, 10, 11, 12, 14
Maximum number        8
Microcode filename      8d77.xx.xx
Bus architecture        Micro Channel
Connectors              50-position card edge
                            External 60-position SCSI bus
Jumpers                  J1 (2 pieces), 42F7325, 42F7326
Cables/Terminators      Refer to "Cable and Terminator Tables for SCSI-1 I/O Controller" on page 4-8.
SCSI bus overcurrent   Refer to "Overload Protection and Terminator Power (Term Power)" on page 4-7.
Fuse                     40F9736 - See "SCSI-1 Adapter Fuse Blowing" in the
                            *RS/6000 Diagnostic Information for Micro Channel Bus Systems*.
                            Order number SA38-0532.

# SCSI Single-Ended High-Performance Internal/External I/O Controller Connectors

Two SCSI interface connectors are provided: a 50-position top edge connector and an external 60-position connector. The 50-position top edge connector attaches the SCSI devices inside the system unit. The external 60-position connector attaches SCSI devices outside the system unit.
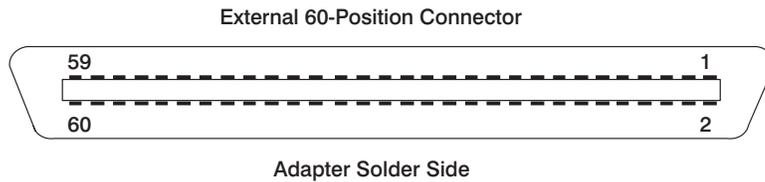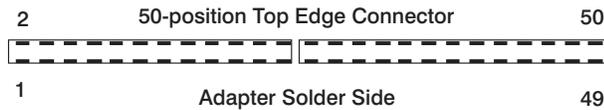
| Signal Name or Mnemonic | Signal on Position | Ground on Position |
|---|---|---|
| -Data Bus (0) | 2 | 1 |
| -Data Bus (1) | 4 | 3 |
| -Data Bus (2) | 6 | 5 |
| -Data Bus (3) | 8 | 7 |
| -Data Bus (4) | 10 | 9 |
| -Data Bus (5) | 12 | 11 |
| -Data Bus (6) | 14 | 13 |
| -Data Bus (7) | 16 | 15 |
| -Data Bus (P) | 18 | 17 |
| Ground | | 19-24 |
| No connection | 25 | |
| TERMPWR | 26 | 27-31 |
| -ATN | 32 | 33-34 |
| -BSY | 36 | 35 |
| -ACK | 38 | 37 |
| -RST | 40 | 39 |
| -MSG | 42 | 41 |
| -SEL | 44 | 43 |
| -C/D | 46 | 45 |
| -REQ | 48 | 47 |
| -I/O | 50 | 49 |
| Reserved (Do not connect) | 51-60 | |

# FC (2420) SCSI-2 Differential High-Performance External I/O Controller (Type 4-2)

Non-OEM SCSI-2 Differential Adapters Will be Labeled on the Rear Bracket with "Differential SCSI."

Y1

Diode D1

Positive Temperature Coefficient (PTC) Resistor (F2)

Differential Terminating Resistors (Remove for High Availability Configuration, and Save; if lost order part number 42G3326.)

U8
U26

## SCSI-2 Differential High-Performance External I/O Controller Specifications

| | |
|---|---|
| FRU number | 43G0176 or 11H2447 |
| Interrupt levels | 3, 4, 5, 7, 10, 11, 12, 14 |
| Bus architecture | Micro Channel |
| Maximum number | 2 controllers per Micro Channel bus (7012/360/36T/370/37T) |
| | 4 controllers per Micro Channel bus (7013, 7015/950) |
| | 4 controllers per Micro Channel bus (two busses on 7015/970/97B/980/98B/990/R24) |
| Microcode filename | 8d77.xx.xx |
| Connector | External 50-position, high density SCSI device connector |
| Cables/Terminators | Refer "System Differential Internal Cable Lengths" on page 4-30 of this manual. |
| SCSI bus overcurrent | Positive Temperature Coefficient (PTC) resistor. |
| Protection device | Refer to "Overload Protection and Terminator Power (Term Power)" on page 4-7. For PTC test procedures, see "SCSI-2 Differential Controller PTC Failure Isolation" in the *RS/6000 Diagnostic Information for Micro Channel Bus Systems*. Order number SA38-0532. |

# SCSI-2 Differential High-Performance External I/O Controller Connector

The external 50-position high density connector attaches SCSI devices outside the system unit. This connector is equivalent to the SCSI-2 standard 50-position shielded high-density connector (the "A" connector).
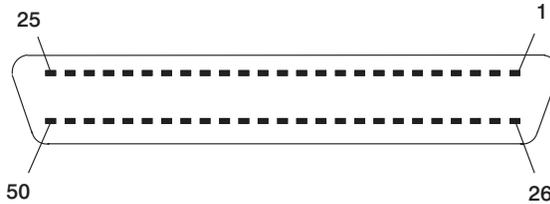


External 50-Position High Density Connector

| Pin | Signal Name | Pin | Signal Name |
|-----|-------------|-----|-------------|
| 1 | Ground | 26 | Ground |
| 2 | +DB(0) | 27 | -DB(0) |
| 3 | +DB(1) | 28 | -DB(1) |
| 4 | +DB(2) | 29 | -DB(2) |
| 5 | +DB(3) | 30 | -DB(3) |
| 6 | +DB(4) | 31 | -DB(4) |
| 7 | +DB(5) | 32 | -DB(5) |
| 8 | +DB(6) | 33 | -DB(6) |
| 9 | +DB(7) | 34 | -DB(7) |
| 10 | +DB(P) | 35 | -DB(P) |
| 11 | DIFFSENS | 36 | Ground |
| 12 | Reserved* | 37 | Reserved* |
| 13 | TERMPWR | 38 | TERMPWR |
| 14 | Reserved* | 39 | Reserved* |
| 15 | +ATN | 40 | -ATN |
| 16 | Ground | 41 | Ground |
| 17 | +BSY | 42 | -BSY |
| 18 | +ACK | 43 | -ACK |
| 19 | +RST | 44 | -RST |
| 20 | +MSG | 45 | -MSG |
| 21 | +SEL | 46 | -SEL |
| 22 | +C/D | 47 | -C/D |
| 23 | +REQ | 48 | -REQ |
| 24 | +I/O | 49 | -I/O |
| 25 | Ground | 50 | Ground |

*Reserved lines are grounded in bus terminator assemblies and are open on SCSI devices.  Refer to Section 4.4.4 in ANSI X3T9.2/86-109  rev. 10h for more information.

# FC (6210) High Performance Disk Drive Subsystem Adapter (Type 4-3)



Test Connector

Address 0
Address 1
Address 2
Address 3
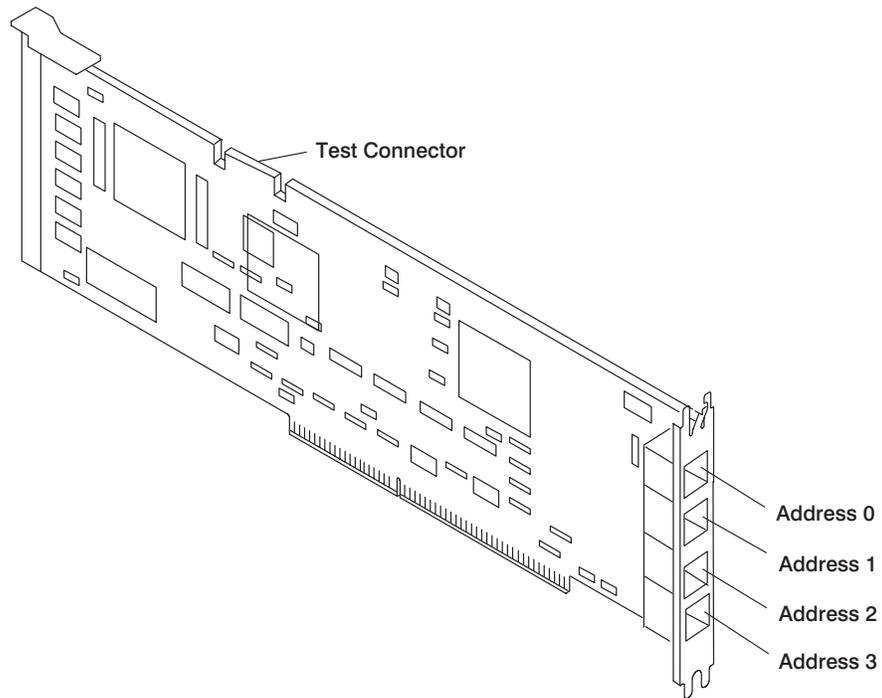
## High Performance Disk Drive Subsystem Adapter Specifications

| | |
|---|---|
| FRU number | 52G1071 |
| Bus architecture | Micro Channel |
| Maximum number | 1 (7012, 7013) |
| | 4 (7015/930/950) |
| | 7 (7015/970/980) |
| Microcode filename | 8f78.xx.xx |
| Data transfer rate | 40 MB/second |
| Connector | 6-position, serial link |
| Cables | Serial link, 9333 attachment, 10 m (33 ft) 07G4859 |
| | Serial link, 9333 attachment, 3 m (10 ft)   07G4860 |

> **Note:** This adapter should be located in Slots 1 through 4.  When this adapter is reported
> to have failed, check its slot position before replacing; if it is mounted in Slots 5
> though 8, relocate the adapter to Slots 1 through 4 and try again.

## High Performance Disk Drive Subsystem Adapter Connector



Ground

Serial Link
Connector

Line In +

Line In ±

Line Out +

Line Out ±
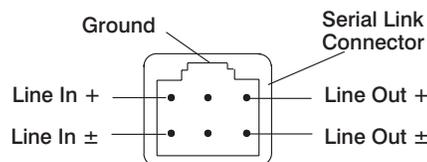
## FC (2410, 2831) SCSI-2 Single-Ended High Performance Internal/External I/O Controller (Type 4-4)

**Note:** Small Computer Systems Interface is abbreviated as SCSI in this publication.

50-position Card Edge Terminator
(Must Be Removed for High-Availability
Configuration)

Positive Temperature
Coefficient (PTC) Resister

External
50-position
Terminator

High Availibility Jumper P3

Must be out of the circuit for high availability
configuration.  To remove from the circuit, move
both pieces over one row to the left (the "B" pin
side), and replug using just one row of pins. In
this manner the jumper will be electrically
removed but not physically misplaced.


## SCSI-2 Single-Ended High Performance Internal/External I/O Controller Specifications

| | |
|---|---|
| FRU number | 52G5484 or 52G7509 or 11H4779 |
| Bus architecture | Micro Channel |
| Interrupt levels | 3, 4, 5, 7, 10, 11, 12, 14 |
| Maximum number | 5 SCSI controllers per system (except 7015) |
| | 6 SCSI controllers (7015/950) |
| | 15 SCSI controllers (7015/970/980/98B/990/R24) |
| Microcode filename | 8d77.xx.xx |
| Connectors | Internal 50-position card edge SCSI bus |
| | External 50-position, high density SCSI device connector |
| Jumpers | P3 (2 pieces), 42F7325, 42F7326 |
| Cables/Terminators | Refer to "Cable and Terminator Tables for SCSI-2 |
| | Single-Ended Controller" 4-25 |
| SCSI bus overcurrent | Positive Temperature Coefficient (PTC) resistor. |
| Protection device | Refer to "Overload Protection and Terminator Power (Term Power)" on page 4-7 |
| | For PTC test procedures, See "PTC Tripping SCSI-2 single-ended controller, |
| | Integrated SCSI on 7012/340/350, 7013/570/580" in the |
| | *RS/6000 Diagnostic Information for Micro Channel Bus Systems*. |
| | Order number SA38-0532. |

# SCSI-2 Single-Ended High-Performance Internal/External I/O Controller Connectors

Two SCSI interface connectors are provided: a 50-position top edge connector and an external 50-position high density connector. The 50-position top edge connector attaches the SCSI devices inside the system unit. The external 50-position high density connector attaches SCSI devices outside the system unit. This connector is equivalent to the SCSI-2 standard 50-position shielded high-density connector (the "A" connector).

50-Position Top Edge Connector (P1)

External 50-Position High Density Connector (P2)

D49    D1    C25    C1

D50    Adapter Component Side    D2    C50    C26
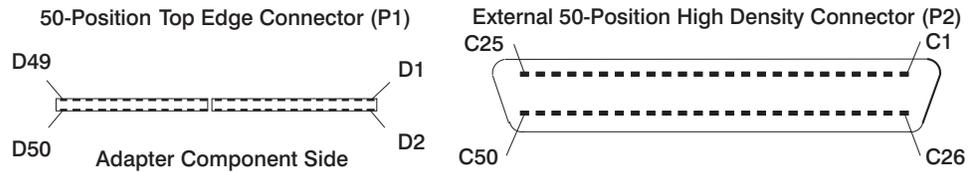
| Signal Name | P2 Pin | P1 Pin | P1 Pin | P2 Pin | Signal Name |
|---|---|---|---|---|---|
| Ground | C1 | D1 | D2 | C26 | -DB(0) |
| Ground | C2 | D3 | D4 | C27 | -DB(1) |
| Ground | C3 | D5 | D6 | C28 | -DB(2) |
| Ground | C4 | D7 | D8 | C29 | -DB(3) |
| Ground | C5 | D9 | D10 | C30 | -DB(4) |
| Ground | C6 | D11 | D12 | C31 | -DB(5) |
| Ground | C7 | D13 | D14 | C32 | -DB(6) |
| Ground | C8 | D15 | D16 | C33 | -DB(7) |
| Ground | C9 | D17 | D18 | C34 | -DB(P) |
| Ground | C10 | D19 | D20 | C35 | Ground |
| Ground | C11 | D21 | D22 | C36 | Ground |
| Reserved* | C12 | D23 | D24 | C37 | Reserved* |
| Open | C13 | D25 | D26 | C38 | TERMPWR |
| Reserved* | C14 | D27 | D28 | C39 | Reserved* |
| Ground | C15 | D29 | D30 | C40 | Ground |
| Ground | C16 | D31 | D32 | C41 | -ATN |
| Ground | C17 | D33 | D34 | C42 | Ground |
| Ground | C18 | D35 | D36 | C43 | -BSY |
| Ground | C19 | D37 | D38 | C44 | -ACK |
| Ground | C20 | D39 | D40 | C45 | -RST |
| Ground | C21 | D41 | D42 | C46 | -MSG |
| Ground | C22 | D43 | D44 | C47 | -SEL |
| Ground | C23 | D45 | D46 | C48 | -C/D |
| Ground | C24 | D47 | D48 | C49 | -REQ |
| Ground | C25 | D49 | D50 | C50 | -I/O |

*Reserved lines are grounded in bus terminator assemblies and are open on SCSI devices. Refer to Section 4.4.4 in ANSI X3T9.2/86-109 rev. 10h for more information.

## FC (6211) High-Performance Disk Drive Subsystem Adapter (80M Byte/S) (Type 4-5)
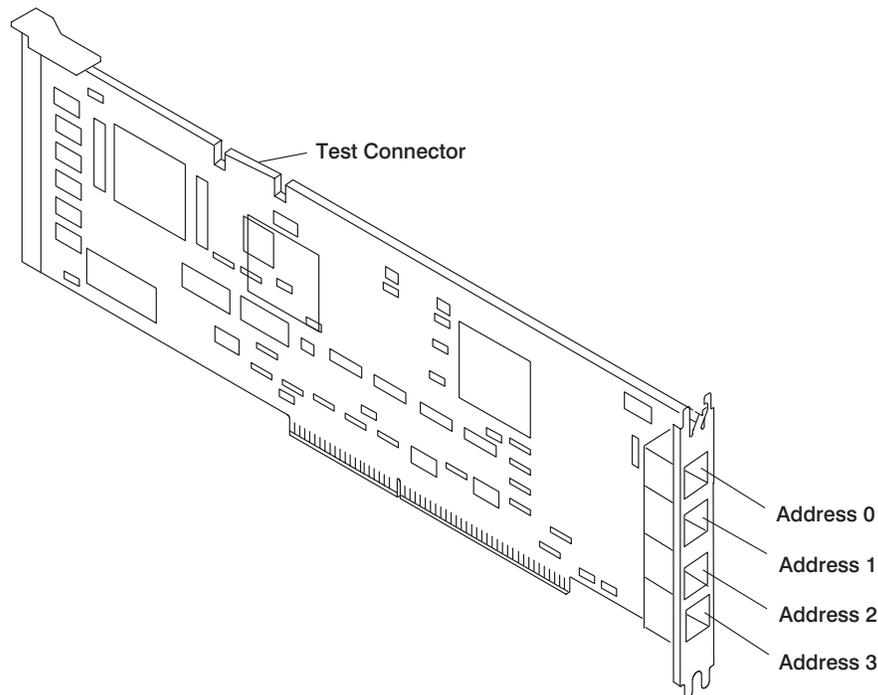


## High Performance Disk Drive Subsystem Adapter (80M Byte/S) Specifications

| | |
|---|---|
| FRU number | 00G3357 |
| Bus architecture | Micro Channel |
| Maximum number | 1 (7013/580) |
| | 7 (7015/970/980) |
| Microcode filename | 8f78.xx.xx |
| Data transfer rate | 80 MB/second |
| Connector | 6-position, serial link |
| Cables | Serial link, 9333 attachment, 10m (33 ft.) 07G4859 |
| | Serial link, 9333 attachment, 3m (10 ft.) 07G4860 |

> **Note:** This adapter should be located in Slots 1 through 4. When this adapter is reported to have failed, check its slot position before replacing; if it is mounted in Slots 5 though 8, relocate the adapter to Slots 1 through 4, and try again.

## High Performance Disk Drive Subsystem Adapter (80M Byte/S) Connector
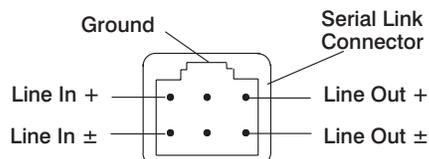
# FC (2416) SCSI-2 Differential Fast/Wide Adapter/A  (Type 4-6)

**Note:**

Small Computer Systems Interface is abbreviated as SCSI in this publication.
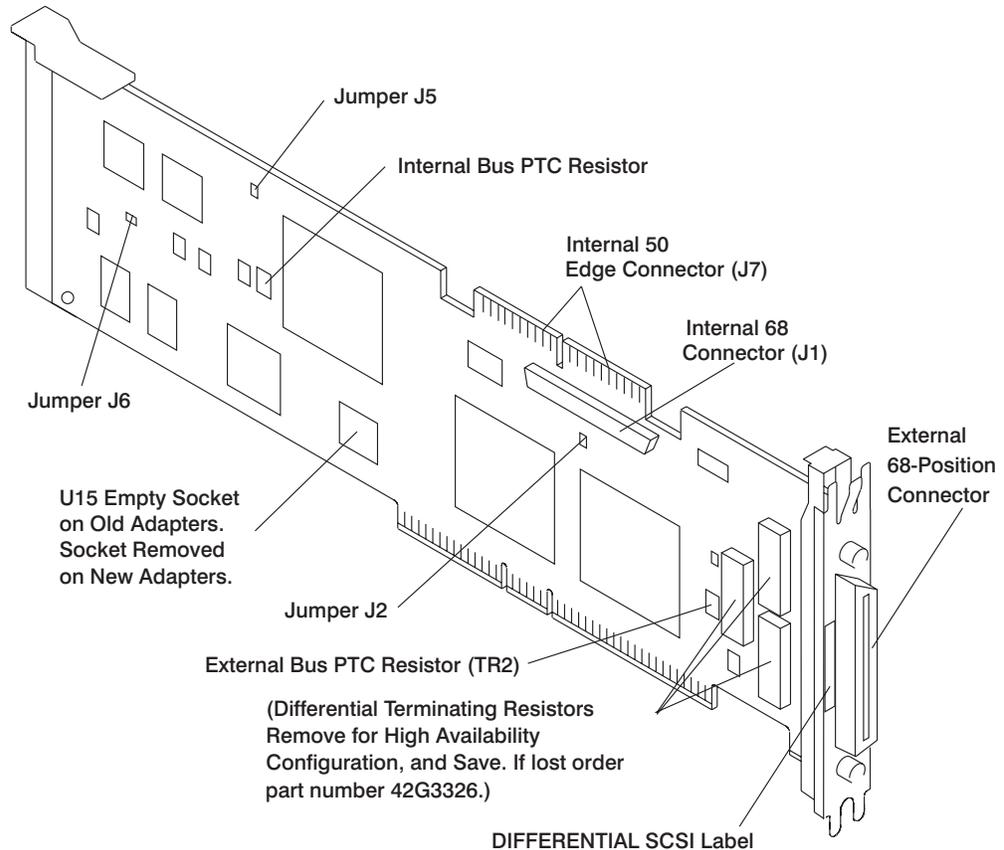


Note: Jumpers J2, J5, and J6 are not used.

## SCSI-2 Differential Fast/Wide Adapter/A Specifications

| | |
|---|---|
| FRU number | 65G7315 or 11H3599 or 11H7660 |
| Bus architecture | Micro Channel |
| Interrupt levels | 11 and 14 |
| Maximum number | A controller may be installed in all available Micro Channel bus slots for the supported 7011, 7012, 7013, and 7015 systems. |
| Connectors | Internal 50-position card edge SCSI bus |
| | Internal 68-position 16-bit High-Density SCSI bus |
| | External 68-position 16-bit Differential High-Density SCSI bus |
| Cables/Terminators | Refer to "Cable and Terminator Tables for the SCSI-2 Differential Fast/Wide Controller" 4-52 |
| SCSI bus overcurrent | Positive Temperature Coefficient (PTC) resistor. |
| Protection device | Refer to "Overload Protection and Terminator Power (Term Power)" on page 4-7. For PTC test procedures, see "SCSI-2 Differential Fast/Wide (Adapter/A) Controller PTC Failure Isolation" in the *RS/6000 Diagnostic Information for Micro Channel Bus Systems*. Order number SA38-0532. |

# SCSI-2 Differential Fast/Wide Adapter/A Connectors

The SCSI-2 Differential Fast/Wide Adapter/A supports an internal single-ended and an external differential SCSI bus.

There are two connectors provided for attaching to the internal SCSI bus.

The 50-pin card edge connector is used for attaching a narrow (8-bit) SCSI cable. The 68-pin connector is used for attaching a wide (16-bit) SCSI cable.  Refer to illustration "FC (2416) SCSI-2 Differential Fast/Wide Adapter/A  (Type 4-6)" on page 1-105.

**Note:**  Only one internal connector can have a cable attached at a time.

D49                                                                    D1

Adapter Component Side

D50                                                                    D2

| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| Ground | 1 | 2 | -DB(0) |
| Ground | 3 | 4 | -DB(1) |
| Ground | 5 | 6 | -DB(2) |
| Ground | 7 | 8 | -DB(3) |
| Ground | 9 | 10 | -DB(4) |
| Ground | 11 | 12 | -DB(5) |
| Ground | 13 | 14 | -DB(6) |
| Ground | 15 | 16 | -DB(7) |
| Ground | 17 | 18 | -DB(P) |
| Ground | 19 | 20 | Ground |
| Ground | 21 | 22 | Ground |
| Reserved* | 23 | 24 | Reserved* |
| Open | 25 | 26 | TERMPWR |
| Reserved* | 27 | 28 | Reserved* |
| Ground | 29 | 30 | Ground |
| Ground | 31 | 32 | -ATN |
| Ground | 33 | 34 | Ground |
| Ground | 35 | 36 | -BSY |
| Ground | 37 | 38 | -ACK |
| Ground | 39 | 40 | -RST |
| Ground | 41 | 42 | -MSG |
| Ground | 43 | 44 | -SEL |
| Ground | 45 | 46 | -C/D |
| Ground | 47 | 48 | -REQ |
| Ground | 49 | 50 | -I/O |

# Internal 68-Position 16-Bit Single-Ended High-Density SCSI Bus Connector (J1)

The following table shows the pinouts for the internal 68-pin SCSI connector.

34            1

68     Internal 68-Pin Connector     35

| Signal Name | Pin | Pin | Signal Name |
|-------------|-----|-----|-------------|
| Ground | 1 | 35 | -DB(12) |
| Ground | 2 | 36 | -DB(13) |
| Ground | 3 | 37 | -DB(14) |
| Ground | 4 | 38 | -DB(15) |
| Ground | 5 | 39 | -DB(P1) |
| Ground | 6 | 40 | -DB(0) |
| Ground | 7 | 41 | -DB(1) |
| Ground | 8 | 42 | -DB(2) |
| Ground | 9 | 43 | -DB(3) |
| Ground | 10 | 44 | -DB(4) |
| Ground | 11 | 45 | -DB(5) |
| Ground | 12 | 46 | -DB(6) |
| Ground | 13 | 47 | -DB(7) |
| Ground | 14 | 48 | -DB(P) |
| Ground | 15 | 49 | Ground |
| Ground | 16 | 50 | Ground |
| TERMPWR | 17 | 51 | TERMPWR |
| TERMPWR | 18 | 52 | TERMPWR |
| Reserved | 19 | 53 | Reserved |
| Ground | 20 | 54 | Ground |
| Ground | 21 | 55 | -ATN |
| Ground | 22 | 56 | Ground |
| Ground | 23 | 57 | -BSY |
| Ground | 24 | 58 | -ACK |
| Ground | 25 | 59 | -RST |
| Ground | 26 | 60 | -MSG |
| Ground | 27 | 61 | -SEL |
| Ground | 28 | 62 | -C/D |
| Ground | 29 | 63 | -REQ |
| Ground | 30 | 64 | -I/O |
| Ground | 31 | 65 | -DB(8) |
| Ground | 32 | 66 | -DB(9) |
| Ground | 33 | 67 | -DB(10) |
| Ground | 34 | 68 | -DB(11) |

# External 68-Position 16-Bit Differential High-Density SCSI Bus Connector

The following table shows the pinouts for the external 68-pin differential SCSI connector.

34 ─ External 68-Pin Connector ─ 1
68 ─ 35

This connector is not the SCSI-2 standard 68-position connector. To attach cables with "P" type connectors, use interposer P/N 50G0460.

| Signal Name | Pin | Pin | Signal Name |
|-------------|-----|-----|-------------|
| +DB(12) | 1 | 35 | -DB(12) |
| +DB(13) | 2 | 36 | -DB(13) |
| +DB(14) | 3 | 37 | -DB(14) |
| +DB(15) | 4 | 38 | -DB(15) |
| +DB(1) | 5 | 39 | -DB(P1) |
| Ground | 6 | 40 | Ground |
| +DB(0) | 7 | 41 | -DB(0) |
| +DB(1) | 8 | 42 | -DB(1) |
| +DB(2) | 9 | 43 | -DB(2) |
| +DB(3) | 10 | 44 | -DB(3) |
| +DB(4) | 11 | 45 | -DB(4) |
| +DB(5) | 12 | 46 | -DB(5) |
| +DB(6) | 13 | 47 | -DB(6) |
| +DB(7) | 14 | 48 | -DB(7) |
| +DB(P) | 15 | 49 | -DB(P) |
| DIFFSENS | 16 | 50 | Ground |
| TERMPWR | 17 | 51 | TERMPWR |
| TERMPWR | 18 | 52 | TERMPWR |
| Reserved | 19 | 53 | Reserved |
| +ATN | 20 | 54 | -ATN |
| Ground | 21 | 55 | Ground |
| +BSY | 22 | 56 | -BSY |
| +ACK | 23 | 57 | -ACK |
| +RST | 24 | 58 | -RST |
| +MSG | 25 | 59 | -MSG |
| +SEL | 26 | 60 | -SEL |
| +C/D | 27 | 61 | -C/D |
| +REQ | 28 | 62 | -REQ |
| +I/O | 29 | 63 | -I/O |
| Ground | 30 | 64 | Ground |
| +DB(8) | 31 | 65 | -DB(8) |
| +DB(9) | 32 | 66 | -DB(9) |
| +DB(10) | 33 | 67 | -DB(10) |
| +DB(11) | 34 | 68 | -DB(11) |

## FC (2415) SCSI-2 Fast/Wide Adapter/A  (Type 4-7)

**Note:** Small Computer Systems Interface is abbreviated as SCSI in this publication.

Internal 50-position card
Edge Connector (J7)

Internal Bus PTC Resistor

Internal 68
Connector (J1)

Jumper J7

External
68-Position
Connector

Jumper J8

Jumper J4

U7 Empty Socket

Jumper J5

External Bus PTC Resistor

Note: Jumpers J4, J5, J7, and J8 are not used.

## SCSI-2 Fast/Wide Adapter/A Specifications

FRU number                 52G4034 or 11H3600
Bus architecture          Micro Channel
Interrupt levels           11 and 14
Maximum number        A controller may be installed in all available Micro Channel
bus slots for the supported 7011, 7012, 7013, and 7015 systems.
Connectors               Internal 50-position card edge SCSI bus
Internal 68-position 16-bit High Density SCSI bus
External 68-position 16-bit High Density SCSI bus
Cables/Terminators     Refer to "Cable and Terminator Tables for the SCSI-2
Single-Ended Fast-Wide Controller" 4-42
SCSI bus overcurrent   Positive Temperature Coefficient (PTC) resistor -
Protection device       Refer to "Overload Protection and Terminator Power (Term Power)" on page  4-7
For PTC test procedures, see "SCSI-2 Fast/Wide (Adapter/A) Controller
PTC Failure Isolation" in the
*RS/6000 Diagnostic Information for Micro Channel Bus Systems.*
Order number SA38-0532.

# SCSI-2 Fast/Wide Adapter/A Connectors

The SCSI-2 Fast/Wide Adapter/A supports two single-ended SCSI busses (internal and external).

There are two connectors provided for attaching to the internal SCSI bus. The 50-pin card edge connector is used for attaching a narrow (8-bit) SCSI cable.  The 68-pin connector is used for attaching a wide (16-bit) SCSI cable. Refer to illustration "FC (2415) SCSI-2 Fast/Wide Adapter/A  (Type 4-7)" on page  1-109.

**Note:**   Only one internal connector can have a cable attached at a time.

## Internal 50-Position Card Edge SCSI Bus Connector



| Signal Name | Pin | Pin | Signal Name |
|-------------|-----|-----|-------------|
| Ground | 1 | 2 | -DB(0) |
| Ground | 3 | 4 | -DB(1) |
| Ground | 5 | 6 | -DB(2) |
| Ground | 7 | 8 | -DB(3) |
| Ground | 9 | 10 | -DB(4) |
| Ground | 11 | 12 | -DB(5) |
| Ground | 13 | 14 | -DB(6) |
| Ground | 15 | 16 | -DB(7) |
| Ground | 17 | 18 | -DB(P) |
| Ground | 19 | 20 | Ground |
| Ground | 21 | 22 | Ground |
| Reserved* | 23 | 24 | Reserved* |
| Open | 25 | 26 | TERMPWR |
| Reserved* | 27 | 28 | Reserved* |
| Ground | 29 | 30 | Ground |
| Ground | 31 | 32 | -ATN |
| Ground | 33 | 34 | Ground |
| Ground | 35 | 36 | -BSY |
| Ground | 37 | 38 | -ACK |
| Ground | 39 | 40 | -RST |
| Ground | 41 | 42 | -MSG |
| Ground | 43 | 44 | -SEL |
| Ground | 45 | 46 | -C/D |
| Ground | 47 | 48 | -REQ |
| Ground | 49 | 50 | -I/O |

# Internal, External 68-Position 16-Bit Single-Ended High-Density SCSI Bus Connector

The following table shows the pinouts for the internal and external 68-pin SCSI connectors. The external connector is not the SCSI-2 standard 68-pin shielded, high density connector.

External 68-Pin Connector

Internal 68-Pin Connector

| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| Ground | 1 | 35 | -DB(12) |
| Ground | 2 | 36 | -DB(13) |
| Ground | 3 | 37 | -DB(14) |
| Ground | 4 | 38 | -DB(15) |
| Ground | 5 | 39 | -DB(P1) |
| Ground | 6 | 40 | -DB(0) |
| Ground | 7 | 41 | -DB(1) |
| Ground | 8 | 42 | -DB(2) |
| Ground | 9 | 43 | -DB(3) |
| Ground | 10 | 44 | -DB(4) |
| Ground | 11 | 45 | -DB(5) |
| Ground | 12 | 46 | -DB(6) |
| Ground | 13 | 47 | -DB(7) |
| Ground | 14 | 48 | -DB(P) |
| Ground | 15 | 49 | Ground |
| Ground | 16 | 50 | Ground |
| TERMPWR | 17 | 51 | TERMPWR |
| TERMPWR | 18 | 52 | TERMPWR |
| Reserved | 19 | 53 | Reserved |
| Ground | 20 | 54 | Ground |
| Ground | 21 | 55 | -ATN |
| Ground | 22 | 56 | Ground |
| Ground | 23 | 57 | -BSY |
| Ground | 24 | 58 | -ACK |
| Ground | 25 | 59 | -RST |
| Ground | 26 | 60 | -MSG |
| Ground | 27 | 61 | -SEL |
| Ground | 28 | 62 | -C/D |
| Ground | 29 | 63 | -REQ |
| Ground | 30 | 64 | -I/O |
| Ground | 31 | 65 | -DB(8) |
| Ground | 32 | 66 | -DB(9) |
| Ground | 33 | 67 | -DB(10) |
| Ground | 34 | 68 | -DB(11) |

## FC (6212) High-Performance Disk Drive Subsystem Adapter (40/80M Byte/S) (Type 4-8)

This adapter provides an interface between 9333 Models 010, 011, 500 or 501 High-Performance Disk Drive Subsystems and a system unit.

Test Connector

Address 0

Address 1

Address 2

Address 3
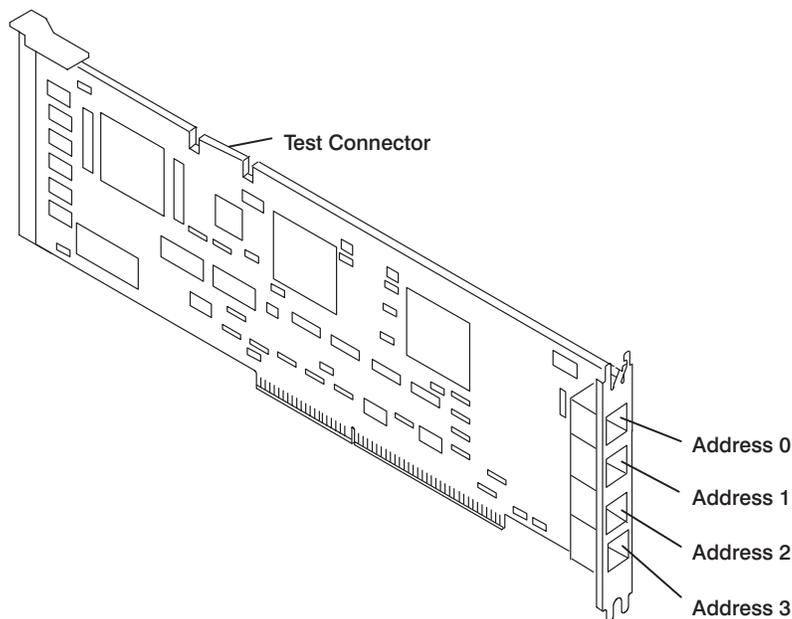
## High-Performance Disk Drive Subsystem Adapter (40/80M Byte/S) Specifications

| | |
|---|---|
| FRU number | 88G3629 |
| Bus architecture | Micro Channel |
| Maximum number | 1 (7013/580) |
| | 7 (7015/970/980) |
| Microcode filename | 8f78.xx.xx |
| Data transfer rate | 80 MB/second |
| Connector | 6-position, serial link |
| Cables | Serial link, 9333 attachment, 10 m (33 ft.)  07G4859 |
| | Serial link, 9333 attachment, 3 m (10 ft.)  07G4860 |

**Note:** This adapter should be located in Slots 1 through 4.  When this adapter is reported to have failed, check its slot position before replacing; if it is mounted in Slots 5 though 8, relocate the adapter to Slots 1 through 4 and try again.

## High-Performance Disk Drive Subsystem Adapter (40/80M Byte/S) Connector

Ground

Serial Link Connector

Line In +

Line In ±

Line Out +

Line Out ±
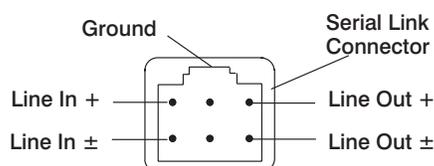
## FC (2412) Enhanced SCSI-2 Differential Fast/Wide Adapter/A (Type 4-C)

**Note:** Small Computer Systems Interface is abbreviated as SCSI in this publication.



Note: Jumpers J2, J5, and J6 are not used.

## Enhanced SCSI-2 Differential Fast/Wide Adapter/A Specifications

| | |
|---|---|
| FRU number | 52G3380 |
| Interrupt levels | 11 and 14 |
| I/O Bus | Micro Channel |
| Maximum number | A controller may be installed in all available Micro Channel bus slots for the supported 7011, 7012, 7013, and 7015 systems. |
| Connectors | Internal 50-position card edge SCSI bus |
| | Internal 68-position 16-bit High-Density SCSI bus |
| | External 68-position 16-bit Differential High-Density SCSI bus |
| Cables/Terminators | Refer to "Cable and Terminator Tables for the SCSI-2 Differential Fast-Wide Controller" 4-52 |
| SCSI bus overcurrent | Positive Temperature Coefficient (PTC) resistor. |
| Protection device | Refer to "Overload Protection and Terminator Power (Term Power)" on page 4-7. For PTC test procedures, see "SCSI-2 Differential Fast/Wide (Adapter/A) Controller PTC Failure Isolation" in the *RS/6000 Diagnostic Information for Micro Channel Bus Systems*. Order number SA38-0532. |

## SCSI-2 Differential Fast/Wide Adapter/A Connectors

The SCSI-2 Differential Fast/Wide Adapter/A supports an internal single-ended and an external differential SCSI bus.

There are two connectors provided for attaching to the internal SCSI bus.

The 50-pin card edge connector is used for attaching a narrow (8-bit) SCSI cable. The 68-pin connector is used for attaching a wide (16-bit) SCSI cable. Refer to illustration "FC (2412) Enhanced SCSI-2 Differential Fast/Wide Adapter/A (Type 4-C)" on page 1-113.

**Note:** Only one internal connector can have a cable attached at a time.

## Internal 50-Position Card Edge SCSI Bus Connector (J2)

D49                                                    D1

D50                    Adapter Component Side          D2

| Signal Name | Pin | Pin | Signal Name |
|-------------|-----|-----|-------------|
| Ground | 1 | 2 | -DB(0) |
| Ground | 3 | 4 | -DB(1) |
| Ground | 5 | 6 | -DB(2) |
| Ground | 7 | 8 | -DB(3) |
| Ground | 9 | 10 | -DB(4) |
| Ground | 11 | 12 | -DB(5) |
| Ground | 13 | 14 | -DB(6) |
| Ground | 15 | 16 | -DB(7) |
| Ground | 17 | 18 | -DB(P) |
| Ground | 19 | 20 | Ground |
| Ground | 21 | 22 | Ground |
| Reserved | 23 | 24 | Reserved |
| Open | 25 | 26 | TERMPWR |
| Reserved | 27 | 28 | Reserved |
| Ground | 29 | 30 | Ground |
| Ground | 31 | 32 | -ATN |
| Ground | 33 | 34 | Ground |
| Ground | 35 | 36 | -BSY |
| Ground | 37 | 38 | -ACK |
| Ground | 39 | 40 | -RST |
| Ground | 41 | 42 | -MSG |
| Ground | 43 | 44 | -SEL |
| Ground | 45 | 46 | -C/D |
| Ground | 47 | 48 | -REQ |
| Ground | 49 | 50 | -I/O |

# Internal 68-Position 16-Bit Single-Ended High-Density SCSI Bus Connector (J1)

The following table shows the pinouts for the internal 68-pin SCSI connector.

```
34                                    1
  ┌────────────────────────────────┐
  │ ░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░ │
  └────────────────────────────────┘
68          Internal 68-Pin Connector    35
```

| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| Ground | 1 | 35 | -DB(12) |
| Ground | 2 | 36 | -DB(13) |
| Ground | 3 | 37 | -DB(14) |
| Ground | 4 | 38 | -DB(15) |
| Ground | 5 | 39 | -DB(P1) |
| Ground | 6 | 40 | -DB(0) |
| Ground | 7 | 41 | -DB(1) |
| Ground | 8 | 42 | -DB(2) |
| Ground | 9 | 43 | -DB(3) |
| Ground | 10 | 44 | -DB(4) |
| Ground | 11 | 45 | -DB(5) |
| Ground | 12 | 46 | -DB(6) |
| Ground | 13 | 47 | -DB(7) |
| Ground | 14 | 48 | -DB(P) |
| Ground | 15 | 49 | Ground |
| Ground | 16 | 50 | Ground |
| TERMPWR | 17 | 51 | TERMPWR |
| TERMPWR | 18 | 52 | TERMPWR |
| Reserved | 19 | 53 | Reserved |
| Ground | 20 | 54 | Ground |
| Ground | 21 | 55 | -ATN |
| Ground | 22 | 56 | Ground |
| Ground | 23 | 57 | -BSY |
| Ground | 24 | 58 | -ACK |
| Ground | 25 | 59 | -RST |
| Ground | 26 | 60 | -MSG |
| Ground | 27 | 61 | -SEL |
| Ground | 28 | 62 | -C/D |
| Ground | 29 | 63 | -REQ |
| Ground | 30 | 64 | -I/O |
| Ground | 31 | 65 | -DB(8) |
| Ground | 32 | 66 | -DB(9) |
| Ground | 33 | 67 | -DB(10) |
| Ground | 34 | 68 | -DB(11) |

# External 68-Position 16-Bit Differential High-Density SCSI Bus Connector

The following table shows the pinouts for the external 68-pin differential SCSI connector.



External 68-Pin Connector

This connector is not the SCSI-2 standard 68-position connector. To attach cables with "P" type connectors, use interposer P/N 50G0460.

| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| +DB(12) | 1 | 35 | -DB(12) |
| +DB(13) | 2 | 36 | -DB(13) |
| +DB(14) | 3 | 37 | -DB(14) |
| +DB(15) | 4 | 38 | -DB(15) |
| +DB(1) | 5 | 39 | -DB(P1) |
| Ground | 6 | 40 | Ground |
| +DB(0) | 7 | 41 | -DB(0) |
| +DB(1) | 8 | 42 | -DB(1) |
| +DB(2) | 9 | 43 | -DB(2) |
| +DB(3) | 10 | 44 | -DB(3) |
| +DB(4) | 11 | 45 | -DB(4) |
| +DB(5) | 12 | 46 | -DB(5) |
| +DB(6) | 13 | 47 | -DB(6) |
| +DB(7) | 14 | 48 | -DB(7) |
| +DB(P) | 15 | 49 | -DB(P) |
| DIFFSENS | 16 | 50 | Ground |
| TERMPWR | 17 | 51 | TERMPWR |
| TERMPWR | 18 | 52 | TERMPWR |
| Reserved | 19 | 53 | Reserved |
| +ATN | 20 | 54 | -ATN |
| Ground | 21 | 55 | Ground |
| +BSY | 22 | 56 | -BSY |
| +ACK | 23 | 57 | -ACK |
| +RST | 24 | 58 | -RST |
| +MSG | 25 | 59 | -MSG |
| +SEL | 26 | 60 | -SEL |
| +C/D | 27 | 61 | -C/D |
| +REQ | 28 | 62 | -REQ |
| +I/O | 29 | 63 | -I/O |
| Ground | 30 | 64 | Ground |
| +DB(8) | 31 | 65 | -DB(8) |
| +DB(9) | 32 | 66 | -DB(9) |
| +DB(10) | 33 | 67 | -DB(10) |
| +DB(11) | 34 | 68 | -DB(11) |

# FC (6214) SSA® 4-Port Adapter (Type 4-D)

The SSA 4-Port Adapter serves as the interface between systems using the Micro Channel architecture and devices using the Serial Storage Architecture (SSA). The adapter provides 4 SSA ports for the attachment of storage devices such as hard disk drives. Each adapter card has four SSA connectors that are arranged in two pairs. Connectors A1 and A2 are one pair; connectors B1 and B2 are the other pair.
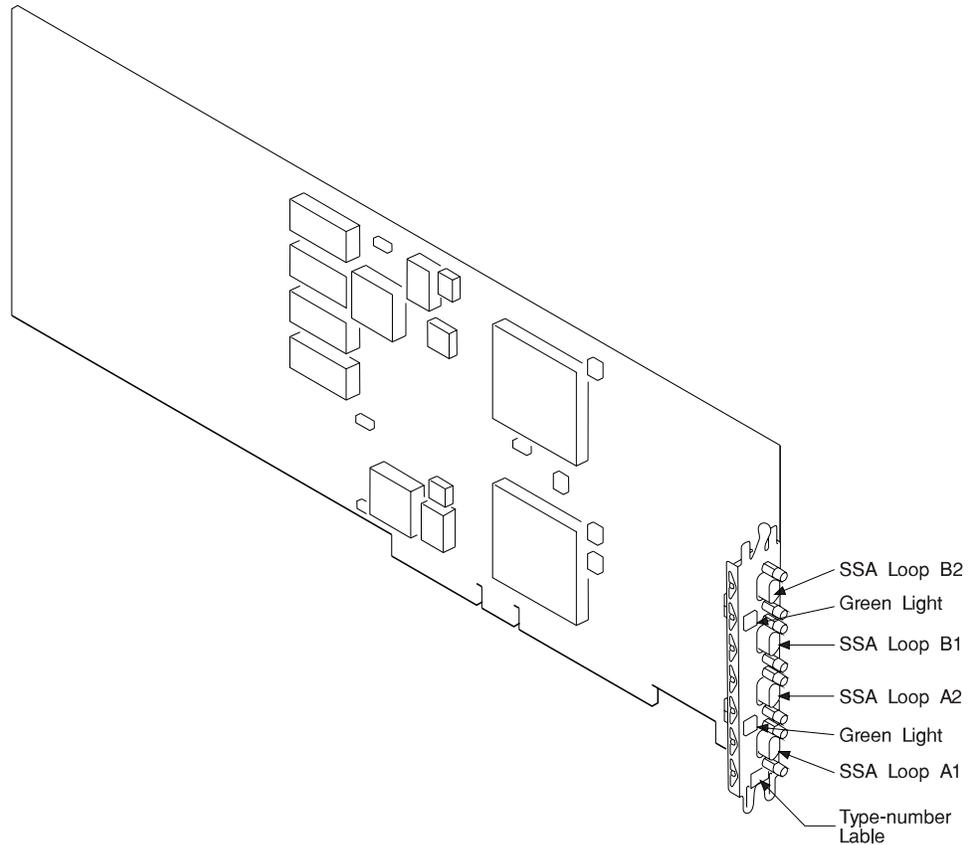


## SSA 4-Port Adapter Specifications

| | |
|---|---|
| FRU Number | 11H3614 |
| Maximum Number[1] | The maximum number of SSA adapters allowed is one half of maximum number of Micro Channel slots available in the system unit. |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Adapter Type | 5 |
| Data transfer rate | 40/80 MB/second |
| Connectors | 9-position, subminiature D |
| Cables | Serial link |

**Note:**

1. The maximum total number of SSA RAID adapters and SSA 4-Port adapters per system includes the following feature codes: 6214, 6216, 6217, and 6219.

## Light Status

Each pair of connectors has a green light that indicates the operational status of its related loop:

| Status of Light | Meaning |
|---|---|
| Off | Both SSA connectors are inactive.  If disk drive modules or other SSA adapters are connected to these connectors, either those modules or adapters are failing, or their SSA links are not active. |
| Permanently on | Both SSA links are active (normal operating condition). |
| Slow Flash | Only one SSA link is active. |

## SSA 4-Port Adapter 9-Position Connector
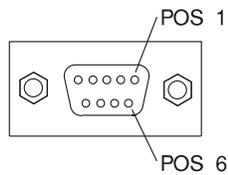


| Position | Signal Name |
|---|---|
| 1 | Ground |
| 2 | - Line Out |
| 3 | Ground |
| 4 | - Line in |
| 5 | Ground |
| 6 | + Line Out |
| 7 | Reserved |
| 8 | + 5 V |
| 9 | +Line In |

## FC (6216) Enhanced SSA 4-Port Adapter (Type 4-G)

The Enhanced SSA 4-Port Adapter serves as the interface between systems using the Micro Channel architecture and devices using the Serial Storage Architecture (SSA). The adapter provides 4 SSA ports for the attachment of storage devices such as hard disk drives. Each adapter card has four SSA connectors that are arranged in two pairs. Connectors A1 and A2 are one pair; connectors B1 and B2 are the other pair. Enhanced SSA 4-port adapters support up to eight (8) initiators per loop.
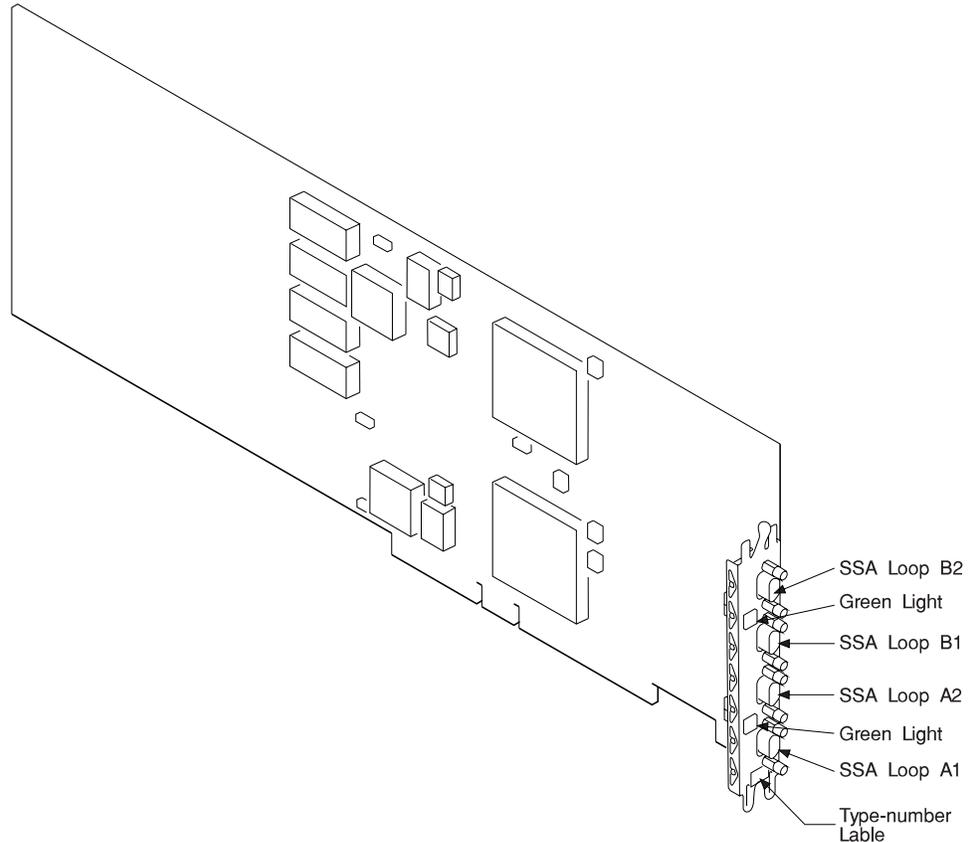


## Enhanced SSA 4-Port Adapter Specifications

| | |
|---|---|
| FRU Number | 40H5707 |
| Maximum Number[1] | The maximum number of SSA adapters allowed is one half of maximum number of Micro Channel slots available in the system unit. |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Adapter Type | 5 |
| Data transfer rate | 40/80 MB/second |
| Connector | 9-position, subminiature D |
| Cables | Serial link |

**Note:**

1. The maximum total number of SSA RAID adapters and SSA 4-Port adapters per system includes the following feature codes: 6214, 6216, 6217, and 6219.

## Light Status

Each pair of connectors has a green light that indicates the operational status of its related loop:

| Status of Light | Meaning |
|---|---|
| Off | Both SSA connectors are inactive. If disk drive modules or other SSA adapters are connected to these connectors, either those modules or adapters are failing, or their SSA links are not active. |
| Permanently on | Both SSA links are active (normal operating condition). |
| Slow Flash | Only one SSA link is active. |

## Enhanced SSA 4-Port Adapter 9-Position Connector
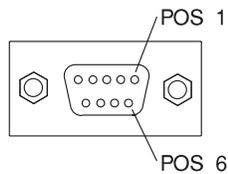


| Position | Signal Name |
|---|---|
| 1 | Ground |
| 2 | - Line Out |
| 3 | Ground |
| 4 | - Line in |
| 5 | Ground |
| 6 | + Line Out |
| 7 | Reserved |
| 8 | + 5 V |
| 9 | +Line In |

# FC (6217) SSA 4-Port RAID Adapter (Type 4–I)

The SSA 4-Port RAID Adapter provides support for two SSA loops. Each loop can contain only one pair of adapter connectors and a maximum of 48 disk drives. For more information see *Micro Channel SSA RAID Adapter, Technical Reference*.



SSA Loop B Port 2
Green Light
SSA Loop B Port 1
SSA Loop A Port 2
Green Light
SSA Loop A Port 1
Type-number Lable
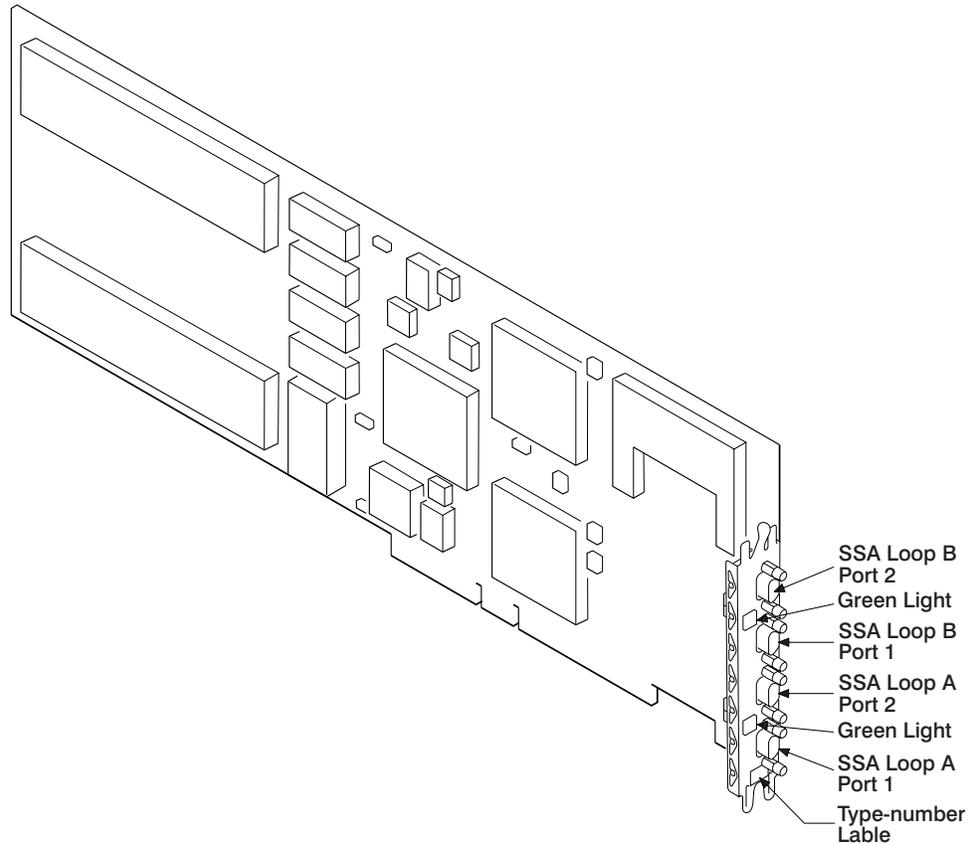
## SSA 4-Port RAID Adapter Specifications

| | |
|---|---|
| FRU Numbers | Base card without DRAM 89H5617 |
| | DRAM memory card 73G3233 |
| Maximum Number[1] | The maximum number of SSA adapters allowed is one half |
| | of maximum number of Micro Channel slots available in the system unit. |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Adapter Type | 5 |
| Data transfer rate | 40/80 MB/second |
| Connector | 9-position, subminiature D |
| Cables | Serial link |

**Note:**

1. The maximum total number of SSA RAID adapters and SSA 4-Port adapters per system includes the following feature codes: 6214, 6216, 6217, and 6219.

# SSA 4-Port RAID Adapter Information

The adapter card has four SSA connectors that are arranged in two pairs. Connectors A1 and A2 are one pair; connectors B1 and B2 are the other pair.

The SSA links must be configured as loops. Each loop is connected to a pair of connectors at the SSA adapter card. These connectors *must* be a valid pair (that is, A1 and A2 or B1 and B2); otherwise, the disk drive modules on the loop are not fully configured, and the diagnostics fail. Operations to all the disk drive modules on a particular loop can continue if that loop breaks at any one point.

This adapter also contains *array management software* that provides RAID-5 functions to control the *arrays* of the RAID subsystem. An array can have from 3 to 16 *member disk drives*. Each array is handled as *one large disk* by the operating system. The array management software translates requests to this large disk into requests to the member disk drives. Although this adapter is a RAID adapter, it can be configured so that all, some, or none of the disk drives that are attached to it are member disks of arrays.

## Lights of the SSA 4-Port RAID Adapter

Each pair of connectors has a green light that indicates the operational status of its related loop:

| Status of Light | Meaning |
|---|---|
| Off | Both SSA connectors are inactive. If disk drive modules or other SSA adapters are connected to these connectors, either those modules or adapters are failing, or their SSA links are not active. |
| Permanently on | Both SSA links are active (normal operating condition). |
| Slow Flash | Only one SSA link is active. |

## SSA 4-Port RAID Adapter 9-Position Connector
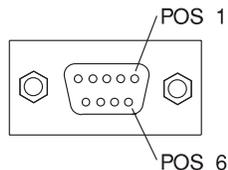


| Position | Signal Name |
|---|---|
| 1 | Ground |
| 2 | - Line Out |
| 3 | Ground |
| 4 | - Line in |
| 5 | Ground |
| 6 | + Line Out |
| 7 | Reserved |
| 8 | + 5 V |
| 9 | +Line In |

# FC (6219, 6222) Micro Channel SSA Multi-Initiator/RAID EL Adapter (Type 4–M) and SSA Fast-Write Cache Option

The Micro Channel SSA Multi-Initiator/RAID EL Adapter provides support for two SSA loops. Each loop can contain a maximum of 48 disk drives. If the fast-write cache or RAID functions of the adapter are used, no other adapter can be connected in an SSA loop with this adapter. If those functions are not used, a second Micro Channel SSA Multi-Initiator/RAID EL Adapter (or a PCI SSA Multi-Initiator/RAID EL Adapter) can be connected in the loop. To use the fast-write cache function, an SSA Fast-Write Cache Option Card (feature 6222) must be installed on the adapter card. For more information see *Micro Channel SSA RAID Adapters, Technical Reference*.
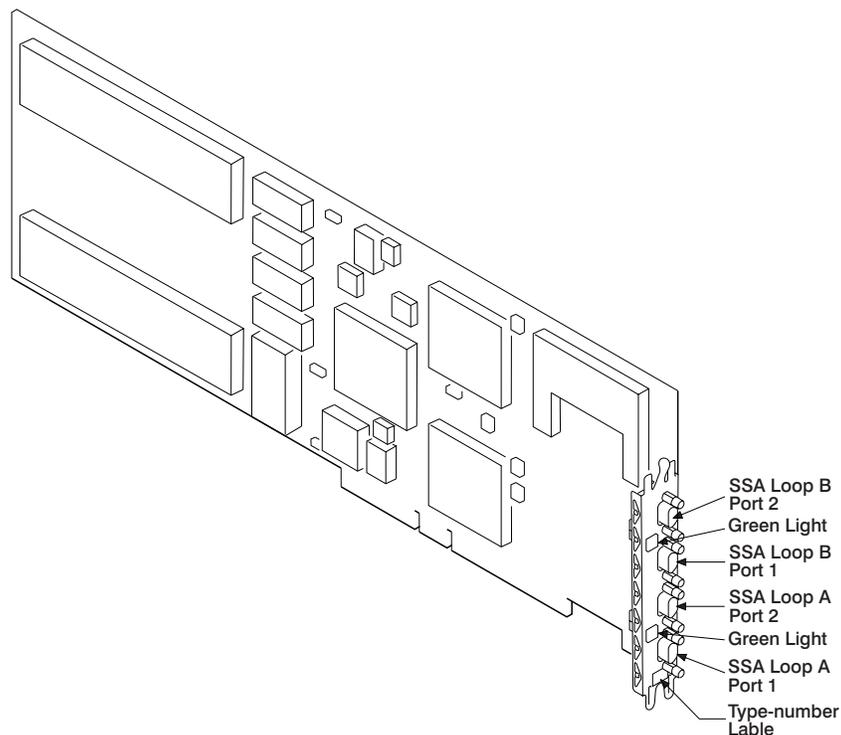


## Micro Channel Multi-Initiator/RAID EL Adapter Specifications

| FRU Numbers | Base card (without Cache Option) 84H9706 |
| | Cache Option card 74G7719 |
| Maximum Number[1] | The maximum number of SSA adapters allowed is one half |
| | of maximum number of Micro Channel slots available in the system unit. |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Adapter Type | 5 |
| Data transfer rate | 40/80 MB/second |
| Connector | 9-position, subminiature D |
| Cables | Serial link |

**Note:**

1. The maximum total number of SSA RAID adapters and SSA 4-Port adapters per system includes the following feature codes: 6214, 6216, 6217, and 6219.

# Micro Channel SSA Multi-Initiator/RAID EL Adapter Information

The adapter card has four SSA connectors that are arranged in two pairs.  Connectors A1 and A2 are one pair; connectors B1 and B2 are the other pair.

The SSA links must be configured as loops.  Each loop is connected to a pair of connectors at the SSA adapter card.  These connectors *must* be a valid pair (that is, A1 and A2 or B1 and B2); otherwise, the disk drive modules on the loop are not fully configured, and the diagnostics fail.  Operations to all the disk drive modules on a particular loop can continue if that loop breaks at any one point.

This adapter also contains *array management software* that provides RAID-5 functions to control the *arrays* of the RAID subsystem.  An array can have from 3 to 16 *member disk drives*.  Each array is handled as *one large disk* by the operating system.  The array management software translates requests to this large disk into requests to the member disk drives.  Although this adapter is a RAID adapter, it can be configured so that all, some, or none of the disk drives that are attached to it are member disks of arrays.

Other software in the adapter controls the Fast-Write Cache Option Card.  This card provides 4MB of cache, which can improve performance for jobs that include many write operations.  The fast-write cache card has a standard PCMCIA connector.

# Lights of the Micro Channel Multi-Initiator/RAID EL Adapter

Each pair of connectors has a green light that indicates the operational status of its related loop:

| Status of Light | Meaning |
| --- | --- |
| Off | Both SSA connectors are inactive.  If disk drive modules or other SSA adapters are connected to these connectors, either those modules or adapters are failing, or their SSA links are not active. |
| Permanently on | Both SSA links are active (normal operating condition). |
| Slow Flash | Only one SSA link is active. |

# Micro Channel Multi-Initiator/RAID EL Adapter 9-Position Connector
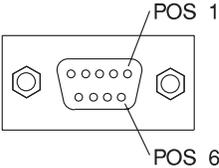


| Position | Signal Name |
|----------|-------------|
| 1        | Ground      |
| 2        | - Line Out  |
| 3        | Ground      |
| 4        | - Line in   |
| 5        | Ground      |
| 6        | + Line Out  |
| 7        | Reserved    |
| 8        | + 5 V       |
| 9        | +Line In    |

# FC (2990) 3270 Connection  (Type 5-1)

This adapter provides a way for the system units to communicate with a host computer. This adapter responds to the host computer like a 3278 or 3279 Display.
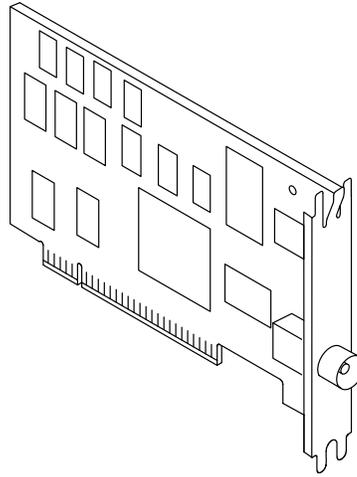
# 3270 Connection Specifications

| | |
|---|---|
| FRU number | 22F9743 |
| Interrupt levels | 9 |
| Bus architecture | Micro Channel |
| Busmaster | No |
| Maximum number | 4 |
| Connector | BNC coaxial |
| Cable | Standard BNC coaxial. |

# FC (2755) Block Multiplexer Channel Adapter (Type 5-2)
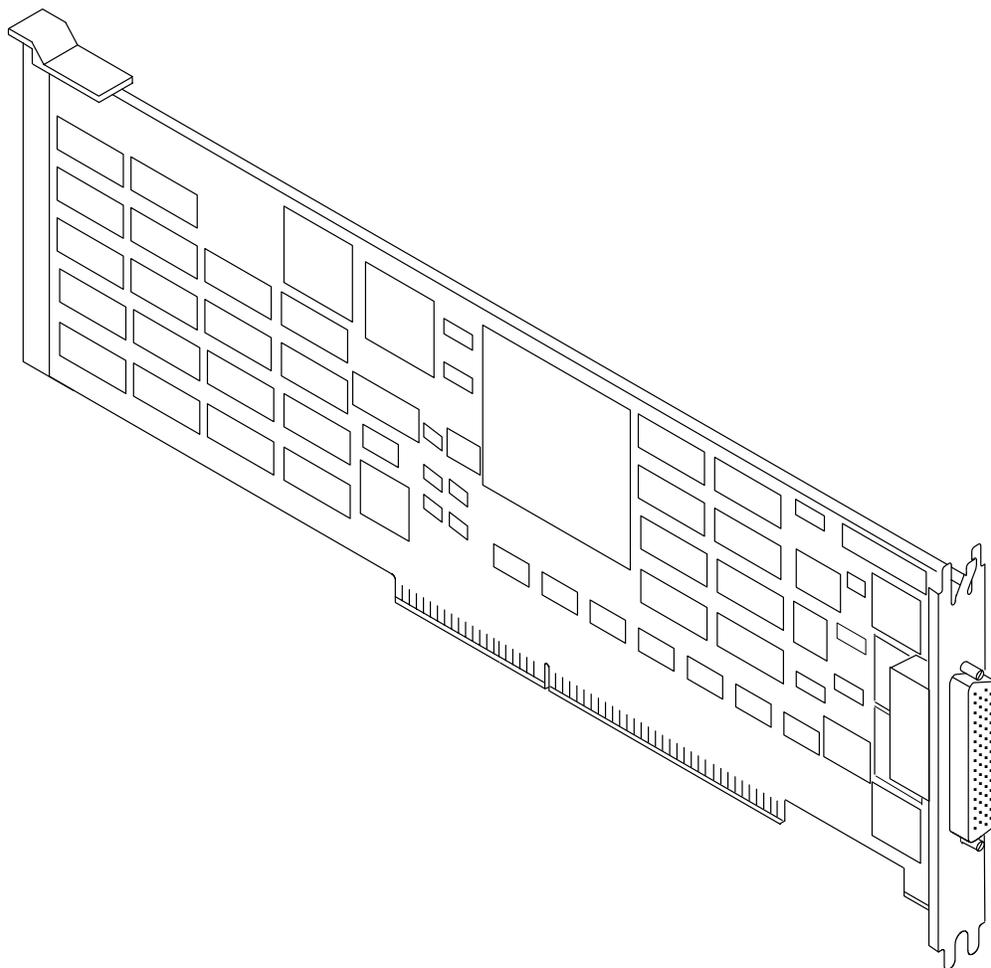
## Block Multiplexer Channel Adapter Specifications

| | |
|---|---|
| FRU number | 02G7425 |
| Bus architecture | Micro Channel |
| Maximum number | 2 |
| Microcode Filenames | fe92.xx.xx |
| | /etc/asw/cu3088b.xx.xx |
| | /etc/asw/cu3088e.xx.xx |
| | /etc/asw/cu3172b.xx.xx |
| Connector | 78-position, D-shell, female |
| Cable | Adapter-to-interface assembly 92F6697 |
| Interface Assembly | 25F9401 |
| Wrap Plugs | |
| Adapter | 71F1184 |
| Bus cable | 8575337 |
| Tag Cable | 8575338 |

# Block Multiplexer Channel Adapter Connector

```
20 ——————  ○○○○○○○○○○○○○○○○○○○○  —————— 1
39 ——————  ○○○○○○○○○○○○○○○○○○○○  —————— 21
59 ——————  ○○○○○○○○○○○○○○○○○○○○  —————— 40
78 ——————  ○○○○○○○○○○○○○○○○○○○○  —————— 60
```
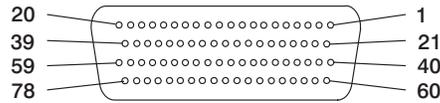
**Note:** All even-numbered pins are grounds.

| Pin | Name | Description | Pin | Name | Description |
|-----|------|-------------|-----|------|-------------|
| 1 | Oplout | Operational Out | 39 | Busout1 | Bus Out (bit 1) |
| 3 | Servout | Service Out | 41 | Adrout | Address Out |
| 5 | Mark0out | Mark 0 Out | 43 | Supout | Suppress Out |
| 7 | Adrin | Address In | 45 | Reserved | |
| 9 | Reqin | Request In | 47 | Srvin | Service In |
| 11 | Reserved | | 49 | Mark0in | Mark 0 In |
| 13 | Busin5 | Bus In (bit 5) | 51 | Busin7 | Bus In (bit 7) |
| 15 | Busin1 | Bus In (bit 1) | 53 | Busin3 | Bus In (bit 3) |
| 17 | Busout6 | Bus Out (bit 6) | 55 | Busoutp | Bus Out (parity) |
| 19 | Busout2 | Bus Out (bit 2) | 57 | Busout4 | Bus Out (bit 4) |
| 21 | Hldout | Hold Out | 59 | Busout0 | Bus Out (bit 0) |
| 23 | Datout | Data Out | 61 | Cmdout | Command Out |
| 25 | Reserved | | 63 | Selout | Select Out |
| 27 | Stain | Status In | 65 | Opin | Operational In |
| 29 | Selin | Select In | 67 | Datin | Data In |
| 31 | Businp | Bus In (parity) | 69 | Disin | Disconnect In |
| 33 | Busin4 | Bus In (bit 4) | 71 | Busin6 | Bus In (bit 6) |
| 35 | Busin0 | Bus In (bit 0) | 73 | Busin2 | Bus In (bit 2) |
| 37 | Busout5 | Bus Out (bit 5) | 75 | Busout7 | Bus Out (bit 7) |
| | | | 77 | Busout3 | Bus Out (bit 3) |

# FC (2756) ESCON Channel Adapter (Type 5-3)



Processor Card

Connect
Strip Connectors
to Pins

Fiber Optic Subassembly

## ESCON Channel Adapter Specifications

| | |
|---|---|
| FRU numbers | Processor card 56G0294 |
| | Fiber optic subassembly 56G0295 |
| Bus architecture | Micro Channel |
| Maximum number | 2 (two slots required per adapter) |
| Microcode Filenames | c38fd.xx.xx c38f.clawn.std c38f.3088n.std |
| | c38f.xx.xx c38f.clawr.std c38f.mcm.con |
| | c38f.mcm.exe c38f.claws.std c38f.mcm.por |
| | c38f.3088s.std c38f.3088r.std c38f.mcm.postd |
| Connector | ESCON fiber connector |
| Fiber Cables | (duplex-to-duplex) |
| | 3.7 m (12 ft.) 74F5412 |
| | 6.1 m (20 ft.) 74F5413 |
| | 12.2 m (40 ft.) 74F5414 |
| | 21.3 m (70 ft.) 74F5415 |
| | 30.4 m (100 ft.) 74F5416 |
| | 61 m (200 ft) 74F5417 |
| | 122 m (400 ft.) 74F5418 |
| Wrap Plug | Fiber optic (included with adapter) 5605670 |

# FC (2754) ESCON Channel  Emulator Adapter (Type 5-3)

Processor Card

Connect
Strip Connectors
to Pins

Fiber Optic Subassembly

## ESCON Channel Adapter Specifications

| | |
|---|---|
| FRU numbers | Processor card  56G0294 |
| | Fiber optic subassembly 56G0295 |
| Bus architecture | Micro Channel |
| Maximum number | 2 (two slots required per adapter) |
| Microcode Filenames | The following Microcode files are included with the ESCON |
| | Channel Tape Attachment/6000 (Feature Code 5223): |
| | c38f.che3026.ucd |
| | c38fd.chh2345.ucd |
| | c38f.emcar408.rom |
| Connector | ESCON fiber connector |
| Fiber Cables | (duplex-to-duplex) |
| | 3.7 m (12 ft.) 74F5412 |
| | 6.1 m (20 ft.) 74F5413 |
| | 12.2 m (40 ft.) 74F5414 |
| | 21.3 m (70 ft.) 74F5415 |
| | 30.4 m (100 ft.) 74F5416 |
| | 61 m (200 ft) 74F5417 |
| | 122 m (400 ft.) 74F5418 |
| Wrap Plug | Fiber optic (included with adapter)  5605670 |

# FC (2759) S/370 Channel Emulator/A (Type 5-4)
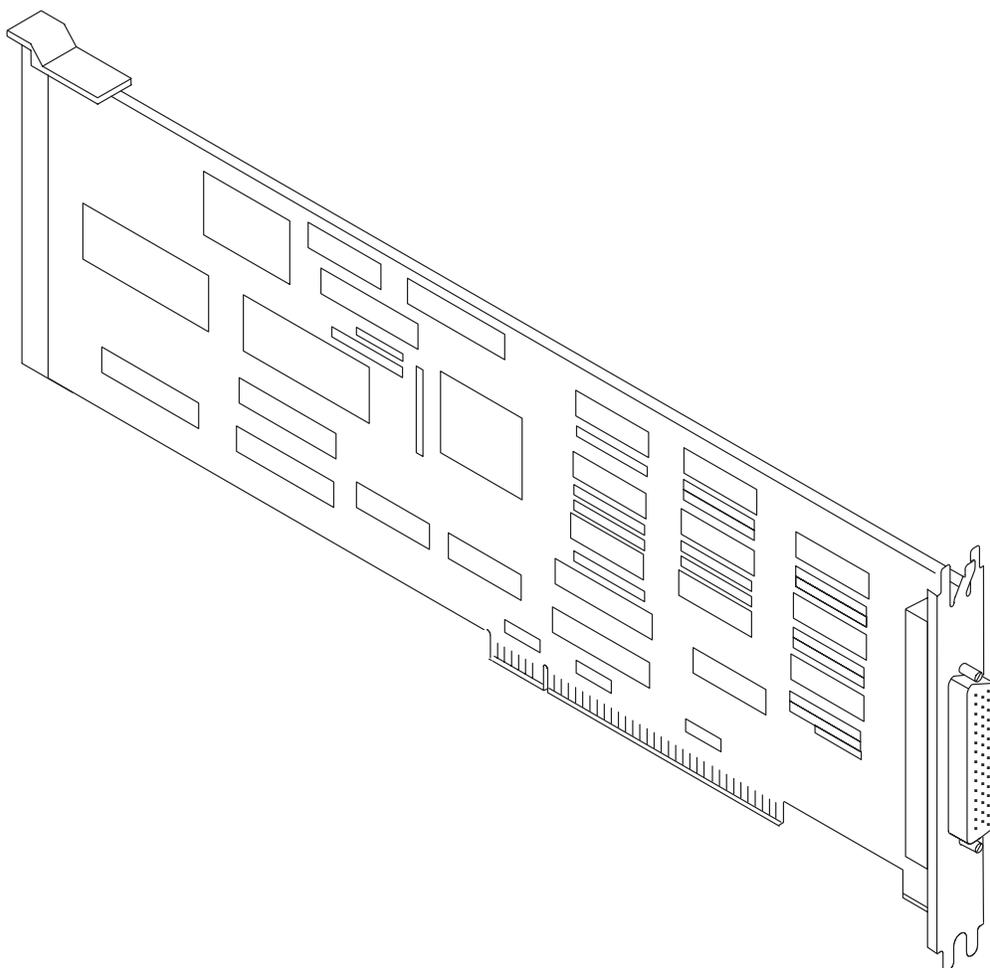


## S/370 Channel Emulator/A Specifications

FRU number                 65G1828
Bus architecture           Micro Channel
Maximum number             4
Connector                  62-position, D-shell, female
Cable                      Interface 68F7209
Wrap Plugs
  Bus cable                5479141
  Tag Cable                5479139
Terminators
  Bus                      2282675
  Tag                      2282676

# S/370 Channel Emulator/A Connector
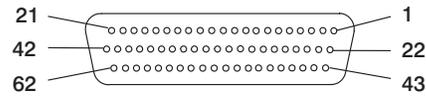


| Pin | Name | Description | Pin | Name | Description |
|-----|------|-------------|-----|------|-------------|
| 1 | Busin | Bus In (parity) | 16 | Selin | Select In |
| 2 | Busin0 | Bus In (bit 0) | 17 | Adrin | Address In |
| 3 | Busin1 | Bus In (bit 1) | 18 | Markin | Mark In |
| 4 | Busin2 | Bus In (bit 2) | 19 | Gnd | Ground |
| 5 | Busin3 | Bus In (bit 3) | 20 | Gnd | Ground |
| 6 | Busin4 | Bus In (bit 4) | 21 | Gnd | Ground |
| 7 | Busin5 | Bus In (bit 5) | 22 | Gnd | Ground |
| 8 | Busin6 | Bus In (bit 6) | 23 | Gnd | Ground |
| 9 | Busin7 | Bus In (bit 7) | 24 | Gnd | Ground |
| 10 | Reqin | Request In | 25 | Gnd | Ground |
| 11 | Srvin | Service In | 26 | Gnd | Ground |
| 12 | Stain | Status In | 27 | Gnd | Ground |
| 13 | Datin | Data In | 28 | Gnd | Ground |
| 14 | Opin | Operation In | 29 | Gnd | Ground |
| 15 | Disin | Disconnect In | 30 | Gnd | Ground |
| 31 | Gnd | Ground | 47 | Busout4 | Bus Out (bit 4) |
| 32 | Gnd | Ground | 48 | Busout5 | Bus Out (bit 5 |
| 33 | Gnd | Ground | 49 | Busout6 | Bus Out (bit 6) |
| 34 | Gnd | Ground | 50 | Busout7 | Bus Out (bit 7) |
| 35 | Gnd | Ground | 51 | Busoutp | Bus Out (parity) |
| 36 | Gnd | Ground | 52 | Adrout | Address Out |
| 37 | Gnd | Ground | 53 | Cmdout | Command Out |
| 38 | Gnd | Ground | 54 | Servout | Service Out |
| 39 | Gnd | Ground | 55 | Datout | Data Out |
| 40 | Gnd | Ground | 56 | Oplout | Operation Out |
| 41 | Gnd | Ground | 57 | Holdout | Hold Out |
| 42 | Gnd | Ground | 58 | Selector | Select Out |
| 43 | Busout0 | Bus Out (bit 0) | 59 | Supprout | Suppress Out |
| 44 | Busout1 | Bus Out (bit 1) | 60 | Gnd | Ground |
| 45 | Busout2 | Bus Out (bit 2) | 61 | Gnd | Ground |
| 46 | Busout3 | Bus Out (bit 3) | 62 | Gnd | Ground |

# FC (2810) Graphics Input Device Adapter (Type 6-1)

This adapter provides a way to attach the 6094 Model 10 Dials or the 6094 Model 20 Lighted Program Function Keyboard (LPFK) to the system units.
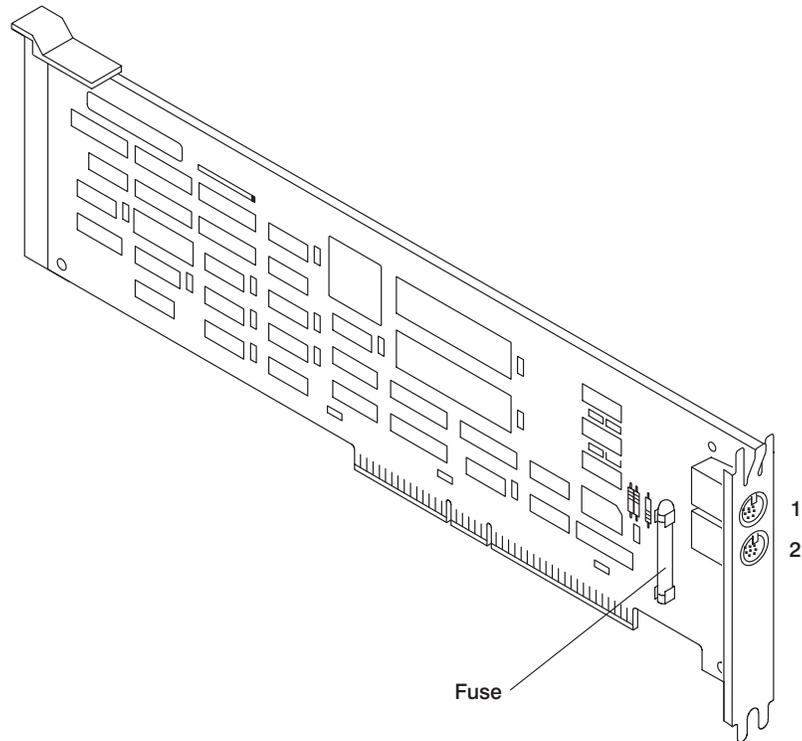


## Graphics Input Device Adapter Specifications

| | |
|---|---|
| FRU number | 22F9758 |
| Bus architecture | Micro Channel |
| I/O addresses | 0960 - 0967, port A (1) |
| | 0968 - 096F, port B (2) |
| Interrupt levels | 3, 4, 5, 6, 7, 9 |
| Busmaster | No |
| Bits per character | 5, 6, 7, 8 (set by program) |
| Bits per second | 9600 |
| Maximum number | 1 |
| Connectors | Two, 8-position DIN connectors |
| Fuse | Part number 0123786 |
| Wrap plug | Dual connector 22F9689 |

# Graphics Input Device Adapter Connectors

Two 8-position mini-DIN connectors are provided for attachment of external device cables. The signals are the same for both connectors.
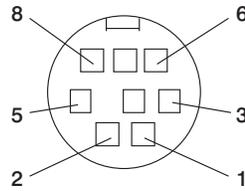


| Position | Signal Name | Direction |
|:---:|---|---|
| 1 | Signal return | |
| 2 | DC return | |
| 3 | + 5 V dc | |
| 4 | Selective reset | To device |
| 5 | Receive data | From device |
| 6 | Transmit data | To device |
| 7 | Diagnostic selective reset | From device |
| 8 | Reserved | |

# FC (2800) S/370 Host Interface Adapter (Type 6-2) or FC (2801, 2802) 5086/5085 Attachment Adapter

This adapter has two distinct modes of operation that correspond with the two Feature Codes for the same physical card. Different microcode accounts for the two different modes of operation. When the adapter is used in:

-hia mode

Referred to as the S/370 Host Interface Adapter (HIA), it allows support for the physical attachment of a system unit to any member of the family of the 5088/6098 Control Units via coaxial cable. It provides support for the AIX 5080 Emulation Program and Soft5080 for AIX.

-gsw mode

Referred to as the 5080 Attachment Adapter (AA) , it provides a way to attach the 5080 Graphics Processor, the 5086 Graphics Processor, or the 5088/6098 Control Unit to the system units.
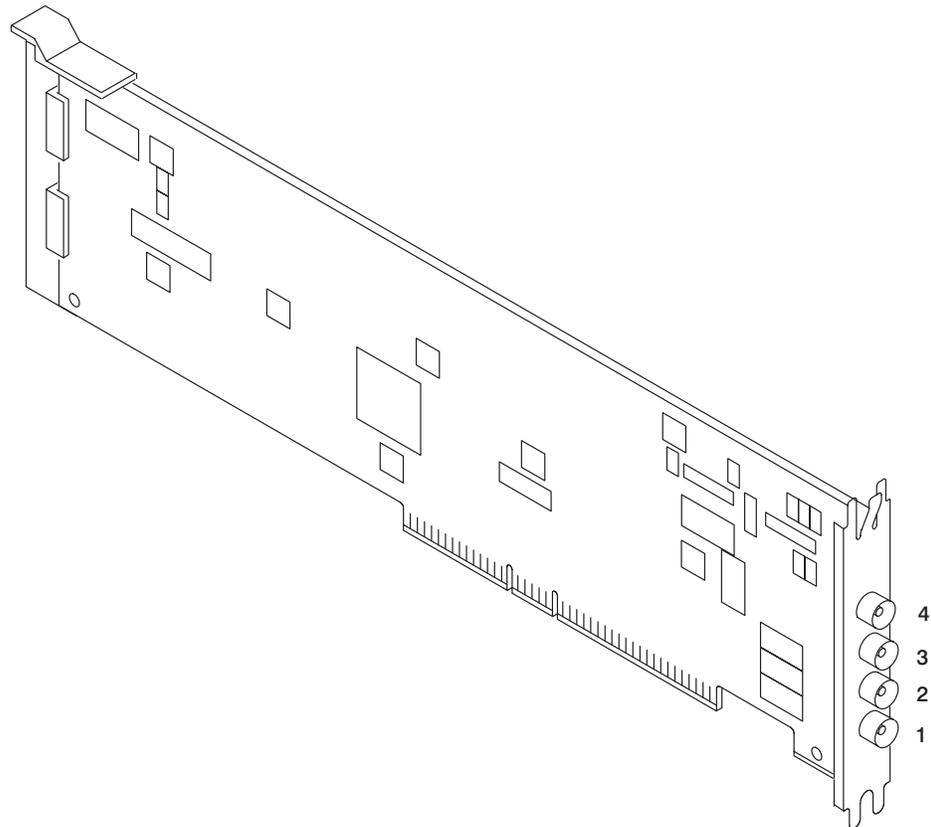
# S/370 Host Interface Adapter / 5080 Attachment Adapter Specifications

| | |
|---|---|
| FRU number | 09G3667 |
| I/O addresses | Assigned a 256 byte block of addresses,within any 64K byte block of addresses, in the first 16M bytes of memory |
| Interrupt levels | 3, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15 (set by the program) |
| Bus architecture | Micro Channel |
| Busmaster | No |
| Microcode file names | For AIX 3.2 and 4.1.3+ <br> 8787S.00.01 <br> 8787P.00.01 |
| Maximum number | one (1) AA adapter and as many HIA adapters as there are Micro Channel slots |
| Cable kits | Order part number 39F8201 to attach the 5085 <br> Order part number 39F8202 to attach the 5086 |
| Connector | Four BNC connectors (ensure that the same RG cable type is used throughout) |

# FC (none) Async Expansion Adapter (Type 6-3)

This adapter extends the Micro Channel bus from the CPU drawer to the async expansion drawer in the 7015 system unit. This card is sold only as part of the Async Expansion drawer.

This adapter extends only those signals needed to use asynchronous communication adapters in the expansion drawer.
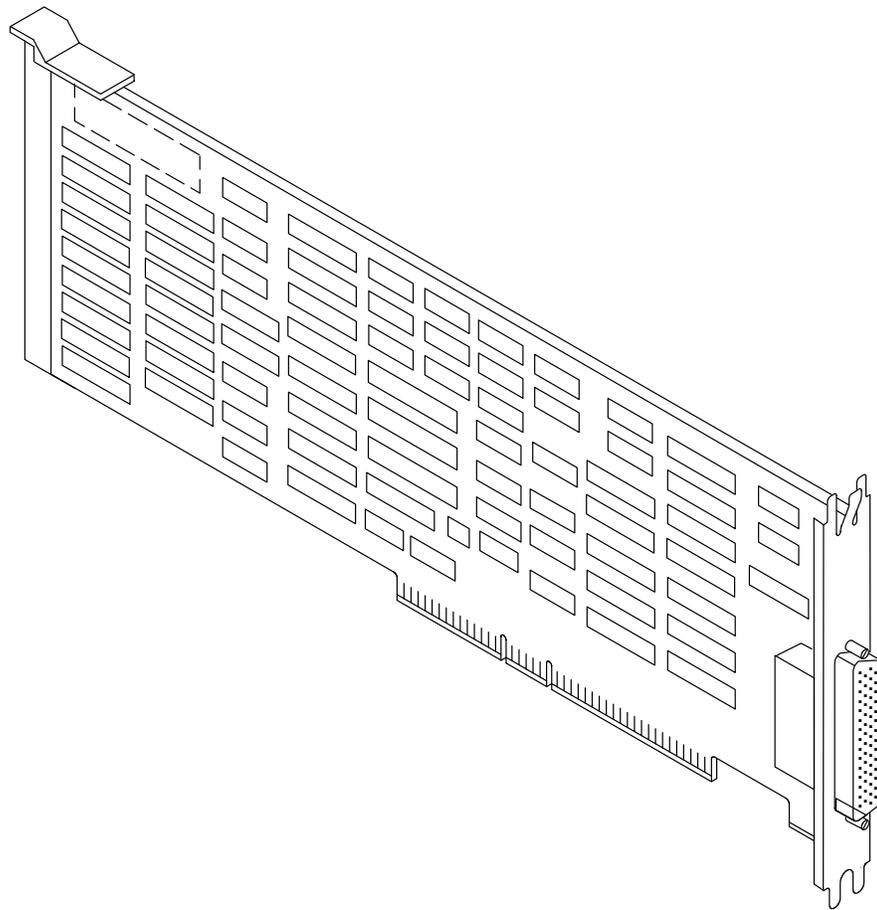
## Async Expansion Adapter Specifications

FRU number              53F3621
Bus architecture        Micro Channel
Busmaster               No
Maximum number          1
Connector               78-position, D-shell
Cable                   Part number 71F1379

# FC (2860) Serial Optical Channel Converter (Type 6-4)

This adapter provides a high-speed communications method between system units through the serialization and deserialization (SERDES) of optical signals. Two independent, half-duplex optical paths are provided.

This adapter is certified as a Class 1 laser device. It contains an automatic shutdown control to prevent laser emissions; safety hazards are not present when the adapter is properly installed and connected. Port covers must be installed when a port is not connected.
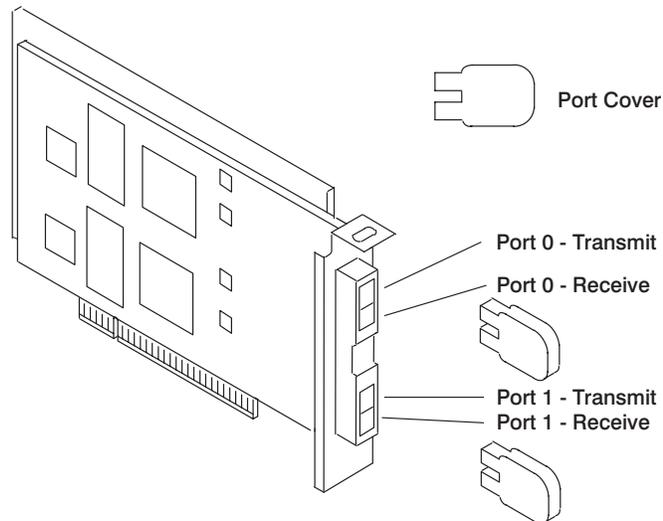


## Serial Optical Channel Converter Specifications

| | |
|---|---|
| FRU number | 59F2969 |
| Bus architecture | Special for serial optical channel converter |
| Maximum number | 1 (7013 Models 520/530/540/550 |
| | 2 (7015 Models 930/950; 7016; 7018) |
| Cables | Optical cable, part number 21F9403 (6 m) |
| | Optical cable, part number 21F9405 (10 m) |
| | Optical cable, part number 21F9407 (20 m) |
| | Optical cable, part number 21F9410 (60 m) |
| | Optical cable, part number 21F9413 (100 m) |
| Fiber type/length restrictions | Minimum 4 m;  Maximum 2K m |
| 50/125 um | (10.5 db guaranteed user available link loss |
| | should not be exceeded for the 2K m supported length) |
| 62.5/125 um | Minimum 4 m;  Maximum  500 m |
| | (10.5 db guaranteed user available link loss |
| | should not be exceeded for any supported length) |
| Wrap plugs | Optical card, 56F0203, shipped with converter |
| | Fiber optic cable, 46F2438 |
| | Feed-through connector, 99F0489 |

# FC (6300) Digital Trunk Adapter (Type 6-5)

This adapter is used to attach 9291/9295 Digital Trunk Processors to the system units.
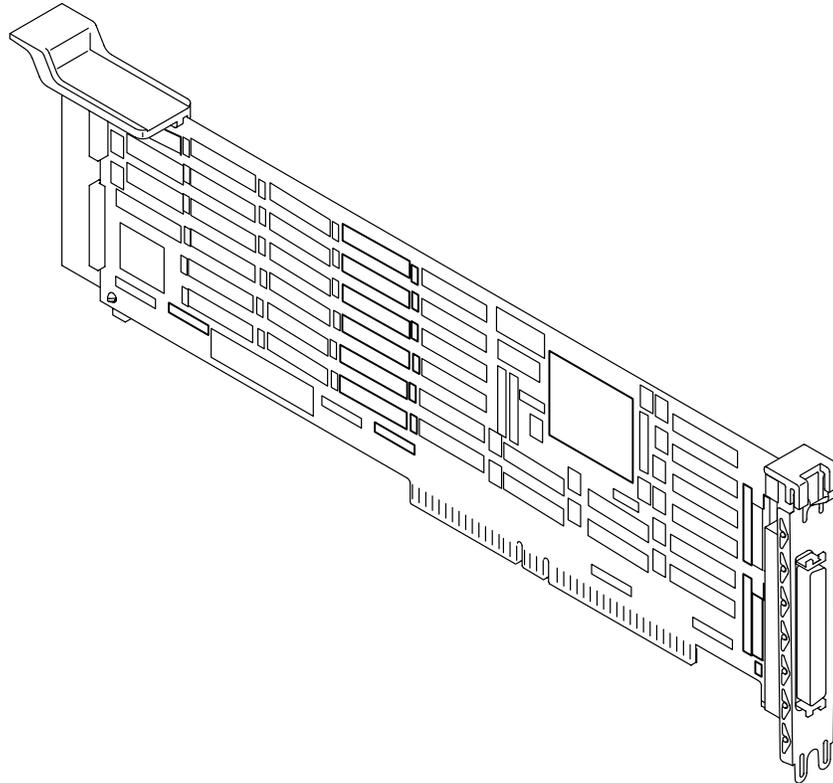
## Digital Trunk Adapter Specifications

| | |
|---|---|
| FRU number | 54F0738 |
| Bus architecture | Micro Channel |
| Microcode file name | none |
| Maximum number | 3 |
| Connector | 25-pin D-shell (male pins on adapter) |
| Cable | adapter-to-9291/9295,  2 m (6.5 ft.) 34F0873 |
| Wrap plug assemblies | |
|   adapter/cable | 25-pin Sub D-shell, female 34F0874 |
|   Enclosure trunk | 15-pin Sub D-shell, male  34F0876 |
|   Telecommunications line | |
|   CSU cable, T1 only | 34F0875 |
|   Coax, CEPT* only | 75-ohm, male-male, 61F5394 |
|   Coax, Network, CEPT* only | female-female, 75-ohm,  61F5395 |

* All countries except France

**Note:**  For diagnostic procedures concerning this adapter and 9291/9295 machine types, refer to the *DirectTalk/6000® Problem Solving Guide*, order number SC22-0105.

# Digital Trunk Adapter 25-Position Connector
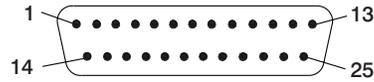


| Position | Signal Name | Direction |
|----------|-------------|-----------|
| 1 | +A0/+DB 0-8 | Bidirectional |
| 2 | A1/+DB 1-9 | Bidirectional |
| 3 | +A2/+DB 2-10 | Bidirectional |
| 4 | +A3/+DB 3-11 | Bidirectional |
| 5 | -CS1/+DB 4-12 | Bidirectional |
| 6 | -Channel Reset | Out |
| 7 | -Host Interrupt (-HOST INT) | Int |
| 8 | -Acknowledge (-ACK) | In |
| 9 | -VSC Present | In |
| 10 | -Command (-CMD) | Out |
| 11 | Status Register Bit 6 (Wrap) | In |
| 12 | +Byte Swap Request | Out |
| 13 | -Parity Enable | Out |
| 14 | NU1 | - |
| 15 | NU2 | - |
| 16 | -Wrap Plug Present | In |
| 17 | Status Register Bit 7 (Wrap) | In |
| 18 | Signal Ground | - |
| 19 | -Host Command | Out |
| 20 | -VSC Parity Error | In |
| 21 | Signal Ground | - |
| 22 | +R/-W/+DB 5-13 | Bidirectional |
| 23 | +DB 6-14 | Bidirectional |
| 24 | +DB 7-15 | Bidirectional |
| 25 | Byte Parity | Bidirectional |

# FC (6305) Digital Trunk Dual Adapter (Type 6-6)

This adapter is used to attach the 9291/9295 Digital Trunk Processors to the system units.
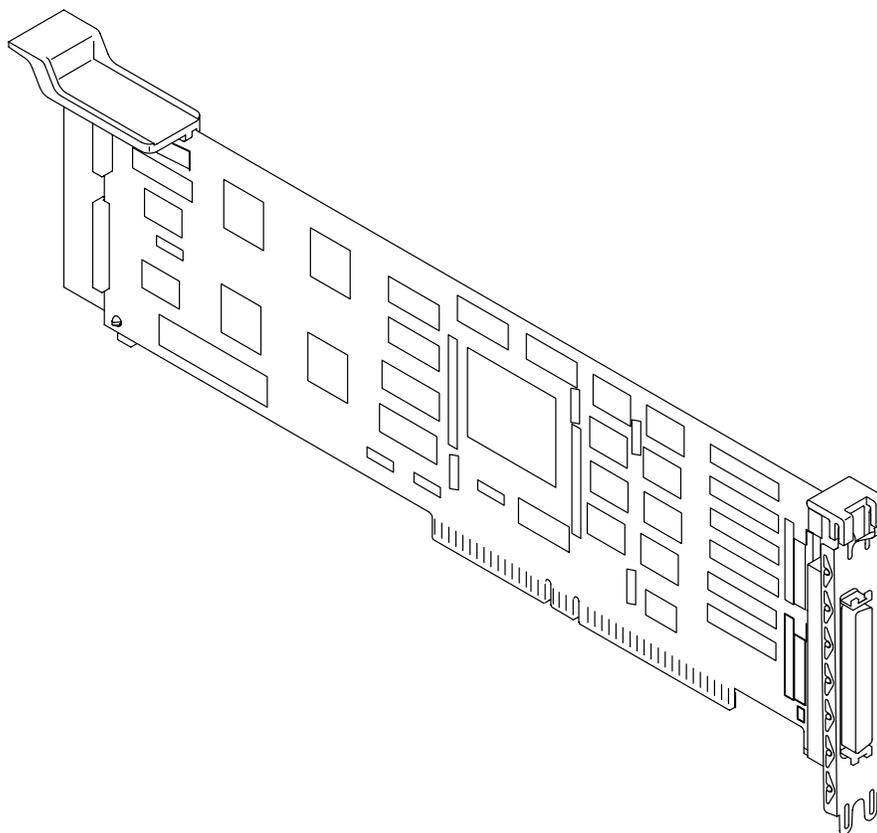


## Digital Trunk Dual Adapter Specifications

| | |
|---|---|
| FRU number | 43G3317 |
| Bus architecture | Micro Channel |
| Microcode file name | none |
| Maximum number | 3 |
| Connector | 62-pin female |
| Cable,"Y" | adapter-to-9291/9295, 62-pin-to-two 25-pin D-shells, 20cm (7.9 in.)  43G3318 |
| Wrap plug assemblies | |
| Enclosure trunk | 15-pin Sub D-shell, male 34F0876 |
| Telecommunications line | |
|   CSU cable, T1 only | 34F0875 |
|   Coax, CEPT* only | 75-ohm, male-male, 61F5394 |
|   Coax, Network, CEPT* only | female-female, 75-ohm,  61F5395 |

\* All countries except France

# Digital Trunk Dual Adapter 62-Position Connector

| Position | Signal Name | Direction |
|---|---|---|
| 1 | GND | Out |
| 2 | -VPACK #2 wrap plug present | In |
| 3 | -VPACK #2 status reg bit 7 (wrap) | In |
| 4 | -VPACK #2 status reg bit 6 (wrap) | In |
| 5 | -VPACK #2 parity enable | Out |
| 6 | +VPACK #2  DB  6-14 | Bidirectional |
| 7 | +VPACK #2  A3/ +DB  3-11 | Bidirectional |
| 8 | +VPACK #2  A0/ +DB  0-8 | Bidirectional |
| 9 | no connection | |
| 10 | GND | Out |
| 11 | -VPACK #1 wrap plug present | In |
| 12 | -VPACK #1 status reg bit 7 (wrap) | In |
| 13 | -VPACK #1 status reg bit 6 (wrap) | In |
| 14 | -VPACK #1 parity enable | Out |
| 15 | +VPACK #1  DB  6-14 | Bidirectional |
| 16 | +VPACK #1  A3/ +DB  3-11 | Bidirectional |
| 17 | +VPACK #1  A0/ +DB  0-8 | Bidirectional |
| 18 | no connection | |
| 19 | no connection | |
| 20 | no connection | |
| 21 | no connection | |
| 22 | GND | Out |
| 23 | -VPACK #2 channel reset | Out |
| 24 | -VPACK #2 host cmd | Out |
| 25 | +VPACK #2 byte swap req | Out |
| 26 | -VPACK #2 cmd | Out |
| 27 | +VPACK #2  DB  7-15 | Bidirectional |
| 28 | -VPACK #2 CS/ +DB  4-12 | Bidirectional |
| 29 | +VPACK #2  A1/ +DB  1-9 | Bidirectional |
| 30 | no connection | |
| 31 | GND | Out |
| 32 | -VPACK #1 channel reset | Out |
| 33 | -VPACK #1 host cmd | Out |
| 34 | +VPACK #1 byte swap req | Out |
| 35 | -VPACK #1 cmd | Out |
| 36 | +VPACK #1  DB  7-15 | Bidirectional |
| 37 | -VPACK #1 CS/ +DB  4-12 | Bidirectional |
| 38 | +VPACK #1  A1/ +DB  1-9 | Bidirectional |
| 39 | no connection | |
| 40 | no connection | |
| 41 | no connection | |
| 42 | no connection | |
| 43 | -VPACK #2 parity error | In |
| 44 | -VPACK #2 Acknowledge (ACK) | In |
| 45 | -VPACK #2 host interrupt | In |
| 46 | -VPACK #2 present | In |
| 47 | +VPACK #2 byte  parity | Bidirectional |
| 48 | +VPACK #2 R/-W/ +DB  5-13 | Bidirectional |

| Position | Signal Name | Direction |
|----------|-------------|-----------|
| 49 | +VPACK #2 A2/ +DB  2-10 | Bidirectional |
| 50 | no connection | |
| 51 | no connection | |
| 52 | -VPACK #1 parity error | In |
| 53 | -VPACK #1 Acknowledge (ACK) | In |
| 54 | -VPACK #1 host interrupt | In |
| 55 | -VPACK #1 present | In |
| 56 | +VPACK #1 byte  parity | Bidirectional |
| 57 | +VPACK #1 R/-W/ +DB  5-13 | Bidirectional |
| 58 | +VPACK #1 A2/ +DB  2-10 | Bidirectional |
| 59 | no connection | |
| 60 | no connection | |
| 61 | no connection | |
| 62 | no connection | |

# FC (2840) 5080 Coax Communications Adapter (Type 6-8)

This adapter is referred to as the 5080 Coax Communications Adapter (5080CCA).  The adapter allows the physical attachment of a system unit to any member of the family of 5080/6090 Control Units via coaxial cable.

Its smaller size provides support for the AIX 5080 emulation program and Soft5080 for AIX on system units that cannot accommodate the larger adapter FC 2800.
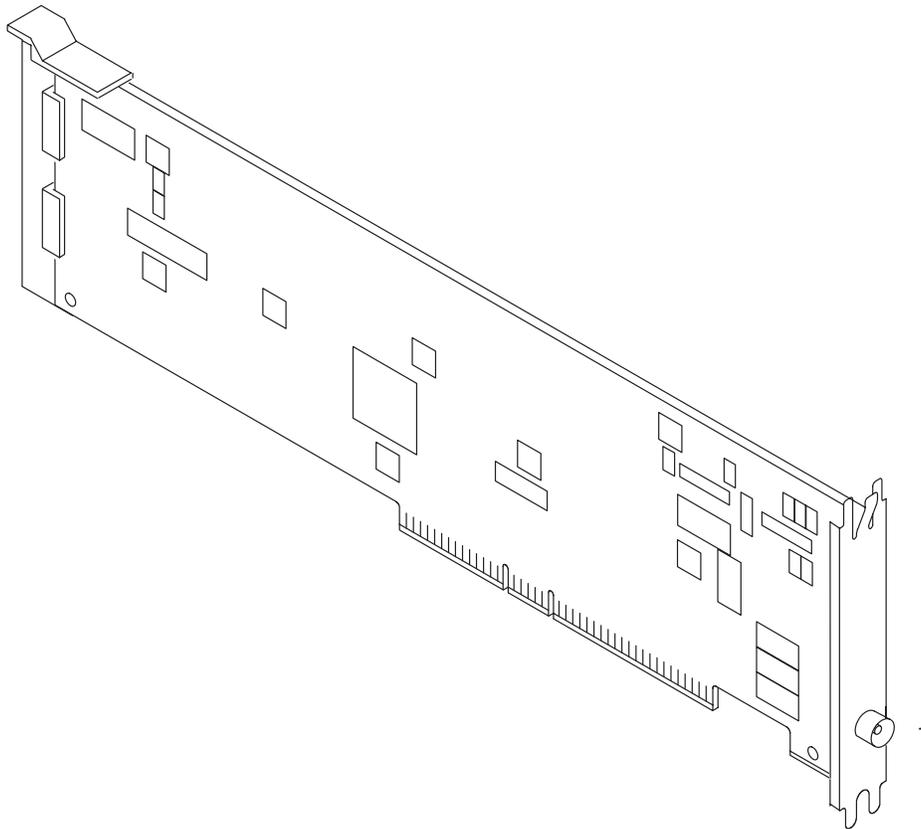
## 5080 Coax Communications Adapter Specifications

| | |
|---|---|
| FRU number | 88G2838 |
| I/O addresses | Assigned a 256 byte block of addresses,within any 64K byte block of addresses, in the first 16M bytes of memory |
| Interrupt levels | 3, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15 (set by the program) |
| Bus architecture | Micro Channel |
| Busmaster | No |
| Microcode file names | For AIX 3.2 and 4.1.3+ 8787S.00.01 |
| Maximum number | As many 5080 CCA adapters as there are Micro Channel slots |
| Cable | Standard BNC Coaxial Order part number 39F8202 to attach the 5086 |

# FC (6301) M-Audio Capture and Playback Adapter (Type 7-1)
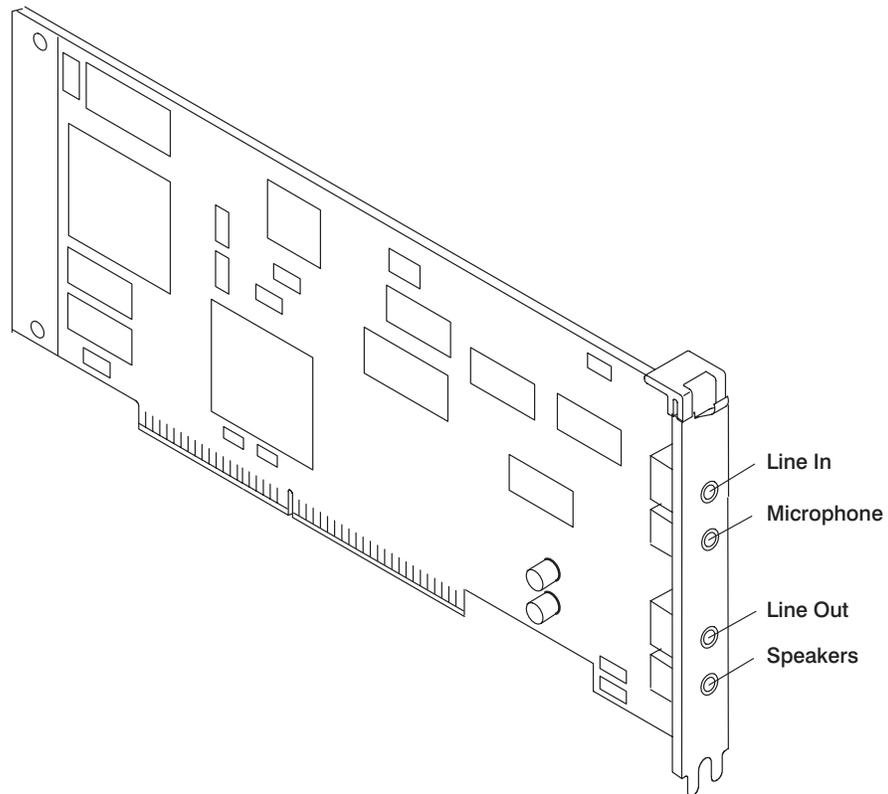


## M-Audio Capture and Playback Adapter Specifications

| | |
|---|---|
| FRU number | 51G8018 |
| Bus architecture | Micro Channel |
| Maximum number | 4 (7012/7013/ 7016) |
| Connector | RCA jack, stereo |
| Microcode filenames | 6c6e511p.xx.xx |
| | 6c6e511r.xx.xx |
| | 6c6epcmp.xx.xx |
| | 6c6epcmr.xx.xx |
| | 6c6e22p.xx.xx |
| | 6c6e22r.xx.xx |
| Microcode diskette assembly | 32G1889 |

# FC (2400) M-Video Capture Adapter (Type 7-2)
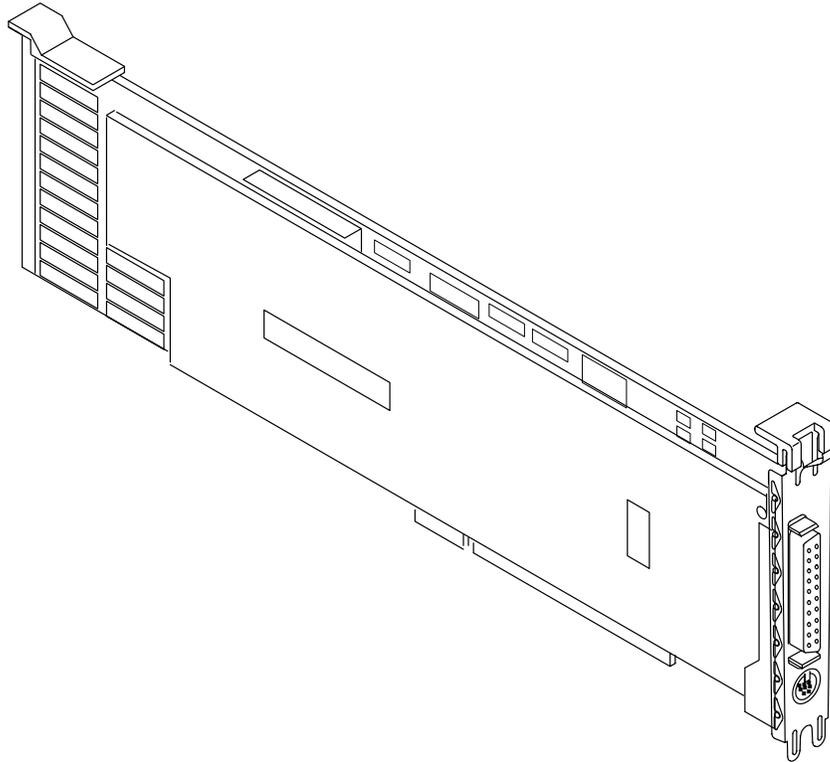
## M-Video Capture Adapter (NTSC Version) Specifications

FRU number                32G0258
Bus architecture          Micro Channel
Maximum number            2
Connectors                20-position D-shell
                          S-type

Cable set                 92F3713, includes:
                          Primary I/O
                          S-Connector
                          Wrap test (3)
                          Terminator plugs (3), 75-ohm

# M-Video Capture Adapter 20-Pin Connector



20    10

Shields          Signals

11    1
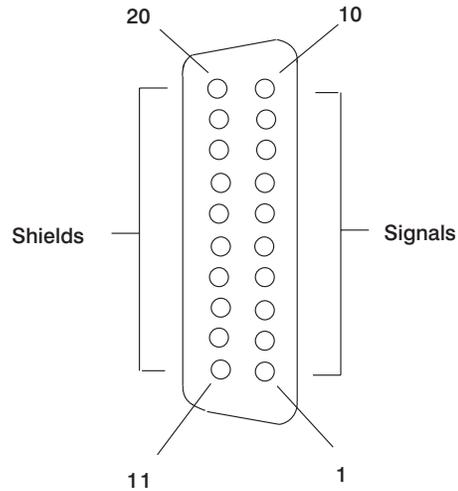
Note: The RCA plug ends of the Primary I/O cable are labelled with corresponding adapter signal pin numbers.

| Position | Signal/Shield | RCA Plug Identifier |
|----------|---------------|---------------------|
| 1/11 | Composite Sync Output/Shield | 1 |
| 2/12 | Analog Blue Output/Shield | 2 |
| 3/13 | Analog Green Output/Shield | 3 |
| 4/14 | Analog Red Output/Shield | 4 |
| 5/15 | NTSC Output/Shield | 5 |
| 6/16 | Composite Sync Input/Shield | 6 |
| 7/17 | Analog Blue Input/Shield | 7 |
| 8/18 | Analog Green or Luma Input/Shield | 8 |
| 9/19 | Analog Red or Chroma Input/Shield | 9 |
| 10/20 | NTSC Input/Shield | 10 |

# M-Video Capture Adapter S-Connector



Chroma Shield          Chroma (Red RCA plug)

Luma Shield          Luma (Black RCA plug)
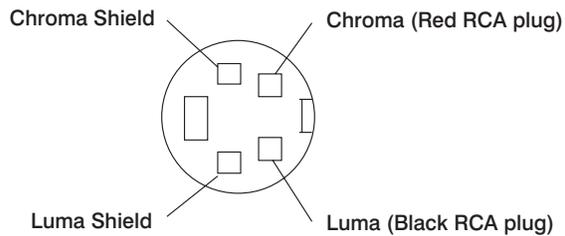
# FC (2401) M-Video Capture Adapter (Type 7-3)
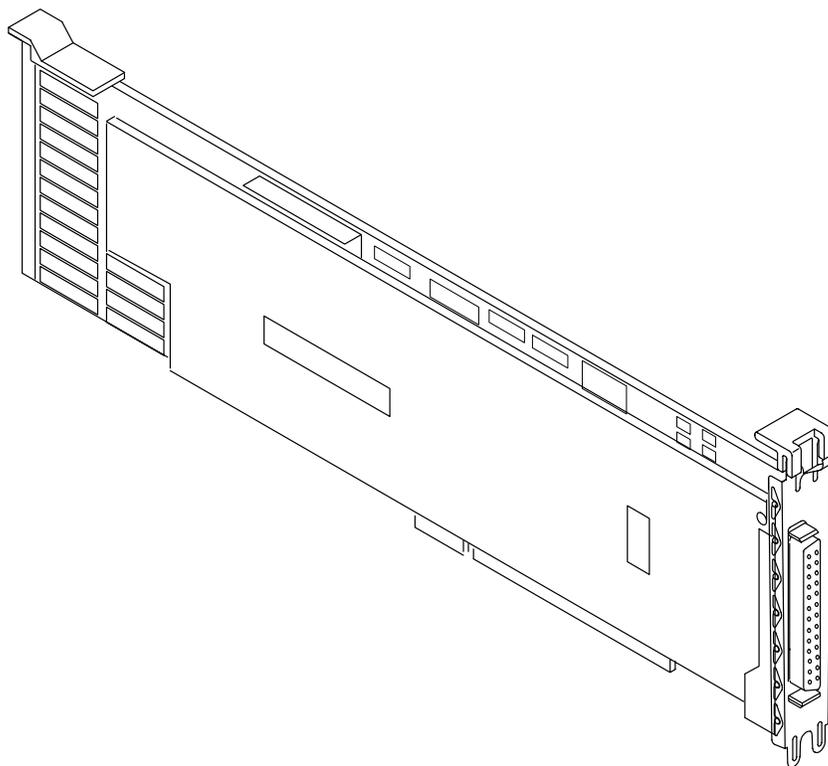


## M-Video Capture Adapter (PAL Version) Specifications

FRU number                     32G0263
Bus architecture           Micro Channel
Maximum number          2
Connectors                 37-position D-shell
Cable set                   92F3714, includes the following:
                                  Primary I/O
                                  Wrap test (3)
                                  Terminator plugs (3), 75-ohm

# M-Video Capture Adapter 37-Pin Connector
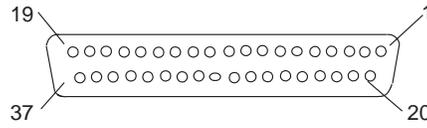


| Position | Signal/Shield | RCA Plug Identifier |
|---|---|---|
| 1/20 | Y (Luma) Output/Shield | OY |
| 2/21 | C (Chroma) Output/Shield | OC |
| 5/24 | Sync Output/Shield | OS |
| 6/25 | Blue Output/Shield | OB |
| 7/26 | Green Output/Shield | OG |
| 8/27 | Red Output/Shield | OR |
| 9/28 | Composite Video Output/Shield | OV |
| 12/30 | Sync Input/Shield | IS |
| 13/31 | Blue Input/Shield | IB |
| 14/32 | Green /Luma Input/Shield | IG |
| 15/33 | Red /Chroma Input/Shield | IR |
| 16/34 | Composite Video Input/Shield | IV |

# FC (2404) Ultimedia Video I/O Adapter (Type 7-5)

This adapter provides video capture, video output.

The adapter supports NTSC, PAL, and S-Video inputs, and provides NTSC, PAL and S-Video outputs. One composite and on S-Video source may be installed simultaneously, with the program selecting the active video input signal.
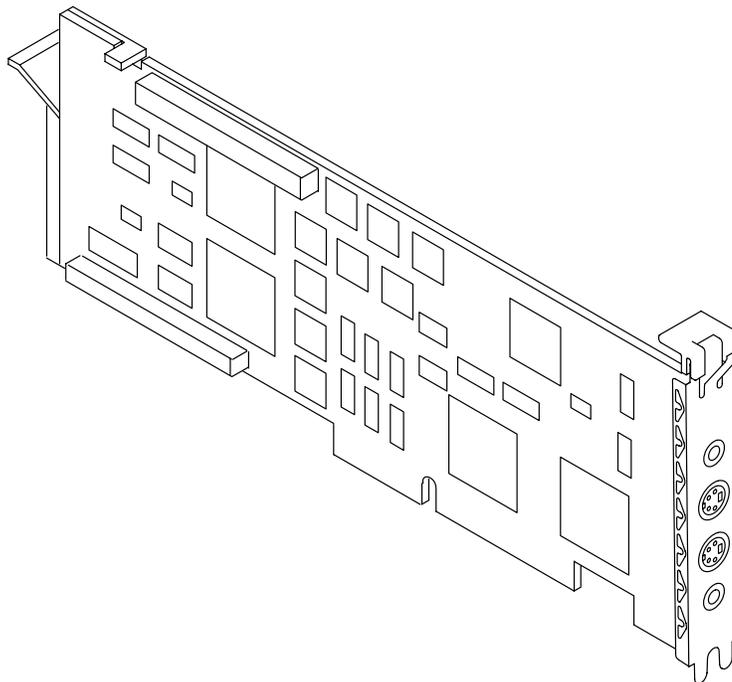


## Ultimedia Video I/O Adapter Specifications

| | |
|---|---|
| FRU number | Base Card, 88G3711 |
| Bus architecture | Micro Channel |
| Maximum number | 1 |
| Connectors | Input    1 - RCA Jack-CVBS |
| |        1 - MiniDin S-Video |
| | Output 1 - RCA Jack-CVBS |
| |        1 - Mini Din S-Video |
| Connector | See "Ultimedia Video I/O Adapter Connector" on page   1-152 |
| Cables | Supplied by Customer |
| Video Input Format | NTSC, PAL, S-Video |
| Mandatory Software | AIX/6000 Version 3.2.5 |
| | AIXwindows® Environment/6000 Version 1.2.3 |
| | Ultimedia Service for AIX Version 1.2.1 or later |
| | or |
| | AIX/6000 Version 4.1 with AIXwindows |
| | 2D and SOMobject Base Tool Kit installed |
| | Ultimedia Services for AIX Version 2.1.1 or later |

# FC (2405) JPEG Compression Option shown Attached to the Ultimedia Video I/O Adapter (Type 7-5)

This adapter provides video capture, JPEG compression of video images, video output, and hardware decompression of JPEG data.

The adapter supports NTSC, PAL, and S-Video inputs, and provides NTSC, PAL and S-Video outputs. One composite and on S-Video source may be installed simultaneously, with the program selecting the active video input signal.



JPEG Compression Daughter Board Option shown attached to the Ultimedia I/O Adapter
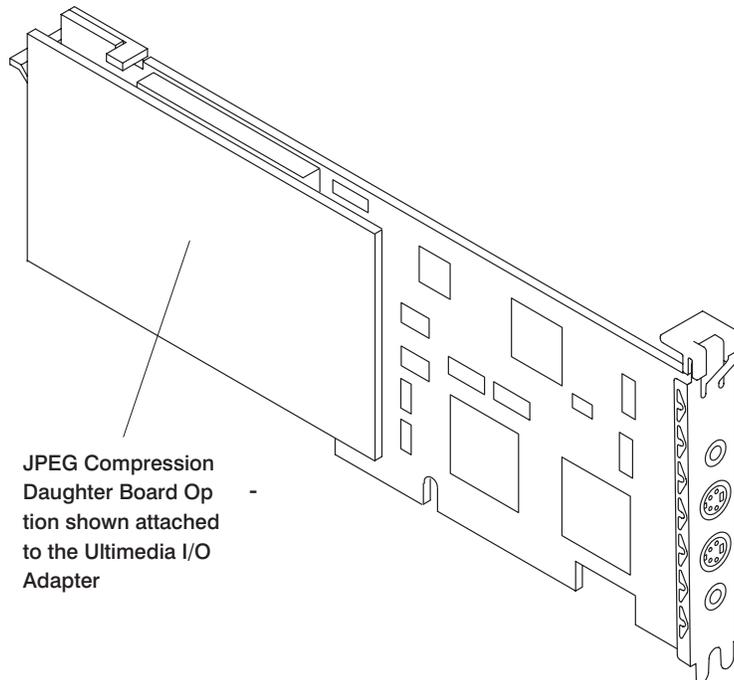
## Ultimedia Video I/O Adapter Specifications

| | |
|---|---|
| FRU numbers | Base Card, 88G3711 |
| | Guest Card, 88G3717 |
| Bus architecture | Micro Channel |
| Maximum number | 1 |
| Connectors | Input  1 - RCA Jack-CVBS |
| | 1 - Mini Din S-Video |
| | Output 1 - RCA Jack-CVBS |
| | 1 - Mini Din S-Video |
| Cables | Supplied by Customer |
| Video Input Format | NTSC, PAL, S-Video |
| Mandatory Software | AIX/6000 Version 3.2.5 |
| | AIXwindows Environment/6000 Version 1.2.3 |
| | Ultimedia Service for AIX Version 1.2.1 or later |
| | or |
| | AIX/6000 Version 4.1 with AIXwindows |
| | 2D and SOMobject Base Tool Kit installed |
| | Ultimedia Services for AIX Version 2.1.1 or later |

# Ultimedia Video I/O Adapter Connector

Chroma

Chroma Shield

Input

Luma

Luma Shield

Output

$\leftarrow$ = Input Symbol

$\rightarrow$ = Output Symbol
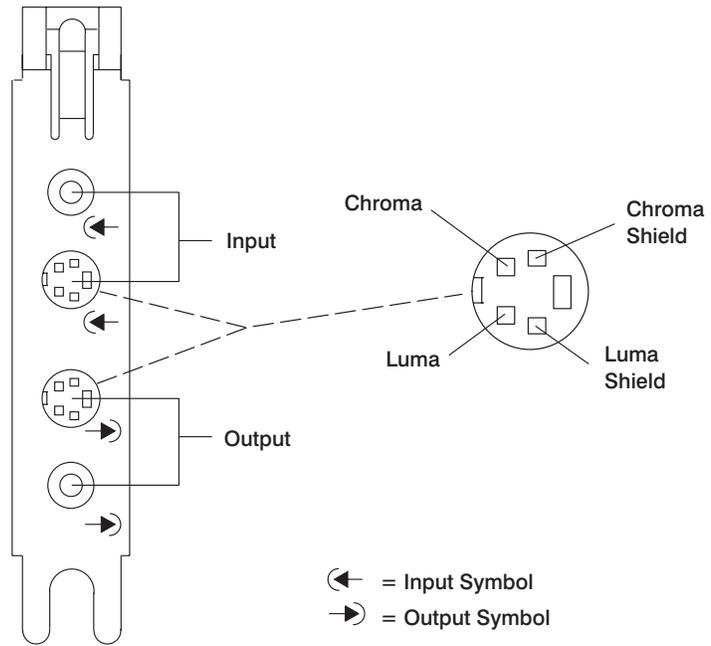
# FC (6302) Ultimedia Audio Adapter (Type 7-6)

The Ultimedia Audio Adapter supports industry standard formats, it is designed to provide business audio solutions to applications enhancing customer productivity and communications.
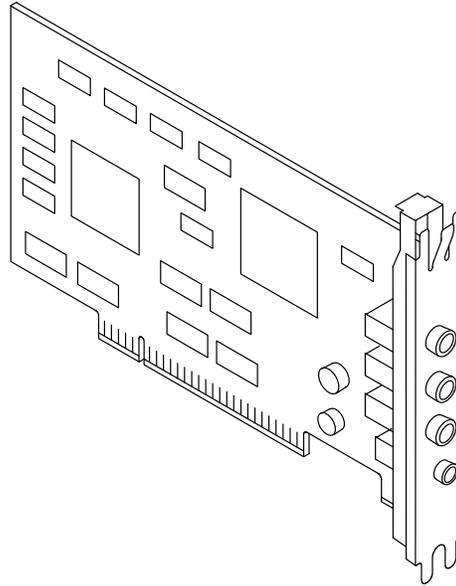
## Ultimedia Audio Adapter Specifications

FRU number                 88G2774
Bus architecture           Micro Channel
Maximum number             Two audio adapters may be installed on R10, R20, and R24
                           One audio adapter may be installed on all other system units.
Cable                      Internal Audio connector cable for connection to
                           CD ROMs on certain workstations (supplied with adapter)
Mandatory Software         Refer to the documentation provided with the adapter.

# FC (2402) Network Terminal Accelerator 256 Adapter (Type 8-5)

The Network Terminator Accelerator 256 is a unique Ethernet interface adapter that offloads the host processor of TCP/IP, TELNET, and RLOGIN protocol processing. The adapter supports IEEE 802.3 and Ethernet version 2 protocols, and it acts as a standard Ethernet adapter, passing other protocol packets directly to the host for normal processing.



15-Position
Connector
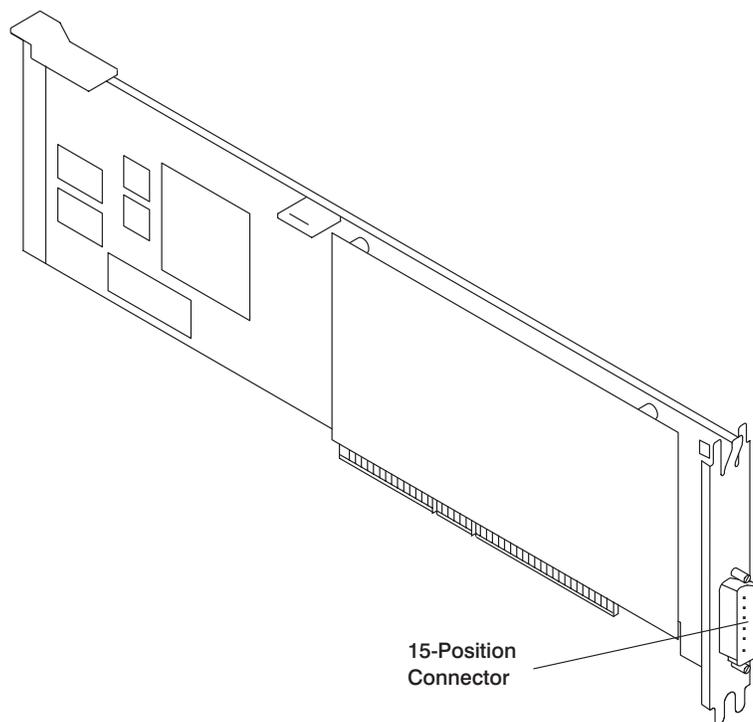
## Network Terminal Accelerator 256 Adapter Specifications

| | |
|---|---|
| FRU Number | 51G8538 |
| Position ID | 0x9500 |
| Bus architecture | Micro Channel |
| I/O Addresses | Assigned by program within range 400-4E000 |
| Interrupt levels | 4, 5, 6, 7, 9, 10, 11, 12 |
| Busmaster | Yes |
| Maximum number | 7 |
| Connector | 15-position D-shell |
| Adapter wrap plug | 15-position D-shell, part number 70F9625 |
| Transceivers | Thin, part number 02G7437 |
| | Twisted-pair, part number 02G7431 |
| Transceiver cable | Adapter-to-transceiver, part number 02G7434 |

# Network Terminal Accelerator 256 Adapter 15-Position Connector

POS 1

POS 9

| Position | Mnemonic | Signal Name |
|---|---|---|
| 1 | CI-S | Control in circuit-shield |
| 2 | CI-A | Control in circuit-A |
| 3 | DO-A | Data out circuit-A |
| 4 | DI-S | Data in circuit-shield |
| 5 | DI-A | Data In circuit-A |
| 6 | Vc | Voltage common |
| 7 | Unused | |
| 8 | Unused | |
| 9 | CI-B | Control in circuit-B |
| 10 | DO-B | Data out circuit-B |
| 11 | DO-S | Data out circuit-shield |
| 12 | DI-B | Data in circuit-B |
| 13 | VP | Voltage plus |
| 14 | VS | Voltage shield |
| 15 | Unused | |
| Shell | PG | Protective ground (conductive shell) |

## FC (2403) Network Terminal Accelerator 2048 Adapter (Type 8-6)

The Network Terminator Accelerator is a unique Ethernet interface adapter that offloads the host processor of TCP/IP, TELNET, and RLOGIN protocol processing.  The adapter supports IEEE 802.3 and Ethernet version 2 protocols, and it acts as a standard Ethernet adapter, passing other protocol packets directly to the host for normal processing.



15-Position
Connector
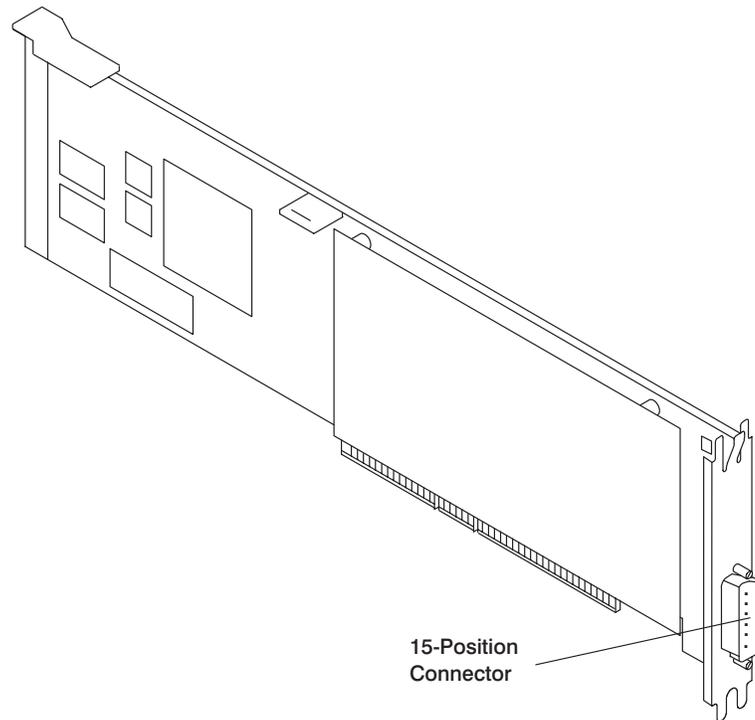
## Network Terminal Accelerator 2048 Adapter Specifications

| | |
|---|---|
| FRU Number | 51G8539 |
| Position ID | 0x7200 |
| Bus architecture | Micro Channel |
| I/O Addresses | Assigned by program within range 400-4E000 |
| Interrupt levels | 4, 5, 6, 7, 9, 10, 11, 12 |
| Busmaster | Yes |
| Maximum number | 7 |
| Connector | 15-position D-shell |
| Adapter wrap plug | 15-position D-shell, part number 70F9625 |
| Transceivers | Thin, part number 02G7437 |
| | Twisted-pair, part number 02G7431 |
| Transceiver cable | Adapter-to-transceiver, part number 02G7434 |

# Network Terminal Accelerator 2048 Adapter 15-Position Connector



| Position | Mnemonic | Signal Name |
|---|---|---|
| 1 | CI-S | Control in circuit-shield |
| 2 | CI-A | Control in circuit-A |
| 3 | DO-A | Data out circuit-A |
| 4 | DI-S | Data in circuit-shield |
| 5 | DI-A | Data In circuit-A |
| 6 | Vc | Voltage common |
| 7 | Unused | |
| 8 | Unused | |
| 9 | CI-B | Control in circuit-B |
| 10 | DO-B | Data out circuit-B |
| 11 | DO-S | Data out circuit-shield |
| 12 | DI-B | Data in circuit-B |
| 13 | VP | Voltage plus |
| 14 | VS | Voltage shield |
| 15 | Unused | |
| Shell | PG | Protective ground (conductive shell) |

# FC (2735) HIgh-Performance Parallel Interface (HIPPI) Channel Attachment

## Transmit Card (Type 8-A), Receive Card (Type 8-B)

The HIPPI adapter set consists of three cards. Interconnection is made by three controlled impedance flex circuit cables. The complete HIPPI subsystem requires five Micro Channel slots. The two additional slots are needed to meet Micro Channel requirements. One vacant card slot is required adjacent to the receive card to insure proper component clearance. In other words there are some tall components on the solder side of the receive card.

**Note:** Be sure to install adapters in the order illustrated. Be sure the ends of all connectors are latched behind the latch clips. Remove the three-position cables first when installing or removing cards. Be sure that all plugs and connectors align correctly.
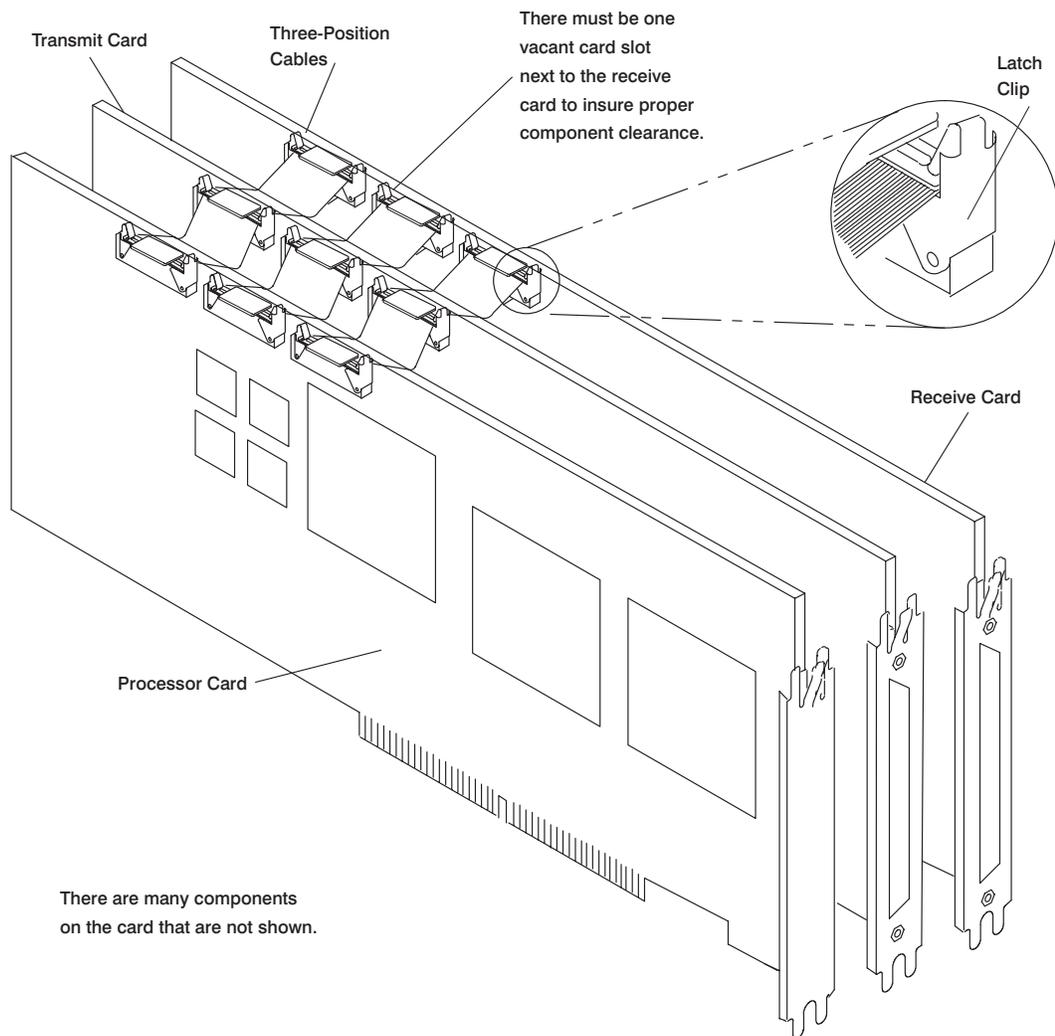
# HIPPI Attachment Adapter Specifications

| | |
|---|---|
| FRU Part Numbers | Processor card, 51G9994 |
| | Transmit card, 51G9996 |
| | Receive card. 11H2504 |
| | Crossover cable (three-position) 51G9226 |
| I/O Bus Architecture | Micro Channel |
| Busmaster | Yes |
| | 64-bit wide data streaming |
| Maximum number | 1 per Micro Channel |
| | 7015 Models 970B, 980B and 990 can have one on each Micro Channel |
| Microcode File Name | 8fe5.00.nn (where nn is the revision level) |
| Sustained Data Transfer | up to 66MBps |

# HIPPI Attachment Adapter Cabling

The cables for this adapter are customer supplied. They must be HIPPI compliant with ANSI standard HIPPI-pH X3. 183-1991.

# FC (2972) Auto Token-Ring LANStreamer® MC 32 Adapter (Type 8-S)

This is a high performance token-ring adapter which is well suited for servers and high-end workstations running I/O intensive applications in a network environment.
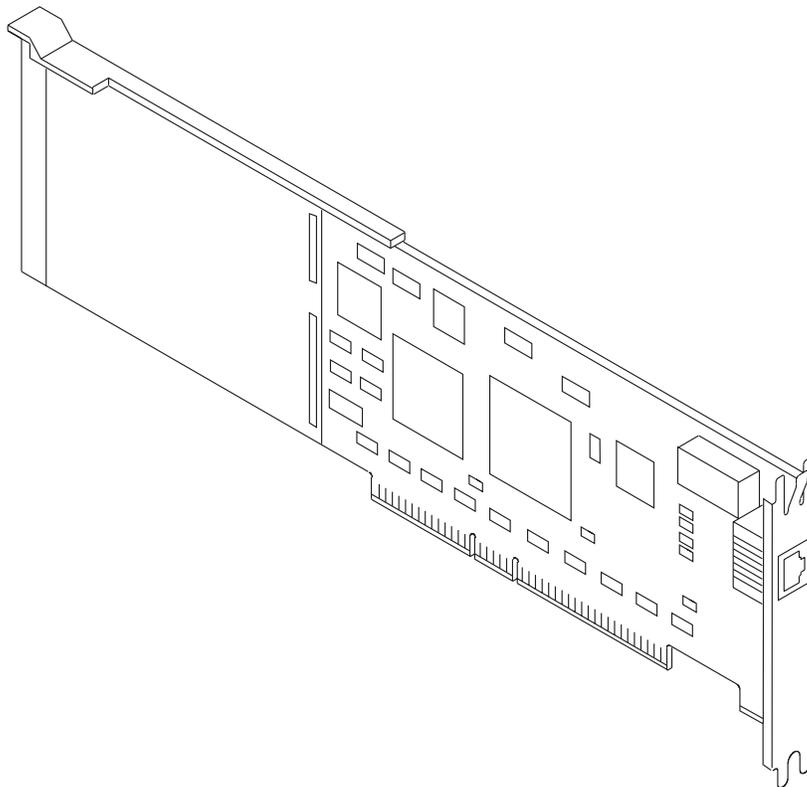
## Auto Token-Ring LANStreamer MC 32 Adapter Specifications

| | |
|---|---|
| FRU Number | 60G1593 |
| I/O addresses | 0000 - fc00 in 0400 increments |
| | |
| Interrupt levels | 2, 3, 10, 11 |
| Bit rate | 4Mb or 16Mb per second (can be set by autosense or configurator) |
| Bus architecture | Micro Channel |
| Busmaster | Yes |
| Maximum number | N/A |
| | |
| Connector | RJ-45 |
| Cables | 60G1066 .254 m (10 inch) included or |
| | 60G1063 3 m (10 ft ) ordered through AAS |

# Auto Token-Ring LANStreamer MC 32 Adapter Connector
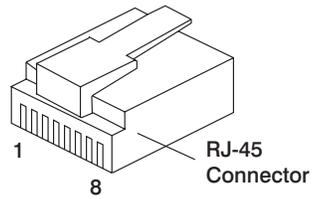


| Position | Signal Name |
|----------|-------------|
| 1        | No Connect  |
| 2        | No Connect  |
| 3        | Ring Out A  |
| 4        | Ring In B   |
| 5        | Ring In A   |
| 6        | Ring Out B  |
| 7        | No Connect  |
| 8        | No Connect  |

## FC (2992) High-Performance Ethernet LAN Adapter (8F95) AUI and 10BaseT (Type 8-U)

This adapter provides a way for the system units to attach to a carrier sense multiple access/collision detection (CSMA/CD) Ethernet network. This adapter attaches to either the IEEE-802.3 type network or the Ethernet version 2 network.  The adapter has connectors for both (AUI) with external transceiver and 10BaseT (twisted pair) connections. Only one connector can be used at one time. The (AUI) allows connection to any Ethernet media with an appropriate transceiver.  The 10BaseT port may be attached to a full duplex switch to enable full duplex operation.
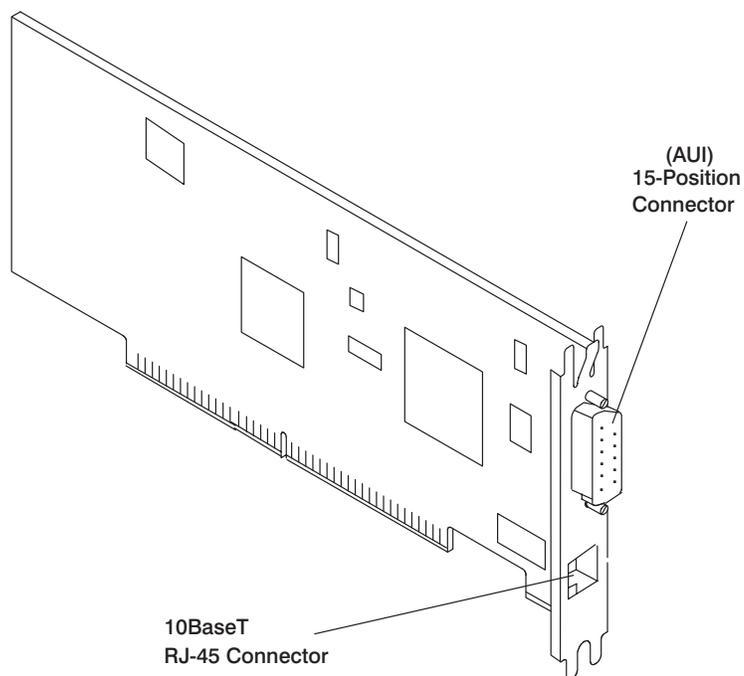


## Ethernet High-Performance LAN Adapter Specifications

| | |
|---|---|
| FRU Number | 39H8817 |
| Interrupt levels | 3, 4, 5, 6, 7, 9, 10, 11 |
| Bus architecture | Micro Channel |
| Busmaster | 40 MB/sec |
| Maximum number | 8 per Micro Channel |
| Connectors | 8-position RJ-45 |
| | 15-position D-shell |
| Adapter wrap plugs | 15-position D-shell, part number 70F9625 |
| | RJ-45 (twisted-pair), part number 00G2380 |

| **Customer Supplied** | **Items** |
|---|---|
| Cables | Customer supplied |
| Transceivers | 10Base2 (Thin), part number 02G7437 |
| | 10BaseT (Twisted-Pair), part number 02G7431 |
| Transceiver cable | Adapter-to-transceiver |
| | Part number 02G7434 |
| Transceiver wrap plugs | Thin, part number 02G7433 |
| | Twisted-Pair, part number 00G2380 |

# Ethernet High-Performance LAN Adapter (8F95) 15-Position AUI Connector



| Position | Mnemonic | Signal Name |
|----------|----------|-------------|
| 1 | CI-S | Control in circuit-shield |
| 2 | CI-A | Control in circuit-A |
| 3 | DO-A | Data out circuit-A |
| 4 | DI-S | Data in circuit-shield |
| 5 | DI-A | Data In circuit-A |
| 6 | Vc | Voltage common |
| 7 | CO-A | Control out circuit-A |
| 8 | CO-S | Control out circuit-shield |
| 9 | CI-B | Control in circuit-B |
| 10 | DO-B | Data out circuit-B |
| 11 | DO-S | Data out circuit-shield |
| 12 | DI-B | Data in circuit-B |
| 13 | VP | Voltage plus |
| 14 | VS | Voltage shield |
| 15 | CO-B | Control out-B |
| Shell | PG | Protective ground (conductive shell) |

# Ethernet High-Performance LAN Adapter (8F95) 8-Position RJ-45 Twisted-Pair Connector
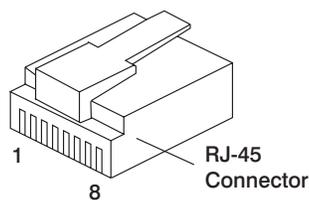


| Position | Mnemonic | Signal Name |
|----------|----------|-------------|
| 1 | TD+ | Upward Data + (positive for HI signal) |
| 2 | TD- | Upward Data - (negative for HI signal) |
| 3 | RD+ | Downward Data + (positive for HI signal) |
| 4 | Reserved | Reserved |
| 5 | Reserved | Reserved |
| 6 | RD- | Downward Data - (negative for HI signal) |
| 7 | Reserved | Reserved |
| 8 | Reserved | Reserved |

## FC (2993) High-Performance Ethernet LAN Adapter (8F95) 10Base2 (Type 8-V)

This adapter provides a way for the system units to attach to a carrier sense multiple access/collision detection (CSMA/CD) Ethernet network. This adapter attaches to either the IEEE-802.3 type network or the Ethernet version 2 network.  The adapter has a BNC connector for 10Base2 (thin coaxial) media connection.



10Base2
BNC Connector
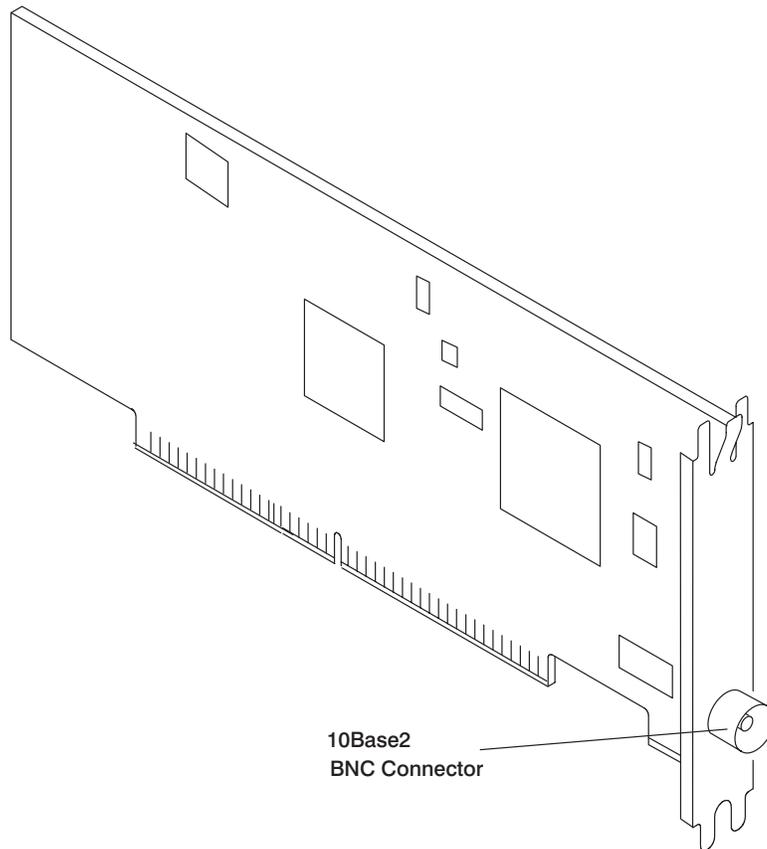
## Ethernet LAN Adapter Specifications

| | |
|---|---|
| FRU Number | 39H8826 |
| Interrupt levels | 3, 4, 5, 6, 7, 9, 10, 11 |
| Bus architecture | Micro Channel |
| Busmaster | 40 MB/sec |
| Maximum number | 8 per Micro Channel |
| Connectors | BNC coaxial |
| Adapter wrap plug | BNC, 25-ohm terminator, part number 70F9626 |

| **Customer Supplied** | **Items** |
|---|---|
| Cables | Customer Supplied |

# FC (2984) TURBOWAYS® 100 ATM Adapter (Type 8-W)

The TURBOWAYS 100 Asynchronous Transfer Mode (ATM) Adapter provides the interface between the ATM 100 Mbit/sec fiber-optics network and the Micro-Channel in your system.
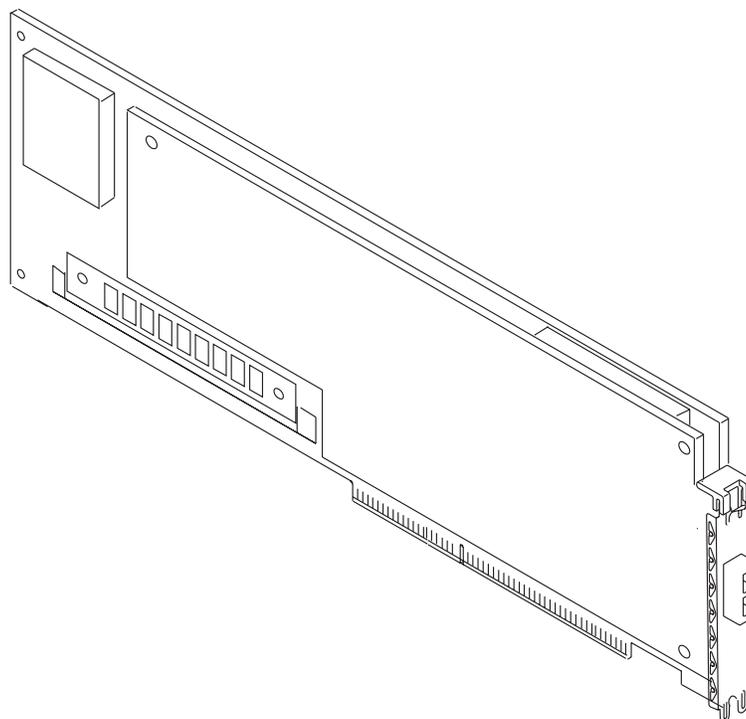
## TURBOWAYS 100 ATM Adapter Specifications

| | |
|---|---|
| FRU Number | 73G9819 |
| Bus architecture | Micro Channel |
| Maximum number | 2 per system |
| Connector | ANSI Specified SC duplex |
| Jumper Cables | Fiber optic, customer provided |
| Microcode filename | /etc/microcode/00613300D.00. (Diagnostic) |
| | /etc/microcode/7F8FD.00.01 |
| Microcode filename | /usr/lpp/DDFI.OUT (Functional) |
| Wrap Plug | 16G5609 Shipped with assembly |

## FC (1906) Fibre Channel/266 Adapter (Type 8-X)

The Fibre Channel/266 Adapter provides the interfacing between a 266 Mbit/sec fiber-optics channel and the Micro-Channel in your system. It is designed for point-to-point communications between two systems or between one system and a switch (fabric).
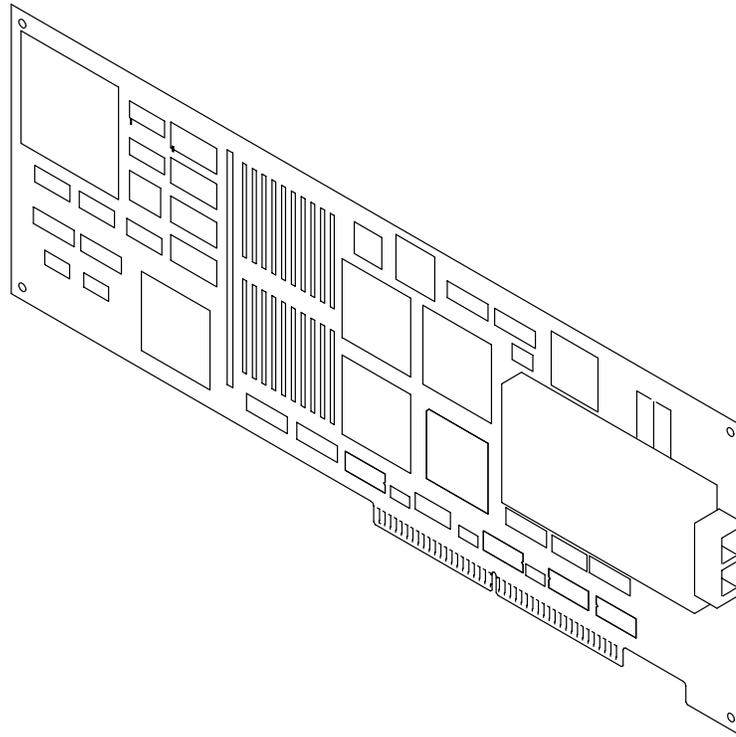
## Fibre Channel/266 Adapter Specifications

| | |
|---|---|
| FRU Number | 52G1006 |
| Bus architecture | Micro Channel |
| Maximum number | 2 per system |
| Connector | ANSI Specified SC duplex |
| Jumper Cables | Fiber optic, customer provided |
| Microcode filename | 8fe2d.00.00 (Diagnostic) |
| Microcode filename | 8fe1.00.01 (Functional) |
| Wrap Plug | 16G5609 Shipped with assembly |
| End-of-cable wrap plug OR | 99F4916 |
| Feed through Connector | 19G4881 with half-meter fiber optic cable 99F4880 |

# FC (2921, 2924, 2928) IBM® ARTIC960 4-Port Multiprotocol Communications Controller (Type 9-1)

This adapter provides a way to attach the system units to several types of communications networks. The adapter consists of the multiprotocol base card and the Application Interface Board (AIB).  This combination provides four individually-addressable communications channels. See memory boards below.

The base card is available with three memory options. The last number of the three feature codes (FC) specifies the amount of memory in megabytes.

There are four AIBs. Each AIB has four ports which are all the same protocol.  Each of the four ports can be attached to and operate with one network. The AIB protocols supported are X.21, V.36, EIA 530 and asynchronous EIA 232.
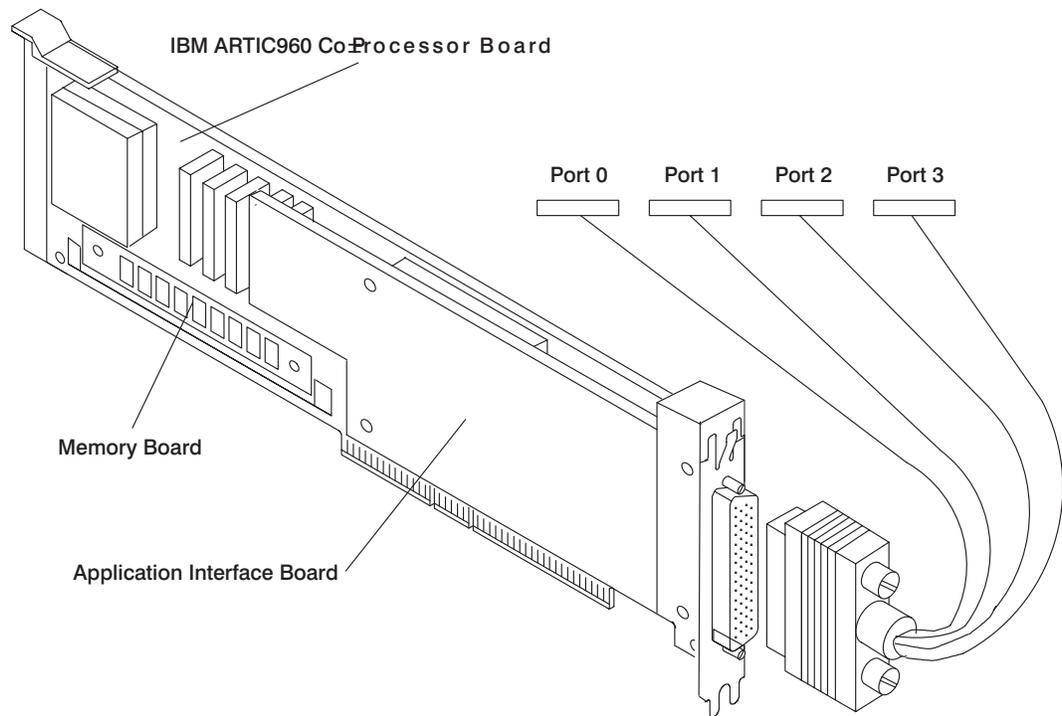
# IBM ARTIC960 4-Port Multiprotocol Communications Controller Specifications

| | |
|---|---|
| FRU Numbers | Base card, part number 61G2916 |
| | Application Interface board, part number 61G2961 (order separately) |
| | 1 MB Memory Board, part number 59F4581 (order separately) |
| | 4 MB Memory Board, part number 70F9973 (order separately) |
| | 8 MB Memory Board, part number 71G6450 (order separately) |
| Bus Architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA0 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Busmaster | Set to No at power on, set to Yes by program |
| Maximum number | 8 |
| Microcode file name | /usr/lib/microcode/00100000d.00.01 (use for 3.2.5 releases) |
| | /usr/lib/microcode/00100000d.00.010/1RC8fd.00.01 |
| Connector | 100-position, D-shell |
| Wrap plugs | 100-position, FRU number 53G0632 |
| | EIA-232D, FRU number 33F8985 |
| | EIA-530 (RS-422), FRU number 53G0639 |
| | ISO 4902 V.36 (V.35 compatible), FRU number 53G0641 |
| | ISO 4903 (X.21), FRU/part number 53G0638 |
| Cables | See below |

| Feature Code | Cable Name/Description | FRU Number | Length | |
|---|---|---|---|---|
| | | | **m** | **ft** |
| 2922 | Cable Option EIA 232D | 61G2919 | 1.8 | 6 |
| 2923 | Cable Option EIA 530 (RS-422) | 61G2924 | 1.8 | 6 |
| 2926 | Cable Option ISO 4902 (V.36) | 61G2934 | 1.8 | 6 |
| 2927 | Cable Option ISO 4903 (X.21) | 61G2929 | 1.8 | 6 |

# IBM ARTIC960 4-Port EIA-232D AIB 100-Position and 25-Position Connectors
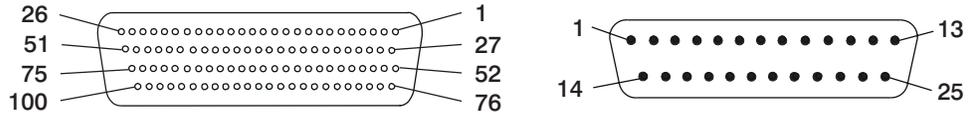


| Signal Name or Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | 25-Position Connector |
|---|---|---|---|---|---|---|
| TxD | O | 05 | 12 | 18 | 24 | 02 |
| RxD | I | 80 | 86 | 92 | 99 | 03 |
| RTS | O | 31 | 37 | 68 | 74 | 04 |
| CTS | I | 32 | 39 | 45 | 51 | 05 |
| DCD | I | 81 | 62 | 94 | 100 | 08 |
| DTR | O | 07 | 13 | 19 | 26 | 20 |
| DSR | I | 57 | 63 | 69 | 50 | 06 |
| SGND | -- | 06 | 38 | 44 | 25 | 07 |
| Shield GND | | -- | Housing | Shield | | 01/Housing |

# IBM ARTIC960 4-Port EIA-530/RS-422 AIB 100-Position and 25-Position Connectors
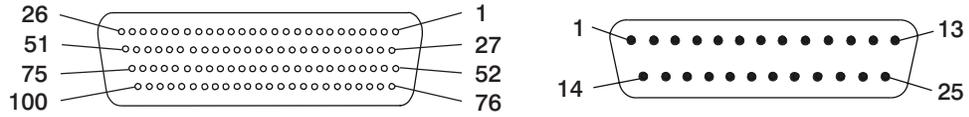


| Signal Name or Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | 25-Position Connector |
|---|---|---|---|---|---|---|
| TXDxA | O | 01 | 09 | 15 | 21 | 02 |
| TXDxB | O | 27 | 34 | 41 | 47 | 14 |
| RTSxA | O | 03 | 11 | 17 | 23 | 04 |
| RTSxB | O | 29 | 36 | 43 | 49 | 19 |
| RXDxA | \| | 52 | 58 | 64 | 95 | 03 |
| RXDxB | \| | 76 | 82 | 88 | 70 | 16 |
| CTSxA | \| | 30 | 61 | 67 | 98 | 05 |
| CTSxB | \| | 04 | 85 | 91 | 73 | 13 |
| CDxA | \| | 55 | 33 | 40 | 20 | 08 |
| CDxB | \| | 79 | 08 | 14 | 46 | 10 |
| RCLKIxA | \| | 54 | 60 | 66 | 97 | 17 |
| RCLKIxB | \| | 78 | 84 | 90 | 72 | 09 |
| TCLKOxA | O | 02 | 10 | 16 | 22 | 24 |
| TCLKOxB | O | 28 | 35 | 42 | 48 | 11 |
| TCLKIxA | \| | 53 | 59 | 65 | 96 | 15 |
| TCLKIxB | \| | 77 | 83 | 89 | 71 | 12 |
| SGND | -- | 06 | 38 | 44 | 25 | 07 |
| ShieldGND | | -- Housing Shield | | | | 01/Housing |

# IBM ARTIC960 4-Port ISO-4902 (V.36) AIB 100-Position and 37-Position Connectors
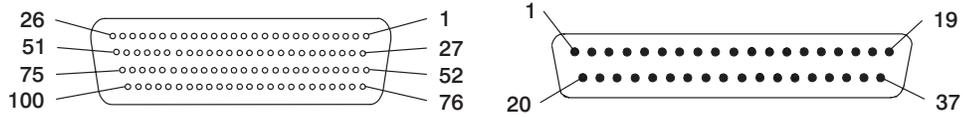


| Signal Name or Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | 37-Position Connector |
|---|---|---|---|---|---|---|
| TXDxA | O | 01 | 09 | 15 | 21 | 04 |
| TXDxB | O | 27 | 34 | 41 | 47 | 22 |
| RTSx | O | 31 | 37 | 68 | 74 | 25 |
| RXDxA | \| | 52 | 58 | 64 | 95 | 06 |
| RXDxB | \| | 76 | 82 | 88 | 70 | 24 |
| CTSx | \| | 32 | 39 | 45 | 51 | 27 |
| DSRx | \| | 57 | 63 | 69 | 50 | 29 |
| DTRx | O | 07 | 13 | 19 | 26 | 30 |
| CDx | \| | 81 | 62 | 94 | 100 | 31 |
| RCLKIxA | \| | 54 | 60 | 66 | 97 | 08 |
| RCLKIxB | \| | 78 | 84 | 90 | 72 | 26 |
| TCLKOxA | O | 02 | 10 | 16 | 22 | 17 |
| TCLKOxB | O | 28 | 35 | 42 | 48 | 35 |
| TCLKIxA | \| | 53 | 59 | 65 | 96 | 05 |
| TCLKIxB | \| | 77 | 83 | 89 | 71 | 23 |
| SGND | -- | 06 | 38 | 44 | 25 | 19, 20, 37 |
| ShieldGND | | -- | Housing | | | 01/Housing |

## IBM ARTIC960 4-Port ISO 4903 (X.21) AIB 100-Position and 15-Position Connectors
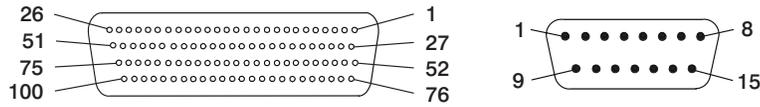
| Signal Name or Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | 15-Position Connector |
|---|---|---|---|---|---|---|
| TXDxA | O | 01 | 09 | 15 | 21 | 02 |
| TXDxB | O | 27 | 34 | 41 | 47 | 09 |
| RTSxA | O | 03 | 11 | 17 | 23 | 03 |
| RTSxB | O | 29 | 36 | 43 | 49 | 10 |
| RXDxA | \| | 52 | 58 | 64 | 95 | 04 |
| RXDxB | \| | 76 | 82 | 88 | 70 | 11 |
| CTSxA | \| | 30 | 61 | 67 | 98 | 05 |
| CTSxB | \| | 04 | 85 | 91 | 73 | 12 |
| RCLKIxA | \| | 54 | 60 | 66 | 97 | 06 |
| RCLKIxB | \| | 78 | 84 | 90 | 72 | 13 |
| TCLKOxA | O | 02 | 10 | 16 | 22 | 07 |
| TCLKOxB | O | 28 | 35 | 42 | 48 | 14 |
| SGND | -- | 06 | 38 | 44 | 25 | 08 |
| ShieldGND | | -- | Housing | Shield | | 01/Housing |

# FC (2938) IBM ARTIC960 (4M) 8-Port X.21 Communications Controller (Type 9-2)

This adapter provides a way to attach the system units to several types of communications networks. The adapter consists of the multiprotocol base card and the Application Interface Board (AIB). This combination provides eight individually-addressable communications channels. The base card has four megabytes of memory.

The AIB supports up to eight ports of X.21 protocol. Each of the eight ports can be attached to and operate one network.
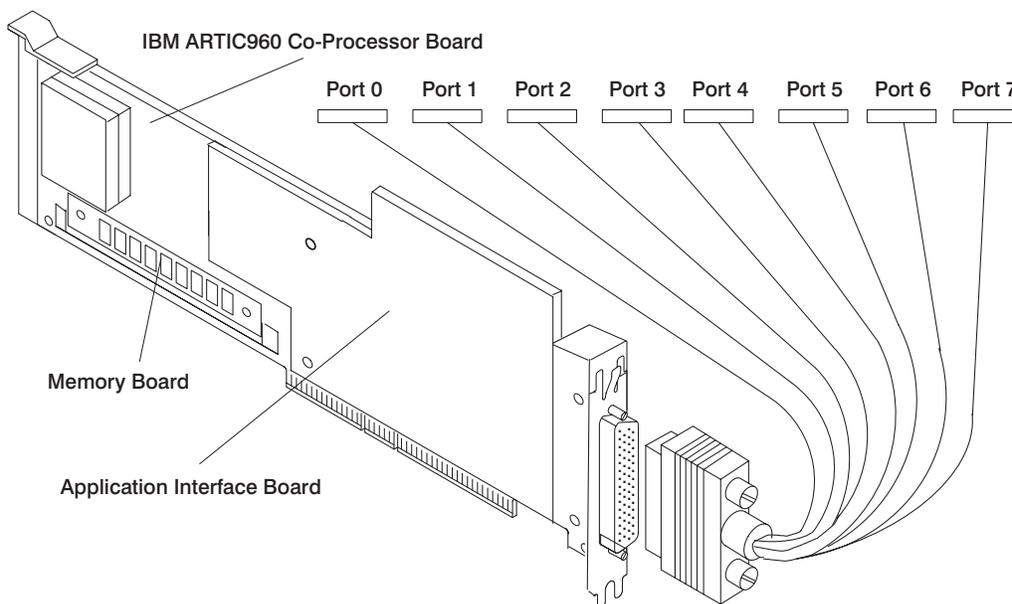


## IBM ARTIC960 (4M) 8-Port X.21 Communications Controller Specifications

| | |
|---|---|
| FRU Numbers | Base card, part number 61G2916 |
| | Application Interface board, part number 06H2141 (order separately) |
| | 4 MB Memory Board, part number 70F9973 (order separately) |
| Bus architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA0 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Busmaster | Set to No at power on, set to Yes by program |
| Microcode file name | /usr/lib/microcode/00200000d.00.01 (use for 3.2.5 releases) |
| | /usr/lib/microcode/00200000d.00.010/1RC8fd.00.01 |
| Connector | 100-position, D-shell |
| Wrap plug | ISO 4903 (X.21), FRU/part number 06H3357 |
| | X.21 cable, FRU/part number 52G3378 |

| Feature Code | Cable Name/Description | FRU Number | Length | |
|---|---|---|---|---|
| | | | m | ft |
| 2922 | Cable Option ISO 4903 (X.21) | 06H4648 | 1.8 | 6 |

# IBM ARTIC960 (4M) 8-Port ISO 4903 (X.21) AIB 100-Position and 15-Position Connectors

```
26                                           1          1                    8
51   ⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒   27          ⌒ • • • • • • • ⌒
75   ⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒   52          9   • • • • • • •   15
100  ⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒⌒   76
```
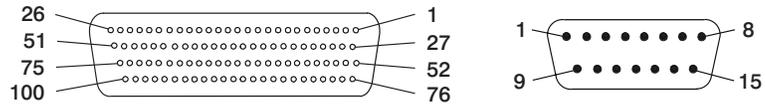
| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 | Port 7 | 15-Position Connector |
|---|---|---|---|---|---|---|---|---|---|---|
| TXDxA | O | 01 | 04 | 08 | 11 | 14 | 17 | 21 | 24 | 02 |
| RXDxB | O | 27 | 30 | 33 | 66 | 40 | 43 | 46 | 49 | 09 |
| CTLxA | O | 02 | 05 | 09 | 12 | 15 | 18 | 22 | 50 | 03 |
| CTLxB | O | 28 | 31 | 34 | 37 | 41 | 19 | 47 | 75 | 10 |
| RXDxA | I | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 04 |
| RXDxB | I | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 11 |
| INDxA | I | 53 | 56 | 59 | 62 | 65 | 68 | 71 | 74 | 05 |
| INDxB | I | 77 | 80 | 83 | 86 | 89 | 92 | 95 | 98 | 12 |
| RCLKIxA | I | 54 | 57 | 60 | 63 | 66 | 69 | 72 | 99 | 06 |
| RCLKIxB | O | 78 | 81 | 84 | 87 | 90 | 93 | 96 | 100 | 13 |
| TCLKIxA | O | 03 | 07 | 10 | 13 | 16 | 20 | 23 | 26 | 07 |
| TCLKIxB | I | 29 | 32 | 35 | 39 | 42 | 45 | 48 | 51 | 14 |
| SGND | -- | 06 | | 25 | | 38 | | 44 | | 08 |
| ShieldGND | | Cable Shield | | | | | | | | 01 |

# FC (2929) IBM ARTIC960 (4M) 8-Port EIA-232 E Communications Controller (Type 9-3)

This adapter provides a way to attach the system units to EIA-232 E communications networks. The adapter consists of the multiprotocol base card and the Application Interface Board (AIB). This combination provides eight individually-addressable communications channels. The base card is available with four megabytes of memory.

The AIB supports up to eight EIA-232 E ports at speeds up to 28K bits per second.
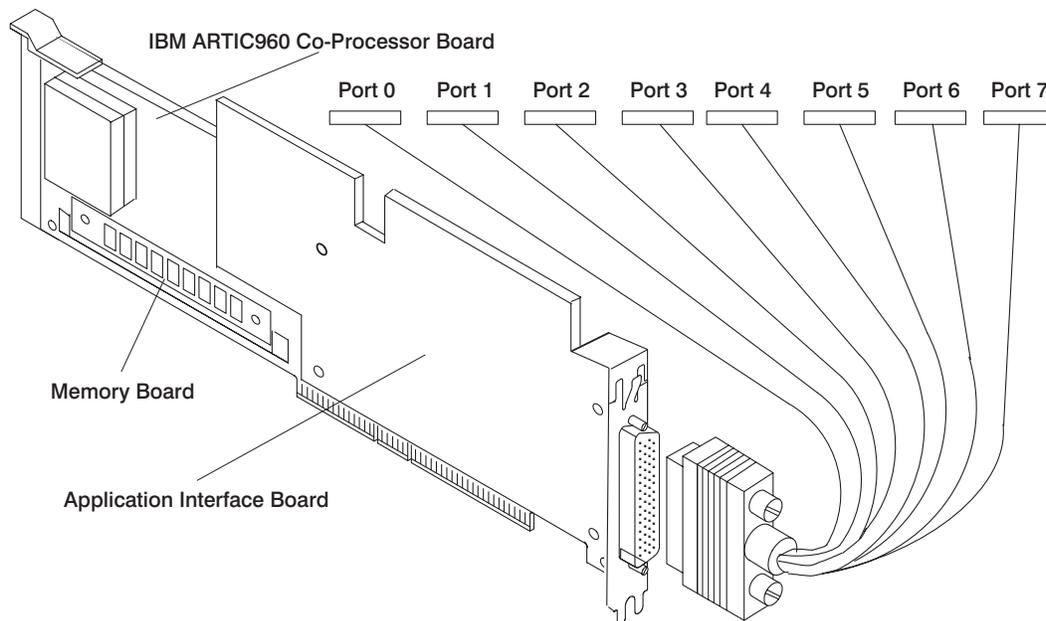


## IBM ARTIC960 8-Port EIA-232 E Communications Controller Specifications

| | |
|---|---|
| FRU Numbers | Base card, part number 61G2916 |
| | Application Interface board, part number 11H3786 (order separately) |
| | 4 MB Memory Board, part number 70X9973 (order separately) |
| Bus architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA0 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Busmaster | Set to No at power on, set to Yes by program |
| Maximum number | 8 |
| Microcode file name | /usr/lib/microcode/00300000d.00.01 (use for 3.2.5 releases) |
| | /usr/lib/microcode/00300000d.00.010/1RC8fd.00.01 |
| Connector | 100-position, D-shell |
| wrap plugs | 100-position, FRU number 68F7208 |
| | EIA-232 E, FRU number 33F8985 |

| Feature Code | Cable Name/Description | FRU Number | Length | |
|---|---|---|---|---|
| | | | m | ft |
| 2939 | Cable Option<br>EIA-232 E | 71G3497 | 1.8 | 6 |

## IBM ARTIC960 8-Port EIA-232 E Communications Controller 100-Position and 25-Position Connectors



| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|---|---|---|---|---|---|---|---|---|---|---|
| TxD | O | 51 | 54 | 07 | 10 | 13 | 16 | 94 | 48 | 02/BA |
| RxD | I | 02 | 05 | 83 | 86 | 89 | 92 | 46 | 74 | 03/BB |
| RTS | O | 01 | 04 | 82 | 85 | 88 | 91 | 45 | 73 | 04/CA |
| CTS | I | 77 | 80 | 34 | 37 | 40 | 43 | 71 | 24 | 05/CB |
| DCD | I | 28 | 31 | 59 | 62 | 65 | 68 | 21 | 99 | 08/CF |
| DTR | O | 76 | 79 | 33 | 36 | 39 | 42 | 70 | 23 | 20/CD |
| DSR | I | 53 | 56 | 09 | 12 | 15 | 18 | 96 | 50 | 06/CC |
| HRS | I | 27 | 30 | 58 | 61 | 64 | 67 | 20 | 98 | 23/CI |
| RI | I | 03 | 06 | 84 | 87 | 90 | 93 | 47 | 75 | 22/CE |
| TxCLKIN | I | 29 | 32 | 60 | 63 | 66 | 69 | 22 | 100 | 15/DB |
| TxCLK | O | 52 | 55 | 08 | 11 | 14 | 17 | 95 | 49 | 24/DA |
| RxCLK | I | 78 | 81 | 35 | 38 | 41 | 44 | 72 | 25 | 17/DD |
| SGND | -- | 19 | 19 | 26 | 26 | 57 | 57 | 97 | 97 | 07/AB |
| FGND | | Cable Shield | | | | | | | | 01/AA |

# FC (2935) IBM ARTIC960 (4M) 6-Port V.36 Communications Controller (Type 9-4)

This adapter provides a way to attach the system units to six V.36 communications networks. The adapter consists of the multiprotocol base card and a six port V.36 Application Interface Board (AIB). This combination provides six individually-addressable communications channels.
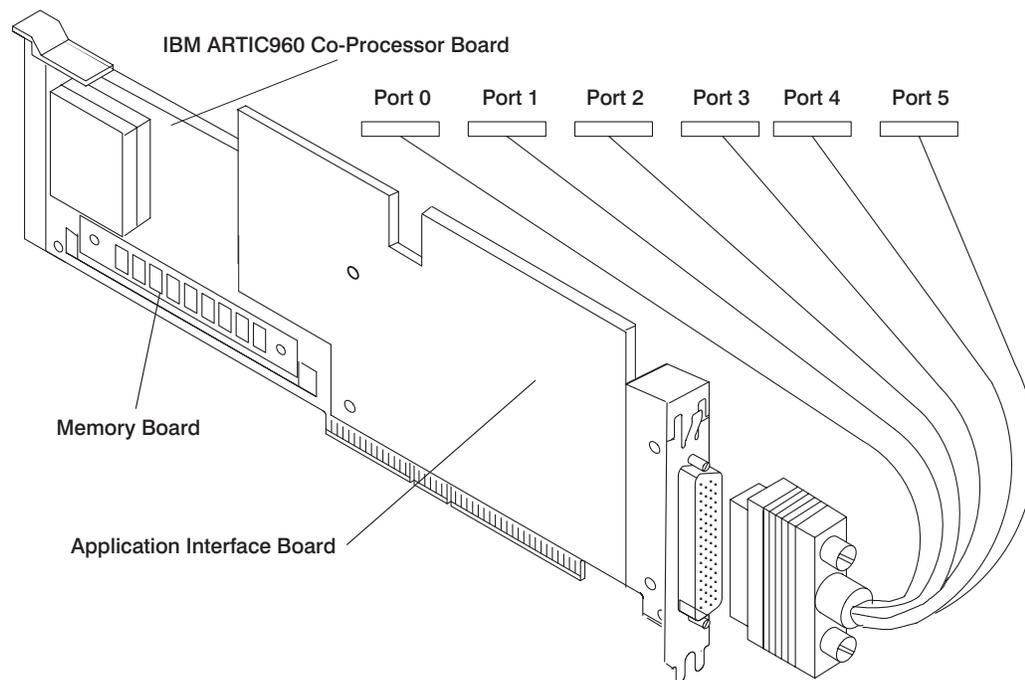


## IBM ARTIC960 6-Port V.36 Communications Controller Specifications

| | |
|---|---|
| FRU Numbers | Base card, part number 61G2916 |
| | Application Interface board, part number 11H3795 (order separately) |
| | 4MB Memory Board, part number 70F9973 (order separately) |
| Bus Architecture | Micro Channel |
| I/O addresses | 02A0 - 1EA0 |
| Interrupt levels | 3, 4, 7, 9, 10, 11, 12 |
| Busmaster | Set to No at power on, set to Yes by program |
| Maximum number | 8 |
| Microcode file name | /usr/lib/microcode/00400000d.00.01 (use for 3.2.5 releases) |
| | /usr/lib/microcode/00400000d.00.010/1RC8fd.00.01 |
| Connector | 100-position, D-shell |
| Wrap plugs | 100-position, FRU number 72F0168 |
| | ISO 4902 V.36 (V.35 compatible), FRU number 73H2508 |

| Feature Code | Cable Name/Description | FRU Number | Length | |
|---|---|---|---|---|
| | | | m | ft |
| 2941 | Cable Option ISO 4902 (V.36) | 11H3796 | 3 | 10 |

# IBM ARTIC960 6-Port ISO-4902 (V.36) AIB 100-Position and 37-Position Connectors
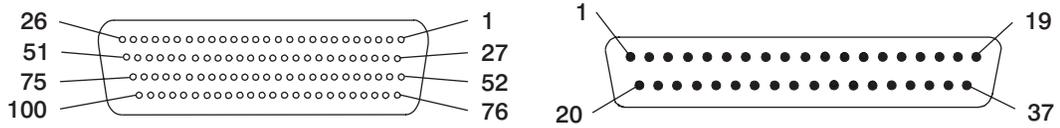


| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | 37-Position Connector |
|---|---|---|---|---|---|---|---|---|
| TxDA | O | 94 | 21 | 47 | 71 | 72 | 23 | 04 |
| TxDB | O | 70 | 46 | 22 | 95 | 96 | 48 | 22 |
| RxDA | I | 08 | 54 | 58 | 29 | 28 | 57 | 06 |
| RxDB | I | 33 | 78 | 82 | 04 | 03 | 81 | 24 |
| TxCA IN | I | 76 | 06 | 77 | 56 | 27 | 55 | 05 |
| TxCB IN | I | 52 | 31 | 53 | 80 | 02 | 79 | 23 |
| RxCA | I | 20 | 41 | 38 | 19 | 32 | 30 | 08 |
| RxCB | I | 45 | 16 | 13 | 44 | 07 | 05 | 26 |
| TxCA OUT | O | 24 | 73 | 98 | 25 | 99 | 26 | 17 |
| TxCB OUT | O | 49 | 97 | 74 | 50 | 75 | 51 | 35 |
| RTS | O | 42 | 43 | 92 | 93 | 37 | 39 | 25 |
| CTS | I | 15 | 65 | 86 | 87 | 59 | 09 | 27 |
| DCD | I | 89 | 40 | 62 | 61 | 35 | 84 | 31 |
| DTR | O | 18 | 91 | 69 | 68 | 14 | 12 | 30 |
| DSR | I | 66 | 90 | 88 | 64 | 60 | 85 | 29 |
| SGND | -- | 34 | 17 | 63 | 67 | 01 | 83 | 19 |
| DCE Rtn | | 100 | | | Shield | | | 20 |
| DCE Rtn | | | | | | | | 37 |

# FC (2989) TURBOWAYS® 155 ATM Adapter (Type 9-9)

The TURBOWAYS 155 Asynchronous Transfer Mode (ATM) Adapter provides the interface between the ATM 155 Mbit/sec fiber-optics network and the Micro Channel in your system.
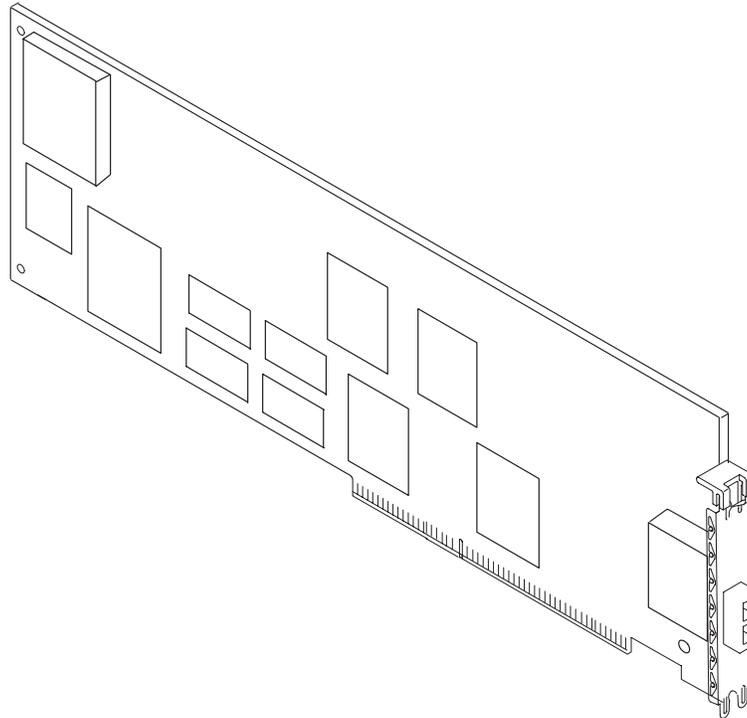
## TURBOWAYS 155 ATM Adapter Specifications

| | |
|---|---|
| FRU Number | 72H3043 |
| Bus architecture | Micro Channel |
| Busmaster | 80 MB/sec |
| Card Type | Type 5 (single slot) |
| Maximum number | 2 per Micro Channel |
| Connector | ANSI Specified SC duplex |
| Wrap Plug | 16G5609 Shipped with assembly |
| Cables | 62.5 micron multi-mode Fiber-optic, customer provided |

# FC (1904/1902) Fibre Channel 1063 Adapter Short Wave (Type 9-A)

The Fibre Channel 1063 Adapter provides the interfacing between a 1063 mega-bits/sec fibre-optic channel and the Micro Channel in your system. It is designed for point-to-point communications between two systems or between one system and a switch (fabric).



Fibre Channel Adapter FC 1904

Optic Driver FC 1902
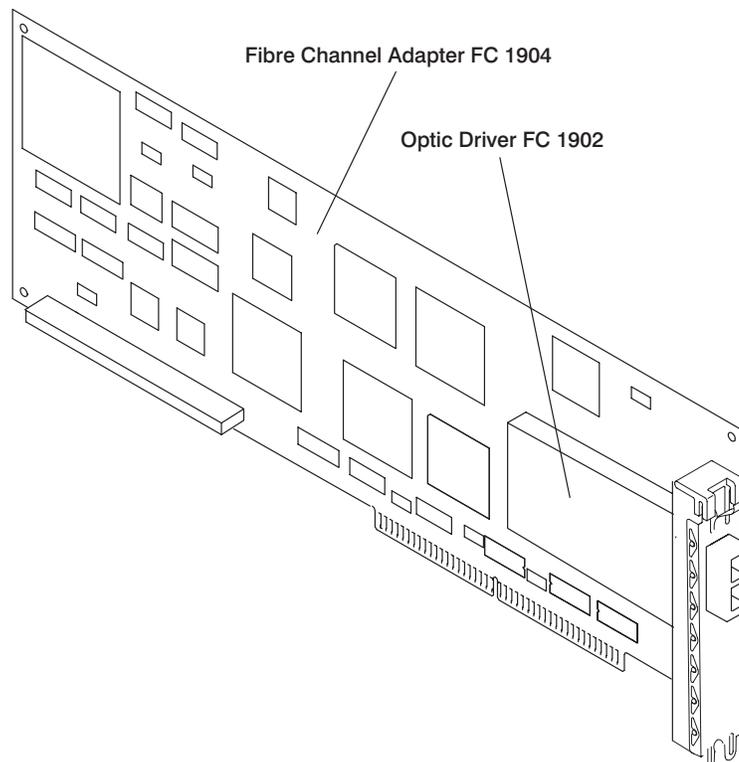
## Fibre Channel 1063 (Short Wave) Adapter Specifications

| | |
|---|---|
| FRU Number Adapter | 73H2503 |
| FRU Number Optic | 65G5292 |
| Card Type | Type 5 |
| Bus architecture | Micro Channel |
| Microcode filename | 8fe2d.00.00 (Diagnostic) |
| Microcode filename | 8fe2.00.01 (Functional) |
| | |
| Connector | ANSI Specified SC duplex |
| Cable Type | 50 micron multi-mode |
| Cables | Fibre-optic, customer provided |
| Wrap Plug | 16G5609 Shipped with assembly |
| End-of-cable wrap plug | 99F4916 |
| OR | |
| Feed through Connector | 19G4881 with half-meter fibre-optic cable 99F4880 |

# FCS Cables

FCS Cables 50 Micron Multi-Mode

- 54G3384/54G3385  7 Meters
- 54G3384/54G3386  13 Meters
- 54G3384/54G3387  22 Meters
- 54G3384/54G3388  31 Meters
- 54G3384/54G3389  46 Meters
- 54G3384/54G3390  61 Meters
- 54G3384/54G3391  Custom Length Meters

**Note:** There are two part numbers shown in the table. The first is for ordering cables in the United States and the second is for ordering cables in other countries. Orders for cables can be placed through MES.

## FC (2999) 155 ATM Video Streaming Adapter (Type 9-E)

The 155 Asynchronous Transfer Mode (ATM) Video Streaming Adapter is a Micro Channel adapter that provides 155 Mbps SONET OC-3 (single mode) fiber connectivity. In addition, the 155 ATM Video Streaming Adapter provides MPEG-2 PCR transmit pacing function.



BNC Connector

## 155 ATM Video Streaming Adapter Specifications

| | |
|---|---|
| FRU Number | 73H1685 |
| Bus architecture | Micro Channel |
| Maximum number | The 155 ATM Video Streaming Adapter requires two Micro Channel slots due to power requirements. When the model 39H is used as the base system for the 155 ATM Video Streaming Adapter one can be installed. The adapter can be installed in any slot. And, one of the other slots must be left open or not used. When the model R20 is used as the base system for the 155 ATM Video Streaming adapter, up to two can be installed. When one Video Streaming Adapter is installed, it must be installed in slot one (1). And slot three must be left open or unused. When two Video Streaming Adapters are installed, they must be installed in slots one and two. Then slots three and four must be left open. |
| Connectors | ANSI Specified SC duplex 75 ohm BNC |
| Jumper Cables | Fiber optic, customer provided |
| Microcode filename | /etc/microcode/20115500d.00.01 (Diagnostic) /etc/microcode/8f66ddif.01 (functional) |
| Wrap Plug | 82G3185 Shipped with assembly |

## FC (2994) 10/100 Mbps Ethernet MC Adapter (Type 9-K)

This adapter provides connectiviey to 10/100 Base Ethernet LANs for systems that support the Micro Channel bus architecture.  This adapter attaches to either 10 M/bps or 100 M/bps ethernet network via 10BaseT or 100BaseTX through an 8 pin RJ45 connector. The adapter is fully 802.3u fast ethernet standard compatible, with an ability to autonegotiate the speed and half/full duplex when connected to an autonegotiable switch. Category 3, 4 or 5 unshielded twisted-pair cable is required for 10 Mbps operation, and category 5 unsheilded twisted-pair cable is required for 100 Mbps on the network.



Amber LED FDX

Amber LED RCV

Green LED 100

Green LED LNK

10BaseT
RJ-45 Connector
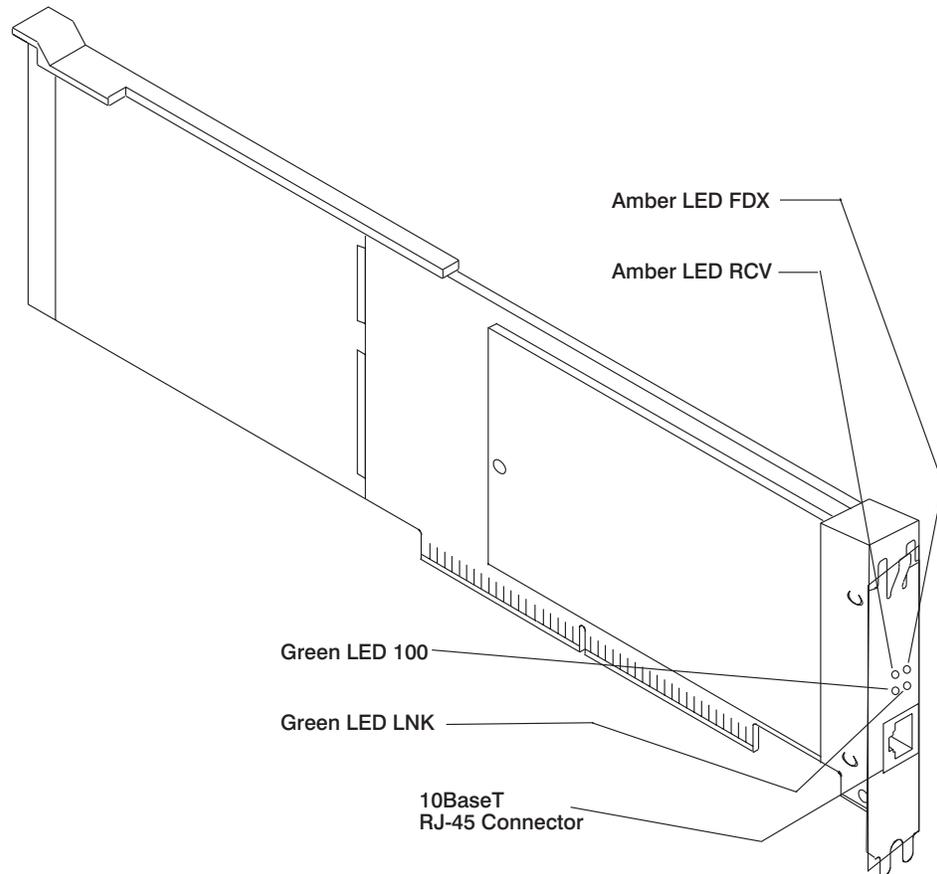
## 10/100 Mbps Ethernet MC Adapter Specifications

| | |
|---|---|
| FRU Number | 07L6601 |
| Interrupt levels | 10, 11, 12, 15 |
| Bus architecture | Micro Channel |
| Form Factor | Type 3 |
| Busmaster | 80 MB/sec data streaming |
| Maximum number | 1, 2 or 4 depending on the model number |
| Connector | 8-position RJ-45 |
| Adapter wrap plug | RJ-45 (twisted-pair), part number 00G2380 |

| **Customer Supplied** | **Items** |
|---|---|
| Cables | Customer supplied |

# 10/100 Mbps Ethernet MC Adapter 8-Position RJ-45 Twisted-Pair Connector
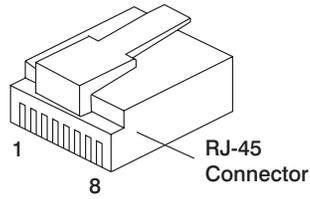


| Position | Mnemonic | Signal Name |
|----------|----------|-------------|
| 1 | TD+ | Upward Data + (positive for HI signal) |
| 2 | TD- | Upward Data - (negative for HI signal) |
| 3 | RD+ | Downward Data + (positive for HI signal) |
| 4 | Reserved | Reserved |
| 5 | Reserved | Reserved |
| 6 | RD- | Downward Data - (negative for HI signal) |
| 7 | Reserved | Reserved |
| 8 | Reserved | Reserved |

## FC (8243) Media Streamer® Audio/Video Decoder (Type *)

**Note:** * This adapter does not have an assigned type number.

The MPEG to analog video decoder adapter is an ISA form factor card. It decodes a stream of digital MPEG data, and outputs analog video and stereo audio. The output signal may be either in NTSC or PAL standard format. The MPEG data, reaches the card via a SCSI-2 cable.
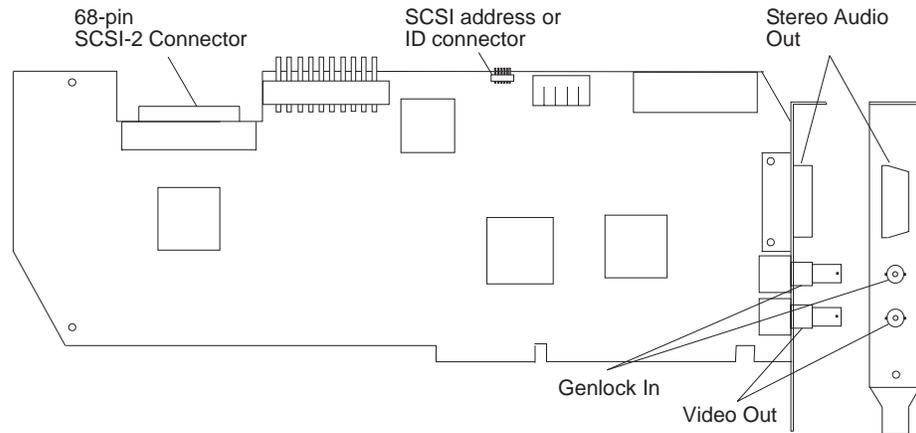


- Connectors

    1. 68-pin SCSI-2 connector for control and data input

    2. SCSI address (ID) connector, for attachment of a cable which takes the place of SCSI address jumpers.

    3. Stereo audio out

    4. Genloc in

    5. Video out

## Media Streamer Audio/Video Decoder Specifications

| | |
|---|---|
| FRU Number | 93H2136 |
| Bus architecture | ISA |
| Bus description | The card requires a single ISA slot. It uses power only from the bus. Typically, these cards are in a special ADAC drawer, which has 14 slots for these adapters. |

# Media Streamer Audio/Video Decoder 15-pin D-Shell Audio Connector

POS 1

POS 9
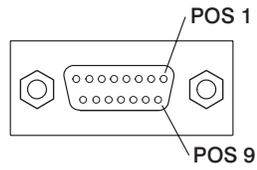
| Position | Signal Name |
|----------|-------------|
| 1 | right audio + |
| 2 | right audio - |
| 3 | shield |
| 4 | left audio - |
| 5 | left audio + |
| 6 | reserved |
| 7 | reserved |
| 8 | video start trigger |
| 9 | reserved |
| 10 | reserved |
| 11 | reserved |
| 12 | reserved |
| 13 | reserved |
| 14 | reserved |
| 15 | reserved |

## FC (2734) Keyboard and Mouse Adapter for 7013 Models J30, J40, and J50 (Type *)

**Note:** * This adapter does not have an assigned Card Type.

This special adapter is used only on 7013 models J30, J40, and J50. It provides a way to attach a keyboard and mouse to the system units.
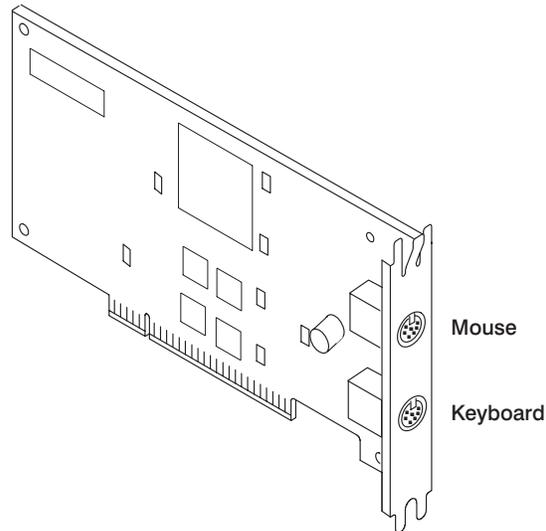


## Keyboard and Mouse Adapter Specifications

FRU Number            40H7496
Bus architecture      Micro Channel
Adapter size          Type 3
Busmaster             No
Maximum number        1
Connector             2 - 6 position Mini Din
Cables                Come standard on the keyboard and mouse

# Keyboard and Mouse Adapter 6-Position Mini Din Connector

The physical layout of the keyboard and mouse connector is shown in the following illustration.
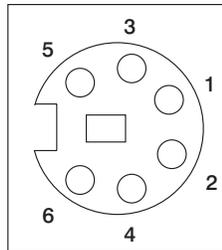


# Keyboard Connector

| Pin | Signal |
|:---:|:---:|
| 1 | Keyboard Data |
| 2 | Speaker Signal |
| 3 | Ground |
| 4 | +5V dc |
| 5 | Keyboard Clock |
| 6 | Speaker Ground |

# Mouse Connector

| Pin | Signal |
|:---:|:---:|
| 1 | Mouse Data |
| 2 | Reserved |
| 3 | Ground |
| 4 | +5V dc |
| 5 | Mouse Clock |
| 6 | Reserved |

# Chapter 2. Devices Information

This chapter contains service data for the devices installed within system units. The specific information about these devices is included here to aid service personnel. This book is updated for most versions of the diagnostic programs.

## Description of the Device Information

System unit manuals show only information that applies to all devices of a type. For example, the removal and replacement procedures in the service guide for a system unit show how to remove and replace *any* type of disk drive. This book shows the specific address switch settings for *each* type of disk drive.

## How to Use the Device Information

The information about internally installed devices is used in nondirected service activities. The information in this chapter is used to:

- Identify a device.
- Find service information about a device.
- Where applicable, show the settings for address switches or jumpers.
- Provide a manual removal procedure for the CD-ROM caddy, compact disk, 4-mm, and 8-mm tape cartridges.
- Provide removal and replacement instructions for the electronic boards on the disk drives.

## 5.25-Inch Diskette Drive

The 5.25-inch diskette drive provides a way to read and write 5.25-inch diskettes. This drive can read or write on the 1.2M-byte diskette or it can read the 360K-byte diskette.

The 5.25-inch diskette drive is attached to the same built-in diskette drive adapter on the standard I/O planar that the 3.5-inch diskette drive uses.

Since the 5.25-inch diskette drive and the PS/2 5.25-inch external diskette drive both use the same internal cable connector, only one can be present on a system unit.

## Setting the Terminator Resistor

The terminator resistor *must not* be installed on the internal 5.25-inch diskette drive when it is installed in the front panel of a system unit.

**Terminator
Resistor Socket**
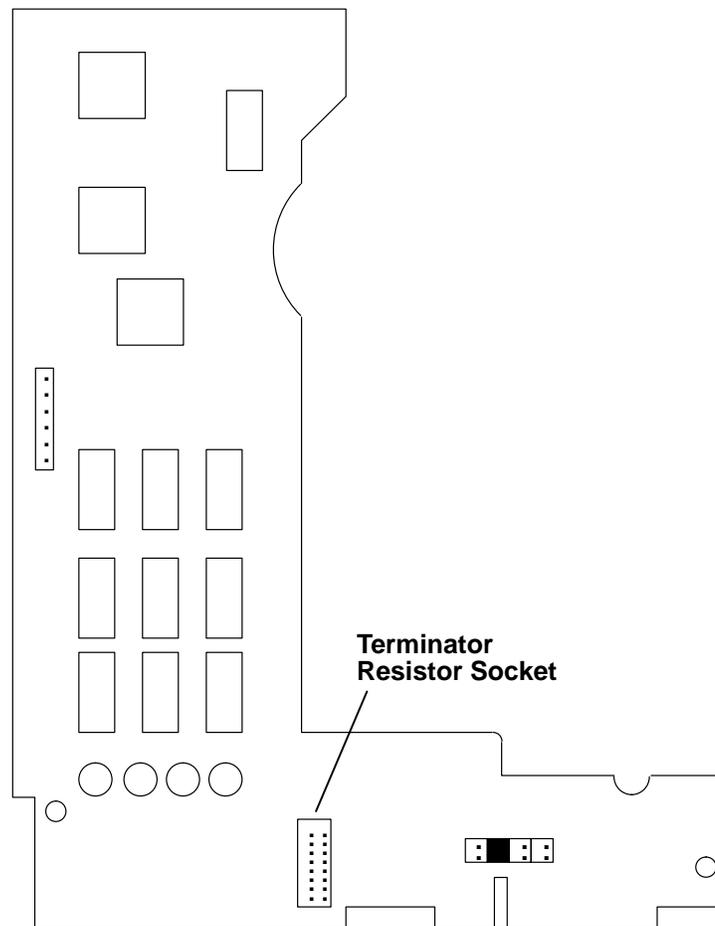
## CD-ROM Drives

The CD-ROM drive is a read-only device which reads compact optical discs. The compact disc (CD) is removable.  See "Laser Safety Information" on page  xvii for the laser safety statement.

The CD-ROM drive connects to the internal SCSI bus cable coming from the standard SCSI I/O controller.  All of the CD-ROM drives can be mounted both horizontally or vertically.

There are four types of CD-ROM drives.  These are designated as type A, B, C, and D. The four types of CD-ROM drives can be identified by looking at the front bezel.

## Type A, and B CD-ROM Drives

Type A and B CD-ROM drives need to have a disc caddy to load the CD.  They are identified by looking at the front bezel as shown below.
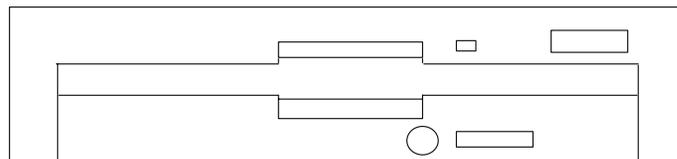
Type A Drive Bezel
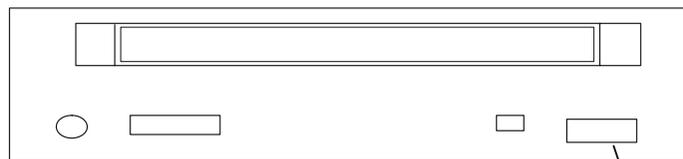
Type B Drive Bezel
(CD-ROM and CD-ROM-2 versions)
CD-ROM-2 Type B Drives have a white
underside on their unload buttons

## Type C CD-ROM Drives

Type C drives have a tray loading mechanism which is used to load the CD.  There are three versions of type C drives.  They are a double-speed version, a quad-speed version, and an 8X speed version. They are identified by the bezel and other identifying features as explained below.

All three drives look the same on the outside.  Both the double-speed drive and the quad-speed drive have a white trays.  The tray on the double-speed drive has two tabs to hold a CD in the vertical position and the quad-speed drive has four tabs to hold the CD in the vertical position.  The main difference between the quad-speed drive and the 8X speed drive is that the tray in the quad-speed CD-ROM is white, and the tray in the 8X speed CD-ROM is black.  On these three drives, the status light blinks amber, is located left of center on the bezel, and has a 50-pin SCSI connector.

### Dual Speed, Quad Speed and 8X Speed Drives

Head Phone Jack    Tray Opening    Emergency Eject Access

Volume Control    Status Light    Load/Unload Button
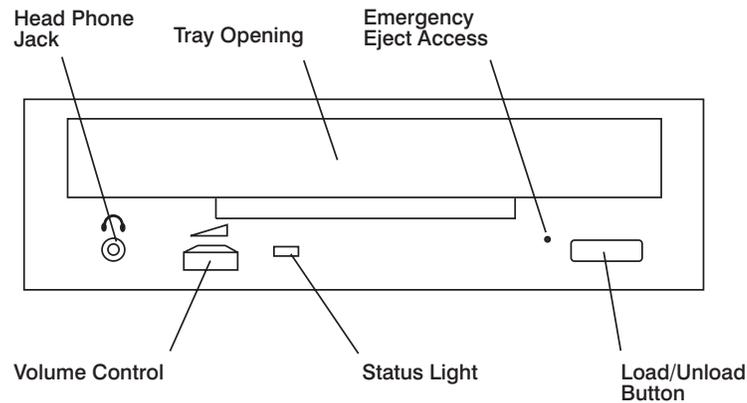
# Type D CD-ROM Drives

There are two versions of type D drives.  They have a tray loading mechanism which is used to load the CD into the drive.  There is a 12 to 20X speed version, and a 14 to 32X speed version.

The 12 to 20X, and the 14 to 32X speed drives look similar to the type C drives on the outside.  The main distinguishing differences are that the status light blinks green and is centered left to right on the bezel.  They also have a 68-pin SCSI connector which plugs directly on to the SCSI bus.

### 12 to 20X, and 14 to 32X Speed Drives

Head Phone Jack    Emergency Eject Access    Tray Opening

Volume Control    Status Light    Load/Unload Button
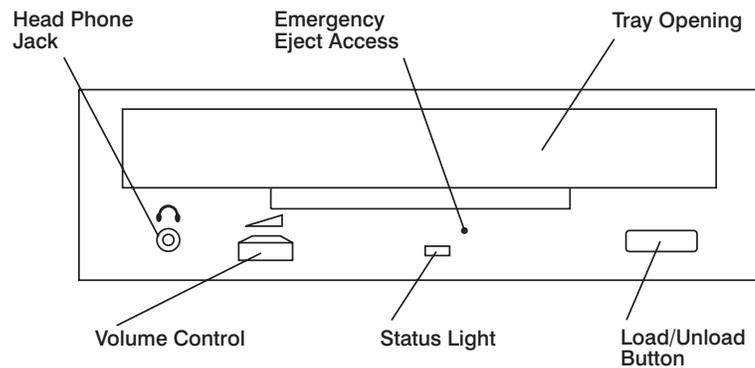
# Setting SCSI Addresses

Depending on the type of CD-ROM drive, the SCSI address is set with switches on the (Type A) drives or jumpers on the (Type B, Type C, and Type D) drives. The switches or jumpers are located on the rear of the drive.

# Type A Drive Switch Settings

Use the following table and diagram to locate and set SCSI address switches 1, 2, and 3 on Type A drives.

**Note:** Switches 4 and 5 should always be set to On and switch 6 set to Off as shown.

| Address | Switch 1 | Switch 2 | Switch 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |



**Type A Drive**
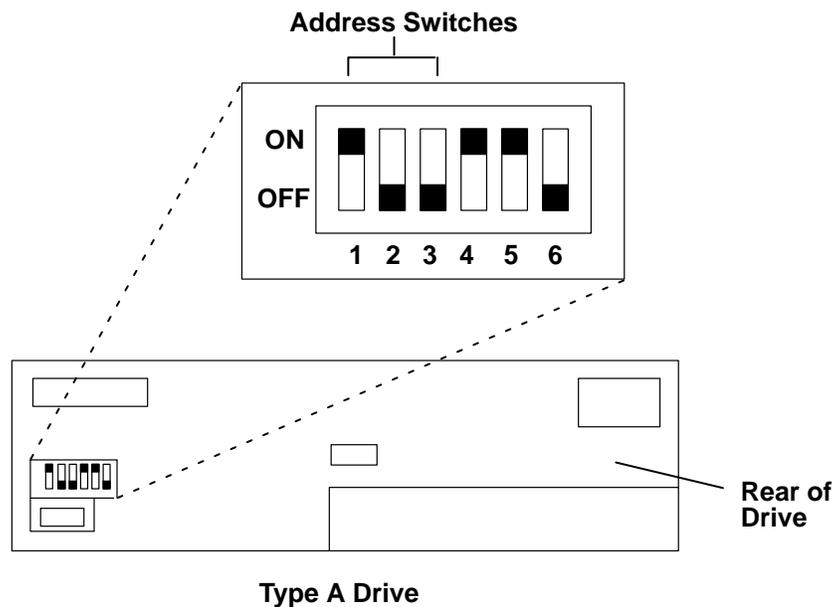
# Type B Drive Jumper Settings

Use the following table and diagram to locate and set address jumpers on Type B CD-ROM drives.  This includes both the CD-ROM and CD-ROM-2 versions.  The jumper at position 6 must always be installed to allow media insertion and removal.

**Note:**  CD-ROM-2 type B drives have an unload button which has a white underside.

**Type B Drive
(Top View)**

**Disable Drive
Terminator Power
(No Jumper)**

**Enable Normal
Drive Operation
(No Jumper)**

**SCSI
Address
Jumpers**

**Enable Media
Removal (Requires
a jumper)**
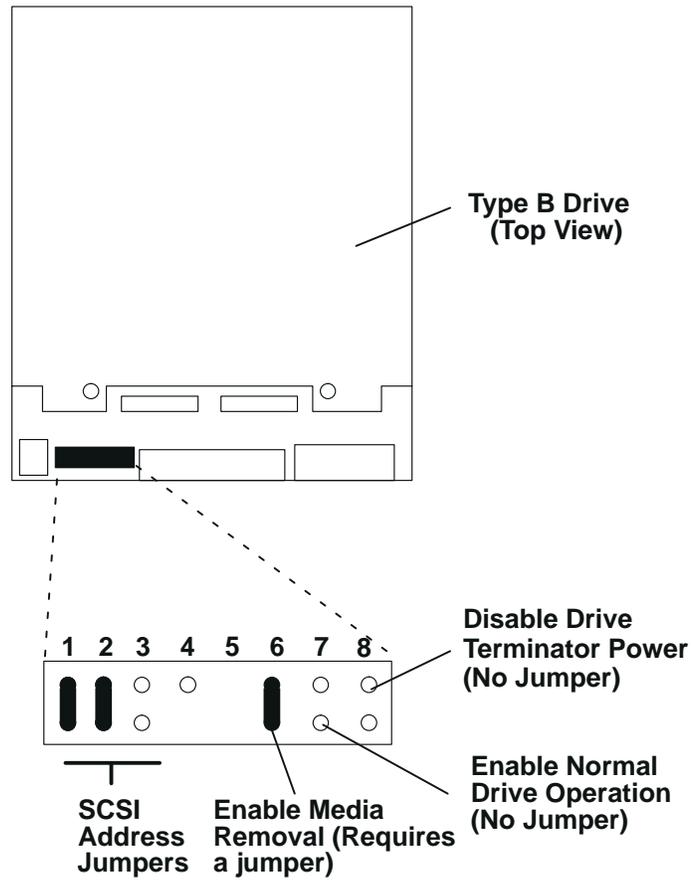
**The jumpers are set at address 3 in diagram.**

| Address | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

# Type C Drive Jumper Settings

Use the following table and diagram to locate and set address jumpers on type C CD-ROM drives.  There are three speeds of type C CD-ROM drives.  There is a double-speed, quad-speed and 8X speed version. The bezel on all of the drives looks the same.  However, the tray in the double-speed CD-ROM drive is white with two tabs, the tray in the quad-speed CD-ROM drive is white with four tabs, while the tray in the 8X CD-ROM drive is black with four tabs.  Refer to the illustration on page 2-13.
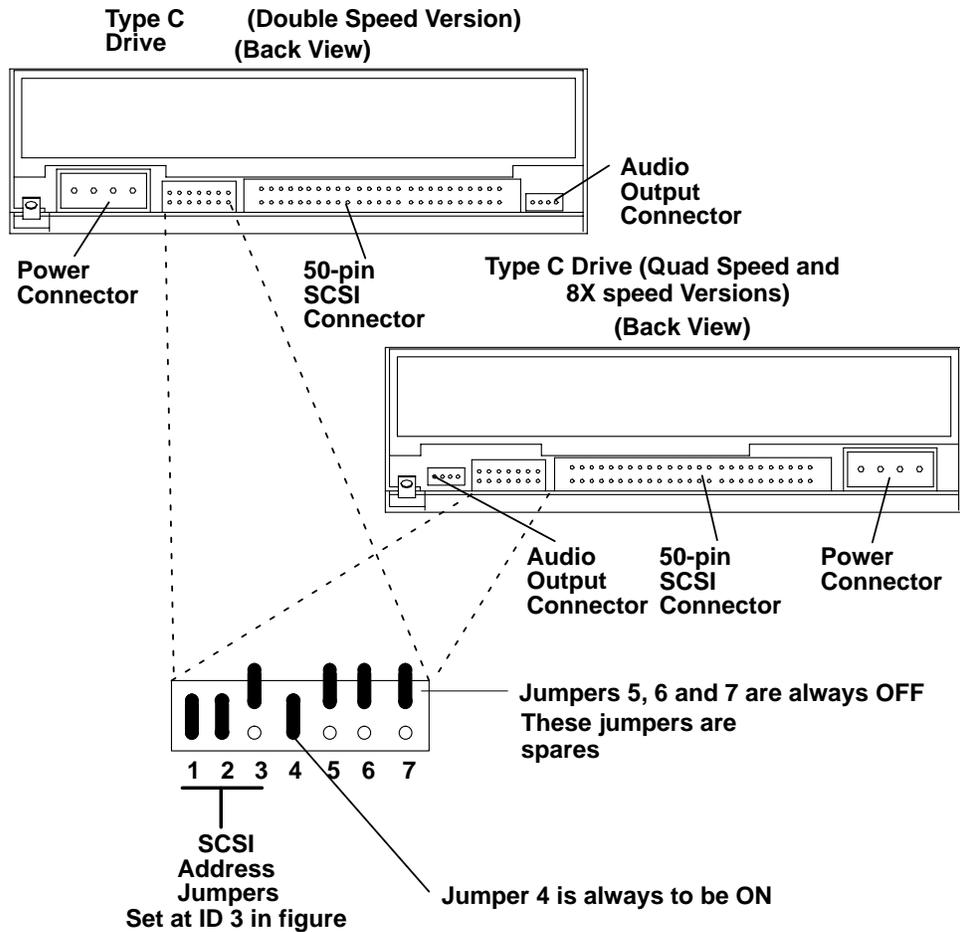


| Address | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

# Type D Drive Jumper Settings

### Jumper Settings on 12 to 20X, and 14 to 32X Speed Drives
Use the following table and diagram to locate and set the SCSI address jumpers.
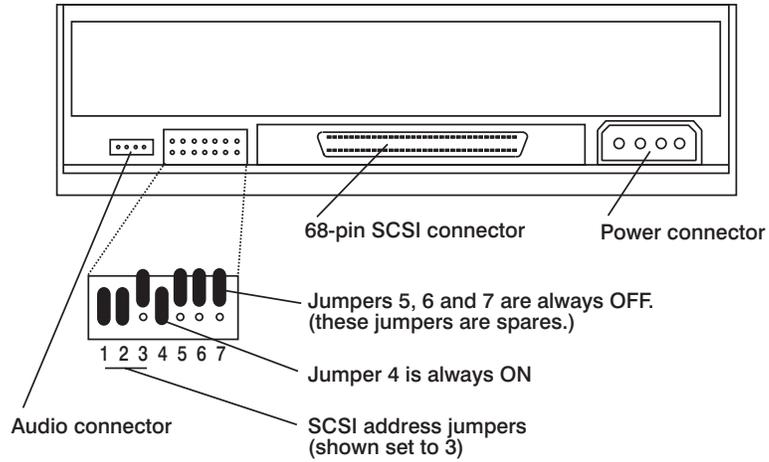


68-pin SCSI connector    Power connector

Jumpers 5, 6 and 7 are always OFF.
(these jumpers are spares.)

1 2 3 4 5 6 7

Jumper 4 is always ON

Audio connector

SCSI address jumpers
(shown set to 3)

| Address | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

# Manually Removing the Disc

**Note:** Use the following manual procedures only after other methods have not worked successfully.

The normal way to remove a disc is to press and hold the load/unload button for about 2 seconds.

When a power or drive failure prevents the disc from unloading normally, use the procedure that applies to the appropriate CD-ROM drive type A, B, C, or D.

# Type A Drives

1. Remove the drive from the system unit or 7210 using the procedures in the installation and service guide for that system unit or device.
2. Lay the drive upside down on a flat surface.
3. Remove the two loader motor mounting screws from the bottom of the drive.
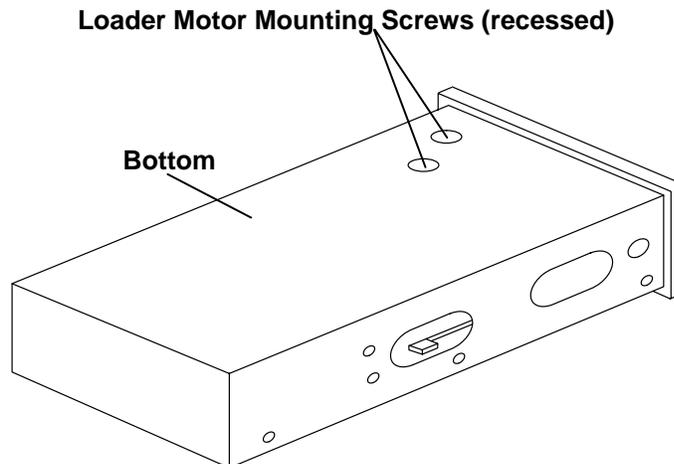


4. Turn the drive over to allow the loader motor mount to slip down and disengage the gears.



.
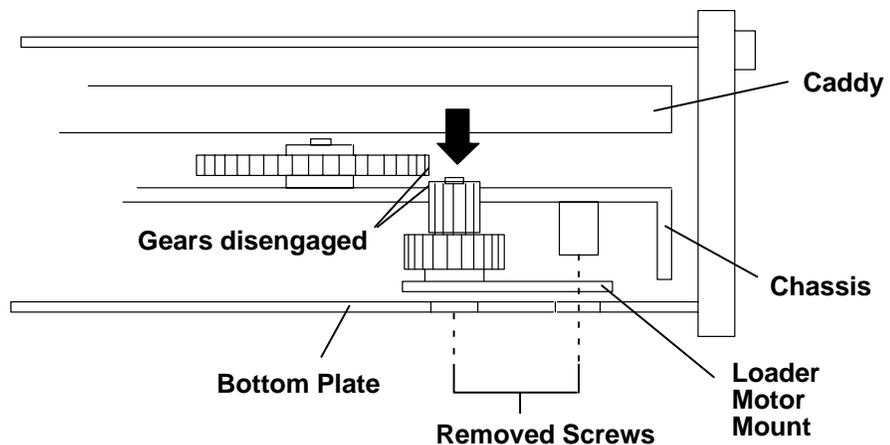
5. If the gears disengage, you should be able to remove the caddy by sliding the lever on the side of the drive toward the chassis front.

**Bottom**
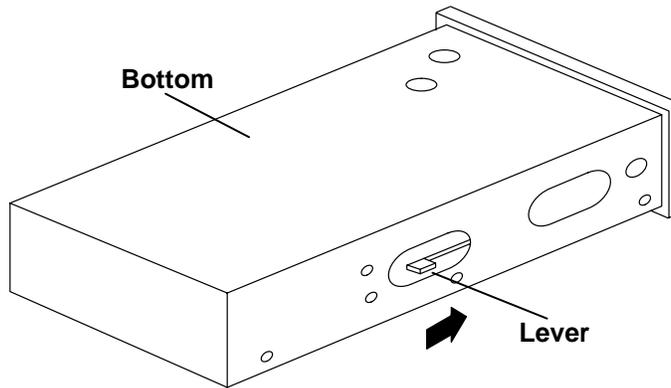
**Lever**

6. If the lever resists movement efforts, the loader motor may have to be moved down and away from the spur gear with a screwdriver, as shown in the illustration. To move the loader motor:

   a. Remove the front bezel.
   b. Press down on the top of the loader motor with a screwdriver to disengage the gears.

**Spur Gear**

**Gears disengaged**

**Loader Motor Mount**
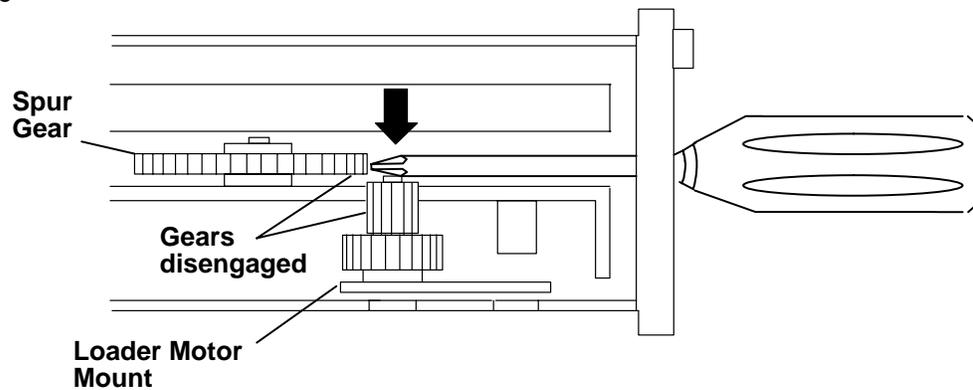
   c. When the gears have disengaged, slide the lever toward the front of the drive chassis, and remove the disc caddy.

**Bottom**

**Lever**
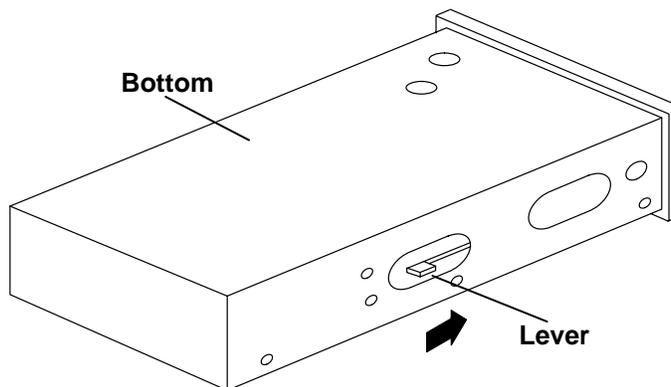
7. Reassemble the drive in reverse order.

## Type B Drives

1. Turn off power to the CD-ROM drive.

2. Remove the front bezel.

3. Remove the small label that covers the emergency eject hole.

**Emergency Eject Hole**                    **Front of Chassis**
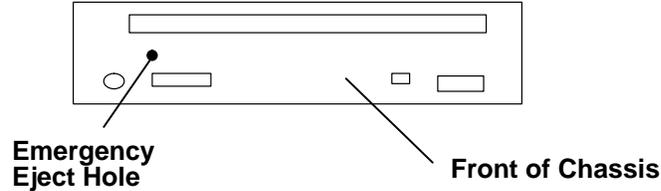
4. Insert a solid metal rod (such as a small Phillips screwdriver) not more than 25 mm (1 in.) into the emergency eject hole, and push; the caddy should be ejected.

**Note:** Use a rod having a diameter of 2.0 mm (.080 in.) or less, and do not insert the rod more than 25 mm (1 inch) into the emergency eject hole. Inserting a rod further than 25 mm (1 inch) may damage the CD-ROM drive.

5. Reassemble the drive in reverse order.

**Note:** The CD-ROM-2 Type B drives have a white underside on their unload buttons.

## Type C, and D Drives

### Double Speed, Quad Speed and 8X Speed Drives

Head Phone Jack          Tray Opening          Emergency Eject Access

Volume Control          Status Light          Load/Unload Button
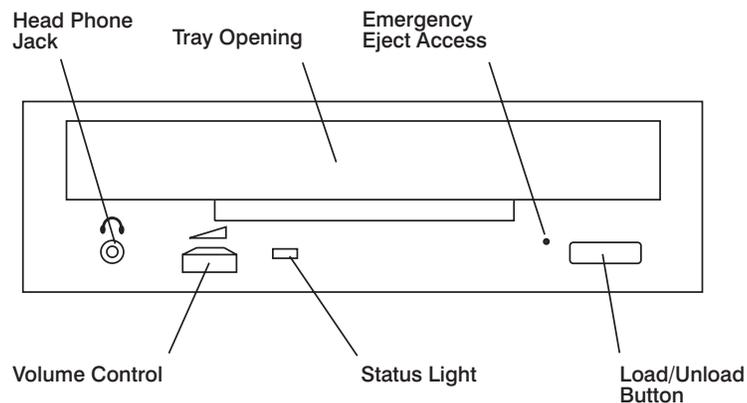
## 12 to 20X, and 14 to 32X Speed Drives
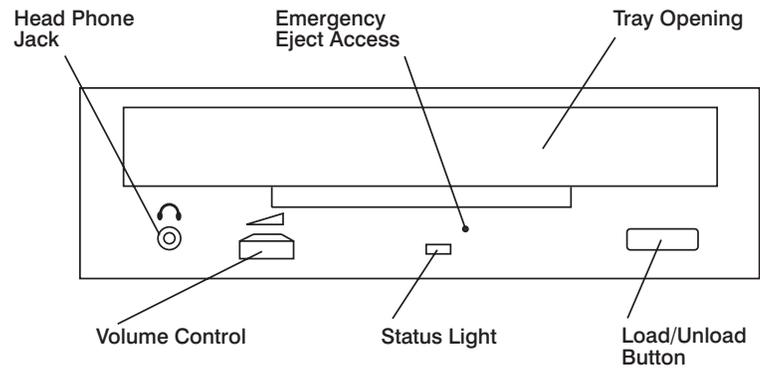


**Note:** Execute the following procedure only in an emergency (ie. tray does not eject after pressing the load/unload button).

1. Power-off the system unit.

2. Insert a small diameter rod, such as a straightened paper clip into the emergency eject hole. (Refer to the illustration below for the location of the emergency eject hole.)

3. Push the tool in until some resistance is felt.

4. Maintain a small amount of pressure on the rod while lifting up on the tray with your finger nail.

5. Pull the tray open and lift out the disc.

**Note:** Normally the tray makes a ratcheting sound when pulling it open using the above procedure. This does not damage the drive.

# Vertical Orientation

All four types of drives can be operated vertically as shown below. Since Type A and B drives use a caddy to hold the disc, no additional provisions are needed when operating vertically. Type A and B drives can be oriented in either vertical direction (ie. the eject button either up or down).

Since the type C, and D drives use a tray, the normal orientation is such that the eject button is up. The two tabs at the bottom of the tray must be extended to hold the disc in place when operating vertically. This is also shown below. Since the double-speed version only has two tabs, it can only be oriented one way. Namely, the eject button must be up. However, all of the other versions of type C and D drives have tabs on both sides of the tray. Therefore, they can be oriented either way the same as the type A and B drives.
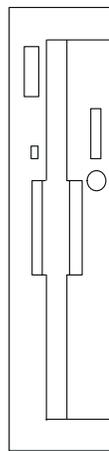
Type A Drive
Bezel
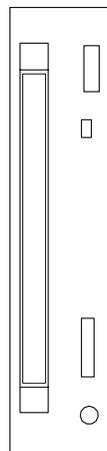
Type B Drive
Bezel

Type C Drive
Bezel

CD-ROM and CD-ROM-2
No Tabs here on Dual Speed Only
Tabs shown Retracted
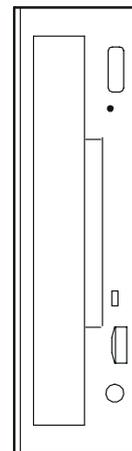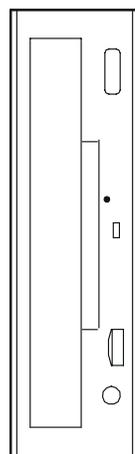
Type D Drive
Bezel
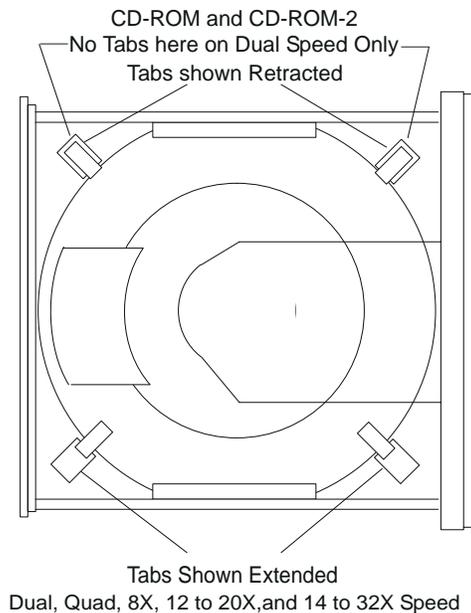
Tabs Shown Extended
Dual, Quad, 8X, 12 to 20X,and 14 to 32X Speed

# Terminator Resistors

Since terminators are already provided on the SCSI bus, terminator resistors are not installed on internal CD-ROM drives, socket locations for these resistors are provided on type A and type B CD-ROM drives as shown below.  If terminating resistors are present on type A or B drives, remove them.
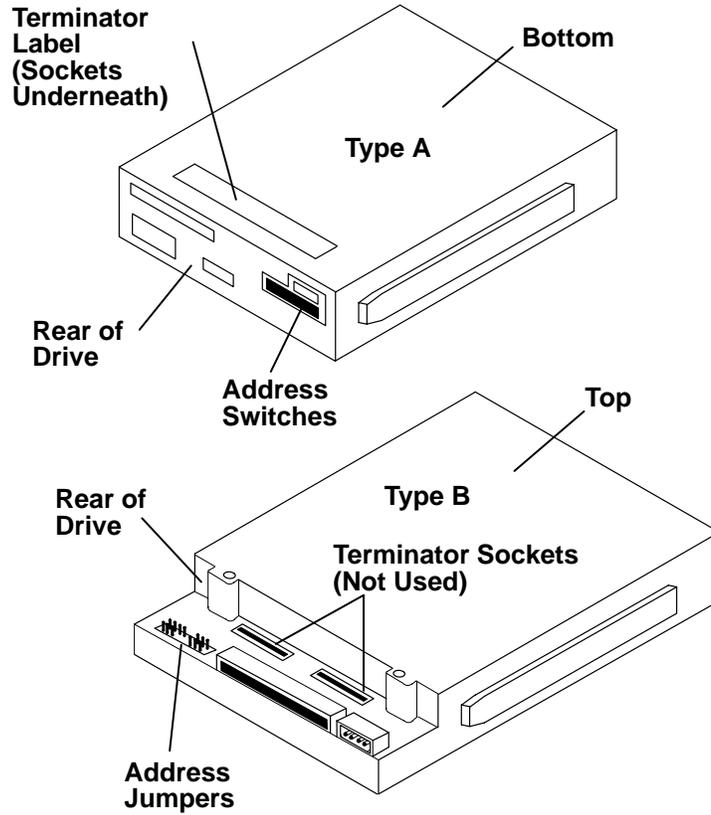
# 1/4-Inch Cartridge Tape Drives

The 1/4-inch cartridge tape drives use a tape cartridge to store data.  The drives require a half-high position when installed in the front panel.

# Setting the SCSI Address

The method of setting the SCSI address depends on internal or external installation of the tape drive.

# Internal SCSI Address Connections

The SCSI address is set using preinstalled address jumpers 1, 2, and 3 on the rear panel of the drive (the jumpers may be labeled differently on the device).

The tape drive model determines whether the parity jumper is installed.
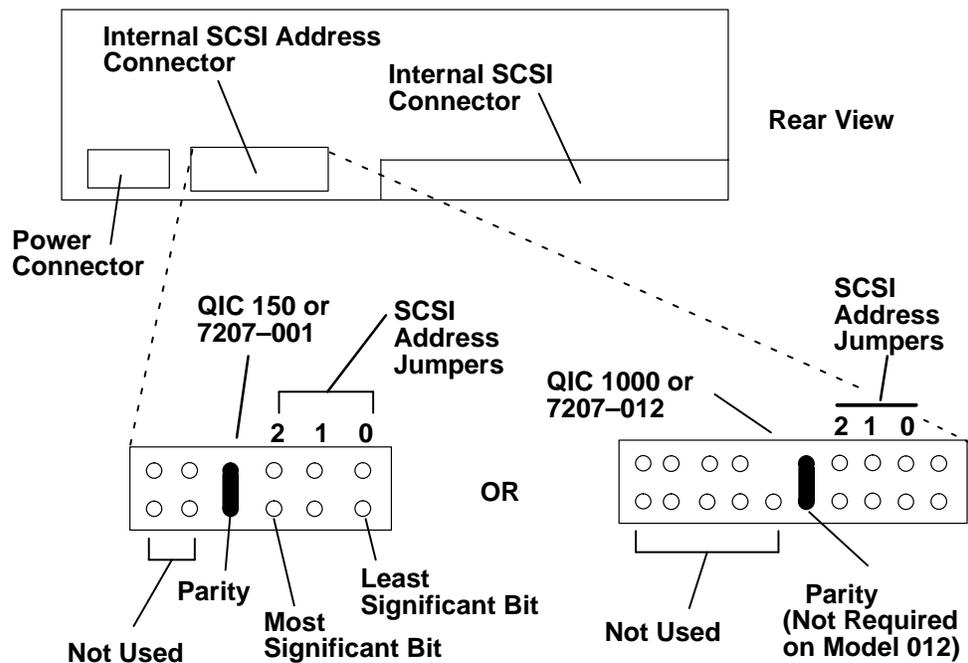


# Valid Addresses

| Address | Jumper 2 | Jumper 1 | Jumper 0 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | Off | Off | On |
| 2 | Off | On | Off |
| 3 | Off | On | On |
| 4 | On | Off | Off |
| 5 | On | Off | On |
| 6 | On | On | Off |

## 150M-byte, 525M-byte and 1.2G-byte 1/4-Inch Cartridge External Tape Drives

The 150 M-byte, 525M-byte and 1.2G-byte 1/4-inch tape drives use a tape cartridge to store data.

## Setting the SCSI Address

Set the address switch shown to 6 or lower with a small screwdriver.

**Note:** The SCSI address switch must be set while the signal cable is disconnected from the device or while system unit power is off.



**External SCSI Address Switch**

**Rear View**

**SCSI Cable Connector**
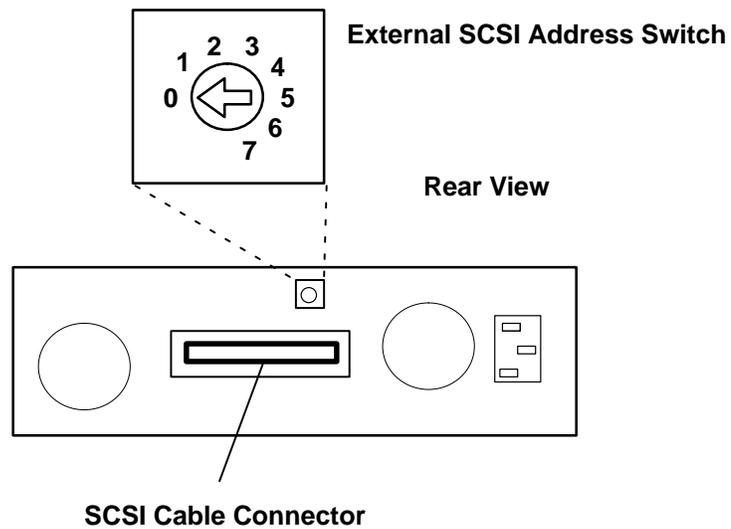
## 2.0G-byte 4-mm Tape Drive

The 2.0G-byte 4-mm tape drive uses a DDS|||| 4-mm tape cartridge to store data.

**Note:** This drive is available as an external installation only.

## Setting the SCSI Address for External Installations

**Attention:** The SCSI address must be set while both system unit and tape drive power are turned off.  Attaching the tape drive to an active system unit may damage the drive and/or the system unit.

To set an SCSI address for external installations, select an unused address number, and press the + or - pushbutton on the rear of the tape drive to display that number.



**Rear View**
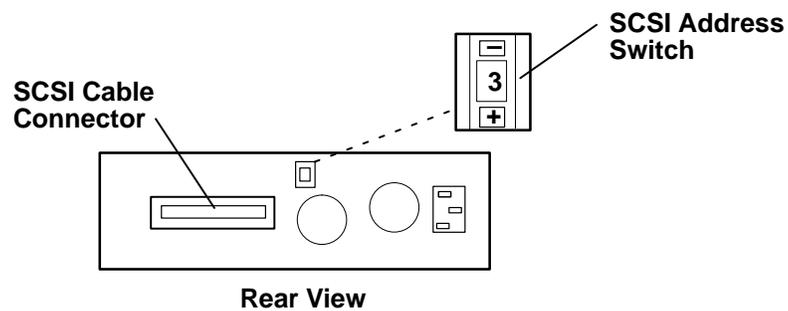
# Manually Removing the Tape Cartridge

This procedure describes how to manually remove a data cartridge from a 2.0G-byte 4-mm Tape Drive.

**Attention:** This procedure is very delicate and could result in damage to your tape cartridge, 4-mm Tape Drive, or both.  Please use this procedure only when you have exhausted the other options for removing the tape cartridge.  These include:

1. Power the 4-mm Tape Drive off and on again to attempt to clear any potential hang conditions.

2. Issue the **Unload SCSI** command from the system command menu, if available, or press the Unload button on the tape drive.

# Removing a Loaded Tape Cartridge

Perform the following steps to manually remove the tape cartridge from your tape drive.

1. Using the instructions in your system unit user's guide, power off your system unit and disconnect the tape drive.

2. Evenly lift and remove the cover from the base, avoiding extreme angles.  Start lifting from the front of the drive to avoid the cover lip pulling off the door from the front panel.

3. If the cover clips get stuck, *do not* push them in by hand.  Instead, lever between the base and the cover gently.  Open up the base so that the clips are freed and, at the same time, pull up on the cover.  If this still does not work, *carefully* press in the clips that are stuck so they are not caught and try again to lift off the cover.

**Note:** Remember, the front clips should *always* be lifted first.
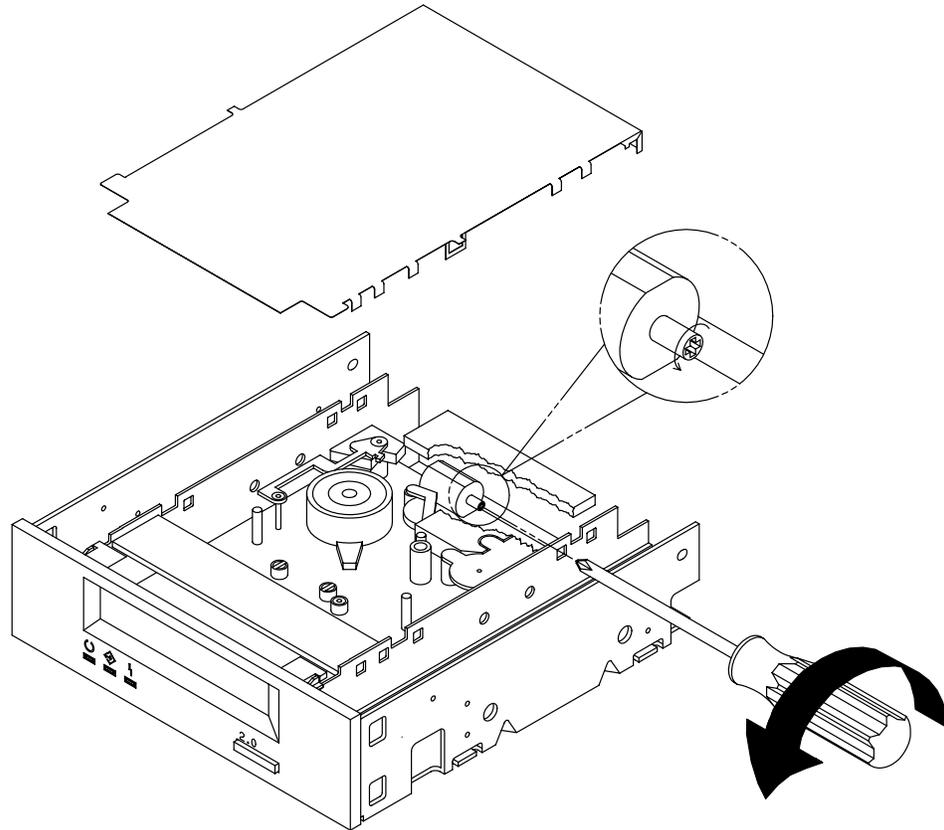
4. This illustration shows the manual method of removing the cartridge. Insert a Phillips #0 screwdriver with a 3-inch long, 1/4-inch diameter shaft into the hole designated on the side of the drive. Engage it with the indented end of the worm drive. Turn the screwdriver counterclockwise until the cartridge is ejected. Many turns may be needed before this happens. If the tape is loaded in the tape path of the drive, it could take approximately 4 minutes to remove the cartridge.

**Note:** If the tape is already within the cartridge housing, the procedure takes less time.

## 4.0G-byte 4-mm Tape Drive

The 4.0G-byte 4-mm tape drive uses either  DDS|||| or DDS2 MRS 4-mm tape cartridges to store data.  This drive requires a half-high position when it is installed in the front panel.

## Setting the SCSI Address for External Installations

**Attention:** The SCSI address must be set while both system unit and tape drive power are turned off.  Attaching the tape drive to an active system unit may damage the drive and/or the system unit.

To set an SCSI address for external installations, select an unused address number, and press the + or - pushbutton on the rear of the tape drive to display that number.



**Rear View**
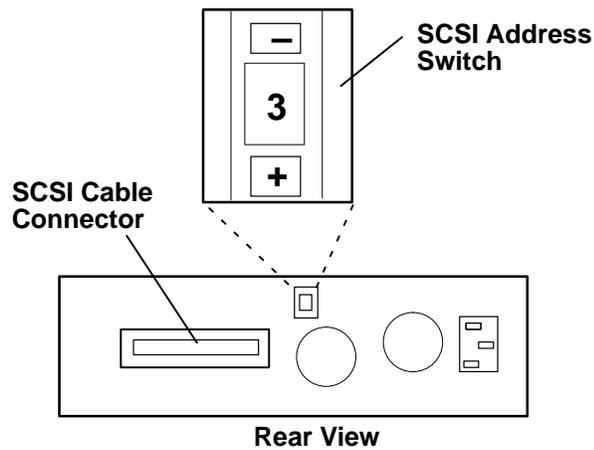
# 4.0GB 4-mm Tape Drives

There are two types of 4.0GB 4-mm tape drives.  They are designated as type A and B.
The two drives can be identified by looking at the rear of the drives or at the ventilation
holes on the drive chassis.  The type A drives have the 50 position SCSI connector at the
top of the drive at about the center and has elongated ventilation holes in the chassis.
The type B drives have the SCSI 50 position SCSI connector and the power connector
across the bottom of the drive and has circular ventilation holes in the chassis.

## Setting the SCSI Address for internal installations

**Attention:** The SCSI address must be set while both the system unit and the tape drive
are turned off.  Attaching the tape drive to an active system unit may damage the drive
and/or the system unit.

**Note:**   Prior to installing the SCSI media device into the media bay, the address of the
device must be set to any of the available SCSI addresses.

Do not change any of the other switches or jumpers that were set at the factory.

## For Type A Drives

Set the SCSI address by using switches 1 through 3 as shown.  The dip switch is located
on the rear panel or the drive.

4 mm Tape (Back View)



Power Connector

50-Pin SCSI Connector

SCSI Address Switches

3 2 1

OFF

ON
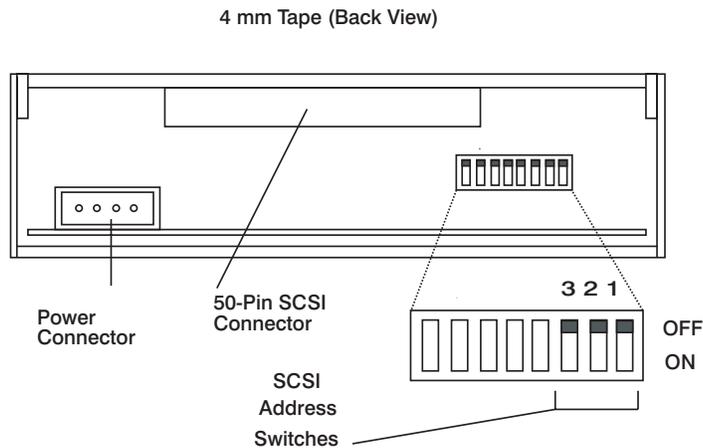
| Address | Switch 3 | Switch 2 | Switch 1 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | Off | Off | On |
| 2 | Off | On | Off |
| 3 | Off | On | On |
| 4 | On | Off | Off |
| 5 | On | Off | On |
| 6 | On | On | Off |

# For Type B Drives

Set the SCSI address by using jumpers 1 through 3 as shown. The address pins are the rightmost pins of the jumper block. The jumper block is located on the rear panel of the drive.

4-mm Tape (Back View)

50-Pin SCSI Connector

SCSI Address Jumpers

Power Connector

| Address | Jumper 5-6 | Jumper 3-4 | Jumper 1-2 |
|---------|------------|------------|------------|
| 0 | Off | Off | Off |
| 1 | Off | Off | On |
| 2 | Off | On | Off |
| 3 | Off | On | On |
| 4 | On | Off | Off |
| 5 | On | Off | On |
| 6 | On | On | Off |

# Manually Removing the Tape Cartridge from a 4-mm Tape Drive

This procedure describes how to manually remove a stuck data cartridge from a 4.0GB 4-mm Tape Drive.

**Attention:** This procedure is very delicate and could result in damage to your tape cartridge, 4-mm Tape Drive, or both. Please use this procedure only when you have exhausted the other options for removing the tape cartridge. These include:

1. Power the 4-mm Tape Drive off and on again to attempt to clear any potential hang conditions.

2. Issue the Unload SCSI command from the system command menu, if available, or press the Unload button on the tape drive.

## Removing a Loaded Tape Cartridge
Perform the following steps to remove the tape drive from the system unit:

1. Disconnect the power to the system unit.

2. Disconnect the tape drive from the system unit.

   - Disconnect the SCSI connections to the host system.

   - Disconnect the power connections to the tape drive.

3. Remove the tape drive and any attached mounting hardware from the system unit.

## Type A Drives

1. Remove the mounting brackets by removing the four screws near the lower edge of the tape drive assembly (two on each side) that are accessed through holes in the side of each bracket.
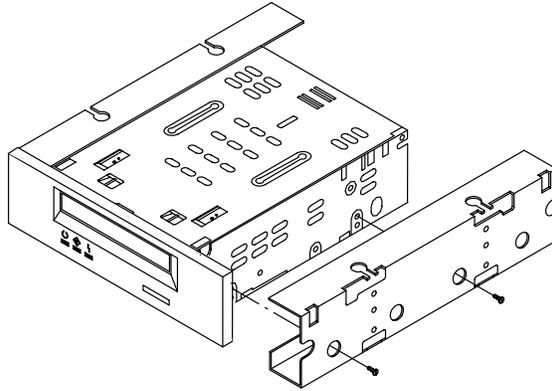
A4AA0216

2. Remove the top cover by removing the four screws near the top edge of the tape drive (two on each side) and lifting at the back of the cover.
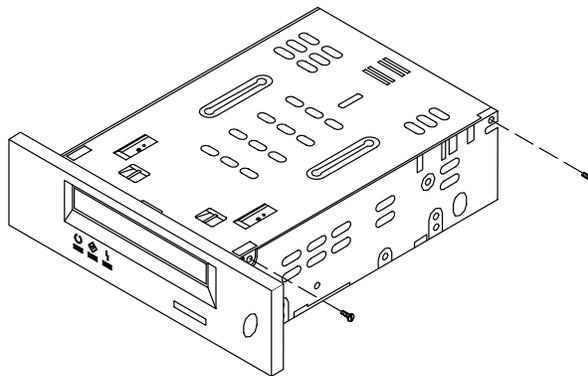
A4AA0217

3. Remove the front bezel by doing the following:

   a. Turn the tape drive upside down and remove the two screws that secure the front bezel on the bottom and one screw on the left side of the bezel.
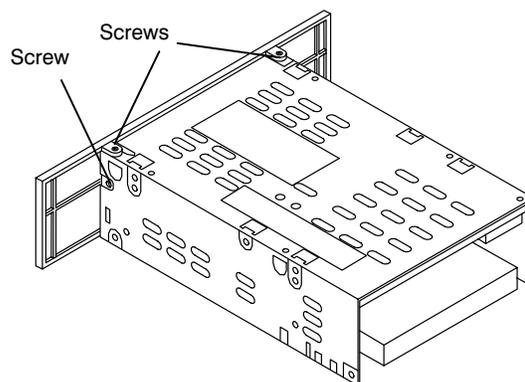
Screws

Screw

A4AA0218

   b. Place the drive assembly on its right side.  Facing the drive assembly, use a small screwdriver to gently press on the bezel tab (through the rectangular hole in the

drive assembly).  Continue to press on the bezel tab until the latch on the bezel
tab clears the hole and the bezel can be pulled away from the drive assembly.

**Note:**  The bezel cannot be completely removed because of the Light Emitting
Diode (LED) printed circuit board assembly.
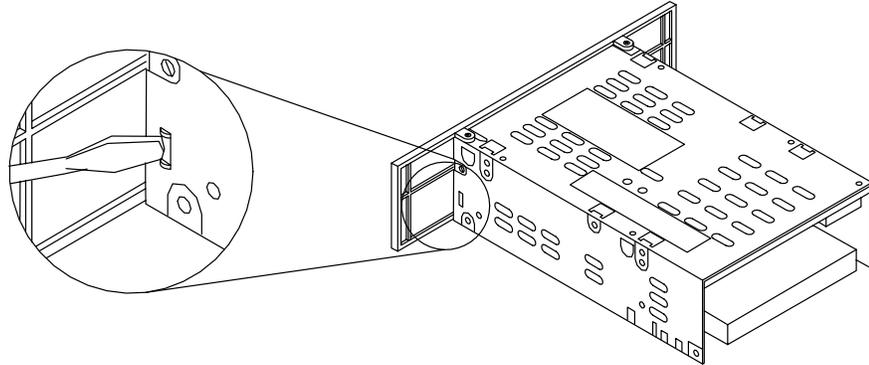


A4AA0219

    c. Move the bezel aside to provide access to the front of the drive assembly.
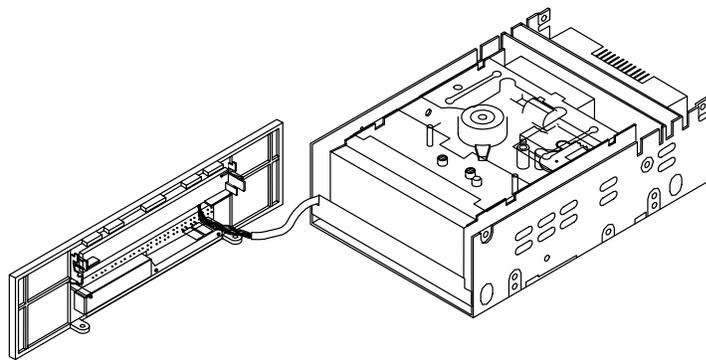


A4AA0220

4. Turn the mode motor shaft counterclockwise until the mode motor stops.

    **Note:**  It may require many turns before the mode motor stops.



Mode Motor Shaft

Front
Roller
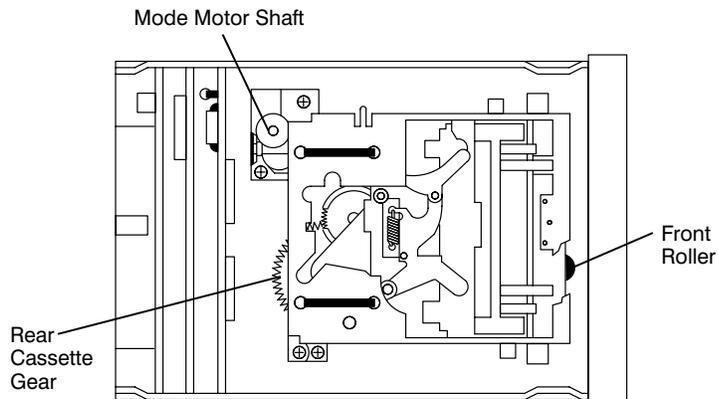
Rear
Cassette
Gear

A4AA0221

5. Push the front roller in and turn it clockwise until the tape is wound on the supply reel,
and the roller stops.

    **Note:**  It may require many turns before the front roller stops.

6. Use a small screwdriver to rotate the rear cartridge gear counterclockwise until the cartridge ejects.

7. Reassemble the tape drive and reconnect it to the system unit.

Top of Drive

Steel Pin on
Door of Bezel

White Plastic
Lever
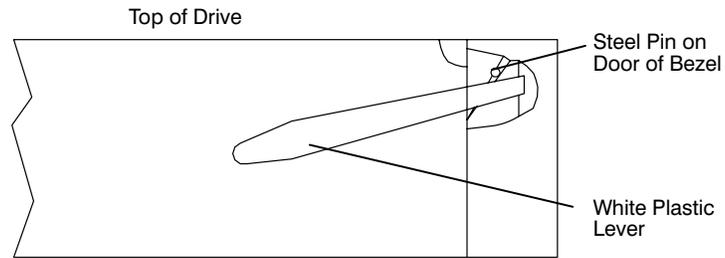
A4AA0222

**Attention:** When attaching the bezel, the cassette door should be raised to make sure that the steel pin on the left side of the door (with the drive assembly facing you) is above the white plastic lever on the left side of the drive assembly.

## Type B Drives:

1. Remove the drive assembly from the your system.  Use the documentation that came with your system.

2. Remove the mounting rails by removing the four screws near the lower edge of the drive assembly (two on each side) that are accessed through holes in the side of each rail.



**Top Cover Screw**

**Bezel Tab**

**Rail Screws**
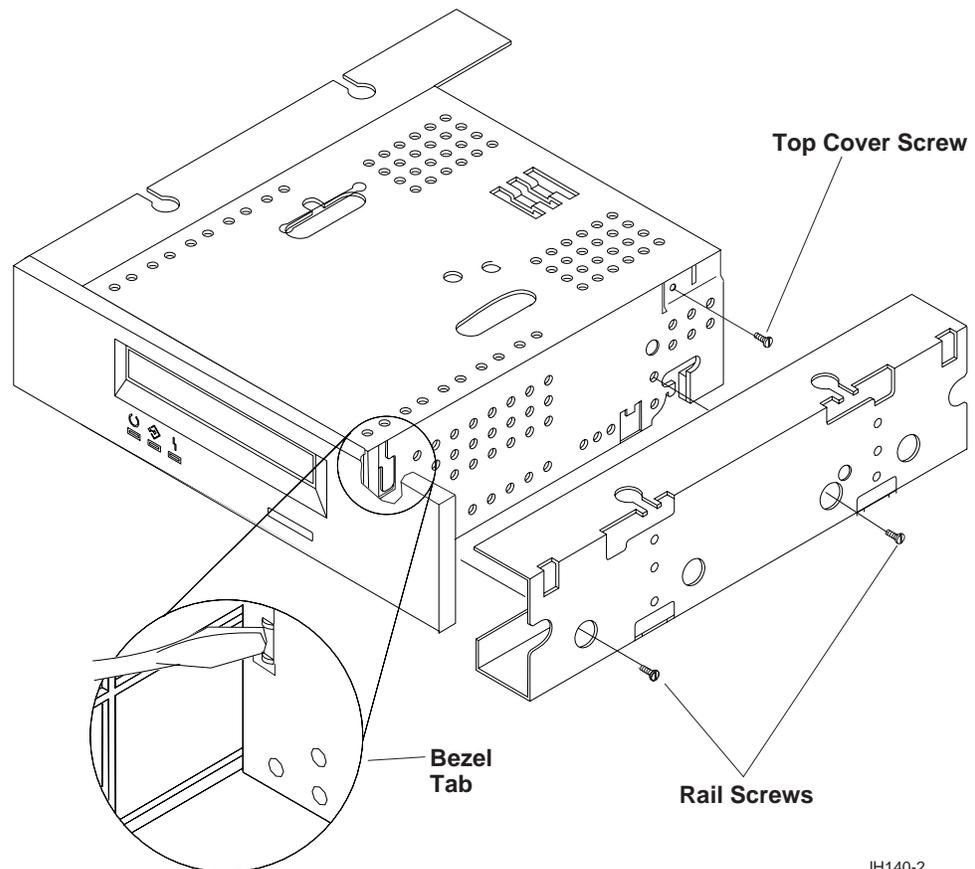
JH140-2

3. Remove the front bezel (the bezel snaps on).

    a. Depress the bezel tabs (one on each side).
    b. Pull the bezel down from the top.
    c. Lift the bezel off of the bottom locating tabs.
    d. Remove the bezel from the unit.

4. Remove the top cover (two screws).

    a. Remove the two screws securing the cover to the drive (one on each side towards rear of drive).
    b. Lift up on the rear of the top cover.
    c. Remove the top cover from the drive.

   **Attention:**  The mode motor gear can be damaged if cycled in the wrong direction.

   The following steps attempt to remove the tape from the drive without damaging the tape.

    a. Manually cycle the drive through an unload cycle until the tape is free of the drive mechanism.

b. Then, manually rotate the spindle to ensure the tape is pulled back inside the tape cartridge so that the tape is not be damaged when the cartridge door closes.

c. Complete the unload cycle until the tape ejects and can be removed from the drive.

5. The 0.25" diameter access hole [1] allows access to the mode gear.  You can find it on the right side of the drive chassis near the back of the unit.
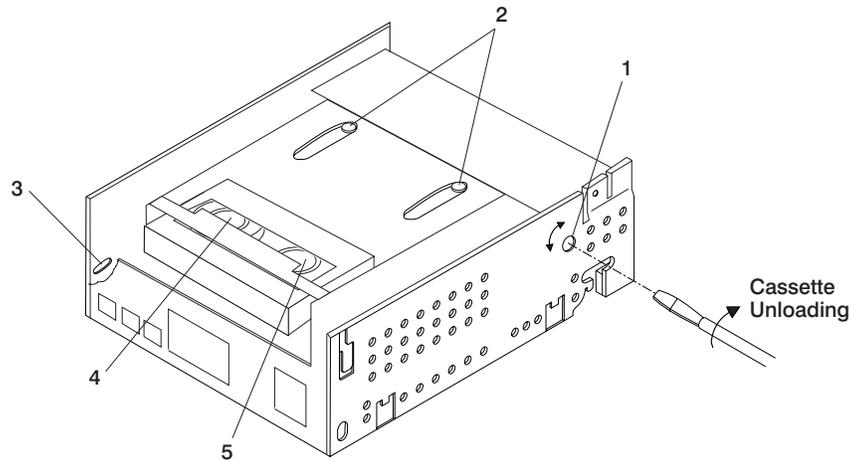


JH167-0

**Right Side View of the Drive Chassis**

6. With a small flat blade screwdriver, turn the mode motor gear inside the access hole, clockwise until the two pins [2] in the elongated slots begin to move toward the front of the drive (this can take up to 100 rotations of the screw driver).

7. Insert a small diameter allen wrench (or a similar tool) into slot [3].  Use it to rotate the left spindle [4] in a counter-clockwise direction by ratcheting the drive gear on the bottom of the spindle.  This pulls the excess tape back into the tape cartridge.

8. Continue turning the left spindle until the right spindle [5] begins to move, indicating the tape is inside the cartridge.

9. Return to the 0.25" diameter access hole [1] and continue cycling the drive (in a clockwise direction) through the unload cycle until the tape cartridge ejects from the drive.  This may take another 100 turns of the screwdriver.

10. Assemble the drive in reverse order.

# 12.0GB 4-mm Tape Drive

This section is used to set SCSI addresses and to give instructions for manually removing a stuck tape.

## Setting the SCSI Address

**Note:** Prior to installing the SCSI media device into the media bay, the address of the device must be set to any of the available SCSI addresses.

Do not change any of the other switches or jumpers that were set at the factory.

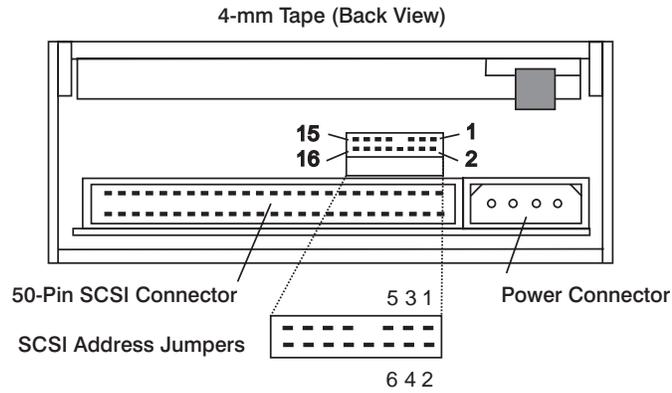The SCSI address is set using address pins located on the rear panel of the drive.
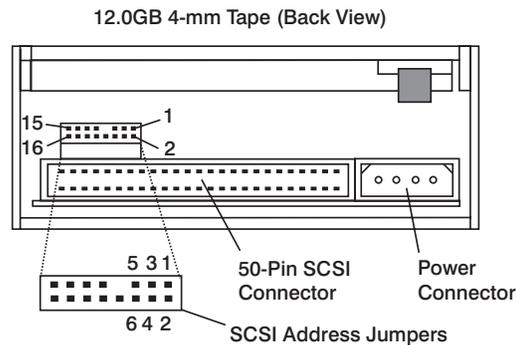


12.0GB 4-mm Tape (Back View)

| Address | Jumper 5-6 | Jumper 3-4 | Jumper 1-2 |
|---------|------------|------------|------------|
| 0 | Off | Off | Off |
| 1 | Off | Off | On |
| 2 | Off | On | Off |
| 3 | Off | On | On |
| 4 | On | Off | Off |
| 5 | On | Off | On |
| 6 | On | On | Off |

**Note:** The 12.0GB 4-mm tape drive is shipped with the three jumpers installed and set to address zero.

## Manually Removing the Tape Cartridge from the 12.0GB 4-mm Tape Drive

Use the following procedure to manually remove the data cartridge.

If a power outage occurs while a tape cartridge is loaded or the automatic unload procedure fails, you may want to manually unload a cartridge from the drive. The following steps outline the manual tape cartridge unloading and removal procedure.

During this process you will need to remove the top cover and front bezel, access and turn the mode motor shaft, and access and rotate the drive reel motor sprockets in order to safely disengage the tape and remove tape cartridge from the drive.

Once the front bezel has been removed, you can access the tape drive reel motor sprockets from the front of the drive. Just below the cartridge opening and above the flex cable there is a opening for access to the supply and take-up reel sprockets. Manually rotating either one of these sprockets will move the tape as long as the cartridge reels are still minimally engaged.

## Procedure:

1. For the external model:

   - Remove the drive from your system using the documentation that came with your external drive.

   - Remove the tape drive from the external covers. Turn the unit upside down and remove the four screws (two screws on each side) that attach the external cover to the drive unit. Remove the exterior cover and retain the screws.

2. For the internal model:

   - Remove the drive assembly from the computer using the documentation that came with your system.



Top Cover Screw

Bezel Identification

Rail Screws

A4AA2916
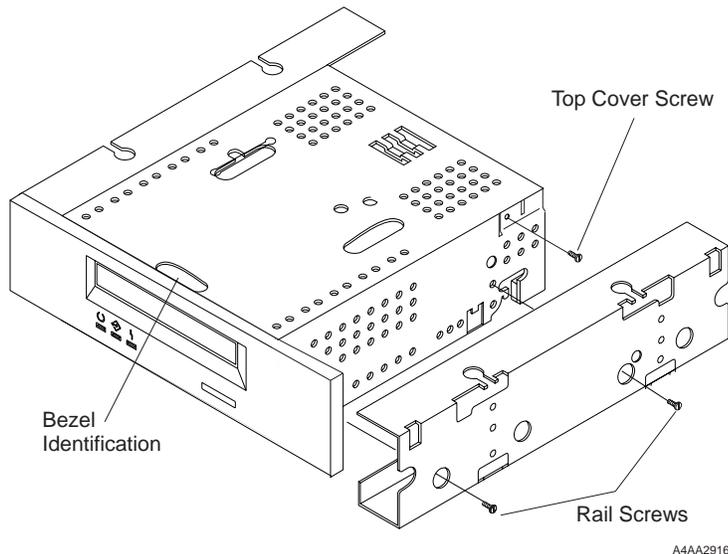
   - For internal models with rails, remove the mounting rails by removing the four screws near the lower edge of the unit (two on each side) that are accessed through holes in the side of each rail.

   - Remove the front bezel by pulling out on the top of the bezel at the indentation.

3. Remove the top cover of the drive unit by removing the two screws at the top edge near the rear of the unit (one on each side). Save the screws in a safe place.

To Mode Motor Shaft  To Mode Motor Shaft

Cassette Unloading

Cassette Tape Sprockets
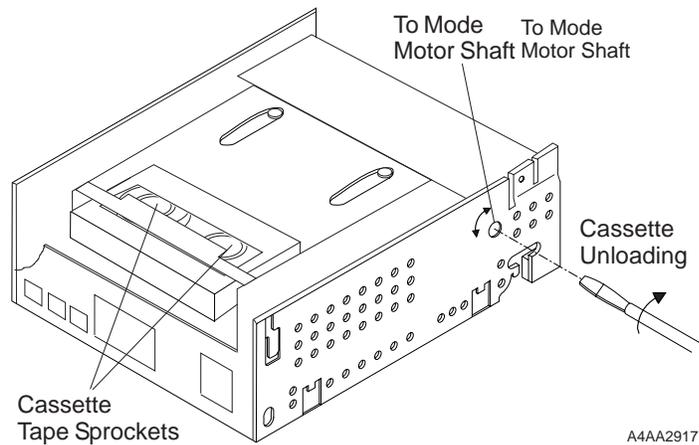
A4AA2917

The following steps attempt to remove the tape from the drive without damaging the tape. In the following steps it can take more than 100 turns (revolutions) of the screwdriver before the tape cartridge can be removed.

**Attention:** The mode motor gear can be damaged if cycled in the wrong direction. **DO NOT** turn the mode motor shaft countercolckwise.

4. Insert a small (precision) screw driver in the hole on the right side of the drive near the rear and begin turning the mode motor shaft clockwise.

   As you turn the shaft clockwise, you can see the tape drive's guidance rollers slowly retract. Once completely retracted it is necessary to access the tape drive reel sprockets to rewind all of the exposed tape into the tape cartridge so that the tape is not damaged when the cartridge door closes. See illustration on page 2-31.

   **Note:** Be sure to rewind all of the loose tape back into the cartridge before completing cartridge removal since tape damage can occur.



Tape Cassette    Drive Wheel Sprockets

Flex Cable
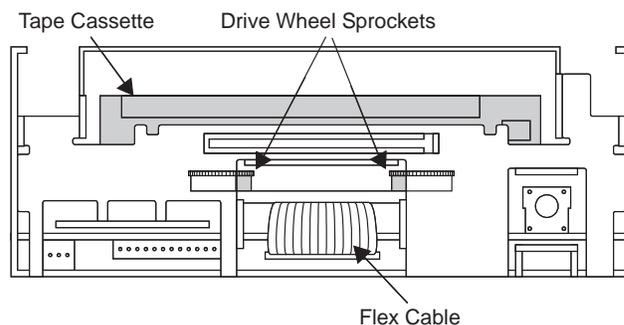
Once the tape drive guidance rollers have fully retracted turn the drive so that you are facing the front. With a small **non-magnetic** probe access one of the drive reel sprockets and manually rotate the drive reels until all of the tape has been wound inside of the cartridge.

5. Once all the tape has been wound back into the cartridge, continue turning the mode motor shaft clockwise until the cartridge rises and protrudes from the slot and "clicks" free. Remove the cartridge.

6. Replace the top cover on the drive and secure it with the two screws that you removed.

7. For the external model:

- Reassemble the drive unit into the exterior cover using the screws that you removed.

- Reconnect the drive to your system using the documentation that came with your external drive.

8. For the internal model:

- Replace the front bezel by angling the two plastic feet at the botton of the bezel into the two allgning holes on the bottom of the unit. Then snap the top of the bezel into place.

- For the internal model with rails, reattach the rails using the screws that you removed.

- Reinstall and connect the drive unit in your system using the documentation that came with your external drive.

# 2.3G-byte 8-mm Tape Drive

The 2.3G-byte 8-mm tape drive uses an 8-mm tape cartridge to store data.  This drive requires a full-high position when it is installed in the front panel.

## Setting the SCSI Address

**Note:**  When the drive is installed in a 7208, the address switches must be set to address  0.

The SCSI address is set using three switches on the rear panel of the drive.  When the drive is installed in a 7208, an address cable is attached to the address jumper block on the rear panel.



Rear View
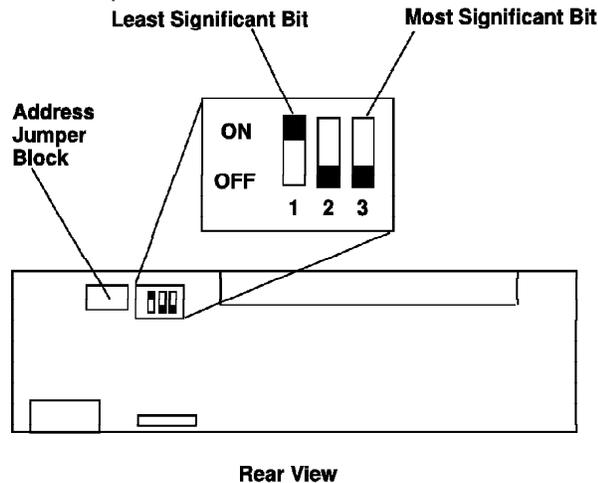
## Valid Addresses

| Address | Switch 1 | Switch 2 | Switch 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

## Manually Removing the Tape Cartridge

When a power or drive failure prevents the cartridge from ejecting, the cartridge may be removed manually.

The following tools are required to remove the cartridge from the tape drive:

- 3/8 inch flat blade screwdriver
- Pointed tweezers or small screwdriver

- Number T8 Torx™ driver
- Number T10 Torx driver
- Tape
- 6-volt lantern battery.

The manual removal requires partial disassembly of the tape drive.  Follow the listed steps exactly as stated.  Read all of the information contained in this procedure completely before attempting to remove a cartridge.

Do only as many parts of the following procedure as are required to free the cartridge.

## Part One of the Cartridge Removal Procedure

1. Use the removal procedure in your systems *Installation and Service Guide* to remove the tape drive.

2. Remove the top cover to the drive. To do this, remove the screws shown in the following illustration.

3. Refer to the illustration on page 2-37.  If the tape has been extracted from the tape cartridge and follows the tape path denoted by the heavy black line, continue with this procedure.  If the tape has not been extracted from the cartridge, go to the "Door Release and Tape Rewind Procedure" on page  2-40.
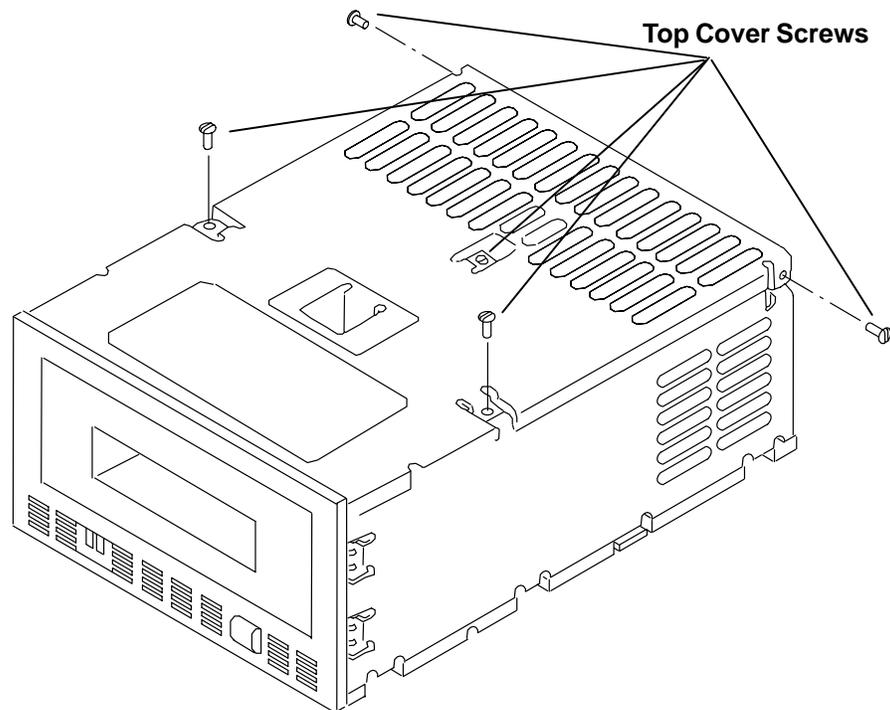


**Top Cover Screws**

**Attention:** Do not touch the tape on the outside of the loop, that is the surface of the tape where data is recorded.

The cartridge door must be taped open to prevent the door from closing on the tape before it is returned to the cartridge.  To tape the door open:

4. Use two pieces of tape approximately 2-1/2 inches long.  Position the two pieces of tape as shown in the illustration, and gently press the tape to the cartridge.
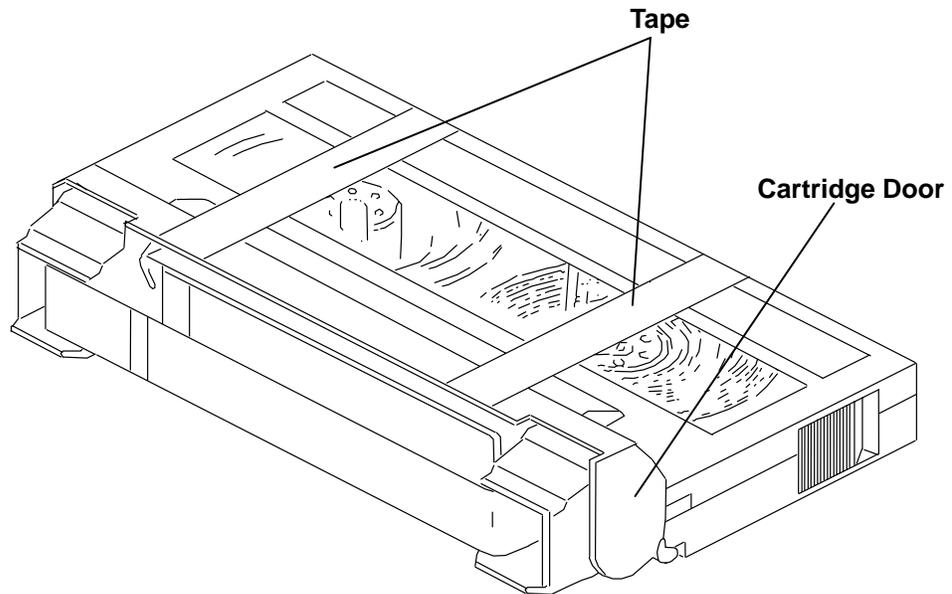
The load motor has a rectangular cover over it, which covers the red and brown load motor connector wires.

5. Remove the cover by lifting it straight up, and then carefully lift the tape covering the load motor contacts. Do not touch the data tape.

**Attention:** Care must be taken to ensure that the customer data tape does not get pinched in any of the rollers or guide posts of the load mechanism, while moving the load mechanism to the unload position.

To move the load mechanism to the unload position, the bottom of the drive should be down and the right side of the drive should be facing you. The red wire from the load motor is the ground, and the brown wire is the +5 V dc for the unload operation.

**Note:** Read steps 6, 7, and 8 completely before proceeding.

6. Connect the ground lead from the 6 volt power source to the pin of the connector attached to the red wire.

7. Connect the +6 volt lead from the power source to the pin of the connector attached to the brown wire.

**Attention:** Do not leave power applied to the load motor for more than 5 seconds maximum. Leaving power applied for periods in excess of the 5 seconds limit can result in damage to the load motor.

8. Apply power to the connector for approximately two seconds.

   You see the load ring and guide posts moving and hear the sounds of the movement while they are moving to the unload position. When movement of the load mechanism and the sound stops, remove the power from both pins of the connector.

9. If the tape unloaded, go to "Door Release and Tape Rewind Procedure" on page 2-40.

   If you did not hear or see any load mechanism movement, disconnect the power to the connector. Verify that the power source is good, and that you were applying the power correctly as described above. If you did not apply the power as described, you were attempting to perform a load operation rather than an unload operation. After making the connections as described above, repeat this step a second time. If the

drive still fails to unload, go to the "Second Part of the Cartridge Removal Procedure" on page 2-36.

**Guide Posts Inside This Area**



**Load Motor
Cable**

**Load Motor**

**Top View of Drive**
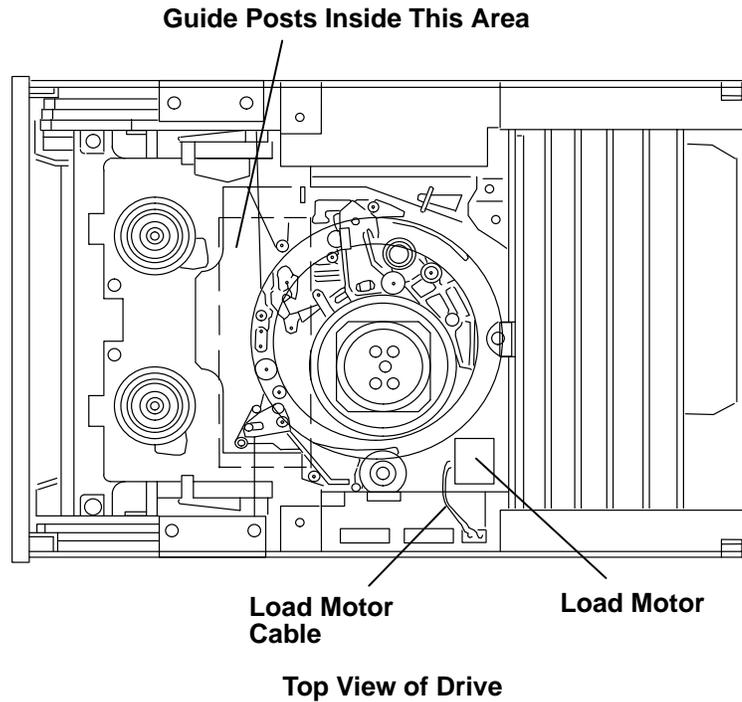
# Second Part of the Cartridge Removal Procedure

1. Remove the bottom cover.

2. Remove the servo card.

3. To prevent damaging the servo board or the wires and connectors, disconnect all of the connectors from the servo board, and be sure to note where they connect.

   Use a small screwdriver or similar tool to push on the key in the center of the connector.  Push the connector away from the servo board.  Start by removing the connectors closest to the rear of the drive.

4. Refer to the following illustration to locate the load motor and gears that control the load mechanism.

   Locate gear number 4 in the illustration; use this gear to return the load mechanism to the unload position.

**Load Motor**

**GEAR # 4 For
Use in Manual
Tape Unloading**

**Front Panel**

**Bottom View of Drive
(Servo Board Removed)**
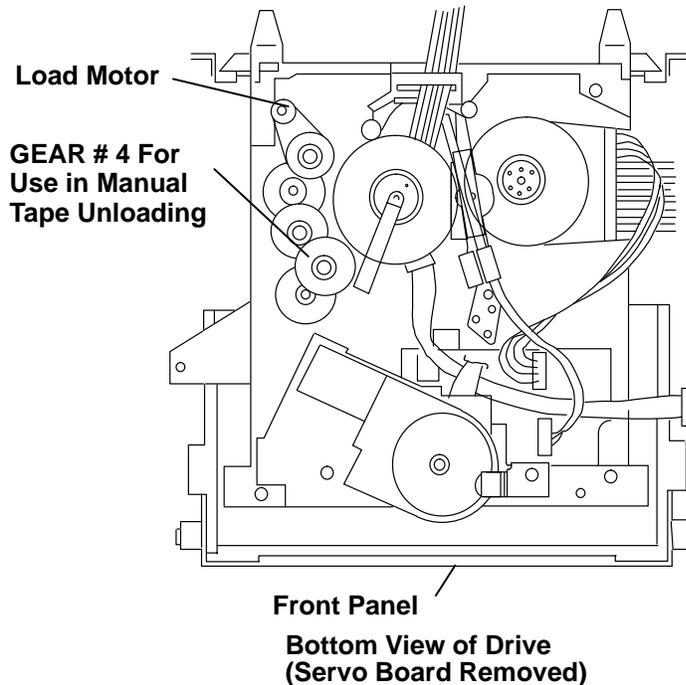
5. Tilt the drive so that you can see the tape load mechanism and the guide posts.
   While holding the drive in this position and watching the load mechanism, use your
   thumb to turn gear number 4. Turn the gear in a counter clockwise direction as
   viewed from the bottom of the drive.

   Continue to turn the gear until the load ring and all guide posts have returned to their
   unload positions. The load ring stops moving before all guide posts and rollers have
   retracted to their unload positions. Continue to turn the gear until the guide posts stop
   moving. The gear should be rotated slowly and without jerking the tape to prevent
   damaging the tape. The load mechanism is in the unload position when all guides,
   posts, and rollers on the load ring, and all other guide posts are approximately in a
   straight line closest to the tape.

6. If the tape unloaded, go to "Door Release and Tape Rewind Procedure" on
   page 2-40.

   If you were not able to unload the tape, go to the "Third Part of the Cartridge Removal
   Procedure."

## Third Part of the Cartridge Removal Procedure

**Attention:** This procedure has the highest potential for damage to the tape and to the
heads of the drive. Use care during this procedure.

1. Refer to the illustration and remove the screw that secures the erase head bracket; lift
   the erase head bracket straight up.

   The connector and wires do not have to be removed from the servo board. There is
   sufficient slack in the wires to allow the erase head bracket to be removed.

**Tape Guide**

**Erase Head Bracket**
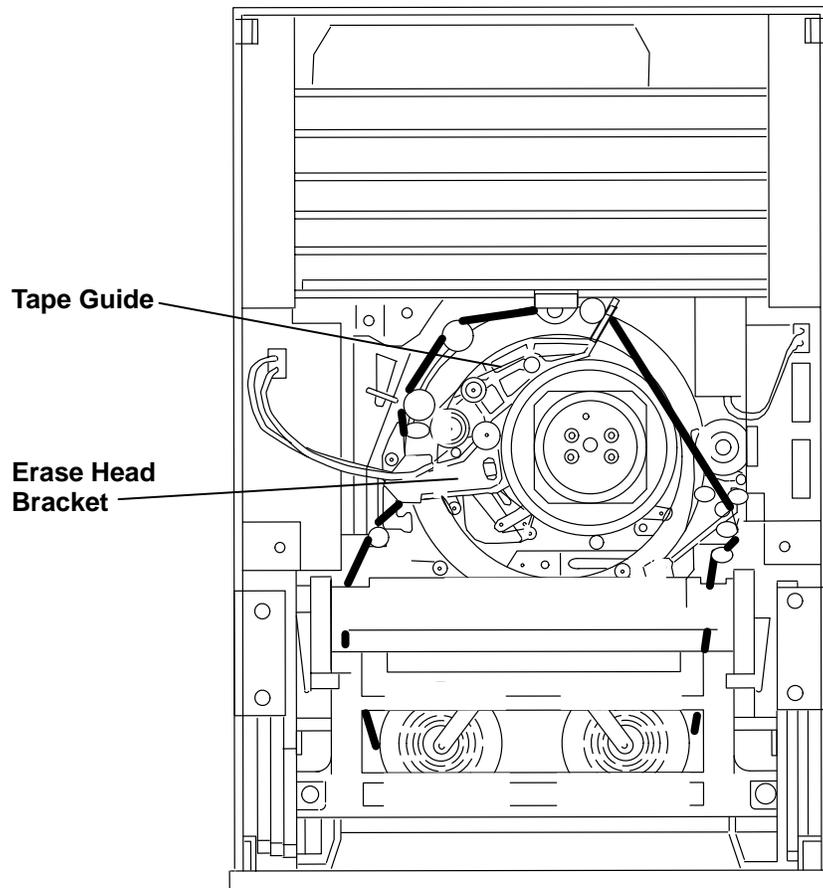
**Top View of Drive**

2. To remove the tape guide, lift it straight up.

   The heavy black line represents the tape path.  Use a nonconductive tool, such as a molded potentiometer adjustment tool when removing the tape from the guide posts and rollers.  Whenever this procedure describes the use of the tool, the tool must touch the side of the tape where no data is recorded.  If you are unsure of which side of the tape to touch with the tool, carefully inspect the tape path before starting this procedure.  The side of the tape that comes in contact with the rotating drum is the side where data is recorded.  The tool must only be used to touch the opposite side.

3. Use the tool to loosen the tape at point 1.  While touching the side of the tape where no data is recorded, move the tool toward the rear of the drive.  This action should cause the tape to pull off of the takeup reel and make a loose loop.

4. Move the pinch roller flange toward the side of the drive, and hold it in this position.  This action releases the pinch roller.  Insert the tool in the tape loop at approximately point 2.

**Attention:** Once you start to remove the tape from between the pinch roller and the capstan, *do not* release the pinch roller until the tape is completely clear of this area.  If the pinch roller is released during this part of the procedure, before the tape is clear of these components, the tape will be damaged.

5. Remove the tape from around the guide posts and rollers at point 3 and point 4, being sure to place the tool inside the tape loop, that is, on the nonrecorded side of the tape.

   Point 5 is an *L-shaped* molded black plastic part. The *L-shaped* part is mounted upside-down to prevent the tape from riding up on the rotating drum. Care must be taken so that the tape is not creased or damaged in any way during tape removal.

6. Position the tool between points 4 and 5 inside the tape loop and gently move the tape up so that it passes between the **L** and the top edge of the drum.

7. Remove the tape from around the guide posts and roller at point 6; be sure to place the tool inside the tape loop.
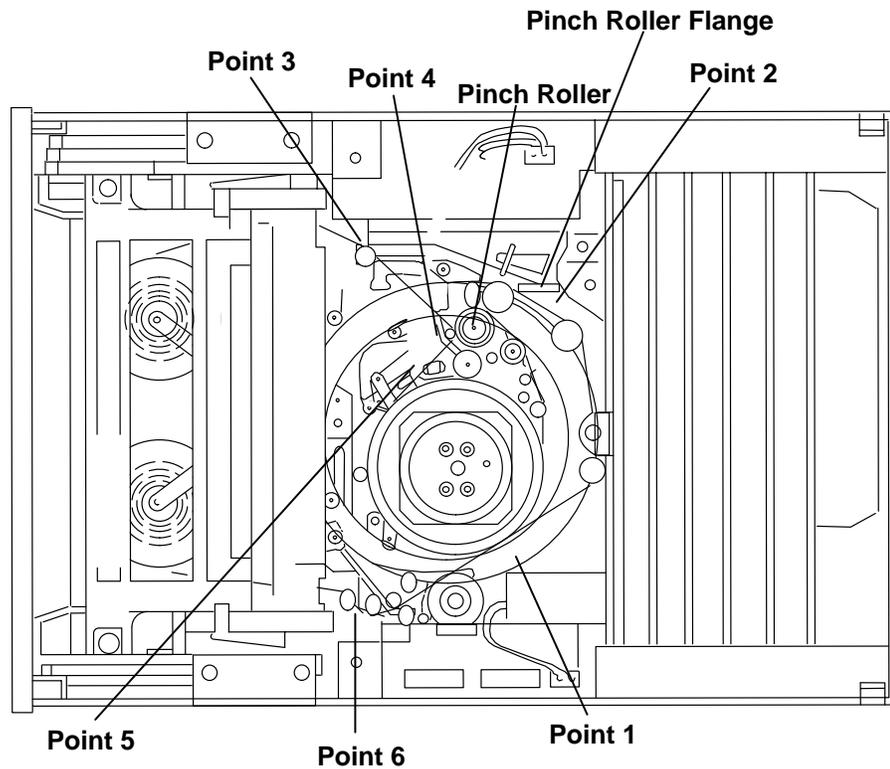


**Top View of Drive**

8. Go to "Door Release and Tape Rewind Procedure."
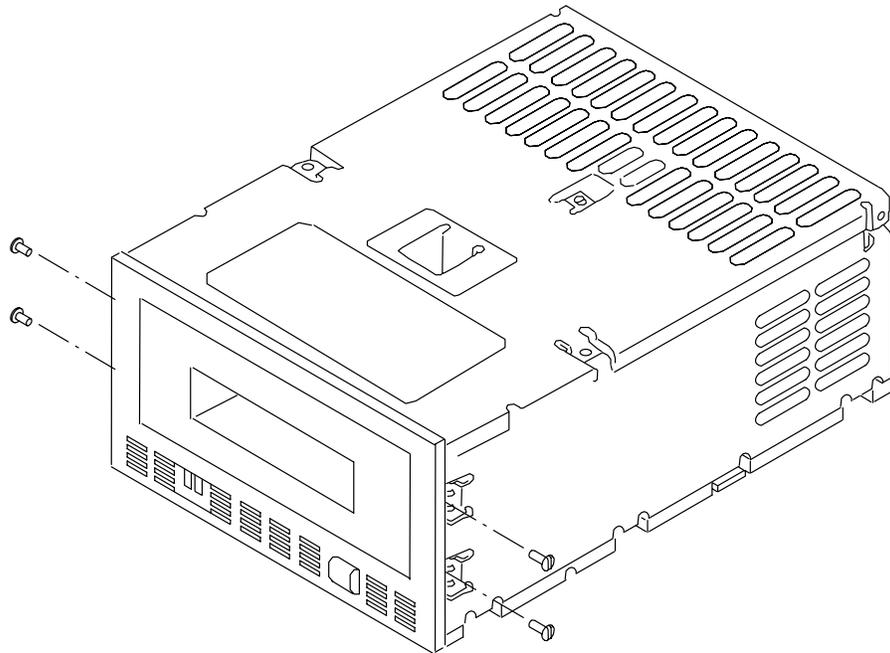
# Door Release and Tape Rewind Procedure

1. Use a small screwdriver to move the drive door release lever toward the front of the drive.

   Care must be taken when removing the drive door components with the data cartridge still in the drive.  When opening the door, control the rate at which it opens by holding the door with your fingers so that it opens more slowly.  This prevents the data cartridge from moving quickly and damaging the loose tape.

**Drive Door**

**Drive Door Release Lever**
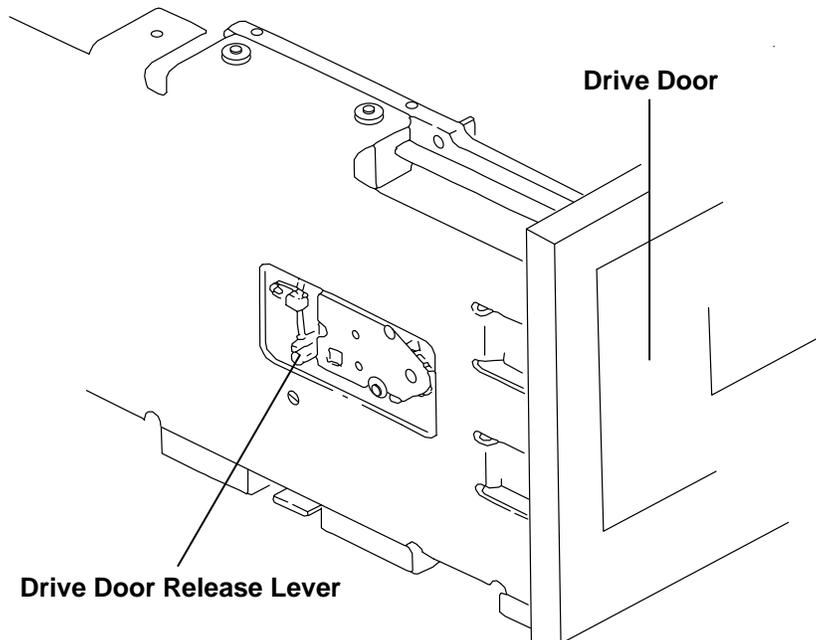
2. Release the two latches on the drive door, then remove the front and back parts of the door assembly from the door hinge.



Latches
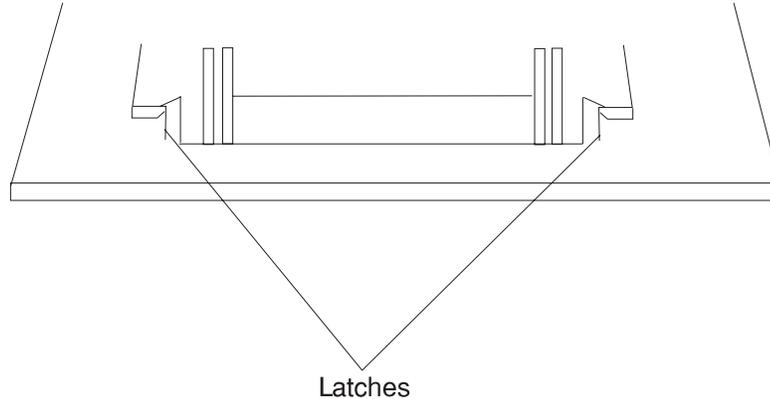
With the door open, position the drive so that it is resting on the rear of the frame, with the door facing up and the bottom of the drive facing you.  Use a flat blade screwdriver and insert it into the hub of the takeup reel; this is the hub on the right with the drive in the current position.

3. When the screwdriver is inserted in the hub, turn the hub counter-clockwise slowly.

While turning the screwdriver, watch the tape loop to ensure that it does not get caught on any of the components.  *If the tape gets caught, free the tape from the obstruction before turning the hub any further*.

**Attention:** Do not touch the tape on the outside of the loop, that is the surface of the tape where data is recorded.  Make sure that all of the loose tape has been wound into the cartridge.  If all of the tape is not in the data cartridge, the tape will be damaged by the cartridge door.  Do not overwind the tape into the cartridge once the loose tape has wound onto the takeup reel.  Overwinding the tape results in tape damage.

4. When all of the loose tape has been wound into the data cartridge, remove the screwdriver.

5. Remove the scotch tape holding the door of the cartridge open.

6. Remove the cartridge.

To reassemble the tape drive, reverse the removal procedures.

# 5G-byte 8-mm Tape Drive

The 5G-byte 8-mm tape drive uses an 8-mm tape cartridge to store data. This drive requires a full-high position when it is installed in the front panel.

# Setting the SCSI Address for External Installations

**Attention:** The SCSI address must be set while both system unit and tape drive power are turned off. Attaching the tape drive to an active system unit may damage the drive and/or the system unit.

To set an SCSI address for external installations, select an unused address number, and press the + or - pushbutton on the rear of the tape drive to display that number.

**Rear View**

# Setting the SCSI Address for Internal Installations

**Attention:** The SCSI address must be set while both system unit and tape drive power are turned off. Attaching the tape drive to an active system unit may damage the drive and/or the system unit.

**Rear View of Tape Drive**

**Remote Connector**



**2  1  0**

**Address**

## Valid Addresses

| Address | Jumper 2 | Jumper 1 | Jumper 0 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | Off | Off | On |
| 2 | Off | On | Off |
| 3 | Off | On | On |
| 4 | On | Off | Off |
| 5 | On | Off | On |
| 6 | On | On | Off |

**Note:** The 5G-byte Tape Drive device is shipped with three jumpers installed.

# Manually Removing the Tape Cartridge

Use the following procedure to manually remove the data cartridge for a non-functioning 8-mm tape drive:

**Attention:** This procedure is very delicate, and it could result in tape drive and/or tape cartridge damage. Use this procedure only as a last option after you have attempted to clear any potential hang condition by powering the tape drive on and off.

# Manually Removing a Loaded Tape Cartridge

Use the following removal procedure when a tape cartridge has been loaded into the tape path:

**Attention:** This procedure destroys the tape.

1. Remove the five screws from the top cover of the tape drive.
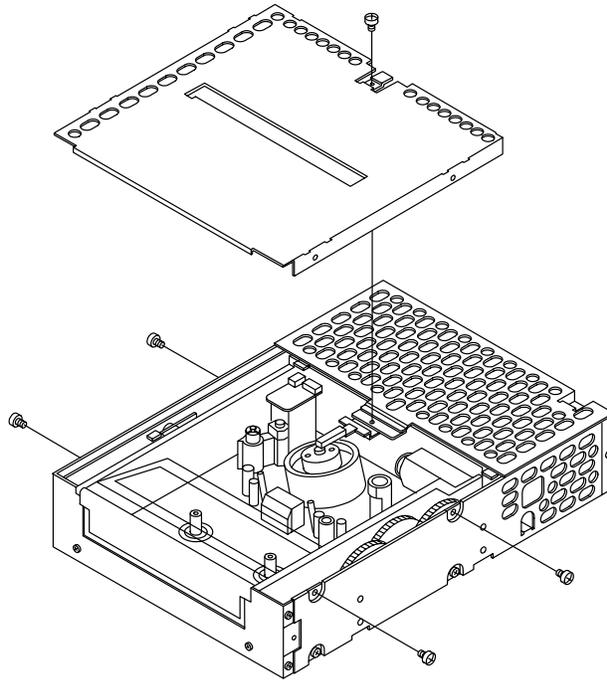
A4AA0223

2. Using tweezers, loosen the tape as shown in the illustration on the following page.  If the pinch roller is engaged, push the indicated spring to release the pinch roller and loosen the tape.

Capstan

Pinch Roller

Make Tape Loop With Tweezers

Push Here to Release Pinch Roller

Cut Tape

Data Cartridge Door
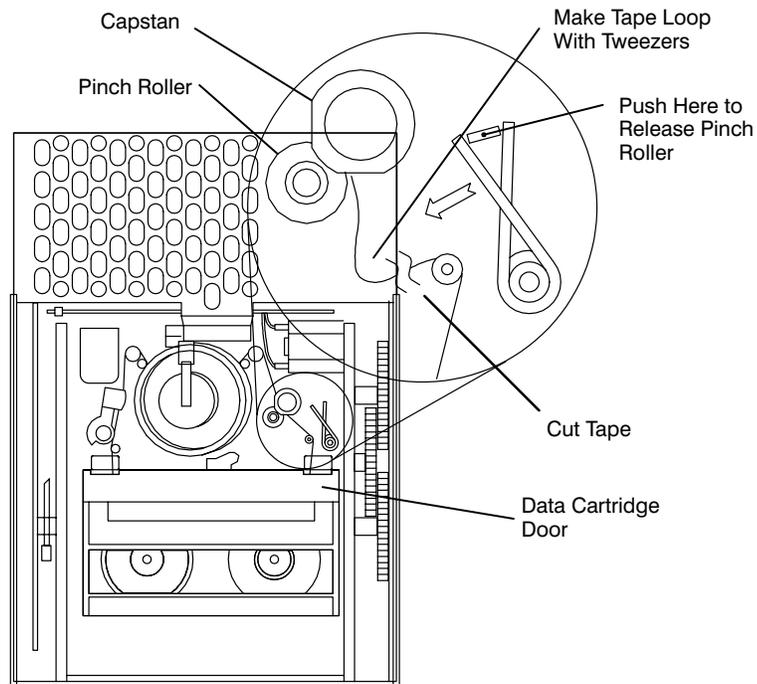
A4AA0224

3. Make a loop in the tape with the tweezers, and cut the tape where shown above.

4. Using your index finger, gently press down the lock release tab until it clicks.

5. With the thumb of your other hand, roll the cassette loading gear toward the data cartridge. The cartridge should eject.



Lock Release Tab

Cassette Loading Gear
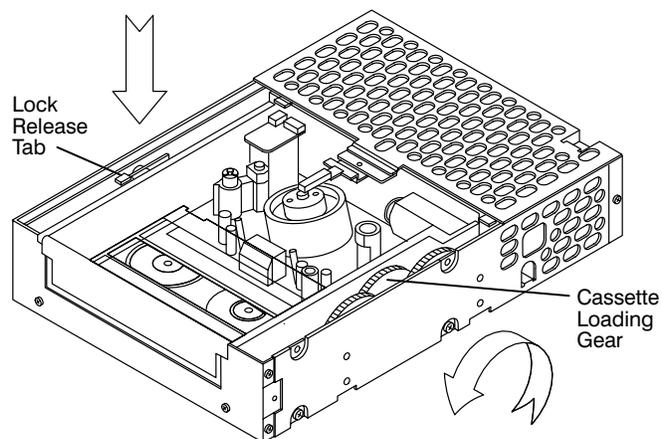
A4AA0225

## Manually Removing an Unloaded Tape Cartridge

Perform Steps 1, 4, and 5 of the loaded tape cartridge removal procedure.

## 20.0GB 8-mm Tape Drive

This section is used to set SCSI addresses and to give instructions for manually removing a stuck tape.

## Setting the SCSI Address

**Note:** Prior to installing the SCSI media device into the media bay, the address of the device must be set to any of the available SCSI addresses.

The SCSI address (ID) is set by placing jumpers on the address pins located on the rear panel of the drive. See table of Valid Addresses (SCSI IDs) on page 2-47.
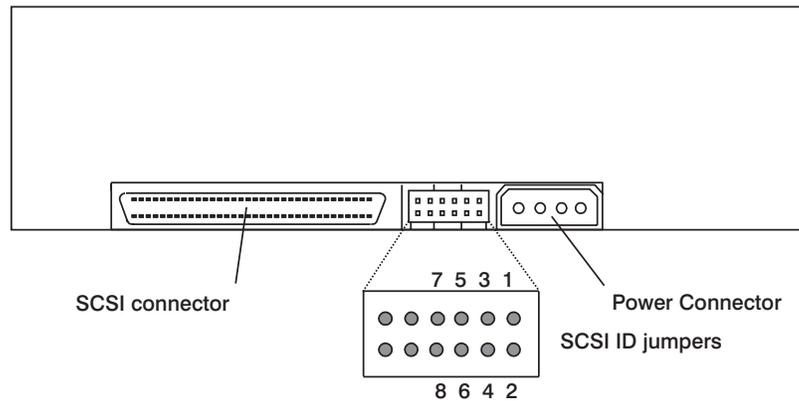
## Valid Addresses (SCSI IDs)

| Address | Jumper 7-8 | Jumper 5-6 | Jumper 3-4 | Jumper 1-2 |
|---------|-----------|-----------|-----------|-----------|
| 0 | Off | Off | Off | Off |
| 1 | Off | Off | Off | On |
| 2 | Off | Off | On | Off |
| 3 | Off | Off | On | On |
| 4 | Off | On | Off | Off |
| 5 | Off | On | Off | On |
| 6 | Off | On | On | Off |
| 7* | Off | On | On | On |
| 8 | On | Off | Off | Off |
| 9 | On | Off | Off | On |
| 10 | On | Off | On | Off |
| 11 | On | Off | On | On |
| 12 | On | On | Off | Off |
| 13 | On | On | Off | On |
| 14 | On | On | On | Off |
| 15 | On | On | On | On |

**Note:**

1. Address 7 is reserved for the adapter.

2. The 20GB 8-mm tape drive is shipped with three jumpers installed.

# Manually Removing the Tape Cartridge from an 20GB 8-mm Tape Drive

Use the following procedure to manually remove the data cartridge from a non-functioning 20GB 8-mm tape drive:

**Attention:**

1. The procedure that follows may result in damage to your tape cartridge. If you use this procedure, you must replace the drive.  If you choose to return the drive and the stuck tape to IBM for maintenance, the tape will be scrapped.

2. This procedure is very delicate, and could result in damage to the tape, the tape drive or both.

3. Use this procedure only as the last option after you have attempted to clear the hang condition by powering the tape drive on and off.

4. A 2.5mm Allen driver is provided with the replacement FRU for the 20GB 8mm tape drive.

Use the service information for your system to remove the tape drive.  Then move the tape drive to a suitable work area.

1. Remove the three T6 screws that hold the top cover of the tape drive. Remove the top cover.  This will allow you to observe the tape unload progress.

2. Alternate moving the drive's trolleys to ward the unloaded position and moving the supply reel motor to take up slack in the media.  Do not touch the media itself.  As the drive faces you, the trolleys are moved by inserting a 2.5mm Allen driver in the hole marked UNLOAD at the left rear and turning in the marked direction (clockwise).  The supply reel motor is moved by inserting a non-metallic probe into the hole marked UNLOAD on the drives bottom and turning in the marked direction (clockwise).  The wooden end of a swab works well for this purpose.  Alternate frequently, between moving the trolleys and taking up slack, to avoid damaging the media.  Use of a metal tool may damage the supply reel motor.  This process is complete when the trolleys stop moving and the media is fully retracted into the cartridge shell.

3. Unload the cartridge.  As the drive faces you, the cartridge is unloaded by inserting a 2.5mm Allen driver in the hole marked UNLOAD at the left front and turning in the marked direction (counter-clockwise).  This process is complete when the cartridge is ejected.

4.  Replace the drive's top cover.

# 160MB SCSI Disk Drive

The 160MB SCSI disk drive is a 3-1/2 inch device which fits into a half-high media position.

## Setting the SCSI Address

**Notes:**

1. The device is shipped with jumpers configured for Address 6.

2. All three terminating resistors must be removed before installing the drive.

The three-position address jumper block J3 is located on the fixed-disk logic card shown. Addressing information is given in the table below.
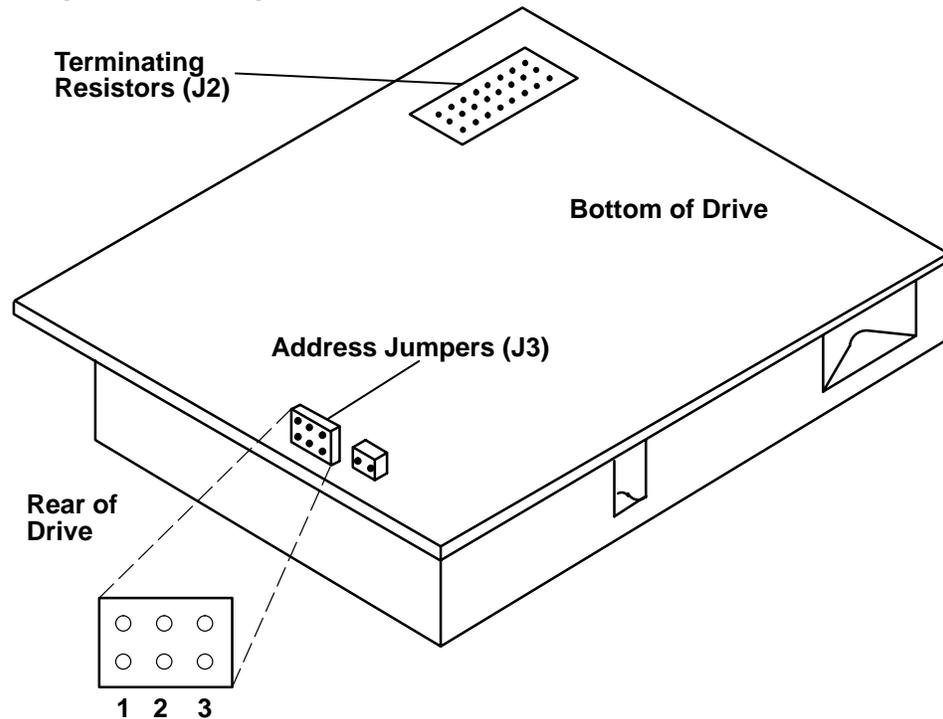


## Valid Addresses

| Address | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

## 200MB SCSI Disk Drive

The 200MB SCSI disk drive is a 3-1/2 inch device which fits into a half-high media position.

## Setting the SCSI Address

**Notes:**

1. The device is shipped with jumpers configured for Address 6.

2. All three terminating resistors must be removed before installing the drive.

3. All option jumpers must be removed.

The address/optional jumper block J4 is located on the fixed-disk logic card shown. Valid addressing information is given in the table below.
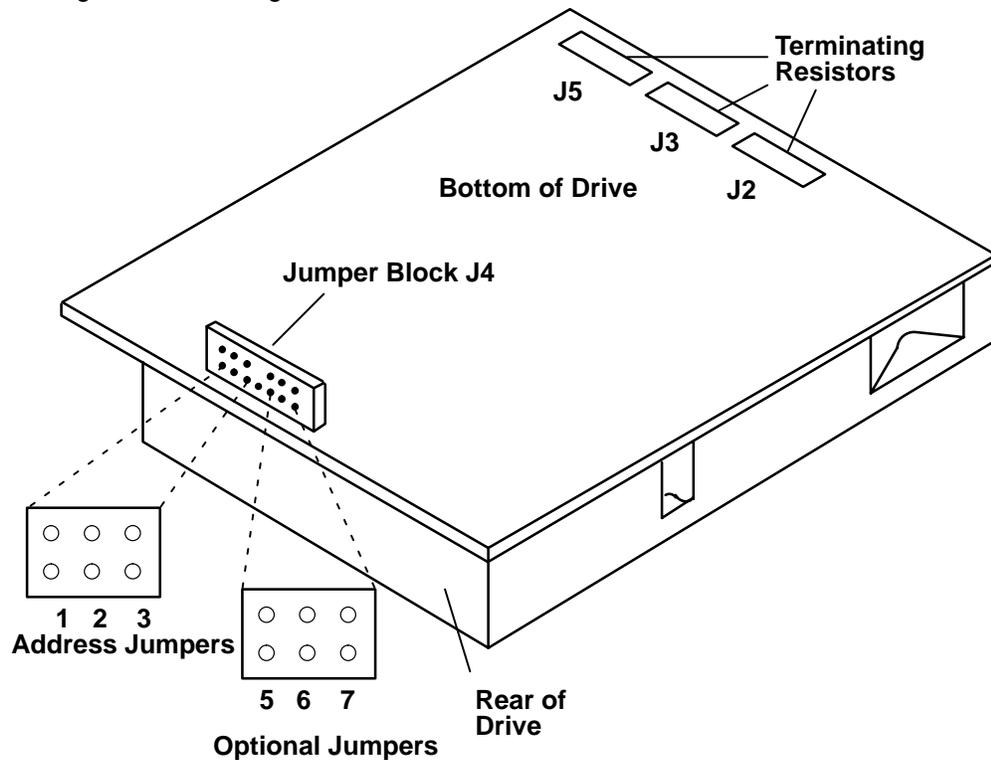


## Valid Addresses

| Address | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

## 320MB and 400MB SCSI Disk Drives

The 320MB and 400MB SCSI disk drives are 3-1/2 inch devices each of which fits into a half-high media position.

## Setting the SCSI Address

**Note:** The device is shipped with no jumpers installed.

Use the following diagram to locate the jumpers and set the SCSI address.

When the 320MB or 400MB SCSI disk drive is installed in the 7204, all jumpers must be removed and an address cable is attached to the connector. The SCSI address is set on the back panel of the device.
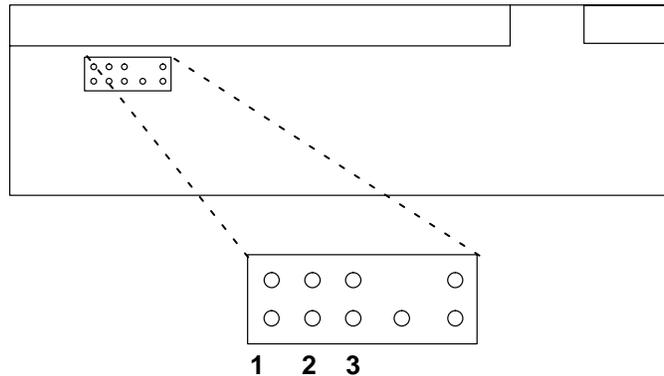


## Valid Addresses

| Address | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

## Exchanging the Logic Card and Frame Assembly

Refer to the procedures that were packed with the FRU.

## 355MB and 670MB SCSI Disk Drives

The 355MB and 670MB SCSI disk drives are 5-1/4 inch drives. These drives mount into a full-high media position.

## Setting the SCSI Address Jumpers

**Note:** The device is shipped with no address jumpers installed. The number and settings of the other jumpers may vary and should not be changed.

The SCSI address of the 355MB and 670MB disk drives is set by jumpers located on the logic card. Use the following diagram to set the jumpers. When the drives are used in the modules for the 7203, the jumpers must be set to address 0.



J37    J36    J35
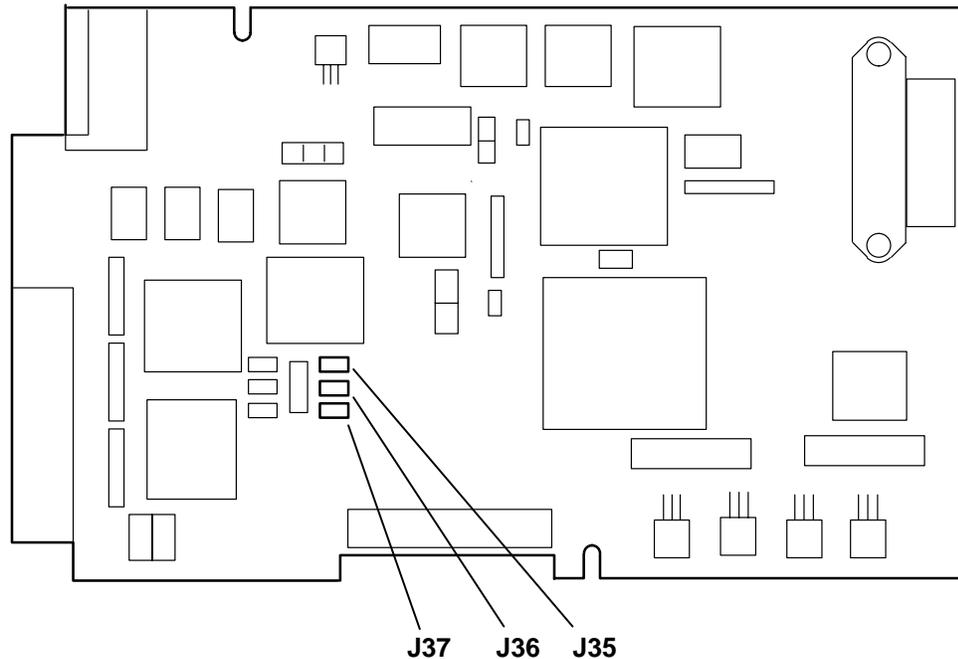
## Valid Addresses

| Address | Jumper 35 | Jumper 36 | Jumper 37 |
|---------|-----------|-----------|-----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

# Exchanging the Logic Card

The logic card on the 355MB and 670MB disk drives can be removed without removing the disk enclosure.  Use the following procedure to exchange the logic card:

1. Remove the disk drive (see the installation and service guide for the system unit or device).

2. Lay the drive upside down on a flat surface.

3. Record the setting of the SCSI address jumpers.

4. Remove the two screws that attach the rear brace to the frame on the J4 side of the drive.

5. Remove the four screws holding the logic card to the frame.

6. Carefully remove the Teflon tape from connectors J4 and J5 (save the tape).

7. Lift the logic card slightly and disconnect the cables from the connectors at J5.

8. Lift the logic card slightly and disconnect the cable from connector J4.

9. Tilt the one side of the logic card up and spread the frame enough to allow the card to be removed.

10. Be sure the logic card shield is in place before starting to install the new logic board; then assemble in the reverse order.



**Unused Position on the Connector**      **J5 Connectors**

**Rear Brace Screws (Not Visible in Drawing)**      **SCSI Address Jumpers**      **Connector J4**
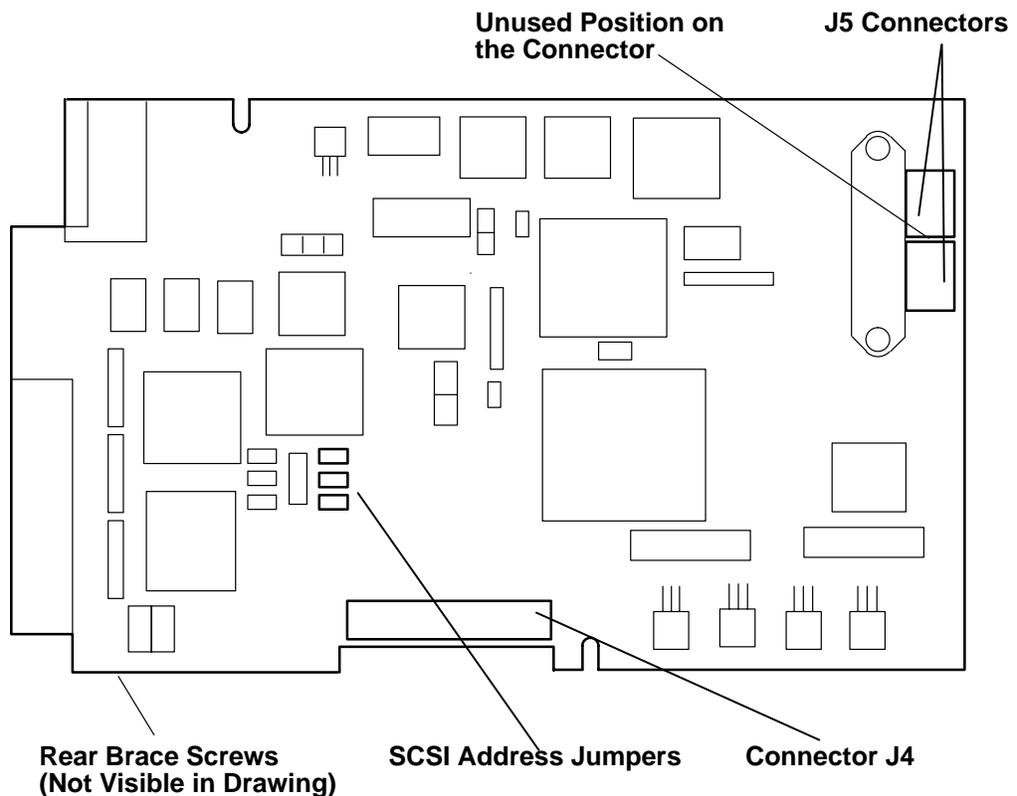
## 540MB SCSI-2 Single-Ended Disk Drive

The 540MB SCSI-2 disk drive has a 3.5 inch form factor and mount in a half-height media position.

## Setting the SCSI Address Jumpers

**Note:** The device is shipped with jumpers configured for Address 6.

The SCSI address of the 540MB SCSI-2 disk drive is set by J6 jumpers located on the logic card. Use the following diagram to set the jumpers.
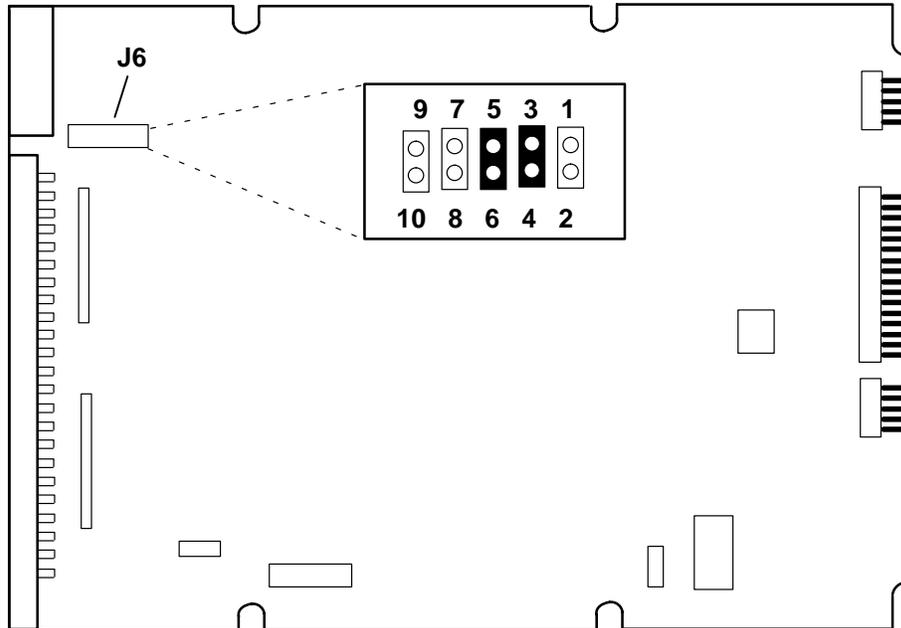
## Valid Addresses

| Address | Jumper 5-6 | Jumper 3-4 | Jumper 1-2 |
|---------|------------|------------|------------|
| 0 | Off | Off | Off |
| 1 | Off | Off | On |
| 2 | Off | On | Off |
| 3 | Off | On | On |
| 4 | On | Off | Off |
| 5 | On | Off | On |
| 6 | On | On | Off |

## 857MB SCSI Disk Drive

The 857MB SCSI disk drive is a 5-1/4 inch fixed-disk drive which mounts into a full-high media position.

## Setting the SCSI Address Switches

The SCSI addresses of the 857MB SCSI disk drive is set with three switches on the rear of each drive.  Use the following diagram to set the SCSI address.
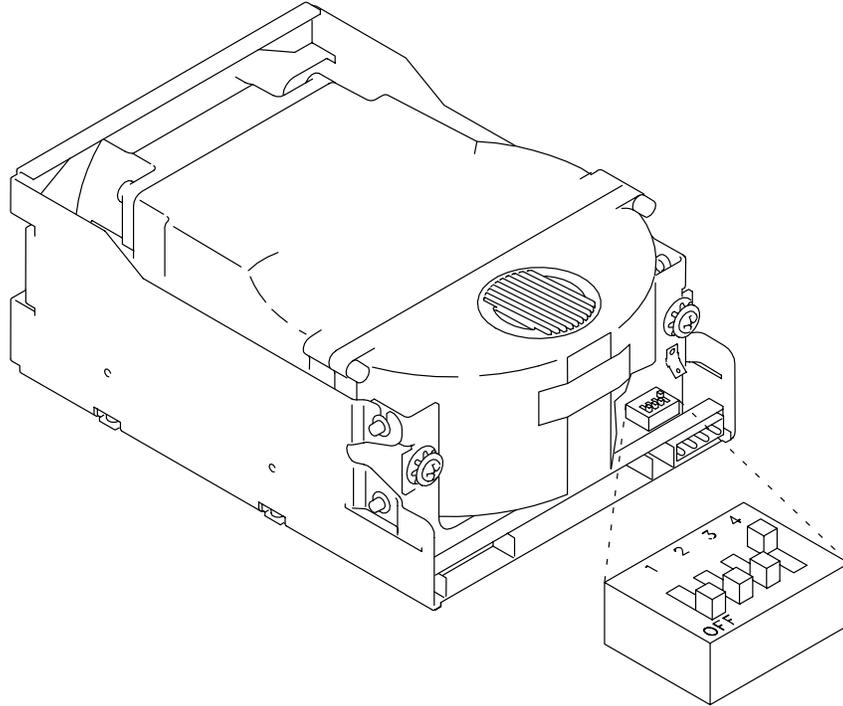
## Valid Addresses

**Note:**  The fourth switch is set to On.

| Address | Switch 1 | Switch 2 | Switch 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | Off | Off | On |
| 2 | Off | On | Off |
| 3 | Off | On | On |
| 4 | On | Off | Off |
| 5 | On | Off | On |
| 6 | On | On | Off |

## 857MB Slim-High SCSI Single-Ended Disk Drive

The 857MB SCSI disk drive is a 3-1/2 inch fixed-disk drive which mounts into a full-high media position when mounted on its adapter plate.

## 857MB Slim-High Single-Ended Drive
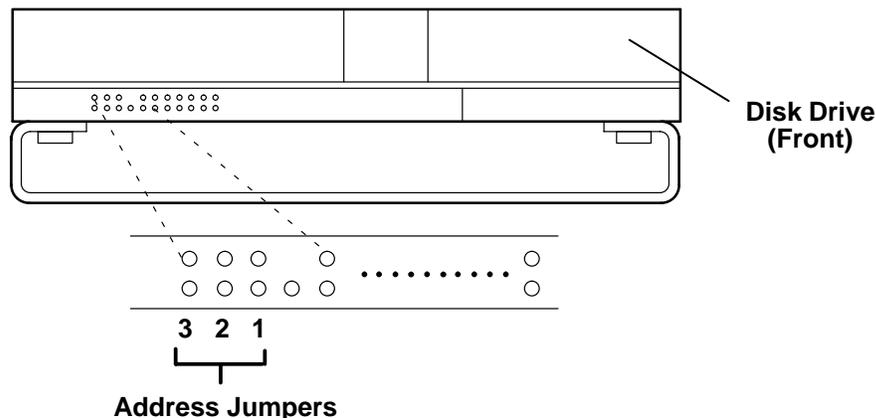


**Disk Drive (Front)**

**3  2  1**

**Address Jumpers**

**Note:** This one-inch height drive is shipped with an appropriate mounting plate to increase its installed thickness.

## Setting the SCSI Address Jumpers

## Valid Addresses

| Address | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

## Exchanging the Frame Electronics

Refer to the procedures that were packed with the FRU.

## Logic Card Removal and Replacement Procedures

The 857M-byte SCSI disk drive does not come as one complete assembly.  You must exchange either the disk enclosure or the logic card and frame assembly.  The logic card and frame assembly is one Field Replaceable Unit (FRU).  When you exchange the logic card and frame assembly, be sure to set the switches correctly.  If the logic card and

frame assembly FRU does not fix your problem, install a new disk enclosure in the old logic card and frame assembly.

This same procedure is also used to exchange the disk enclosure.

Carefully perform the following procedure while observing the accompanying attention notices.

**Attention:**

- The disk drive weighs 3.5 kg (7.7 pounds). Take care when you remove it from the using system.

- When the disk drive is brought from an environment whose temperature is outside the specified operating range, that disk drive should not be used for at least three hours. This delay allows it to acclimatize to its new environment.  During this period, the disk drive should be removed from its shipping box, but must remain in the sealed bag to prevent condensation from forming.

- The disk drives are fragile.  Handle them with care and keep them well away from strong magnetic influences.  Use protective packaging materials when transporting disk drives.

- The logic card is electrostatic discharge (ESD) sensitive.  When handling the card, use the field ESD kit (part 6428316) in accordance with CEM 270 (305).

- A new FRU may not be compatible with the original FRU.  If the instructions accompanying the new FRU indicate that the FRUs are compatible, continue with the procedures in this section.  If the FRUs are not compatible, follow the instructions enclosed with the new FRU.

**Note:**  Early logic card and frame assemblies (part 95X2172) are not inscribed or labeled with the part number.  Later assemblies (part 95X2346) contain a part number label on the inside of the frame.

# Disassembling the Disk Drive

1. Ensure that you have a flat work surface on which to disassemble the disk drive.

2. Switch off the using system.

**Attention:** Allow approximately 20 seconds for the disk drive to stop rotating. Do not attempt to remove the disk drive until it has stopped rotating.

3. Remove the disk drive (see the installation and service guide for the system unit or device).

4. Lay the disk drive onto a suitable support [1]. The support must be narrower than the disk enclosure [2], so that it does not touch the frame [3] of the logic card assembly, and thick enough (approximately 7 mm or 0.25 inches) to hold the frame just clear of the work surface. A notepad or similar item makes an ideal support.
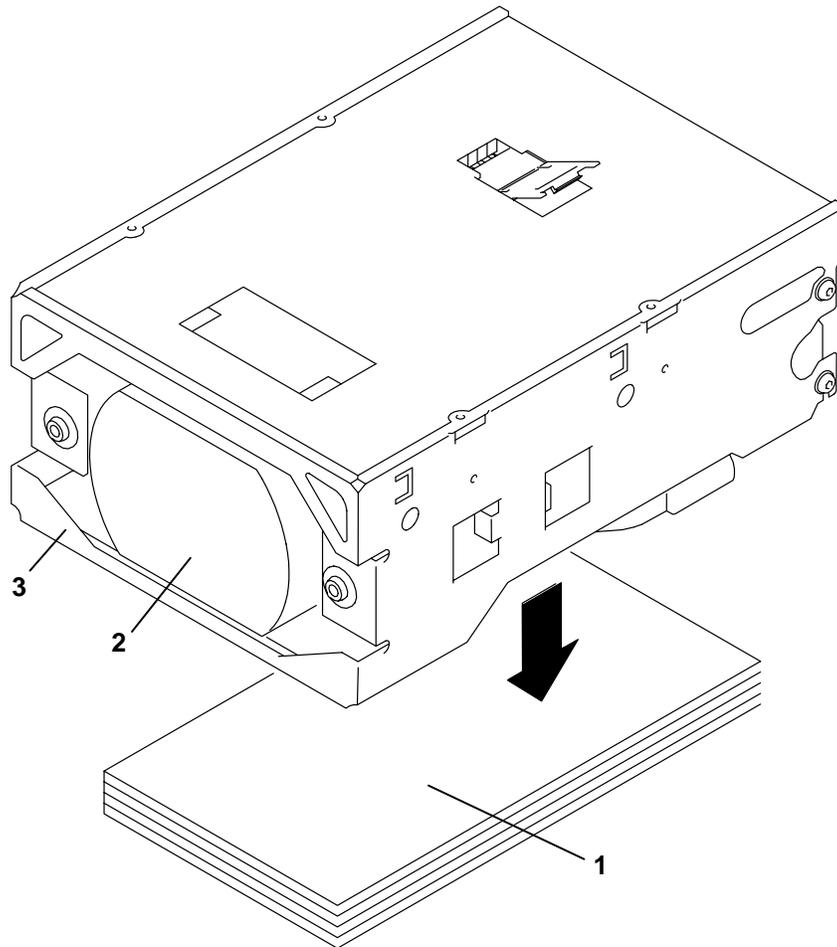
**Attention:** In this step and the following steps, you are going to disconnect the spindle-motor connector.  The wires to this connector might become damaged if they are pulled or bent too much. Follow the instructions carefully.

5. Using a small screwdriver, release and carefully lift the plastic flap of the spindle-motor connector [1].

6. Slide the connector in the direction of the arrow, and disconnect it from the logic card.
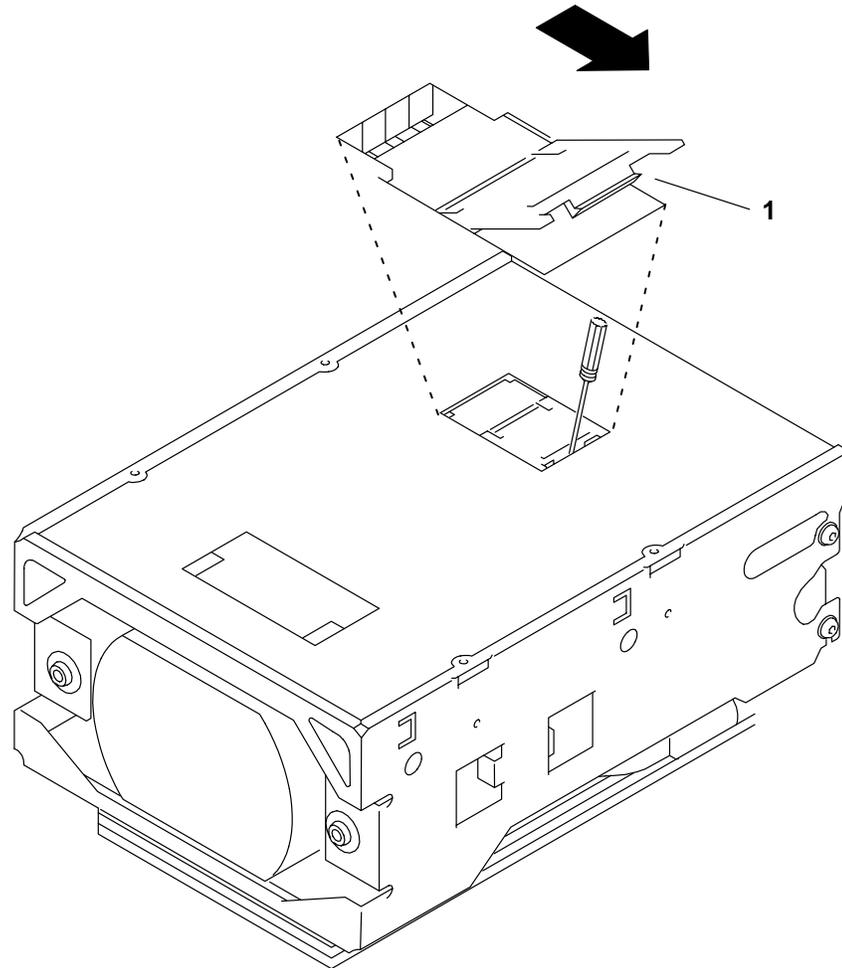
7. Lift the paper flap [1].

8. Open the retaining bar [2] by pulling it back to the position shown in the diagram.

9. Using two ball-point pens or similar objects in the holes of the flexible circuit [3], pull the flexible circuit out from the connector (in the direction shown by the arrow). *Do not try to pull the flexible circuit out from under the logic card.*
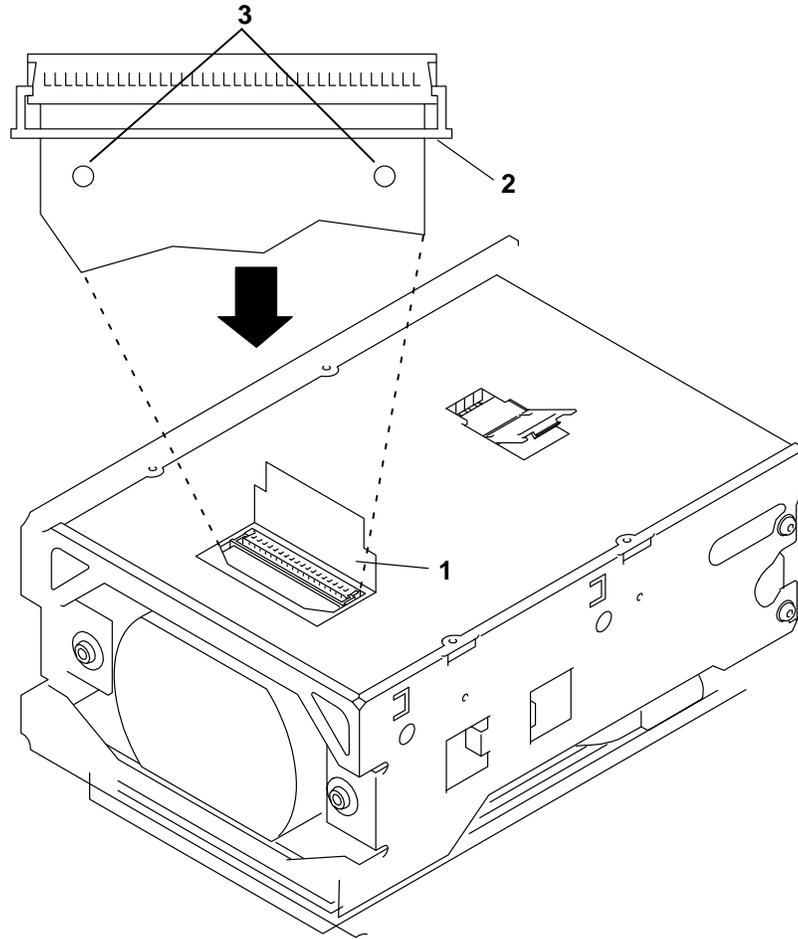
10. Close the retaining bar [2] to prevent the flexible circuit from reentering the connector.

11. Loosen the four cross-member screws [2] (part number 95X1939).

12. Remove the four disk-enclosure mounting screws [1] (part number 95X1940).

**Note:** Some shock mounts [7] (part number 95X1995) have separate bushings [4] (part number 95X2191). These bushings might fall out when you remove the screws. Do not lose them.

13. Carefully start to lift the logic card and frame assembly [3] away from the disk enclosure. As you lift the assembly, carefully push the spindle motor connector [8] down through the hole in the logic card. Keep the connector end [5] of the assembly slightly higher than the actuator end [6] while you are lifting, so that the cross member passes over the end of the disk enclosure.

**Note:** You might feel some friction when lifting the logic card and frame assembly.

**Attention:** Do not attempt to remove the logic card from the frame assembly; damage to the card could occur. The logic card and frame assembly are exchanged together as a single FRU.
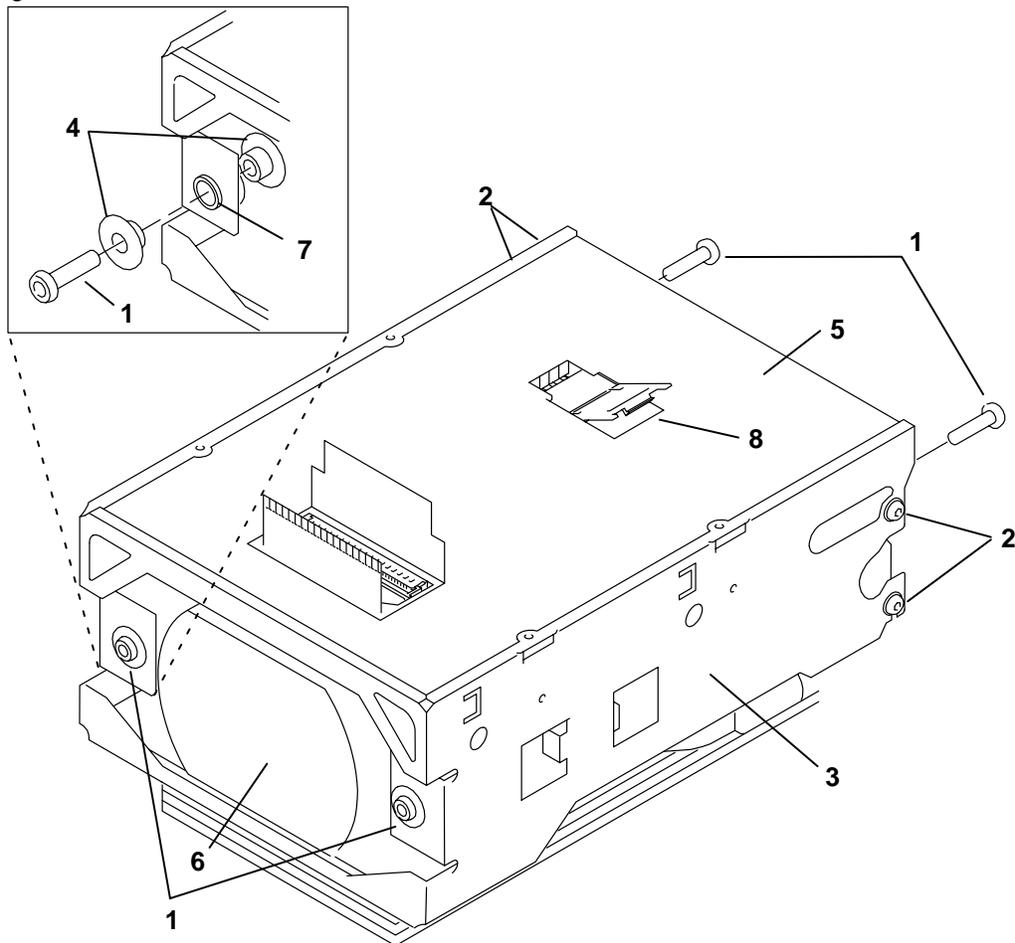
# Assembling the Disk Drive

**Attention:** A replacement disk enclosure might need time to acclimatize to its new environment.  See the Attention notices at the first of the removal and replacement procedures.

1. Ensure that you have a flat work surface on which to assemble the disk drive.

2. Lay the disk enclosure onto a suitable support.  The support must be narrower than the disk enclosure, so that it does not touch the frame when the logic card assembly is installed, and thick enough (approximately 7 mm or 0.25 inches) to hold the frame just clear of the work surface.  A notepad or similar item makes an ideal support. Ensure that the actuator-end [1] of the disk enclosure protrudes beyond the edge of the support.
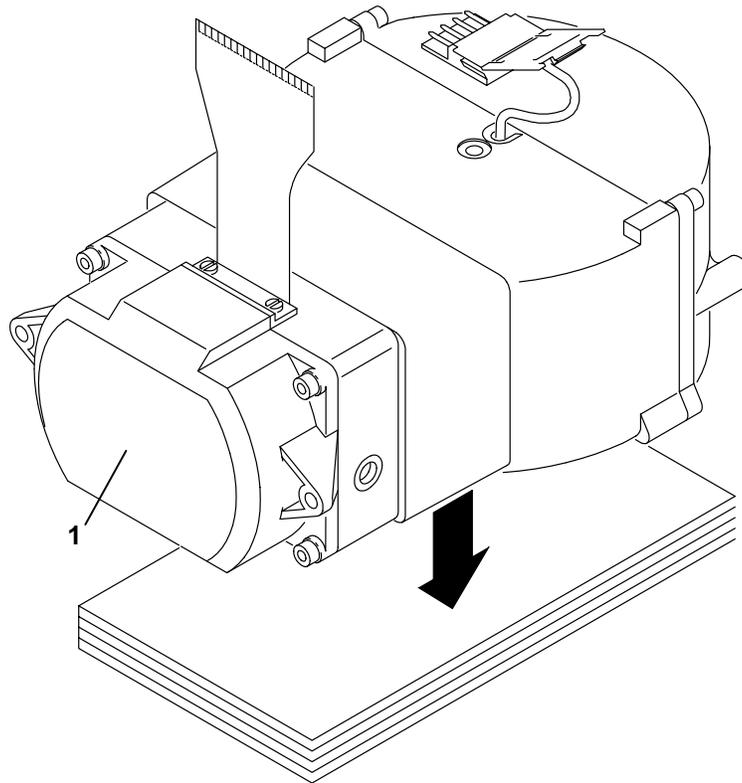
3. Fold the flexible circuit as shown below.  Ensure that:

- The first fold [1] is at the point where the flexible circuit enters the disk enclosure.

- The second fold [2] is in line with the actuator end of the disk enclosure.

Make two creases in the flexible circuit by pressing on the folds.  These creases help to locate the flexible circuit correctly when the disk drive is assembled.
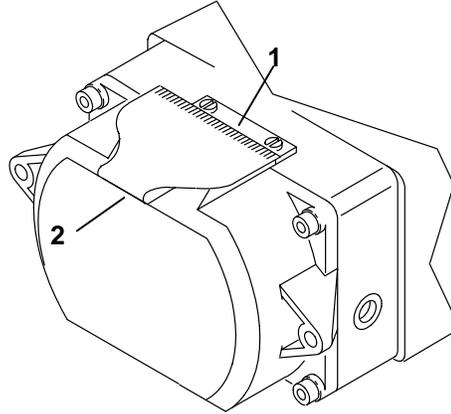


4. If you are exchanging the logic card and frame assembly, configure the four switches [2] on the replacement logic card and frame assembly to match that of the replaced FRU.

**Attention:** Missing or additional terminator blocks can cause intermittent problems. Ensure that the terminator block [1] configuration of the replacement logic card and frame assembly is the same as that of the replaced FRU.  For most systems, the terminator block must be removed.
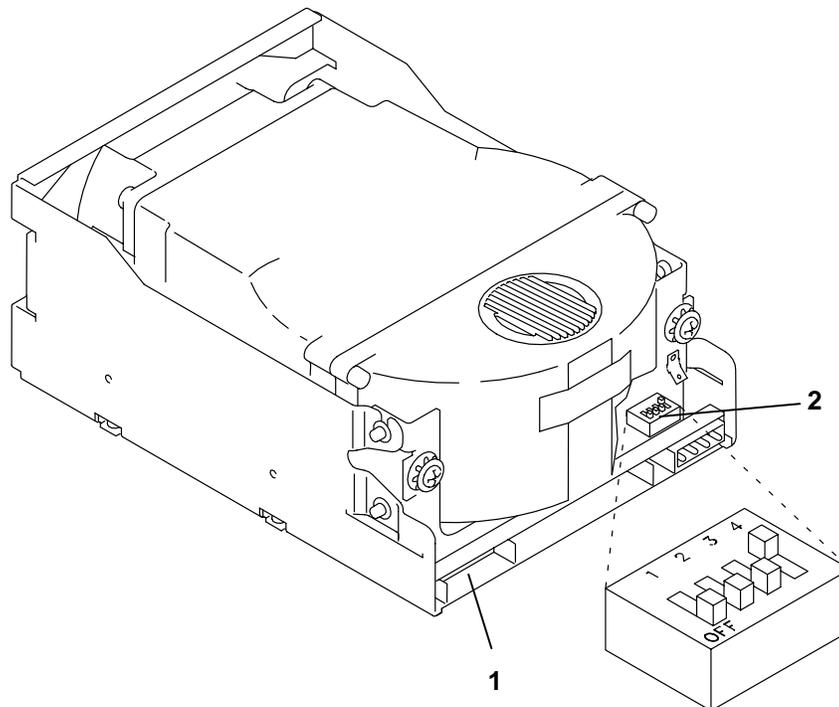
5. Ensure that the four screws [1] in the front cross-member are loose.

6. Open the retaining bar [2] by pulling it back to the position shown in the diagram.
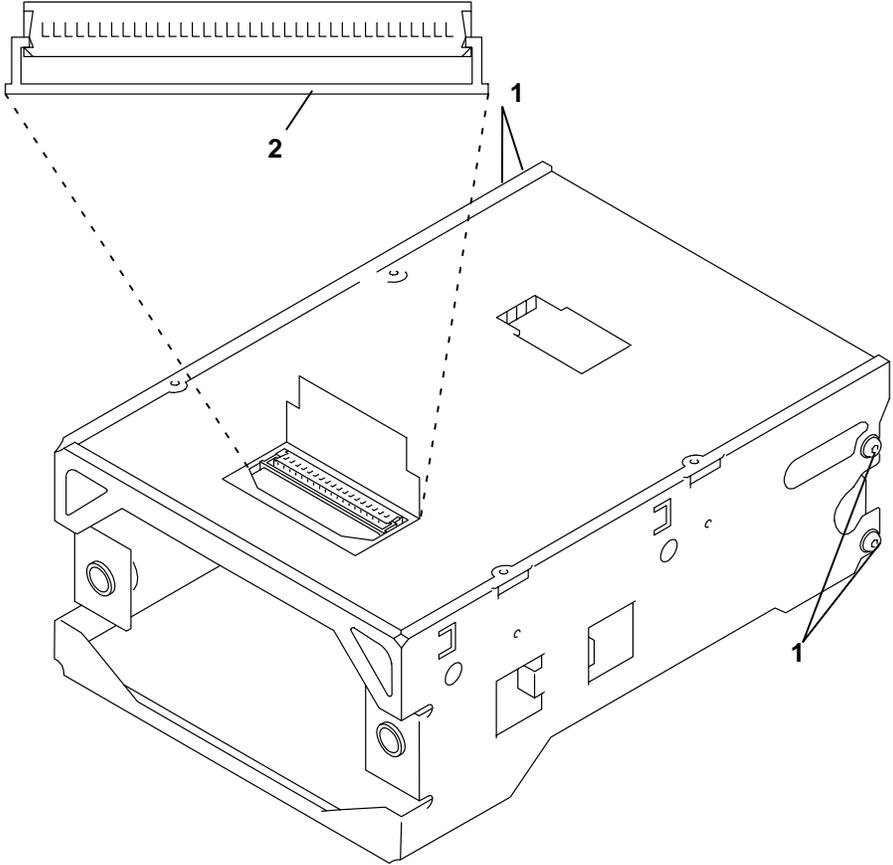
7. If the shock mounts have separate bushings, ensure that those bushings [1] are present in all four shock mounts.
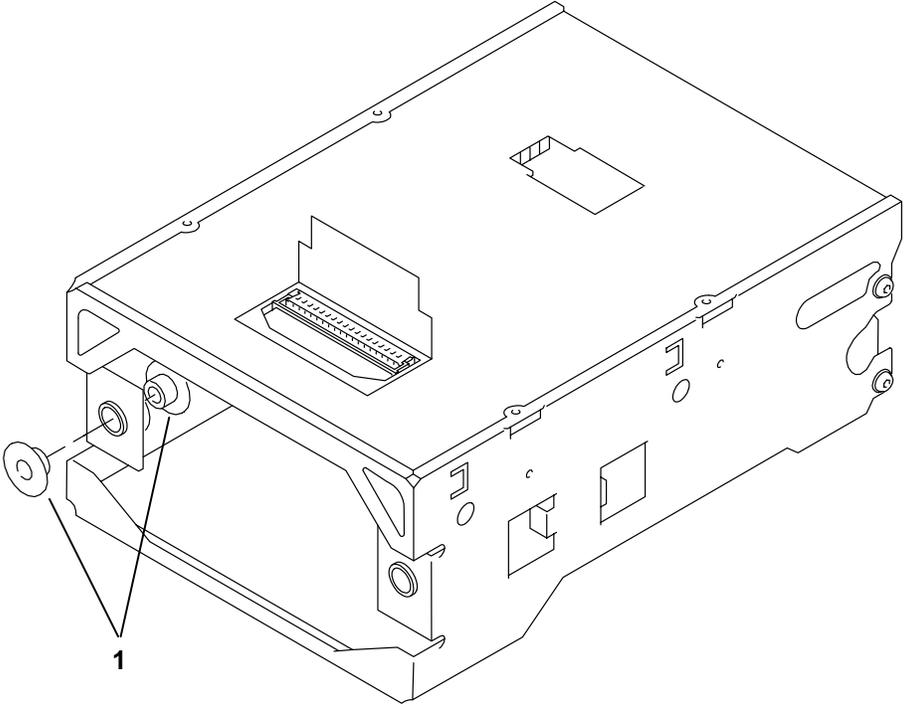
8. Holding the connector end [3] of the frame slightly higher than the actuator end [4], lower the frame over the disk enclosure, and guide the flexible circuit [1] into the actuator connector [2], *but do not close the retaining bar yet*.
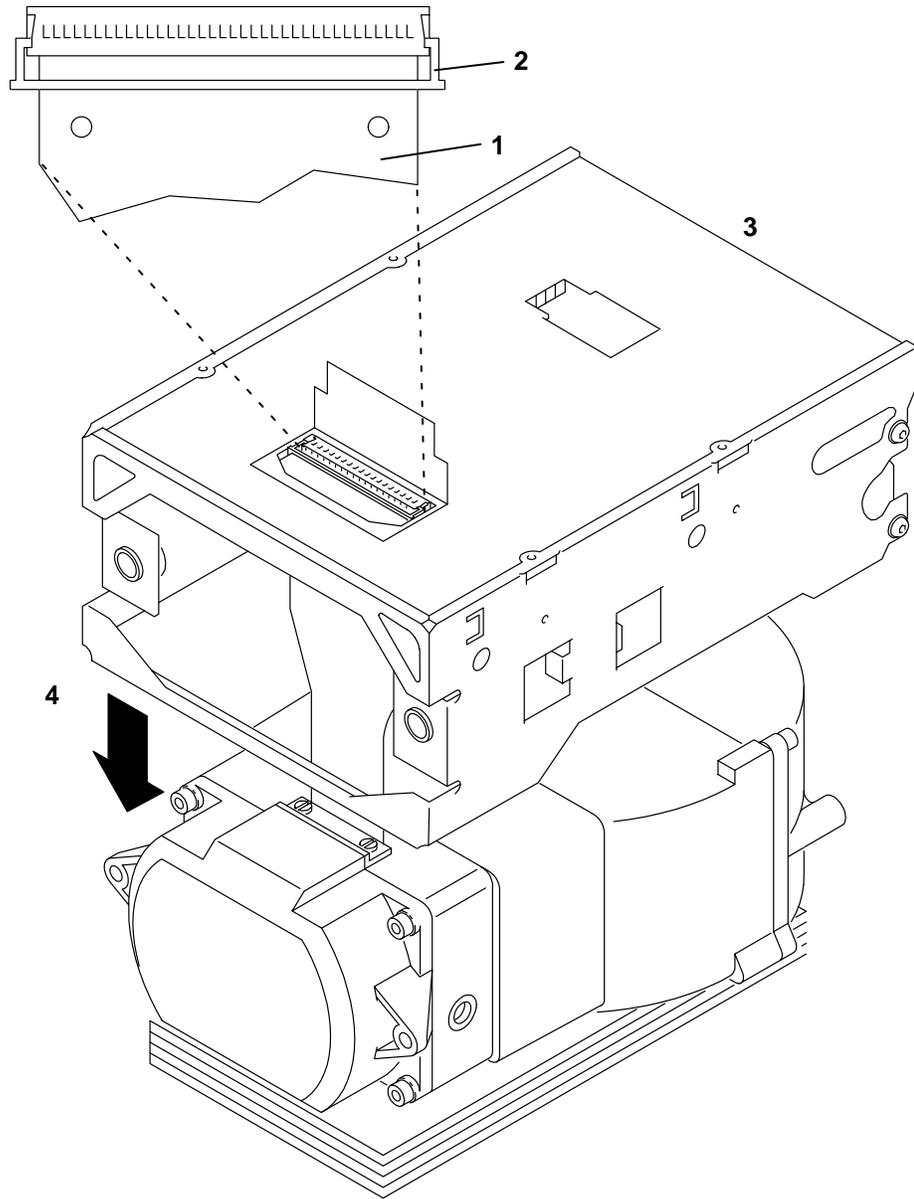
**Attention:** The wires on the spindle-motor connector [1] might become damaged if they are pulled or bent too much. Handle them with care.

9. Lower the frame, and carefully guide the spindle-motor connector [1] up through the hole in the logic card. Ensure that the flexible circuit folds correctly. Continue lowering the frame until it rests on the disk enclosure.

**Note:** Although resting on the disk enclosure, the frame is not steady. This effect is normal.
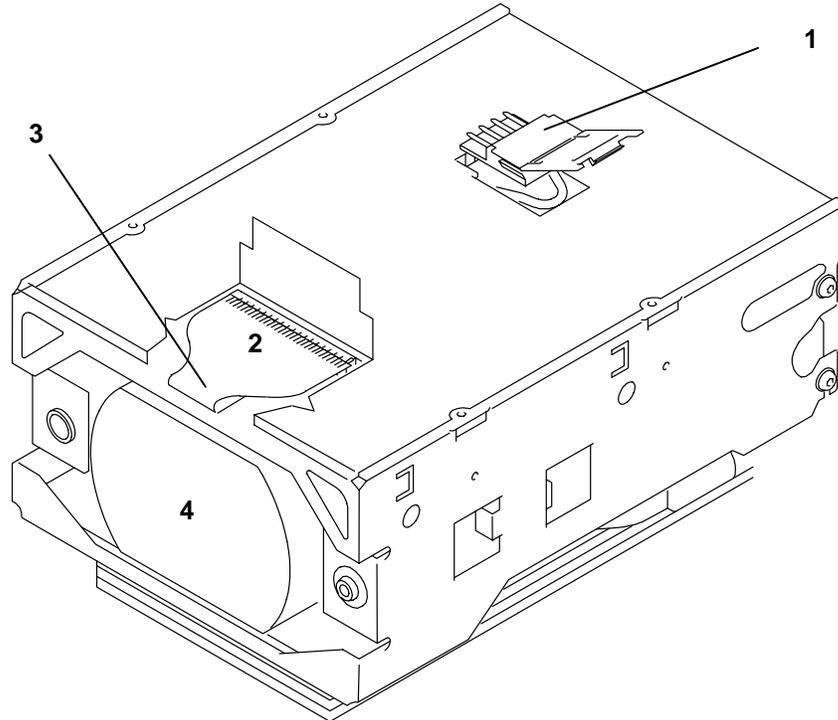
10. Check that the flexible circuit [2] is still located correctly. The second fold [3] should be just visible at the actuator end [4] of the disk enclosure.

11. If the shock mounts [5] (part number 95X1995) have separate bushings [1] (part number 95X2191), ensure that all those bushings are still present.

12. At the *actuator-end* of the disk drive, install and fully tighten the two disk-enclosure mounting screws [2] (part number 95X1940).

13. At the *connector-end* of the disk drive, install and fully tighten the two disk-enclosure mounting screws [3]. Do not press down on the disk drive as you do this.

14. Fully tighten the four crossmember screws [4].
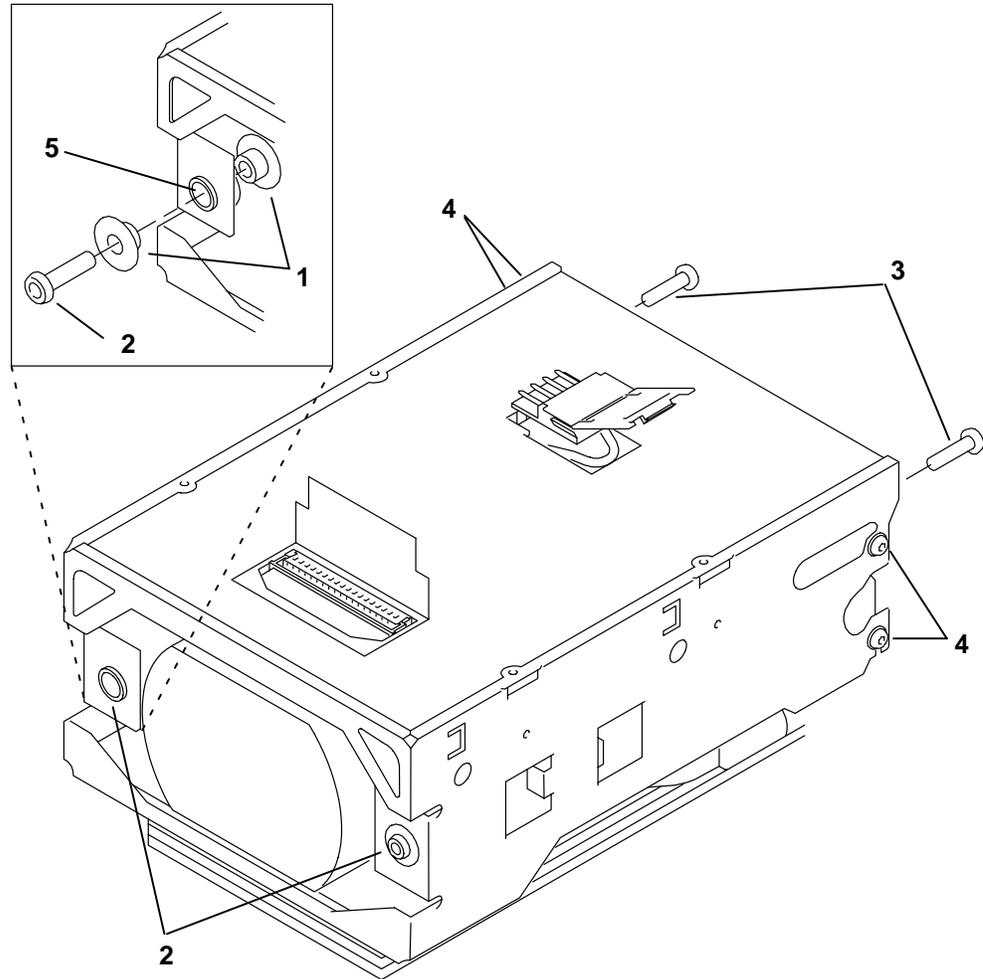
**Attention:** If the front cross-member is not aligned correctly, the disk drive might become damaged through excessive vibration.

15. Check that the front-cross member [1] is correctly aligned.  Check also that the clip [3] at each end of the crossmember is not trapped behind the connector.  If necessary, loosen the four crossmember screws [2], relocate the  cross-member, and then tighten the screws.
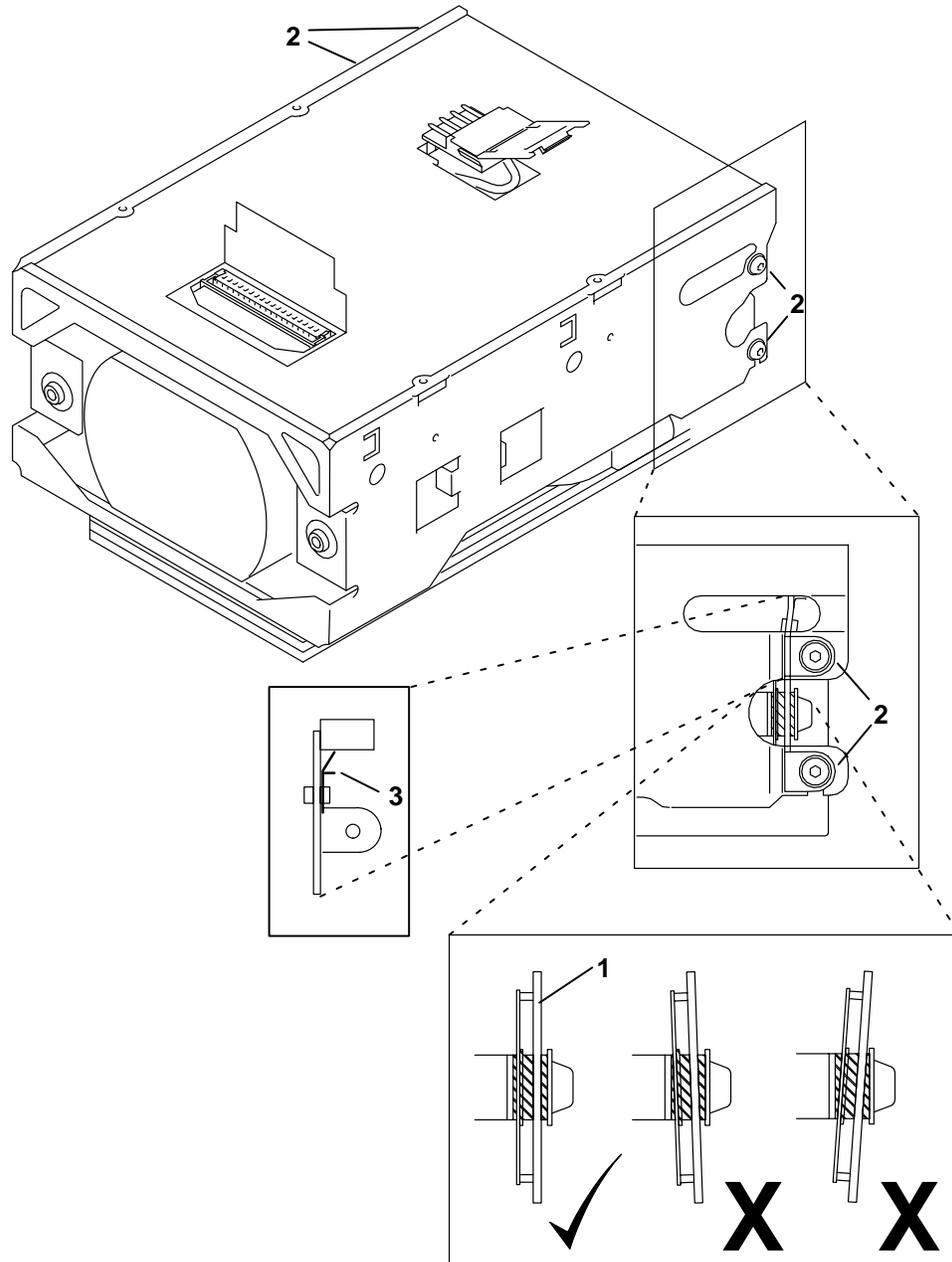
16. Engage the grooves of the spindle-motor connector [1] with the edges of the hole in the logic card. Ensure that the connector pins are correctly aligned, and then push the connector fully home.

17. **Attention:** The wires on the spindle-motor connector might become damaged if they rub against a component or the edge of the logic card.

Bend the wires [3] as shown.

**Later Disk Drives**

**Early Disk Drives**
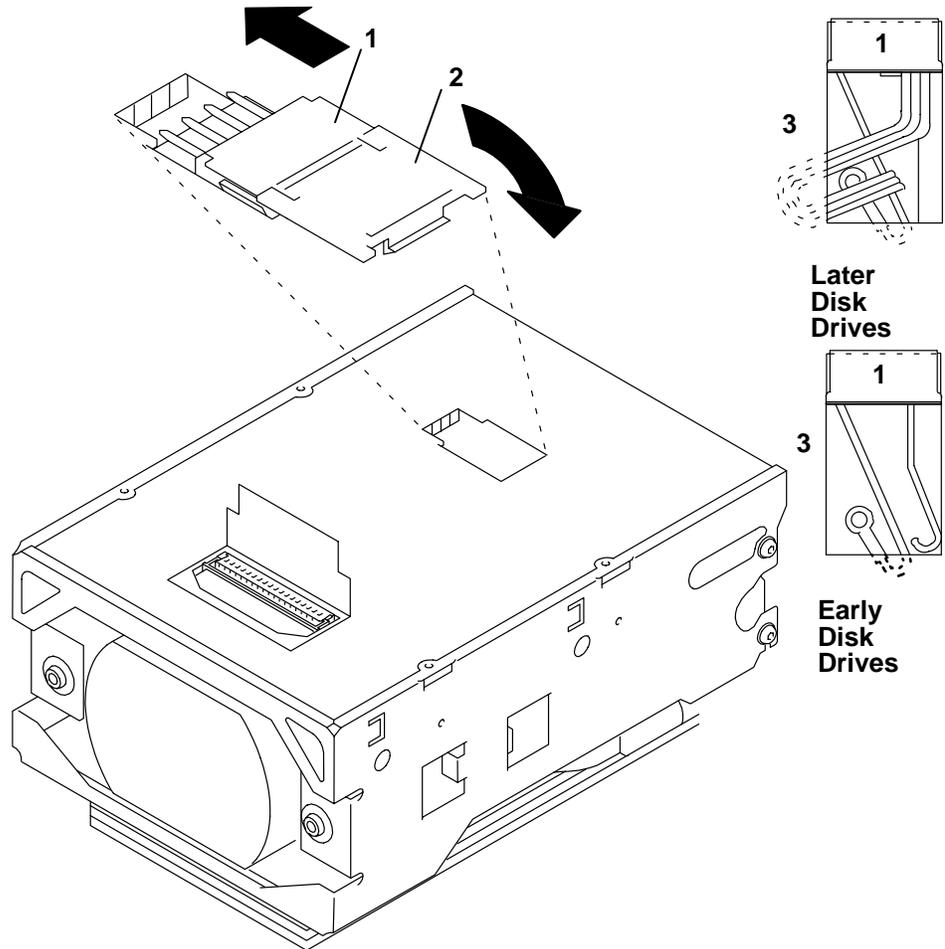
18. Close the plastic flap [2] and press it firmly until it clicks into position.

19. Using two ball-point pens or similar instruments in the holes of the flexible circuit [3], ensure that the flexible circuit is pushed fully home.  The top edge of the label [2] should be just below the open retaining bar [1] when the flexible circuit is in its correct position.

   **Note:**  On early disk drives, the label is not present.  Use the thin line [2] on the flexible circuit instead.  This line corresponds to the top edge of the label.

20. Close the retaining bar.  (The illustration below also shows the retaining bar in the closed position.)
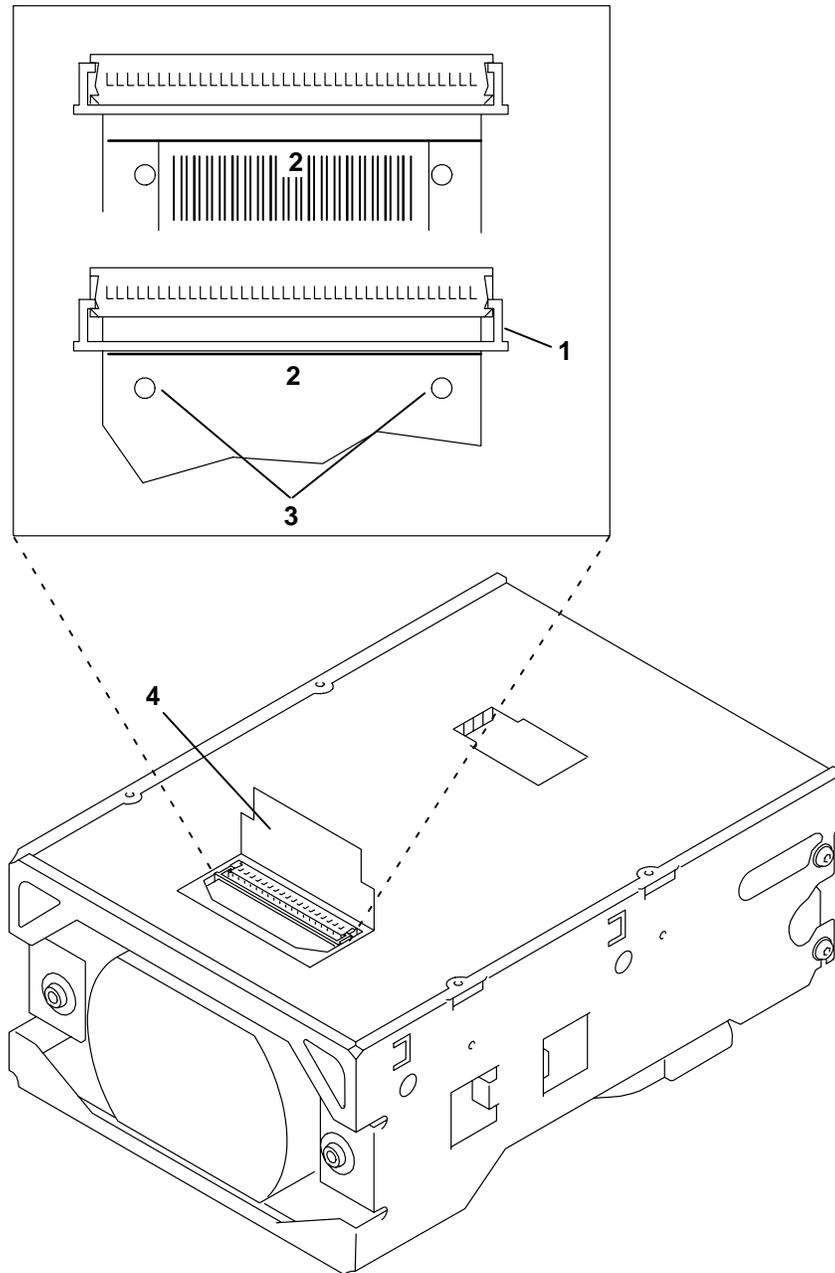
21. Close the paper flap [4]. Locate the excess flap under the edge of the slot in the logic card.

22. Check that all screws are tight.

23. Reinstall the disk drive in the using system.

# 1G-byte SCSI Single-Ended and Differential Disk Drives

The 1G-byte SCSI disk drives are 3-1/2 inch devices which fit into half-high media positions.

## Setting the SCSI Address

Use the illustrations on this and following pages to locate the jumpers and set the SCSI address.

**Note:** The devices are shipped with no jumpers installed. When a 1G-byte SCSI disk drive is installed in the 7204, all jumpers must be removed, and an address cable is attached to the connector. The SCSI address is set on the back panel of the device.

## Half-High Single-Ended Drives

1 G-byte half-high single-ended drives may be either of the following configurations.
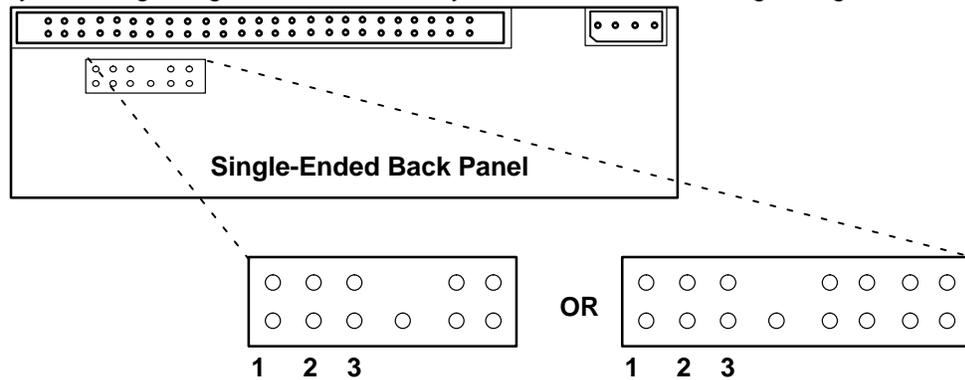


**Single-Ended Back Panel**

## Valid Addresses

| Address | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

## Exchanging the Frame Electronics

Refer to the procedures that were packed with the FRU.

# Slim-High Single-Ended Drives
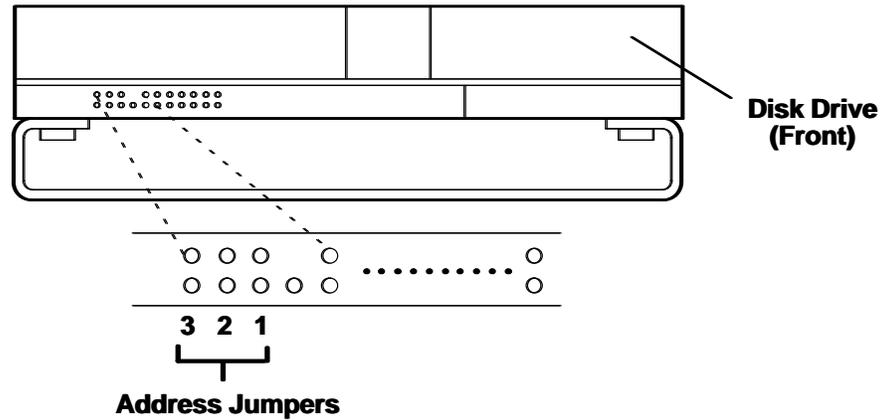


**Note:** This one-inch height drive is shipped with an appropriate mounting plate to increase its installed thickness.

## Valid Addresses

| Address | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

# Exchanging the Frame Electronics

Refer to the procedures that were packed with the FRU.

# Half-High Differential Drives

**Note:** The differential drive signal connector is labelled "Differential SCSI."
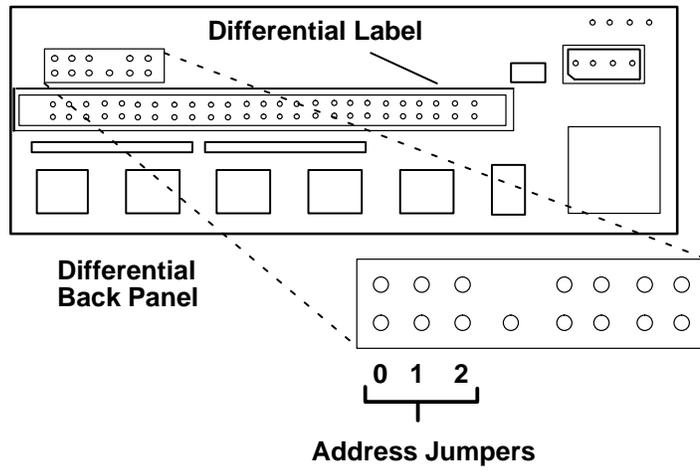
**Differential Label**

**Differential Back Panel**

**0 1 2**

**Address Jumpers**

## Valid Addresses

| Address | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

## Exchanging the Frame Electronics

Refer to the procedures that were packed with the FRU.

# 1080MB SCSI-2 Disk Drive

The 1080MB SCSI-2 disk drive has a 3.5 inch form factor and mounts in a half-height media position.

## Setting the SCSI Address Jumpers

**Note:** The device is shown with jumpers configured for SCSI Address 6.

The SCSI address of the 1080MB SCSI-2 disk drive is set by jumpers located on the logic card. Use the following diagram to set the jumpers.
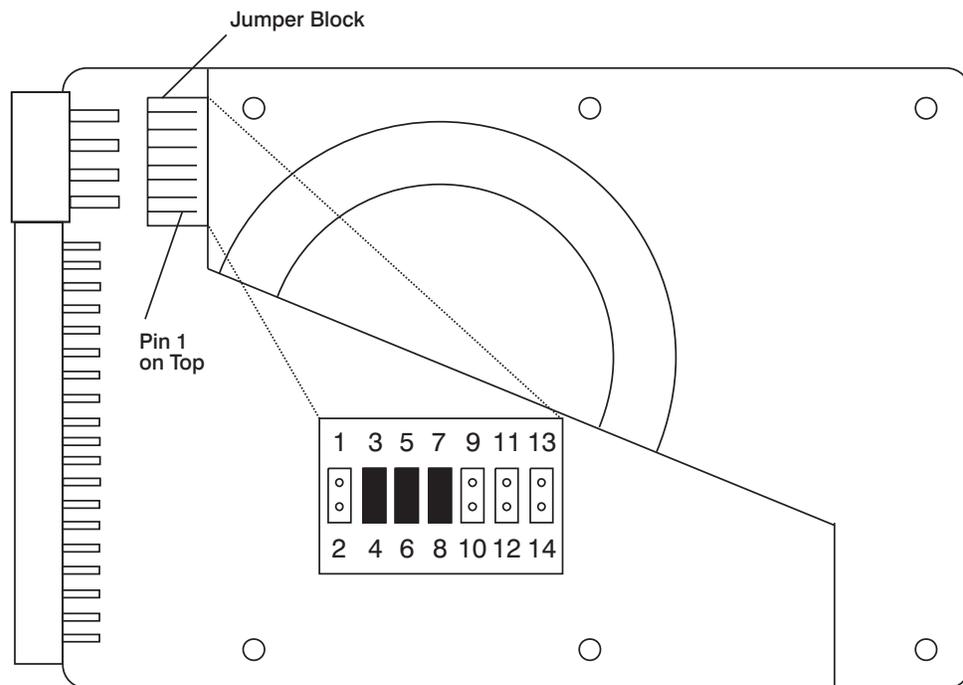


## Valid Addresses

| Address | Jumper 1-2 | Jumper 3-4 | Jumper 5-6 |
|---------|------------|------------|------------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

## 2.1GB SCSI-2 Disk Drive

The 2.1GB SCSI-2 disk drive has a 3.5 inch form factor and mounts in a half-height media position.

## Setting the SCSI Address Jumpers

**Note:** The device is shown with jumpers configured for SCSI Address 6.

The SCSI address of the 2.1GB SCSI-2 disk drive is set by jumpers located on the logic card. Use the following diagram and the SCSI address table on page 2-80 to set the jumpers.
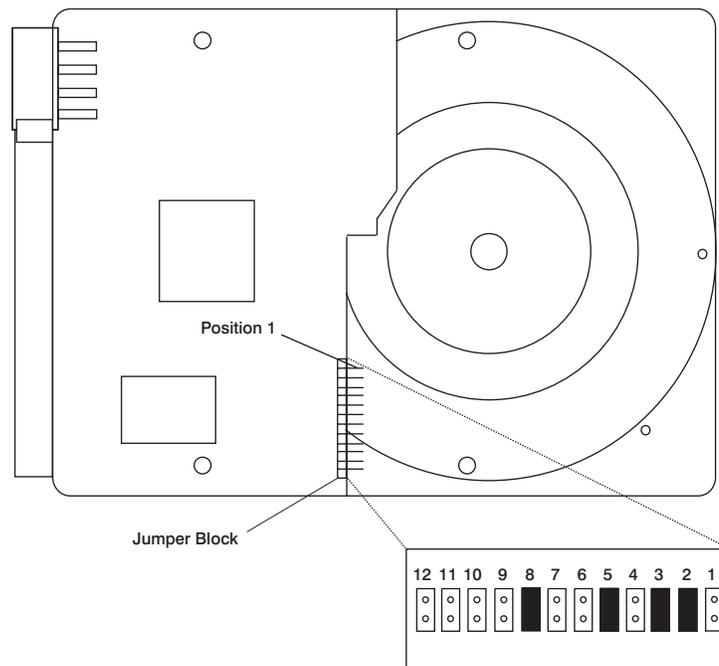


- Positions 5, and 8 must have jumpers.
- Positions 1, 6, 7, 9, 10, 11, and 12 must not have jumpers.

## 4.5GB SCSI-2 Disk Drive - Type F1

The 4.5GB SCSI-2 disk drive has a 3.5 inch form factor and mounts in a half-height media position. See table in section "1.1GB, 2.2GB, 4.5GB, 9.1GB, 18.2GB Single-Ended Disk Drives" on page 2-81 for description of disk drive Type - F1.

## Setting the SCSI Address Jumpers

**Note:** The device is shown with jumpers configured for SCSI Address 6.

The SCSI address of the 4.5GB SCSI-2 disk drive is set by jumpers located on the logic card. Use the following diagram and the SCSI address table on page 2-80 to set the jumpers.
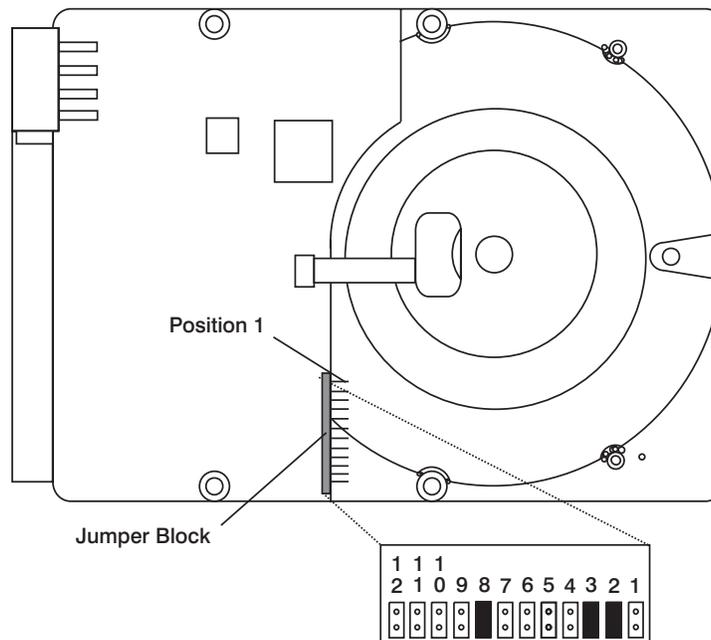


- Position 8 must have a jumper.
- Positions 5, 6, 7, 9, 10, 11, and 12 must not have jumpers.

## Type G1 Drive

Jumper locations for the 4.5, 9.1, and 18.2 GB ultra SCSI disk drives.  See table in section
"1.1GB, 2.2GB, 4.5GB, 9.1GB, 18.2GB Single-Ended Disk Drives" on page  2-81 for
description of disk drive Type - G1.

See table on page 2-80 for jumper settings.
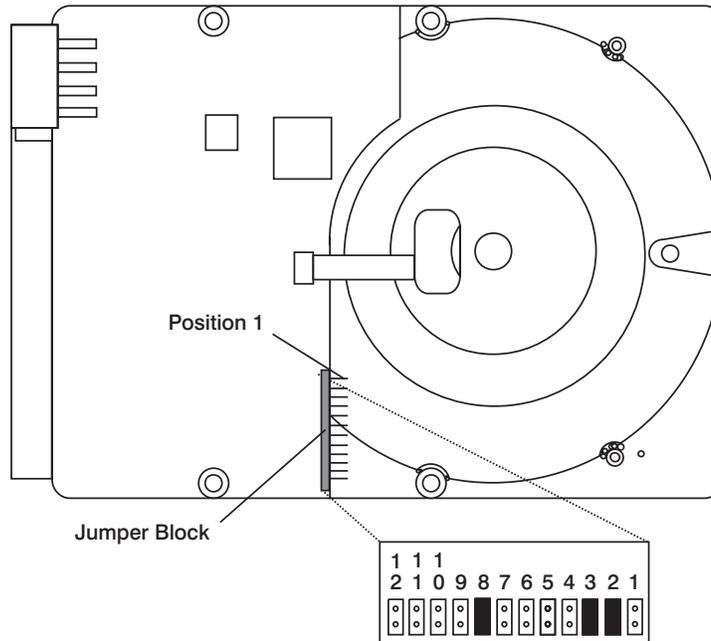


**Notes:**

1. Position 8 must have a jumper.

2. Positions 5, 7, 9, 10, 11, and 12 must not have jumpers.

3. Position 6 is jumpered only when the system requires the device at the end of the
   SCSI bus to provide termination (non-LVD models only).

# Type I1 Drive

Jumper locations for the 9.1 and 18.2GB ultra SCSI disk drives.

See "Setting the SCSI Address Jumpers" in this supplement for the setting of jumpers 4 through 1.
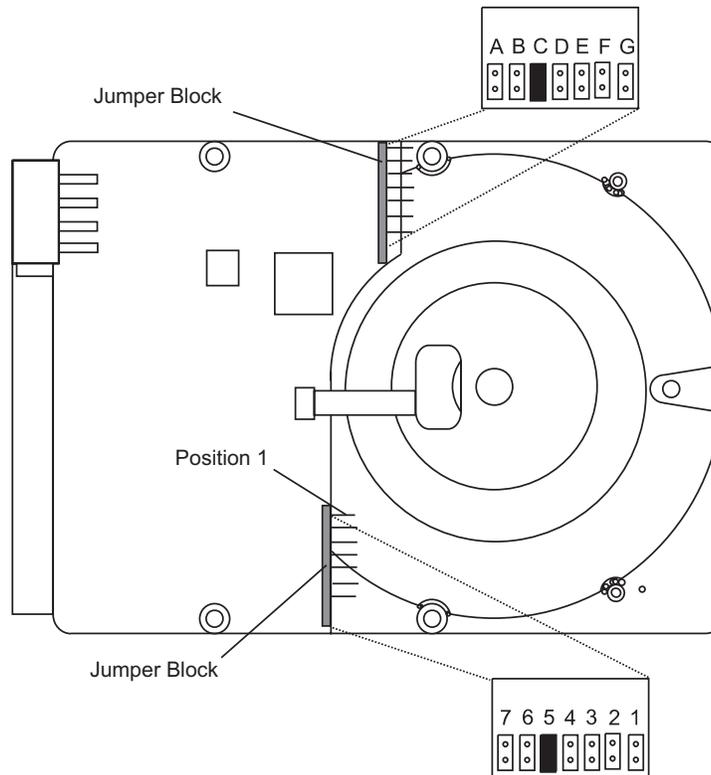


**Notes:**

1. Jumper positions 5 and C must have a jumper installed.

2. Jumper positions 4 through 1 are used to set the SCSI address.

3. There is no SCSI bus termination on this disk drive.

## SCSI Address Table for Jumpers Numbered 4 to 1

| Address | Jumper 4 | Jumper 3 | Jumper 2 | Jumper 1 |
|---------|----------|----------|----------|----------|
| 0 | Off | Off | Off | Off |
| 1 | On | Off | Off | Off |
| 2 | Off | On | Off | Off |
| 3 | On | On | Off | Off |
| 4 | Off | Off | On | Off |
| 5 | On | Off | On | Off |
| 6 | Off | On | On | Off |
| 7 | On | On | On | Off |
| 8 | Off | Off | Off | On |
| 9 | On | Off | Off | On |
| 10 | Off | On | Off | On |
| 11 | On | On | Off | On |
| 12 | Off | Off | On | On |
| 13 | On | Off | On | On |
| 14 | Off | On | On | On |
| 15 | On | On | On | On |

**Note:**

1. Address 7 is reserved for the adapter.

2. There is no jumper 1 on 50 pin drives, thus SCSI addresses eight to fifteen are not valid.

## 1.1GB, 2.2GB, 4.5GB, 9.1GB, 18.2GB Single-Ended Disk Drives

There are many different types of the SCSI-2 Disk Drives. Before you can set the SCSI address, you must determine which type of SCSI-2 disk drive you have. The table below describes the various features of each drive to help you do this.

| Type | Form Factor | Capacity in GB | SCSI Conn Pins | Required Jumper(s) | Jumper Block Pins | Drive Type |
|------|-------------|----------------|----------------|--------------------|--------------------|-----------|
| A1 | 1" | 1.1/2.2 | 50-pin | 23-24[1] | 32 | DFHS/DFMS |
| A2 | 1" | 1.1/2.2 | 68-pin | 23-24[1] | 32 | DFHS/DFMS |
| A3 | 1.6" | 4.5 | 68-pin | 23-24[1] | 32 | DFHS/DFMS |
| A4 | 1" | 2.2 | 68-pin[4] | 23-24[1] 25-26[2] | 32 | DFHS |
| B1 | 1" | 1.1/2.2 | 50-pin | None | 20 | Quantum |
| B2 | 1" | 1.1/2.2 | 68-pin | None | 12 | Quantum |
| B3 | 1.6" | 4.5 | 68-pin | None | 12 | Quantum |
| C1 | 1" | 2.2 | 50-pin | None | 32 | DCHS |
| C2 | 1" | 2.2 | 68-pin | None | 32 | DCHS |
| C3 | 1" | 4.5 | 68-pin | 23-24 & 31-32[2] | 32 | DCHS |
| C4 | 1.6" | 9.1 | 68-pin | 23-24 & 31-32[2] | 32 | DCHS |
| C5 | 1" | 2.2 | 68-pin[4] | 25-26[2] | 32 | DCHS |
| D1 | 1" | 2.2/4.5 | 68-pin | 31-32[2] | 32 | Quantum |
| D2 | 1.6" | 9.1 | 68-pin | 31-32[2] | 32 | Quantum |
| D3 | 1" | 2.2 | 68-pin[4] | 23-24 & 31-32[2] | 32 | Quantum |
| E1 | 1" | 9.1 | 68-pin | None | 32 | DGHS |
| E2 | 1.6" | 18.2 | 68-pin | Note [3] | 32 | DGHS |
| F1 | 1" | 4.5 | 68-pin | Note [3] | - | DDRS |
| G1 | 1" | 4.5/9.1/18.2 | 68-pin | | 12 | DNES |
| I1 | 1" | 9.1/18.2 | 68-pin | See[5] | 32 | DPSS |

**Notes:**

[1] Factory installed jumpers

[2] Customer or customer representative installed jumpers.

[3] See jumper setting information in "4.5GB SCSI-2 Disk Drive - Type F1" on page 2-77.

[4] This is a 68-pin drive being used as a 50-pin drive.

[5] For factory jumper settings, see "Type I1 Drive" on page 2-79.

Other differences to look for are the number jumper block pins, and SCSI connector size.

## SCSI-2 Disk Drives

The following figures show the location of the jumper blocks and where to place the jumpers to set the SCSI address or SCSI ID. There are three jumpers to set on 50-pin models and four on 68-pin models.

# Setting the SCSI address or SCSI ID

To set the SCSI address see the table on page 2-93.

### Type A1 Drive
For 1.1GB, and 2.2GB drives, 50-pin models.

**Note:** Type A disk drives are shipped with one factory installed jumper. Do not change the factory installed jumper.
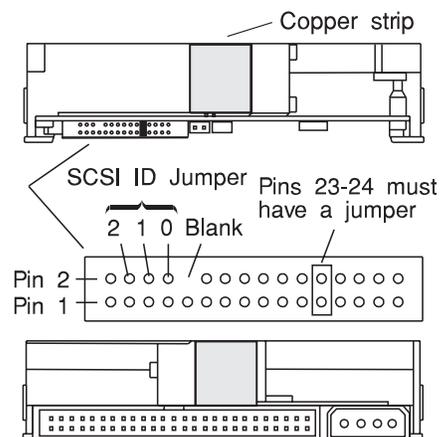
## Type A2 Drive

For 1.1GB, and 2.2GB drives, 68-pin models.

To set the SCSI address see the table on page 2-93.
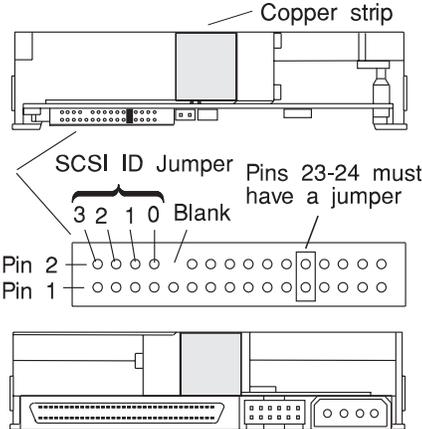
## Type A3 Drive

For 4.5GB drives, 68-pin model.

To set the SCSI address see the table on page 2-93.
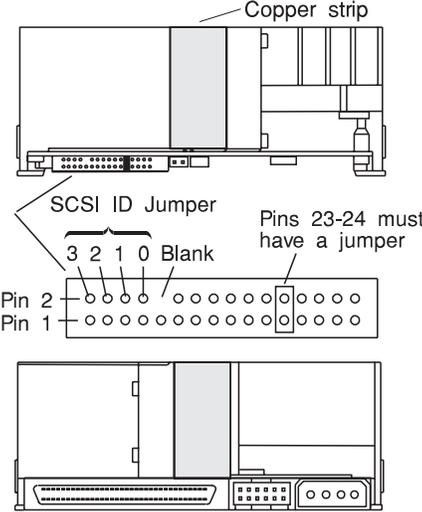
## Type A4 Drive

The type A2 2.2GB, 68-pin (16-bit) disk drive can be used as a 50-pin (8-bit) drive by adding a jumper.

To set the SCSI address see the table on page 2-93.
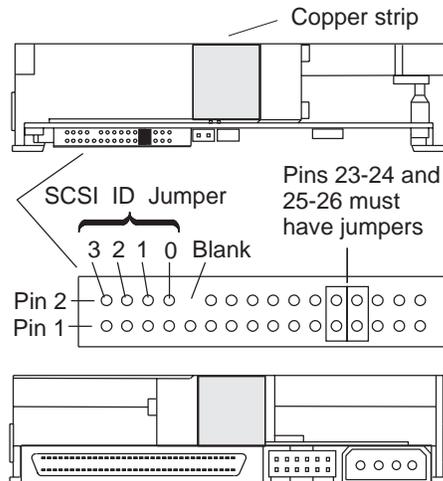


Observe the following:

- Pins 23-24 and 25-26 must be jumpered together as shown in the figure above.

- Jumper 3 on pins 1 to 2 is not used in this configuration.  Do not place a jumper on these pins. Eight bit devices can only use SCSI ID's zero (0) through six (6).

- Some systems require a 68-pin to 50-pin interposer, made up of a short cable and interposer as shown below.
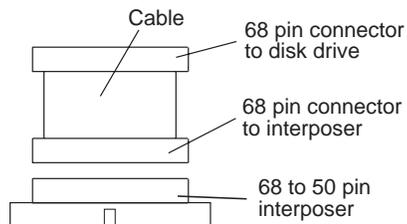
## Type B1 Drive

For 1.1GB, and 2.2GB drives, 50-pin models.

To set the SCSI address see the table on page 2-93.
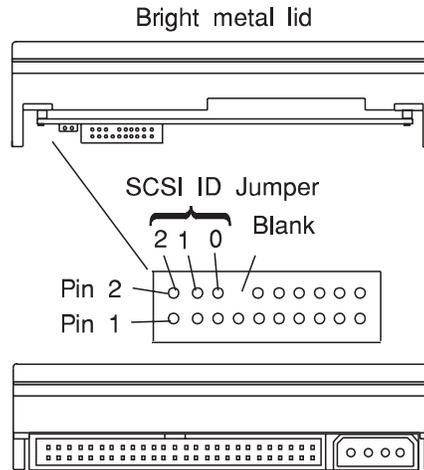
Bright metal lid

SCSI ID Jumper

2 1 0  Blank

Pin 2
Pin 1

## Type B2 Drive

For 1.1GB, and 2.2GB drives, 68-pin models.

To set the SCSI address see the table on page 2-93.

Bright metal lid

SCSI ID Jumper

3 2 1 0  Blank

Pin 2
Pin 1

## Type B3 Drive

For 4.5GB drives, 68-pin model.

To set the SCSI address see the table on page 2-93.



Bright metal lid

SCSI ID Jumper

3 2 1 0  Blank

Pin 2
Pin 1
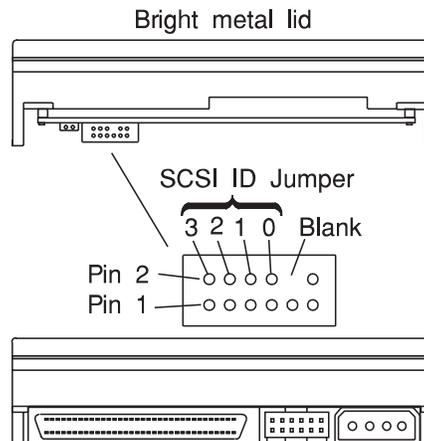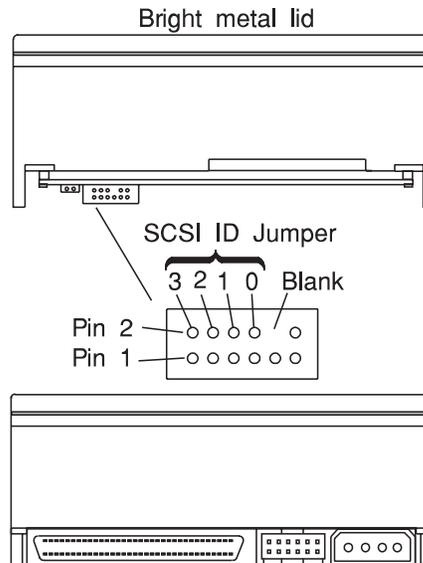
## Type C1 Drive

For 2.2GB drives, 50-pin model.

To set the SCSI address see the table on page 2-93.



Copper strip

SCSI ID Jumper

2 1 0  Blank

Pin 2
Pin 1
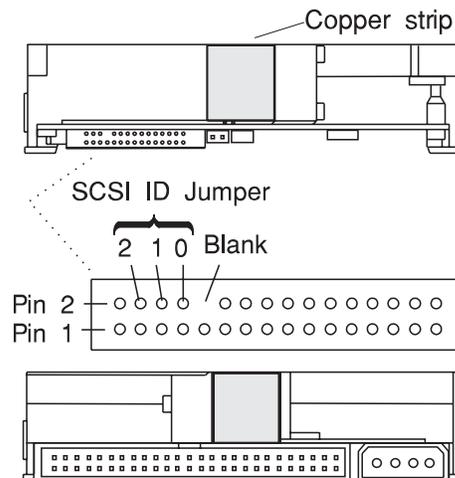
## Type C2 Drive

For 2.2GB drives, 68-pin model.

To set the SCSI address see the table on page 2-93.
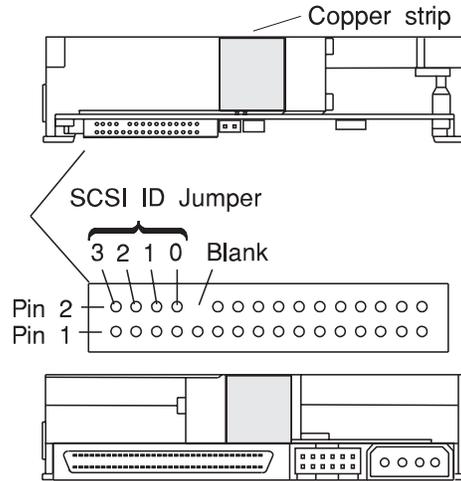


## Type C3 Drive

For 4.5GB drives, 68-pin model.

To set the SCSI address see the table on page 2-93.
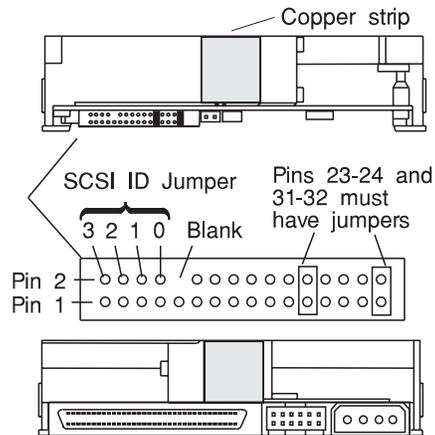
## Type C4 Drive

For 9.1GB drives, 68-pin model.

To set the SCSI address see the table on page 2-93.
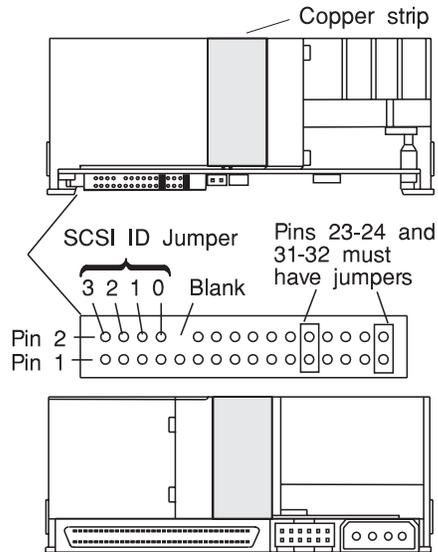
## Type C5 Drive

The type C2 2.2GB, 68-pin (16-bit) disk drive can be used as a 50-pin (8-bit) drive by adding a jumper.
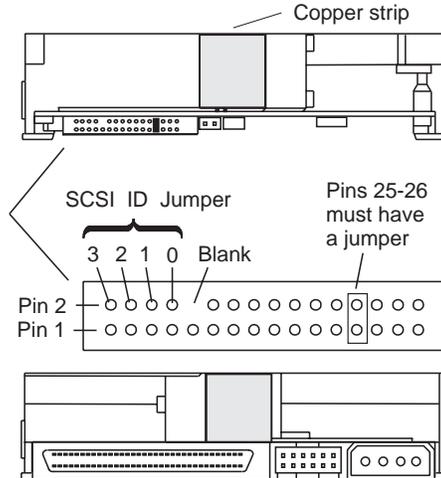
Observe the following:

- Pins 25 and 26 must be jumpered together as shown in the figure above.

- Jumper 3 on pins 1 to 2 is not used in this configuration. Do not place a jumper on these pins. Eight bit devices can only use SCSI ID's zero (0) through six (6).

- Some systems require a 68-pin to 50-pin interposer, made up of a short cable and interposer as shown below.
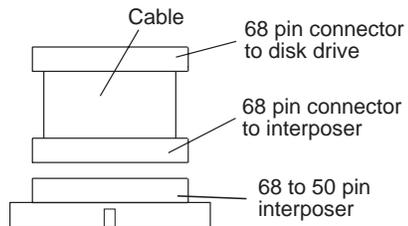
## Type D1 Drive

For 2.2GB and 4.5GB drives, 68-pin models.

To set the SCSI address see the table on page 2-93.
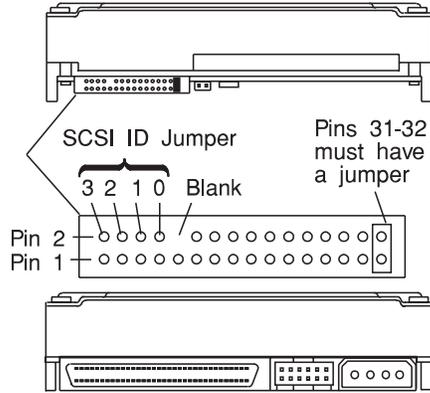


## Type D2 Drive

For 9.1GB drives, 68-pin models.

To set the SCSI address see the table on page 2-93.
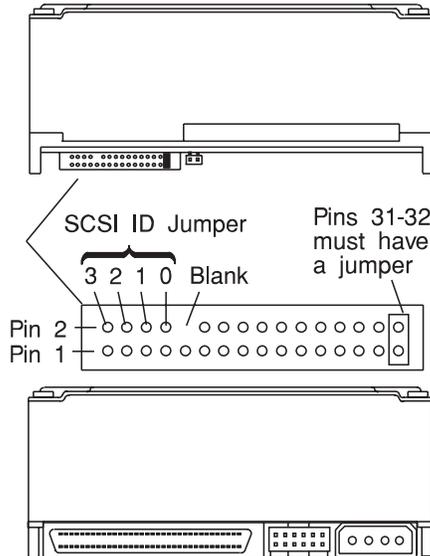
## Type D3 Drive

The type D1 2.2GB, 68-pin (16-bit) disk drive can be used as a 50-pin (8-bit) drive by adding a jumper.

To set the SCSI address see the table on page 2-93.
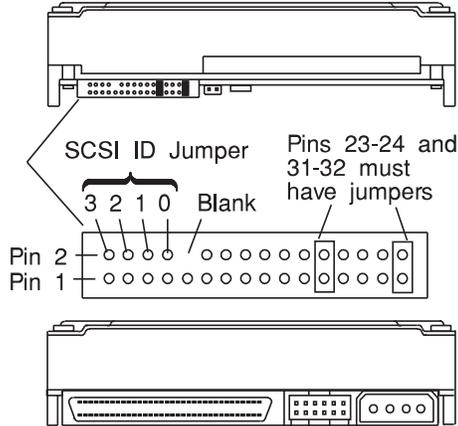


Observe the following:

- Pins 23 and 24 must be jumpered together as shown in the figure above.

- Jumper 3 on pins 1 to 2 is not used in this configuration. Do not place a jumper on these pins. Eight bit devices can only use SCSI ID's zero (0) through six (6).

- Some systems require a 68-pin to 50-pin interposer, a cable and interposer or an interposer cable as shown below.
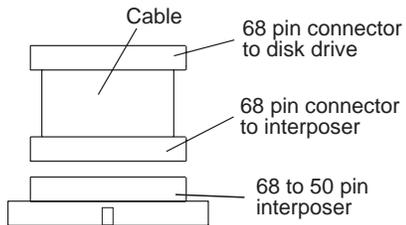


- When this disk drive is used on a Machine Type 7015 Models R20, R30, R40, or R50, the terminator power jumper (2.5 mm) must be installed. See figure below.
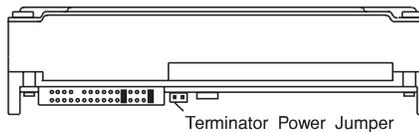
## Type E1 Drive

For 9.1GB drive, 68-pin model.

To set the SCSI address see the table on page 2-93.
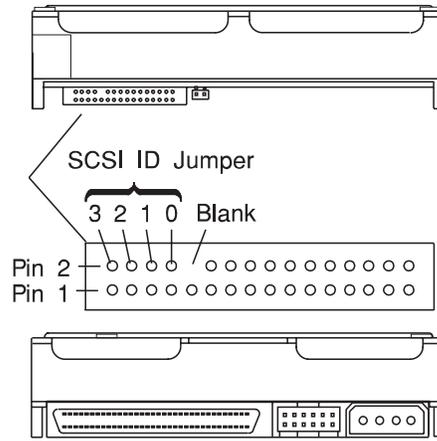


## Type E2 Drive

Jumper locations for the 18.2GB ultra SCSI disk drive.

To set the SCSI address see the table on page 2-93.
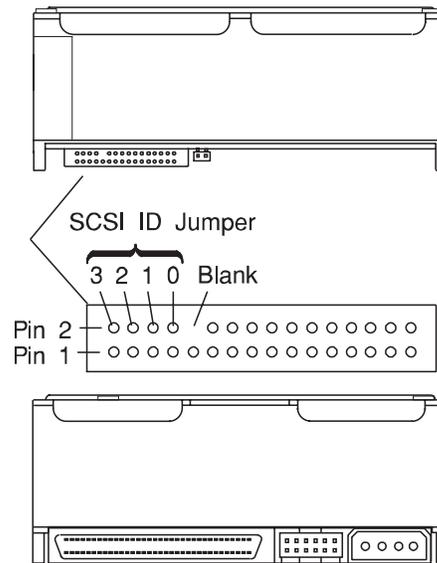
## Type H1 Drive

Jumper locations for the 9.1 and 18.2 GB ultra SCSI disk drives (68-pin model).

See 2-93 for SCSI address settings.

3 2 1 0   SCSI ID Jumper Positions
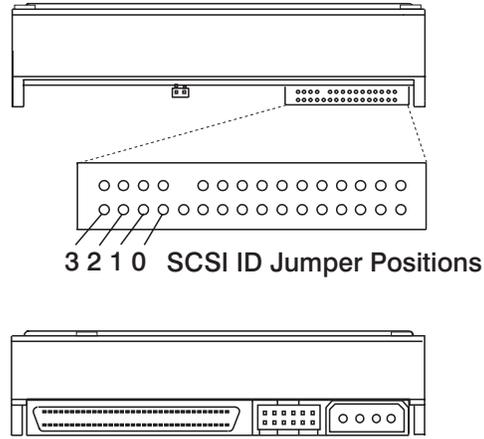
## SCSI Addres Table for Jumpers Numbered 3 to 0

| Address | Jumper 3 | Jumper 2 | Jumper 1 | Jumper 0 |
|---------|----------|----------|----------|----------|
| 0 | Off | Off | Off | Off |
| 1 | Off | Off | Off | On |
| 2 | Off | Off | On | Off |
| 3 | Off | Off | On | On |
| 4 | Off | On | Off | Off |
| 5 | Off | On | Off | On |
| 6 | Off | On | On | Off |
| 7* | Off | On | On | On |
| 8 | On | Off | Off | Off |
| 9 | On | Off | Off | On |
| 10 | On | Off | On | Off |
| 11 | On | Off | On | On |
| 12 | On | On | Off | Off |
| 13 | On | On | Off | On |
| 14 | On | On | On | Off |
| 15 | On | On | On | On |

**Note:**

1. Address 7 is reserved for the adapter.

2. There is no jumper 3 on 50 pin drives, thus SCSI addresses eight to fifteen are not valid.

# 1.37GB SCSI Disk Drive

The 1.37G-byte SCSI disk drive is a 5-1/4 inch fixed-disk drive. This drive mounts into a full-high media position.

# Setting the SCSI Address Jumpers

The SCSI address of the 1.37G-byte SCSI disk drive is set with three jumpers on the top rear of the drive.

**Note:** Address jumper block configurations differ; compare your drive to the illustrations below and on the following page.
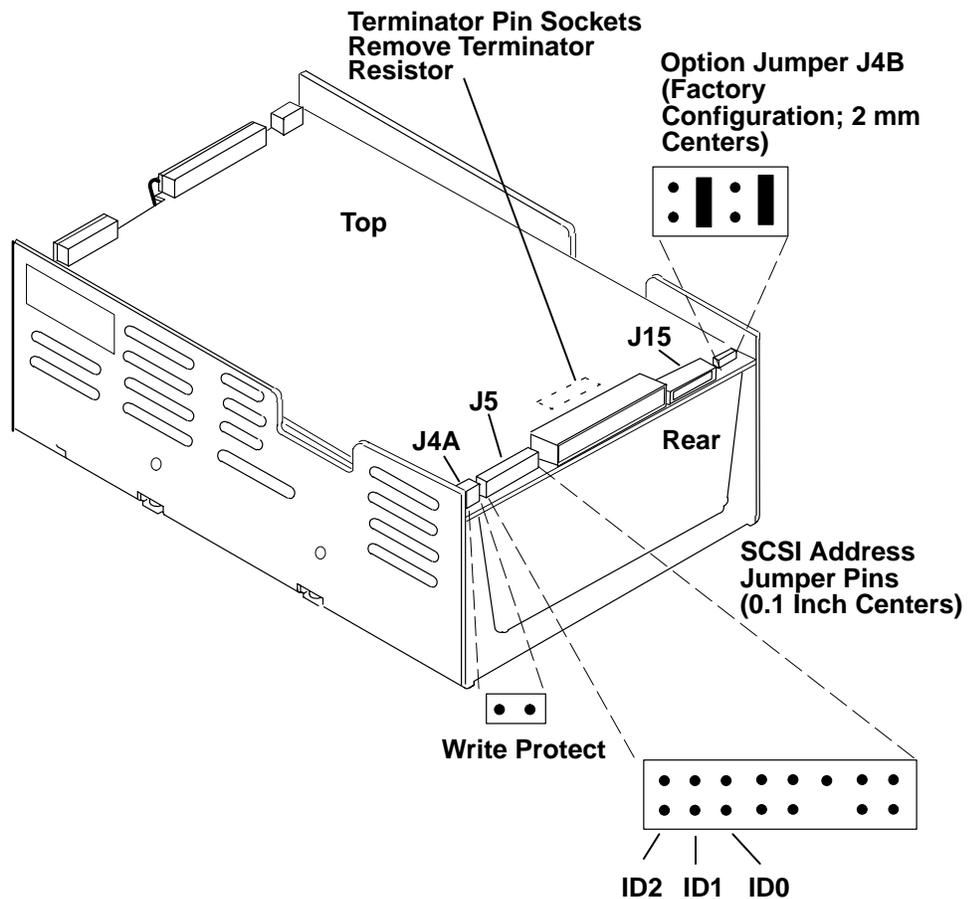


**Note:** The ID2, 1, and 0 pins on J5 use 0.1 inch (on center) jumpers (P/N 61X7052); option jumpers elsewhere on the drive use 2 mm jumpers (P/N 65F1103).

# Valid Addresses

| Address | Jumper ID2 | Jumper ID1 | Jumper ID0 |
|---------|------------|------------|------------|
| 0 | Off | Off | Off |
| 1 | Off | Off | On |
| 2 | Off | On | Off |
| 3 | Off | On | On |

| Address | Jumper ID2 | Jumper ID1 | Jumper ID0 |
|---------|-----------|-----------|-----------|
| 4 | On | Off | Off |
| 5 | On | Off | On |
| 6 | On | On | Off |
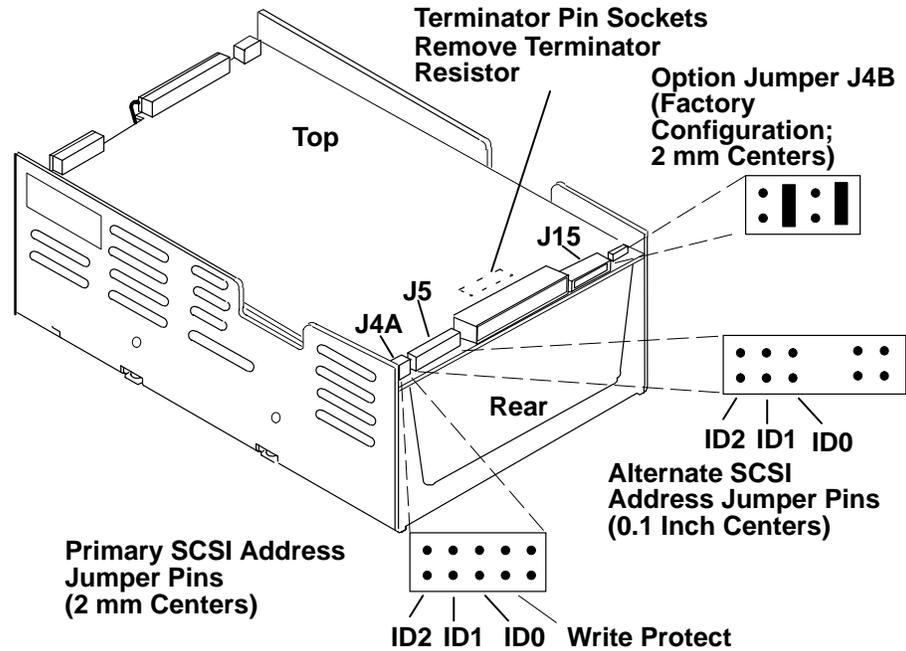


**Note:** The primary ID2, 1, and 0 pins on J4A use 2 mm (on centers) jumpers (P/N 65F1103). Alternatively, SCSI addressing can be accomplished by using 0.1 inch (100 mil) jumpers (P/N 61X7052) in the adjacent J5 jumper block.

## Valid Addresses

| Address | Jumper ID2 | Jumper ID1 | Jumper ID0 |
|---------|-----------|-----------|-----------|
| 0 | Off | Off | Off |
| 1 | Off | Off | On |
| 2 | Off | On | Off |
| 3 | Off | On | On |
| 4 | On | Off | Off |
| 5 | On | Off | On |
| 6 | On | On | Off |

## Exchanging the Logic Card

The logic card on the 1.37G-byte Disk Drive can be removed without removing the disk drive module. Use the following procedure:

1. Remove the disk drive from the system (refer to the installation and service guide for the system unit or device).

2. Place the disk drive on a flat work surface that offers electrostatic discharge protection, and use an electrostatic wrist strap.

**Attention:** The flex circuit is fragile. Avoid unnecessary bending of the circuit when connecting and disconnecting flex circuit connectors from circuit board connectors. Use an IC removal tool (*not* tools like screwdrivers or pliers) to disconnect flex circuit connectors. *If the flex circuit becomes damaged, the entire disk drive module must be replaced.*

3. Carefully grasp flex circuit connector **P30** with an IC removal tool. Avoid unnecessary rocking of the flex circuit assembly while pulling **P30** away from **J30**.

4. Remove the four T-10 Torx screws that secure the logic card to the disk drive.

5. Grasp the logic card at the address jumper end, and separate connectors **J23** and **P23** by wiggling the logic card slightly while pulling the logic card away from the power board.

6. Remove the logic card, and place it on an appropriate work surface.

   **Note:** Ensure that the foam acoustic insulation pad (if present) remains in place between the logic card and disk drive module.

7. Reassemble the logic card to the disk drive module by reversing the preceding steps.

   **Note:** All Terminator resistors must be removed from the logic card.
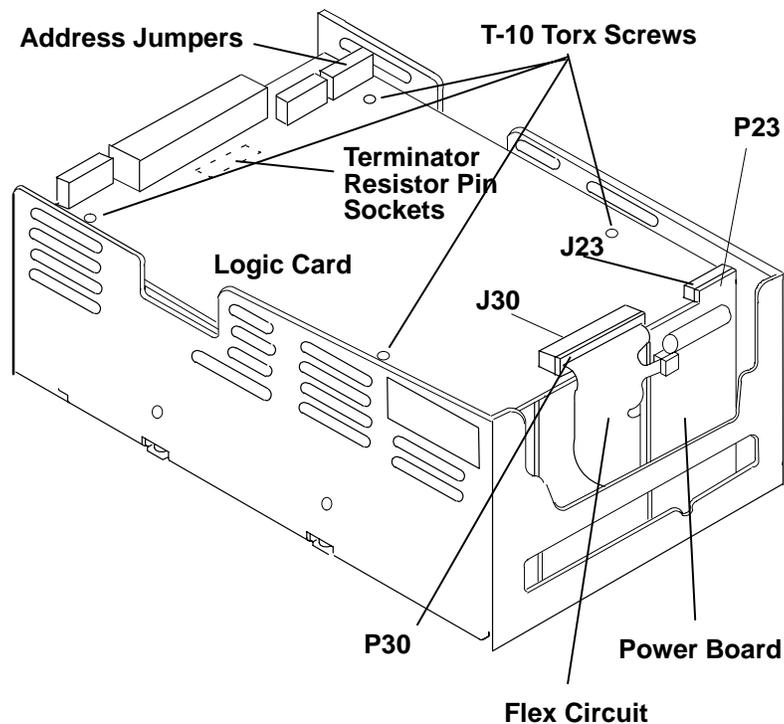
## 2.0G-byte SCSI-2 Single-Ended and Differential Disk Drives

The 2.0G-byte SCSI-2 disk drives are high performance, 3.5-inch, form factor disk drives that have single-ended or differential interfaces.  Fast (10MB/sec) and fast/wide (20MB/sec) drives are available with single-ended or differential interfaces.

Connect single-ended drives to single-ended controllers; connect differential drives to differential controllers.  Refer to "Cabling SCSI Devices" on page  4-3 for more information on cabling SCSI controllers and devices.

**Note:**  SCSI-2 single-ended and differential disk drives are shipped with no jumpers installed.

## Setting the SCSI Address or SCSI ID

Use the following illustrations to locate the jumper blocks and set the SCSI address.

## Differential Drives with 50-Pin Connector (Fast  10MB/sec)
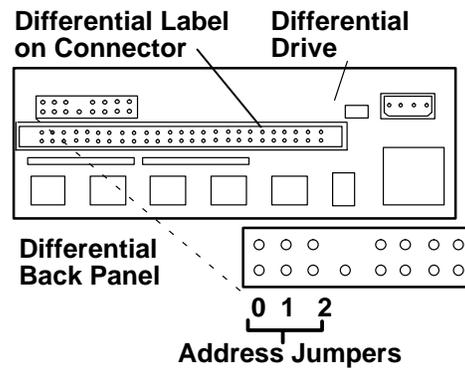


| Address | Jumper 0 | Jumper 1 | Jumper 2 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6* | Off | On | On |
| 7* | On | On | On |

**Note:**  * Address 7 is usually reserved for the adapter; in high-availability configurations, the second adapter is usually assigned address 6.

## Single-Ended Drives with 50-Pin Connector (Fast 10MB/sec)

### Type A Drive
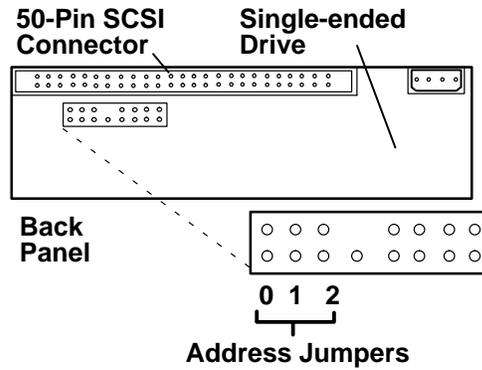


### Type B Drive
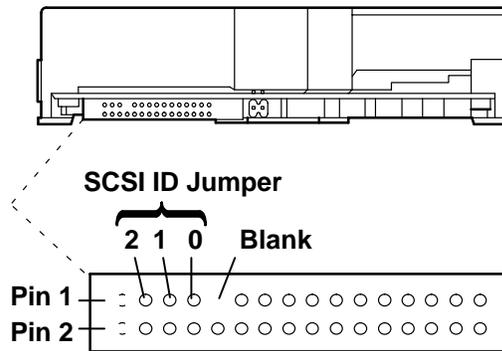


**Note:** Pins 1 and 2 do not exist on this model.

## Single-Ended and Differential Drives with 50-Pin Connector (Fast 10MB/sec)

| Address | Jumper 0 | Jumper 1 | Jumper 2 |
|---------|----------|----------|----------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6* | Off | On | On |
| 7* | On | On | On |

**Note:** * Address 7 is usually reserved for the adapter; in high-availability configurations, the second adapter is usually assigned address 6.

# Single-Ended and Differential Drives with 68-Pin Connector (Fast/Wide 20MB/sec)
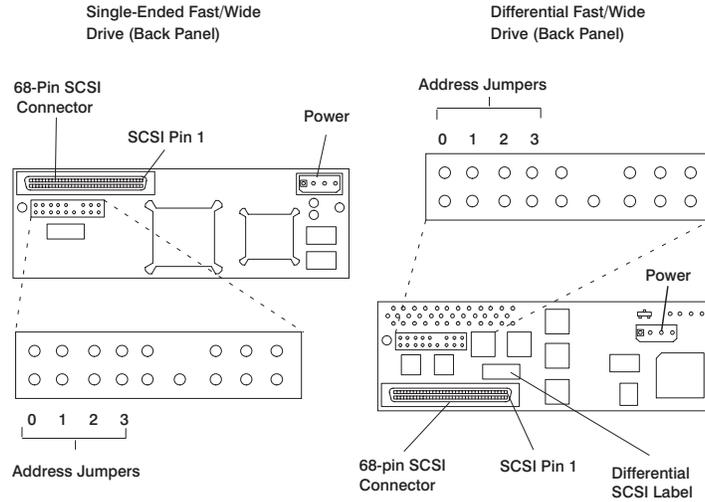


## Addresses

| Address | Jumper 0 | Jumper 1 | Jumper 2 | Jumper 3 |
|---------|----------|----------|----------|----------|
| 0 | Off | Off | Off | Off |
| 1 | On | Off | Off | Off |
| 2 | Off | On | Off | Off |
| 3 | On | On | Off | Off |
| 4 | Off | Off | On | Off |
| 5 | On | Off | On | Off |
| 6* | Off | On | On | Off |
| 7* | On | On | On | Off |
| 8 | Off | Off | Off | On |
| 9 | On | Off | Off | On |
| 10 | Off | On | Off | On |
| 11 | On | On | Off | On |
| 12 | Off | Off | Off | On |
| 13 | On | Off | On | On |
| 14 | Off | On | On | On |
| 15 | On | On | On | On |

**Note:** * Address 7 is usually reserved for the adapter; in high-availability configurations, the second adapter is usually assigned address 6.

## Exchanging the Frame Electronics

Refer to the procedures that were packed with the FRU.

## 2.4G-byte SCSI Disk Drive

The 2.4G-byte SCSI disk drive assembly contains two independently addressable 3-1/2 inch Head Disk Assemblies (HDAs) mounted in a 5-1/4-inch form factor enclosure. An available field repair kit includes one Head Disk Assembly (HDA), the electronics planar and the 5-1/4-inch form factor enclosure ("cage"). For applicable FRU numbers, refer to Failing Functional Codes C11 and 986 in Chapter 3 of the *RS/6000 Diagnostic Information for Micro Channel Bus Systems*, order number SA38-0532.

## Setting the SCSI IDs (Addresses)

The SCSI addresses of the 2.4G-byte SCSI disk drive are set with two ID (address) groups (HDA A and B) on the connector end of the drive.

**Note:** Each of the two HDAs must be assigned its own, unique SCSI ID (address); the system configures two individual SCSI drives.
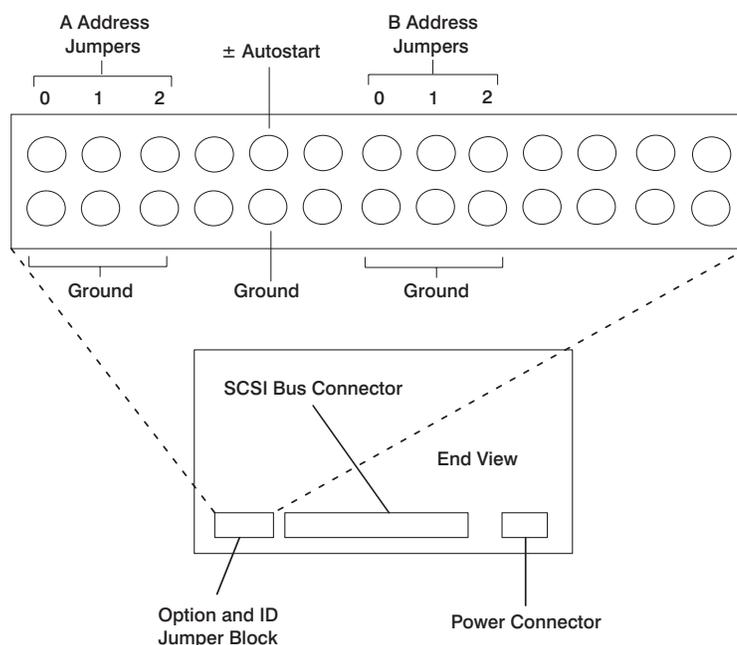


## Valid Addresses

| Address | Address Jumper 0 | Address Jumper 1 | Address Jumper 2 |
|---------|------------------|------------------|------------------|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

**Note:** "On" in the preceding table means that the jumper is installed between the address pin and its corresponding ground pin.

# HDA Removal and Replacement

Contained within the 5-1/4 inch form factor enclosure (cage) are two 3-1/2 inch head drive assemblies (HDAs) (each containing a data channel card) and an electronics planar. Field replacement options are 1) replace the entire two-HDA assembly or 2) assuming that only one HDA has failed, remove the "good" HDA, and install it in the Field Repair Kit which comprises one complete HDA, an electronics planar, and the 5-1/4 inch form factor cage.

**Note:** As a final effort to save critical data from the "failed" HDA, that drive may be temporarily substituted for the "good" drive that has been installed in the Field Repair Kit. If the "failed" drive then functions properly, the problem was probably in the electronics planar. If possible, back up data from the "failed" HDA, and return it to the factory for analysis. Keep the "good" HDA, along with the new HDA from the Field Repair Kit.

**Special Tools Required:**

- Torx T7 bit, 37F8396
- Torx T20 bit (tamper-proof), 39F8401

**Note:** Torx set, 39F8407, includes the T7 and T20 bits.

- Holding clip removal tool (included with field repair kit; not available separately).

# HDA Removal

**Note:** The HDA removal procedure is the same for either of the two HDAs; the following illustrations portray removal of HDA B.

1. Remove the cage top cover by loosening the top cover Torx T20 screws [2], and then lifting cover off the tabs [1] in the lower frame.

**Note:** Some versions of the top cover may have rear interlocking tabs that do not fit under screws.
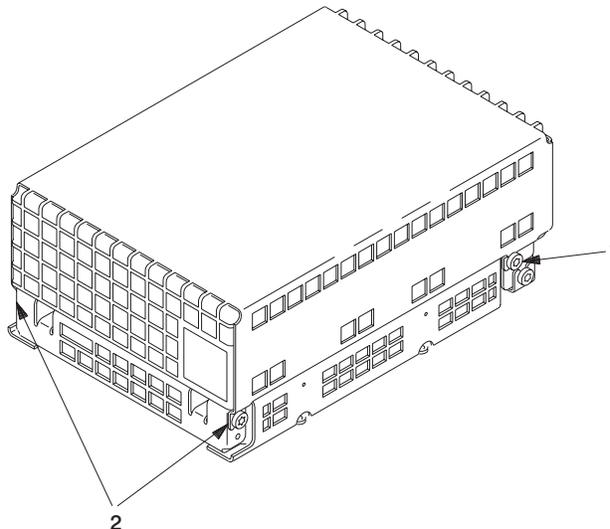
**Attention:** The flex cable can be torn by excessive force, or signal lines can be broken by bending the cable sharply.

2. Disconnect the data channel flex cable by:

    a. Orienting the HDA so that the channel data card [1] is in front of you.

    b. Releasing the flex cable connector by pulling both ends of the connector forward as shown.

    c. Pulling the flex cable from the connector.
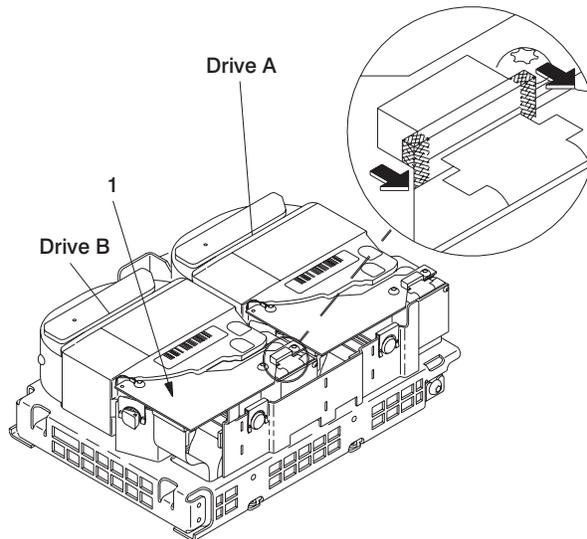


**Attention:** There is a greater risk of ESD damage to the disk enclosure when the jumper wire shown below is removed from the data channel card.

3. Remove the three Torx T7 screws [1] that hold the channel data card to the frame.

4. Lift up the jumper wire shown in the enlargement, but *do not lift up the channel card at this time*.
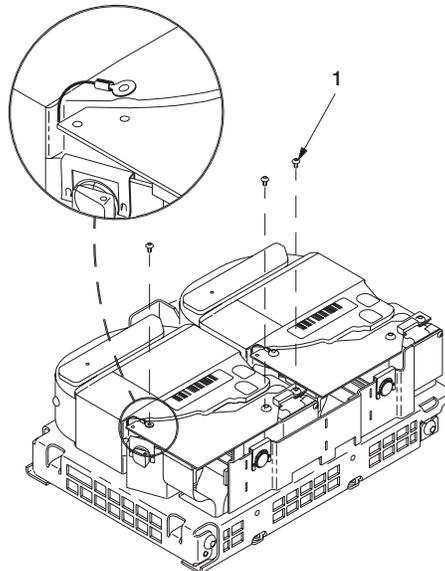
**Attention:** In the following step, ensure that you lift the data channel card [2] around the plastic retainer, or the data channel card may be damaged.

5. Lift the channel data card [2] up from the HDA, and hold it at an angle so that you can easily get access to the connector [3].

6. Remove the spacer [1] from the top of the HDA. Note how the spacer is installed so that you can reinstall it correctly.
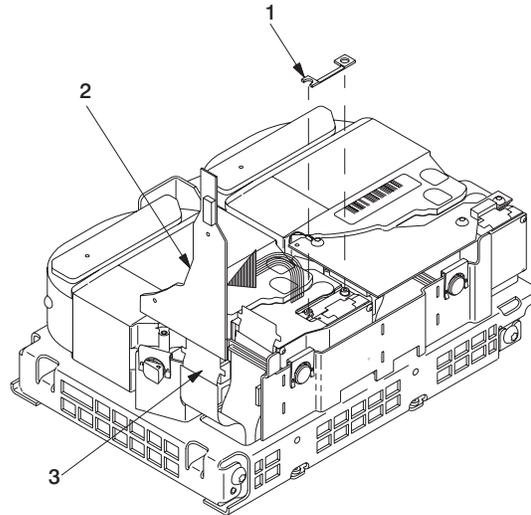
7. Release the flex cable connector [1] by pulling up on both ends of the connector.

8. Pull the flex cable from the connector, and put the data channel card on an ESD-protected work surface.
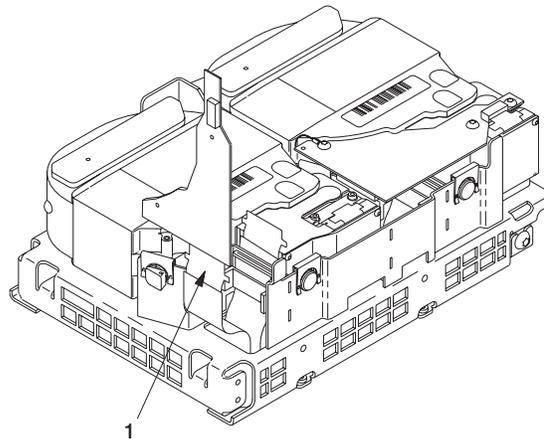
**Attention:** The flex cable can be torn by excessive force, or signal lines can be broken by bending the cable sharply.

9. Disconnect the actuator flex cable by:

   a. Releasing the flex cable connector by lifting up on both ends of the connector with the holding clip removal tool [1].

   b. Pulling the flex cable [2] from the connector.
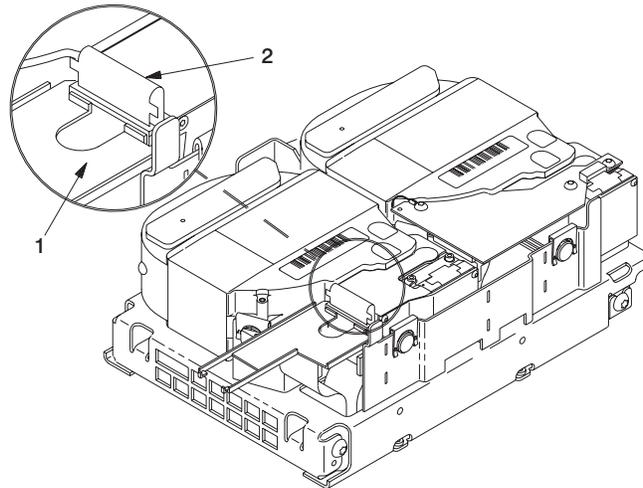


10. Locate three holding clips [1], [2] and [3].

**Note:** The cut tabs [4] (notches in the metal) that lock the holding clips to the frame are on the outside of the frame.

11. Place the holding clip removal tool over the holding clip as shown; the flat part of the tool should be against the HDA frame.

12. Pull up on the holding clip removal tool until the holding clip comes off the shock mount.
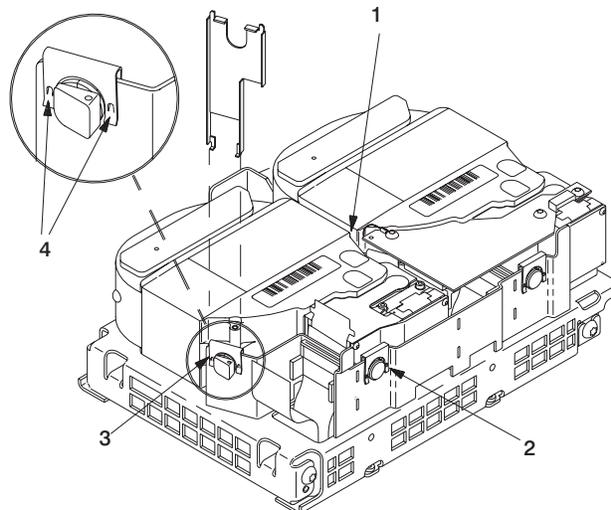
**Attention:** Do not hold or apply pressure to the HDA cover (shaded area in the illustration) the HDA cover may touch and damage the disks inside.

**Note:** In the two following steps, only loosen the HDA; do not lift it out yet.

13. Loosen the damper spring screw.

14. Loosen the HDA by first grasping the front and left shock mounts [3] and pulling up. Then, grasp the HDA just above the right shock mount [2], and pull up.
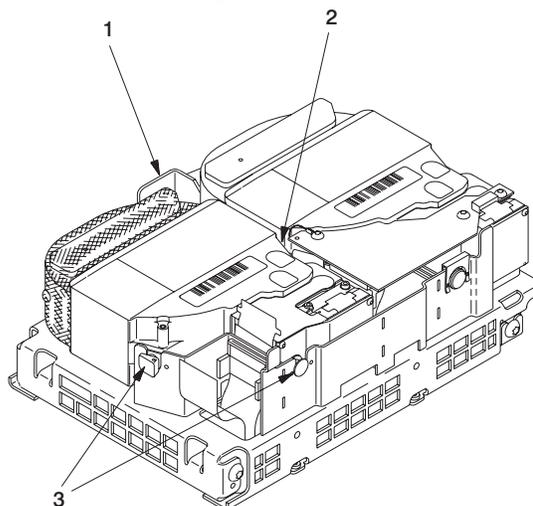


**Attention:** The HDA has no shock protection when removed from the frame. The HDA must be held by the shock mounts with extreme care.

**Attention:** The motor cable is attached to the bottom of the HDA. Be careful not to lift the HDA too high, or this short cable may break.

**Attention:** Do not hold or apply pressure to the HDA cover (shaded area in the illustration); the HDA cover may touch and damage the disks inside.

15. *Holding the shock mounts [1] only at the points shown*, lift the HDA from the frame.

16. Hold the HDA by the shock mounts on the ESD-protected work surface with the motor cable up.
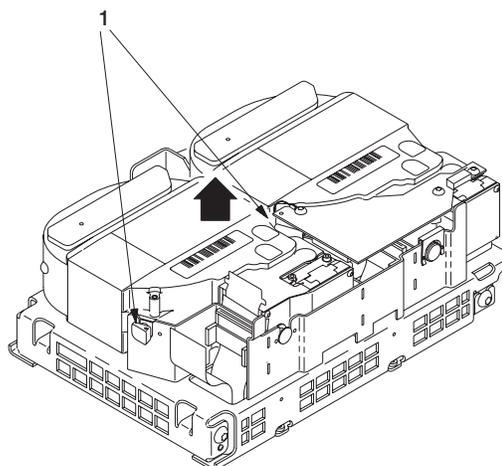
17. Note the position of the motor cable and how it attaches to its connector [1]; the motor cable must be in the same position when it is reconnected.

18. Remove the motor cable from its connector by pulling up on the tab [2] This completes the removal procedure.

Drive A

Note: Although the procedure detailed in this step is shown as performed with HDA A, the procedure is the same for HDA B.

1

2
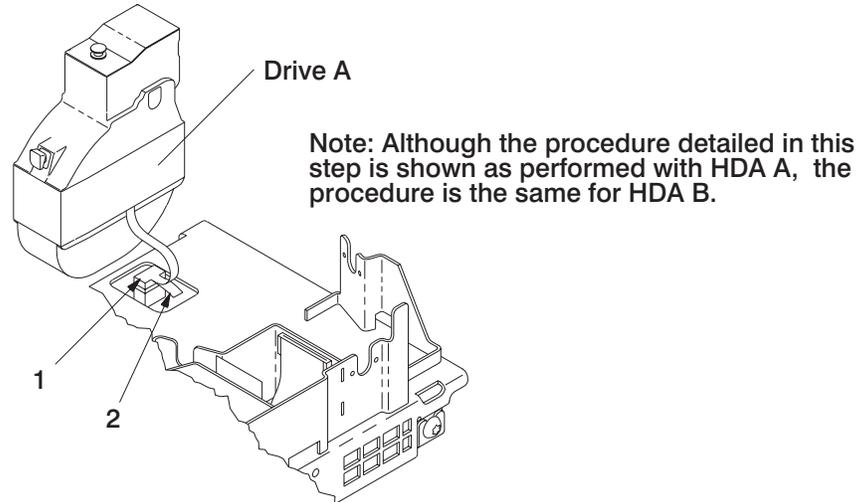
## HDA Replacement

1. Hold the HDA by the shock mounts so that it is standing up on the ESD-protected work surface.

2. Reconnect the motor cable [1] to the planar card.

Drive A

Note: Although the procedure detailed in this step is shown as performed with HDA A, the procedure is the same for HDA B.

1
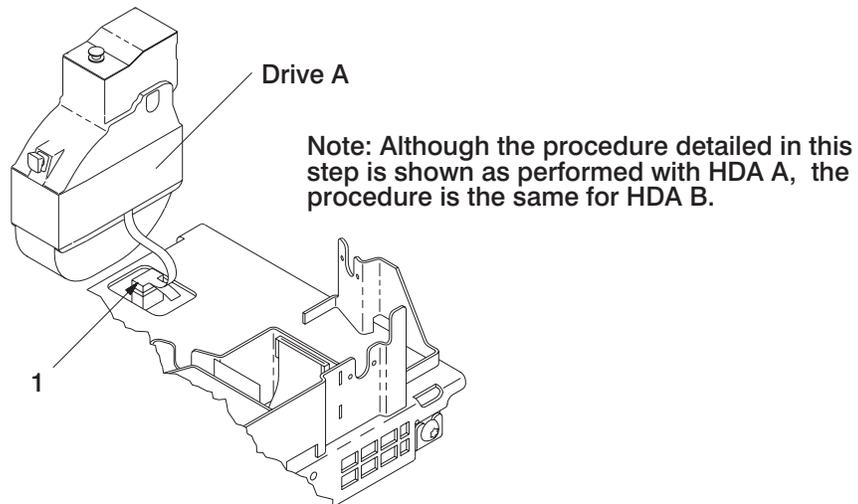
**Attention:** Hold the HDA by the shock mounts. *Ensure that the motor cable is not twisted*.

3. Align the front shock mount [3] with the slot on the connector end of the frame.

4. Align the side shock mounts [2] and [4] with the slot on the connector end of the frame.

5. Push down on the side shock mounts at points [2] and [4] to seat the HDA.

6. Tighten the damper spring screw [1] that is against the rear of the HDA.
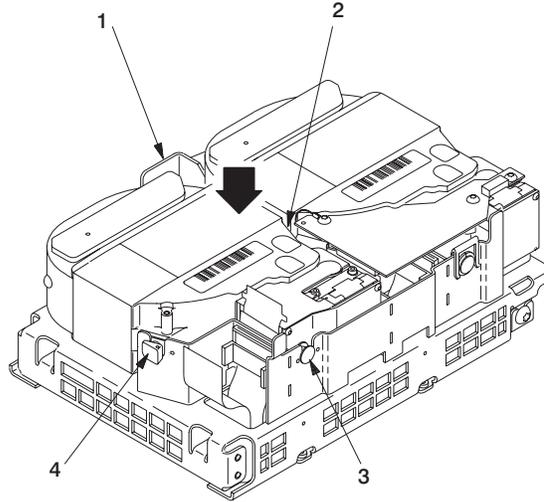


**Note:** The cut tabs [4] (notches in the metal holding clips) that lock the holding clips to the frame must be on the outside of the frame. If installed incorrectly, the holding clips cannot be removed easily.

7. Install three new holding clips, [1], [2] and [3] provided in the parts kit, so that they hold the HDA shock mounts to the frame.
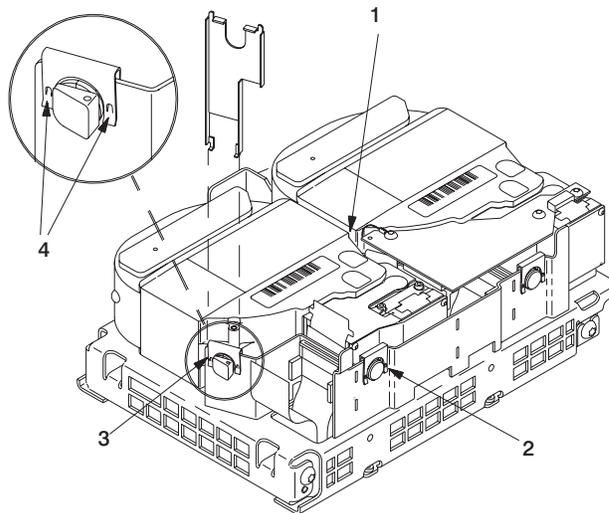
**Attention:** The flex cable can be torn by excessive force, or signal lines can be broken by bending the cable sharply.

8. Lift up on both ends of the connector with the holding clip removal tool [1].

9. Push the flex cable [2] all the way into the connector until the flex cable tabs touch the connector.

**Note:** The flex cable tabs do not touch the connector after the connector is sealed.
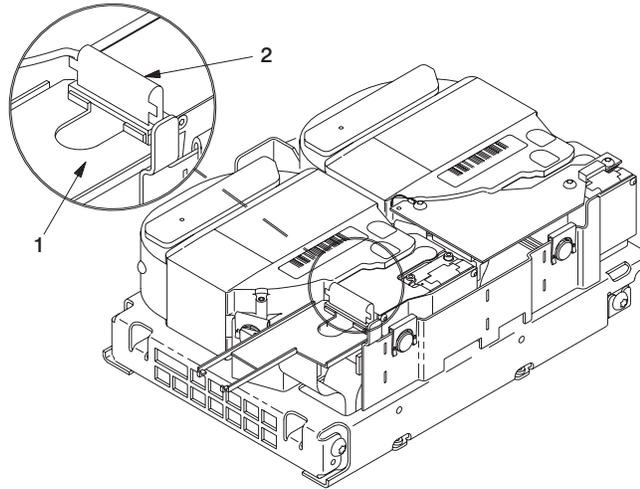


10. Push the read/write flex cable [1] into the end of the connector, and push the tabs on the connector edge down to fasten the cable.

11. Ensure that the spacer [2] is in the correct position as shown.

12. Hold the data channel card in place on the frame.
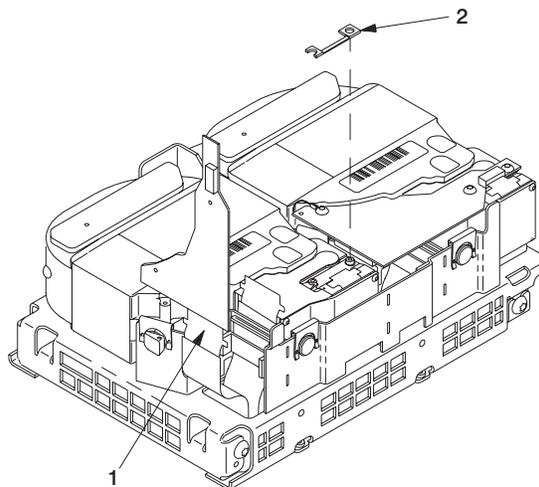
**Attention:** There is a greater risk of ESD damage to the HDA when the jumper wire shown below is removed from the data channel card. *Ensure that the jumper wire is installed in the following step.*

13. Install three Torx T7 screws [1] that hold the data channel card to the frame, with the jumper wire under the screw as shown. Ensure that the jumper wire is routed between the HDA and the data channel card to avoid interference when you replace the top cover.
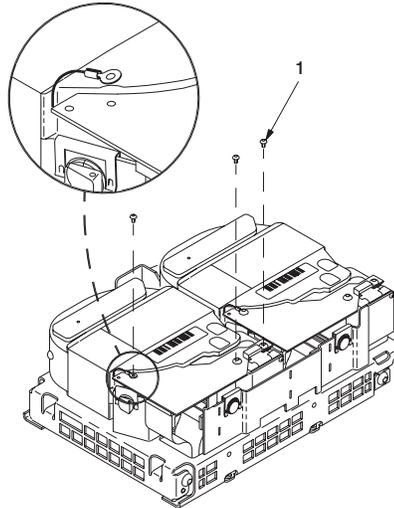


**Attention:** The flex cable can be torn by excessive force, or signal lines can be broken by bending the cable sharply.

14. Pull out on both ends of the connector.

15. Push the flex cable all the way into the connector until the flex cable tabs touch the connector.

16. Seat the connector by pushing in on both ends of the connector.

**Note:** The flex cable tabs do not touch the connector after the connector is sealed.
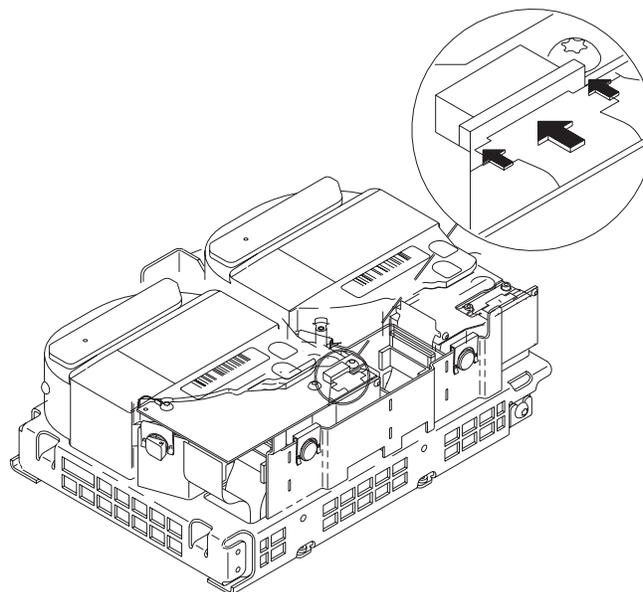
17. Place the two tabs [1] into the lower frame, and tighten the top cover Torx T20 screws [2].

**Note:** Some versions of the top cover may have rear interlocking tabs that do not fit under screws.
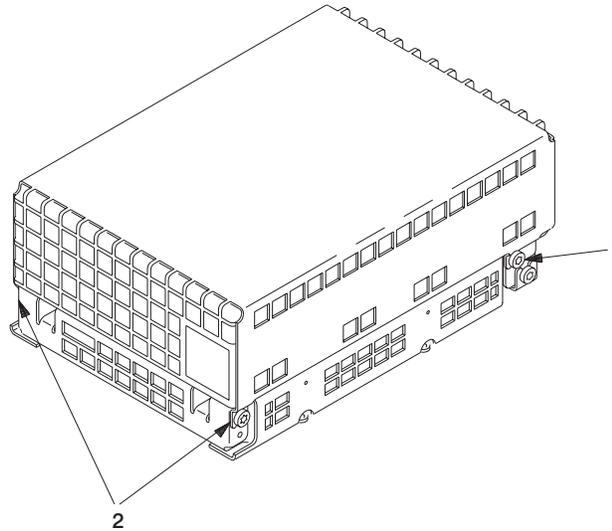
# Chapter 3. Cables and Cabling

This chapter has information for those servicing installed systems and to help those planning for new installations. There is information that describes cabling to the standard interfaces that come in the system and cabling to the many optional adapters that are used with the system.

In most cases when a system unit is getting attached to large computer systems, file systems, or networks, the cabling is complicated and the appropriate publications for those specific products are required for cabling and setup.

Chapter 4 has all of the information about SCSI cabling.

Chapter 5 has information on cable building and pin-outs that may be helpful if you are considering custom built cables.

## Adapter Cabling

This section helps you determine the types of cables you need to attach devices to their adapters. *Length* refers to the length of a cable. There are many general purpose cables shown in this section. However, there are many cases where custom cables are required when installing large or complicated systems. Chapter 5 provides pin-outs and in some cases additional information that may help you or your cable vendor build these cables.

If there are custom built cables used with your system, be sure to read the applicable sections in chapter 5 of this book and in the *Site and Hardware Planning Information*. Order number SA38-0508.

## Communications Adapter Cabling

This section provides information on cabling for communications adapters.

There are many ways to connect communications cables and devices. Because each installation may have unique requirements, the following topics present attachment configurations using part-numbered cables. These drawings are not the only ways you can cable devices to a system; see Chapter 5 for additional information about custom built cables.

## EIA-232 Cabling Considerations

**Attention:** EIA-232 asynchronous adapters may be damaged if the following cabling practices are not observed:

**Note:** Use of the following recommendations are not a guarantee of compliance with FCC EMI/RFI regulations.

- Cable directly, as described in the Hardware Offerings overview manual, since there should then be no Electrical Static Discharge (ESD) entry point other than a charged cable.
- Discharge cables before plugging into adapters or interface cable ports (fanout box).
- Do not allow conductors, leads, or pins to be exposed to the touch of non-anti-static-protected persons.

- Avoid the use of Type 66 Punchdown or similar terminal blocks. If these terminal blocks must be used, ensure that the person handling interface wires is using appropriate ESD precautions such as ground straps and grounded floor mats, and that grounded equipment covers that require touching before access are in use. These precautions must be taken even if power is off, since ESD damage is independent of circuit power.
- Eight- and sixteen-port adapter cables should not be used outdoors. Such outdoor use is at the customer's risk, and an appropriate transient voltage suppression device should be used on *each signal wire in the cable* at every exit or entry point.
- Do not route cables near or around power cables, power transformers, or high power switching devices such as air conditioners, refrigeration units, or elevators.

**Note:** The 78-pin multiport interface cables for the 8-or 16-port Async Adapters when used with the 7015 Models R10 and R20 attach to the system tailgate rather than to the adapter itself. Internal cables not shown in the cable diagrams run from the adapter through the cable management arm to the tailgate connector.

- Shielded cables are essential to prevent damaging high voltage noise impulses from coupling onto signal lines. The shielded cable should be data grade, at least 24 AWG, and of individual shielded twisted pairs. Shielding should have both overall shorted aluminum foil to suppress high frequency noise and tinned copper braid (capacitance approximately 12pF per foot, not to exceed 2500pF in the recommended maximum cable length of 200 feet) to suppress low frequency noise. Shielded connectors with metal shrouds are also recommended, as are cable strain reliefs.

**Note:** Twisted pair cable with only overall aluminum foil shielding, as described above, may be used if the signal conductors are carefully bundled to prevent crosstalk.

- If the cable is routed from the system (fanout box) to the I/O device, the shields and drain wire should be connected to the metal shell of the connector at the system end. At the I/O device end, the drain wire should be connected to Pin 1, and the shields should be connected to the metal shell of the connector. If a cable similar to the Async cable is to be attached from the system (fanout box) to a permanently installed cable, frame ground should be present on Pin 1 and on both ends of the permanently installed cable.
- Excessive cable lengths expose the system to more noise. Maximum supported cable length is 200 feet for EIA-232 applications.
- The cable should not contain unterminated (connected at one end only) wires. Unterminated wires act as antennas and can pick up or emit electrical noise.
- Do not tie the frame (shield) ground to the signal ground within the cable or connector.

## FC 2930 (8-Port Async Adapter-EIA-232)

The following figure illustrates the 8-Port Async Adapter-EIA-232 with the Multiport Interface Cable and attachment cables. The cable assembly ports are labeled 0 through 7. Attachment cables can connect to any of the eight ports. In order to make the necessary connections to this adapter, your setup person needs to know the devices and persons assigned to each port.



| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| J | Part of cable assembly | 00F5531 | 2995 | 3 | 10 |
| D | Async Cable-EIA-232/V.24, if customer-supplied, must meet EIA-232D requirements | 6323741 | 2936 | 3 | 10 |
| E | Printer/Terminal Interposer EIA-232 | 58F2861 | 2937 | N/A | |
| I | Printer/Terminal Cable EIA-232 if customer-supplied, must meet EIA-232D requirements | 12H1204 | 2934 | 3 | 10 |

## FC 2940 (8-Port Async Adapter-EIA-422A)

The following figure illustrates the 8-Port Async Adapter-EIA-422A with the Multiport Interface Cable and attachment cables. The cable assembly ports are labeled 0 through 7. Attachment cables can connect to any of the eight ports. In order to make the necessary connections to this adapter, your setup person needs to know the devices and persons assigned to each port.
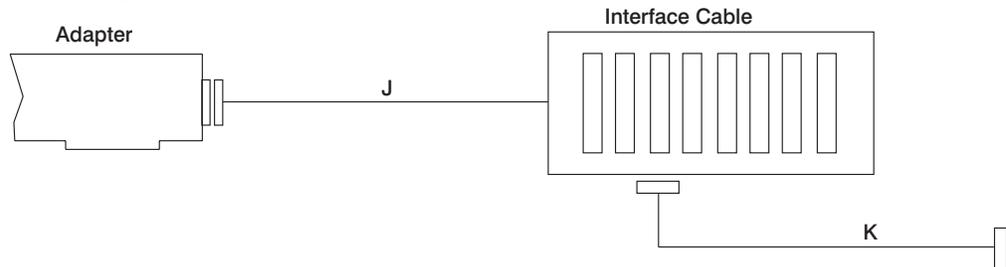


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| J | Part of cable assembly | 00F5531 | 2995 | 3 | 10 |
| K | Terminal Cable-EIA-422A, if customer-supplied, must meet EIA-422A requirements | 30F8966 | 2945 | 20 | 65.5 |

# FC 2950 (8-Port Async Adapter MIL-STD 188)

The following figure illustrates the 8-Port Async Adapter MIL-STD 188 with the Multiport Interface Cable and attachment cables. The cable assembly ports are labeled 0 through 7. Attachment cables can connect to any of the eight ports. In order to make the necessary connections to this adapter, your setup person needs to know the devices and persons assigned to each port.
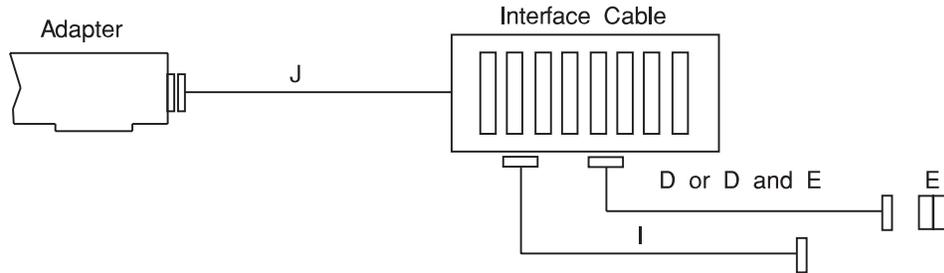


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| J | Interface cable assembly | 00F5531 | 2995 | 3    10 |
| D | Async Cable-EIA-232/V.24, if customer-supplied, must meet MIL-STD 188 requirements | 6323741 | 2936 | 3    10 |
| E | Printer/Terminal Interposer EIA-232 | 58F2861 | 2937 | N/A |
| I | Printer/Terminal Cable EIA-232 if customer-supplied, must meet EIA-232D requirements | 12H1204 | 2934 | 3    10 |

# FC 2955 (16-Port Async Adapter-EIA-232)

The following figure illustrates the adapter with the 16-Port Interface Cable-EIA-232 and attachment cables.  The cable assembly ports are labeled 0 through 15.  Attach cables can connect to any of the 16 ports.  In order to make the necessary connections to this adapter, your setup person needs to know the devices and persons assigned to each port.
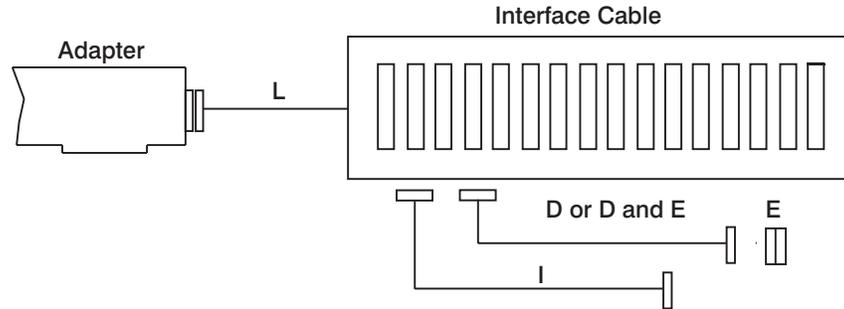


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| L | Interface cable assembly | 43G0463 | 2996 | 3 | 10 |
| D | Async Cable EIA-232/V.24, if customer-supplied, must meet EIA-232D requirements | 6323741 | 2936 | 3 | 10 |
| E | Printer/Terminal Interposer EIA-232 | 58F2861 | 2937 | N/A | |
| I | Printer/Terminal Cable EIA-232 if customer-supplied, must meet EIA-232D requirements | 12H1204 | 2934 | 3 | 10 |

## FC 2957 (16-Port Async Adapter-EIA-422A)

The following figure illustrates the adapter with the 16-Port Interface Cable-EIA-422A and attachment cables. The cable assembly ports are labeled 0 through 15. Attachment cables can connect to any of the 16 ports. In order to make the necessary connections to this adapter, your setup person needs to know the devices and persons assigned to each port.
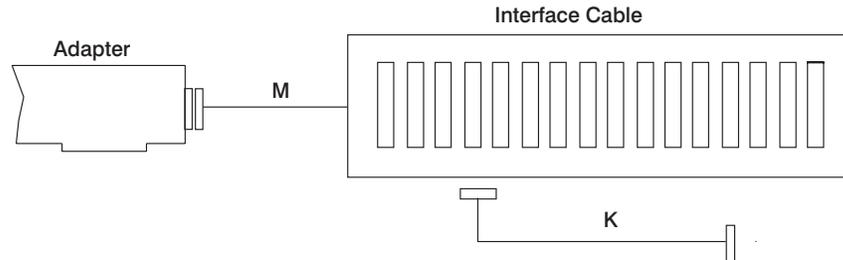


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| M | Interface cable assembly | 43G0462 | 2997 | 3    10 |
| K | Terminal Cable-EIA-422A, if customer-supplied, must meet EIA-422A requirements | 30F8966 | 2945 | 20   65.5 |

# FC 6400 (Async Device Attached to a 64-Port Async Controller)

Use this drawing only for the 64-port async controller and 16-port async concentrator.

Use this drawing when connecting async devices or communications devices to the 64-port async controller. Each 64-port controller can support up to four 16-port concentrators.



| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length | |
|---|---|---|---|---|---|
| | | | | m | ft |
| D | Async Cable EIA-232/V.24, if customer-supplied, must meet EIA-232D requirements | 6323741 | 2936 | 3 | 10 |
| E | Printer/Terminal Interposer EIA-232 | 58F2861 | 2937 | N/A | N/A |
| I | Printer/Terminal Cable EIA-232 if customer-supplied, must meet EIA-232D requirements. | 12H1204 | 2934 | 3 | 10 |
| N | Controller to concentrator cable if customer-supplied, must meet EIA-232D requirements. | 00G1109 | | 7.6 | 25 |
| P | RJ-45 to DB-25 converter cable Note: Only available as four-cable kit. If customer-supplied, must meet EIA-232D requirements. | 59F3432 | 6402 | .45 | 1.5 |
| XX | Directly wires RJ-45 to DB-25 connector for attaching a terminal or printer. See note. | N/A | N/A | N/A | N/A |
| YY | Directly wires RJ-45 to DB-25 connector for attaching a modem. See note. | N/A | N/A | N/A | N/A |
| Power Trans former | Power transformer 115 - 127 V ac | 70F9938 | N/A | N/A | N/A |
| | Power transformer 100 - 110 V ac | 70F9937 | N/A | N/A | N/A |
| | Power transformer 200 - 220 V ac | 70F9939 | N/A | N/A | N/A |
| | Power transformer 230 - 240 V ac | 70F9940 | N/A | N/A | N/A |

**Note:** This customer supplied cable must meet EIA-232D electrical requirements.

# FC 8128 (128-Port Async Controller)

A number of cabling scenarios are possible when installing this feature. The following figure shows a typical configuration in which eight Remote Async Nodes are attached to the 128-Port Async Controller using both 4-wire and 8-wire direct cabling. Note that in the figure below, the 128-Port Async Controller supports up to four Remote Async Nodes on each controller. Cables NB and NC are available or can be customer supplied. The ND cable in the configuration below is a customer-supplied cable. See "128-Port Async Controller" on page 5-28.
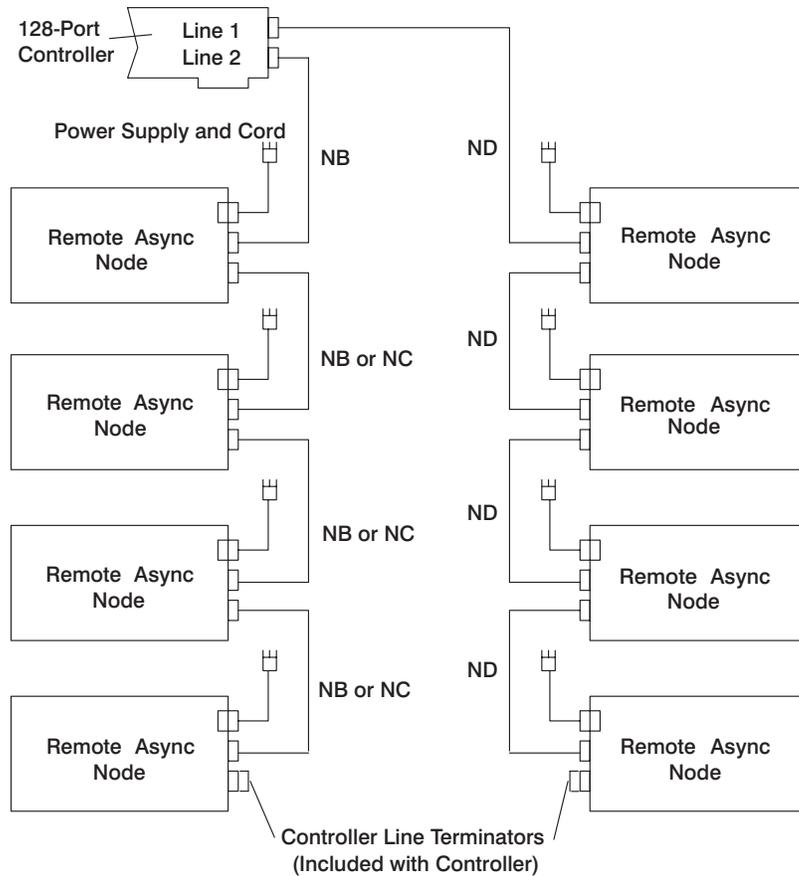
A choice of cables can be attached to any of the 16 Remote Async Node ports. See the following illustration. These ports are labeled 0 through 15 and accept 4-, 6-, 8-, and 10-pin RJ-type connectors.
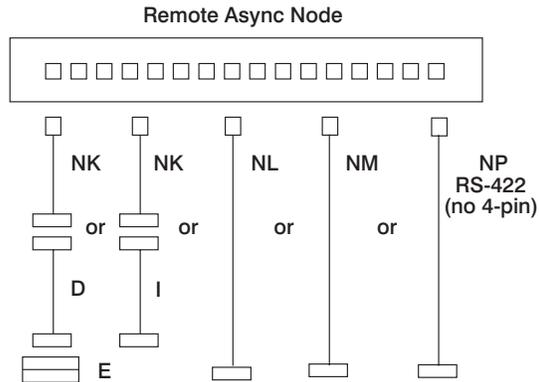


Remote Async Node

In order to make the necessary connections to the Remote Async Node, the system administrator must know the type of device that is being configured and its port location on the Remote Async Node. The cable planning charts section of the *Site and Hardware Planning Information*, order number SA38-0508 can help you make these assignments.

The following table shows the cables that are used to configure the 128-Port Async Controller, see "128-Port Async Controller" on page 5-28, for information on cables that you can build yourself.

| Cable Letter | Cable Name/ Description | Part Number | Feature Code | Length<br>m        ft |
|---|---|---|---|---|
| NB | 128-Port Async Controller Cable, 8-wire | 43G0937 | 8131 | 4.57    15 |
| NC | 128-Port Async Controller Cable, 8-wire | 43G0936 | 8132 | .23    .75 |
| ND | 128-Port Async Controller Cable, 4-wire, customer-supplied | N/A | N/A | N/A |
| NE | 128-Port Async Controller EIA-232 Modem Cable, system, customer-supplied | N/A | N/A | N/A |
| NF | 128-Port Async Controller EIA-232 Modem Cable, device, customer-supplied | N/A | N/A | N/A |
| NG | 128-Port Async Controller EIA-422 Modem Cable, system, customer-supplied | N/A | N/A | N/A |
| NH | 128-Port Async Controller EIA-422 Modem Cable, device, customer-supplied | N/A | N/A | N/A |
| NK | RJ-45 to DB-25 Converter Cables (four provided with each order) | 43G0935 | 8133 | 0.61    2 |

| Cable Letter | Cable Name/ Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| D | Async Cable EIA-232/V.24, if customer-supplied, must meet EIA-232-D requirements. | 6323741 | 2936 | 3 | 10 |
| E | Printer/Terminal Interposer EIA-232 | 58F2861 | 2937 | N/A | |
| I | Printer/Terminal Cable EIA-232 if customer-supplied, must meet EIA-232-D requirements | 12H1204 | 2934 | 3 | 10 |
| NL | Cable directly wires RJ-45 to a DB-25 connector for attachment to a terminal or printer; customer-supplied, must meet EIA-232-D electrical requirements | N/A | N/A | N/A | |
| NM | Cable directly wires RJ-45 to a DB-25 connector for attachment to a modem; customer-supplied, must meet EIA-232-D electrical requirements | N/A | N/A | N/A | |
| NP | Cable for RS-422. Directly wires RAN to RS-422 device.  RJ-45 to DB-25, customer-supplied, must meet RS-422 electrical requirements | N/A | N/A | N/A | |
| See Note | Cable converter 64-Port to 128-Port Pin-out converter Allows customers to use 64-Port Concentrator wiring with 128-Port Remote Async Node; if customer-supplied, must meet EIA-232-D electrical requirements | 88G3650 (pkg of 4) | 8135 | N/A | |

**Note:** This converter cable allows customers with installed 64-Port Async Card and 16-Port concentrators to convert the 8-wire wiring used with the 16-Port concentrators to the 10-wire wiring used with the 16-Port Remote Async Nodes that are used with the 128-Port Adapter.

# FC 2921, 2924, 2928 (IBM ARTIC960 Adapter)

The cabling options for the IBM ARTIC960 Adapter (FC 2921, 2924, 2928) are shown below.

The AIB with the matching cable provide a choice or four interfaces:

- 4-Port EIA-232-D
- 4-Port EIA-530 (RS-422)
- 4-Port ISO 4902 (V.36)
- 4-Port ISO 4903 (X.21)
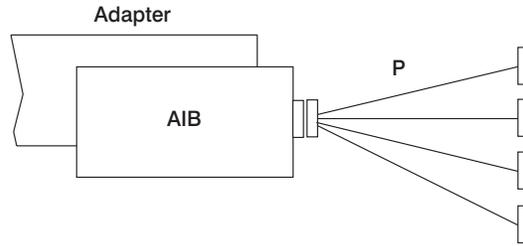


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length | |
|---|---|---|---|---|---|
| | | | | m | ft |
| P | Cable Option EIA 232D | 61G2918 | 2922 | 1.8 | 6 |
| | Cable Option EIA 530 (RS-422) | 61G2923 | 2923 | 1.8 | 6 |
| | Cable Option ISO 4902 (V.36) | 61G2933 | 2926 | 1.8 | 6 |
| | Cable Option ISO 4093 (X.21) | 61G2928 | 2927 | 1.8 | 6 |

# FC 2935, 2929, 2938 (IBM ARTIC960 Adapter)

The cabling options for the IBM ARTIC960 Adapter (FC 2935, 2929, 2938) are shown below.

The AIB with the matching cable provide a choice or three interfaces:

- 6-Port ISO 4902 (V.36)
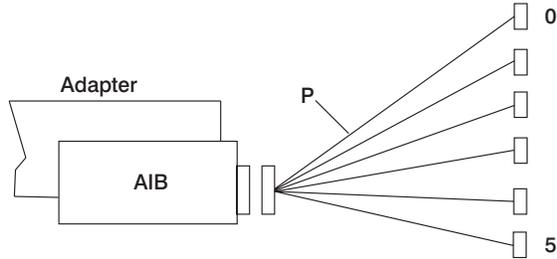


- 8-Port EIA-232-E
- 8-Port ISO 4903 (X.21)
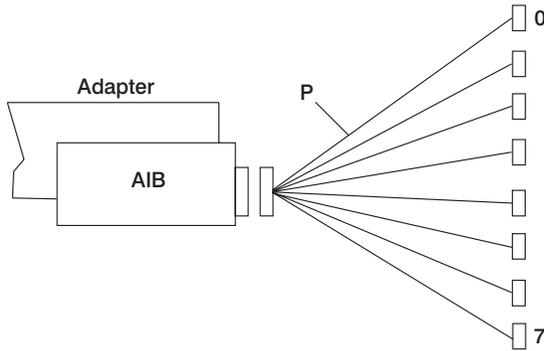


| Cable | Cable Name/Description | Part Number | Feature Code | Length | |
|-------|------------------------|-------------|--------------|--------|----|
| | | | | m | ft |
| P | Cable Option EIA 232 E | 71G3497 | 2939 | 1.8 | 6 |
| | Cable Option ISO 4902 (V.36 | 73H2507 | 2941 | 3 | 10 |
| | Cable Option ISO 4093 (X.21) | 06H4648 | 2942 | 1.8 | 6 |

# FC 2959 (Multiprotocol Adapter/A)

The following figure illustrates the Multiprotocol Adapter/A with an industry-standard EIA 232-D with 25-pin D-shell connectors.
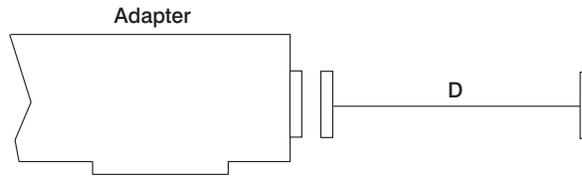
Adapter



| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| D | Async Cable EIA-232 (If customer-supplied: must meet EIA-232D requirements 50 feet maximum) | 6323741 | 2936 | 3 | 10 |

# FC 2960 (X.25 Interface Co-Processor/2)

The following figure illustrates the X.25 Interface Co-Processor/2 with attachment cables for each of the three supported interfaces. In order to make the necessary connections to this adapter, your setup person needs to know the type of network interface to be used.

Adapter
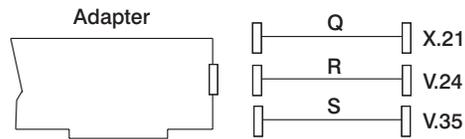


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| Q | X.25 Attachment Cable-X.21 | 07F3150/07F3151 53F3926 | 2965 2976 | 3  10 6  20 |
| R | X.25 Attachment Cable-V.24 | 07F3160/07F3161 53F3927 | 2966 2977 | 3  10 6  20 |
| S | X.25 Attachment Cable-V.35 | 07F3170/07F3171 53F3928 | 2967 2978 | 3  10 6  20 |

# FC 2700 (4-Port Multiprotocol Communications Controller)

The following figure illustrates the 4-Port Multiprotocol Communications Controller with the 4-Port Multiprotocol Interface Cable and attachment cables. The interface cable ports are labeled 0, 1, 3, and 2. Only one interface and associated cable can be selected per port. In order to make the necessary connections to this adapter, your setup person needs to know the type of network interface assigned to each port.
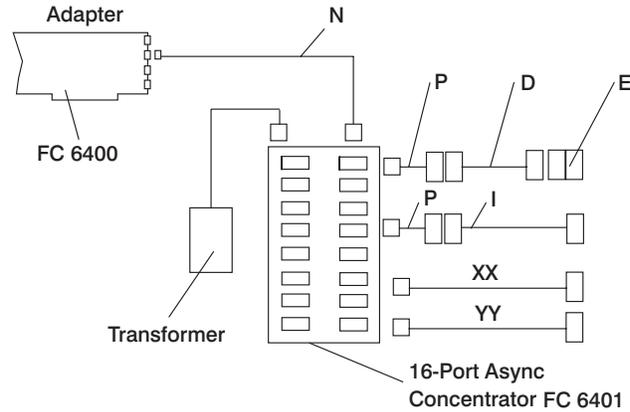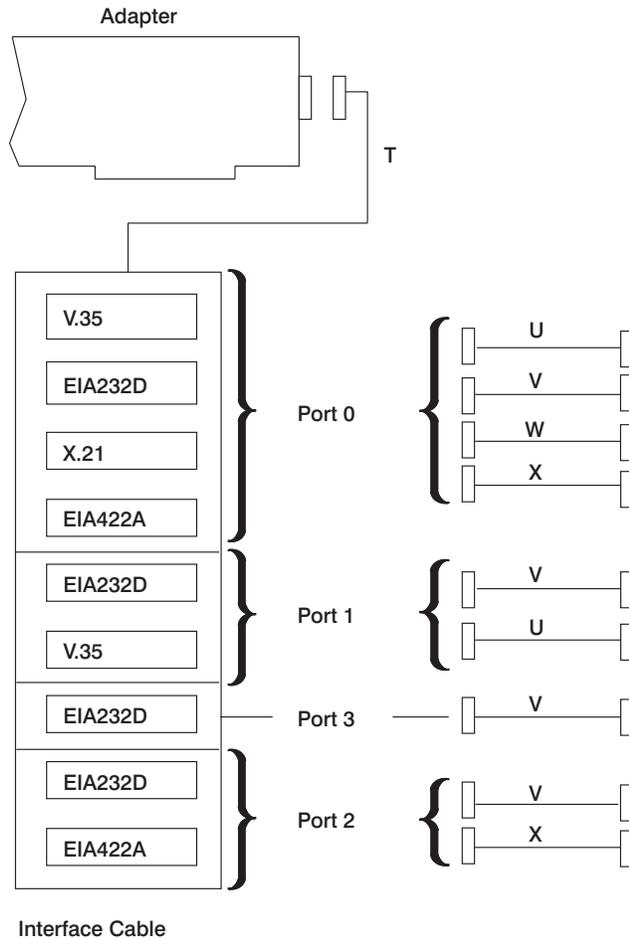
| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| T | Interface/Breakout Box | 53F2622/ 40F9897 | 2705 | 3 | 10 |
| U | V.35 cable, if customer-supplied, must meet V.35 requirements | 71F0162 | 2702 | 2 | 6.5 |
| V | EIA-232D/V.24 cable, if customer-supplied, must meet EIA-232D/V.24 requirements | 71F0165 | 2706 | 3 | 10 |
| W | X.21 cable, if customer-supplied, must meet X.21 cable requirements | 71F0164 | 2704 | 3 | 10 |
| X | If customer-supplied, must meet EIA-422A requirements | N/A | N/A | N/A | |

# FC 7002, 7004 Realtime Interface Co-Processor Multiport/2 Adapter/A Configurations

The Realtime Interface Co-Processor Multiport/2 Adapter/A must be used with an Electronic Interface Board and the appropriate device interface breakout box (cable).  The following sections illustrate the configurations of the Realtime Interface Co-processor Multiport/2 Adapter/A with an Electronic Interface Board (EIB) and device interface breakout box and cable.

## 4-Port EIA-232-C Multiport/2 Co-Processor Adapter (FC 7022)

The following figure illustrates the Realtime Interface Co-Processor Multiport/2 Adapter/A with the 4-Port EIA-232-C EIB (FC 7022) attached to a device interface breakout box (cable):



| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| T1 | 4/8-Port 232/422 Multiport/2 device interface breakout box (cable) | 00F5531 | 7102 | 3 | 10 |

## 6-Port Synchronous EIA-232-C Multiport/2 Co-Processor Adapter (FC 7024)

The following figure illustrates the Realtime Interface Co-processor Multiport/2 Adapter/A with the 6-Port Synchronous EIA-232-C EIB (FC 7024) attached to a device interface breakout box (cable):
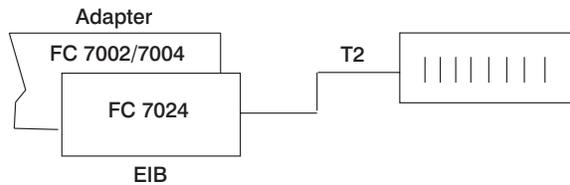


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| T2 | 6-Port Sync device interface breakout box with Multiport/2 Cable | 05F2028 | 7104 | 3 | 10 |

## 8-Port EIA-232-C Multiport/2 Co-Processor Adapter (FC 7026)

The following figure illustrates the Realtime Interface Co-Processor Multiport/2 Adapter/A with the 8-Port EIA-232C EIB (FC 7026) attached to a device interface breakout box (cable):
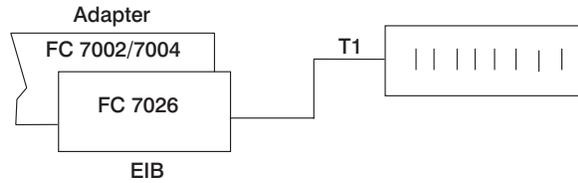


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| T1 | 4/8-Port 232/422 Multiport/2 device interface breakout box (Cable) | 00F5531 | 7102 | 3    10 |

## 4-Port EIA-232-C/4-Port EIA-422A Multiport/2 Co-Processor Adapter (FC 7030)

The following figure illustrates the Realtime Interface Co-Processor Multiport/2 Adapter/A with the 4-Port EIA-232C/4-Port EIA-422A EIB (FC 7030) attached to a device interface breakout box (cable):
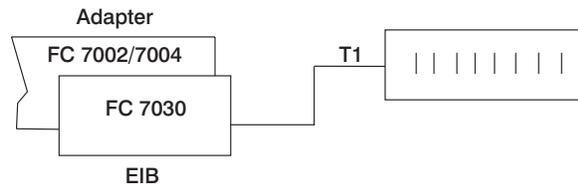


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| T1 | 4/8-Port 232/422 Multiport/2 device interface breakout box (cable) | 00F5531 | 7102 | 3    10 |

## 8-Port EIA-422-A Multiport/2 Co-Processor Adapter (FC 7028)

The following figure illustrates the Realtime Interface Co-Processor Multiport/2 Adapter/A with the 8-Port EIA-422-A EIB (FC 7028) attached to a device interface breakout box (cable):
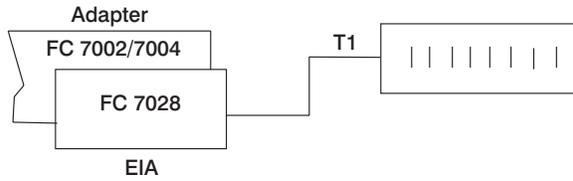


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|--------------|----------------------------------------------------------------|-------------|--------------|----------------|
| T1 | 4/8-Port 232/422 Multiport/2 device interface breakout box (cable) | 00F5531 | 7102 | 3    10 |

# FC 7006, 7008 Realtime Interface Co-Processor Portmaster Adapter/A Configurations

The Realtime Interface Co-Processor Portmaster Adapter/A must be used with an Electronic Interface Board and the appropriate device interface breakout box (cable). The following sections illustrate the configurations of the Realtime Interface Co-processor Portmaster Adapter/A with an Electronic Interface Board (EIB) and device interface breakout box and cable.

## 8-Port EIA-232-D Portmaster Adapter (FC 7042)

The following figure illustrates the Realtime Interface Co-Processor Portmaster Adapter/A with the 8-Port EIA-232-D EIB (FC 7042) attached to a device interface breakout box (cable):
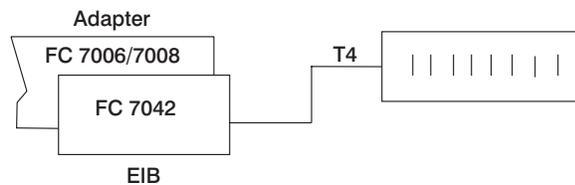


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| T4 | 8-Port 232/422 Portmaster device interface box (cable) | 53F2619 | 7108 | 1.2   4 |

## 8-Port EIA-422-A Portmaster Adapter (FC 7044)

The following figure illustrates the Realtime Interface Co-Processor Portmaster Adapter/A with the 8-Port EIA-422-A EIB (FC 7044) attached to a device interface breakout box (cable):
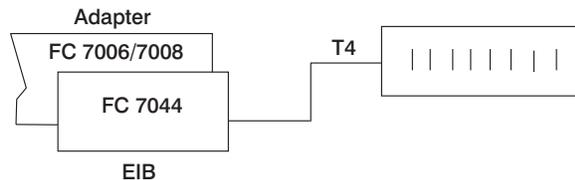


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| T4 | 8-Port 232/422 Portmaster device interface breakout box (cable) | 53F2619 | 7108 | 1.2   4 |

## 6-Port V.35 Portmaster Adapter (FC 7046)

The following figure illustrates the Realtime Interface Co-Processor Portmaster Adapter/A with the 6-Port V.35 EIB (FC 7046) attached to a device interface breakout box (cable):
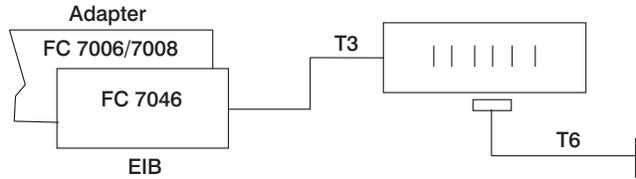


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| T3 | 6-Port V.35 Portmaster with device interface breakout box (cable) | 72F0165 | 7106 | 1.2    4 |
| T6 | 6-Port V.35 Network Attachment (cable) | 11H4958 | 7107 | 2    6.5 |

## 6-Port X.21 Portmaster Adapter (7048)

The following figure illustrates the Realtime Interface Co-Processor Portmaster Adapter/A with the 6-Port X.21 EIB (FC 7048) attached to a device interface breakout box (cable):
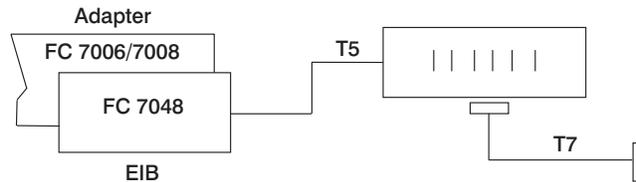


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| T5 | 6-Port X.21 Portmaster with device interface breakout box (cable) | 05F2028 | 7110 | 1.2    4 |
| T7 | 6-Port X.21 Network Attachment (cable) | 11H4957 | 7111 | 2    6.5 |

## FC 2970 (Token-Ring High-Performance Network Adapter)

Considerations for Token-Ring applications are found in the following:

- IEEE 802.5 requirements
- *Token-Ring Network Introduction and Planning Guide* (GA27-3677)
- *A Building Planning Guide for Communication Wiring* (G320-8059)
- *Cabling System Planning and Installation Guide* (GA27-3361)
- *Using the Cabling System with Communication Products* (GA27-3620).

The following figure illustrates the Token-Ring High-Performance Network Adapter with an attachment cable for the Token-Ring LAN (Local Area Network).  In order to make the necessary connections to this adapter, your setup person needs to know the devices and persons assigned to each port.
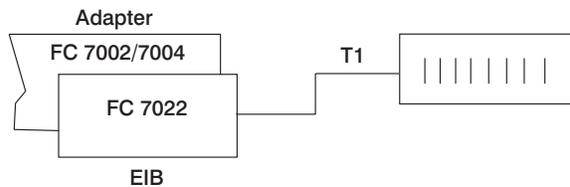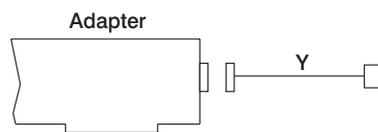


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| Y | Token-Ring LAN cable, (shipped with the adapter) | 6339098 | N/A | 3 | 10 |
| | | 53F3930 | N/A | 6 | 20 |

## FC 2972 (Auto Token-Ring LANstreamer MC 32 Adapter)

Considerations for Token-Ring applications are found in the following:

- IEEE 802.5 requirements
- *Token-Ring Network Introduction and Planning Guide* (GA27-3677)
- *A Building Planning Guide for Communication Wiring* (G320-8059)
- *Cabling System Planning and Installation Guide* (GA27-3361)
- *Using the Cabling System with Communication Products* (GA27-3620).

The following figure illustrates the Auto Token-Ring LANstreamer MC 32 Adapter with an attachment cable for the Token-Ring LAN.
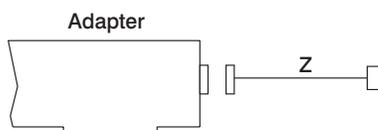


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| Z | 12-inch Conversion Cable (shipped with the adapter), converts from a 9 pin D-shell to an RJ-45 connector 10-foot data to RJ-45 cable (available) | 60G1066 | N/A | .3 | 1 |
| | | 60G1063 | N/A | 3.04 | 10 |

# Integrated Ethernet LAN Adapters

Ethernet cabling varies dependant on the type of system unit you have.

## 7010 Xstations Ethernet

The 7010 Model 140 and Model 150 integrated Ethernet provides attachments to 10Base5 (AIU), 10Base2 (BNC), and 10BaseT (twisted-pair) Ethernet. Twisted-pair Ethernet is achieved by connecting the 10BaseT twisted-pair converter directly to the 15-pin D-shell AUI Ethernet port. When connectiog to an external transceiver (AA or MM), a block of (7) jumpers on thes X-station planar must be switched.
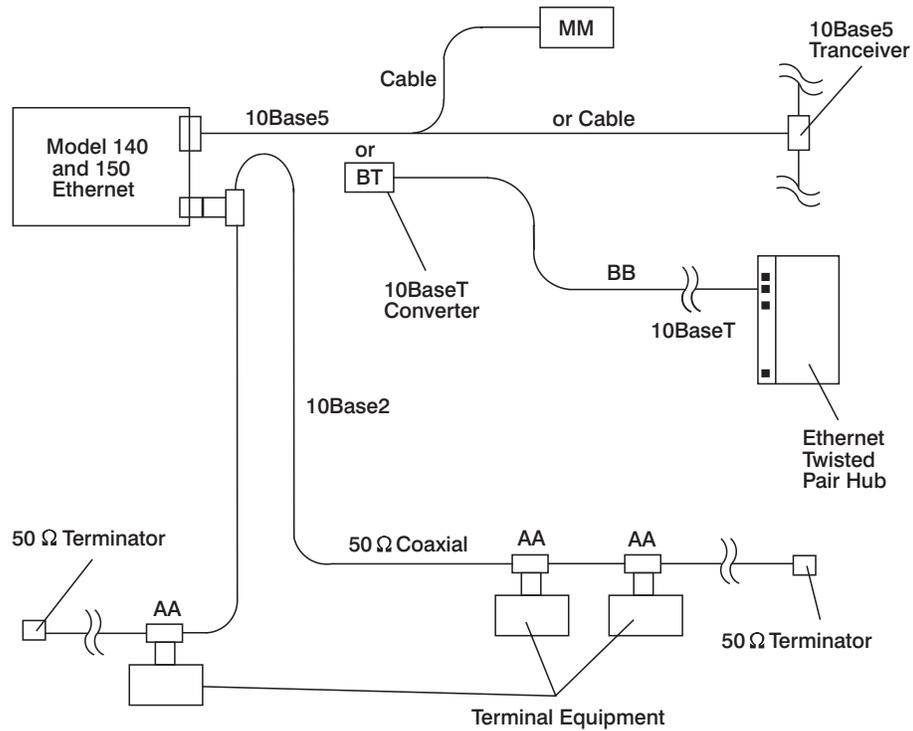


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| AA | A coaxial "T" connector, "Y-" or "L-" shaped, is recommended | N/A | N/A | N/A |
| BB | Customer-supplied RJ-45 unshielded twisted-pair cable, must meet IEEE 802.3 requirements | N/A | N/A | N/A |
| BT | 10BaseT Converter (Shipped with Xstation from the factory) | 43G2820 | N/A | N/A |
| MM | Ethernet 10Base2 Transceiver or Ethernet 10BaseT Transceiver (feature code includes cable) | 02G7435<br><br>02G7429 | 4223<br><br>4224 | 1    3<br><br>1    3 |

# Models M20, M2A, 220, and 230 Integrated Ethernet LAN Adapter

The Models M20, M2A, 220 and 230 Integrated Ethernet adapters feature only an Ethernet standard thick (10Base5) connector. Transceivers must be ordered for use with either thin (10Base2) or twisted-pair (10BaseT). The following is an example of 10Base2:
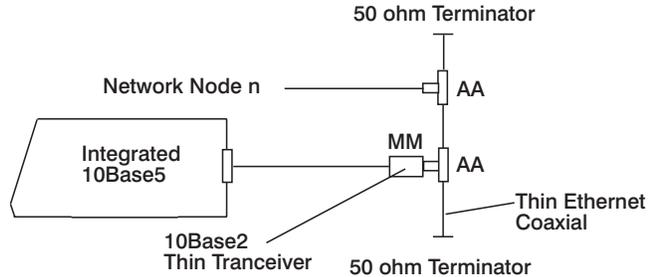


**Note:** *n* is a maximum of 30 nodes per segment (maximum of five segments connected by a repeater).
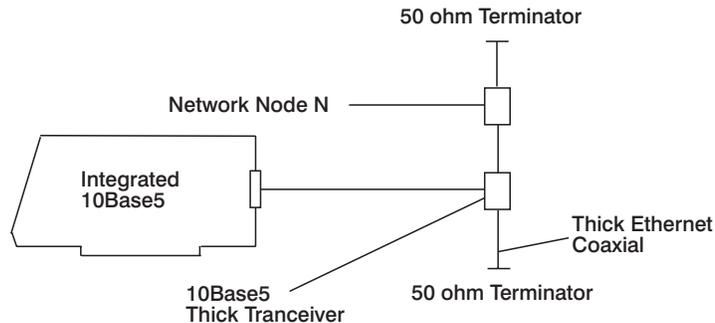


**Note:** *n* is a maximum of 100 nodes per segment (maximum of five segments with each segment connected by a repeater).

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| MM | Ethernet 10Base2 Transceiver (feature code includes cable) | 02G7435 | 4223 | 1 | 3 |

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| AA | A coaxial "T" connector, "Y-" or "L-" shaped, is recommended | N/A | N/A | N/A |
| BB | Customer-supplied RJ-45 unshielded twisted-pair cable, must meet IEEE 802.3 requirements | N/A | N/A | N/A |
| MM | Ethernet 10BaseT Transceiver (feature code includes cable) | 02G7429 | 4224 | 1    3 |

## Models 250, 41T, 41W, 42T, and 42W Integrated Ethernet LAN Adapter

The Models 250, 41T, 41W, 42T and, 42W have integrated Ethernet thick and twisted pair. Twisted-pair Ethernet is achieved by connecting the 10BaseT (twisted-pair) converter directly into the 15 pin D-shell AUI Ethernet port. Transceivers must be ordered for use with Ethernet Thin (10base2). The following are examples of 10Base2, and 10Base5:



**Note:** *n* is a maximum of 30 nodes per segment (maximum of five segments connected by a repeater).



**Note:** *n* is a maximum of 100 nodes per segment (maximum of five segments with each segment connected by a repeater).

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| AA | A coaxial "T" connector, "Y-" or "L-" shaped, is recommended | N/A | N/A | N/A |
| MM | Ethernet 10Base2 Transceiver (feature code includes cable) | 02G7435 | 4223 | 1    3 |

| Cable<br>Letter | Cable Name/Description | Part<br>Number | Feature<br>Code | Length<br>m    ft |
|---|---|---|---|---|
| AA | A coaxial "T" connector, "Y-" or "L-" shaped, is recommended | N/A | N/A | N/A |
| BB | Customer-supplied RJ-45 unshielded twisted-pair cable,must meet IEEE 802.3 requirements | N/A | N/A | N/A |
| MM | Ethernet 10BaseT Transceiver (feature code includes cable) | 02G7429 | 4224 | 1    3 |
| BT | 10BaseT Converter (Shipped with system from the factory) | 51G8479 | N/A | N/A |

## Models 34H, 350, 360, 370, 380, 390, 39H, 3AT, 3BT and 3CT Integrated Ethernet LAN Adapter

The integrated Ethernet adapter features thick and thin connectors (FC 4221) or twisted-pair (FC 4222).  The thick connector is an Ethernet standard connector.



**Note:** *n* is a maximum of 30 nodes per segment (maximum of five segments with each segment connected by a repeater).
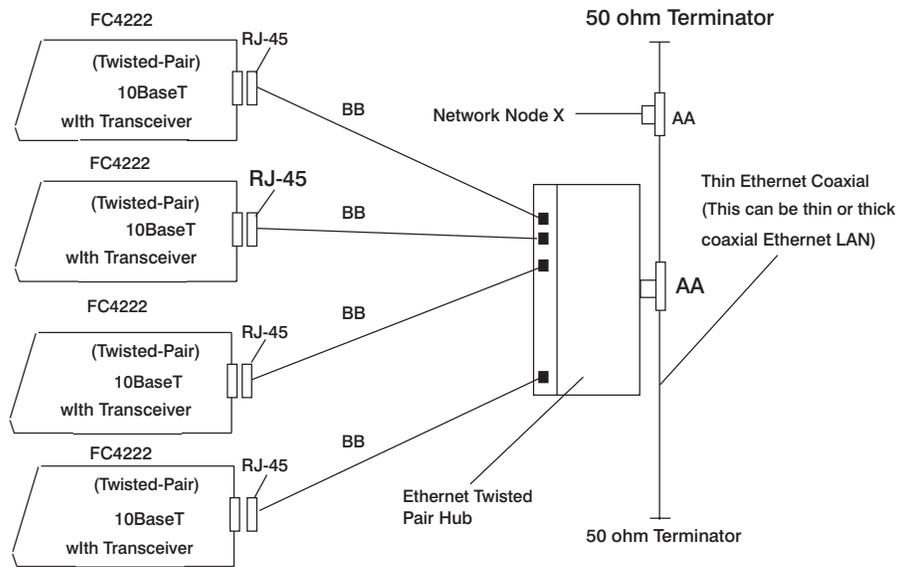
| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| AA | A coaxial "T" connector, "Y-" or "L-" shaped, is recommended | N/A | N/A | N/A |
| BB | Customer-supplied RJ-45 unshielded twisted-pair cable,must meet IEEE 802.3 requirements | N/A | N/A | N/A |

# FC 2980 (Ethernet High-Performance LAN Adapter)

The following figure illustrates the Ethernet High-Performance LAN Adapter with attachment cables. The thick connector is an Ethernet standard connector.
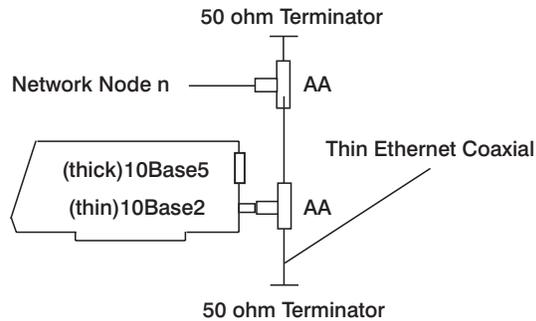


**Note:** *n* is a maximum of 30 nodes per segment (maximum of five segments with each segment connected by a repeater).
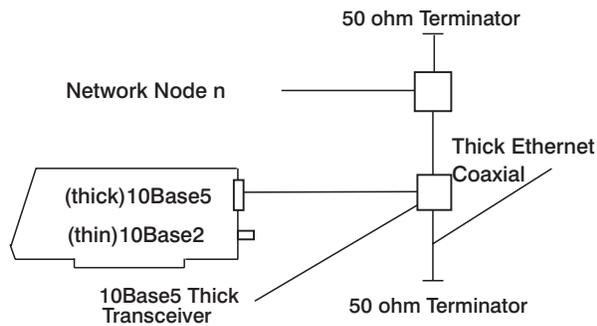


**Note:** *n* is a maximum of 100 nodes per segment (maximum of 5 segments with each segment connected by a repeater).

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| AA | A coaxial "T" connector, "Y-" or "L-" shaped, is recommended | N/A | N/A | N/A |

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m     ft |
|---|---|---|---|---|
| AA | A coaxial "T" connector, "Y-" or "L-" shaped, is recommended | N/A | N/A | N/A |
| BB | Customer-supplied RJ-45 unshielded twisted-pair cable, must meet IEEE 802.3 requirements | N/A | N/A | N/A |
| MM | Ethernet 10Base-T Transceiver (feature code includes cable) | 02G7429 | 4224 | 1      3 |

# FC 2984, 2989 (TURBOWAYS 100 and 155 ATM Adapter)
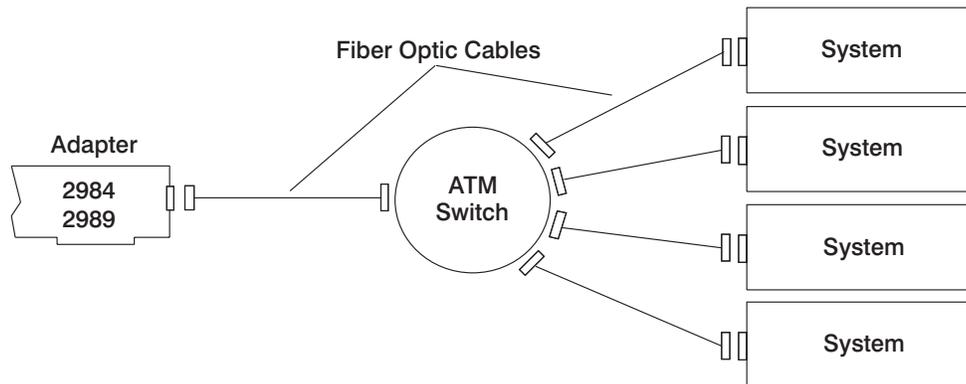


## Cable Considerations

Fiber Channel cabling is required and must be ordered separately.  Orders can be placed using an MES.  For standard cable lengths and part numbers, see the chart below. Custom lengths are also available.

| Cable Name/Description | Length | | Part Number |
| | m | ft | 62.5/125 Multimode |
| --- | --- | --- | --- |
| Fiber Optic Cable | 2 | 6.6 | 19G6706 |
| | 4 | 13 | 19G4864 |
| | 6 | 20 | 19G4865 |
| | 10 | 33 | 19G4866 |
| | 20 | 66 | 19G4867 |
| | 40 | 131 | 19G4868 |
| | Custom | | 19G4863 |

Optical ports may also be connected by 62.5/125 micron multimode fiber, terminated with industry standard SC connectors.  The maximum length between the optical port on the adapter and the switch is 0.7 kilometers with the 62.5/125 micron fiber.

## FC 2990 (3270 Connection Adapter)

The following figure illustrates the 3270 Connection Adapter with attachment cable.

Adapter

LL
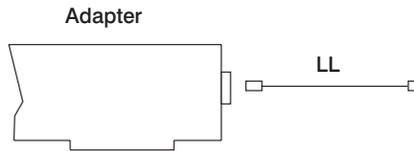
| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| LL | Customer-supplied coaxial cable | 6245998 | N/A | 3 | 10 |

## FC 2800 (System/370 Host Interface Adapter)

There are a variety of ways to cable the System/370 Host Interface Adapter to the 5088 or the 6098 Graphics Control Units.

The System/370 Host Interface Adapter and the 5080 Attachment Adapter are the same physical adapter. The way the adapter is cabled and the microcode loaded in the adapter changes the function. See the *5080 Graphics System Installation, Operation, and Problem Determination* manual, order number GA23-2063 for information about the various configurations using the host interface adapter and 5080 attachment adapter.

The host interface adapter has an HIA label on it. It connects the system to a 5088 or 6098 Controller. The adapter can pass the signal on to other systems.

System/370 Host Interface Adapter (HIA)

From 5088 or 6098 Controller

4
3
2
1

To Next Workstation or a Terminator
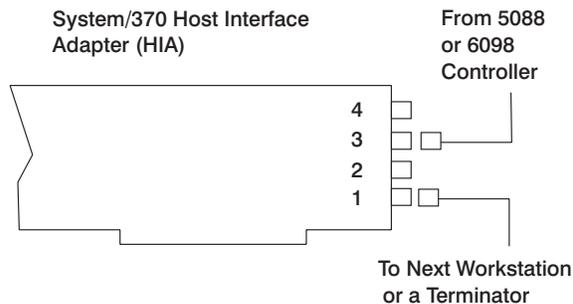
## FC 2801, 2802 (5086/5085 Attachment Adapter)

There are a variety of ways to cable the 5086/5085 Attachment Adapter to the 5088 or the 6098 Graphics Control Units.

This drawing shows the system connected to a 5085/5086 Graphics Processor using the 5080 Attachment Adapter (AA).  See the *5080 Graphics System Installation, Operation and Problem Determination* manual, order number GA23-2063 for information about the various configurations using the host interface adapter and 5080 attachment adapter.
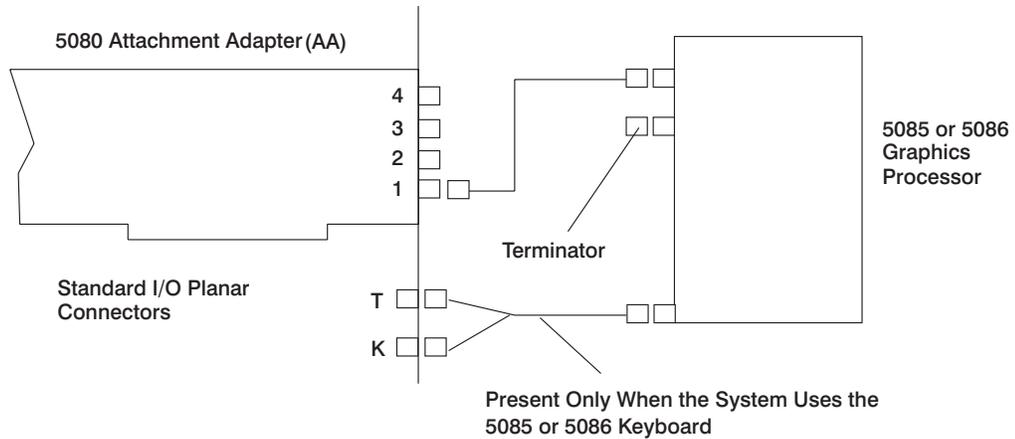


## FC 2840 (5080 Coax Communication Adapter)

The 5080 Coax Communication Adapter (5080CCA) can be cabled in the same ways that FC 2800 with the exception that the FC 2840 has a single BNC connector and requires a BNC T-connector to accomplish the same possibilities.

See the *5080 Graphics System Installation, Operation and Problem Determination* manual, order number GA23-2063 for information about the various configurations using the host interface adapter.
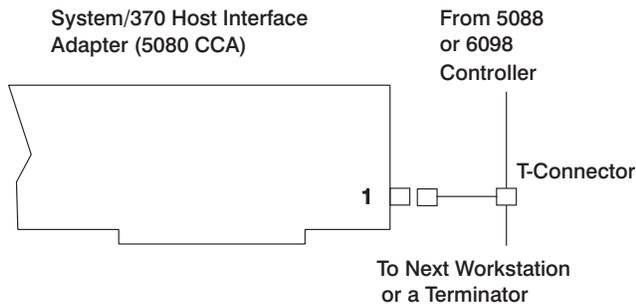
# FC 2720, 2722, 2723, and 2724 (Fiber Distributed Data Interface (FDDI) Adapters) Fiber

All FDDI-Fiber adapters require multi-mode FDDI optical fiber jumper cables.  Jumper cables are a customer responsibility.  For more information about jumper cables, planning, design or installation of FDDI systems, refer to the *FDDI Introduction and Planning Guide*, order number GA27-3892.  For more information regarding FDDI optical systems, refer to the *FDDI Optical Fiber Planning and Installation Guide*, order number GA27-3943.  For more detailed information on planning for, installing, and operating the adapter, refer to the *FDDI Adapter User's Guide and Programming Reference*, order number SC23-2426.

The various FDDI adapter types can be used in two configurations:  single ring and dual ring.  The single ring configuration is subject to failure if ring continuity is interrupted at any point.  The dual ring configuration provides the capability to detect line breaks and reconfigure the rings to maintain network continuity.

The following figure illustrates the FDDI Adapter with attachment cable.  feature codes 2720 and 2724 are for the base card or single-ring attach; feature codes 2722 and 2723 are for the FDDI dual-ring upgrade kit.
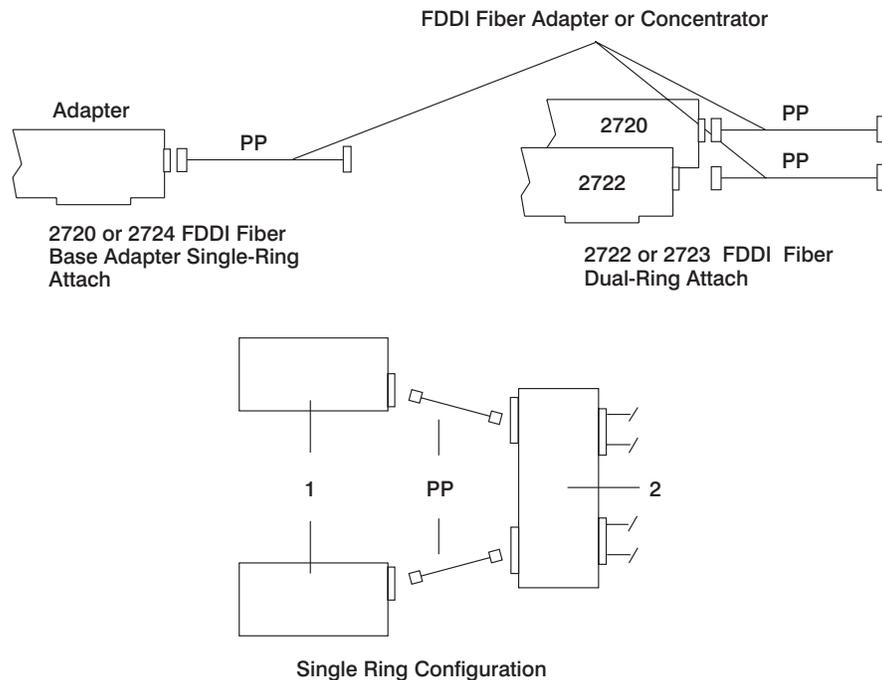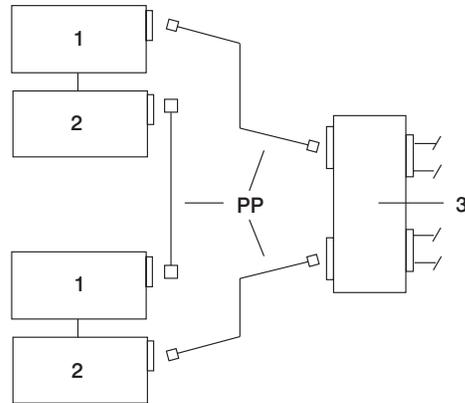
Dual Ring Configuration

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| PP | All FDDI Fiber Adapters require multi-mode FDDI optical fiber jumper cables.<br><br>Jumper cables are the responsibility of the customer and can be ordered from the local cabling distributor.<br><br>For installation of FDDI systems, refer to publication *FDDI Introduction and Planning Guide*, order number GA27-3892.<br><br>For additional information concerning FDDI optical systems, refer to publication *FDDI Optical Fiber Planning and Installation Guide*, order number GA27-3943. | N/A | N/A | N/A |
| 1 | FDDI Fiber Base Adapter Single-Ring Attach | N/A | 2720 or 2724 | N/A |
| 2 | FDDI Fiber Dual-Ring Attach | N/A | 2722 or 2723 | N/A |
| 3 | Concentrator | N/A | N/A | N/A |

# FC 2725 and 2726 Shielded Twisted-Pair (STP) FDDI Adapter

All FDDI-STP adapters require shielded twisted pair copper jumper cables.  Jumper cables are a customer responsibility and may be ordered from authorized cabling distributors. For more information about jumper cables, planning, design or installation of FDDI systems, refer to *FDDI Introduction and Planning Guide*, order number GA27-3892.  For more information regarding FDDI optical systems, refer to *FDDI Optical Fiber Planning and Installation Guide*, order number GA27-3943.
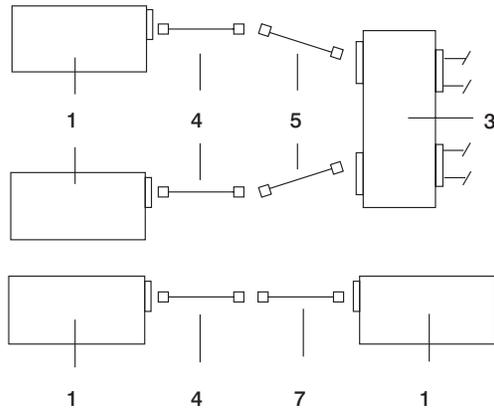
| Item Number | Cable Letter | FRU Number | Description |
|---|---|---|---|
| 1 | N/A | 65G1878 | FDDI-STP (Type 2-T) single ring adapter |
| 3 | N/A | N/A | Concentrator |
| 4 | FB | 33G2761 | FDDI-STP adapter cable |
| 5 | FC | 33G2760 | FDDI-STP - FDDI-STP transition cable |
| 7 | FA | 33G2762 | FDDI-STP reversing cable |

**Note:**  The part numbers in the table above are controlled by Mechanicsburg.
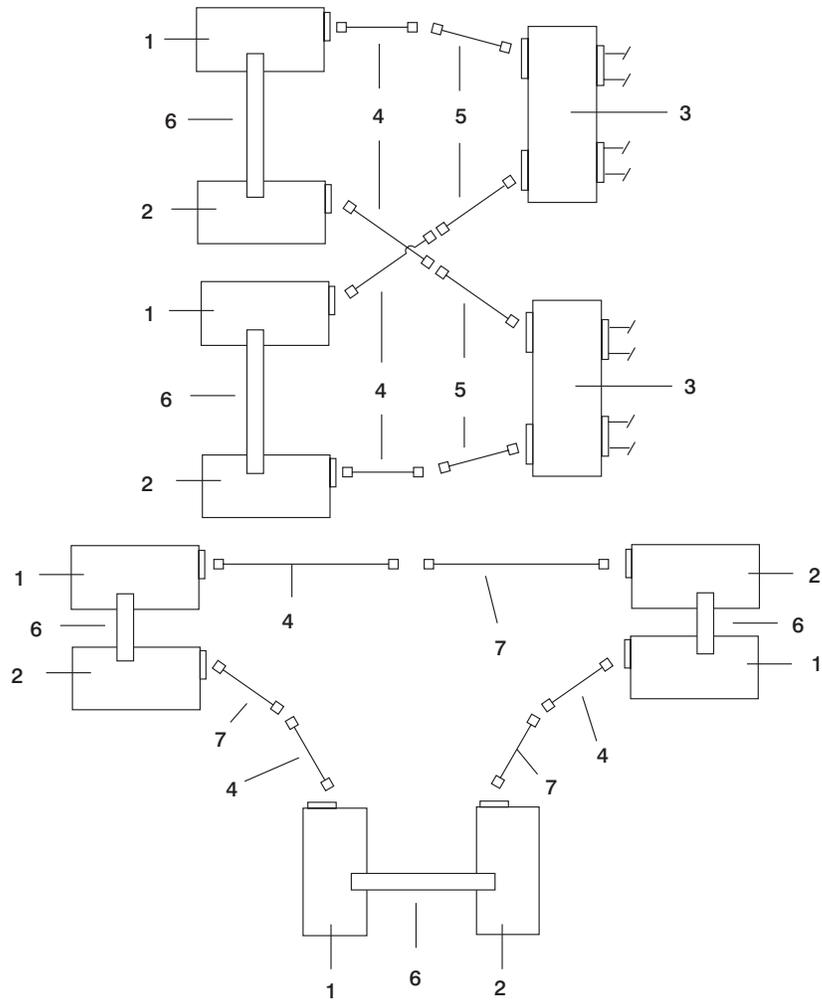
| Item Number | Cable Letter | FRU Number | Description |
|---|---|---|---|
| 1 | N/A | 65G1878 | FDDI-STP (Type 2-T) single ring adapter |
| 2 | N/A | 43G0876 | FDDI-STP (Type 2-U) dual ring upgrade kit adapter |
| 3 | N/A | N/A | Concentrator |
| 4 | FB | 33G2761 | FDDI-STP adapter cable |
| 5 | FC | 33G2760 | FDDI-STP - FDDI-STP transition cable |
| 6 | N/A | 93F1162 | FDDI-STP dual ring upgrade kit crossover cable |
| 7 | FA | 33G2762 | FDDI-STP reversing cable |

**Note:** The part numbers in the table above are controlled by Mechanicsburg.

**Cable FA - FDDI Copper Adapter Reversing Cable**

| Adapter Card D Connector Pin | Wire Number | Wire Color | Data Connector Pin | Usage |
|---|---|---|---|---|
| Shield (ground) | 1 | Shield | Shield (ground) | Ground |
| 1 | 3 | Black | Black | Receive + |
| 5 | 4 | Red | Red | Transmit + |
| 6 | 2 | Orange | Orange | Receive - |
| 9 | 5 | Green | Green | Transmit - |

**Cable FB - FDDI Copper Adapter Cable**

| Adapter Card D Connector Pin | Wire Number | Wire Color | Data Connector Pin | Usage |
|---|---|---|---|---|
| Shield (ground) | 1 | Shield | Shield (ground) | Ground |
| 5 | 3 | Black | Black | Receive + |
| 1 | 4 | Red | Red | Transmit + |
| 9 | 2 | Orange | Orange | Receive - |
| 6 | 5 | Green | Green | Transmit - |

# FC 2860 (Serial Optical Channel Converter)

The following figure illustrates the Serial Optical Channel Converter with an attachment cable.
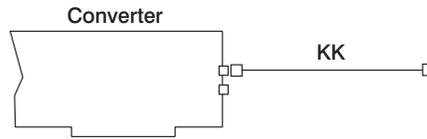


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| KK | Optical Channel Converter Cable | 46F2440 | 2866 | 6 | 20 |
| | | 46F2441 | 2867 | 10 | 33 |
| | | 46F2442 | 2868 | 20 | 65.5 |
| | | 46F2443 | 2869 | 60 | 197 |
| | | 46F2444 | 2870 | 100 | 328 |

# FC 2402 and 2403 (Network Terminal Accelerator Adapters)

## 10Base-T Cabling



| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| AA | Customer-supplied coaxial T-connector, Y- or L-shaped is recommended. | N/A | N/A | N/A | |
| BB | Customer-supplied RJ-45 unshielded twisted-pair cable, must meet IEEE 802.3 requirements. | N/A | N/A | N/A | |
| MM | Ethernet 10Base-T transceiver Cable (feature code includes cable) | 02G7429 02G7434 | 4224 | 1 | 3 |

# 10Base-2 Cabling
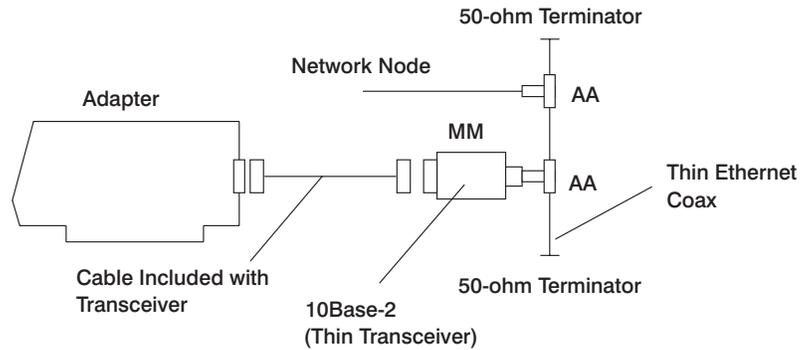


**Note:** *n* is a maximum of 30 nodes per segment (maximum of 5 segments connectted by a repeater).

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| AA | Customer-supplied coaxial T-connector, Y- or L-shaped is recommended. | N/A | N/A | N/A |
| MM | Ethernet 10Base-2 transceiver Cable (feature code includes cable) | 02G7435 | 4223 | 1    3 |

# 10Base-5 Cabling
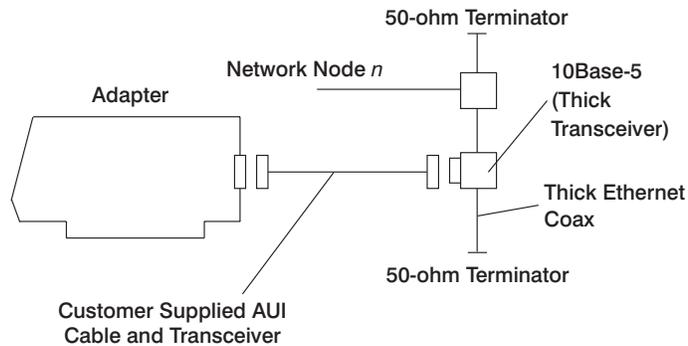


**Note:** *n* is a maximum of 100 nodes per segment (maximum of five segments with each segment connected by a repeater).

# FC 1904/1902 (Fibre Channel Adapter 1063)

This Fibre Channel Switch has a maximum of 16 ports. The switch operates at 1063 mega-bits per second. Feature code 1902 is for the optical driver.
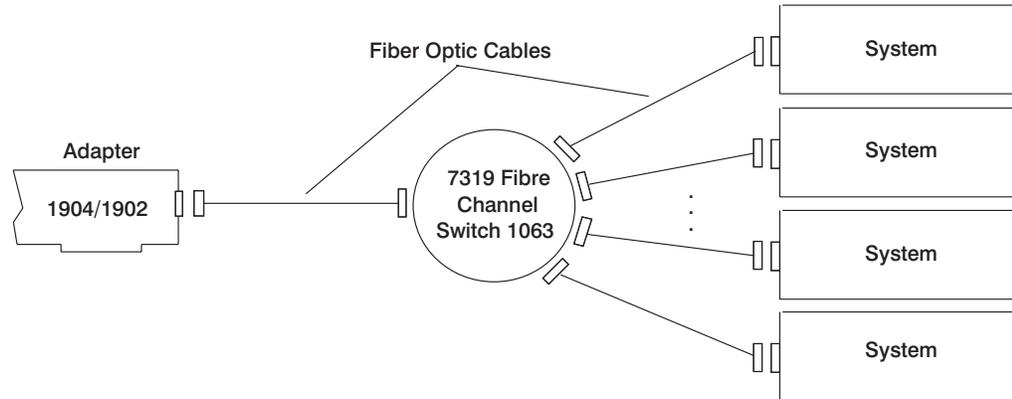


## Cable Considerations

Fibre Channel cabling is required and must be ordered separately. Orders for cables can be placed through MES. For standard cable lengths and part numbers, see the chart below.

| Cable Name | Length<br>m    ft | Part Number *<br>Multi-mode |
|---|---|---|
| Fibre Optic Cable | 7     22 | 54G3384/54G3385 |
|  | 13    42 | 54G3384/54G3386 |
|  | 22    72 | 54G3384/54G3387 |
|  | 31    101 | 54G3384/54G3388 |
|  | 46    150 | 54G3384/54G3389 |
|  | 61    200 | 54G3384/54G3390 |
|  | Custom | 54G3384/54G3391 |

**Note:** * There are two part numbers in the table. The first is for ordering cables in the United States. The second is for ordering cables in other countries.

Optical ports are connected with 50/125 multi-mode Fibre and terminated with industry-standard SC connectors.

## Multi-mode

- 50 Micron Fibre
- Short Wave - 680 nanometers wave length

## Full Speed

- 1063 mega-bits per second
- Up to 500 meters cable length

# FC 1906 (Fibre Channel Adapter/266)
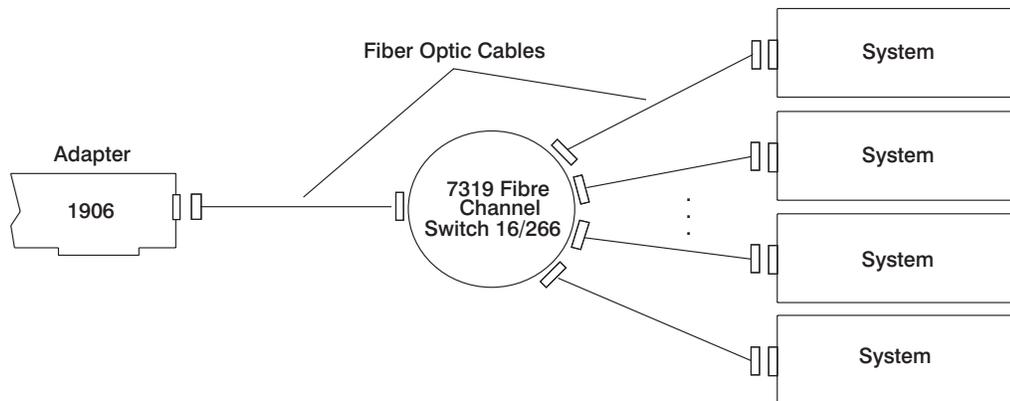


## Cable Considerations

Fibre Channel cabling is required and must be ordered separately. Some specific lengths are available. Custom lengths and cable accessories are also available.

| Cable Name/ Description | Length m   ft | Part Number 50/125 Multimode | Part Number 62.5/125 Multimode |
|---|---|---|---|
| Fiber Optic Cable | 2  6.6 | NA | 19G6706 |
| | 4   13 | 19G4772 | 19G4864 |
| | 6   20 | 19G4773 | 19G4865 |
| | 10  33 | 19G4774 | 19G4866 |
| | 20  66 | 19G4775 | 19G4867 |
| | 40  131 | 19G4776 | 19G4868 |
| | 60  197 | 19G4777 | NA |
| | 80  262 | 19G4778 | NA |
| | 100  328 | 19G4799 | NA |
| | Custom | NA | 19G4863 |

Optical ports may also be connected by either 50/125 (recommended) or 62.5/125 micron multimode fiber, terminated with SC connectors (industry-standard connectors). The maximum length between the optical port on the adapter and the switch is 2 kilometers with the 50/125 micron cables and 0.7 kilometers with the 62.5/125 micron fiber.

# Channel Attachment Adapter Cabling

This section provides information on cabling for channel attached devices.

## FC 2755 (Block Multiplexer Channel Adapter)

Establishing communications with an S/370 or S/390® host requires special planning. Cabling, hardware, and software considerations are discussed below. For more detailed information on planning for, installing, and operating the adapter, refer to the *Block Multiplexer Channel Adapter User's Guide and Service Information*, order number SC23-2427. And, see *Block Multiplexer/6000 User's Guide and Programming Reference*, order number SC28-2824 for cabling information.

## Cable Considerations

The cable and cable assembly in the following figure are separately orderable. Use of the specified cable and cable assembly is recommended due to the critical cabling specifications required for your systems connection to the host.

To order the cables necessary to attach the cable assembly to the host, contact your marketing representative. Keep the following in mind when ordering:

**Notes:**

1. Blue channel cables must be used if the adapter is to be operated at 4.5MB or if the 3044 Model 2 Channel Extender is used.

2. Cables (bus and tag) must be used in pairs of equal length and matching color (blue or gray, but not both). Bus and tag cables can be ordered separately and must be ordered to the desired length. The Host Channel Cable group for your system is 0185.

3. There are some cable length limitations. When data streaming mode is used, there can be no more than 122 m (400 ft) between the system unit and the host. If there are other channel-attached devices located between the system unit and the host, deduct 4.5 m (15 ft) for each device in your cable measurement. Some devices may require additional cable length calculations; consult your *System/360, System/370, 4300, 9370 and ES/9000® Processors Input Output Equipment Installation Manual-Physical Planning*, order number GC22-7064, for the particular device.

4. The system unit can connect to a 3044 Model 002 Channel Extender, which allows the System/370 parallel channel to be extended up to 3 km (1.9 miles). It can also connect to a 9034 Model 1 ESCON Converter, which allows communications with a System/370 or System/390® ESCON channel. There can be up to 3 km (1.9 miles) between the 9034 and the host.

## Single Adapter to Single Channel
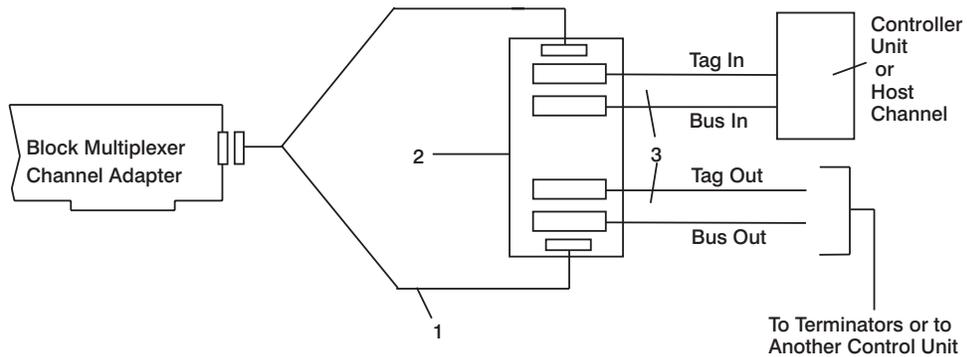


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length | |
|---|---|---|---|---|---|
| | | | | m | ft |
| 1 | Block Multiplexer Channel Adapter Cable | 92F6697 52G6119 | 2757 | 1.8 3.6 | 6 12 |
| 2 | Block Multiplexer Channel Cable Interface Assembly | 25F9401 | 2758 | N/A | |
| 3 | Block Multiplexer Channel Cables Cable Group 0185 | NA | NA | N/A | |

**Note:** Refer to the *System/360 System/370, 4300, 9370 and ES/9000 Processors Input/Output Equipment Installation Manual - Physical Planning*, order number GC22-7064, for details and restrictions regarding channel cabling. The Interface Assembly is wired for "high" channel priority.

# Cabling Sequence

For details on the installation and cabling of the Block Multiplexer Channel Adapter and bus and tag cables to a host system, See the *Block Multiplexer Channel Adapter User's Guide and Service Information*, order number SC23-2427.

# Hardware Considerations

- The remote power interface as described in *System/360 and System/370 Power-Control Interface Original Equipment Manufacturers' Information*, order number GA22-6906, is not supported on the system.
- The processors supported by the Block Multiplexer Channel Adapter are summarized below. Certain processors can use the 9034 Model 1 ESCON Converter or the 3044 Model 2 Channel Extender. Connection to an ESCON channel requires a 9034 Model 1. You cannot use both a 9034 and a 3044 on the same channel.

| System Processor | Channel Type | Speed |
|---|---|---|
| 9021 | Parallel | Up to 4.5MB |
| 9021 | ESCON* | Up to 4.5MB |
| 9121 | Parallel | Up to 4.5MB |
| 9121 | ESCON* | Up to 4.5MB |
| 9221 | Parallel | Up to 4.5MB |
| 9221 | ESCON* | Up to 4.5MB |
| ES/3090™ | Parallel | Up to 4.5MB |
| ES/3090 (J) | ESCON* | Up to 4.5MB |
| 308X | Parallel | Up to 3.0MB |
| 4381 | Parallel | Up to 3.0MB |

  \* Requires use of the 9034 Model 1 ESCON Converter.

- The Block Multiplexer Channel Adapter supports three speeds. The type of processor channel used depends on the speed setting.

| Speed Setting | Channel Speed | Processor Channel |
|---|---|---|
| 0 | DCI | Any |
| 2 | 2.7MB (maximum) | 3MB |
| 4 | 4.5MB (maximum) | 4.5MB |

# Software Considerations

Consider the following when planning for the Block Multiplexer Channel Adapter:

- AIX® Version 3.2 or later is required for your system. Adapter channel addresses and speed are set up using SMIT.
- The System/390™ host I/O control program (IOCP) must be updated to include your system. The system is defined as a 3088.
- The System/390 host operating systems must be updated to recognize and support your system unit.

## FC 2756 (System/390 ESCON Control Unit Adapter)

Establishing communications with a System/390 host requires special planning. Cabling, hardware, and software considerations are discussed below. For more detailed information on planning for, installing, and operating the adapter, refer to the *Enterprise System Connection Adapter User's Guide and Service Information*, order number SC23-2474.
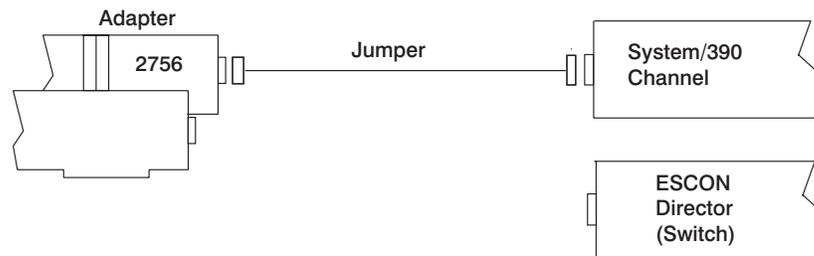


**Note:** The ESCON jumper cable can connect to any ESCON channel, trunk, or ESCON director.

## Cable Considerations

ESCON jumper cables may be ordered separately.

To order the cable necessary to attach to the host, contact your marketing representative. The following table lists the standard ESCON duplex-to-duplex jumper cable part numbers.

| Cable Name/Description | Part Number | Length | |
| --- | --- | --- | --- |
| | | m | ft |
| System/390 ESCON Channel Jumper Cable (Duplex-to-Duplex) | 74F5412 | 3.7 | 12 |
| | 74F5413 | 6.1 | 20 |
| | 74F5414 | 12.1 | 40 |
| | 74F5415 | 21.3 | 70 |
| | 74F5416 | 30.4 | 100 |
| | 74F5417 | 61 | 200 |
| | 74F5418 | 122 | 400 |

Refer to Maintenance Information for Enterprise Systems Connection Links, *Fiber optic Link Maintenance*, order number SY27-2597 for additional information.

# Hardware Considerations

The processors supported by the System/390 ESCON Channel Adapter are summarized below.

| System Processor | Channel Type | Speed |
|---|---|---|
| 9021 | ESCON | Up to 17MB |
| 9121 | ESCON | Up to 10MB |
| 9221 | ESCON | Up to 10MB |
| ES/3090 (J) | ESCON | Up to 10MB |

# Software Considerations

Consider the following when planning for the ESCON channel adapter:

- AIX Version 3.2 or later is required. Adapter channel address and speed are set up using SMIT.

- The System/390 I/O Control Program (IOCP) must be updated to include your system. The IOCP should specify a 3088 device type, or an SCTC (if using HCD).

- The System/390 operating system must be updated to recognize and support your system unit.

# FC 2735 (HIPPI Channel Adapter)

The following figure illustrates the HIPPI Channel Adapter set with the attachment cables:
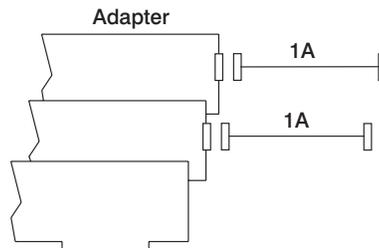


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| 1A | Customer-supplied HIPPI cable, must be HIPPI-compliant with ANSI standard HIPPI-pHX3.183-1991 | N/A | N/A | N/A |

## FC 2759 (S/370 Channel Emulator/A Adapter)

The following figure illustrates the S/370 Channel Emulator/A adapter with an attachment cable (the cable is included with the feature):

## Single Adapter to Single Channel
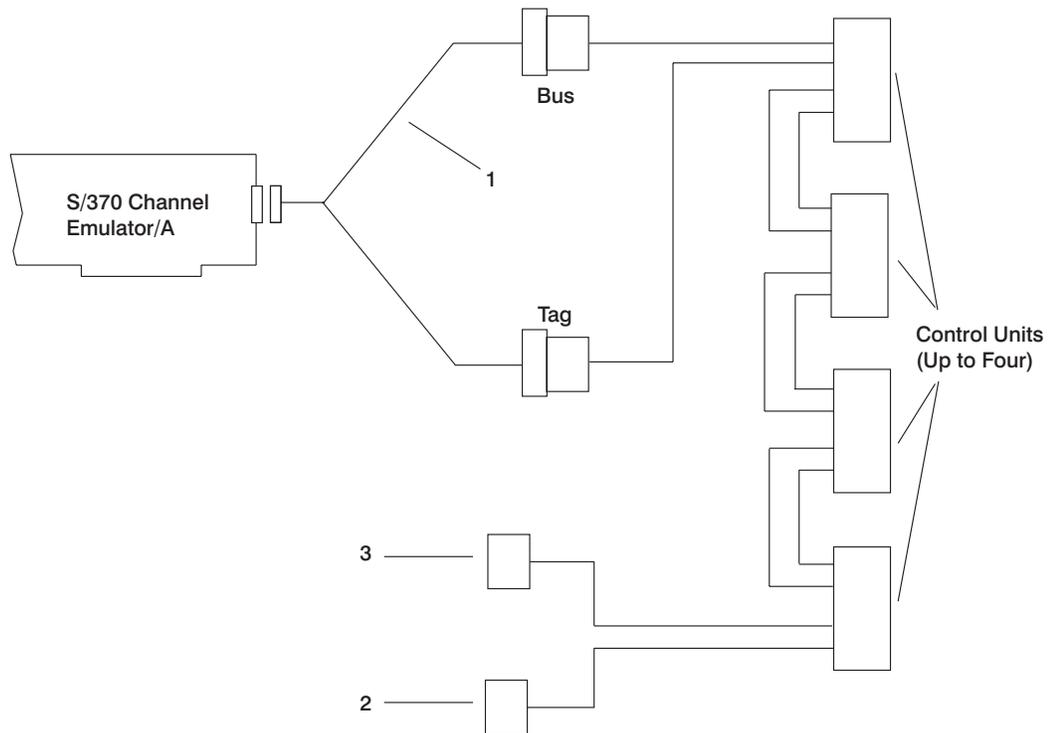


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| 1 | S/370 Channel Emulator/A Cable | 68F7209 | N/A | 3.0    9.8 |
| 2 | Bus Terminator | 2282675 | N/A | NA |
| 3 | Tag Terminator | 2282676 | N/A | NA |

**Note:** Refer to the *System/360, System/370, 4300, 9370 and ES/9000 Processors Input/Output Equipment Installation Manual - Physical Planning*, order number GC22-7064, for details and restrictions regarding channel cabling.

# FC 2754 (S/390 ESCON Channel Emulator)
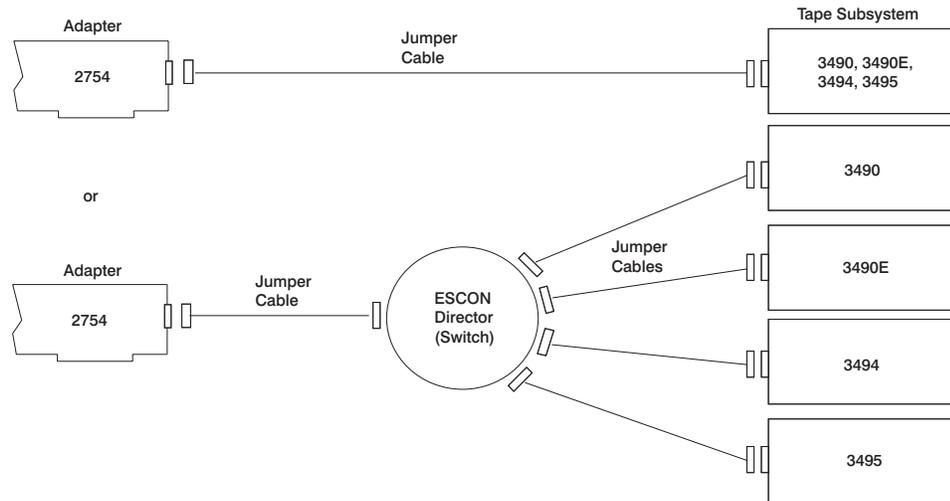


## Cable Considerations

ESCON jumper cables may be ordered separately.

To order the cable necessary to attach your system, contact your marketing representative. The following table lists the standard ESCON duplex-to-duplex jumper cable part numbers.

| Cable Name/Description | Part Number | Length m ft |
|---|---|---|
| System/390 ESCON Channel Jumper Cable (Duplex-to-Duplex) | 74F5412 | 3.7    12 |
| | 74F5413 | 6.1    20 |
| | 74F5414 | 12.1    40 |
| | 74F5415 | 21.3    70 |
| | 74F5416 | 30.4    100 |
| | 74F5417 | 61    200 |
| | 74F5418 | 122    400 |

Fiber optical cables for the ESCON Channel Emulator are required and should be ordered separately. For more information about planning for and installing required cables, see Planning for Enterprise System Connection Links in, *ESCON Link Planning section*, order number (GA23-0367).

## Software Considerations

Consider the following when planning for the S/390 ESCON Channel Emulator:

- AIX Version 3.2 or later is required.

- Software for tape subsystem support is obtained from Storage Systems Division.

# Graphics Adapter Cabling

This section provides information on cabling for graphics adapters. Displays mentioned in this section have the following characteristics:

1. POWERdisplay 17 (features a Trinitron $^{TM1}$ CRT with a maximum viewable image size of 409 mm (16.1 inches) measured diagonally).

2. POWERdisplay 20 display (features a Trinitron CRT with a maximum viewable image size of 486 mm (19.1 inches) measured diagonally).

3. 6091-19i display (features a Trinitron CRT that has a fixed image size of 439 mm (17.3 inches) measured diagonally).

4. 1091-051 display (features a Trinitron CRT that has a fixed image size of 376 mm (14.8 inches) measured diagonally).

## FC 2770 (Color Graphics Display Adapter)
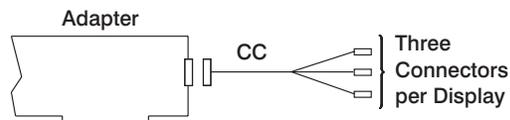


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| CC | Display adapter cable, contains an integral toroid assembly | 58F2903 | N/A | 2.4 | 8 |

## FC 4208 and 2803 (POWER Gt17™, Gt1b)



The adapter also supports attachment to some PS/2 displays, with attached cables.
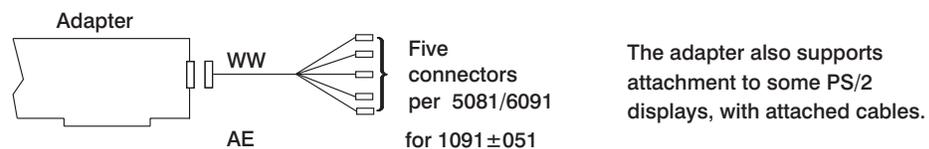
| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| WW | POWER Gt1 Display Adapter Cable, contains an integral toroid assembly. | 58F2902 | 4217 | 2 | 6 |
| AE | Gt1 to 1091-051 | 09G3588 | 9020 | 1.83 | 6 |

---

[1] Trademark of Sony Corporation

## FC 4207 (POWER Gt1x™)

Adapter
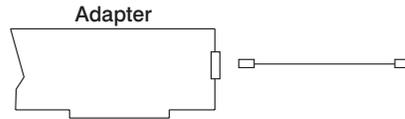
AB (POWERdisplays 16, 17, 19, 20, 5081, 6091)
AC (6314, 6317, 6319, 8508, 8517)
AD POWERdisplay 16s, 1091-051

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft | |
|---|---|---|---|---|---|
| AB | Gt1x  display cable | 09G3539 | 4214 | 1.83 | 6 |
| AC | Gt1x display cable | 52G3255 | 4213 | 0.3 | 1 |
| AD | Gt1x to 1091-051 | 09G3589 | 9021 | 1.83 | 6 |
| AD | Gt1x POWERdisplay 16s | 09G3589 | 4229 | 1.83 | 6 |

## FC 2768 (POWER Gt4e™)

The following figure illustrates the POWER Gt4e with an attachment cable for one display.
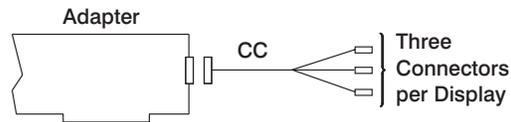
Adapter

CC

Three
Connectors
per Display

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft | |
|---|---|---|---|---|---|
| CC | Display adapter cable (contains an integral toroid assembly) | 58F2903 | N/A | 2.4 | 8 |

## FC 2711 and 2713 (POWER Gt4i™ and Gt4xi™)

The figure below illustrates the POWER Gt4i and Gt4xi with an attachment cable for one display.
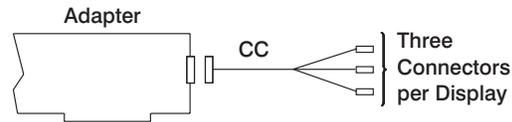
Adapter

CC — Three Connectors per Display

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| CC | Display adapter cable (contains an integral toroid assembly) | 58F2903 | N/A | 2.4  8 |

## FC 2766 (POWER GXT100 Graphics Adapter)

Adapter

AB (POWERdisplays 16, 17, 19, 20, 5081, 6091
AC (6314, 6317, 6319, 6324, 6325, 8508, 8517, 9524, 9525)
AD (POWERdisplay 16s, 1091-51)

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| AB | Display cable, 3 BNC connectors | 09G3539 | 4214 | 1.83  6 |
| AC | Display conversion cable, 13W3 to 15-pin | 52G3255 | 4213 | 0.3  1 |
| AD | Display cable, 5 BNC connectors | 09G3589 | 4229 | 1.83  6 |

## FC 2767 (POWER GXT150 Graphics Adapter)
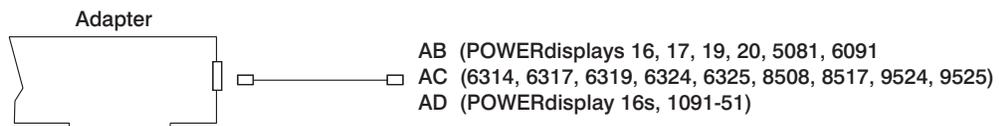
Adapter

AB (POWERdisplays 16, 17, 19, 20, 5081, 6091
AC (6314, 6317, 6319, 6324, 6325, 8508, 8517, 9524, 9525)
AD (POWERdisplay 16s, 1091-51)

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| AB | Display cable, 3 BNC connectors | 09G3539 | 4214 | 1.83  6 |
| AC | Display conversion cable, 13W3 to 15-pin | 52G3255 | 4213 | 0.3  1 |
| AD | Display cable, 5 BNC connectors | 09G3589 | 4229 | 1.83  6 |

## FC 2660 (POWER GXT150L™ Graphics Adapter)
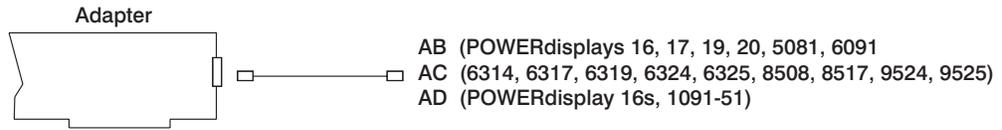
Adapter

AB (POWERdisplays 16, 17, 19, 20, 5081, 6091
AC (6314, 6317, 6319, 6324, 6325, 8508, 8517, 9524, 9525)
AD (POWERdisplay 16s, 1091-51)

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| AB | Display cable, 3 BNC connectors | 09G3539 | 4214 | 1.83 | 6 |
| AC | Display conversion cable, 13W3 to 15-pin | 52G3255 | 4213 | 0.3 | 1 |
| AD | Display cable, 5 BNC connectors | 09G3589 | 4229 | 1.83 | 6 |

## FC 2650 (POWER GXT150M™ Graphics Adapter)
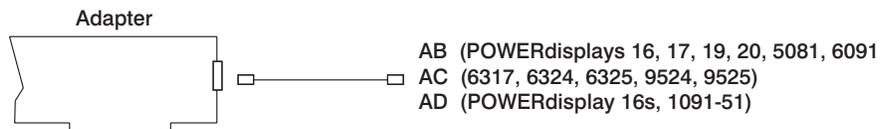
Adapter

AB (POWERdisplays 16, 17, 19, 20, 5081, 6091
AC (6317, 6324, 6325, 9524, 9525)
AD (POWERdisplay 16s, 1091-51)

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| AB | Display cable, 3 BNC connectors | 09G3539 | 4214 | 1.83 | 6 |
| AC | Display conversion cable, 13W3 to 15-pin | 52G3255 | 4213 | 0.3 | 1 |
| AD | Display cable, 5 BNC connectors | 09G3589 | 4229 | 1.83 | 6 |

## FC 2665 (POWER GXT155L Graphics Adapter)
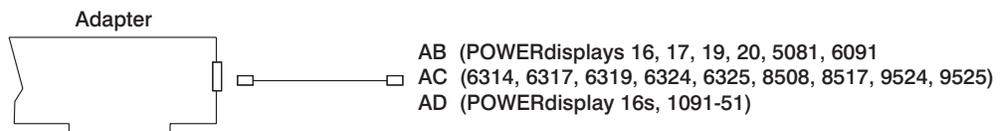
Adapter

AB (POWERdisplays 16, 17, 19, 20, 5081, 6091
AC (6314, 6317, 6319, 6324, 6325, 8508, 8517, 9524, 9525)
AD (POWERdisplay 16s, 1091-51)

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| AB | Display cable, 3 BNC connectors | 09G3539 | 4214 | 1.83 | 6 |
| AC | Display conversion cable, 13W3 to 15-pin | 52G3255 | 4213 | 0.3 | 1 |
| AD | Display cable, 5 BNC connectors | 09G3589 | 4229 | 1.83 | 6 |

# FC 2801 and 2802 (5085 or 5086 Attachment Adapters)

The following figure illustrates the 5085 or 5086 Attachment Adapters with an attachment cable for one 5085 or 5086 Graphics Processor.
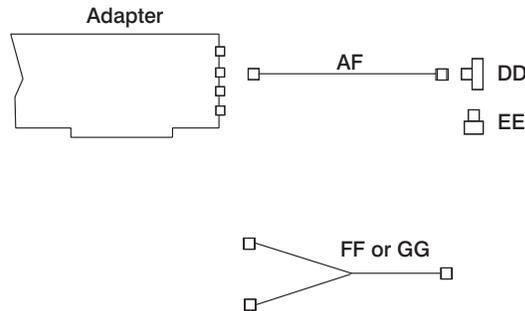


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| AF | Customer-supplied coaxial cable | 6245998 | N/A | 5   16.4 |
| DD | Coaxial BNC Tee connector | N/A | N/A | N/A |
| EE | BNC terminator | 6246330 | N/A | N/A |
| FF | "Y" cable from 5085 Graphics Processor to system unit | 6247042 | N/A | 5   16.4 |
| GG | "Y" cable from 5086 Graphics Processor to system unit | 6247041 | N/A | 5   16.4 |

For specific planning and cabling information, refer to the *5080 Graphics System Installation, Operation, and Problem Determination Guide*, order number GA23-2063.

# FC 2810 (Graphics Input Device Adapter)

The following figure illustrates the Graphics Input Device Adapter with an attachment cable.
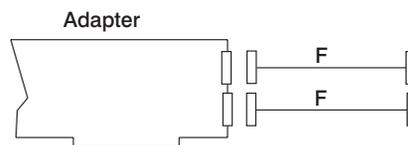


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| F | Lighted Programmable Function Keyboard, Dials, or Tablet Attachment Cable, supplied with the 6094 Model 10 Dials or the 6094 Lighted Programmable Function Keyboard Model 20 See "6094 Attached to the Graphics Input Device Adapter" on page 3-78. | 6247480 | 2811 | 2.1   7 |

## FC 4350 (7235 Attachment Adapter) POWER GTO™ Accelerator Adapter

The following figure shows the POWER GTO Accelerator Adapter attached to the 7235 POWER GTO to the system unit. For additional information see *7235 POWER GtO Installation and Service Guide*, Order Number SY66-0216.
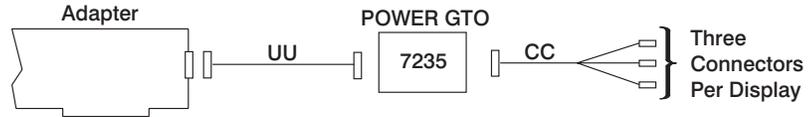


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| UU | 7235 Signal Cable, used to attach system unit to 7235 (supplied with 7235) | 74F3102 | N/A | 2.0 | 6.5 |
| CC | Display Adapter Cable, contains an integral toroid assembly (cable supplied with 7235) | 58F2903 | N/A | 2.4 | 8 |

## FC 2820 (7250 Attachment Adapter) POWER GXT1000® Graphics Accelerator

The following figure shows the POWER GXT1000 Graphics Accelerator Adapter attached to the 7250 POWER GXT1000. For additional information see *7250 POWER GXT1000 GRAPHIC Accelerator Service Guide*, order number SY66-0219.
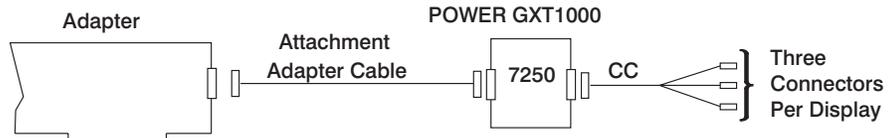


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
|  | Attachment Adapter Cable | 19G5935 | N/A | 2 | 6.6 |
| CC | Display Adapter Cable, contains an integral toroid assembly | 58F2903 | N/A | 2.4 | 8 |

# FC 2850 POWER GXT800M 3D Graphics Adapter W/Texture Memory

| Display Type | Screen Resolution (Non-Interlaced) | Refresh Freq (Hz) | Adapter Cable Part Number |
|---|---|---|---|
| 6091-16 Color POWERdisplay 16 | 1280 x 1024 | 60 [1] * | 39H8683 |
| | | 77 [2] | 39H8683 |
| 6091-19i Color POWERdisplay 19 | 1280 x 1024 | 60 [3] * | 39H8683 |
| | | 77 | 39H8683 |
| 1091-051 Color POWERdisplay 16S | 1280 x 1024 | 72* | 09G3588 [4] |
| 5081-16 Color 5081-019 w/ RPQ | 1280 x 1024 | 60* | 39H8683 |
| 6091-19 Color | 1280 x 1024 | 60* | 39H8683 |
| 6091-23 Color | 1280 x 1024 | 60* | 39H8683 |
| POWERdisplay 17 POWERdisplay 20 | 1024 x 768 | 74 | 39H8683 |
| | | 76 | 39H8683 |
| | 1280 x 1024 | 60* | 39H8683 |
| | | 77 | 39H8683 |
| P50 | 1024 x 768 | 74 | Cable Included with Display |
| | | 75 | Cable Included with Display |
| | | 85 | Cable Included with Display |
| | 1280x1024 | 60* | Cable Included with Display |
| P70 | 1024 x 768 | 70 | 96G2156 |
| | | 74 | 96G2156 |
| | | 75 | 96G2156 |
| | | 85 | 96G2156 |
| | 1280 x 1024 | 60* | 96G2156 |
| | | 75 | 96G2156 |
| | | 77 | 96G2156 |
| P200 | 1024 x 768 | 70 | 96G2156 |
| | | 74 | 96G2156 |
| | | 75 | 96G2156 |
| | | 85 | 96G2156 |
| | 1280 x 1024 | 60* | 96G2156 |
| | | 75 | 96G2156 |
| | | 77 | 96G2156 |
| | | 85 [5] | 96G2156 |

| Display Type | Screen Resolution (Non-Interlaced) | Refresh Freq (Hz) | Adapter Cable Part Number |
|---|---|---|---|
| P201 | 1024 x 768 | 70 | 96G1712 |
| | | 74 | 96G1712 |
| | | 75 | 96G1712 |
| | | 85 | 96G1712 |
| | 1280 x 1024 | 60* | 96G1712 |
| | | 75 | 96G1712 |
| | | 77 | 96G1712 |
| | | 85 | 96G1712 |
| 9516-A03 (US/EMEA) 9516-A04 (AP) | 1280 x 1024 | 60* | 39H8682 |
| Other VESA Resolutions/Refresh Rates | 1024 x 768 | 60 | |
| | | 70 | |
| | | 75 | |
| | | 85 | |
| | 1280 x 1024 | 60* | |
| | | 75 | |
| | | 85 | |

**Note:**

* Default display mode.  Monitors listed are selectable via the AIX utility (SMIT) except where noted.

[1] For 6091-16 Color/POWERdisplay 16 at 60 Hz, set the monitor display mode switch to `out(1)`.

[2] For 6091-16 Color/POWERdisplay 16 at 77 Hz, set the monitor display mode switch to `in(2)`.

[3] For 6091-19i Color/POWERdisplay 19 at 60 Hz, set the monitor display mode switch to `2`.

[4] When installing cable P/N 09G3588, the black leaded BNC connector (labeled "V") *must* be connected to the "VD" sync out connector on the back of the display.

[5] Only P200 Monitors with the N2 Chassis (M/T 6555, Model 77x) support 1280x1024 at 85Hz.

# I/O Adapter Cabling

This section provides information on cabling for I/O adapters.

## FC 6211 (High-Performance Disk Drive Subsystem Adapter)

The following figure illustrates the High-Performance Disk Drive Subsystem Adapter with attachment cable.
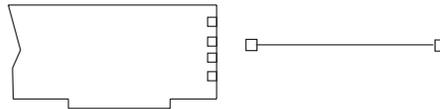


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| QQ | Serial Link Cable | 07G4859 | N/A | 3 | 10 |
|  |  | 07G4860 | N/A | 10 | 33 |

# High-Availability Configurations

All 7013 and 7015 systems can share a 9333 Model 500 or Model 010 respectively with another system unit. Such configurations may increase system availability and aid in recovery from certain types of hardware, software, and media failures. If one of the systems involved, or a High-Performance Disk Drive Subsystem Adapter fails, the other system can access the shared drives (with appropriate software support). Each 9333 Model 010 or Model 500 supports two independent adapter serial interfaces.

A typical high-availability configuration requires the following:

- Two POWERstations™ or POWERservers®
- One or more High-Performance Disk Drive Subsystem Adapters per host system
- One SCSI High-Performance I/O Controller per system and at least one SCSI disk drive, which can be used to boot the system
- Two or more 9333 Model 010 Drawers or 9333 Model 500 Subsystems (this allows mirroring of data files across drawers or subsystems, preventing a single point of failure)
- Sufficient 10m (33 ft) Serial Link Cables to connect system units with drawers or subsystems.
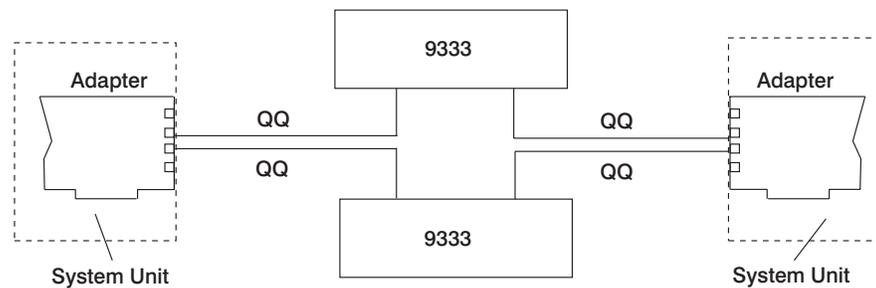


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| QQ | Serial Link Cable | 07G4859 | N/A | 3 | 10 |
|  |  | 07G4860 | N/A | 10 | 33 |

# FC 6212 (High-Performance Subsystem Adapter 40/80MB/Sec)

The following figure illustrates the High-Performance Subsystem Adapter 40/80MB/Sec with attachment cable.
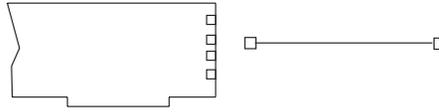
| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| QQ | Serial Link Cable | 07G4859 | N/A | 3 | 1 |
|  |  | 07G4860 | N/A | 10 | 33 |

# High-Availability Configurations

All 7013 and 7015 systems can share a 9333 Model 501 or Model 011 respectively with another system unit. Such configurations may increase system availability and aid in recovery from certain types of hardware, software, and media failures. If one of the systems involved, or a High-Performance Disk Drive Subsystem Adapter fails, the other system can access the shared drives (with appropriate software support). Each 9333 Model 011 or Model 501 supports two independent adapter serial interfaces.

A typical high-availability configuration requires the following:

*   Two system units
*   One or more High-Performance Disk Drive Subsystem Adapters per host system
*   One SCSI High-Performance I/O Controller per system and at least one SCSI disk drive, which can be used to boot the system
*   Two or more 9333 Model 011 Drawers or 9333 Model 501 Subsystems (this allows mirroring of data files across drawers or subsystems, preventing a single point of failure)
*   Sufficient 10-m (33-ft) Serial Link Cables to connect system units with drawers or subsystems.
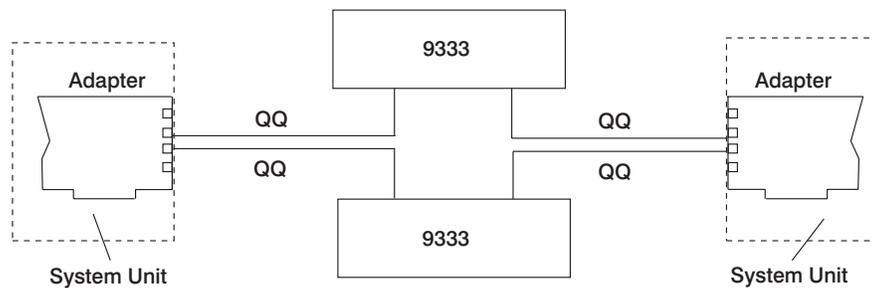
| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| QQ | Serial Link Cable | 07G4859 | N/A | 3 | 10 |
| | | 07G4860 | N/A | 10 | 33 |

The figure above shows two systems attached to a 9333 Subsystem Model 011 or 501. The Model 9333 Models 011 and 501 can attach to up to eight system units at the same time.

# Cabling Considerations for 9333 High-Performance Disk Drive Subsystems

The following points should be considered when connecting the 9333 High-Performance Disk Drive Subsystem to the system:

- Up to four subsystems can be connected to a High-Performance Disk Drive Subsystem Adapter, providing up to sixteen disk drives per adapter. The subsystems cannot be serially connected, and there are no external terminators to be installed or removed.

- 9333 Model 010 Drawer subsystems can be installed in the same rack as the CPU drawer, or in a nearby expansion rack.

- There are no address switches in 9333 subsystems. The addresses are determined only by the way in which the subsystems are connected to the system.

- 9333 subsystems can be connected to two High-Performance Disk Drive Subsystem Adapters, either in the same or in different system units. If a subsystem is connected to two adapters in two different systems, ensure that the address of that subsystem on each of the systems is carefully recorded to avoid confusion between similarly addressed devices on the two systems. Information regarding the checking of disk drive addresses in 9333 subsystems can be found in 9333 documentation.

# FC 6214, 6216, 6217, and 6219  (SSA Subsystems Attaching to SSA Adapters)

Use this section when connecting SSA subsystem units as follows:

- MT 7131 Model 405
- MT 7133 Models 010, 020, 500, and 600

to SSA Adapters (such as the Enhanced SSA 4-Port Adapter, the SSA 4-Port RAID Adapter, or the Micro Channel SSA Multi-Initiator/RAID EL Adapter).

## Introduction to SSA Cabling

This section provides the configuration rules for each SSA adapter, a general introduction to SSA cabling, and details of the SSA cables.

The installation and service manuals for each SSA subsystem unit have more information that relates to connecting that unit; those manuals contain cabling details for sample configurations that meet the simplest requirements.  Marketing Representatives have information on more complex configurations for installations where performance or availability are particularly important.

## SSA Loops, Links, and Data Paths

In the simplest SSA configuration, SSA devices are connected through two or more SSA links to an SSA adapter that is located in a using system.  The devices, SSA links, and SSA adapter are configured in loops.  Each loop provides a data path that starts at one connector of the SSA adapter and passes through a link (SSA cable) to the devices.  The loop continues through the devices and returns through another link to a second connector on the SSA adapter.

The maximum permitted length for an external copper cable that connects two SSA nodes (disk drives or adapters) is 25 meters (82 feet).

Nodes that have the fiber-optic extender (feature code 5500 on MT 7133) feature can be connected by fiber optic cable over a maximum permitted length of 2.4 kilometers (7874 feet).

All devices that are attached to an SSA adapter (shown in the figure below) are connected through SSA links [2]. Data and commands to a particular device pass through all other devices in the loop between the adapter and the target device. See the illustration on page 3-62.

Data can travel in either direction round a loop. The adapter can, therefore, access the devices [3] through two data paths. The using system cannot detect which data path is being used.
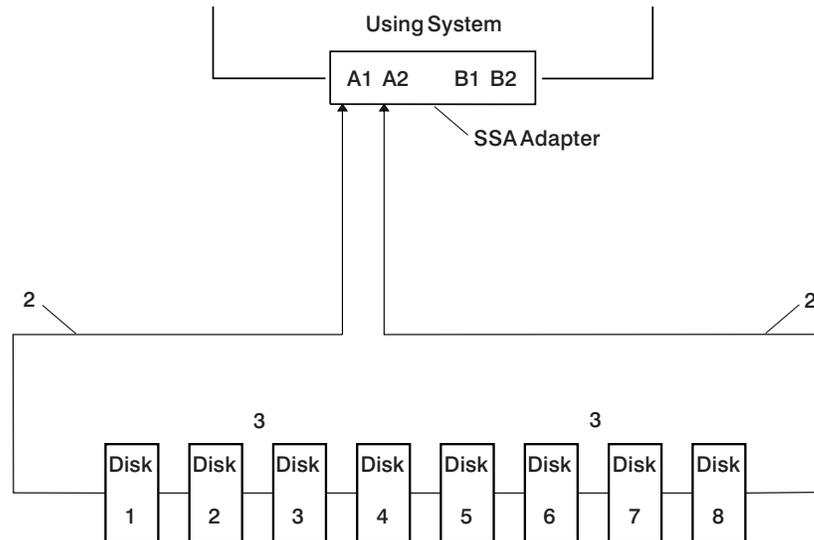


If a disk drive fails, or is turned off, the loop is broken, and one of the data paths to each disk drive is no longer available. The other disk drives continue to work through the remaining data path, but an error is reported to the system.

## Rules for SSA Loops

For SSA loops that include the SSA 4-Port Adapter (FC 6214, type 4-D) or the Enhanced SSA 4-Port Adapter (FC 6216, type 4-G), the following rules apply:

* Each SSA loop must be connected to a valid pair of connectors on the SSA adapter (that is, either connectors A1 and A2, or connectors B1 and B2).

* Only one of the two pairs of connectors on an adapter card can be connected in a particular SSA loop.

* A maximum of 48 devices can be connected in a particular SSA loop.

* A maximum of two pairs of adapter connectors can be connected in a particular loop if one adapter is an SSA 4-Port Adapter (type 4–D).

* A maximum of eight pairs of adapter connectors can be connected in a particular SSA loop if all the adapters are Enhanced SSA 4-Port Adapters (type 4–G).

* A maximum of two SSA adapters, that are connected in a particular SSA loop, can be installed in a single host system unit.

For SSA loops that include the SSA 4-Port RAID Adapter (FC 6217, type 4–I), the following rules apply:

- Each SSA loop must be connected to a valid pair of connectors on the SSA adapter (that is, either connectors A1 and A2, or connectors B1 and B2).

- A maximum of 48 devices can be connected in a particular SSA loop.

- Only one pair of adapter connectors can be connected in a particular SSA loop.

For SSA loops that include the Micro Channel SSA Multi-Initiator/RAID EL Adapter (FC 6219, type 4-M), the following rules apply:

- Each SSA loop must be connected to a valid pair of connectors on the SSA adapter (that is, either connectors A1 and A2, or connectors B1 and B2).

- A maximum of 48 devices can be connected in a particular SSA loop.

- If the fast-write cache or RAID functions of the adapter are used, no other adapter can be connected in an SSA loop with this adapter.

- If the fast-write cache or RAID functions of the adapter are not used, a second Micro Channel SSA Multi-Initiator/RAID EL Adapter (or a PCI SSA Multi-Initiator/RAID EL Adapter) can be connected in the loop.

## SSA Cabling for 7133 Models 010, 020, 500, and 600

This section provides information on cabling for 7133 models 010, 020, 500, and 600 to the SSA 4-Port Adapters.

See "Rules for SSA Loops" on page 3-62 for information on setting up your system.

See "SSA Cabling for 7133 Models D40 and T40" on page 3-70 for cabling 7133 models D40 and T40.

**Important**: All of the feature codes listed in the following table are feature codes of machine type 7133.

| Part Number | Feature Code | Length | |
|---|---|---|---|
| | | m | ft |
| 07H9163 | 5002 (See note) | 0.18 | 0.6 |
| 31H7960 | 5006 (See note) | 0.6 | 1.9 |
| 07H8985 | 5010 | 1.0 | 3.3 |
| 32H1465 | 5025 | 2.5 | 8.2 |
| 88G6404 | 5050 | 5.0 | 16.4 |
| 32H1466 | 5100 | 10 | 32.8 |
| 88G6406 | 5250 | 25 | 82.0 |
| **Note:** For Models 010 and 500 only | | | |

## SSA Cabling for MT 7133 Models 010 and 020

If you order one or more 7133 Model 010 or 020 units as part of a new system, some cables are supplied with each 7133 unit. These cables might be connected to the unit, or the adapter, or both. Which cables are supplied depends on the number of disk drives that are installed in the 7133 unit:

| Number of Disk Drives | Number of Cables | Part Number | Feature Code | Length | |
|---|---|---|---|---|---|
| | | | | m | ft |
| 1 through 4 | 2 | 88G6404 | 5050 | 5.0 | 16.4 |
| 5 through 8 | 2 | 88G6404 | 5050 | 5.0 | 16.4 |
| | 1 | 07H8985 | 5010 | 1.0 | 3.3 |
| 9 through 12 | 2 | 88G6404 | 5050 | 5.0 | 16.4 |
| | 1 | 07H8985 | 5010 | 1.0 | 3.3 |
| | 1 (Model 010 only) | 07H9163 | 5002 | 0.18 | 0.6 |
| 13 through 16 | 2 | 88G6404 | 5050 | 5.0 | 16.4 |
| | 2 | 07H8985 | 5010 | 1.0 | 3.3 |
| | 1 (Model 010 only) | 07H9163 | 5002 | 0.18 | 0.6 |

Some of these cables might have to be disconnected and discarded when the system is installed.

# 7131 SSA Cabling for MT 7131 Model 405

This section provides information on cabling for 7131 model 405 to the SSA 4-Port Adapters.

See "Rules for SSA Loops" on page 3-62 for information on setting up your system.

Pages 3-66 and 3-67 show two configurations for SSA subsystems using 7131 units.

**Attention:** When you connect the SSA cables to a 7131 unit, always connect them as specified in the diagram; this enables operators and service representatives to identify the disk drives more easily.

**Important:** All of the feature codes listed for the SSA Copper Cables (item [2]) in the following table are feature codes of machine type 7131.

| Item | Description | Part Number | Feature Code | Length | |
|------|-------------|-------------|--------------|--------|------|
| | | | | m | ft |
| [1] | SSA 4-Port Adapter | 31H3614 | 6214 feature of system unit | N/A | N/A |
| [1] | Enhanced SSA 4-Port Adapter | 40H5707 | 6216 feature of system unit | N/A | N/A |
| [1] | SSA 4-Port RAID Adapter | 89H5617 | 6217 feature of system unit | N/A | N/A |
| [1] | Micro Channel SSA Multi-Initiator/ RAID EL Adapter | 84H9706 | 6219 feature of system unit | N/A | N/A |
| [2] | SSA Cable, 7131 to Adapter | 07H8985 | 2895* | 1.0 | 3.3 |
| | | 32H1465 | 2896 | 2.5 | 8.2 |
| | | 88G6404 | 2897 | 5.0 | 16.4 |
| | | 32H1466 | 2898 | 10 | 32.8 |
| | | 88G6406 | 2899 | 25 | 82.0 |

## Base Configuration

A 7131 unit base configuration includes two disk drive carrier assemblies. These carrier assemblies are installed in the lower two slots of the 7131 unit. The other 3 disk drive positions contain dummy disk drive carrier assemblies.

In the simplest configuration, the SSA loop is completed by connecting the two SSA connectors on the 7131 unit to one of the two pairs of connectors on an SSA adapter in the using system:

Using system

A1 A2 ☐1 B1 B2

☐2    ☐2

7131 unit

Disk 1

Disk 2

Disk 3

Disk 4

J6    Disk 5

J10
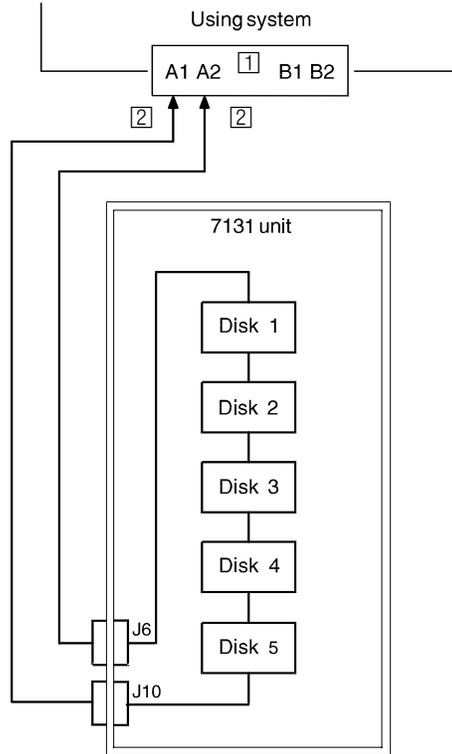
**Note:** The cables shown in the diagram above are described on page 3-65.

## Loop Configuration using Four 7131 Units

All 20 disk drive carrier assemblies in the four full 7131 units are connected in a single loop.
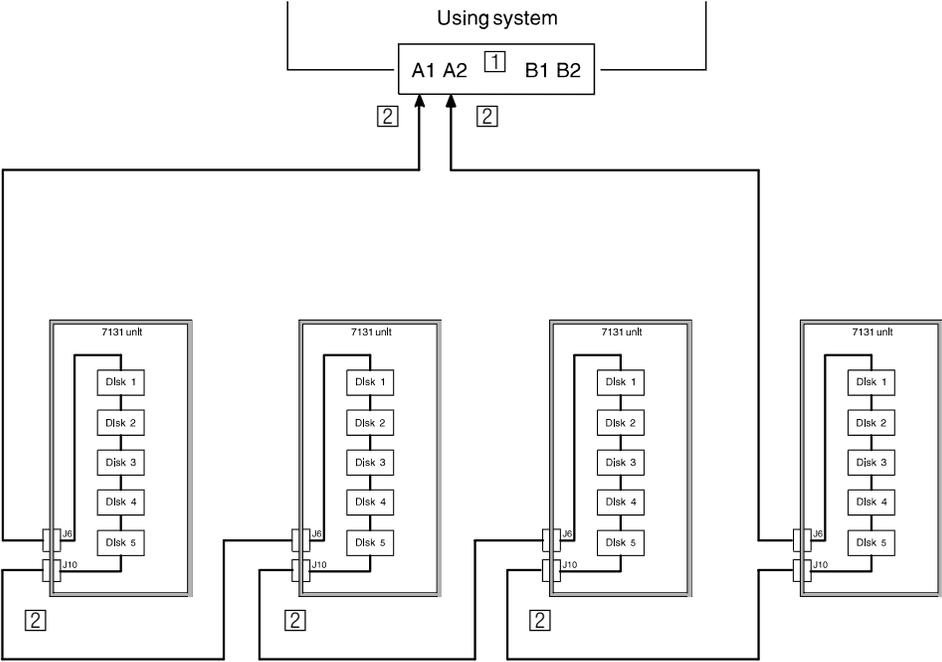


For a higher-availability configuration, a second SSA adapter can be included in the loops.

**Note:** The cables shown in the diagram above are described on page 3-65.

## FC 6216, and 6219 (Attaching SSA Subsystems MT 7133 Models D40 and T40 to SSA Adapters)

Use this section when connecting SSA subsystem units MT 7133 Models D40 and T40. 7133 Models D40 and T40 can be only be used with SSA Adapters FCs 6216 or 6219.

This section provides the configuration rules for each SSA adapter, a general introduction to SSA cabling, and details of the SSA cables.

The installation and service manuals for each SSA subsystem unit have more information that relates to connecting that unit; those manuals contain cabling details for sample configurations that meet the simplest requirements. Marketing Representatives have information on more complex configurations for installations where performance or availability are particularly important.

## SSA Loops, Links, and Data Paths

In the simplest SSA configuration, SSA devices are connected through two or more SSA links to an SSA adapter that is located in a using system. The devices, SSA links, and SSA adapter are configured in loops. Each loop provides a data path that starts at one connector of the SSA adapter and passes through a link (SSA cable) to the devices. The loop continues through the devices and returns through another link to a second connector on the SSA adapter.

The maximum permitted length for an external copper cable that connects two SSA nodes (disk drives or adapters) is 25 meters (82 feet).

Nodes that have the fiber-optic extender (feature code 8851 on MT 7133 Models D40, and T40) feature can be connected by fiber optic cable over a maximum permitted length of 5 kilometers (16400 feet).

All devices that are attached to an SSA adapter (shown in the figure below) are connected through SSA links [2].  Data and commands to a particular device pass through all other devices in the loop between the adapter and the target device.  See the illustration on page 3-69 and the table on page 3-70.

Data can travel in either direction round a loop.  The adapter can, therefore, access the devices [3] through two data paths.  The using system cannot detect which data path is being used.

Using System

A1 A2    B1 B2

SSA Adapter

2                                                                2

3                              3

| Disk | Disk | Disk | Disk | Disk | Disk | Disk | Disk |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
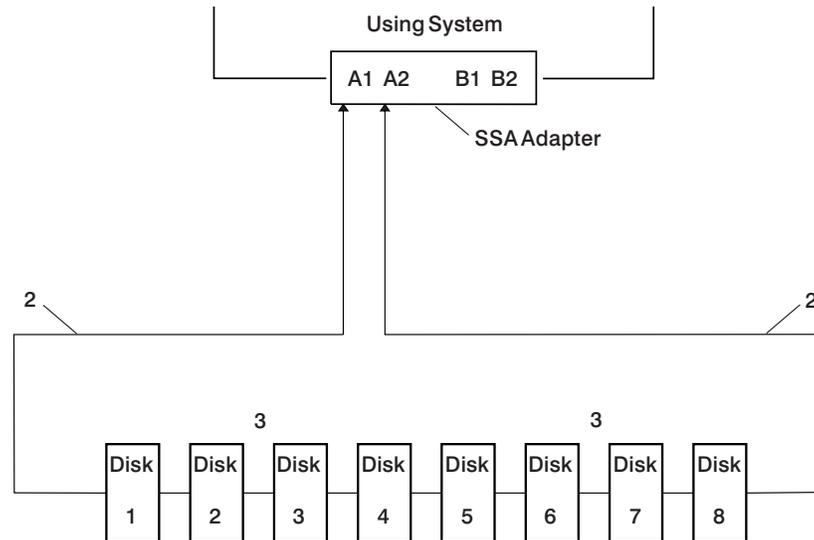
If a disk drive fails, or is turned off, the loop is broken, and one of the data paths to each disk drive is no longer available.  The other disk drives continue to work through the remaining data path, but an error is reported to the system.

## Rules for SSA Loops

For SSA loops that include the Enhanced SSA 4-Port Adapter (FC 6216, type 4-G), or the Micro Channel SSA Muiti-Initiator/RAID EL Adapter (FC 6219, type 4-M) the following rules apply:

- Each SSA loop must be connected to a valid pair of connectors on the SSA adapter (that is, either connectors A1 and A2, or connectors B1 and B2).

- Only one of the two pairs of connectors on an adapter card can be connected in a particular SSA loop.

- A maximum of 48 devices can be connected in a particular SSA loop.

- A maximum of eight pairs of adapter connectors can be connected in a particular SSA loop if all the adapters are Enhanced SSA 4-Port Adapters (type 4–G).

- A maximum of two SSA adapters, that are connected in a particular SSA loop, can be installed in a single host system unit.

# SSA Cabling for 7133 Models D40 and T40

This section provides information on cabling for 7133 models D40, and T40 to the SSA 4-Port Adapters.

See "Rules for SSA Loops" on page 3-69 for rules and information on setting up your system.

**Important**: All of the feature codes listed in the following table are feature codes of machine type 7133 models D40 and T40.

| Part Number | Feature Code | Length | |
|---|---|---|---|
| | | **m** | **ft** |
| 02L7445 | 8801 | 1.0 | 3.3 |
| 02L7446 | 8802 | 2.5 | 8.2 |
| 02L7447 | 8805 | 5.0 | 16.4 |
| 02L7448 | 8810 | 10 | 32.8 |
| 02L7449 | 8825 | 25 | 82.0 |

# FC 2401 (M-Video Capture Adapter)

The following figure illustrates the M-Video Capture Adapter with an attachment cable.
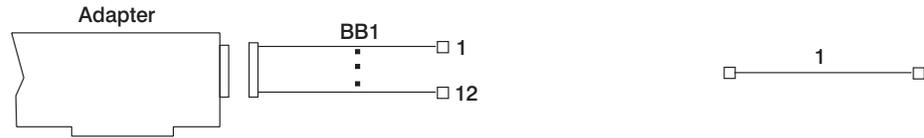


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| 1 | Customer-supplied cable | N/A | N/A | N/A |
| BB1 | Supplied cableset | 92F3714 | N/A | N/A |

# FC 6300 (9291/9295 Digital Trunk Adapter)

The following figure illustrates the 9291/9295 Digital Trunk Adapter with an attachment cable.
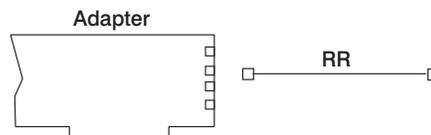


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| RR | Cable to 9291/9295 assembly, provided with VPACK | 34F0873 | N/A | 2    6.6 |

# FC 6301 (M-Audio Capture and Playback Adapter)

The following figure illustrates the M-Audio Capture and Playback Adapter with an attachment cable.
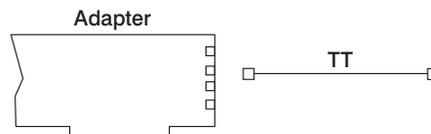


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| TT | Customer-supplied cable | N/A | N/A | |

# FC 6302 (Ultimedia Audio Adapter)

The following figure illustrates the Ultimedia Audio Adapter.
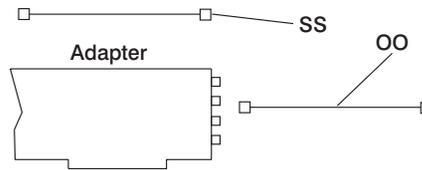
| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| OO | Customer-supplied cables:<br><br>Line In cable, Microphone In cable<br><br>Line out cable, and Headphone out cable | N/A | N/A | |
| SS | Internal CD-ROM cable<br>(supplied with adapter) | NA | NA | NA |

# FC 6304 (Ultimedia Video I/O Adapter)

The following figure illustrates the Ultimedia Video I/O Adapter with an attachment cable.
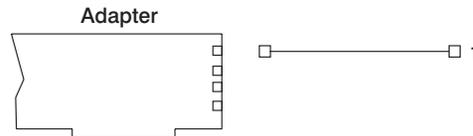
| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| 1 | Customer-supplied cable for connection to:<br>S-VHS mini din jack for video in<br>C-VBS RCA type jack for video in<br>S-VHS mini din jack for video out<br>C-VBS RCA type jack for video out | N/A | N/A | N/A |

# Standard I/O Ports

There are many new Machine Types and Models of Systems. These new systems have a variety of standard I/O interfaces. Most of the new systems have interfaces as shown in the figure below. Some of the new systems have one or more of the following interfaces standard Ethernet, Token Ring and SCSI. Check the manuals that came with your system for the standard I/O interfaces on your system unit. See the appropriate cabling sections for cabling these interfaces. See "Attaching User Input Devices" on page 3-76.

The following figure illustrates the standard I/O ports (built into the planar board of many of the system units) with attachment cables. The 7015 system unit supports serial port 1 (S1), serial port 2 (S2), and parallel port (P) only. To make the necessary connections to this planar, your setup person needs to know how each port is used. The Standard I/O ports for Models G30, J30, and R30 are shown in topic 3-74.
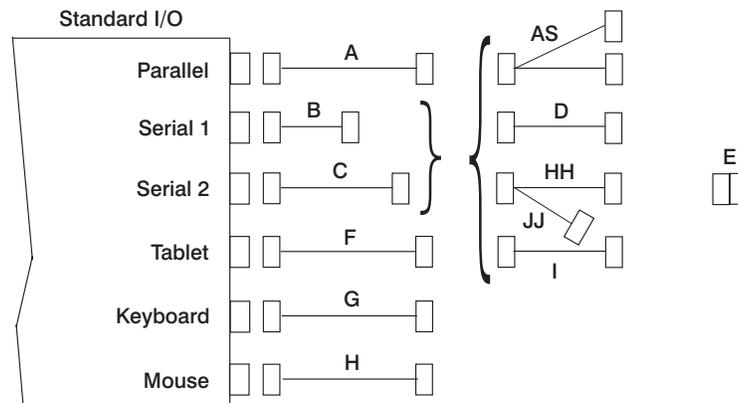


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m    ft |
|---|---|---|---|---|
| A | PC Parallel Printer Cable | 1525612 09F5544 | 3100 | 3      10 5      16.4 |
| B | Serial port jumper cable, two provided with each system models 320, 32H, 520, 530, 540, and 550 | 00G0943 | N/A | 0.09 0.33 |
| C | Serial port jumper cable for 7015 Models 930 and 950, two provided with each system unit | 59F4533 | N/A | 3      10 |
| D | Async Cable-EIA-232/V.24, if customer-supplied, must meet EIA-232D requirements | 6323741 | 2936 | 3      10 |
| E | Printer/Terminal Interposer EIA-232 | 58F2861 | 2937 | N/A |
| F | Tablet cable, supplied with tablet | 6247480 | 2811 | 2.1     7 |
| G | Keyboard cable, supplied with keyboard | N/A | N/A | 3      10 |
| H | Mouse cable, supplied with mouse | N/A | N/A | 2.75    9 |
| I | Printer/Terminal Cable EIA-232 if customer-supplied, must meet EIA-232D requirements | 12H1204 | 2934 | 3      10 |
| AR | Serial port jumper cable that converts from a 9-pin D-shell connector to a 25-pin D-shell (supplied with the system unit). | 6133917 | N/A | .25  0.83 |

| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m ft |
|---|---|---|---|---|
| AS | Serial port fanout cable feature that makes the second serial port available from a single serial port connector on the back of some Models | 31F4590 | 3107 | 0.17  0.57 |
| HH | 6094 Attachment Cable, attaches to both device and power cable (JJ) | 39F8228 | 4060 | 1.8  6 |
| JJ | Power cable for 6094, attaches to display | 39F8302 | 4061 | 1.8  6 |

The following figure illustrates the standard I/O ports with attachment cables for Models G30, J30, and R30.  The cables are described in the table above.

Model G30

Parallel    A

Serial 1
and     AS
Serial 2

Serial 3    AR

D

I

E

Model J30

Parallel    A

Serial 1

Serial 2

Serial 3

D

I

E

Model R30

Parallel    A

Serial 1

Serial 2    AR

Serial 3

D

I

E
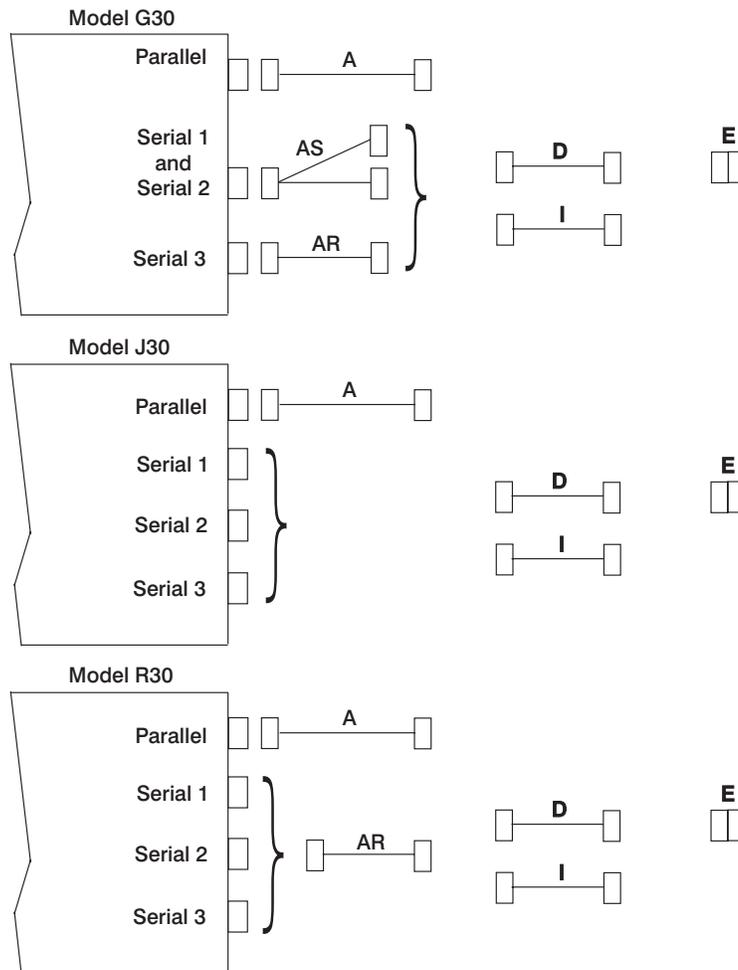
# Re-IPL Cabling

This section provides information on cabling for serial Re-IPL.

## FC 3122 and 3123 (Serial to Re-IPL Port Re-IPL Cables)

The following figure illustrates how to install a serial Re-IPL cable.
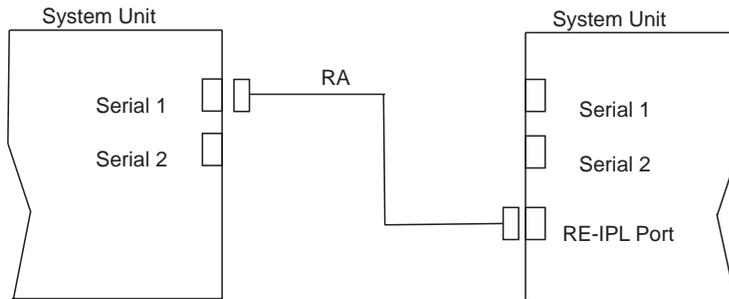


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| RA | Serial to Re-IPL Port<br>Can be customer-supplied | 65G6887 | 3122 | 3.7 | 12 |
| RA | Serial to Re-IPL Port<br>Can be customer-supplied | 65G6979 | 3123 | 8 | 39.4 |

## FC 3124 and 3125 (Serial to Serial Port Re-IPL Cables)

The following figure illustrates how to install a serial Re-IPL cable.
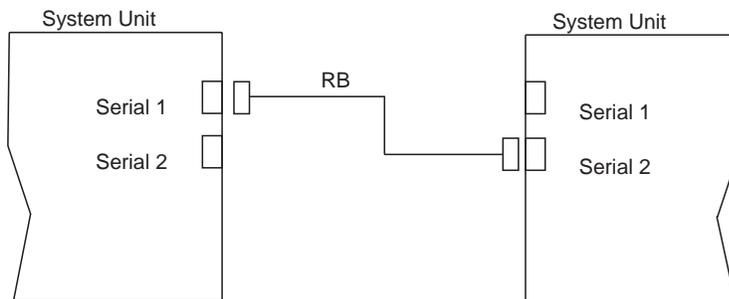


| Cable Letter | Cable Name/Description | Part Number | Feature Code | Length m | ft |
|---|---|---|---|---|---|
| RB | Serial to Serial Port<br>Can be customer-supplied | 88G4853 | 3124 | 3.7 | 12 |
| RB | Serial to Serial Port<br>Can be customer-supplied | 88G4854 | 3125 | 8 | 39.4 |

# Attaching User Input Devices

The following topics show how to attach user input devices to system units. This is shown for example only; some system units do not support user input devices.

## Attaching to the Standard I/O Interfaces

When Ethernet, Token-Ring, SCSI or SCSI-2 come as standard interfaces, their attachment is shown in the specified section.

## Keyboard

The following drawing shows the keyboard attached to the standard I/O port K. The keyboard cable is supplied with the keyboard.



System
Keyboard Only

Keyboard Cable
Part Number 1394609
(Later keyboards)
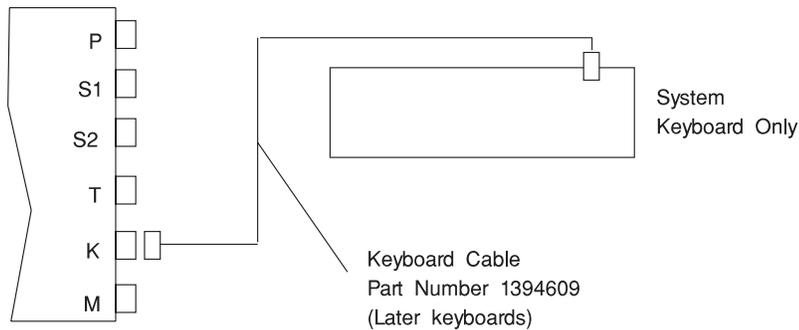
## Speaker and Keyboard

Some systems were shipped that did not have a speaker in the keyboard or the system unit. The following drawing shows the keyboard attached to a speaker box with a 3 ft. cable which attaches to the standard I/O port K. The speaker box has a keyboard connector to pass the keyboard signals through to the keyboard. The keyboard cable is supplied with the keyboard.



Keyboard
Connector

System
Keyboard Only

Keyboard Cable
Part Number 1394609
(Later keyboards)

Speaker with
Cable
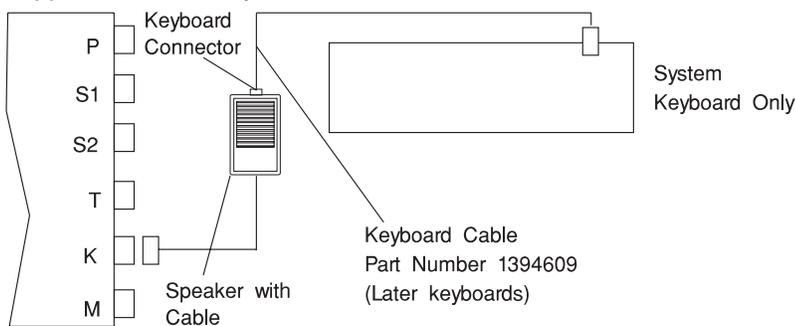
# Mouse

The following drawing shows the mouse attached to the standard I/O port M.

```
P
S1
S2
T
K
M        Mouse

Mouse  Cable
(attached)
```
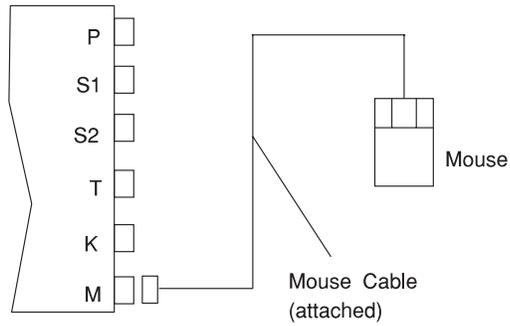
# 5083 Tablet

The following drawing shows the tablet attached to the standard I/O port  T. The cursor or stylus attaches to the tablet.

```
P
S1
S2
T                Tablet        or
K                        Cursor      Stylus
M

Tablet  Cable
 Part  Number  6247480
```
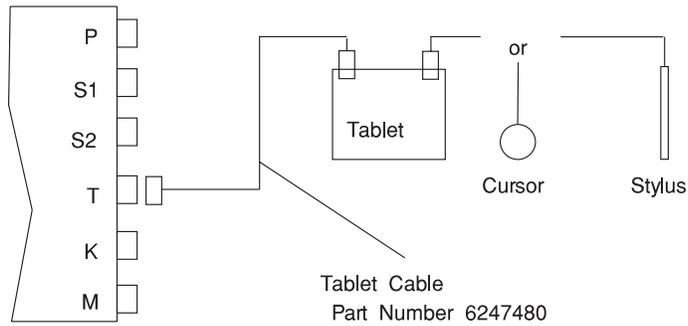
## 6094 Dials and Lighted Program Function Keyboard

The 6094 Model 10 Dials and the 6094 Model 20 Lighted Program Function Keyboard (LPFK) can be attached to either the Graphics Input Device Adapter or to standard I/O ports S1 and S2.

## 6094 Attached to the Graphics Input Device Adapter

When the 6094 is attached to the Graphics Input Device Adapter, the 6094 gets power from the adapter.

The following drawing shows a 6094 Model 10 Dials and a 6094 Model 20 LPFK attached to the Graphics Input Device Adapter. See "FC 2810 (Graphics Input Device Adapter)" on page 3-52 for further information.



6094
Model 10
Dials

6094
Model 20
LPFK

LPFK or Dials Attachment Cable
Part Number 6247480
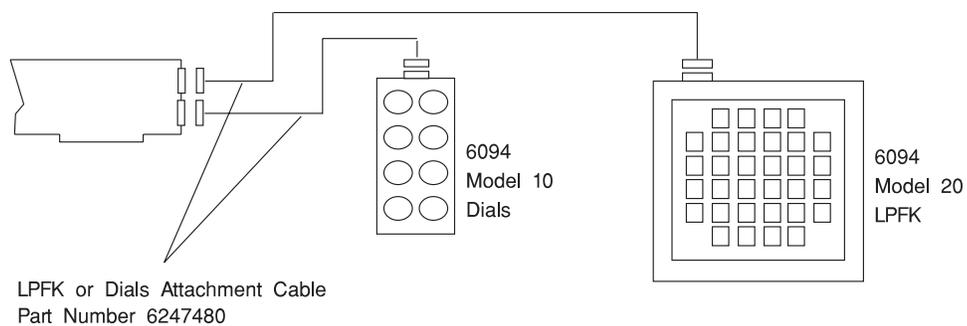
## 6094 Attached to Standard I/O Ports S1 and S2

The 6094 can only be attached to standard I/O ports S1 and S2 when there is a 5081 or 6091 display on the same system unit. The 6094 gets power from the 5081 or 6091 through a special power cable.

When the 6094 is attached to standard I/O ports S1 and S2, these ports *cannot* be used for regular EIA-232D communications ports.



Attachment Cable
Part Number 39F8228

10-Pin to 25-Pin
Converter Cable
Part Number 59F3740
These are only need-
ed on some early
systems.

6094
Model 10
Dials

6094
Model 20
LPFK

5081
Display

Power Cable
Part Number 39F8302
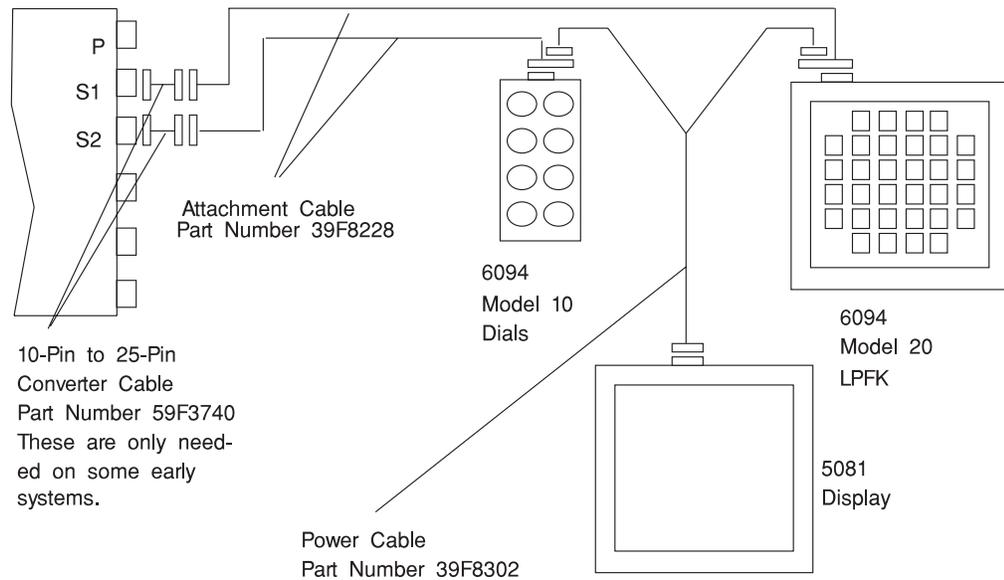
## Attaching the Graphic Displays

There are several graphic displays and display adapters used with system units. There are three ways to attach graphic displays to the system units:

- Attach a monochrome display using a 15-position D-shell connector.
- Attach a color graphics display using an RGB video cable.
- Attach the 7235 using a 68-position D-shell connector. The color graphics display then attaches to the 7235.

The following examples show the cabling arrangements.

## 5081 or 6091 Display Attached to a Color Graphics Adapter

The following drawing shows a 5081 or 6091 display attached directly to a color graphics display adapter in the system unit.

A Color Graphics
Display Adapter

5081 or
6091 Display

RGB Video Cable
Part Number 58F2903
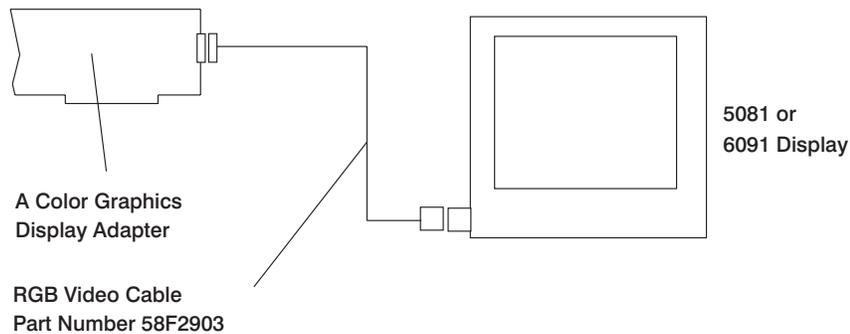
## 5081 or 6091 Display Attached to a 7235

The following drawing shows a 7235 attached directly to a graphics subsystem adapter in the system unit.

Graphics
Subsystem
Adapter
FC 4350

7235

5081 or
6091 Display

Cable
Part Number 74F3102

RGB Video Cable
Part Number 58F2903
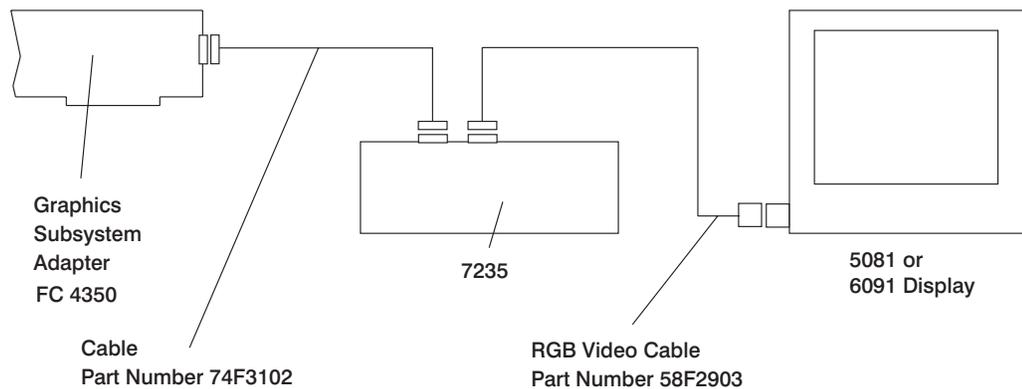
## 8508 Display

The following drawing shows an 8508 display attached directly to a grayscale graphics display adapter in the system unit.  Attach the toroids (there may be only one) to the display signal cable near the adapter.

Toroids (shipped
with the adapter)

8508 Display

15-Position
D-Shell Connector

Grayscale  Graphics
Display Adapter

Signal Cable is Part of
the Display
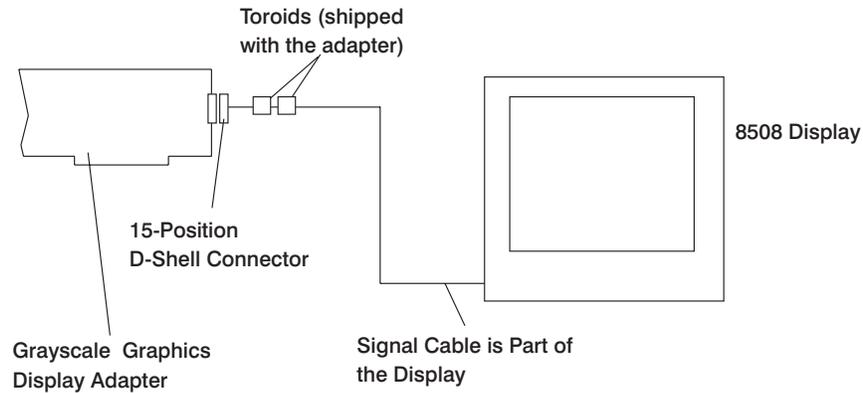
## Attaching the External Diskette Drive

Some of the early early model system units had 5.25-inch diskette drives for compatibility with previous systems.

## 4869 5.25-Inch

The following drawing shows a 4869 attached to the optional external diskette drive connector on a system unit.

System Unit

4869 5.25-Inch
External Diskette Drive

Optional External Diskette
Drive Connector

Signal Cable is Part of the
External Diskette Drive
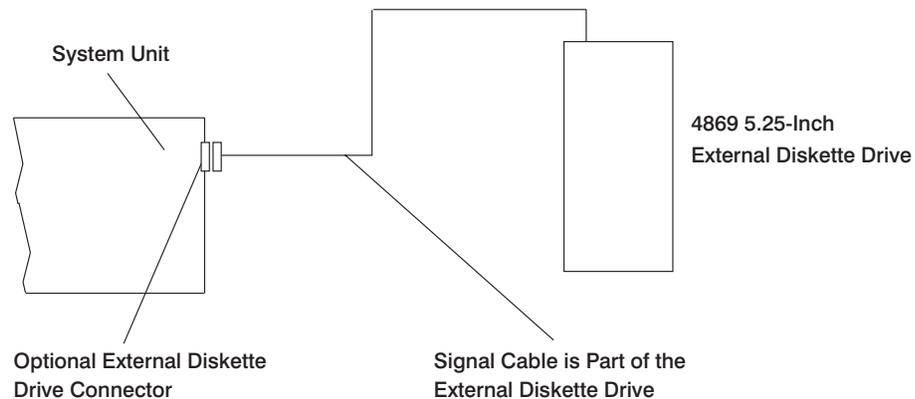
# Attaching to the M-Video Capture Adapter (NTSC Version)

## Connecting Input Devices

All input devices are connected via the Primary I/O cable.



**Note:** The Primary I/O cable is not intended to attach directly to input/output devices; RCA plugs are required.

| Input Device | Connections |
|---|---|
| NTSC Composite Video | Cable -10 |
| RGB with Separate Composite Analog Sync<br><br>**Note:** The composite analog sync may come from the composite video output of a camera. If this camera composite video output is used for the sync input, do not use the camera as a composite video source as well. | Red to Cable -9<br>Green to Cable -8<br>Blue to Cable -7<br>Composite Analog Sync to Cable -6 |
| RGB with Sync on Green | Red to Cable -9<br>Green to Cable -8<br>Blue to Cable -7 |
| Y/C Video<br><br>**Note:** RGB and Y/C inputs cannot be used simultaneously. Use shielded cables. | Chroma (C) to Cable -9<br>Luma (Y) to Cable -8 |

# Connecting Output Devices

The M-Video Capture Adapter simultaneously drives NTSC, RGB, and Y/C output monitors.



**Note:** The Primary I/O cable is not intended to attach directly to input/output devices; RCA plugs are required.

| Output Device | Connections |
|---|---|
| NTSC Monitor | Cable -5 |
| RGB with Sync on Green<br><br>**Note:** If the Sync on Green output is used, the NTSC Y/C outputs are *not* usable. | Red to Cable -4<br>Green to Cable -3<br>Blue to Cable -2 |
| RGB with Separate Sync | Red to Cable -4<br>Green to Cable -3<br>Blue to Cable -2<br>Sync to Cable -1 |
| Y/C Monitor | Monitor to S-Connector Cable |

**Attention:** The Red, Green and Blue video outputs must be terminated in 75 ohms or all outputs will be overdriven. 75-ohm termination is normally built into the monitors, but ensure that the 75-ohm switch is properly set. If you are not using a 75-ohm terminated RGB video display, use the 75-ohm terminator plugs supplied with the M-Video Capture Adapter.

# Attaching to the M-Video Capture Adapter (PAL Version)

## Connecting Input Devices

All input devices are connected via the Primary I/O cable.



**Note:** The Primary I/O cable is not intended to attach directly to input/output devices; RCA plugs are required.

| Input Device | Connections |
|---|---|
| Pal Composite Video | Cable IV |
| RGB with Separate Composite Analog Sync<br><br>**Note:** The composite analog sync may come from the composite video output of a camera. If this camera composite video output is used for the sync input, do not use the camera as a composite video source as well. | Red to Cable IR<br>Blue to Cable IB<br>Green to Cable IG<br>Composite Analog Sync to Cable IS |
| RGB with Sync on Green | Red to Cable IR<br>Green to Cable IG<br>Blue to Cable IB |
| Y/C Video | Chroma (C) to Cable IR<br>Luma (Y) to Cable IG |
| **Notes:**<br><br>1. RGB and Y/C inputs cannot be used simultaneously.<br>2. Use shielded cables. | |

# Connecting Output Devices

The M-Video Capture Adapter simultaneously drives PAL, RGB, and Y/C output monitors.
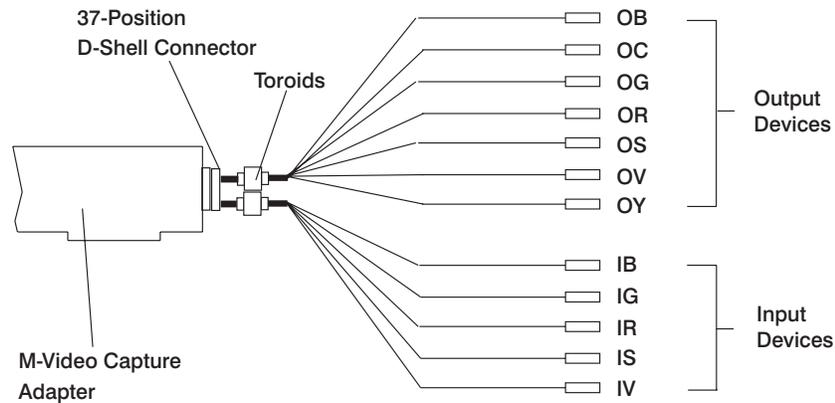


**Note:** The Primary I/O cable is not intended to attach directly to input/output devices; RCA plugs are required.

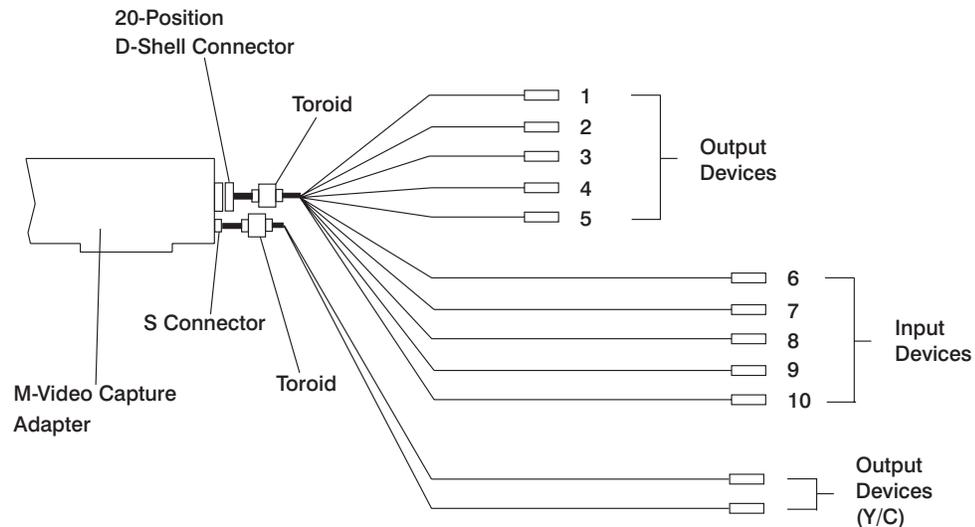| Output Device | Connections |
|---|---|
| PAL Monitor | Cable OV |
| RGB with Sync on Green<br><br><br>**Note:** If the Sync on Green output is used, the PAL and Y/C outputs will *not* be useable. | Red to Cable OR<br>Green to Cable OG<br>Blue to Cable OB |
| RGB with Separate Sync | Red to Cable OR<br>Green to Cable OG<br>Blue to Cable OB<br>Sync to Cable OS |
| Y/C Monitor | Chroma (C) to Cable OC<br>Luma (Y) to Cable OY |

**Attention:** The Red, Green, and Blue video outputs must be terminated in 75 ohms or all outputs will be overdriven. 75-ohm termination is normally built into the monitors, but ensure that the 75-ohm switch is properly set. If you are not using a 75-ohm terminated RGB video display, use the 75-ohm terminator plugs supplied with the M-Video Capture Adapter.

# Chapter 4.  SCSI Cabling

## Description of the SCSI Cable Information

The following sections describe the cabling, termination, and addressing for all SCSI controllers. There are many descriptions describing how to cable various controllers to the SCSI devices.

**Note:** The end brackets of non-OEM SCSI-2 differential controllers carry the label, "Differential."

OEM SCSI-1 or SCSI-2 single-ended, SCSI-2 differential, and SCSI-2 single ended / low voltage differential controllers may carry one of the following ANSI icons:



*Single-Ended*
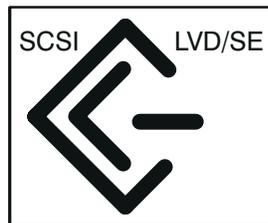


*Differential*



*Low Voltage Differential*/
*Single-Ended*

# How to Find the 5% You Need to Know

The following SCSI cable section contains lots of information on all of the SCSI Controllers, cables, terminators and SCSI rules. If all you want to do is attach one SCSI device to a SCSI controller, you do not need all of this information and you can follow the quick procedure below. If you are attaching more than one device to a controller, you need to read the entire general section and all of the detail section for the SCSI controller so you understand all of the controller rules.

QUICK Procedure to attach one device.

- Go to table "External SCSI Devices" on page 4-4 and look up the device you want to attach. Make a note of its characteristics.

- Go to table "Cabling SCSI Devices" on page 4-3 and in the first column look up the controller to which you want to attach the device. (**Note:** You cannot attach single-ended (SE) devices to differential controllers or visa-versa). Note the page number from the first column.

- Go to the page for the selected controller and continue forward until you come to the "Controller-to-First Device Cable Table." Look up the cable you need. Both the feature code and part number are provided. The machine type (MT) column tells you if the cable is ordered with the system or with the device.

Example: You want to attach a 7204-010 external 1GB disk drive.

- From the table "External SCSI Devices" on page 4-4, you record that the 7204-010 is an 8-bit, single-ended dual connector device.

- You decide to connect this device to the SCSI-2 Fast /Wide controller. From "Cabling SCSI Devices" on page 4-3 you see that the cabling information for this controller starts on "Cabling the SCSI-2 Single-Ended Fast/Wide Controller FC 2414, 2415, and 9216" on page 4-41page only.

- You go to "Cabling the SCSI-2 Single-Ended Fast/Wide Controller FC 2414, 2415, and 9216" on page 4-41 and continue to the "Controller-to-First Device Cables" on page 4-42. From this table you choose feature code 2437 which is the cable to attach an 8-bit device which has 2 connectors.

- From the MT column, you know to order that feature code against the host system.

**Note:** The terms SCSI IDs and SCSI addresses are used interchangeably in the publication.

# Cabling SCSI Devices

The table below shows where in this section to look for information on cabling specific SCSI configurations:

**Note:** To understand the cabling for the SCSI controllers read "General SCSI Considerations" on page 4-5, and then refer to the sections described in the table for information on specific SCSI cabling configurations.

| Reference and Page | ID | Standard on Model | Type | Description | Label |
|---|---|---|---|---|---|
| "Cabling the SCSI I/O Controller FC 2828, 2829, and 2835" on page 4-8 | SCSI-1 | 7013-520 thru 560<br>7015-930/950<br>7016-all models | Single-ended | Adapter | 4-1 |
| "Cabling the SCSI-1 Integrated Controller for Machine Types 7012, 7013, and 7015" on page 4-18 | SCSI-1 | 7012-340 thru 375<br>7013-570 thru 590<br>7013-59H/591<br>7015-970 thru 990<br>7015-R10 thru R24 | Single-ended | Integrated | N/A |
| "Cabling the SCSI-2 Fast/Wide Integrated Controller for Machine Type 7012 Models 380/390/39H and 7030 Models 3AT/3BT/3CT" on page 4-16 | SCSI-2 | 7012-380/390/39H<br>7030-3AT/3BT/3CT | Single-ended/<br>Single-ended | Integrated | N/A |
| "Cabling the SCSI Integrated Controller for Machine Types 7006, 7008, 7009, and 7011" on page 4-21 | SCSI-1 | 7008<br>7011-220/230 | Single-ended | Integrated | N/A |
| | SCSI-2 | 7006<br>7009<br>7011-250 | Single-ended | Integrated | N/A |
| "Cabling the SCSI-2 Single-Ended Controller FC 2831 and 2410" on page 4-24 | SCSI-2 | 7013-580/58H/590<br>7015-970/980 | Single-ended | Adapter | 4-4 |
| "Cabling the SCSI-2 Differential I/O Controller FC 2420" on page 4-28 | SCSI-2 | N/A | Differential | Adapter | 4-2 |
| "Cabling the SCSI-2 Single-Ended Fast/Wide Controller FC 2414, 2415, and 9216" on page 4-41 | SCSI-2 | 7013-59H<br>7012-G30/G40<br>7015-R30 | Single-ended/<br>Single-ended | Adapter | 4-7 |
| "Cabling the SCSI-2 and Enhanced SCSI-2 Differential Fast/Wide Controllers FC 2413, 2416, 9217, 2412, 9212, 2418, and 2419" on page 4-51 | SCSI-2 | 7013-J30 | Single-ended/<br>Differential | Adapter | 4-6 |
| Cabling for the Enhanced SCSI-2 Differential Fast/Wide Controller FC 2412, 9212, 2418 and 2419 uses the same cables as the "Cabling the SCSI-2 and Enhanced SCSI-2 Differential Fast/Wide Controllers FC 2413, 2416, 9217, 2412, 9212, 2418, and 2419" on page 4-51 | SCSI-2 | 7013-J30/J40/J50<br>7015-R40/R50 | Single-ended/<br>Differential | Adapter | 4-C |

# External SCSI Devices

The table below shows some characteristics of some External SCSI Devices:

| Machine Type / Model | Bus Width | Interface | Connectors |
|---|---|---|---|
| 7203 - 001 | 8 Bit | Single-ended | Single |
| 7204 - 001 | 8 Bit | Single-ended | Single |
| 7204 - 010 | 8 Bit | Single-ended | Dual |
| 7204 - 112 | 16 Bit | Single-ended | Dual |
| 7204 - 113 | 16 Bit | Single-ended | Dual |
| 7204 - 114 | 16 Bit | Single-ended | Dual |
| 7204 - 118 | 8 Bit | Single-ended | Dual |
| 7204 - 139 | 16 Bit | Single-ended | Dual |
| 7204 - 215 | 8 Bit | Differential | Dual |
| 7204 - 315 | 16 Bit | Differential | Dual |
| 7204 - 317 | 16 Bit | Differential | Dual |
| 7204 - 320 | 8 Bit | Single-ended | Single |
| 7204 - 325 | 16 Bit | Differential | Dual |
| 7204 - 339 | 16 Bit | Differential | Dual |
| 7204 - 402 | 16 Bit | Differential | Dual |
| 7204 - 404 | 16 Bit | Differential | Dual |
| 7204 - 409 | 16 Bit | LVD/SE | Dual |
| 7204 - 418 | 16 Bit | Differential | Dual |
| 7204 - 419 | 16 Bit | LVD/SE | Dual |
| 7205 - 311 | 16 Bit | Differential | Dual |
| 7205 - 340 | 16 Bit | Differential | Dual |
| 7206 - 001 | 8 Bit | Single-ended | Dual |
| 7206 - 005 | 8 Bit | Single-ended | Dual |
| 7206 - 110 | 8 Bit | Single-ended | Dual |
| 7206 - 220 | 16 Bit | LVD/SE | Dual |
| 7207 - 001 | 8 Bit | Single-ended | Single |
| 7207 - 011 | 8 Bit | Single-ended | Single |
| 7207 - 012 | 8 Bit | Single-ended | Single |
| 7207 - 122 | 8 Bit | Single-ended | Dual |
| 7207 - 315 | 16 Bit | Differential | Dual |
| 7208 - 001 | 8 Bit | Single-ended | Single |
| 7208 - 011 | 8 Bit | Single-ended | Single |
| 7208 - 341 | 16 Bit | Differential | Dual |
| 7209 - 001 | 8 Bit | Single-ended | Single |
| 7209 - 002 | 8 Bit | Single-ended | Dual |
| 7209 - 003 | 8 Bit | Single-ended | Dual |
| 7210 - 001 | 8 Bit | Single-ended | Single |
| 7210 - 005 | 8 Bit | Single-ended | Dual |
| 7210 - 010 | 8 Bit | Single-ended | Dual |
| 7210 - 015 | 8 Bit | Single-ended | Dual |
| 7210 - 020 | 8 Bit | Single-ended | Dual |
| 7331 - 205 | 16 Bit | Differential | Quad |
| 7331 - 305 | 16 Bit | Differential | Quad |
| 7332 - 005 | 8 Bit | Single-ended | Dual |
| 7332 - 110 | 8 Bit | Single-ended | Dual |
| 7332 - 220 | 16 Bit | LVD/SE | Dual |
| 7336 - 205 | 16 Bit | Differential | Quad |

| Machine Type / Model | Bus Width | Interface | Connectors |
|---|---|---|---|
| 7337 - 305 | 16 Bit | Differential | 4/6 |
| 7337 - 306 | 16 Bit | Differential | 4/6 |
| 7131 - 105 | 16 Bit | Single-ended | Single |
| 7131 - 105 | 16 Bit | Differential | Dual |

# General SCSI Considerations

### SCSI Terminators
– There must be exactly two terminators on the SCSI bus, and they must be located at each extreme end of the bus.
– If the configuration consists of a controller with external devices only (not high-availability), for all controllers except the SCSI-2 Fast/Wide Controller, connect the internal card edge terminator on the top edge connector of the SCSI-1 or SCSI-2 single-ended controller.  Connect the SCSI device terminator (D-shell connector) to the last device on the bus.
– If the configuration consists of internal devices only, for all controllers except the SCSI-2 Fast/Wide Controller, connect the external terminator to the external connector of the SCSI controller.  The internal cable contains a built-in terminator on the other end of the cable.
– If the configuration uses both internal and external devices, connect a terminator on the last external device on the bus, and use the internal cable with the built-in terminator.
– Some devices may be shipped with terminators attached.  Remove these terminators.
– Some terminators are referred to as FPT-3 or FPT-18.  The FPT stands for Forced Perfect Termination. Some cables integrate these terminators.

### SCSI Bus Length General Guidelines
SCSI bus length is defined as the distance between terminators at either end of an SCSI bus.

* For configurations using both internal and external cabling, length restrictions refer to the length from the end of the internal cable (terminator) to the terminator on the last device on the external bus.

* Devices such as the 9334 - 010 or 9334 - 500 require a dedicated external SCSI-1 or SCSI-2 controller.

* Devices which have two SCSI connectors have internal cabling which must be included when calculating total cable length.  When connecting these devices, connect one cable into one connector and the other cable (or terminator, if this is the last device on the bus) to the second connector.  Do not "piggy back" the second cable/terminator onto the first as you would on a device with only one connector.  See illustration below.

Single-Ended External Narrow Bus

This "piggy back" connector is
not to be used if it is attached
to a two connector device.

Use this connector
to attach a cable
or terminator          .

one connector device          two  connector device
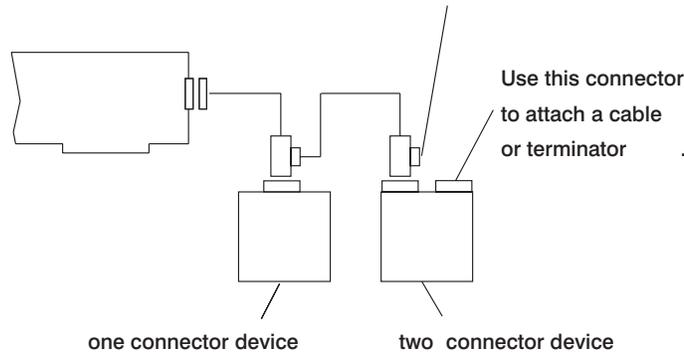
## SCSI Device Addresses or IDs

The SCSI-1 and SCSI-2 single-ended controllers support a maximum of eight SCSI addresses.

- For any single-controller configuration, a maximum of seven additional devices are permitted, providing that the supported configuration specific bus lengths are not exceeded.  Other restrictions such as bus length may further limit the number of allowable devices.

- For two-controller configurations (high-availability), up to six devices are permitted, providing that the supported configuration specific bus lengths are not exceeded. Other restrictions such as bus length may further limit the number of allowable devices.

- The SCSI bus address determines priority on the bus. Address priority from the highest to the lowest is as follows:

    - 7, ..0, 15,...8 (address 15 to 8 are only used on SCSI-2 wide buses).  Address 7, the highest priority, must always be assigned to the controller.  In general, assign the fastest devices the lowest priority. Disk drives should be assigned IDs in the range of 0 to 3; CD-ROMS in the range of 3 to 4, and tapes in the range of 4 to 6 (addresses 15 to 8 can also be used on SCSI-2 wide buses as additional lower-priority addresses)

- The default ID of the SCSI controller in a single controller configuration is 7.  All devices on that bus must have a unique ID from 0 to 6 (8 to 15 are also valid if SCSI-wide); two different devices may not have the same SCSI ID.  In the high-availability configurations, the second controller must have its address changed to avoid conflicts.

**Note:**  The SCSI address switch for each device must be set while power to the system unit is off.  The operating system determines the system configuration during IPL. If an SCSI address is changed after the operating system is loaded, the operating system must be stopped and loaded again to have the correct configuration. Standalone diagnostics always default to a SCSI ID of 7 when testing SCSI controllers and devices.  Choosing SCSI IDs other than 7 for both controllers prevents any problems when using standalone diagnostics on systems in HA clusters or in multi-initiator configurations.  Please check the SCSI documentation

for your specific SCSI subsystem to insure that there are no ID conflicts if the adapters are addressed at ID (s) other than 6 and 7.

To determine what SCSI addresses are available you must know what SCSI addresses are already in use. The following are several ways to do this:

- If the system is operational and AIX is loaded and configured,use the **lsdev -C -s scsi** (where the l in lsdev is a lowercase L) command to list all of the devices in the Customized Devices Object Class. The list shows name, status, location (the software location code), and the description.

- Use customer planning information supplied by the customer.

- Use the "About Your Machine" listing that was shipped with your system unit to determine the internal device addresses.

- Physically check each device address. Refer to Chapter 2 of this book to identify the SCSI address jumpers or switches.

## Overload Protection and Terminator Power (Term Power)

The SCSI controllers provide term power for the SCSI bus; connect devices to the bus so they do not provide term power. The controller uses either a fuse that must be replaced after failure, or a positive temperature coefficient (PTC) resistor that resets within five minutes after the overload cause is removed. SCSI-2 controllers all use a PTC resistor.

- Do not connect or disconnect any SCSI device while power is on. Such "hot plugging" is forbidden because this practice may blow the controller fuse, trip the PTC resistor, corrupt data or permanently damage SCSI controller chips in controllers or devices.

- The fuse or PTC on an SCSI controller protects the external and internal SCSI bus. The fuse may be blown or the PTC tripped by a defective cable, terminator, or device attached to the controller, but not by a defective controller.

## Controller Access Time

- Consider the following to keep controller access time within reasonable limits:

  - Have the disk being backed up and the backup device on separate controllers

  - Attach four or fewer disk drives to the same SCSI-1 controller and six or fewer disk drives to a SCSI-2 controller.

  - If possible have the high-usage disk drives (such as operating system drives) on the same controller with low-usage devices to improve access time.

# Cabling the SCSI I/O Controller FC 2828, 2829, and 2835

To understand the cabling for this controller, read "General SCSI Considerations" on page 4-5, then read the following for specific information.

### As Required Engineering Change (EC)

For all machines shipped prior to 16 May 1991 (and for some machines shipped between 17 May and 14 June 1991), any SCSI-1 High Performance Controller that has an internally installed SCSI device connected to the card edge connector can only have two externally attached devices. If the customer having this configuration wishes to use more than two external devices, an "As Required Engineering Change (EC)" which provides a new internal cable is available at no charge upon request by service personnel.

This EC is not required if only external devices are attached.

Grey-colored internal terminators crimped on the internal SCSI ribbon cable indicate that the EC has been installed; pre-EC terminators are blue or black.

## SCSI-1 Single-Ended Cable Lengths Using this Controller

SCSI-1 single-ended cabling should be accomplished in accordance with the following criteria and machine type specifications.

**Note:** SCSI cable length maximums must be carefully observed to avoid transmission line mismatch problems.

- The maximum length of a chain of SCSI devices and cables is 6 m (19.7 feet). This maximum length includes the internal cabling of a device that has two connectors.

- For systems with both internal and external cables, the 6 m (19.7 feet) maximum is defined as the distance from the internal terminator to the external terminator.

## Cable and Terminator Tables for SCSI-1 I/O Controller

The following tables and examples aid in properly cabling a SCSI bus.

### System Internal Cable Lengths

| Machine Type | Feature Code | Description | Cable Length (meters) |
|---|---|---|---|
| 7012/320/32H | 2828 | Disk drive SCSI Option | 0.5 |
| 7013 thru 560 | * | First card, with internal devices | 3.67 |
| 7013 | 2829 | Second card, with internal devices | 1.56 |
| 7015/930/950 | * | Length inside CPU drawer | 1.2 |
| 7016 | * | | 2.37 |
| **Note:**<br> * These cables ship with the base machine and cannot be ordered separately | | | |

**Note:** All differential cables are terminated at the end of the cable farthest from the SCSI controller.

## Controller-to-First Device Cables

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| Host System | 2832 | Controller-to-first-device (where the first device has one connector) | 70F9733 31F4221 | 1.57 |
| 7204-010 7206-005 7209-002 7210-005 | 2837/ 9123 | Controller-to-first-device (where the first device has two connectors.) | 33F4606 | 1.5 |
| 9334 | 2919 2917 | Controller-to-9334/500 | 07G5143 07G5127 | 2.38 1.57 |
| Host System 9334 | 2832 9205 9203 | Controller-to-9334/010 or media drawer (7015 system) | 71F1072 31F4223 71F1073 31F4224 | 2.38 1.48 |
| 9334 | 9210 | Controller-to-1/2 inch, 9-track tape drive (7015 system) or Controller-to-9334-010 | 00G1278 | 4.75 |

**Note:** The 70F9733, 71F1072, and 71F1073 cables are no longer manufactured, but are still usable, the 70F9733 is limited to four external devices maximum.

## Device Internal Cable Lengths

| Device | Cable Length (meters) |
|---|---|
| 7203, 7204, 7206,-1 7207, 7208, 7209-1, 7210 | Negligible |
| 7206-5, 7209-2 | .25 |
| 9348 | Negligible |
| 9334-010 | 1.0 |
| 9334-500 | 2.66 |
| 7015 Media Drawer | 3.1 |

## Device-to-Device Cables

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| Host System | 3130 | Device-to-device (where second device has one connector) | 70F9734/ 31F4222 | 0.66 |
| 7204-010 7206-005 7209-002 7210-005 | 2840/ 9126 | Device-to-device (where second device has two connectors) | 33F4607 | 0.7 |

**Note:** The 70F9734 cable is no longer manufactured, but still usable if no more than 4 external devices are attached.

# Terminators for Use with this Controller

### Card Edge
An SCSI card edge terminator is required when no internal cable or SCSI device is attached.  This terminator is installed on the top edge of the SCSI card.

| Terminator Description | Part Number |
|---|---|
| Card edge, non-FPT | 70F9900 |
| Card edge, FPT-3 | 00G0972 |

**Note:**  The 70F9900 terminator is no longer manufactured, but still usable if no more than 2 external devices are attached.

### Card External
A SCSI card external terminator is required when no external cable or SCSI device is attached.  This terminator attaches to the SCSI card external bus connector on the rear edge of the SCSI card.

| Terminator Description | Part Number |
|---|---|
| 60-pin, external | 15F6743 |

### Single-Ended External
An SCSI external terminator is required when any external cable or SCSI device is attached.  This terminator is attached at the external end of the bus.

| Terminator Description | Part Number |
|---|---|
| 50-pin, Low-density, external, non-FPT | 70F9671 |
| 50-pin, Low-density, external, FPT-3 | 00G0968 |
| 50-pin, Low-density, external, FPT18C | 52G4260 |

**Notes:**

1. The 70F9671 terminator is no longer manufactured, but it is still usable if no more than four external devices are attached.

2. The 52G4260 terminator was released as a common replacement for all of the single-ended terminators.  It replaces the FPT-3 part number 00G0968, the FPT-18 part number 43G0467, and the FPT-18 part number 51G7736.  All of these terminators are still usable; new installations and field replacements are supplied with the new 52G4260 terminator.

# Cabling Examples

### Example 1:
Connect a 7207 1/4-inch tape drive and a 7010 CD-ROM to a 7013/530 system; there are two SCSI devices inside the covers, already connected to the SCSI card.

**Solution:**

From the tables on the previous two pages, the following cable lengths are obtained:

- System Internal SCSI Cable Lengths: internal length 3.67 m
- SCSI Device Internal Cable Length: 7207 internal length negligible
- SCSI Device Internal Cable Length: 7210 internal length negligible
- SCSI External Cable length: controller-to-first-device(31F4221) 1.57
- SCSI External Cable length: device-to-device (31F4222) 0.66 m

   **Total**      **5.90 m**

The internal cable has a terminator on the end of the bus, internal to the system unit. Terminator (P/N 00G0968) should be connected after the last external device to terminate the other end of the bus. Note that a third external device cannot be connected on this bus, as the length would exceed 6 meters.

**Example 2:**

Connect a 7207 1/4-inch tape drive and a 7210 CD-ROM to a 7013/530 system that already has seven devices connected to the base SCSI controller.

**Solution:**

Add another controller as follows. From the SCSI length tables on previous pages, the following cable lengths are obtained:

- SCSI Device Internal Cable Length: 7207 internal length negligible
- SCSI Device Internal Cable Length: 7210 internal length negligible
- SCSI External Cable length: controller-to-first-device(31F4221) 1.57
- SCSI External Cable length: device-to-device (31F4222) 0.66 m

   **Total**      **2.23 m**

An SCSI card edge terminator (PN 00G0972) should be attached to the top edge connector of a second SCSI card, in order to terminate the end of the bus at the SCSI controller. Terminator (PN 00G0968) should be connected after the last external device to terminate the other end of the bus.

**Example 3:**

Add an internal 400MB disk drive to a 7012/32H system that already has one internal 320MB disk drive on the SCSI bus.
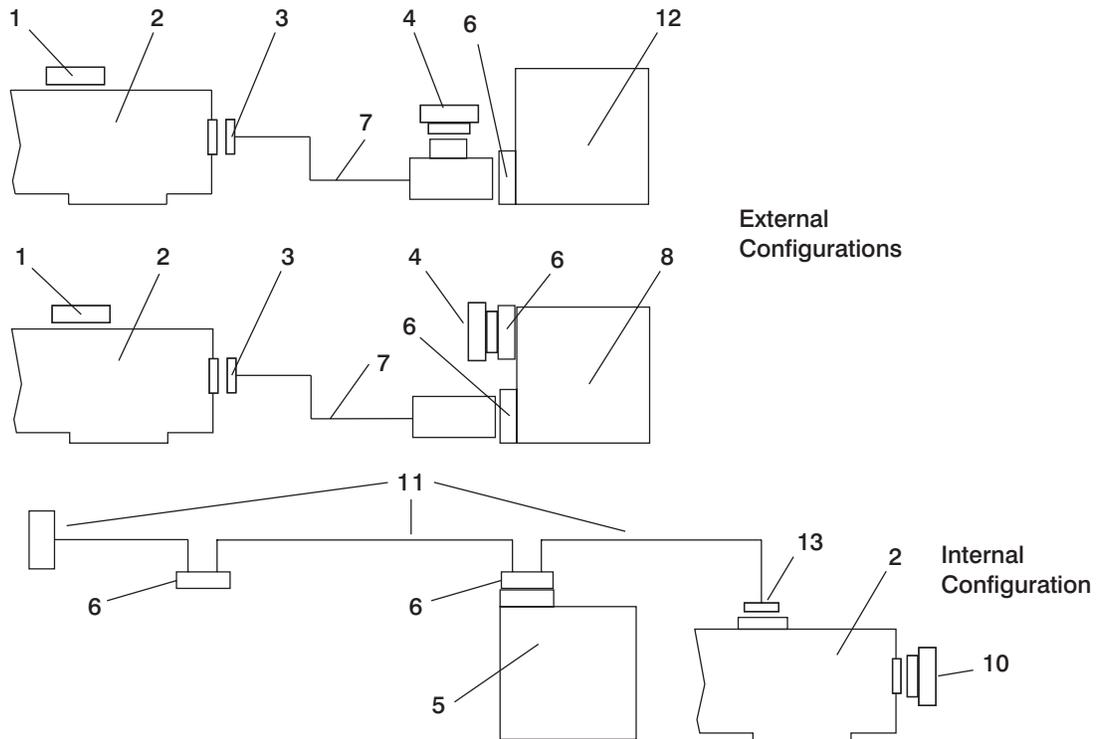
**Solution:**

- Connect the 400MB disk drive to the SCSI bus.

From the SCSI length tables on previous pages, the following cable lengths are obtained:

- SCSI Device Internal Cable Length: 0.5 m
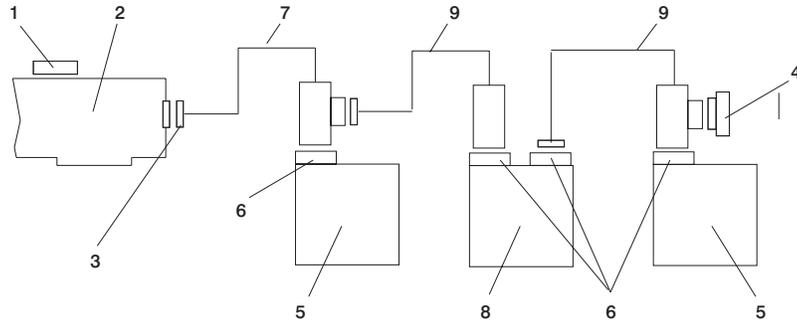  7012 internal length

   **Total**      **0.5 m**

The internal cable should already have a terminator on the bus end that is internal to the system unit. A second terminator (PN 15F6743) should already be connected to the SCSI controller external bus connector terminating the other end of the bus.



External Configurations

Internal Configuration

| Item Number | SCSI-1 Part Number | SCSI-2 Part Number | Description |
|---|---|---|---|
| 1 | 00G0972 | 00G0972 | 50-position card edge terminator |
| 2 | 51G9425 | | SCSI-1 I/O controller (labelled "4-1" near external connector) |
| | | 52G7509 11H4779 | SCSI-2 I/O controller (labelled "4-4" near external connector) |
| 3 | | | 60-position SCSI-1/50-position SCSI-2 connector |
| 4 | 00G0968 or 52G4260 | 51G7736 or 52G4260 | 50-position SCSI external terminator |
| 5 | | | One-connector type SCSI internal device |
| 6 | | | 50-position SCSI connector |
| 7 | 31F4221 70F9733 | 32G0397 | Dual-connector type controller-to-device SCSI cable (attaches single connector devices) |
| | 33F4606 | 8191425 | Single-connector type controller-to-device cable (attaches two connector devices) |
| 8 | | | Two-connector type SCSI devices |
| 10 | 15F6743 | | 60-position SCSI external terminator |
| | 51G7737 or 52G4259 | | 50-position high-density SCSI-2 single-ended external terminator |

| Item Number | SCSI-1 Part Number | SCSI-2 Part Number | Description |
|---|---|---|---|
| 11 | | | Internal SCSI disk drive cable and terminator assembly |
| 12 | | | One-connector type SCSI device |
| 13 | | | 50-position card edge SCSI connector |

## Attaching Multiple SCSI Single-Ended Devices



| Item Number | SCSI-1 Part Number | SCSI-2 Part Number | Description |
|---|---|---|---|
| 1 | 00G0972 | 00G0972 | 50-position card edge terminator |
| 2 | 51G9425 | | SCSI-1 I/O controller (labelled "4-1" near external connector) |
| | | 52G7509 11H4779 | SCSI-2 I/O controller (labelled "4-4" near external connector) |
| 3 | | | 60-position SCSI-1/50-position SCSI-2 connector |
| 4 | 00G0968 or 52G4260 | 51G7736 or 52G4260 | 50-position SCSI external terminator |
| 5 | | | One-connector type SCSI internal device |
| 6 | | | 50-position SCSI connector |
| 7 | 31F4221 or 70F9733 | 32G0397 | Dual-connector type controller-to-device SCSI cable (attaches single connector devices) |
| 8 | | | Two-connector type SCSI device |
| 9 | 31F4222 | 31F4222 | Dual-connector type device-to-device cable (attaches single connector devices) |
| | 33F4607 | 33F4607 | Single-connector type device-to-device cable (attaches two connector devices) |

# High-Availability SCSI-1 and SCSI-2 Single-Ended Cabling

**Attention:** The following high-availability section describes supported hardware configurations.  These configurations may not be supported by your software application.  Be sure that your software application supports these configurations before attempting to use them.

**Note:**  The passthrough terminator cables are no longer available except through RPQ 8A0759 for the SCSI-1 controller and RPQ 8A0758 for the SCSI-2 controller.  The recommended high-availability SCSI configuration is the SCSI-2 differential controller and subsystems.

The high-availability configuration has important prerequisites:

- No internal SCSI single-ended devices may be attached to either SCSI single-ended controller used in the high-availability configuration.

**Note:**  1. The integrated SCSI function found on the planar of certain models, such as 7012/340/350, cannot be used for high-availability.  To achieve high-availability on these models, separate SCSI-1 Single-Ended, SCSI-2 single-ended, or SCSI-2 differential controllers must be used.
2. The recommended high-availability SCSI configuration is the SCSI-2 differential controller and differential subsystem.

- No internal terminators may be used on either SCSI single-ended I/O Controller.

- Jumper J1 (2 pieces) or P3 (2 pieces) must be moved, refer to Chapter 1, "Adapter Information" on page 1-1.

- A Passthrough Terminator, Controller-to-First-Device Cable must be used from each SCSI single-ended  I/O Controller to the first SCSI single-ended device at each end of the device chain. (Only available through RPQ.)

- High-availability software must be installed on both system units.

- A specific device-to-device cable (listed below) should be used.

**Note:**  The termination of the SCSI single-ended chain is continued by the Passthrough Terminator in the event that one host becomes disconnected.
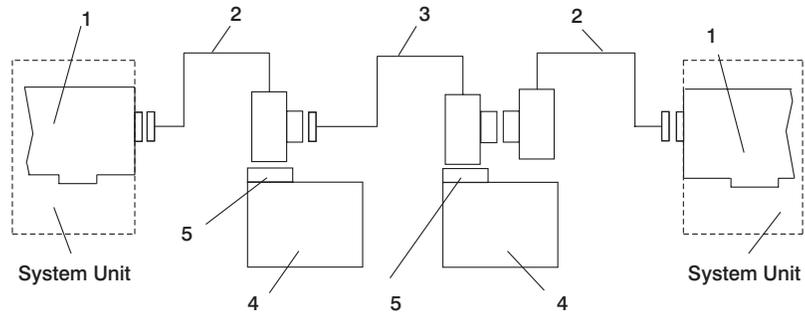
| Item<br>Number | SCSI-1<br>Part<br>Number | SCSI-2<br>Part<br>Number | Description |
|---|---|---|---|
| 1 | 51G9425 | | SCSI-1 I/O controller (labelled "4-1" near external connector) |
| | | 52G7509<br>11H4779 | SCSI-2 I/O controller (labelled "4-4" near external connector) |
| 2 | 00G0959 | 51G8568 | Passthrough Terminator,Controller-to-First- Device Cable |
| | 70F9171 | | 9334/500 attachment |
| 3 | 31F4222 | 31F4222 | Device-to-device cable for single connector devices |
| 4 | | | One-connector type SCSI device |
| 5 | | | 50-position SCSI connector |

# Cabling the SCSI-2 Fast/Wide Integrated Controller for Machine Type 7012 Models 380/390/39H and 7030 Models 3AT/3BT/3CT

To understand the cabling for this controller, read "General SCSI Considerations" on page 4-5, then read the following for specific information.

There are two unique considerations when cabling this controller:

- There are actually two separate SCSI controllers, thus enabling the internal and external SCSI buses to be completely independent. Because of this independence, the internal cable length and number of internally attached devices need not be considered when cabling external devices. This is different from previous designs and makes cabling considerations simpler.

- The internal bus is a 16-bit bus and the external bus is a 16-bit bus.

Physical differences between the wide bus (16-bit) and the narrow bus (8-bit) are:

| Wide Bus (16-bit) | Narrow Bus (8-bit) |
|---|---|
| Uses a 68 conductor cable. | Uses a 50 conductor cable. |
| Can attach either wide (16-bit) or narrow (8-bit) devices to the internal bus (narrow devices only have narrow (8-bit) performance). Can attach either all wide or all narrow devices to the external bus. | Can only attach to narrow devices. |
| 4 address bits, allowing for 16 unique addresses. | 3 address bits, allowing for 8 unique addresses. |

**Note:** AIX 3.2.5 with the appropriate PTFs supports only SCSI IDs from 0 to 7, limiting the number of device attachments to 7 per bus. The default SCSI address of this controller is 7.

## SCSI-2 Single-Ended External Cable Lengths Using This Controller

SCSI-2 single-ended cabling should be accomplished in accordance with the following criteria and machine-type specifications. SCSI cable length maximums must be carefully observed to avoid transmission line mismatch problems.

Due to increased maximum data rates in systems with SCSI-2 fast devices, the SCSI-2 single-ended bus length is 3 meters (9.9 ft) maximum. This maximum length includes the internal cabling of a device that has two connectors. All configurations incorporating OEM devices are restricted to a 3 meter (9.9 ft) maximum length. However, certain configurations using supported devices with specialized termination allow longer bus lengths. The following bulleted items indicate the only supported configurations that are longer than 3 meters:

- With this integrated controller, an SCSI bus length of 3.75 m (12.3 ft) may be achieved using part numbers 52G4231 or 92F2559 and 31F4222 or 35F4607 to attach up to 4 external (supported) SCSI devices in a narrow bus implementation.
- With this integrated controller a maximum SCSI bus length of 5.04 m (16.53) may be achieved using part number 52G4232 or 88G5755 to attach a 9334/500 to a 7012 system.

**Note:** Appropriate terminators are also required.

# Cable and Terminator Tables for the SCSI-2 Single-Ended Fast/Wide Integrated Controller

The following tables and examples are provided as an aid to properly cable an SCSI-2 single-ended bus.

### System Internal Cable Lengths
Because this controller has separate internal and external SCSI buses, the internal cable lengths need not be considered when attaching external SCSI devices.

### Controller-to-First Device Cables
Refer to "Controller-to-First Device Cables" on page 4-42.

### Device Internal Cable Lengths
Refer to "Device Internal Cable Lengths" on page 4-9 for information on narrow bus devices.

### Device-to-Device Cables
Refer to "Device-to-Device Cables" on page 4-9 for information on narrow bus cables, or on page 4-44 for information on wide bus cables.

### Terminators for Use with This Controller

#### Internal Cabling
This controller has an onboard terminator for the internal bus; if the internal bus is not used, there is no need for additional internal terminators. If the internal bus is used, terminator P/N 88G3977 should be attached at the end of the internal cable.

#### External Cabling
The controller has an onboard terminator for the external bus; no additional external terminators are needed if this bus is not being used.

An SCSI-2 single-ended external terminator is required when any external cable or device is attached. Refer to Terminator Description table on page 4-44.

### Cable Examples for the SCSI-2 Single-Ended Fast/Wide Integrated Controller
The cable examples in the section "Cable Examples for the SCSI-2 Single-Ended Fast/Wide Controller" on page 4-45 can be used as a reference for internal and external device attachments.

### High-Availability SCSI-2 Integrated Controller
High-availability is not supported with this controller.

# Cabling the SCSI-1 Integrated Controller for Machine Types 7012, 7013, and 7015

To understand the cabling for this controller, read "General SCSI Considerations" on page 4-5, then read the following for specific information.

## SCSI-1 Single-Ended Cable Lengths Using this Controller

SCSI-1 single-ended cabling should be accomplished in accordance with the following criteria and machine type specifications.

**Note:** SCSI cable length maximums must be carefully observed to avoid transmission line mismatch problems.

- The maximum length of a chain of SCSI devices and cables is 6 m (19.7 feet). This maximum length includes the internal cabling of a device that has two connectors.

- For systems with both internal and external cables, the 6 m (19.7 feet) maximum is defined as the distance from the internal terminator to the external terminator.

## Cable and Terminator Tables for the SCSI-1 Integrated Controller

The following tables and examples are provided as an aid to properly cable an SCSI bus.

### System Internal Cable Lengths

| Machine Type | F/C | Description | Cable Length (meters) |
|---|---|---|---|
| 7012-340 to 375 | * | Integrated SCSI cable | 0.5 |
| 7013-(all except 550L), 570 and 580 shipped before 7/1/93 | * | Integrated SCSI cable | 3.45 |
| 7013-550L | * | Integrated SCSI cable | 3.85 |
| 7013-580/58H/590 shipped after 7/1/93 | * | Integrated SCSI cable | 1.95 |
| 7015-970/980 | * | Integrated SCSI cable externally attaches to media drawer | 1.57 |
| 7015-97B/98B/990/ R10/R20/R24 | * | No external connection to integrated SCSI | |
| **Note:** * These cables ship with the base machine and cannot be ordered separately ||||

## Controller-to-First Device Cables

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| Host System | 2833 | Integrated SCSI controller-to-first-device (where first device has one connector) | 32G0397 | 1.57 |
| 7204-010 7206-005 7209-002 7210-005 | 2838/ 9124 | Integrated SCSI controller-to-first-device (where first device has two connectors) | 8191425 | 1.5 |
| 9334 | 2918 | Integrated SCSI controller-to-9334/500 | 70F9188 | 1.48 |

### Device Internal Cable Lengths
Refer to "Device Internal Cable Lengths" on page 4-9.

### Device-to-Device Cables
Refer to "Device-to-Device Cables" on page 4-9.

### Terminators for Use with this Controller
This controller has an internal terminator built into the controller.

#### Controller Output Connector
An SCSI card external terminator is required when no external cable or SCSI device is attached. This terminator attaches to the SCSI controller external bus connector on the rear edge of the box.

| Terminator Description | Part Number |
|---|---|
| 50-pin, high-density, external, FPT-3 | 00G2223 |
| 50-pin, high-density, external, FPT18C | 52G4259 |

**Note:** The 52G4259 terminator was released as a common replacement for all of the single-ended terminators. It replaces the FPT-3 part number 00G2223, part number 51G7737, and the FPT-18 part number 43G0378. All of these terminators are still usable; new installations and field replacements are supplied with the new 52G4259 terminator.

#### SCSI-1 Single-Ended External
An SCSI external terminator is required when any external cable or SCSI device is attached. This terminator is attached at the external end of the bus.

| Terminator Description | Part Number |
|---|---|
| 50-pin, low-density, external, non-FPT | 70F9671 |
| 50-pin, low-density, external, FPT-3 | 00G0968 |
| 50-pin, low-density, external, FPT18C | 52G4260 |

**Note:** The 52G4260 terminator was released as a common replacement for all of the single-ended terminators. It replaces the FPT-3 part number 00G0968, the FPT-18 part number 43G0467, and the FPT-18 part number 51G7736. All of these terminator are still usable; new installations and field replacements are supplied with the new 52G4260 terminator.

# Cable Examples for the Integrated Controller

The cable examples in "Cabling Examples" on page 4-10 can be used as reference for device-to-device attachment. Substitute the above integrated controller-to-device cables for the controller-to-device cables in the examples.

# High-Availability SCSI-1 Integrated Controller

High-availability is not supported with this controller.

# Cabling the SCSI Integrated Controller for Machine Types 7006, 7008, 7009, and 7011

**Note:** To understand the cabling for this controller, read "General SCSI Considerations" on page 4-5, then read the following for specific information.

## SCSI Single-Ended Cable Lengths

SCSI single-ended cabling should be accomplished in accordance with the following criteria and machine type specifications. The maximum lengths stated below include the internal cabling of any device that has two connectors.

- For the 7006, and 7009 controllers, the total cable length is limited to 3 m (9.8 ft) which allows a maximum of two external devices.

- For the 7008 and 7011-220/230 controllers, the maximum cable length is 6 m (19.7 ft).

- For 7011-250 controllers, if any SCSI-2 device is attached, the total cable length is limited to 3 meters which allows a maximum of 3 external devices. If only SCSI-1 devices are attached (internally or externally) on the SCSI bus the total cable length is limited to 6 m (19.7 ft).

## Cable and Terminator Tables for this Controller

The following tables and examples aid in properly cabling a SCSI bus.

### System Internal Cable Lengths

| Machine Type | Notes | Cable Length (meters) |
|---|---|---|
| 7006 | Integrated SCSI length | .76 |
| 7008 | Integrated SCSI length | Negligible |
| 7009 | Integrated SCSI length | .76 |
| 7011 | Integrated SCSI length | .2 |

**Note:** These controllers have an internal terminator.

### Controller-to-First Device Cables

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| Host System | 2833 | Integrated SCSI controller-to-first-device (where first device has one connector) | 32G0397 | 1.57 |
| 7204-010 7206-005 7209-002 7210-005 | 2839/9125 | Integrated controller-to-first-device (where first device has two connectors) | 8191425 | 1.5 |

## Device Internal Cable Lengths

Refer to "Device Internal Cable Lengths" on page 4-9.

## Device-to-Device Cables

Refer to "Device-to-Device Cables" on page 4-9.

## Terminators for Use with This Controller

The single-ended controller has an internal terminator built into the controller.

### Controller Output Connector

An SCSI card external terminator is required when disk drive is installed in the box and no external cable or SCSI device is attached. This terminator attaches to the SCSI controller external bus connector on the rear edge of the box.

| Terminator Description | Part Number |
|---|---|
| 50-pin, high-density, external, FPT-18 | 43G0378 |
| 50-pin, high-density, external, FPT-18+ | 51G7737 |
| 50-pin, high-density, external, FPT18C | 52G4259 |

**Note:** The 52G4259 terminator was released as a common replacement for all of the single-ended terminators. It replaces the FPT-3 part number 00G2223, part number 51G7737, and the FPT-18 part number 43G0378. All of these terminators are still usable; new installations and field replacements are supplied with the new 52G4259 terminator.

### SCSI-1 Single-Ended External

An SCSI external terminator is required when any external cable or SCSI device is attached. This terminator is attached at the external end of the bus.

| Terminator Description | Part Number |
|---|---|
| 50-pin, low-density, external, FPT-18 | 43G0467 |
| 50-pin, low-density, external, FPT-18+ | 51G7736 |
| 50-pin, low-density, external, FPT18C | 52G4260 |

**Note:** The 52G4260 terminator was released as a common replacement for all of the single-ended terminators. It replaces the FPT-3 part number 00G0968, the FPT-18 part number 43G0467, and the FPT-18 part number 51G7736. All of these terminators are still usable; new installations and field replacements are supplied with the new 52G4260 terminator.

## Cabling Examples

The cable examples in "Cabling Examples" on page 4-10 can be used for reference for device-to-device attachment. Substitute the above integrated controller-to-device cables for the controller-to-device cables in the examples. Use the above terminators in place of the terminators in the examples

## High-Availability with this Controller

High-availability is not supported with this controller.

# Cabling the SCSI-2 Single-Ended Controller FC 2831 and 2410

To understand the cabling for this controller, read "General SCSI Considerations" on page 4-5, then read the following for specific information.

## SCSI-2 Single-Ended Cable Lengths Using this Controller

SCSI-2 single-ended cabling should be accomplished in accordance with the following criteria and machine type specifications.

**Note:** SCSI-2 single-ended cable length maximums must be carefully observed to avoid transmission line mismatch problems.

- Due to increased maximum data rates, the SCSI-2 single-ended bus length is specified to be 3 m (9.9 ft.) maximum. This maximum length includes the internal cabling of a device that has two connectors. All configurations incorporating OEM devices are restricted to 3 m maximum length. However, certain configurations with specialized termination allow longer bus lengths. The following configurations are the only supported configurations that are longer than 3 meters.

  **Note:** The following referenced part numbers are cables only; terminators are also required.

  For cable lengths and feature codes a specific reference is listed immediately following the cable part number. If no reference is made immediately following the part number, see "Cable and Terminator Tables for SCSI-2 Single-Ended Controller" on page 4-25.

  – An SCSI bus length of 3.75 m (12.3 ft) may be achieved using Part Numbers 32G0397 and 31F4222/33F4607 (refer to "Device-to-Device Cables" on page 4-9) to attach up to four external, supported SCSI devices to a 7011, 7012 or 7013 system.

  – An SCSI bus length of 4.25 m (13.9 ft) may be achieved using Part Numbers 51G857 (or 52G7451) an internal six-drop cable, 32G0397, and 31F4222 to attach up to two supported SCSI devices on the external bus, together with up to six SCSI devices on the internal bus, to a 7013 system.

  – An SCSI bus length of 5.2 m (17.1 ft) may be achieved using Part Number 45G2858 to attach a 9334-500 to a 7011, 7012 or 7013 system.

  – An SCSI bus length of 5.5 m (18 ft) may be achieved using Part Number 45G2858 to attach to a 6100 Drawer containing only new feature code 2555 1GB disk drives (1GB disk drives shipped before 8/17/93 do not work), or feature code 2580 2GB disk drives, or any SCSI-1 disk drives.

  – A SCSI bus length of 5.9 m (19.3 ft) may be achieved using Part Number 51G8569 to attach a 9334-010 to a 7015 system.

  **Note:** The total number of attached SCSI devices must be seven or fewer.

- For systems with both internal and external cables, the maximum length is defined as the distance from the internal terminator to the external terminator.

# Cable and Terminator Tables for SCSI-2 Single-Ended Controller

The following tables and notes aid in properly cabling an SCSI-2 single-ended bus. For diagram examples, refer to pages 4-12 and 4-13.

## System Internal Cable Lengths

The SCSI-2 Single-Ended controller is included with the 7013-580's that were shipped after 7/1/93. Only two external devices can be attached to this controller using part numbers from table "Controller-to-Device Cables" and part numbers from table "Device-to-Device Cables" on page 4-9 to attach the external devices.

The SCSI-2 Single-Ended controller is included with all 970B's and 980B's to drive the internal disk drives, no external devices can be attached to this controller.

## Internal Cables for 5XX Models

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| SCSI-2 Con-troller | 2831 | Internal six-drop cable and attached terminator | 52G7451 | 1.86 |
| * | * | Internal six-drop cable and attached terminator | 51G8571 | 1.81 |
| **Note:** * This cable has been replaced by 52G7451. | | | | |

## Controller-to-Device Cables

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| Host System | 2836 | Controller-to-first-device (where first device has one connector) | 32G0397 | 1.57 |
| 7204-010 7206-005 7209-002 7210-005 | 2838/ 9124 | Controller-to-first-device (where first device has two connectors) | 8191425 | 1.57 |
| 9334 | 9211 | Controller-to-9334-010 | 51G8569 | 4.75 |
| | 2920 | Controller-to-9334-500 | 45G2858 | 2.38 |

## Device Internal Cable Lengths

Refer to "Device Internal Cable Lengths" on page 4-9.

## Device-to-Device Cables

Refer to "Device-to-Device Cables" on page 4-9.

# Terminators for Use with this Controller

### Card Edge

An SCSI-2 single-ended card edge terminator is required when no internal cable is attached.  This terminator is installed on the top edge of the SCSI card.

| Terminator Description | Part Number |
|---|---|
| Card edge, FPT-3 | 00G0972 |

### Card External

An SCSI-2 single-ended card external terminator is required when no external cable is attached.  This terminator attaches to the SCSI single-ended card external bus connector on the rear edge of the SCSI-2 single-ended card.

**Note:**  The SCSI-2 single-ended controller is labelled "4-4" near the external connector, and the terminator is labelled "SCSI-2 SE".

| Terminator Description | Part Number |
|---|---|
| 50-pin, high-density, external, FPT-18+ | 51G7737 |
| 50-pin, high-density, external, FPT18C | 52G4259 |

**Note:**  The 52G4259 terminator is used in place of the 51G7737 terminator; the 51G7737 terminator is still usable.

### External Terminator

An SCSI-2 single-ended external terminator is required when any external cable or device is attached (except for 9334/010 attachment or high-availability configuration).  This terminator is attached at the external end of the bus, and  is labelled "SCSI-2 SE".

| Terminator Description | Part Number |
|---|---|
| 50-pin, low-density, external, FPT-18+ | 51G7736 |
| 50-pin, low-density, external, FPT18C | 52G4260 |

**Note:**  The 52G4260 terminator is used in place of the 51G7736 terminator; the 51G7736 terminator is still usable.

# Cabling Examples for the SCSI-2 Single-Ended Controller

# High-Availability SCSI-2 Single-Ended Cabling

**Attention:** The following high-availability section describes supported hardware configurations.  These configurations may not be supported by your software application.  Be sure that your software application supports these configurations before attempting to use them.

**Note:**  Passthrough terminator cables are no longer available except through RPQ 8A0758 for the SCSI-2 controller.  The recommended high-availability SCSI configuration is the SCSI-2 differential controller and subsystems.

The high-availability configuration has important prerequisites:

- No internal SCSI single-ended devices may be attached to either SCSI single-ended controller used in the high-availability configuration.

- No internal terminators may be used on either SCSI single-ended I/O Controller.

- Jumper P3 (2 pieces) must be moved.

- High-availability software must be installed on both system units.

**Note:** The only approved high-availability configuration using this Controller is using the following cables to attach up to two external supported SCSI devices that are shared by any two 7011, 7012, or 7013 systems.

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|----|-----|------------------|-------------|------------------------|
| * | N/A | Passthrough terminator, controller-to-device | 51G8568 | 1.57 |
| Host System | 3130 | Device-to-device | 31F4222 | .66 |

* This cable is available only as an RPQ.

**Note:** See cabling examples in "High-Availability SCSI-1 and SCSI-2 Single-Ended Cabling" on page 4-14.

# Cabling the SCSI-2 Differential I/O Controller FC 2420

SCSI-2 I/O controllers may be of single-ended or differential SCSI bus signal driver design. Differential devices cannot be attached to single-ended controllers and single-ended devices cannot be attached to differential controllers.

## Identifying SCSI-2 Differential Components

**Note:** SCSI controllers, devices, enclosures, and cables that are not marked with reference to single-ended or differential design should be considered as single-ended.

- Differential controllers are labeled Differential SCSI on the rear controller bracket.

- Differential devices are labeled Differential SCSI as near as possible to the appropriate connector.

- Differential enclosures are labeled Differential SCSI as near as possible to appropriate internal and external connectors. Differential enclosure access panels that must be removed to allow access to devices or cables are labeled: All internal SCSI devices and cables are Single-ended SCSI.

## OEM Components

OEM devices may be marked with one of the following ANSI icons:



*Single-Ended*
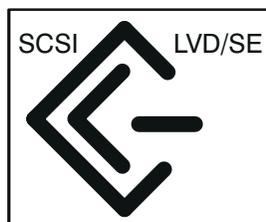


*Differential*



*Low Voltage Differential/*
*Single-Ended*

# SCSI-2 Differential Bus Lengths Using This Controller

Differential SCSI bus length is defined as the distance between terminators at either end of a SCSI bus.

- For configurations using external cabling, length restrictions refer to the length from the built-in differential terminator on the controller to the last device on the external SCSI bus.

- Devices that have two connectors, such as the 9334-011/501, have internal cabling that must be included when calculating total cable length. When connecting these devices, connect one cable into one connector and the other cable (or terminator if this is the last device on the bus) to the second connector. Up to two 9334-011/501 may be connected on one SCSI-2 differential bus.

- The SCSI-2 differential bus length should be no longer than 19m (62.3 ft.).

# Cable and Terminator Tables for the SCSI-2 Differential Controller

SCSI-2 differential cabling should be accomplished in accordance with the following criteria and machine type specifications.

SCSI-2 differential cable length maximums must be carefully observed to avoid transmission line mismatch problems.

Use the 2xxx feature codes listed in the following tables to order just the cable or terminator.  Use the 9xxx feature codes to order a cable or terminator as a select feature for the SCSI device you are attaching.  These cables and terminator may also be provided with other feature codes.

## System Differential Internal Cable Lengths
There are no internal connections to the SCSI-2 differential controller.

## Controller-to-First-Device Cables

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| 7204-2xx | 2854/9138 2921/9221 | Controller-to-7204-2xx differential device (8-bit) | 87G1358 67G0593 | 0.6 4.75 |
| 9334 | 2921/9221 2923/9223 | Controller-to-9334-011 differential device (8-bit) | 67G0593 95X2494 | 4.75 8.0 |
| 9334 | 2931 2933 2935 2937 | Controller-to-9334-501 deskside differential unit (8-bit) | 67G0589 67G0590 67G0566 67G0562 | 1.48 2.38 4.75 8.0 |
| 7135 | 2902/9202 2905/9205 2912/9212 2914/9214 2918/9218 | Controller-to-7135 (16-bit) | 67G1260 67G1261 67G1262 67G1263 67G1264 | 2.4 4.5 12.0 14.0 18.0 |
| | 2919 | Interposer required to attach cable. | 61G8323 | N/A |

## Differential Device Internal Cable Lengths

| Device | Cable Length (meters) |
|---|---|
| 9334/011 9334/501 | 3.1 2.66 |
| 7204 | 0.25 |
| 7134 | 2.7 |
| 7135 | .66 |

## Differential Device-to-Device Cables

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| 7204-2xx | 2848/9134 | 7204-to-7204 differential device cable (8-bit) | 74G8511 | .66 |
| 9334 | 2925/9225 | 9334-011-to-9334-011 differential (8-bit) | 95X2492 | 2.0 |
| 9334 | 2939/9239 | 9334-501-to-9334-501 differential device cable (8-bit) | 95X2498 | 2.0 |
| 7135 | 2901/9201 | 7135-to-7135 (16-bit) | 67G1259 | .6 |

# Differential Terminators for Use with This Controller

- Each end of the bus must have a terminator; that is, there are only two terminators on the bus.

  - The SCSI-2 Differential High Performance External I/O Controller (Type 4-2) has built-in, removable differential terminators. One additional external terminator is required when connecting devices to the external SCSI bus.

| F/C | Terminator Description | Part Number |
|---|---|---|
| 2847/ 9133 | 50-pin, low-density, external, narrow bus (8-bit) | 79X3795/87G1356 |
|  | 68-pin, external, wide bus (16-bit) | 61G8324 |

# Cabling Examples for the SCSI-2 Differential Controller
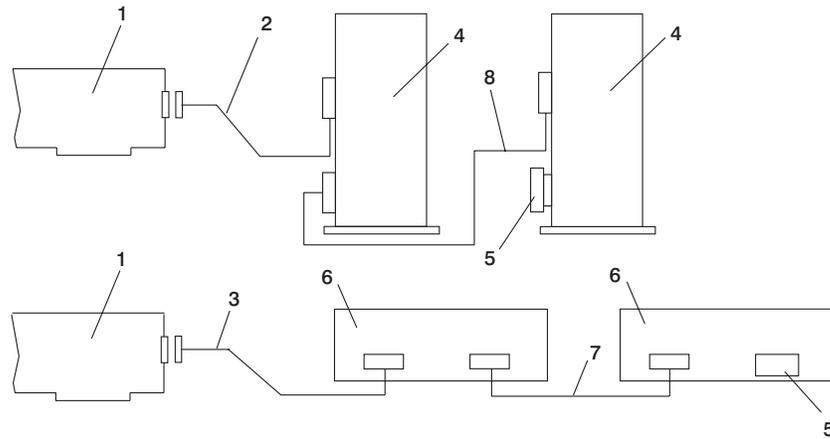


| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | 43G0176 11H2447 | SCSI-2 Differential High-Performance External I/O Controller (Type 4-2 labeled 4-2 near the external connector) | N/A |
| 2 | 67G0566 | Controller-to-first 9334-501 deskside differential unit, | 4.75 |
| | 67G0562 | Controller-to-first 9334-501 deskside differential unit, | 8.0 |
| 3 | 67G0593 | Controller-to-9334-011 or 7204 differential unit, | 4.75 |
| | 95X2494 | Controller-to-9334-011 or 7204 differential unit, | 8.0 |
| 4 | | 9334-501 deskside differential unit | N/A |
| 5 | 79X3795 | External differential terminator, 50-pin, low-density, 9334-011/501 | N/A |
| 6 | | 9334-011 or 7204 differential device | N/A |
| 7 | 95X2492 | 9334-011 or 7204 differential device-to-9334-011 | N/A |
| | 95X2498 | or 7204 differential device cable, | 2 |
| 8 | | 9334-501 deskside differential unit-to-9334-501 deskside differential unit cable, | 2 |

## Special Cabling Considerations for the 7135 RAIDiant Array
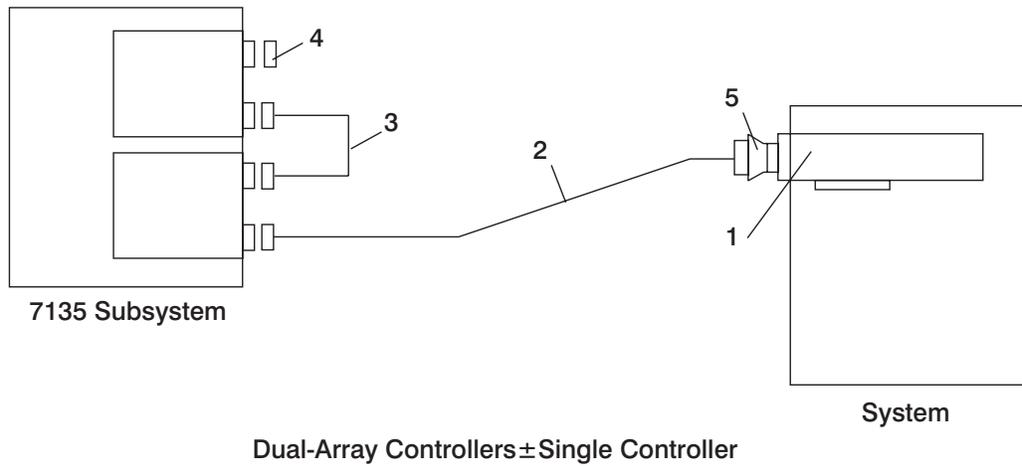


7135 Subsystem

System

Dual-Array Controllers±Single Controller

| Item Number | Part Number | Description | Cable Length meters |
|---|---|---|---|
| 1 | 43G0176 11H2447 | SCSI-2 Differential High-Performance External I/O Controller (Type 4-2 labeled 4-2 near the external connector) | N/A |
| 2 | 67G1263 | Cable, controller-to-7135, | 14 |
| 3 | 67G1259 | Cable, array-controller-to-array-controller, | 0.6 |
| 4 | 61G8324 | Terminator, differential, 68-pin | N/A |
| 5 | 61G8323 | Interposer, 68-pin to 50-pin interface | N/A |

**Note:** For item 2, a shorter cable can be used. Refer to "Controller-to-First-Device Cables" on page 4-30 under 7135.

# High-Availability Configuration SCSI-2 Differential Cabling

**Attention:** The following high-availability section describes supported hardware configurations. These configurations may not be supported by your software application. Be sure that your software application supports these configurations before attempting to use.

The high-availability configuration is implemented with the SCSI-2 Differential High-Performance External I/O Controller (Type 4-2) by plugging the middle leg connector of the high-availability configuration Y-cable into the controller external 50-pin connector and by removing the two built-in differential terminator resistors from the controller. The two top legs of the high-availability configuration Y-cable plug into the SCSI bus.

If the SCSI-2 Differential High-Performance External I/O Controller (Type 4-2) is at the end of the SCSI bus, the shorter top leg of the high-availability configuration Y-cable must be terminated with the differential high-density 50-pin terminator, part number 52G7350.

**Notes:** The high-availability configuration (Y-cable with a terminator on the shorter top leg) permits the controller to be disconnected from the SCSI bus by removing the 50-pin external bus connection (middle leg of the Y-cable). Although the SCSI bus continuity is maintained during removal of the controller, noise generated may create undetected bus errors if the bus is in use. To maintain data integrity, the SCSI bus should be quiesced during the removal of controllers, devices, terminators, or cables.

High-availability software must be installed on both system units.

## Cables for High-Availability and Target Mode

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|----|-----|-------------------|-------------|-----------------------|
| Host System | 2422 | Y-cable (8-bit) | 52G7348 | .765 |
| Host System | 2423 | System-to-system Cable (Target mode environment) 8-bit) | 52G7349 | 2.5 |

## Terminator for High-Availability and Target Mode

| F/C | Cable Description | Part Number |
|-----|-------------------|-------------|
| * | 50-pin high-density (connects to Y-cable) | 52G7350 |
| **Note:** * Included in F/C 2422 | | |

## Cabling Examples for High-Availability SCSI-2 Differential Configurations



| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | 43G0176 11H2447 | SCSI-2 Differential High-Performance External I/O Controller (Type 4-2 labelled 4-2 near the external connector) | N/A |
| 2 | 52G7348 | Y-cable, differential, high-availability configuration, (total, all legs) | 0.765 |
| 3 | 52G7350 | Differential terminator, high-availability configuration Y-cable, 50-pin, high-density | N/A |
| 4 | 67G0566 | Cable, controller-to-first 9334-501 deskside differential unit | 4.75 |

**Notes:**

1. When a Y-cable is used, the internal terminator on the controller card must be removed.

2. For item 4, other cables can be used as long as the total bus length is kept to 19 meters or less. Refer to "Controller-to-First-Device Cables" on page 4-30 under 9334-501.

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | 43G0176 11H2447 | SCSI-2 Differential High-Performance External I/O Controller (Type 4-2 labelled 4-2 near the external connector) | N/A |
| 2 | 52G7348 | Y-cable, differential, high-availability configuration, (total, all legs) | 0.765 |
| 3 | 52G7350 | Differential terminator, high-availability configuration Y-cable, 50-pin, high-density | N/A |
| 4 | 67G0566 | Cable, controller-to-first 9334-501 deskside differential unit, | 4.75 |
| 5 | 52G7349 | Cable, system-to-system, SCSI-2 differential, | 2.5 |

**Notes:**

1. When a Y-cable is used, the internal terminator on the controller card must be removed.

2. For item 4, other cables can be used as long as the total bus length is kept to 19 meters or less. Refer to "Controller-to-First-Device Cables" on page 4-30 under 9334-501.

System A Rack

Expansion Rack or
Unit in System A or B

System B Rack

System A Rack

System B Rack

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | 43G0176 11H2447 | SCSI-2 Differential High-Performance External I/O Controller (Type 4-2 labelled 4-2 near the external connector) | N/A |
| 2 | 52G7348 | Y-cable, differential, high-availability configuration, (total, all legs) | 0.765 |
| 3 | 52G7350 | Differential terminator, high-availability configuration Y-cable, 50-pin, high-density | N/A |
| 4 | 67G0593 | Cable, controller-to-first 9334-011 or 7204 differential device, | 4.75 |
| 5 | | 9334-011 differential drawer | N/A |
| 6 | 95X2492 | 9334-011 differential drawer-to-9334-011 differential drawer or 7204 differential unit to 7204 differential unit cable, | 2 |
| 7 | | 7204 differential unit | N/A |

**Notes:**

1. When a Y-cable is used, the internal terminator on the controller card must be removed.

2. For item 4, other cables can be used as long as the total bus length is kept to 19 meters or less. Refer to "Controller-to-First-Device Cables" on page 4-30 under 9334-011.

## Special Cabling Considerations for the 7135 RAIDiant Array
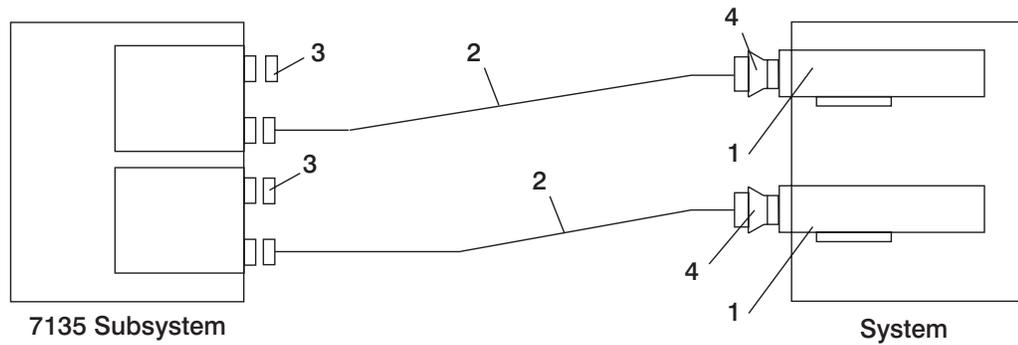


7135 Subsystem                                                    System

Dual-Array Controllers±Dual SCSI Controllers±Single Host

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | 43G0176 11H2447 | SCSI-2 Differential High-Performance External I/O Controller (Type 4-2 labeled 4-2 near the external connector) | N/A |
| 2 | 67G1264 | Cable, controller-to-7135, | 18 |
| 3 | 61G8324 | Terminator, differential, 68-pin | N/A |
| 4 | 61G8323 | Interposer, 68-pin to 50-pin interface | N/A |

**Note:** For item 2, a shorter cable can be used. Refer to "Controller-to-First-Device Cables" on page 4-30 under 7135.

## Special Cabling Considerations for the 7135 RAIDiant Array (continued)



Single-Array Controllers±
Single Controllers±Dual Host

Dual-Array Controllers±
Dual Controllers±Dual Host

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | 43G0176 11H2447 | SCSI-2 Differential High-Performance External I/O Controller (Type 4-2 labeled 4-2 near the external connector) | N/A |
| 2 | 52G7348 | Y-cable, differential, high-availability configuration, (total all legs) | 0.765 |
| 3 | 52G7350 | Terminator, differential, high-availability configuration, 50-pin, high-density (attaches to Y-cable only) | N/A |
| 4 | 67G1261 | Cable, controller-to-7135, | 4.5 |
| 5 | 61G8323 | Interposer, 68-pin to 50-pin interface | N/A |

**Notes:**

1. When a Y-cable is used, the internal terminator on the controller card must be removed.

2. If item 2 is used (Y-cable), an Item5 (interposer) is required between item 2 (Y-cable) and item 4 (controller-to-7135 cable).

3. For item 4, other cables can be used as long as the total bus length is kept to 19 meters or less.  Refer to "Controller-to-First-Device Cables" on page  4-30 under 7135.

## Special Cabling Considerations for the 7135 RAIDiant Array (continued)



Single-Array Controller±Multiple Hosts

Dual-Array Controller±Multiple Hosts

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | 43G0176 11H2447 | SCSI-2 Differential High-Performance External I/O Controller (Type 4-2 labeled 4-2 near the external connector) | N/A |
| 2 | 52G7348 | Y-cable, differential, high-availability configuration, (total all legs) | 0.765 |
| 3 | 52G7350 | Terminator, differential, high-availability configuration, 50-pin, high-density (attaches to Y-cable only) | N/A |
| 4 | 67G1261 | Cable, controller-to-7135, | 4.5 |
| 5 | 52G7349 | Cable, system-to-system, SCSI-2 differential | 2.5 |
| 6 | 61G8323 | Interposer, 68-pin to 50-pin interface | N/A |

**Notes:**

1. When a Y-cable is used, the internal terminator on the controller must be removed.

2. For item 4, other cables can be used as long as the total bus length is kept to 19 meters or less.  Refer to table "Controller-to-First-Device Cables" on page  4-30 under 7135.

# Cabling the SCSI-2 Single-Ended Fast/Wide Controller FC 2414, 2415, and 9216

To understand the cabling of this controller, read "General SCSI Considerations" on page 4-5, and then read the following for specific information.

There are two unique considerations when cabling this controller:

- The controller card has two independent SCSI controllers. One of the SCSI controllers is used exclusively for internal devices. The other SCSI controller is used exclusively for an external SCSI bus for external devices. Because of this independence, the internal cable length and number of internally attached devices need not be considered when cabling external devices. This is different from previous designs and makes cabling considerations simpler.

- Either bus may be connected as a wide (16-bit) or narrow (8-bit) bus.

Physical differences between the wide (16-bit) bus and the narrow (8-bit) bus are:

| Wide Bus (16-bit) | Narrow Bus (8-bit) |
|---|---|
| Uses a 68 conductor cable. | Uses a 50 conductor cable. |
| Can attach either all wide (16-bit) or all narrow (8-bit) devices to either bus (narrow devices will only have narrow (8-bit) performance.) | Can only attach to narrow devices. |
| 4 address bits, allowing for 16 unique addresses. | 3 address bits, allowing for 8 unique addresses. |

**Note:** AIX 3.2.5 with the appropriate PTFs supports only SCSI IDs from 0 to 7, limiting the number of device attachments to 7 per bus. The default address of this controller is 7.

## SCSI-2 Single-Ended Cable Lengths Using This Controller

SCSI-2 single-ended cabling should be accomplished in accordance with the following criteria and machine type specifications.

**Note:** SCSI-2 single-ended cable length maximums must be carefully observed to avoid transmission line mismatch problems.

Due to increased maximum data rates, the SCSI-2 single-ended bus length is specified to be 3 m (9.9 ft) maximum. This maximum length includes the internal cabling of a device that has two connectors. All configurations incorporating OEM devices are restricted to a 3 m (9.9 ft) maximum length. However, certain configurations using supported devices with specialized termination allow longer bus lengths. The following bulleted items indicate the only supported configurations that are longer than 3 m.

**Note:** The following referenced part numbers are for cables only; terminators are also required.

- An SCSI bus length of 3.75 m (12.3 ft) may be achieved using part numbers 52G4231 or 92F2559 and 31F4222 or 35F4607 to attach up to 4 external (supported) SCSI devices in a narrow bus implementation to a 7011, 7012, 7013, or 7030 system.

- A maximum SCSI bus length of 5.04 m (16.53 ft) may be achieved using part number 52G4232 or 88G5755 to attach a 9334/500 to a 7011, 7012, 7013, or 7030 system.

- An SCSI bus length of 5.5 m (18 ft) may be achieved using part number 92F2559 to attach a 6226 Drawer containing only new feature code 2555 1GB disk drives (1GB disk drives shipped before 8/17/93 do not work), or feature code 2580 2GB disk drives, or any SCSI-1 drives.
- An SCSI bus length of 5.9 m (19.3 ft) may be achieved using part number 52G4235 to attach a 9334-010 to a 7015 system.

## Cable and Terminator Tables for the SCSI-2 Single-Ended Fast/Wide Controllers

The following tables and examples aid in properly cabling a SCSI-2 single-ended bus.

### System Internal Cable Lengths
Because this controller card has separate internal and external SCSI buses, the internal cable lengths need not be considered when attaching external SCSI devices.

### Optional Internal SCSI-2 Single-Ended Fast/Wide Cables

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| Model 5XX and SCSI-2 SE F/W | 2430 | Internal six-drop cable, 8-bit narrow bus, terminator included | 52G7451 | 1.86 |
| Model 5XX and SCSI-2 SE F/W | 2431 | Internal six-drop cable, 16-bit wide bus, the terminator is included when the F/C is ordered | 52G4430 | 1.57 |
| 7006/ 7009 | 2434 | Internal three-drop cable, 16-bit wide bus, The terminator is included when the F/C is ordered | 65G8085 | 0.77 |

## Controller-to-First Device Cables

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| Host System | 2439 | Controller-to-first device (where first device has one connector) 8-bit narrow bus, terminator included in MES F/C | 52G4231 | 1.5 |
| Host System | 2437 | Controller-to-first device (where first device has two connectors) 8-bit narrow bus, terminator included in MES F/C | 92F2559 | 1.5 |
| | 2435 | Controller-to-first device (where first device has two connectors) 16-bit wide bus, terminator included in MES F/C | 52G9501 | 1.5 |

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| 9334 | 9212 | Controller-to-9334-010 (8-bit narrow bus) | 52G4235 | 4.75 |
| 9334 | 2926/9226 2907/9207 | Controller-to-9334-500 (8-bit narrow bus) | 52G4232 88G5755 | 1.5 2.38 |
| 7027 | 3133 3134 | Controller-to-7027 | 40H7353 40H7352 | 3 6 |

## Device Internal Cable Lengths

Refer to "Device Internal Cable Lengths" on page 4-9 for information on narrow bus devices.

## Device-to-Device Cables

Refer to "Device-to-Device Cables" on page 4-9 for information on narrow bus cables.

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| 7204-1xx | 2860/9139 | Fast/Wide SE device-to-device cable (16-bit) | 52G9921 | .5 |

## Terminators for Use with This Controller

### Card Internal

The controller has an onboard terminator for the internal bus; no additional terminators are needed if this bus is not being used.

### Internal Cabling

The internal narrow device cable has a built-in terminator. The wide cable uses a detachable terminator. Part number 88G3977 is used for new build cables and has locking tabs for a more secure connection. The earlier version part number 92F2566 (FRU 92F0322) is still available.

### Card External Connector

The controller has an onboard terminator for the external bus; no additional terminators are needed if this bus is not being used.

### SCSI-2 Single-Ended External Cabling

An SCSI-2 single-ended external terminator is required when any external cable or device is attached. The terminator should be attached at the external end of the bus.

| Terminator Description | Part Number |
|---|---|
| 50 pin, low-density, external, narrow bus, FPT-18+ | 51G7736 |
| 50-pin, low-density, external, narrow bus, FPT18C | 52G4260 |
| 68 pin, high-density, external wide Boulay | 52G9907 (FRU 92F0432) |

**Note:** The 52G4260 terminator is used in place of the 51G7736 terminator; the 51G7736 terminator is still usable.

# Cable Examples for the SCSI-2 Single-Ended Fast/Wide Controller

Single-Ended Internal

Wide Bus

or

Narrow Bus
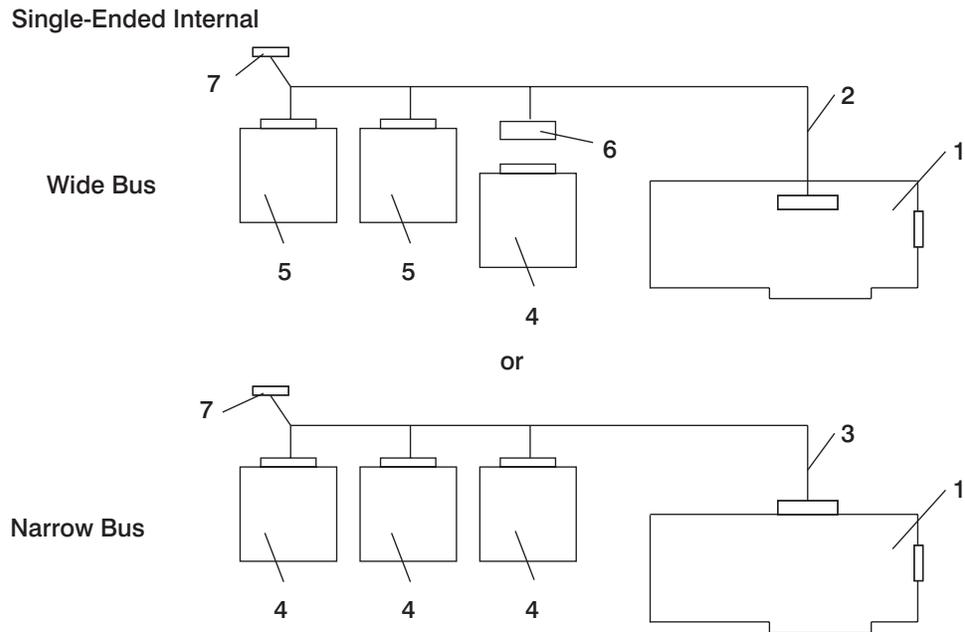
| Item Number | Description |
|---|---|
| 1 | Controller |
| 2 | Internal SCSI cable and terminator assembly (wide) |
| 3 | Internal SCSI cable and terminator assembly (narrow) |
| 4 | Narrow device (50-pin connector) |
| 5 | Wide device (68-pin connector) |
| 6 | 68-pin to 50-pin interposer (only used with 7012 and 7030 "wide" bus, FRU 92F0324 (assenbly P/N 92F2565)) **Note:** 7013 and 7015 boxes do not allow mixing wide and narrow devices on the same bus. |
| 7 | Terminator |

Single-Ended External Narrow Bus



or
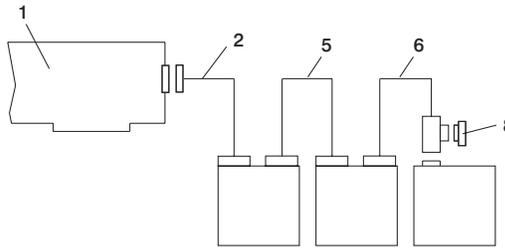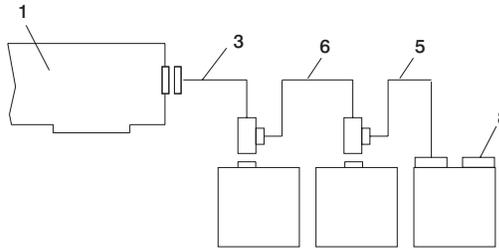


Single-Ended External Wide bus
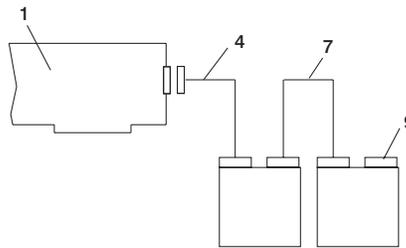


| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | Controller | N/A |
| 2 | 92F2559 | Controller-to-dual-connector device (narrow 8-bit) | 1.5 |
| 3 | 52G4231 | Controller-to-single-connector device (narrow 8-bit) | 1.5 |
| 4 | 52G9501 | Controller-to-dual-connector device (wide 16-bit) | 1.5 |
| 5 | 33F4607 | Device-to-dual-connector device (narrow 8-bit) | .66 |
| 6 | 31F4222 | Device-to-single-connector device (narrow 8-bit) | .7 |
| 7 | 52G9921 | Device-to-dual-connector device (wide 16-bit) | .5 |
| 8 | 51G7736 or 52G4260 | Terminator (narrow 8-bit) | N/A |
| 9 | 52G9907 | Terminator (wide 16-bit) | N/A |

# Special Cabling Considerations for the 7131 Single-Ended Interface
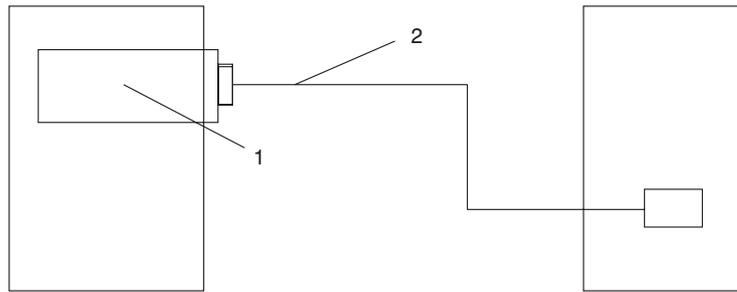


7131 - 105

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | 11H3600 | SCSI-2 Fast/Wide Controller | N/A |
| 2 | 52G9501 | Controller-to-dual-connector device (16-bit) | 1.5 |

**Note:** The single ended version of the 7131 cannot be connected to any other device. The SCSI terminator is built into the 7131.

# Special Cabling Considerations for the 7027 - HSC Single-Ended Interface

The following figure shows the back of the 7027.  Banks A, B, and C are on the front of the 7027.



**Note:**  Up to three adapters can be connected as shown. The adapters are on different SCSI-Busses.  This is not a multi-initiator setup.

- Adapter 1 controls Banks B and C.

- Adapter 2 controls Banks A and F.

- Adapter 3 controls Banks D and E.

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 Fast/Wide Adapter | NA |
| 2 | 40H7353 | Adapter-to-Dual-Connector device (16-bit) | 3.0 |
| | 40H7352 | | 6.0 |

# High-Availability SCSI-2 Single-Ended Fast/Wide Controller Cabling

### Special Cabling Considerations for the 7027 - HSC Single-Ended Interface with the Twin Initiator Option (FC 6552)
**Attention:**

- FC 6552 must be installed on your 7027 to use the twin initiator option.

- Be sure that your software application supports the twin (multi) initiator option before attempting to use.

- Only one adapter per system per SCSI bus is allowed.

The following figure shows the back of the 7027. Banks A, B, and C are on the front of the 7027. Banks A and F are not used in the twin (multi) initiator option. Refer to the *7027 Disk Drive Drawer Installation and Service Guide*, order number SA38-0520 for more information.
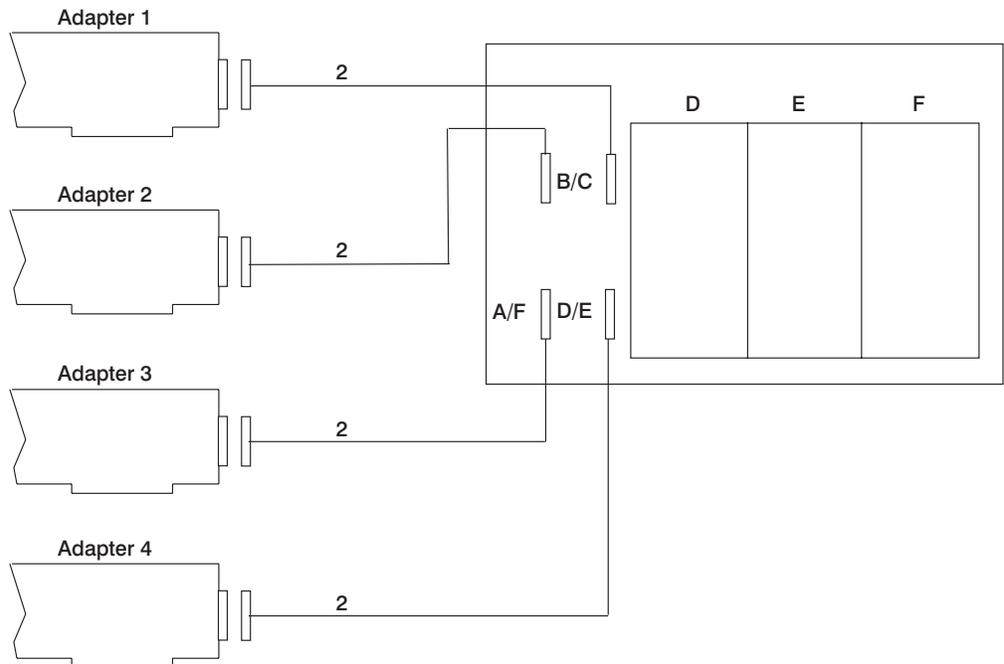


**Note:**

- The top two connectors control banks B, and C (adapters 1, and 2 share the same SCSI bus). Adapters 1 and 2 must be in different host systems.

- The bottom two connectors control banks D, and E (adapters 3, and 4 share the same SCSI bus). Adapters 3 and 4 must be in different host systems.

- Banks A, and F are not available with this twin initiator configuration.

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 Fast/Wide Adapter | NA |
| 2 | 40H7353 | Adapter-to-Dual-Connector device (16-bit) | 3.0 |
| | 40H7352 | | 6.0 |

## Special Cabling Considerations for the 2104 Single-Ended Interface
**Attention:**

- FC 2501 must be installed on your 2104 second Ultra 2 (LVD) port.

- Be sure that your software application supports the 2104 before attempting to use.

- Two adapters per system per SCSI bus are allowed.

Refer to the *2104 DL1 Installation Guide*, order number GA33-3292, *2104 TL1 Installation Guide*, order number GA33-3293, and *2104 DL1, and TL1 Service Guide*, order number GY33-0194 for more information.

The following figure shows two system units and two 2104 subsystems each with two SCSI interfaces. These system units and 2104 subsystems can be cabled in a varity of combinations. There could be two system units each with one SCSI adapter cabled to one 2104 sybsystem or one system unit with two SCSI adapters cabled to two different 2104 subsystems.
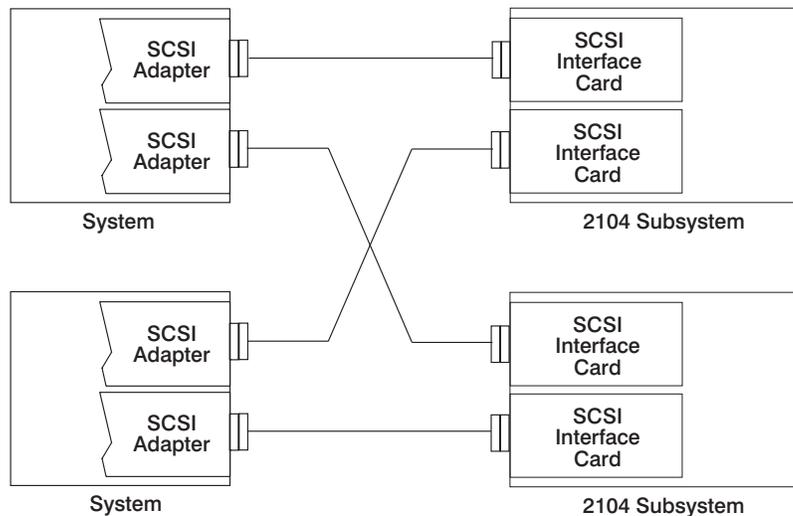


| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | 52G4034 11H3600 | SCSI-2 Fast/Wide Adapter/A (Type 4-7) | NA |
| 2 | 09L3311 | Adapter-to-Dual-Connector device (16-bit) | 3.0 |

# Cabling the SCSI-2 and Enhanced SCSI-2 Differential Fast/Wide Controllers FC 2413, 2416, 9217, 2412, 9212, 2418, and 2419

To understand the cabling of this controller, read "General SCSI Considerations" on page 4-5, and then read the following for specific information.

This controller has two independent SCSI-2 fast/wide controllers:

- One controller is single-ended. It is used for the internal SCSI bus, supporting single-ended internal connections only. The internal bus can be cabled as either wide (16-bit) or narrow (8-bit). Refer to "Cable Examples for the SCSI-2 Single-Ended Fast/Wide Controller" on page 4-45 for examples of internal bus cabling.

- The other controller is used exclusively for the external SCSI bus and supports differential connections only. The external bus can be cabled as either wide (16-bit) or narrow (8-bit).

**Note:** AIX 3.2.5 with the appropriate PTFs supports only SCSI IDs from 0 to 7, limiting the number of device attachments to 7 per bus. The default address of this controller is 7.

## SCSI-2 Differential Cable Lengths Using This Controller

SCSI-2 differential cabling should be accomplished in accordance with the following criteria and machine-type specifications.

**Note:** SCSI-2 differential cable length maximums must be carefully observed to avoid transmission line mismatch problems.

The SCSI-2 fast/wide differential bus length is specified to be 25 m (82 ft) maximum. For configurations using external cabling length restrictions, refer to the length from the built-in differential terminator on the controller to the last device on the external SCSI bus.

Attach only differential devices on the external bus and single-ended devices on the internal bus.

## Cable and Terminator Tables for the SCSI-2 Differential Fast/Wide Controller

The following tables and examples aid in properly cabling a SCSI-2 differential bus.

### Controller-to-First-Device Cables

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| Host System | 2438 | Controller-to-first device (where first device has two connectors) 8-bit narrow bus terminator included in MES F/C | 88G3636 | 1.5 |
| Host System | 2436 | Controller-to-first device (where first device has two connectors) 16-bit wide bus terminator included in MES F/C | 52G4337 | 1.5 |
| 9334 | 2922/9222<br>2924/9224 | Controller-to-9334-011<br>(8-bit narrow bus) | 52G4327<br>88G5757 | 4.75<br>8.0 |
| 9334 | 2932/9232<br>2934/9234<br>2936/9236<br>2938/9238 | Controller-to-9334-501<br>(8-bit narrow bus) | 52G4326<br>88G5758<br>88G5759<br>88G5760 | 1.5<br>2.38<br>4.75<br>8.0 |
| 7134 | 2902<br>2905<br>2912<br>2914<br>2918 | Controller-to 7134 (16-bit wide bus) | 88G5750<br>88G5749<br>88G5747<br>88G5748<br>88G5746 | 2.4<br>4.5<br>12.0<br>14.0<br>18.0 |
|  | 2920 | Interposer required to attach 7134 controller cable to the controller. | 50G0460 | N/A |
| 7135 | 2902/9202<br>2905/9205<br>2912/9212<br>2914/9214<br>2918/9218 | Controller-to 7135 (16-bit wide bus) (can also be used as a System-to-System cable with Y-cable 52G4234) | 67G1260<br>67G1261<br>67G1262<br>67G1263<br>67G1264 | 2.4<br>4.5<br>12.0<br>14.0<br>18.0 |
|  | 2920 | Interposer required to attach 7135 controller cable to the controller. | 50G0460 | N/A |
| 7027 | 3134<br>3133<br>3137 | Controller-to 7027 (16-bit wide bus)<br>F/C includes necessary interposer | 40H7352<br>40H7353<br>88G5747 | 3.0<br>6.0<br>12.0 |
|  | 3138 | Controller-to 7137 (16-bit wide bus) F/C includes necessary interposer | 88G5746 | 18.0 |
|  | 2920 | Interposer required to attach 7137 controller cable to the controller. | 50G0460 | N/A |

## Differential Device Internal Cable Lengths

Refer to "Differential Device Internal Cable Lengths" on page 4-30 for information on narrow bus differential devices.

## Differential Device-to-Device Cables

Refer to "Differential Device-to-Device Cables" on page 4-31 for information on narrow bus differential cables.

## Device-to-Device Wide (16-bit)

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| Host System | 2424 2425 | Device-to-device, (16-bit wide bus) | 52G4291 52G4233 | .6 2.5 |
| 7135 | 2901/9201 | 7135-to-7135 (16-bit wide bus) | 67G1259 | .6 |

## Differential Terminators for Use with This Controller

### *Card External Connector*

The controller has an onboard terminator for the external bus; no additional terminators are needed if this bus is not being used.

### *SCSI-2 Differential External Cabling*

An SCSI-2 differential external terminator is required when any external cable or device is attached. The terminator should be attached at the external end of the bus.

| Terminator Description | Part Number |
|---|---|
| 50-pin, low-density, external, narrow bus (8-bit) | 79X3795 |
| 50-pin, low-density, external, narrow bus (8-bit) | 87G1356 |
| 50-pin, high-density external narrow bus (8-bit) | 52G7350 |
| 68-pin, external, wide bus (16-bit) | 61G8324 |

## Cabling Examples for the SCSI-2 Differential Fast/Wide Controller

### Differential External
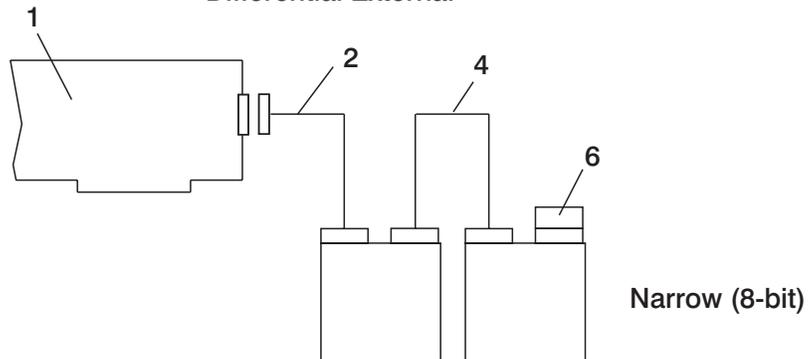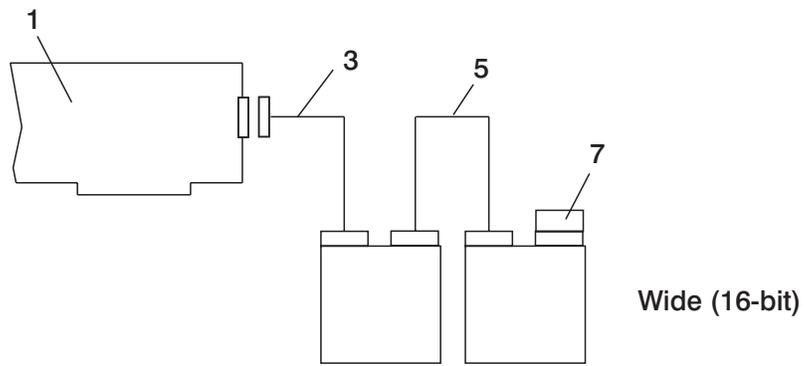


Narrow (8-bit)

or



Wide (16-bit)

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 52G4327<br>52G4326<br>88G3636 | Controller-to-9334-011 (narrow 8-bit)<br>Controller-to-9334-501 (narrow 8-bit)<br>Controller-to-720x (narrow 8-bit) | 4.75<br>1.5<br>1.5 |
| 3 | 52G4337 | Controller-to-first device (wide 16-bit) | 1.5 |
| 4 | 95X2492<br>95X2498<br>74G8511 | Device-to-9334-011 (narrow 8-bit)<br>Device-to-9334-501 (narrow 8-bit)<br>Device-to-720x (narrow 8-bit) | 2.0<br>2.0<br>.66 |
| 5 | 52G4291<br>52G4233 | Device-to-device (wide 16-bit) | .6<br>2.5 |
| 6 | 87G1356 | Terminator (narrow 8-bit) | N/A |
| 7 | 61G8324 | Terminator (wide 16-bit) | N/A |

# Special Cabling Considerations for the 7134



| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 50G0460 | Interposer (converts controller connector to "P" type) | N/A |
| 3 | 88G5750<br>88G5749<br>88G5747<br>88G5748<br>88G5746 | Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide) | 2.4<br>4.5<br>12.0<br>14.0<br>18.0 |
| 4 | 61G8324 | Terminator (wide 16-bit) | N/A |

**Note:** System A and B are not on the same SCSI bus and do not share any drives.

## Special Cabling Considerations for the 7134 (Continued)



| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 50G0460 | Interposer (converts controller connector to "P" type) | N/A |
| 3 | 88G5750<br>88G5749<br>88G5747<br>88G5748<br>88G5746 | Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide) | 2.4<br>4.5<br>12.0<br>14.0<br>18.0 |
| 4 | 61G8324 | Terminator (wide 16-bit) | N/A |
| 5 | 67G3341 | Internal SCSI-2 Bus Linkage Cable (wide) | 0.69 |

**Notes:**

1. For item 3, various cable combinations can be used as long as the total bus length is kept to 25 meters or less. Total bus length must include the internal cable length for the 7134 which is 2.7 m. The bus length for the 7134 Expansion Unit is an additional 2.7 m.

2. Systems A and B are not on the same SCSI-2 bus and do not share disk drives.

## Special Cabling Considerations for the 7135 RAIDiant Array
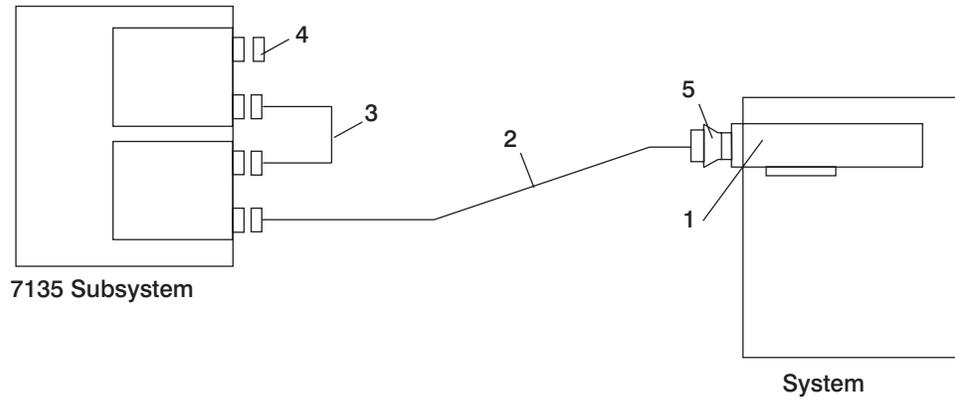


7135 Subsystem

System

Dual-Array Controllers±Single Controller

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 67G1264 | Cable, controller-to-7135 | 18 |
| 3 | 67G1259 | Cable, array-controller-to-array-controller | 0.6 |
| 4 | 61G8324 | Terminator (wide 16-bit) | N/A |
| 5 | 50G0460 | Interposer (wide 16-bit) (converts the controllers external connector to "P" type) | N/A |

**Note:** For item 2, a shorter cable can be used. Refer to "Controller-to-First-Device Cables" on page 4-52 under 7135.

# Special Cabling Considerations for the 7331-205 or 7331-305 8mm Tape Library or the 7336-205 4mm Tape Library

**Single Drive - Single Host or Dual Drive - Single Host**
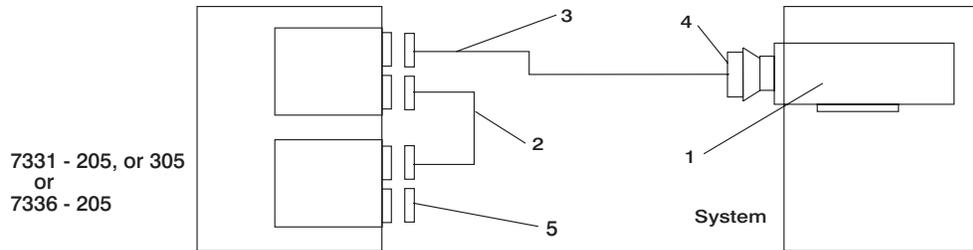


**Dual Drive - Dual Host**
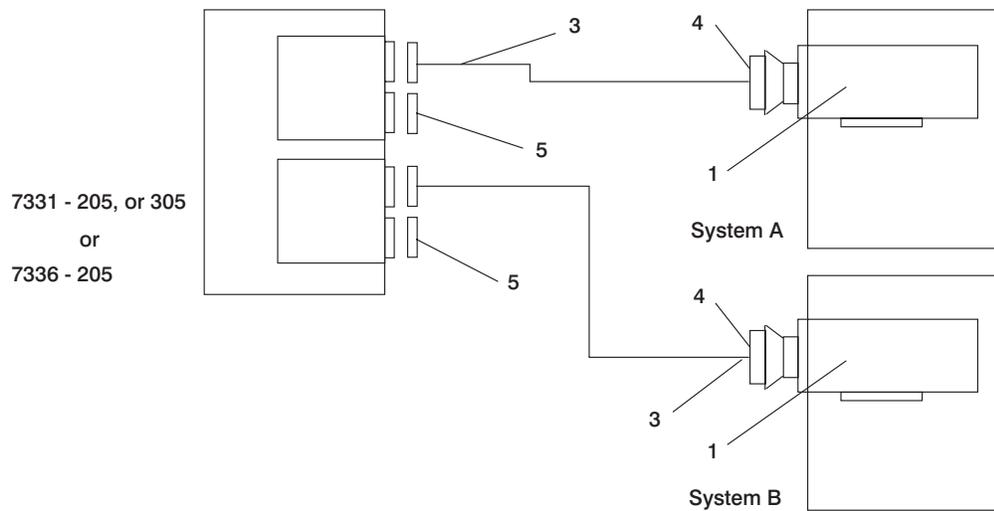


| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | |
| 2 | | Cable - SCSI jumper | |
| 3 | 06H6036<br>52G4233<br>88G5749<br>88G5747<br>88G5746 | Device-to-Device cable (wide 16-bit) | 1.0<br>2.5<br>4.5<br>12.0<br>18.0 |
| 4 | 50G0460 | Interposer (wide 16-bit) converts the controller's external connector to a "P" type connector. | |
| 5 | 61G8324 | Terminator (16-bit) | |

**Note:** For more information on these configurations, refer to the *7331 Tape Library Installation Guide*, order number SA26-7110, or the *7336 4mm Tape Library Model 205 Set up and Operator guide*, order number SA37-0309.

# Special Cabling Considerations for the 7131 Differential Interface (FC 2508)

**Single Host - Single Tower**



7131 - 105

**Single Host - Dual Tower**



7131 - 105    7131 - 105

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | |
| 2 | 52G4291 06H6036 52G4233 88G5749 88G5747 88G5748 88G5746 | Device-to-Device cable (wide 16-bit) | 0.6 1.0 2.5 4.5 12.0 14.0 18.0 |
| 3 | 61G8324 | Terminator (16-bit) | |
| 4 | 50G0460 | Interposer (wide 16-bit) converts the controller's external connector to a "P" type connector. | |

# Special Cabling Considerations for the 7027 - HSD Differential Interface

The following figure shows the back of the 7027. Banks A, B, and C are on the front of the 7027.



**Note:** Up to three adapters can be connected as shown. The adapters are on different SCSI-Busses. This is not a multi-initiator setup.

- Adapter 1 controls Banks B and C.

- Adapter 2 controls Banks A and F.

- Adapter 3 controls Banks D and E.

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | NA |
| 2 | 52G4233 40H7351 88G5747 88G5746 | Adapter-to-Dual-Connector device (16-bit) | 2.5 6.0 12.0 18.0 |

# High-Availability Configuration SCSI-2 Differential Fast/Wide Controller Cabling

**Attention:** The following section describes supported hardware configurations. These configurations may not be supported by your software application. Be sure that your software application supports these configurations before attempting to use.

The high-availability configuration is implemented with the SCSI-2 Fast/Wide controller by removing the three built-in differential terminator resistors (labelled RN1, RN2, and RN3) on the controller, then attaching the middle leg connector of the high-availability configuration Y-cable to the controller's external 68-pin connector. The remaining two legs of the Y-cable are then used to attach other systems and devices to the SCSI bus.

If the SCSI-2 Fast/Wide Controller is at the end of the SCSI bus, the shorter leg of the high-availability configuration Y-cable must be terminated with the appropriate terminator.

**Note:** The high-availability configuration (Y-cable with a terminator on the shorter top leg) allows disconnection of the controller from a "live" SCSI bus, by removal of the external bus connection (the middle leg of the Y-cable). Although termination and SCSI bus continuity is maintained during removal of the controller, noise generated may create undetected bus errors if the bus is in use during the time of removal. To maintain data integrity, the SCSI bus should be inactive during the removal of controllers, devices, cables, or terminators.

High-availability software must be installed on system units cabled into a high-availability configuration.

## Cable and Terminator Tables for the High-Availability Configuration SCSI-2 Differential Fast/Wide Controller

The following tables and examples aid in properly cabling an SCSI-2 differential bus.

| MT | F/C | Cable Description | Part Number | Cable Length (meters) |
|---|---|---|---|---|
| 7204-3xx | 2845/9131 2846/9132 | Device-to-Device cable, wide bus (16-bit) | 52G4291 52G4233 | 0.66 2.5 |
| Host System | 2426 | Controller-to-device Y-cable, wide bus (16-bit) | 52G4234 | 0.94 |
| Host System | 2427 | Controller-to-device Y-cable, narrow bus (8-bit) | 52G4349 | 0.765 |
| 7204-2xx | 2854/9138 2921/9221 | From Y-cable-to-7204-2xx, narrow bus (8-bit) | 87G1358 67G0593 | .6 4.75 |
| 9334 | 2921/9221 2923/9223 | From Y-cable-to-9334-11, narrow bus (8-bit) | 67G0593 95X2494 | 4.75 8.0 |
| 9334 | 2935 2937 | From Y-cable-to-9334-501, narrow bus (8-bit) | 67G0566 67G0562 | 4.75 8.0 |
| Host System | 2425 | System-System cable (target mode environment) (16-bit) | 52G4233 | 2.5 |
| Host System | 2423 | System-System cable (target mode environment) (8-bit) | 52G7349 | 2.5 |

| Terminator Description | Part Number |
|---|---|
| 50-Pin, high-density, external, Y-cable, narrow bus (8-bit) | 52G7350 |
| 68-Pin, external, wide bus (16-bit) | 61G8324 |

## Cabling Examples for the High-Availability Configuration SCSI-2 Differential Fast/Wide Controller
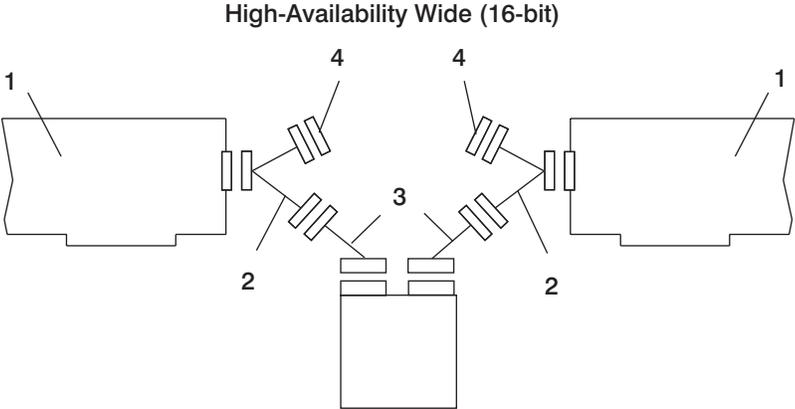
High-Availability Wide (16-bit)



**Attention:** Adapters must be in different host systems; only one adapter per system per SCSI bus is allowed.

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 52G4234 | Y-cable | .94 |
| 3 | 52G4291 52G4233 | Device-to-Device cable (Y-cable to device for high availability use) | 0.6 2.5 |
| 4 | 61G8324 | Differential Terminator (wide 16-bit) | N/A |

**Note:** When a Y-cable is used, the three (3) termination resisters on the controller card must be removed.

High-Availability Narrow (8-bit)

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 52G4349 | System 8-bit differential Y-cable, (total all legs) | 0.765 |
| 3 | 52G7350 | Differential terminator, high-availability configuration, 50-pin, high-density (attaches to Y-cable only) | N/A |
| 4 | 67G0566 | Cable, controller-to-first 9334-501 deskside differential unit, | 4.75 |
| 5 | 52G7349 | Cable, system-to-system, SCSI-2 differential | 2.5 |

**Notes:**

1. When a Y-cable is used, the three (3) termination resisters on the controller card must be removed.

2. For item 4, other cable combinations can be used as long as the total bus length is kept to 25 meters or less.  Refer to table "Controller-to-First-Device Cables" on page 4-52 under 9334/501.

High-A vailability Narrow (8-bit)



| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 52G4349 | System 8-bit differential Y-cable, (total all legs) | 0.765 |
| 3 | 52G7350 | Differential terminator, high-availability configuration, 50-pin, high-density (attaches to Y-cable only) | N/A |
| 4 | 67G0593 | From Y-cable-to-9334, narrow bus (8-bit) | 4.75 |
| 5 | 95X2494 | From Y-cable-to-9334, narrow bus (8-bit) | 8.0 |
| 6 | | 9334-011 differential drawer | N/A |

**Note:** When a Y-cable is used, the three (3) termination resistors on the controller card must be removed.

## Special Cabling Considerations for the 7027 - HSD Differential Interface with Multiple Initiators



**Attention:** Adapters must be in different host systems; only one adapter per system per SCSI bus is allowed.

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | NA |
| 2 | 52G4234 | Y-cable | 0.94 |
| 3 | 52G4291<br>52G4233<br>88G5749<br>40H7351 | Device-to-Device Cable (wide 16-bit) | 0.6<br>2.5<br>6.0<br>12.0 |
| 4 | 61G8324 | Terminator (16-bit) | |

**Note:** This configuration shows four adapters in a multiple-initiator configuration with the devices in banks B and C. If four adapters are used then you must remove the devices from bays 5 and 6 in banks D and B.  If only three adapters are used, you must remove the device in bay six of banks B and D.  For more information, refer to the 7027 Disk Drive Drawer *Installation and Service Guide*, order number SA38-0520.

**Note:**  When Y-cables are used, on card terminating resistors must be removed from the adapters.

## Special Cabling Considerations for the 2105 Differential Interface with Multiple Initiators



**Attention:** Adapters must be in different host systems; only one adapter per system per SCSI bus is allowed.

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | Enhanced SCSI-2 Differential Fast/Wide Adapter/A (4-C ONLY) | NA |
| 2 | 52G4234 | Y-cable | 0.94 |
| 3 | 52G4291 52G4233 88G5749 40H7351 | Device-to-Device Cable (wide 16-bit) | 0.6 2.5 6.0 12.0 |
| 4 | 61G8324 | Terminator (16-bit) | |
| 5 | 05J7336 05J7337 | SCSI Cable to 2105 VSS (except E20) SCSI Cable to 2105 VSS (except E20) Note: Interposer P/N 50G0460 is required with above. | 10 20 |
| | 09L0315 09L0316 | SCSI Cable to 2105 VSS Model E20 SCSI Cable to 2105 VSS Model E20 | 10 20 |

**Note:** When Y-cables are used, on card terminating resistors must be removed from the adapters.

# Special Cabling Considerations for the High-Availability 7134

7134

2

2

7134
Expansion
Unit (if
installed)

4 3

3 4

1

1

System A

System C

4

4

1

1

3

3

System B

System D
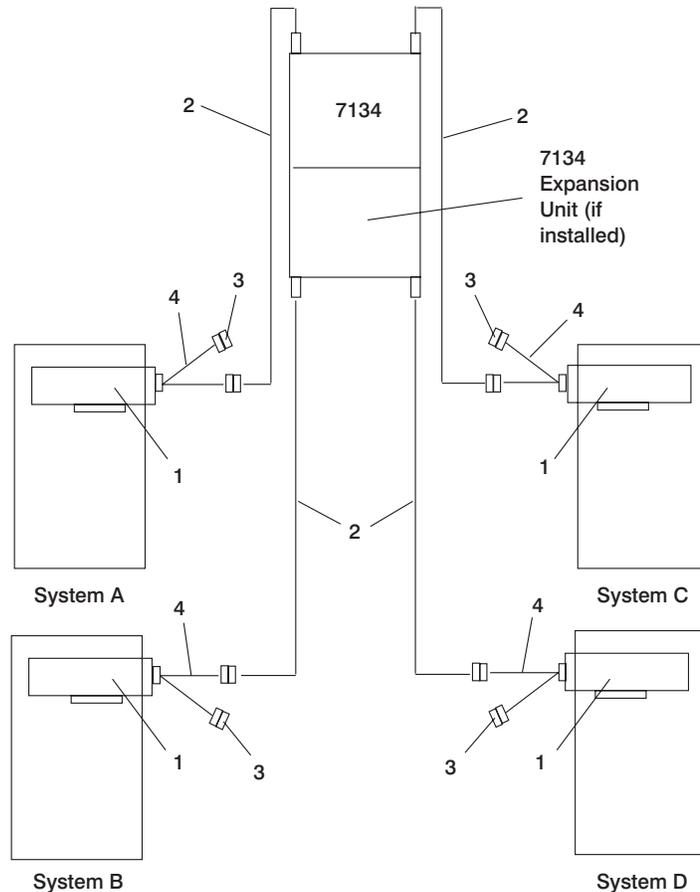
| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 88G5750<br>88G5749 | Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide) | 2.4<br>4.5 |
| 3 | 61G8324 | Terminator (wide 16-bit) | N/A |
| 4 | 52G4234 | Y-cable | 0.94 |

**Notes:**

1. When a Y-cable is used, the three (3) termination resistors on the controller card must be removed.

2. For item 2, other cable combinations can be used as long as the total bus length is kept to 25 meters or less.  Refer to table "Controller-to-First-Device Cables" on page 4-52 under 7134.  Total bus length must include the internal cable length for the 7134. Refer to "Differential Device Internal Cable Lengths" on page 4-30.

3. In this example, systems A and C are on one SCSI bus and systems B and D are on another SCSI bus.  In this configuration, systems A and C do not share drives with systems B and D.

## Special Cabling Considerations for the High-Availability 7134 (Continued)



| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 |  | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 88G5750<br>88G5749<br>88G5747<br>88G5748 | Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide)<br>Controller-to-7134 cable (wide) | 2.4<br>4.5<br>12.0<br>14.0 |
| 3 | 61G8324 | Terminator (wide 16-bit) | N/A |
| 4 | 52G4234 | Y-cable | 0.94 |
| 5 | 67G3341 | Internal SCSI-2 Bus Linkage Cable (wide) | 0.69 |

**Notes:**

1. For item 2, various cable combinations can be used as long as the total bus length is kept to 25 meters or less.  Total bus length must include the internal cable length for the 7134 which is 2.7 m.  The bus length for the 7134 Expansion Unit is an additional 2.7 m. For example, if item 2 above is the 4.5 meter cable in both places, the total bus length is .94 m + 4.5 m + 2.7 m + .69 m + 2.7 m + 4.5 m + .94 m which equals 16.97  m

2. When a Y-cable is used, the three (3) termination resistors on the controller card must be removed.

## Special Cabling Considerations for the 7135 RAIDiant Array



7135 Subsystem                                    System

Dual-Array Controllers-Dual SCSI Controllers-Single Host

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 67G1264 | Cable, controller-to-7135 | 18 |
| 3 | 61G8324 | Terminator (wide 16-bit) | N/A |
| 4 | 50G0460 | Interposer (wide 16-bit) | N/A |

**Note:** For item 2, a shorter cable can be used. Refer to table "Controller-to-First-Device Cables" on page 4-52 under 7135.

## Special Cabling Considerations for the 7135 RAIDiant Array (continued)



Single-Array Controllers±
Single SCSI Controllers±Dual Host

Dual-Array Controllers±
Dual SCSI Controllers±Dual Host

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 52G4234 | Y-cable, differential, high-availability configuration, (total all legs) | 0.94 |
| 3 | 61G8324 | Terminator (wide 16-bit) | N/A |
| 4 | 67G1261 | Cable, controller-to-7135 | 4.5 |
| 5 | 50G0460 | Interposer (wide 16-bit) | N/A |

**Notes:**

1. When a Y-cable is used, the three (3) termination resistors on the controller card must be removed.

2. If item 2 (Y-cable) is used, item 5 (interposer) is not needed.

3. For item 4, other cable combinations can be used as long as the total bus length is kept to 25 meters or less.  Refer to table "Controller-to-First-Device Cables" on page 4-52 under 7135.

## Special Cabling Considerations for the 7135 RAIDiant Array (continued)



Single-Array Controller±Multiple Hosts

Dual-Array Controller±Multiple Hosts

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 52G4234 | Y-cable, differential, high-availability configuration, (total all legs) | 0.94 |
| 3 | 61G8324 | Terminator (wide 16-bit) | N/A |
| 4 | 67G1261 | Cable, controller-to-7135 | 4.5 |
| | or 52G4233 | Cable, system-to-system, SCSI-2 differential | 2.5 |

**Notes:**

1. When a Y-cable is used, the three (3) termination resistors on the controller card must be removed.

2. For item 4, other cable combinations can be used as long as the total bus length is kept to 25 meters or less.  Refer to table "Controller-to-First-Device Cables" on page 4-52 under 7135.

# Special Cabling Considerations for the 7131 Differential Interface (FC 2508) High Availability

**Dual Host - Single Tower**
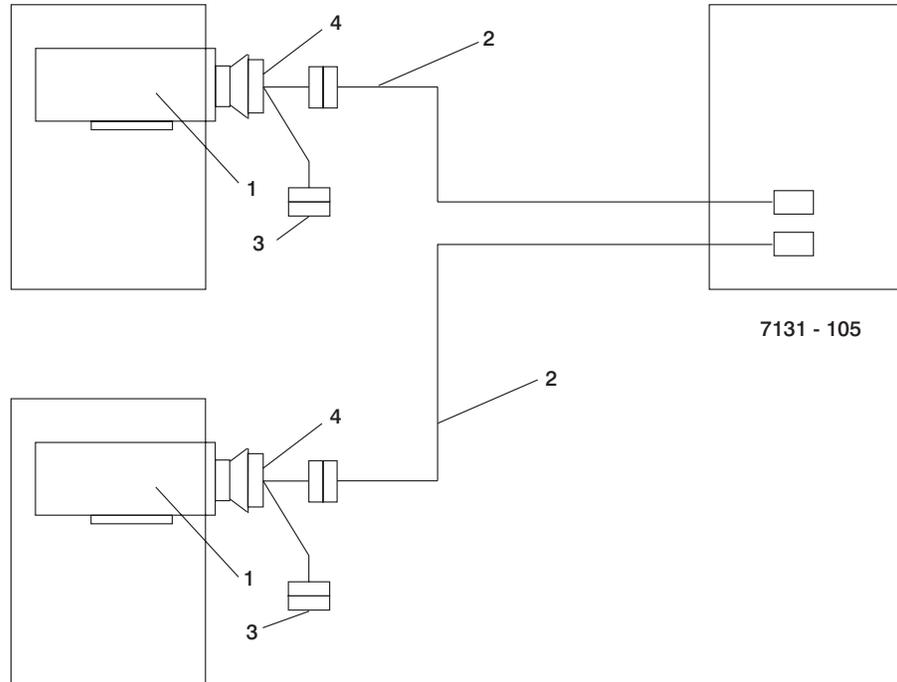


7131 - 105

| Item Number | Part Number | Description | Cable Length (meters) |
|---|---|---|---|
| 1 | | SCSI-2 or Enhanced SCSI-2 Differential Fast/Wide Controller (4-6 or 4-C) | N/A |
| 2 | 52G4291<br>06H6036<br>52G4233<br>88G5749<br>88G5747<br>88G5748<br>88G5746 | Device-to-Device cable (wide 16-bit) | 0.6<br>1.0<br>2.5<br>4.5<br>12.0<br>14.0<br>18.0 |
| 3 | 61G8324 | Terminator (16-bit) | N/A |
| 4 | 52G4234 | Y-cable | 0.94 |

**Note:**

1. When a Y-cable is used, the three (3) termination resisters on the controller adapter must be removed.

2. For item 2, any cable combination may be used as long as the total bus length is kept to 25 meters or less.

3. Please refer to the 7131 documentation for SCSI addressing limitations. If there are any devices in the upper media bay of the 7131, the adapters are restricted to certain SCSI IDs.

# Chapter 5. Cable Assembly and Pin-Outs

## Disclaimer

The information presented in this chapter *does not* guarantee functionality or compliance with any RFI or EMI regulations.

This information should be used along with other information about the location and use of the cables to help provide custom cabling that is acceptable for this customer.

## General Cable Building Information

The following information are things to consider and to keep in mind if you are going to build your own cables. All of this information does not apply to all cables you are building. Use the information that is needed.

- Any communications cable being run outdoors must have an appropriate lightning arrester on it.
- All outer foil shields should be connected to the metal shell of the connector at both ends.
- Be sure any wire that is connected at one end is terminated at the other end. No wire should be attached to circuitry at only one end, because it acts like an antenna to pick up or give out electrical noise.
- On *modem* cables for async communications, ground wires for twisted pairs should be connected together and to position 7 of the connector at each end of the cable.
- On *other than modem* async communications cables, the outer foil drain wire should connect to the metal shell of the connector on the system end of the cable. The outer foil drain wire should be connected to position 1 of the connector on the device end of the cable.
- The connectors on all cables should provide strain relief to prevent breaking the wires.

## Adapter-Specific Cable Building Information

The following information is presented to help the person building or servicing custom cables understand specific needs of certain adapters.

The following charts show pin-out information for many cables. Only pins that are used are mentioned. Cables are presented alphabetically, according to the letter designations given in Chapter 3, "Cables and Cabling" on page 3-1. The connector summary at the end of this section lists many cables and their associated connectors.

Custom cables must conform to the appropriate standards. Standards information can usually be obtained from a cable vendor, but copies of EIA specifications can be purchased by writing to the following address:

Electronic Industries Association
Attn. Standards Office
2001 Pennsylvania Ave., NW
Washington, DC 20006

# Cable Description and Page Number

Most of the cables in this chapter are arranged alphabetically.

| Cable | Description | Page |
|---|---|---|
| A | PC Parallel Printer Cable | 5-3 |
| B and C | Serial Port Jumper Cables | 5-5 |
| D | Async Cable EIA-232/V.24 | 5-6 |
| E | Printer/Terminal Interposer | 5-7 |
| I | Printer/Terminal Interface Cable | 5-8 |
| J | 8-Port Interface Cable | 5-8 |
| K | Terminal Cable EIA-422A | 5-9 |
| L | 16-Port Interface Cable EIA-232 | 5-9 |
| M | 16-Port Interface Cable EIA-422A | 5-9 |
| P | 8-pin RJ-45 to DB-25 Converter Cable | 5-10 |
| Q | X.25 Attachment Cable X.21 | 5-11 |
| R | X.25 Attachment Cable V.24 | 5-12 |
| S | X.25 Attachment Cable V.35 | 5-13 |
| T | 4-Port Multiprotocol Communications Interface Cable | 5-13 |
| U | V.35 cable for use with 4-Port Multiprotocol Communications Controller | 5-14 |
| V | EIA-232D/V.24 cable for use with 4-Port Multiprotocol Communications Controller | 5-15 |
| W | X.21 cable for use with 4-Port Multiprotocol Communications Controller | 5-16 |
| X | EIA-422A cable for use with 4-Port Multiprotocol Communications Interface Cable (Port 0 only) | 5-17 |
| Z | 8-pin RJ-45 to DB-9 converter cable for use with the Auto Token Ring LAN Streamer | 5-18 |
| AR | Serial Port Cable (EIA-232) for systems with a nine (9) pin serial port connector | 5-19 |
| AS | Serial Port Fanout Cable or "Y" Cable (EIA-232) for systems with a single 25 pin connector that has both serial port 1 and serial port 2 on the same connector | 5-20 |
| KK | Optical Channel Converter Cable | 5-21 |
| N | 64-Port Async Controller to 16-Port Async Concentrator Cable | 5-22 |
| XX | 16-Port Concentrator EIA-232 Printer or Terminal Cable | 5-24 |
| YY | 16-Port Concentrator EIA-232 Modem Cable | 5-26 |
| NB and NC | 128-Port Async Controller Cable, 8-wire | 5-29 |
| ND | 128-Port Async Controller to Remote Async Node Cable | 5-31 |
| NE | 128-Port Async Controller EIA-232 Modem Cable, System Side | 5-32 |
| NF | 128-Port Async Controller EIA-232 Modem Cable, Device Side | 5-34 |
| NG | 128-Port Async Controller EIA-422 Modem Cable, System Side | 5-35 |
| NH | 128-Port Async Controller EIA-422 modem Cable, Device Side | 5-36 |
| NK | 10-pin RJ-45 to DB-25 Converter Cable for Use with the Remote Async Node | 5-37 |
| NL | Cable for Connecting Remote Async Node to a Printer or Terminal Device | 5-38 |
| NM | Cable for Connecting Remote Async Node to a Modem Device | 5-40 |
| NP | RS-422 Cable for 16-port RAN | 5-43 |
| RA | Serial Re_IPL Cable 25-pin D to 9-pin D | 5-44 |
| RB | Serial Re_IPL Cable 25-pin D to 25-pin D | 5-45 |
| T1 | 4 or 8 Port EIA-232 or EIA-422 Multiport/2 Interface Cables | 5-46 |
| T2 | 6-Port Multiport/2 Cable | 5-49 |
| T3 | 6-Port V.35 Portmaster Cable | 5-50 |
| T4 | 8-Port EIA-232 or EIA-422 Portmaster Cable | 5-51 |
| T5 | 6-Port X.21 Portmaster Cable | 5-52 |
| T6 | 6-Port V.35 Network Attachment Cable for use with the 6-Port V.35 Portmaster Adapter/A | 5-54 |
| T7 | 6-Port X.21 Network Attachment Cable for use with the 6-Port X.21 Portmaster Adapter/A | 5-55 |

# Cable A

Description: PC Parallel printer Cable.

POS 14    POS 1                POS 26    POS 1
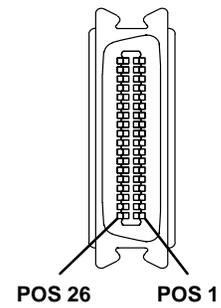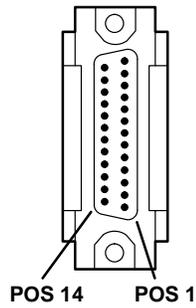
| System End Connector | Signal | Device End Connector |
|---|---|---|
| **Pin (Male)** | | **Socket (Female)** |
| 1 | Strobe | 1 |
| 2 | Data | 2 |
| 3 | Data | 3 |
| 4 | Data | 4 |
| 5 | Data | 5 |
| 6 | Data | 6 |
| 7 | Data | 7 |
| 8 | Data | 8 |
| 9 | Data | 9 |
| 10 | ACK | 10 |
| 11 | Busy | 11 |
| 12 | PE | 12 |
| 13 | Select | 13 |

| System End Connector | Signal | Device End Connector |
|---|---|---|
| **Pin (Male)** | | **Socket (Female)** |
| 14 | Autofeed XT | 14 |
| 18 | Ground | 15 |
| 19 | Ground | 16 |
| Not Used | | 17 |
| Not Used | | 18 |
| 21 | Ground | 19 |
| 21 | Ground | 20 |
| 21 | Ground | 21 |
| 22 | Ground | 22 |
| 22 | Ground | 23 |
| 23 | Ground | 24 |
| 23 | Ground | 25 |
| 24 | Ground | 26 |
| 24 | Ground | 27 |
| 24 | Ground | 28 |
| 25 | Ground | 29 |
| 25 | Ground | 30 |
| 16 | INIT | 31 |
| 15 | Error | 32 |
| 25 | Ground | 33 |
| Not Used | | 34 |
| Not Used | | 35 |
| 17 | Select IN | 36 |

# Cables B and C

Description: Serial Port Jumper Cables.



10-Pin MODU

POS 14   POS 1
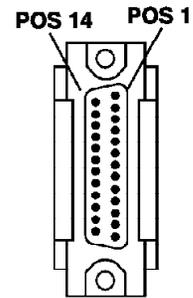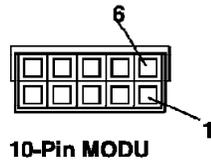
| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Pin (Male) |
| 1 | TxD | 2 |
| 2 | DTR | 20 |
| 3 | RTS | 4 |
| 4 | RI | 22 |
| 5 | Not Used | |
| 6 | RxD | 3 |
| 7 | DSR | 6 |
| 8 | CTS | 5 |
| 9 | CD | 8 |
| 10 | Signal Ground | 7 |
| | Shield | 1 |

# Cable D

Description: Async Cable EIA-232/V.24.

POS 14   POS 1

POS 14   POS 1

| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Pin (Male) |
| Shell | Shield Ground | 1, Shell |
| 2 | TxD | 2 |
| 3 | RxD | 3 |
| 4 | RTS | 4 |
| 5 | CTS | 5 |
| 6 | DSR | 6 |
| 7 | Signal Ground | 7 |
| 8 | CD | 8 |
| 20 | DTR | 20 |
| 22 | RI | 22 |

For applications where the Multiprotocol Adapter/A is used, the following additional pins are required.

| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Pin (Male) |
| 15 | Tx CLK | 15 |
| 17 | Rx CLK | 17 |

# Cable E

Description: Printer/Terminal Interposer-EIA-232. Use this to convert a modem cable to Printer or terminal connection.

This is a Printer/Terminal interposer which is about two inches long and connects the pins from input to output as shown below.  See cable I on page 5-8 for a printer terminal cable.

| System End Connector | Signal | Device End Connector |
|---|---|---|
| **Socket (Female)** | | **Pin (Male)** |
| 1 | Shield Ground | shell |
| 2 | TxD | 3 |
| 3 | RxD | 2 |
| 4 | RTS | 5 |
| 5 | CTS | 4 |
| 6, 8 | DSR, CD | 20 |
| 7 | Signal Ground | 7 |
| 20 | DTR | 6, 8 |

# Cable I

Description: Printer/Terminal Interface Cable.  The cable is 3m or 10 feet long.

**POS 14**   **POS 1**

**POS 14**   **POS 1**

| System End Connector | Signal | Device End Connector |
|---|---|---|
| **Socket (Female)** | | **Pin (Male)** |
| Shell | Shield Ground | Shell, 1 |
| 2 | TxD | 3 |
| 3 | RxD | 2 |
| 4 | RTS | 5 |
| 5 | CTS | 4 |
| 6, 8 | DSR, CD | 20 |
| 7 | Signal Ground | 7 |
| 20 | DTR | 6, 8 |

# Cable J

Description: Part of the Multiport Interface Cable.

The pin-out information for the connector on the back of the 8-port adapter is given in the adapters chapter of this book on page 1-73.  The Multiport Interface Cable allows attachment of up to eight separate devices to any of the 8-port asynchronous adapters.

# Cable K

Description: Terminal Cable EIA-422A.
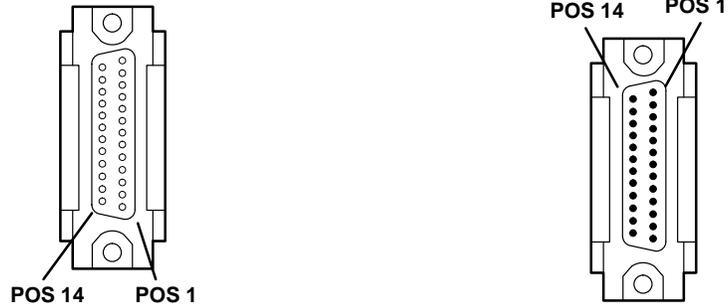
**POS 14**  **POS 1**

**POS 14**  **POS 1**

| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Pin (Male) |
| shell | Shield Ground | 1 |
| 2 | TxA | 15 |
| 3 | RxA | 19 |
| 4 | TxB | 17 |
| 5 | RxB | 25 |
| 7 | Signal Ground | 7 |

# Cable L

Description: Part of the 16-Port Interface Cable-EIA-232.

The pin-out information for the connector on the back of the 16-Port Async Adapter-EIA-232 is given in the adapter section on page 1-77.

# Cable M

Description: Part of the 16-Port Interface Cable-EIA-422A.

The pin-out information for the connector on the back of the 16-Port on page 1-79. Async Adapter EIA-422 is given in the adapter section.

# Cable P

Description: RJ-45 to DB-25 Converter for the 16-Port Concentrator

| Concentrator End Connector | Signal | Device End Connector |
|---|---|---|
| Pin | | Pin (Male) |
| 1 | Shield Ground | Float * |
| 2 | RTS | 4 |
| 3 | RxD | 3 |
| 4 | CD | 8 |
| 5 | Signal Ground | 7 |
| 6 | TxD | 2 |
| 7 | DTR | 20 |
| 8 | CTS | 5 |

# Cable Q

Description: X.25 Attachment Cable X.21.

**POS 9**  **POS 1**

**POS 20**  **POS 1**

| System End Connector | Signal | Device End Connector |
|---|---|---|
| **Socket (Female)** | | **Pin (Male)** |
| 10 | T (A) | 2 |
| 28 | T (B) | 9 |
| 11 | C (A) | 3 |
| 29 | C (B) | 10 |
| 12 | R (A) | 4 |
| 30 | R (B) | 11 |
| 13 | I (A) | 5 |
| 31 | I (B) | 12 |
| 14 | S (A) | 6 |
| 32 | S (B) | 13 |
| 7* | Ground | 8 |
| 9* | Ground | 8 |

*Tied together at system end connector.

# Cable R

Description: X.25 Attachment Cable-V.24.

**POS 14**  **POS 1**

**POS 20**  **POS 1**

| System End Connector | Signal | Device End Connector |
|---|---|---|
| **Socket (Female)** | | **Pin (Male)** |
| 2 | TxD | 2 |
| 3 | RxD | 3 |
| 4 | RTS | 4 |
| 5 | CTS | 5 |
| 6 | DSR | 6 |
| 8 | CD | 8 |
| 24 | Tx CLK | 15 |
| 26 | Rx CLK | 17 |
| 27 | LLBT | 18 |
| 20 | DTR | 20 |
| 21 | RLBT | 21 |
| 22 | CI | 22 |
| 25 | TI | 25 |
| 7* | Ground | 7 |
| 9* | Ground | 7 |
| 15* | Ground | 7 |

*Tied together at system end connector.

# Cable S

Description: X.25 Attachment Cable V.35.



POS A

POS 20    POS 1

| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Pin (Male) |
| 4 | RTS | C |
| 5 | CTS | D |
| 6 | DSR | E |
| 8 | CD | F |
| 20 | DTR | H |
| 22 | CI | J |
| 35 | TxD (A) | P |
| 17 | TxD (B) | S |
| 37 | RxD (A) | R |
| 19 | RxD (B) | T |
| 36 | Tx Clk (A) | Y |
| 18 | Tx Clk (B) | AA |
| 34 | Rx Clk (A) | V |
| 16 | Rx Clk (B) | X |
| 7 | Ground | B |
| 15 | Ground | B |

# Cable T

Description:  This cable comes with an Interface/Breakout box.  It has eight connectors for the four ports.  See cabling chapter of this book for description of the 4-Port Multiprotocol Communications interface cable.  The interface cable is used with the 4-Port Multiprotocol Communications Controller.

The pin-out information for the connector on the back of the 4-Port Multiprotocol Communications Controller is given in the adapters chapter on page 1-42.

# Cable U

Description: 4-Port Multiprotocol Communications Controller V.35 Cable.

Use a 15-position female connector and a 34-position block connector.  The bulk cable must have four shielded twisted pairs and six individually shielded wires.



POS A

POS 9    POS 1

| System End Connector Socket (Female) | Signal | Twisted Pair Number | Device End Connector Pin (Male) |
|---|---|---|---|
| 1 | Ground Shield | | A (Shield) |
| 2 | TxD (B) | 1 | S |
| 3 | RTS | | C |
| 4 | RxD (B) | 2 | T |
| 5 | CTS | | D |
| 6 | DSR | | E |
| 7 | CD | | F |
| 8 | Signal Ground | | B |
| 9 | TxD (A) | 1 | P |
| 10 | Tx Clk (A) | 3 | Y |
| 11 | RxD (A) | 2 | R |
| 12 | Tx Clk (B) | 3 | AA |
| 13 | Rx Clk (B) | 4 | X |
| 14 | Rx Clk (A) | 4 | V |
| 15 | DTR | | H |

# Cable V

Description: EIA-232D/V.24 cable for use with the 4-Port Multiprotocol Communications Controller.

Use a 25-position male connector and a 25-position female connector. Use bulk cable that has individually shielded wires.



| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Pin (Male) |
| 2 | TxD | 2 |
| 3 | RxD | 3 |
| 4 | RTS | 4 |
| 5 | CTS | 5 |
| 6 | DSR | 6 |
| 7 | Signal Ground | 7 |
| 8 | CD | 8 |
| 15 | Tx Clk | 15 |
| 17 | Rx Clk | 17 |
| 20 | DTR | 20 |
| 22 | RI | 22 |
| 23 | HRS | 23 |
| 24 | DTE Clk | 24 |
| 1 | Shield Ground | |

# Cable W

Description:  X.21 cable for use with the 4-Port Multiprotocol Communications Controller.

Use a 15-position male connector and a 15-position female connector.  Use bulk cable with at least five shielded twisted pairs.  Wire the pairs as shown (the pin numbers are the same on both ends).

POS 9    POS 1

POS 9    POS 1

| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Socket (Female) |
| | Shield | |
| 2 | T(A) | 2 |
| 3 | C(A) | 3 |
| 4 | R(A) | 4 |
| 5 | I(A) | 5 |
| 6 | S(A) | 6 |
| 8 | Signal Ground | 8 |
| 9 | T(B) | 9 |
| 10 | C(B) | 10 |
| 11 | R(B) | 11 |
| 12 | I(B) | 12 |
| 13 | S(B) | 13 |

# Cable X

Description: EIA-422A cable for use with the 4-Port Multiprotocol Communications Controller (Port 0 only).



**POS 14**          **POS 1**
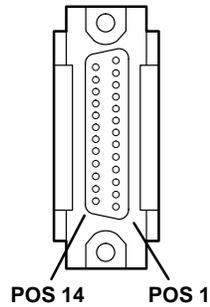
| System End Connector | Signal | Device End Connector |
|---|---|---|
| **Socket (Female)** | | **Customer-supplied** |
| | Ground Shield | |
| 2 | TxA | - |
| 3 | RxA | - |
| 4 | TxB | - |
| 5 | RxB | |
| 7 | Signal Ground | - |
| 17 | RxB Clk | - |
| 22 | RxA Clk | - |
| 23 | TxA Clk | - |
| 24 | TxB Clk | - |

# Cable Z

Description: 8-pin RJ-45 to DB-9 converter cable for use with the Auto Token Ring LAN Streamer.



POS 1                                    POS 6      POS 1
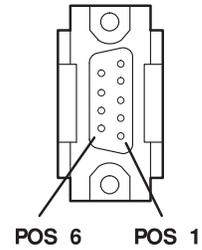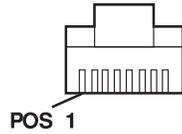
| 8-Pin RJ-45 Connector | | 9-Pin D-Shell Connector | |
|---|---|---|---|
| Pin | Signal | Signal | Pin |
| 1 | No Connection | | |
| 2 | No Connection | | |
| 3 | Ring Out A | Ring Out 2 | 5 |
| 4 | Ring In B | Ring In 1 | 1 |
| 5 | Ring In A | Ring In 2 | 6 |
| 6 | Ring Out B | Ring Out 1 | 9 |
| 7 | No Connection | | |
| 8 | No Connection | | |

# Cable AR

Description: This Serial Port cable (Async Cable EIA-232) is for systems that have a nine pin serial port connector.

**POS 14   POS 1**

**POS 6   POS 1**

| System End Connector Socket (Female) | Signal | Device End Connector Pin (Male) |
|---|---|---|
| Shell | Shield Ground | 1, Shell |
| 3 | TxD | 2 |
| 2 | RxD | 3 |
| 7 | RTS | 4 |
| 8 | CTS | 5 |
| 6 | DSR | 6 |
| 5 | Signal Ground | 7 |
| 1 | CD | 8 |
| 4 | DTR | 20 |
| 9 | RI | 22 |

# Cable AS

Description: This Serial Port fanout cable (Async Cable EIA-232D) is a feature that makes the second Serial Port available on systems that have a single serial port connector with signals for two serial ports. The pin-out is such that if a standard serial port cable is installed on the system then Serial Port (1) is available. This Serial Port fanout cable is a "Y" cable with three connectors. They have a single standard serial port connector that connects to the system and two standard serial port output connectors, one for serial port (1) and another for serial Port (2).



| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Pin (Male) |
| Shell | Shield Ground | 1, Shell |
| 2 | TxD (1) | 2 |
| 3 | RxD (1) | 3 |
| 4 | RTS (1) | 4 |
| 5 | CTS (1) | 5 |
| 6 | DSR (1) | 6 |
| 7 | Signal Ground | 7 |
| 8 | CD (1) | 8 |
| 20 | DTR (1) | 20 |
| 22 | RI (1) | 22 |
| Shell | Shield Ground | 1, Shell |
| 14 | TxD (2) | 2 |
| 16 | RxD (2) | 3 |
| 19 | RTS (2) | 4 |
| 13 | CTS (2) | 5 |
| 15 | DSR (2) | 6 |
| 7 | Signal Ground | 7 |
| 12 | CD (2) | 8 |
| 24 | DTR (2) | 20 |
| 17 | RI (2) | 22 |
| Others | Reserved | Others |

# Cable KK

Description: Optical Channel Converter Cable.

If customer-supplied, the cable must be built based on the following:

- Operating wavelength: 780 nm
- Fiber type and length:
  - 50/125 um (minimum length, 4 m (13 ft)), maximum length is determined by user-available link loss.
  - 62.5/125 um (minimum length, 4 m (13 ft)), maximum length is determined by user-available link loss, and cannot exceed 500 m (1640 ft), regardless of link loss.
- User-available link loss: 10.5 dB
- Averaged launched power: Minimum -4.7 dBm, Typical -3 dBm, Maximum -0.9 dBm
- Receiver sensitivity: Minimum -16.0 dBm, Maximum -0.9 dBm
- SC connector attenuation: Typical 0.25 dB, Maximum 0.5 dB
- Total fiber bandwidth must exceed 300 MHz.

## 64-Port Async Controller to Async Concentrator Cable

The following information is for custom built cables connecting the 64-Port Async Controller to the 16-Port Concentrator.

Both ends use the RJ-45 connectors. The cable has six conductors (three twisted pair) and is shielded on the outside.

## Cable N

Description: 64-Port Async Controller to 16-Port Async Concentrator Cable

### Line Length
If built to a length of 305 m (1000 feet) or less, each conductor must be 28 AWG or larger (typically stranded wire with seven strands of number 36 wire); if built between 305 m (1000 feet) and 762 m (2500 feet), each conductor must be 24 AWG or larger solid wire. Use appropriate RJ-45 connector for wire type.

The removable toroid(s) (some may have only one) is supplied on the  7.6 m (25 foot) cable shipped with the adapter.  It must be removed from the cable supplied with the adapter and installed on the custom built cable. Install one of them within 152 mm (6 inches) of the 16-port concentrator and the other one (if available) within 152 mm (6 inches) of the adapter.

Use the following information to build this cable.
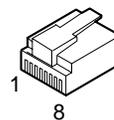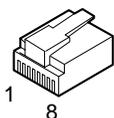
| Concentrator End Connector Position | Wiring of the Pairs | Mnemonic (Signal Name) | 64-Port Async Controller End Connector Position |
|:---:|:---:|:---:|:---:|
| 1 | Pair 1 | Transmit data A | 1 |
| 2 | Pair 1 | Transmit data B | 2 |
| 3 | Shield | No connection | 3 |
| 4 | Pair 2 | Transmit Clock B | 4 |
| 5 | Pair 2 | Transmit Clock A | 5 |
| 6 | No connection | Shield | 6 |
| 7 | Pair 3 | Receive Data B | 7 |
| 8 | Pair 3 | Receive Data A | 8 |

**Attention:**  The receivers and drivers used in most asynchronous communications devices are sensitive to electrostatic discharge (ESD).  To reduce the possibility of exposure to ESD, observe the following cabling practices when building or using device cables for attachment to the Remote Async Node 16-Port EIA-232:

**Note:** Do not build a cable that has exposed conductors, leads, or pins that could be touched by someone not protected against ESD. Avoid the use of punchdown blocks and patch panels which have exposed terminator/pins. In the event that you use intermediate connectors or cables, be sure to discharge them to ground before plugging them into equipment.

# 16-Port Concentrator-to-Device Cables

## Cable XX

Description: 16-Port Concentrator EIA-232 Printer or Terminal Cable

The following information is for custom built cables connecting the 16-Port Concentrator to a printer or terminal device.

This cable can be up to 61 m (200 ft) long. Use overall foil/braid shielded multi-conductor cable that is recommended for low capacitance (less than 12.5 picofarads per foot) use. Conductors should be 28 AWG (7 strands of Number 36 wire). For lengths of less than 61 m (200 ft), a higher capacitance cable can be used, as long as the total capacitance does not exceed 2500 picofarads.

**Note:** Connections to pins 6 and 22 are not required since DSR and RI are not supported on this controller. If DSR and RI wires are included in the cable, ensure that they are not connected to socket pins, as they may act as noise-receiving antennas and could impair data transmission.

**Attention:** The receivers and drivers used in the 16-Port Concentrator are very sensitive to electrostatic discharge (ESD). To reduce the possibility of exposure to ESD, observe the following cabling practices when building or using device cables for attachment to the 16-Port Concentrator:

1. Do not build a cable that has exposed conductors, leads, or pins that could be touched by someone not protected against ESD. Avoid the use of punchdown blocks and patch panels. In the event that you use intermediate connectors or cables, be sure to discharge them to ground before plugging them into equipment.

2. Do not run any cables outdoors without having proper transient voltage suppression devices installed.

3. Do not route cables near or around items such as power transformers, high-power switching devices and refrigerations units.

4. Use shielded cables. All wires should be terminated, not floating. The shield should be connected to shield ground at the concentrator.

| Concentrator End Connector | Signal | Device End Connector |
|---|---|---|
| **Pin** | | **Pin (Male)** |
| 1 | Shield Ground | Float * |
| 2 | RTS | 5 |
| 3 | RxD | 2 |
| 4 | CD | 20 |
| 5 | Signal Ground | 7 |
| 6 | TxD | 3 |
| 7 | DTR | 6, 8 |
| 8 | CTS | 4 |

**Note:** *In some cases it may be preferable to connect the shield ground at Pin 1 of the device end and allow the system end to float. In either case, the shield should be connected to the frame ground at one end only.

# Cable YY

Description: 16-Port Concentrator EIA-232 modem Cable

The following information is for custom built cables connecting the 16-port concentrator to a modem.

This cable can be up to 61 m (200 ft) long. Use overall foil/braid shielded multi-conductor cable that is recommended for low capacitance (less than 12.5 picofarads per foot) use. Conductors should be 28 AWG (7 strands of Number 36 wire). For lengths of less than 61 m (200 ft), a higher capacitance cable can be used, as long as the total capacitance does not exceed 2500 picofarads.

**Note:** Connections to pins 6 and 22 are not required since DSR and RI are not supported on this controller. If DSR and RI wires are included in the cable, ensure that they are not connected to socket pins, as they may act as noise-receiving antennas and could impair data transmission.

**Attention:** The receivers and drivers used in the 16-Port Concentrator are very sensitive to electrostatic discharge (ESD). To reduce the possibility of exposure to ESD, observe the following cabling practices when building or using device cables for attachment to the 16-Port Concentrator:

1. Do not build a cable that has exposed conductors, leads, or pins that could be touched by someone not protected against ESD. Avoid the use of punchdown blocks and patch panels. In the event that you use intermediate connectors or cables, be sure to discharge them to ground before plugging them into equipment.

2. Do not run any cables outdoors without having proper transient voltage suppression devices installed.

3. Do not route cables near or around items such as power transformers, high-power switching devices and refrigerations units.

4. Use shielded cables. All wires should be terminated, not floating. The shield should be connected to shield ground at the concentrator.

| Concentrator End Connector | Signal | Device End Connector |
|:---:|:---|:---:|
| Pin | | Pin (Male) |
| 1 | Shield Ground | Float * |
| 2 | RTS | 4 |
| 3 | RxD | 3 |
| 4 | CD | 8 |
| 5 | Signal Ground | 7 |
| 6 | TxD | 2 |
| 7 | DTR | 20 |
| 8 | CTS | 5 |

**Note:** *In some cases it may be preferable to connect the shield ground at Pin 1 of the device end and allow the system end to float. In either case, the shield should be connected to the frame ground at one end only.

## 128-Port Async Controller

The following information is for custom built cables connecting the 128-Port Async Controller to the Remote Async Nodes (RANs) and RANs to async devices. For more information on asynchronous communications, see *AIX Versions 3.2 and 4 Asynchronous Communications Guide* order number SC23-2488.

## 128-port async adapter

FC (8128) 128-Port Async Adapter is a Micro Channel adapter which can communicate with a Remote Async Node (RAN) at bit rates up to 1.2 Mbps.

## Cabling the adapter and the four different Remote Async Nodes

The following table shows the bit rates when the different remote async nodes are connected:

| Adapter Feature Code | Adapter Description | Remote Async Node | Maximum RAN to device Bit Rate in bps |
|---|---|---|---|
| 8128 | Micro Channel 128-Port Async | FC 8130 box style EIA-232 | 57,000 |
| | | FC 8136 rack style EIA-232 | |
| | | FC 8137 box style Enhanced EIA-232 | 230,000 |
| | | FC 8138 box style Enhanced RS-422 | |

# 128-Port Async Controller to Remote Async Node Cables

The cable has an HD-15 male connector on the controller side and an HD-15 female connector on the remote async node side.

## Cables NB and NC

Description: 128-Port Async Controller Cable, 8-wire.

The cable has eight conductors, four twisted-pair, and is shielded on the outside. If built to a length of 300 m (1000 ft) or less, conductors should be 28 AWG (stranded wire) with a capacitance rating of 52 pF/m (16 pF/ft) or less (Belden type 9806 or equivalent). For lengths greater than 300 m (1000 ft), conductors should be 24 AWG (stranded wire) with a capacitance rating of 52 pF/m (16 pF/ft) or less (Belden type 9831 or equivalent).



| System End Connector | | Device End Connector | |
|---|---|---|---|
| Pin      (Male) | Signal | Signal | Socket (Female) |
| 1 | RxD - | TxD - | 1 |
| 2 | RxD + | TxD + | 2 |
| 4 | RxC - | TxC - | 4 |
| 5 | RxC + | TxC + | 5 |
| 6 | TxD - | RxD - | 6 |
| 7 | TxD + | RxD + | 7 |
| 9 | TxC - | RxC - | 9 |
| 10 | TxC + | RxC + | 10 |
| Shell | Shield Ground | Shield Ground | Shell |

## Line Length, 8-wire

Controller line length for the 128-port async subsystem is measured as the total cabling length from the adapter to the last remote async node on the controller line. Individual cable lengths between remote async nodes or between the adapter and the first remote async node are not significant as long as total cable length does not exceed 1200 m (3930 feet) depending on the baud rate.

The 128-port async controller supports multiple controller line baud rates in 8-wire direct-attach mode. The following table shows the maximum allowable controller line length for each supported baud rate. The controller line length is the actual cable length from the controller to the last remote async node in the controller line.

For maximum performance, NB cables can be greater than 4.6 m (15 ft) if the distance from the controller to the last remote async node in the controller line does not exceed 300 m (1000 ft) running at 1.2 Mbps or 90m (300 ft.)  running at 2.4 Mbps.

| Controller Line Baud Rate | Total Controller Cable Length | |
|---|---|---|
| bps | m | ft |
| 2400 | 1200 | 3930 |
| 4800 | 1200 | 3930 |
| 9600 | 1200 | 3930 |
| 19200 | 1200 | 3930 |
| 38400 | 1200 | 3930 |
| 57600 | 1200 | 3930 |
| 76800 | 1200 | 3930 |
| 115000 | 900 | 2950 |
| 230000 | 400 | 1350 |
| 460000 | 300 | 1000 |
| 920000 | 300 | 1000 |
| 1200000 | 300 | 1000 |
| 2400000 | 90 | 300 |

**Note:** The above table assumes no intermediate connectors between remote async nodes. Each additional connection decreases the maximum allowable controller line length by approximately two percent due to increased line capacitance.

# Cable ND

Description: 128-Port Async Controller to Remote Async Node Cable, 4-wire.

The cable has four conductors, two twisted-pair, and is shielded on the outside.  If built to a length of 300 m (1000 ft) or less, conductors should be 28 AWG (stranded wire) with a capacitance rating of 52 pF/m (16 pF/ft) or less (Belden type 9804 or equivalent).  For lengths greater than 300 m (1000 ft), conductors should be 24 AWG (stranded wire) with a capacitance rating of 52 pF/m (16 pF/ft) or less (Belden type 9829 or equivalent).
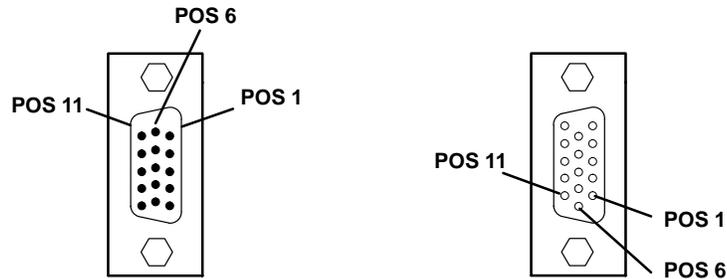


| System End Connector | | Device End Connector | |
|---|---|---|---|
| Pin       (Male) | Signal | Signal | Socket (Female) |
| 1 | RxD - | TxD - | 1 |
| 2 | RxD + | TxD + | 2 |
| 6 | TxD - | RxD - | 6 |
| 7 | TxD + | RxD+ | 7 |
| Shell | Shield Ground | Shield Ground | Shell |

## Line Length, 4-wire

The 128-port Async Controller supports two controller line baud rates in 4-wire, direct-attach mode.  The following table shows the maximum allowable controller line length for each supported baud rate.  The controller line length is the actual cable length from the controller to the last remote async node in the controller line.

| Controller Line Baud Rate | Total Controller Cable Length | |
|---|---|---|
| bps | m | ft |
| 230000 | 400 | 1350 |
| 460000 | 300 | 1000 |

**Note:**  The above table assumes no intermediate connectors between remote async nodes.  Each additional connection decreases the maximum allowable controller line length by approximately two percent due to increased line capacitance.

# Cable NE

Description: 128-Port Async Controller EIA-232 Modem Cable, System-Side.

The cable has eight twisted-pair conductors and is shielded on the outside.  Cable length can be from 1.8 m (6 ft) to 3.7 m (12 ft).  Conductors should be 24 AWG (stranded wire) with a capacitance rating of 41 pF/m (12.5 pF/ft) or less.



**System End**
**HD-15 Male**

**Modem End**
**DB-25 Male**

| | | | | |
|---|---|---|---|---|
| RxD | 1 | | 3 | RxD |
| RxC | 4 | | 17 | RxC |
| | 5 | | | |
| TxD | 6 | | 2 | TxD |
| TxC | 9 | | 15 | TxC |
| | 10 | | | |
| SG | 12 | | 7 | SG |
| FGND | Shell | Shield | Shell, 1 | FGND |
| | | | 4 | RTS |
| | | | 6 | DSR |
| | | | 20 | DTR |
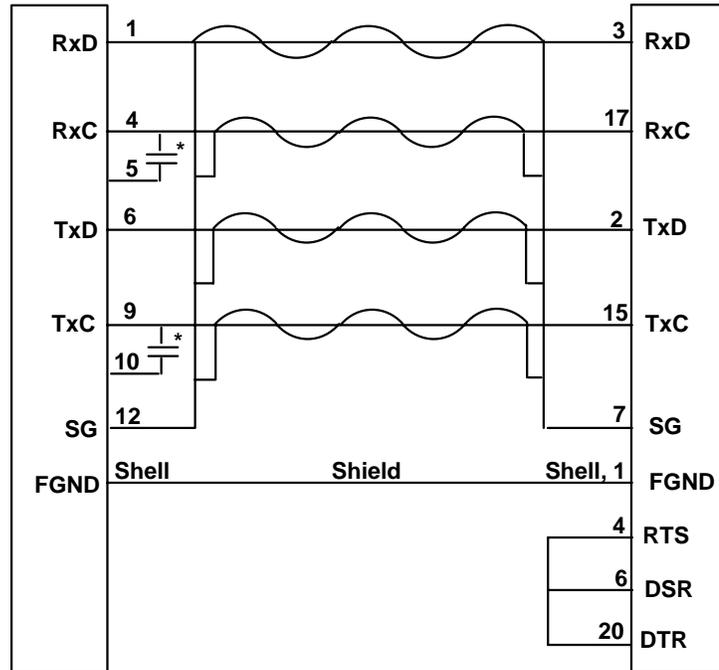
**\* 2200pf Capacitor**

**Note:**  See next page for notes.

The 128-port async controller supports multiple controller line baud rates in EIA-232 synchronous-modem-attach mode. Although the 128-port async controller can operate at 57.6 Kbps, to ensure a low error rate on the synchronous link, controller line baud rates of 19.2 Kbps or less are recommended.

**Note:** The length to the furthest RAN including modem cable should be limited to 50 feet. If there is a requirement to go up to 1000 feet, then EIA-422 modems must be used.

**Attention**: Testing Recommendation - When setting up equipment: Hook up all equipment near the host system. Make sure that the 128-port adapter, cables, modems, and RAN are all functioning properly. Equipment is easier to trouble shoot when all compoments are local. Consult modems technical manual for settings and wiring when modems are used back to back in a test configuration as described here. Baud rates of 19.2 Kbps or less are recommended to help insure low error rates. Using EIA232 modems, the length to the furthest RAN including modem cable should be limited to 50 feet. If there is a requirement to go up to 1000 feet, then EIA422 modems must be used. .

# Cable NF

Description: 128-Port Async Controller EIA-232 Modem Cable, Device-side.

The cable has eight twisted-pair conductors and is shielded on the outside. Cable length can be from 1.8 m (6 ft) to 3.7 m (12 ft). Conductors should be 24 AWG (stranded wire) with a capacitance rating of 41 pF/m (12.5 pF/ft) or less.



**POS 14**  **POS 1**

**POS 11**  **POS 1**
**POS 6**

**Modem End**
**DB-25 Male**

**Device End**
**HD-15 Female**

| | | | |
|---|---|---|---|
| **RxD** | 3 | 6 | **RxD** |
| **RxC** | 17 | 9 | **RxC** |
| | | *10 | |
| **TxD** | 2 | 1 | **TxD** |
| **TxC** | 15 | 4 | **TxC** |
| | | *5 | |
| **S G** | 7 | 12 | **S G** |
| **FGND** | Shell, 1   Shield   Shell | | **FGND** |
| **RTS** | 4 | | |
| **DSR** | 6 | | |
| **DTR** | 20 | | |

**\* 2200pf Capacitor**

The 128-port async controller supports multiple controller line baud rates in EIA-232 synchronous-modem-attach mode. Although the 128-port async controller can operate at 57.6 Kbps, to ensure a low error rate on the synchronous link, controller line baud rates of 19.2 Kbps or less are recommended.

**Note:** The length to the furthest RAN including modem cable should be limited to 50 feet. If there is a requirement to go up to 1000 feet, then EIA-422 modems must be used.

See Testing Recommendation in Chapter 5 Cable NE on page 5-33.

# Cable NG

Description: 128-Port Async Controller EIA-422 Modem Cable, System.

The cable has eight conductors, four twisted-pair, and is shielded on the outside. If built to a length of 300 m (1000 ft) or less, conductors should be 28 AWG (stranded wire) with a capacitance rating of 52 pF/m (16 pF/ft) or less (Belden type 9806 or equivalent). For lengths greater than 300 m (1000 ft), conductors should be 24 AWG (stranded wire) with a capacitance rating of 52 pF/m (16 pF/ft) or less (Belden type 9831 or equivalent).
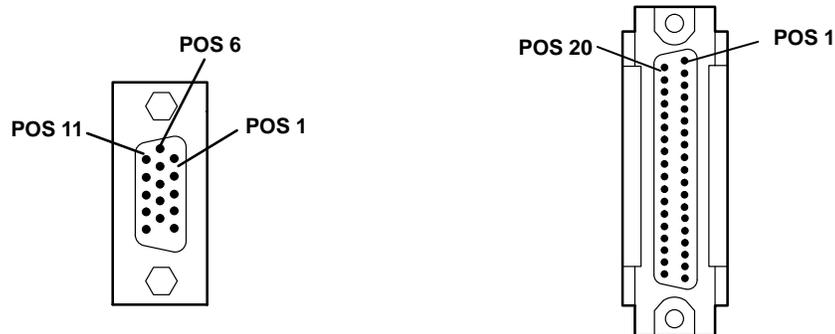


| System End Connector | | Device End Connector | |
|---|---|---|---|
| **Pin       (Male** | **Signal** | **Signal** | **Socket (Female)** |
| 1 | RxD - | RD - | 6 |
| 2 | RxD + | RD + | 24 |
| 4 | RxC - | RT - | 8 |
| 5 | RxC + | RT + | 26 |
| 6 | TxD - | SD - | 4 |
| 7 | TxD + | SD + | 22 |
| 9 | TxC - | ST - | 5 |
| 10 | TxC + | ST  + | 23 |
| 12 | Shield Ground | Shield Ground | 19 |

The 128-port async controller supports multiple controller line baud rates in EIA-422 synchronous-modem-attach mode. See the Controller Line Baud Rate table for Cable NB "Line Length, 8-wire" on page 5-30.

# Cable NH

Description: 128-Port Async Controller EIA-422 Modem Cable, Device-Side.

The cable has eight conductors, four twisted-pair, and is shielded on the outside.  If built to a length of 300 m (1000 ft) or less, conductors should be 28 AWG (stranded wire) with a capacitance rating of 52 pF/m (16 pF/ft) or less (Belden type 9806 or equivalent).  For lengths greater than 300 m (1000 ft), conductors should be 24 AWG (stranded wire) with a capacitance rating of 52 pF/m (16 pF/ft) or less (Belden type 9831 or equivalent).
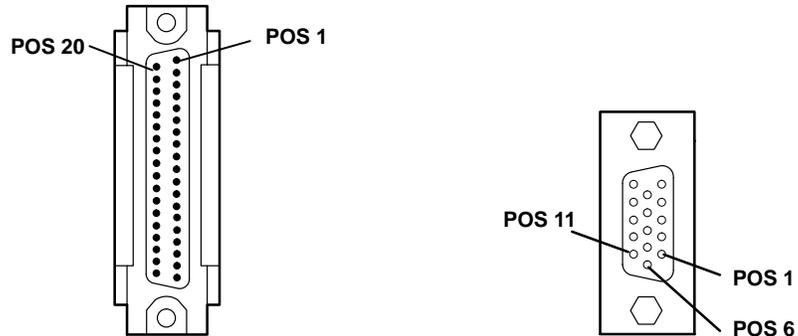
| System End Connector | | Device End Connector | |
|---|---|---|---|
| Pin      (Male | Signal | Signal | Socket (Female) |
| 6 | RD - | RxD - | 6 |
| 24 | RD + | RxD + | 7 |
| 8 | RT - | RxC - | 9 |
| 26 | RT + | RxC + | 10 |
| 4 | SD - | TxD - | 1 |
| 22 | SD + | TxD + | 2 |
| 5 | ST - | TxC - | 4 |
| 23 | ST + | TxC  + | 5 |
| 19 | Shield Ground | Shield Ground | 12 |

The 128-port async controller supports multiple controller line baud rates in EIA-422 synchronous-modem-attach mode.  See the Controller Line Baud Rate table for Cable NB "Line Length, 8-wire" on page  5-30.

# Remote Async Node-to-Device Cables

## Cable NK

Description: 10-pin RJ-45 to DB-25 Converter Cable for use with the Remote Async Node 16-Port EIA-232.
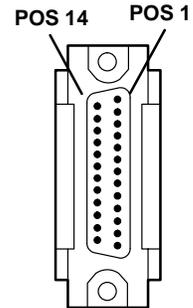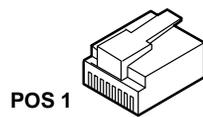
| System End Connector | | Device End Connector | |
|---|---|---|---|
| **Pin (Male** | **Signal** | **Signal** | **Socket (Female)** |
| 1 | RI | RI | 22 |
| 2 | DSR | DSR | 6 |
| 3 | RTS | RTS | 4 |
| 4 | Chassis Ground | Chassis Ground | Shell |
| 5 | TxD | TxD | 2 |
| 6 | RxD | RxD | 3 |
| 7 | Signal Ground | Signal Ground | 7 |
| 8 | CTS | CTS | 5 |
| 9 | DTR | DTR | 20 |
| 10 | CD | CD | 8 |

**Note:**

1. This cable assembly is shielded.

2. This cable assembly and the 64-port RJ-45 to DB-25 converter cable (FC 6402) are not interchangeable.

# Cable NL

Description: Customer-supplied cable for connecting Remote Async Node 16-Port EIA-232 to a printer or terminal device.

Cable length can be up to 30 m (100 ft) for baud rates up to 57.6 Kbps. See "RAN to Device Cable Lengths" on page 5-41. Use overall foil/braid shielded multiconductor cable with a capacitance rating of 41 pF/m (12.5 pF/ft) or less. Conductors should be 28 AWG (stranded wire). For lengths less than 61 m (200 ft), higher capacitance cable can be used, as long as the total capacitance (including intermediate connectors and cables) does not exceed 2500 pF.



RAN to Printer/T erminal Cable (NL)
for 4- and 6-Pin RJ-1 1, and 8-Pin RJ-45 Plugs

**Note:** *The physical location of DCD and DSR may be interchanged through software control if desired. Used only on 8-pin RJ-45 cable.

The following diagram illustrates cable NL using a 10-pin RJ-45 plug.
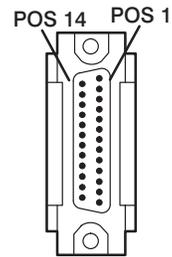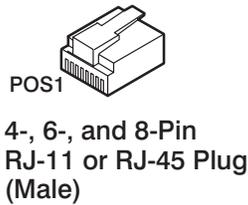
10-Pin RJ-45

Terminal/Printer
DTE DB-25

| RI | 1 | | 22 | RI |
| DSR | 2 | | 20 | DTR |
| RTS | 3 | | 5 | CTS |
| FGND | 4 | | Shell | FGND |
| TxD | 5 | | 3 | RxD |
| RxD | 6 | | 2 | TxD |
| SG | 7 | | 7 | SG |
| CTS | 8 | | 4 | RTS |
| DTR | 9 | | 6 | DSR |
| DCD | 10 | | 8 | DCD |
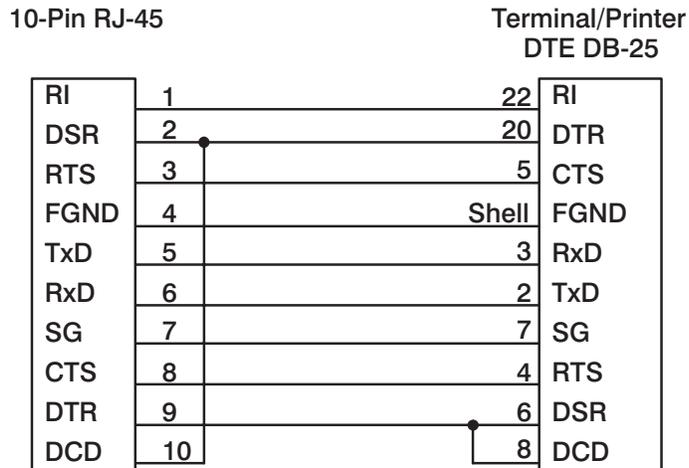
RAN to Printer/T erminal Cable (NL)
for 10-Pin RJ-45 Plug

**Attention:**  The receivers and drivers used in most asynchronous communications devices are sensitive to electrostatic discharge (ESD). To reduce the possibility of exposure to ESD, observe the following cabling practices when building or using device cables for attachment to the Remote Async Node 16-Port EIA-232:

1. Do not build a cable that has exposed conductors, leads, or pins that could be touched by someone not protected against ESD.  Avoid the use of punchdown blocks and patch panels which have exposed terminator/pins.  In the event that you use intermediate connectors or cables, be sure to discharge them to ground before plugging them into equipment.

2. Do not run any cables outdoors without having proper transient voltage suppression devices installed.

3. Do not route cables near or around items such as power transformers, high-power switching devices and refrigeration units.

4. Use shielded cables.  All wires should be terminated, not floating.  The shield should be connected to shield ground at the remote async node.

# Cable NM

Description: Customer-supplied cable for connecting Remote Async Node 16-Port EIA-232 to a modem device.

Cable length can be up to 30 m (100 ft) for baud rates up to 57.6 Kbps. See "RAN to Device Cable Lengths" on page 5-41. Use overall foil/braid shielded multiconductor cable with a capacitance rating of 41 pF/m (12.5 pF/ft) or less. Conductors should be 28 AWG (stranded wire). For lengths less than 61 m (200 ft), higher capacitance cable can be used, as long as the total capacitance (including intermediate connectors and cables) does not exceed 2500 pF.

POS 14    POS 1

POS1

4-, 6-, and 10-Pin
R-J11 or RJ-45 Plug
(Male)
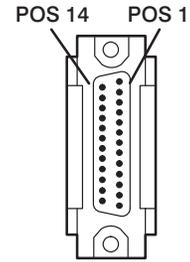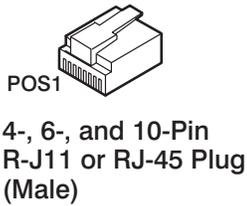
DB-25 Pin (Male)

| | 4-Pin RJ-11 | 6-Pin RJ-11 | 10-Pin RJ-45 | Cable NM Modem DCE DB-25 | |
|---|---|---|---|---|---|
| RI | 1 | | | 1 | 22 | RI |
| DSR | 2 | | | 2 | 6 | DSR |
| RTS | 3 | | 1 | 3 | 4 | RTS |
| FGND | 4 | 1 | 2 | 4 | Shell | FGND |
| TxD | 5 | 2 | 3 | 5 | 2 | TxD |
| RxD | 6 | 3 | 4 | 6 | 3 | RxD |
| SG | 7 | 4 | 5 | 7 | 7 | SG |
| CTS | 8 | | 6 | 8 | 5 | CTS |
| DTR | 9 | | | 9 | 20 | DTR |
| DCD | 10 | | | 10 | 8 | DCD |

RAN to Modem Cable (NM)
for 4-Pin, 6-Pin RJ-1 1, and 10-Pin RJ-45 Plugs

**Attention:** The receivers and drivers used in most asynchronous communications devices are sensitive to electrostatic discharge (ESD). To reduce the possibility of exposure to ESD, observe the following cabling practices when building or using device cables for attachment to the Remote Async Node 16-Port EIA-232:

1. Do not build a cable that has exposed conductors, leads, or pins that could be touched by someone not protected against ESD. Avoid the use of punchdown blocks and patch panels which have exposed terminator/pins. In the event that you use intermediate connectors or cables, be sure to discharge them to ground before plugging them into equipment.

2. Do not run any cables outdoors without having proper transient voltage suppression devices installed.

3. Do not route cables near or around items such as power transformers, high-power switching devices and refrigeration units.

4. Use shielded cables. All wires should be terminated, not floating. The shield should be connected to shield ground at the remote async node.

**Note:**

1. This cable assembly is shielded.

2. This cable assembly and the 64-port RJ-45 to DB-25 converter cable (FC 6402) are not interchangeable.

## RAN to Device Cable Lengths

| RAN to Device Line Baud Rate | Total RAN to Device Cable Length | |
|---|---|---|
| bps | m | ft |
| 57600 or less | 30 | 100 |
| 115000 | 24 | 80 |
| 230000 | 12 | 40 |

The following diagram illustrates cable NM using an 8-pin RJ-45 plug.

```
                                                      Cable NM
                                                       Modem
                 8-Pin RJ-45                            DCE
                  (Male)                               DB-25

        ┌──────────────┐                      ┌──────────────┐
        │  DCD*    1   ├──────────────────────┤ 8   DCD      │
        │  RTS     2   ├──────────────────────┤ 4   RTS      │
        │  FGND    3   ├──────────────────Shell┤   FGND      │
        │  TxD     4   ├──────────────────────┤ 2   TxD      │
        │  RxD     5   ├──────────────────────┤ 3   RxD      │
        │  SG      6   ├──────────────────────┤ 7   SG       │
        │  CTS     7   ├──────────────────────┤ 5   CTS      │
        │  DTR     8   ├──────────────────────┤ 20  DTR      │
        └──────────────┘                      └──────────────┘
```
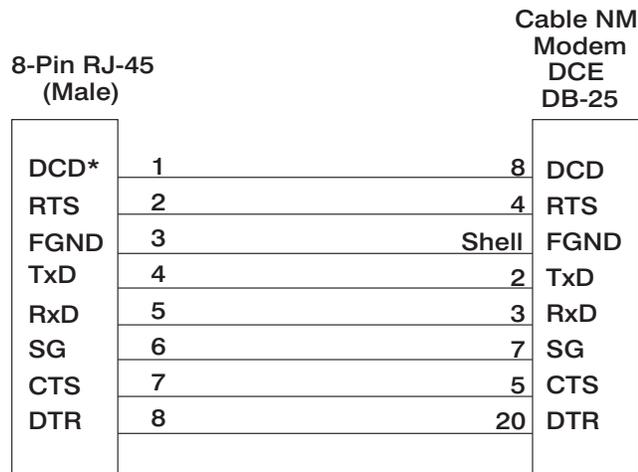
**RAN to Modem Cable (NM)**
**for 8-Pin RJ-45 Plug**

**Note:**  *The physical location of DCD is switched with DSR through software control.

**Attention:**  The receivers and drivers used in most asynchronous communications devices are  sensitive to electrostatic discharge (ESD).  To reduce the possibility of exposure to ESD, observe the following:

1. Do not build a cable that has exposed conductors, leads, or pins that could be touched by someone not protected against ESD.  Avoid the use of punchdown blocks and patch panels which have exposed terminator/pins.  In the event that you use intermediate connectors or cables, discharge them to ground before plugging them into equipment.

2. Do not run any cables outdoors without having proper transient voltage suppression devices installed.

3. Do not route cables near or around items such as power transformers, high-power switching devices and refrigeration units.

4. Use shielded cables.

5. All wires should be terminated, not floating.  The shields should be connected to shield ground at the remote async node.

# Cable NP

Description: 10-pin RJ-45 to DB-25 converter cable for use with the Enhanced Remote Async Node 16-Port RS-422.  Only six wires are used by the NP cable.

**Note:**  An NK cable (an EIA-232 cable) can be used for an NP cable if available.  It has some extra wires but should work.
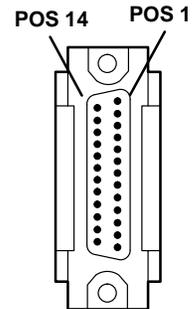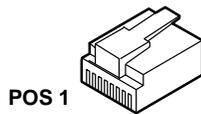
| System End Connector | | Device End Connector | |
|---|---|---|---|
| **Pin      (Male)** | **Signal** | **Signal** | **Socket (Female)** |
| 1 | Reserved | Reserved | 22 |
| 2 | Reserved | Reserved | 6 |
| 3 | TxD+ | TxD+ | 4 |
| 4 | Chassis Ground | Chassis Ground | Shell |
| 5 | TxD- | TxD- | 2 |
| 6 | RxD- | RxD- | 3 |
| 7 | Signal Ground | Signal Ground | 7 |
| 8 | RxD+ | RxD+ | 5 |
| 9 | Reserved | Reserved | 20 |
| 10 | Reserved | Reserved | 8 |

**Note:**

- This cable assembly is shielded.

# Cable RA

Description: This is a Serial to Re_IPL port Re_IPL Cable.

There are two lengths of serial to Re_IPL port Re_IPL cables available. One cable is 3.7 meters and the other is 8 meters long.

**POS 6**   **POS 1**

**POS 14**   **POS 1**

| System End Connector | Signal | Device End Connector |
|---|---|---|
| **Socket (Female)** | | **Socket (Female)** |
| 7 | Ground | 1 |
| 2, 3 | TxD | 3 |
| 6, 8, 20 | DTR | 2 |
| 4, 5 ,22 | RTS | 4 |

# Cable RB

Description: This is a serial to serial port Re_IPL Cable.

The serial to serial port Re_IPL cable comes in two lengths, 3.7 or 8 meters long.

POS 14    POS 1              POS 14    POS 1
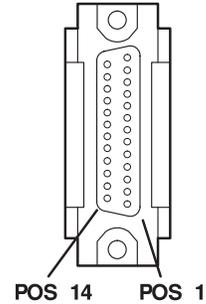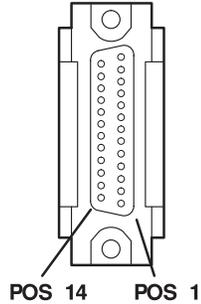
| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Socket (Female) |
| Shell | Shield Ground | Shell, 1 |
| 2 | TxD | 3 |
| 3 | RxD | 2 |
| 4 | RTS | 5 |
| 5 | CTS | 4 |
| 6, 8 | DSR, CD | 20 |
| 7 | Signal Ground | 7 |
| 20 | DTR | 6, 8 |

# Multiport/2 4P/8P Interface Cable

The 4P/8P Multiport Interface Cable supports all of the following Multiport/2 Electronic Interface Boards:

- 8P EIA-422

- 8P EIA-232

- 4P EIA-232

- 4P EIA-232/4P EIA-422.

# Cable T1

Description: 4/8-Port 232/422 Multiport/2 Cable. The system end of the 4/8-Port 232/422 Multiport/2 Cable consists of a 78-position D-shell connector. The cable device end consists of a Molded Distribution Box (MDB) with eight 25-pin D-shell connectors to allow up to eight standard device connections, depending on the number of ports supported by the Multiport/2 adapter.

## EIA-422 Multiport/2 Adapter 78- and 25-Position Connector



| Mnemonic | Port 0 | Port 1 | Port 2 | Port 3 | 25-Position Connector |
|----------|--------|--------|--------|--------|-----------------------|
| TxD      | 40     | 04     | 66     | 69     | 02/BA-103             |
| RxD      | 02     | 64     | 28     | 31     | 03/BB-104             |
| RTS      | 01     | 63     | 27     | 30     | 04/CA-105             |
| CTS      | 61     | 25     | 48     | 51     | 05/CB-106             |
| DTECLK   | 41     | 05     | --     | --     | 24/DA-113             |
| SG       | 43     | 07     | 08     | 67     | 07/AB-102             |
| DCD      | 22     | 45     | 09     | 12     | 08/CF-109             |
| RxCLKIN  | 62     | 26     | --     | --     | 17/DD-115             |
| DTR      | 60     | 24     | 47     | 50     | 20/CD-108.2           |
| DSR      | 42     | 06     | 68     | 71     | 06/CC-107             |
| HRS      | 21     | 44     | --     | --     | 23/CH-111             |
| RI       | 03     | 65     | 29     | 32     | 22/CE-125             |
| TxCLKIN  | 23     | 46     | --     | --     | 15/DB-114             |

| Mnemonic | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|----------|--------|--------|--------|--------|-----------------------|
| TxD+     | 73     | 55     | 76     | 58     | 02/TXA                |
| TxD-     | 34     | 16     | 37     | 19     | 04/TXB                |
| RxD+     | 54     | 75     | 57     | 78     | 03/RXA                |
| RxD-     | 15     | 36     | 18     | 39     | 05/RXB                |
| SG       | 11     | 70     | --     | --     | 07/                   |

## 8-Port EIA-232-C Multiport/2 Adapter 78- and 25-Position Connectors



| Mnemonic | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|---|---|---|---|---|---|---|---|---|---|
| TxD | 40 | 04 | 66 | 69 | 73 | 55 | 76 | 58 | 02/BA-103 |
| RxD | 02 | 64 | 28 | 31 | 54 | 75 | 57 | 78 | 03/BB-104 |
| RTS | 01 | 63 | 27 | 30 | 34 | 16 | 37 | 19 | 04/CA-105 |
| CTS | 61 | 25 | 48 | 51 | 15 | 36 | 18 | 39 | 05/CB-106 |
| DTECLK | 41 | 05 | -- | -- | -- | -- | -- | -- | 24/DA-113 |
| SG | 43 | 07 | 08 | 67 | 11 | 70 | -- | -- | 07/AB-102 |
| DCD | 22 | 45 | 09 | 12 | 74 | 56 | 77 | 59 | 08/CF-109 |
| RxCLKIN | 62 | 26 | -- | -- | -- | -- | -- | -- | 17/DD-115 |
| DTR | 60 | 24 | 47 | 50 | 35 | 17 | 38 | 20 | 20/CD-108.2 |
| DSR | 42 | 06 | 68 | 71 | 72 | 33 | 53 | 14 | 06/CC-107 |
| HRS | 21 | 44 | -- | -- | -- | -- | -- | -- | 23/CH-111 |
| RI | 03 | 65 | 29 | 32 | 49 | 52 | 10 | 13 | 22/CE-125 |
| TxCLKIN | 23 | 46 | -- | -- | -- | -- | -- | -- | 15/DB-114 |

## 4-Port EIA-232-C Multiport/2 Adapter 78- and 25-Position Connectors



| Mnemonic | Port 0 | Port 1 | Port 2 | Port 3 | 25-Position Connector |
|---|---|---|---|---|---|
| TxD | 40 | 04 | 66 | 69 | 02/BA-103 |
| RxD | 02 | 64 | 28 | 31 | 03/BB-104 |
| RTS | 01 | 63 | 27 | 30 | 04/CA-105 |
| CTS | 61 | 25 | 48 | 51 | 05/CB-106 |
| DTECLK | 41 | 05 | -- | -- | 24/DA-113 |
| SG | 43 | 07 | 08 | 67 | 07/AB-102 |
| DCD | 22 | 45 | 09 | 12 | 08/CF-109 |
| RxCLKIN | 62 | 26 | -- | -- | 17/DD-115 |
| DTR | 60 | 24 | 47 | 50 | 20/CD-108.2 |
| DSR | 42 | 06 | 68 | 71 | 06/CC-107 |
| HRS | 21 | 44 | -- | -- | 23/CH-111 |
| RI | 03 | 65 | 29 | 32 | 22/CE-125 |
| TxCLKIN | 23 | 46 | -- | -- | 15/DB-114 |

## 4-Port EIA-232-C/4-Port-422-A Multiport/2 Adapter

| Mnemonic | Port 0 | Port 1 | Port 2 | Port 3 | 25-Position Connector |
|---|---|---|---|---|---|
| TxD | 40 | 04 | 66 | 69 | 02/BA-103 |
| RxD | 02 | 64 | 28 | 31 | 03/BB-104 |
| RTS | 01 | 63 | 27 | 30 | 04/CA-105 |
| CTS | 61 | 25 | 48 | 51 | 05/CB-106 |
| DTECLK | 41 | 05 | -- | -- | 24/DA-113 |
| SG | 43 | 07 | 08 | 67 | 07/AB-102 |
| DCD | 22 | 45 | 09 | 12 | 08/CF-109 |
| RxCLKIN | 62 | 26 | -- | -- | 17/DD-115 |
| DTR | 60 | 24 | 47 | 50 | 20/CD-108.2 |
| DSR | 42 | 06 | 68 | 71 | 06/CC-107 |
| HRS | 21 | 44 | -- | -- | 23/CH-111 |
| RI | 03 | 65 | 29 | 32 | 22/CE-125 |
| TxCLKIN | 23 | 46 | -- | -- | 15/DB-114 |

| Mnemonic | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|---|---|---|---|---|---|
| TxD+ | 73 | 55 | 76 | 58 | 02/TxA |
| TxD- | 34 | 16 | 37 | 19 | 04/TxB |
| RxD+ | 54 | 75 | 57 | 78 | 03/RxA |
| RxD- | 15 | 36 | 18 | 39 | 05/RxB |
| Signal Ground | 11 | 70 | -- | -- | 07/GRD |

# Cable T2

Description:  6-Port Sync Multiport/2 Cable.

The system end of the 6-Port Sync Multiport/2 cable consists of a 78-position D-shell connector.  The cable device end consists of an MDB with six 25-pin D-shell connectors to allow six devices to be connected to the six ports supported by this adapter.

## 6-Port Synchronous EIA-232-C Multiport/2 Adapter 78-and 25-Position Connectors

| Mnemonic | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | 25-Position Connector |
|---|---|---|---|---|---|---|---|
| TxD | 40 | 04 | 66 | 69 | 73 | 55 | 02/BA-103 |
| RxD | 02 | 64 | 28 | 31 | 54 | 75 | 03/BB-104 |
| RTS | 01 | 63 | 27 | 30 | 34 | 16 | 04/CA-105 |
| CTS | 61 | 25 | 48 | 51 | 15 | 36 | 05/CB-106 |
| DTECLK | 41 | 05 | 19 | 20 | 10 | 13 | 24/DA-113 |
| SG | 43 | 07 | 08 | 67 | 11 | 70 | 07/AB-102 |
| DCD | 22 | 45 | 09 | 12 | 74 | 56 | 08/CF-109 |
| RxCLKIN | 62 | 26 | 57 | 77 | 18 | 53 | 17/DD-115 |
| DTR | 60 | 24 | 47 | 50 | 35 | 17 | 20/CD-108.2 |
| DSR | 42 | 06 | 68 | 71 | 72 | 33 | 06/CC-107 |
| HRS | 21 | 44 | 76 | 37 | 38 | 58 | 23/CH-111 |
| RI | 03 | 65 | 29 | 32 | 49 | 52 | 22/CE-125 |
| TxCLKIN | 23 | 46 | 78 | 59 | 39 | 14 | 15/DB-114 |

# Cable T3

Description:  6-Port V.35 Portmaster Cable.

The system end of the 6-Port V.35 Portmaster cable consists of a 100-position D-shell connector.  The cable device end consists of an MDB with six 25-pin D-shell connectors to allow six devices to be connected to the six ports supported by the adapter.

## 6-Port V.35 Portmaster Adapter/A 100- and 25-Position Connectors
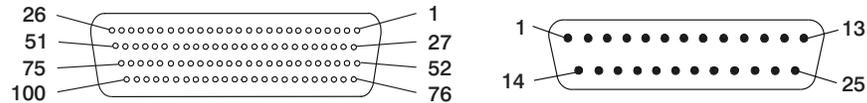
| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | 25-Position Connector |
|----------|-----|--------|--------|--------|--------|--------|--------|----------------------|
| TxDA | O | 94 | 21 | 47 | 71 | 72 | 23 | 02 |
| TxDB | O | 70 | 46 | 22 | 95 | 96 | 48 | 14 |
| RxDA | \| | 08 | 54 | 58 | 29 | 28 | 57 | 03 |
| RxDB | \| | 33 | 78 | 82 | 04 | 03 | 81 | 16 |
| TxCA IN | \| | 76 | 06 | 77 | 56 | 27 | 55 | 15 |
| TxCB IN | \| | 52 | 31 | 53 | 80 | 02 | 79 | 12 |
| RxCA | \| | 20 | 41 | 38 | 19 | 32 | 30 | 17 |
| RxCB | \| | 45 | 16 | 13 | 44 | 07 | 05 | 09 |
| TxCA OUT | O | 24 | 73 | 98 | 25 | 99 | 26 | 24 |
| TxCB OUT | O | 49 | 97 | 74 | 50 | 75 | 51 | 11 |
| RTS | O | 42 | 43 | 92 | 93 | 37 | 39 | 04 |
| CTS | \| | 15 | 65 | 86 | 87 | 59 | 09 | 05 |
| DCD | \| | 89 | 40 | 62 | 61 | 35 | 84 | 08 |
| DTR | O | 18 | 91 | 69 | 68 | 14 | 12 | 20 |
| DSR | \| | 66 | 90 | 88 | 64 | 60 | 85 | 06 |
| SGND | -- | 34 | 17 | 63 | 67 | 01 | 83 | 07 |
| FGND | | -- | 100 | | Shield | | | 01 |

# Cable T4

Description:  8-Port 232/422 Portmaster Cable.

The system end of the 8-Port 232/422 Portmaster cable consists of a 100-position D-shell connector.  The cable device end consists of an MDB with eight 25-pin D-shell connectors to allow up to eight devices to be connected to the eight ports supported by the adapter.

## 8-Port EIA-422-A Portmaster Adapter/A 100- and 25-Position Connectors

| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|---|---|---|---|---|---|---|---|---|---|---|
| TxD | O | 51 | 54 | 07 | 10 | 13 | 16 | 94 | 48 | 02/SDA |
|  | O | 52 | 55 | 08 | 11 | 14 | 17 | 95 | 49 | 24/SDB |
| RxD | \| | 02 | 05 | 83 | 86 | 89 | 92 | 46 | 74 | 03/RDA |
|  | \| | 78 | 81 | 35 | 38 | 41 | 44 | 72 | 25 | 17/RDB |
| -RTS | O | 01 | 04 | 82 | 85 | 88 | 91 | 45 | 73 | 04/RSA |
|  | O | 76 | 79 | 33 | 36 | 39 | 42 | 70 | 23 | 20/RSB |
| -CTS | \| | 77 | 80 | 34 | 37 | 40 | 43 | 71 | 24 | 05/CSA |
|  | \| | 53 | 56 | 09 | 12 | 15 | 18 | 96 | 50 | 06/CSB |
| TxCLK | \| | 28 | 31 | 59 | 62 | 65 | 68 | 21 | 99 | 08/STA |
|  | \| | 03 | 06 | 84 | 87 | 90 | 93 | 47 | 75 | 22/STB |
| RxCLK | \| | 29 | 32 | 60 | 63 | 66 | 69 | 22 | 100 | 15/RTA |
|  | \| | 27 | 30 | 58 | 61 | 64 | 67 | 20 | 98 | 23/RTB |
| SGND | -- | 19 | 19 | 26 | 26 | 57 | 57 | 97 | 97 | 07/GND |
| FGND | | Cable Shield | | | | | | | | 01/FGND |

# Cable T5

Description:  6-Port X.21 Portmaster Cable.

The system end of the 6-Port X.21 Portmaster cable consists of a 78-position D-shell connector.  The cable device end consists of an MDB with six 25-pin D-shell connectors to allow six devices to be connected to the six ports supported by the adapter.

## 6-Port X.21 Portmaster Adapter/A 78 - and 25-Position Connectors
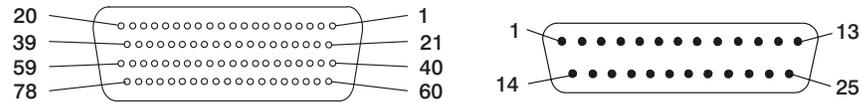


| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | 25-Position Connector |
|----------|-----|--------|--------|--------|--------|--------|--------|------------------------|
| T(A) | O | 40 | 04 | 66 | 69 | 73 | 55 | 02 |
| T(B) | O | 41 | 05 | 19 | 20 | 10 | 13 | 24 |
| R(A) | \| | 02 | 64 | 28 | 31 | 54 | 75 | 03 |
| R(B) | \| | 62 | 26 | 57 | 77 | 18 | 53 | 17 |
| C(A) | O | 01 | 63 | 27 | 30 | 34 | 16 | 04 |
| C(B) | O | 60 | 24 | 47 | 50 | 35 | 17 | 20 |
| I(A) | \| | 61 | 25 | 48 | 51 | 15 | 36 | 05 |
| I(B) | \| | 42 | 06 | 68 | 71 | 72 | 33 | 06 |
| S(A) | \| | 23 | 46 | 78 | 59 | 39 | 14 | 15 |
| S(B) | \| | 21 | 44 | 76 | 37 | 38 | 58 | 23 |
| X(A) | O | 22 | 45 | 09 | 12 | 74 | 56 | 08 |
| X(B) | O | 03 | 65 | 29 | 32 | 49 | 52 | 22 |
| SGND | -- | 43 | 07 | 08 | 67 | 11 | 70 | 07 |

## 8-Port EIA-232-D Portmaster Adapter/A 100- and 25-Position Connectors



| Mnemonic | I/O | Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 | Port 7 | 25-Position Connector |
|----------|-----|--------|--------|--------|--------|--------|--------|--------|--------|-----------------------|
| TxD | O | 51 | 54 | 07 | 10 | 13 | 16 | 94 | 48 | 02/BA |
| RxD | I | 02 | 05 | 83 | 86 | 89 | 92 | 46 | 74 | 03/BB |
| RTS | O | 01 | 04 | 82 | 85 | 88 | 91 | 45 | 73 | 04/CA |
| CTS | I | 77 | 80 | 34 | 37 | 40 | 43 | 71 | 24 | 05/CB |
| DCD | I | 28 | 31 | 59 | 62 | 65 | 68 | 21 | 99 | 08/CF |
| DTR | O | 76 | 79 | 33 | 36 | 39 | 42 | 70 | 23 | 20/CD |
| DSR | I | 53 | 56 | 09 | 12 | 15 | 18 | 96 | 50 | 06/CC |
| HRS | I | 27 | 30 | 58 | 61 | 64 | 67 | 20 | 98 | 23/CI |
| RI | I | 03 | 06 | 84 | 87 | 90 | 93 | 47 | 75 | 22/CE |
| TxCLKIN | I | 29 | 32 | 60 | 63 | 66 | 69 | 22 | 100 | 15/DB |
| TxCLK | O | 52 | 55 | 08 | 11 | 14 | 17 | 95 | 49 | 24/DA |
| RxCLK | I | 78 | 81 | 35 | 38 | 41 | 44 | 72 | 25 | 17/DD |
| SGND | -- | 19 | 19 | 26 | 26 | 57 | 57 | 97 | 97 | 07/AB |
| FGND | | Cable Shield | | | | | | | | 01/AA |

# Cable T6

Description: 6 Port V.35 Network Attachment Cable for use with the 6 Port-V.35 Portmaster.

POS A

POS 14          POS 1

| System End Connector | Signal | Device End Connector |
|---|---|---|
| **Socket (Female)** | | **Pin (Male)** |
| 4 | RTS | C |
| 5 | CTS | D |
| 6 | DSR | E |
| 8 | CD | F |
| 20 | DTR | H |
| 24 | DTECLK(A) | U |
| 11 | DTECLK(B) | W |
| 2 | TxD (A) | P |
| 14 | TxD (B) | S |
| 3 | RxD (A) | R |
| 16 | RxD (B) | T |
| 15 | Tx Clk (A) | Y |
| 12 | Tx Clk (B) | AA |
| 17 | Rx Clk (A) | V |
| 9 | Rx Clk (B) | X |
| 7 | Ground | B |
| 8 | Frame Ground | Shield |

# Cable T7

Description: 6-Port X.21 Network Attachment Cable for use with the 6-Port-X.21 Portmaster.

POS 9    POS 1

POS 14    POS 1
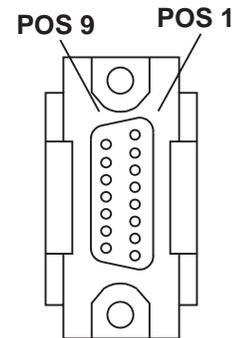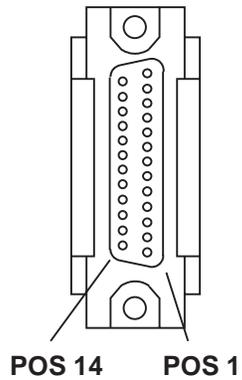
| System End Connector | Signal | Device End Connector |
|---|---|---|
| Socket (Female) | | Pin (Male) |
| 2 | T (A) | 2 |
| 24 | T (B) | 9 |
| 4 | C (A) | 3 |
| 20 | C (B) | 10 |
| 3 | R (A) | 4 |
| 17 | R (B) | 11 |
| 5 | I (A) | 5 |
| 6 | I (B) | 12 |
| 15 | S (A) | 6 |
| 23 | S (B) | 13 |
| 15 | X(A) | 7 |
| 23 | X(B) | 14 |
| 7 | Ground | 8 |

# Cable Number to Connector Cross-reference Table

| Cable Letter | Cable Name | Connector Descriptions (adapter end/device end) |
|---|---|---|
| A | PC Parallel Printer Cable | 25-pin D male/36-pin D male barrier |
| B | Serial Port Jumper Cable | 10-pin MODU female/25-pin D male |
| D | Async Cable-EIA-232/V.24 | 25-pin D female/25-pin D male |
| E | Printer/Terminal Interposer-EIA-232 | 25-pin D female/25-pin D male |
| I | Printer/Terminal Cable-EIA-232 | 25-pin D female/25-pin D male |
| J | Multiport Interface Cable | 78-pin D male/78-pin D female |
| K | Terminal Cable-EIA-422A | 25-pin D male/25-pin D male |
| L | 16-Port Interface Cable-EIA-232 | 78-pin D male/25-pin D male |
| M | 16-Port Interface Cable-EIA-422A | 78-pin D male/25-pin D male |
| N | 64-Port Controller Cable | RJ-45 male/RJ-45 male |
| P | 64-Port Converter Cable for the 16 port concentrator | 8-pin RJ-45 male/25-pin D male |
| Q | X.25 Attachment Cable-X.21 | 37-pin D female/15-pin D male |
| R | X.25 Attachment Cable-V.24 | 37-pin D female/25-pin D male |
| S | X.25 Attachment Cable-V.35 | 37-pin D female/34-pin Type M male |
| T | 4-Port Multiprotocol Interface Cable | 78-pin D male/78-pin D female |
| U | Multiprotocol Attachment Cable-V.35 | 15-pin D female/34-pin Type M male |
| V | Multiprotocol Attachment Cable-EIA-232/V.24 | 25-pin D female/25-pin D male |
| W | Multiprotocol Attachment Cable-X.21 | 15-pin D female/15-pin D female |
| X | EIA-422A Cable | 25-pin D female/customer supplied |
| Z | Token Ring converter Cable | 8-pin RJ-45 male/9-pin D |
| AR | 9-Pin to 25-Pin Serial converter Cable | 9-pin D female/25-pin D male |
| AS | Serial Port fanout Cable makes second serial port available see Standard I/O Ports page | 25-pin D female/two 25-pin D male |
| KK | Serial Optical Channel Converter Cable (all lengths) | SC Optical Receptacle Connector (color-coded) |
| NB, NC | 128-Port Async Controller Cable, 8-wire | 15-pin HD male/15-pin HD female |
| ND | 128-Port Async Controller Cable, 4-wire | 15-pin HD male/15-pin HD female |
| NE | 128-Port Async Controller EIA-232 Modem Cable, System | 15-pin HD male/25-pin D male |
| NF | 128-Port Async Controller EIA-232 Modem Cable, Device | 25-pin D male/15-pin HD female |
| NG | 128-Port Async Controller EIA-422 Modem Cable, System | 15-pin HD male/37-pin D male |
| NH | 128-Port Async Controller EIA-422 Modem Cable, Device | 37-pin D male/15-pin HD female |
| NK | RJ-45 to DB-25 Coverter Cable | 10-pin RJ-45 male/25-pin D male |
| NL | Customer-supplied cable for connecting Remote Async Node 16-Port EIA-232 to a printer or terminal device | 4-, 6-, 8-, 10-pin RJ-45 male/25-pin D male |
| NM | Customer-supplied cable for connecting Remote Async Node 16-Port EIA-232 to a modem device | 4-, 6-, 8-, 10-pin RJ-45 male/25-pin D male |
| NP | RJ-45 to DB-25 Converter Cable | 10-pin RJ-45 male/25-pin D male |
| RA | Serial to Re-IPL Port Re-IPL Cable | 25-pin D female/9-pin D female |
| RB | Serial to Serial port Re-IPL Cable | 25-pin D female/25-pin D female |
| T1 | 4/8-Port 232/422 Multiport/2 Cable | 78-pin D male/25-pin D male |

| Cable Letter | Cable Name | Connector Descriptions (adapter end/device end) |
|---|---|---|
| T2 | 6-Port Sync Multiport/2 Cable | 78-pin D male/25-pin D male |
| T3 | 6-Port V.35 Portmaster Cable | 100-pin D male/25-pin D male |
| T4 | 8-Port 232/422 Portmaster Cable | 100-pin D male/25-pin D male |
| T5 | 6-Port X.21 Portmaster Cable | 78-pin D male/25-pin D male |
| T6 | 6-Port Network Cable V.35 Portmaster | 25-pin D female/34-pin Type M male |
| T7 | 6-Port Network Cable X.21 Portmaster | 25-pin D female/15-pin D male |
| XX | 16-Port Concentrator to printer or terminal device | 8-pin RJ-45 male/25-pin D male |
| YY | 16-Port Concentrator to modem | 8-pin RJ-45 male/25-pin D male |

# Standard I/O pinouts

## Keyboard Connector

The physical layout of the keyboard connector is shown in the following illustration.
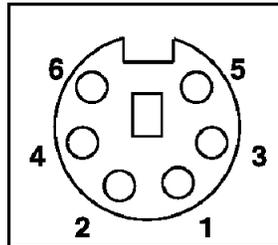


| Pin | Signal |
|-----|--------|
| 1 | Keyboard Data |
| 2 | Speaker Signal |
| 3 | Ground |
| 4 | +5V dc |
| 5 | Keyboard Clock |
| 6 | Speaker Ground |

## Mouse Connector

The physical layout of the mouse adapter connector is shown in the following illustration.
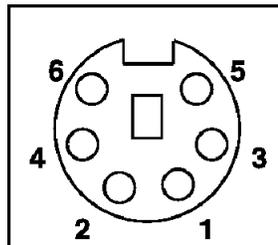


| Pin | Signal |
|-----|--------|
| 1 | Mouse Data |
| 2 | Reserved |
| 3 | Ground |
| 4 | +5V dc |
| 5 | Mouse Clock |
| 6 | Reserved |

# Tablet Connector

The physical layout of the tablet connector is shown in the following illustration.
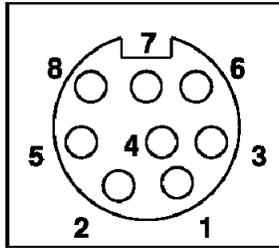


| Pin | Signal |
|-----|--------|
| 1 | Ground |
| 2 | Direct Current |
| 3 | (dc) Return |
|   | (Ground) |
| 4 | +5 V dc |
|   | Reserved |
| 5 | Receive from device |
| 6 | Transmit to device |
| 7 | Reserved |
| 8 | Reserved |

# Serial Port Connectors

A physical layout of the serial port connectors is shown in the following two illustrations.
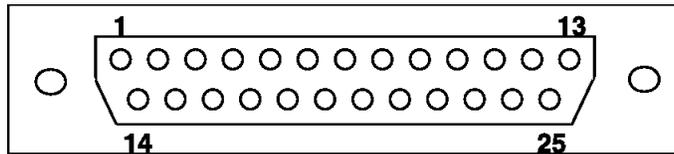


**25 Pin D-Shell**

| Pin | Signal |
|-----|--------|
| 2 | Transmit Data |
| 3 | Receive Data |
| 4 | Request to Send |
| 5 | Clear to Send |
| 6 | Data Set Ready |
| 7 | Signal Ground |
| 8 | Data Carrier Detect |
| 20 | Data Terminal Ready |
| 22 | Ring Indicate |
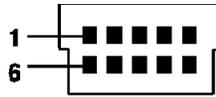
**10 Pin MODU Male**

| Pin | Signal |
|-----|--------|
| 1 | Transmit Data |
| 2 | Data Terminal Ready |
| 3 | Request to Send |
| 4 | Ring Indicate |
| 5 | Reserved |
| 6 | Receive Data |
| 7 | Data Set Ready |
| 8 | Clear to Send |
| 9 | Data Carrier Detect |
| 10 | Signal Ground |

# Parallel Port Connector

A physical layout of the parallel port connector is shown in the following illustration.
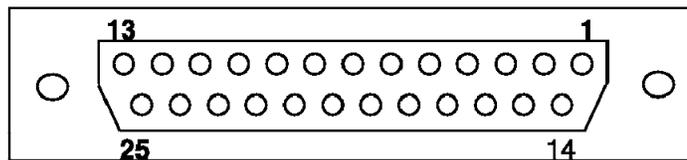


**25 Pin D-Shell**

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1 | Strobe | 14 | Autofeed XT |
| 2 | PDATA0 | 15 | Error |
| 3 | PDATA1 | 16 | INIT |
| 4 | PDATA2 | 17 | Select In |
| 5 | PDATA3 | 18 | Ground |
| 6 | PDATA4 | 19 | Ground |
| 7 | PDATA5 | 20 | Ground |
| 8 | PDATA6 | 21 | Ground |
| 9 | PDATA7 | 22 | Ground |
| 10 | ACK | 23 | Ground |
| 11 | Busy | 24 | Ground |
| 12 | PE | 25 | Ground |
| 13 | Select | -- | -- |

# External Diskette Connector

The following illustration shows the external diskette connector.

**B12**                                     **B01**

**A12**                                     **A01**
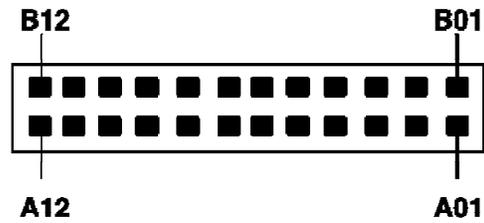
| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| A01 | Rd wt current/ High Density | B01 | Track 0 |
| A02 | Enable 74F760S | B02 | Write Protect |
| A03 | Ground | B03 | Read Data |
| A04 | Index | B04 | Head Select 1 OC |
| A05 | Motor Enable 0 OC | B05 | Diskette Change |
| A06 | Drive Select 1 OC | B06 | Reserved |
| A07 | Drive Select 0 OC | B07 | Ground |
| A08 | Motor Enable 0 1C | B08 | Ground |
| A09 | Direction OC | B09 | Ground |
| A10 | Step | B10 | Ground |
| A11 | Write Data OC | B11 | Ground |
| A12 | Write Enable | B12 | Ground |

# Appendix A. Notices

This information was developed for products and services offered in the U.S.A.

The manufacturer may not offer the products, services, or features discussed in this document in other countries.  Consult the manufacturer's representative for information on the products and services currently available in your area.  Any reference to the manufacturer's product, program, or service is not intended to state or imply that only that product, program, or service may be used.  Any functionally equivalent product, program, or service that does not infringe any intellectual property right of the manufacturer may be used instead.  However, it is the user's responsibility to evaluate and verify the operation of any product, program, or service.

The manufacturer may have patents or pending patent applications covering subject matter described in this document.  The furnishing of this document does not give you any license to these patents.  You can send license inquiries, in writing, to the manufacturer.

**The following paragraph does not apply to the United Kingdom or any country where such provisions are inconsistent with local law:**  THIS MANUAL IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT,  MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.  Some states do not allow disclaimer of express or implied warranties in certain transactions; therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication.  The manufacturer may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Information concerning products made by other than the manufacturer was obtained from the suppliers of those products, their published announcements or other publicly available sources.  The manufacturer has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to products made by other than the manufacturer. Questions on the capabilities of products made by other than the manufacturer should be addressed to the suppliers of those products.

# Index

## Numerics

# Reader's Comments — We'd Like to Hear From You

**RS/6000 Adapters, Devices, and Cable Information for Micro Channel Bus Systems**

**Order Number: SA38-0533-06**

**Overall how satisfied are you with the information in this book?**

|  | Very Satisfied | Satisfied | Neutral | Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|
| Overall Satisfaction | □ | □ | □ | □ | □ |

**How satisfied are you that the information in this book is:**

|  | Very Satisfied | Satisfied | Neutral | Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|
| Accurate | □ | □ | □ | □ | □ |
| Complete | □ | □ | □ | □ | □ |
| Easy to find | □ | □ | □ | □ | □ |
| Easy to understand | □ | □ | □ | □ | □ |
| Well organized | □ | □ | □ | □ | □ |
| Applicable to your tasks | □ | □ | □ | □ | □ |

**Please tell us how we can improve this book:**

**Thank you for your response. May we contact you?** □ Yes □ No

**When you send comments to us, you grant us a nonexclusive right to use or distribute your comments in any way we believe appropriate without incurring any obligation to you.**

Name

Company or Organization

Phone Number

Address
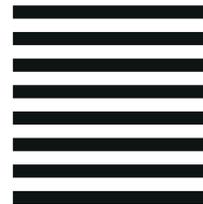
NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES

# BUSINESS REPLY MAIL

POSTAGE WILL BE PAID BY ADDRESSEE

**Information Development**
**Department H6DS-9561**
**11400 Burnet Road**
**Austin, TX  78758-3493**

**IBM**®