RS/6000
@server pSeries



Adapters, Devices, and Cable Information for Multiple Bus Systems

SA38-0516-13

Fourteenth Edition (May 2003)

Before using this information and the product it supports, read the information in “Notices”, on page 453.

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About This Book

The information contained in this book is common to all open bus system units. Use this information carefully, because not all adapters and devices apply to all system units. Information or procedures that are specific to a certain system unit or device are contained in the service guide for that system unit or device.

This book provides information about adapters, devices and cables attached to or used within a system unit. Also included are removal procedures for stuck tapes for some of the tape drives.

This book can be used to help identify an adapter, to aid in the servicing of some devices, designing or servicing cabling layouts for a system.

ISO 9000

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

Highlighting

The following highlighting conventions are used in this book:

Bold	Identifies commands, subroutines, keywords, files, structures, directories, and other items whose names are predefined by the system. Also identifies graphical objects such as buttons, labels, and icons that the user selects.
Italics	Identifies parameters whose actual names or values are to be supplied by the user.
`Monospace`	Identifies examples of specific data values, examples of text similar to what you might see displayed, examples of portions of program code similar to what you might write as a programmer, messages from the system, or information you should actually type.

Accessing Information

Documentation for the IBM @server pSeries is available online. Visit the IBM @server pSeries Information Center at http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base.

- To access the pSeries publications, click **Hardware documentation**.
- To view information about the accessibility features of @server pSeries hardware and the AIX operating system, click **AIX and pSeries accessibility**.

References to AIX Operating System

This document may contain references to the AIX operating system. If you are using another operating system, consult the appropriate documentation for that operating system.

This document may describe hardware features and functions. While the hardware supports them, the realization of these features and functions depends upon support from the operating system. AIX provides this support. If you are using another operating system, consult the appropriate documentation for that operating system regarding support for those features and functions.

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- S/390
- SP
- TURBOWAYS

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Related Publications

The following publications provide related information:

- The *RS/6000 @server pSeries Diagnostics Information for Multiple Bus Systems*, order number SA38-0509 contains common diagnostic procedures, error codes, and adapters and device service information. This manual is intended for trained service personnel.
- The system unit service guide that was provided with your system contains maintenance information and service procedures for trained service personnel.
- The system unit user's guide that was provided with your system, contains information to help set up, install options, configure, modify and solve minor problems.
- *AIX Versions 3.2 and 4 Asynchronous Communications Guide*, order number SC23-2488. This publication has information on installing asynchronous communications hardware and software.
- *CIO Publications*: Your system unit came with a package of booklets or a CD-ROM with a complete set of currently available (on date of shipment) feature and option installation guides. They are referred to as Customer Installable Options (CIO) publications and can be used with the information in this publication. The CIO publications are intended for customers or trained service personnel.
- *Site and Hardware Planning Information*, order number SA38-0508. This publication has information on physical characteristics of many machine types and cable planning.
- *SP Planning Volume 1, Hardware and Physical Environment*, order number GA22-7280. This publication has information on the SP System environment for system planning.
- *PCI Adapter Placement Reference*, order number SA38-0538. This publication has information regarding PCI adapter placement in your system unit.

Chapter 1. Adapter Information

This chapter contains information to aid in identifying adapters and service data for the adapters installed within a system unit.

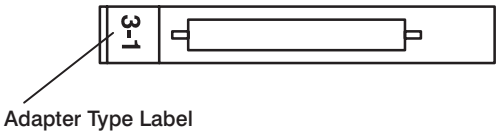
The adapter information contained in this book is used during nondirected service activities. The information in this chapter is used to:

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

Some of 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 page 7 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.

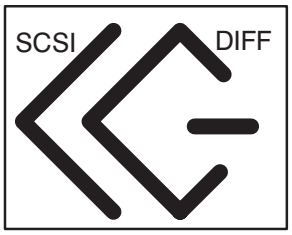
The following drawing shows how an adapter is labeled.



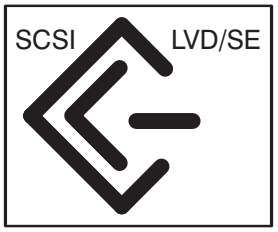
Notes:
1. The end brackets of non-OEM SCSI-2 differential adapters also carry the label, *Differential*.
2. OEM SCSI-1 or SCSI-2 single-ended, low-voltage differential, or differential adapters may carry one of the following ANSI icons:



Single-Ended



Differential



Low Voltage Differential/ Single-Ended

CSU/SSR Feature Installation

Attention: The following information indicates which features on various systems/models are intended to be installed by the customer and which features are to be installed by a System Service Representative (SSR) as part of a Miscellaneous Equipment Specification (MES). This information is for systems/models available as of the edition date.

Notes:

1. CSU = Customer Set-Up.
2. SSR = System Service Representative.
3. For a description of Feature Codes. See the Feature Code Descriptions below the following table.
4. The 7013 Model J30 was announced as CSU. U.S. practice has been for SSR installation.
5. The 7014 rack is SSR install. However, the system units which are installed into the 7014 may be CSU. Check the matrix below to verify which system units should be installed by the SSR or are CSU.

Machine Type	Model	System CSU [1]	Features/Options [2]	
			SSR 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	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, 5217, 5219, 5221, 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, 4365, 4366	All Other Features
7028	6C1, 6E1	Yes	FC 4248, 4249, 6567	All Other Features
7028	6C4, 6E4	Yes	FC 5132, 6556, 6575, 6576	All Other Features
7029	6C3, 6E3	Yes	None	All Features
7038	All	No	All Features	None
7039	All	No	All Features	None
7040	All	No	All Features	None
7043	140, 240	Yes	FC 2856, 6309	All Other Features
7043	150	Yes	FC 2842	All Other Features
7043	270	Yes	FC 4362, 4365, 4366	All Other Features
7044	170	Yes	FC 4360, 4364	All Other Features
7044	270	Yes	FC 4362, 4365, 4366	All Other Features

Machine Type	Model	System CSU [1]	Features/Options [2]	
			SSR Install	Customer Install
7046	All	Yes	FC 2856, 6309	All Other Features
7236	All	No	All Features	None
7248	All	Yes	FC 2856	All Other Features
7316	All	No	All Features	None
7317	All	No	All Features	None
7318	All	No	All Features	None
7319	All	No	All Features	None
9112	265	Yes	FC 6567	All Other Features

Feature Code	Feature Code Description
2842	POWER GXT4500P Graphics Accelerator
2856	IBM 7250 Attachment Adapter - PCI
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
4248	SCSI Connector Cable and Repeater Card
4249	SCSI 3-Drop Connector Cable
4360	1-Way 400MHz POWER3-II Processor Card w/4MB L2 Cache
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)
4364	1-Way 450MHz POWER3-II Processor Card w/8MB L2 Cache
4365	2-Way 375MHz POWER3-II Processor Card (8MB L2/Processor)
4366	2-Way 450MHz POWER3-II Processor Card (8MB L2/Processor)
5132	2-way 1.0 GHz POWER4 Processor Card
5217	RS64 IV, 2-Way SMP, 750MHz, 8MB L2 Cache
5219	RS64 IV, 4-Way SMP, 750MHz, 8MB L2 Cache
5221	RS64 IV, 6-Way SMP, 750MHz, 8MB L2 Cache
6120	80/160 GB Internal Tape Drive with VXA Technology, Bolt-in
6131	60/150 GB 8mm Internal Tape Drive, Autodock
6134	60/150 GB 8mm Internal Tape Drive, Bolt-in
6142	Internal 4mm 4/8GB Tape
6147	8mm 5/10GB VDAT Tape
6153	4mm Tape Drive + Autoloader, Horizontal
6154	20 GB 8-mm Tape Drive, White bolt-in

Feature Code	Feature Code Description
6156	20 GB 8-mm Tape Drive, Black bolt-in
6158	20 GB 4-mm Tape Drive, Bolt-in
6159	12 GB 4-mm Tape Drive, Bolt-in
6169	80/160 GB Internal Tape Drive with VXA Technology, Autodock
6185	20 GB 4-mm Tape Drive, Autodock
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
6556	6 Slot PCI Riser (MES order only)
6567	Ultra3 SCSI Backplane for Hot-swap Disks
6575	Enhanced Planar (MES order only)
6576	LPAR Enablement (MES order only)

Adapter Identification Reference List for IHV-Supplied Adapters

Notes:
1. These adapters are arranged by adapter type.
2. These adapters are from Independent Hardware Vendors (IHVs).
3. The adapters are presented here as a service aid.
4. Adapters shown with an adapter type of * do not have an assigned adapter type.

Type Label	Description	FRU Number
9-N	Eicon ISDN DIVA PRO 2.0 PCI S/T Adapter for PowerPC Systems	93H5839
*	3Com Fast Etherlink XL PCI 10/100 Ethernet (PCI)	93H1845
*	Syskonnect SK-NET FDDI-LP SAS (PCI)	73H3504
*	Syskonnect SK-NET FDDI-LP DAS (PCI)	73H3401
*	Syskonnect SK-NET FDDI-UP SAS (PCI)	73H3418
*	MVP POWER Multi-Monitor Adapter (PCI)	93H5107

Adapter Identification Label Cross Reference List

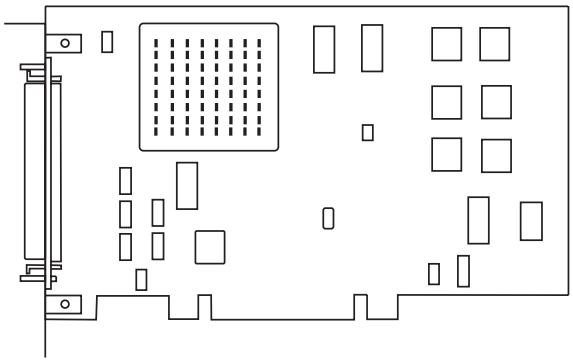
Notes:

1. This section is arranged by adapter type.
2. Adapters shown with an adapter type of * do not have an assigned adapter type.

Type Label	Description	Page
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1-I	POWER GXT500P 3D Graphics PCI	12
1-J	POWER GXT550P 3D Graphics PCI	12
1-K	POWER GXT800P 3D Graphics PCI, Base	16
1-L	POWER GXT800P 3D Graphics PCI, With Texture Memory	16
1-M	POWER GXT250P High-Performance Graphics PCI	19
1-N	POWER GXT255P High-Performance Graphics PCI	19
1-P	GXT120P 2D Video Accelerator Graphics PCI	21
1-R	POWER GXT3000P 3D Graphics Adapter PCI	23
1-S	POWER GXT2000P 3D Graphics Adapter PCI	26
1-T	POWER GXT130 Graphics PCI Adapter	29
1-U	POWER GXT300P 2D Graphics Adapter PCI	31
1-V	POWER GXT4000P 3D Graphics Adapter	34
1-W	POWER GXT6000P 3D Graphics Adapter	38
1-X	POWER GXT135P Graphics PCI Adapter	42
1-Y and 1-Z	POWER GXT4500P and POWER GXT6500P Graphic Adapters	43
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Type 1-H, POWER GXT1000 Graphics Accelerator Attachment Adapter (FC 2856)

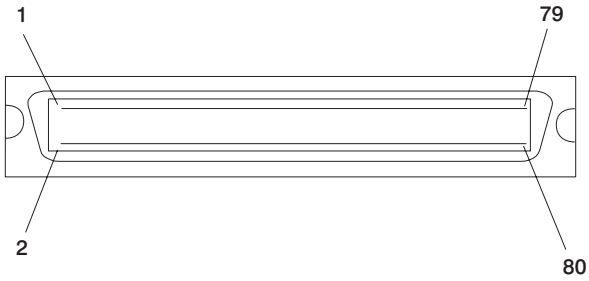


The attachment adapter feature allows connection of the system unit to a 7250 POWER GXT1000 Graphics Accelerator.

POWER GXT1000 Graphics Accelerator Attachment Adapter Specifications

Item	Description
FRU number	93H2399
Resolution	N/A
Colors	N/A
Busmaster	Yes
I/O bus	PCI
Adapter form factor	PCI short
Attachment adapter callout	908
Connectors	80 pin
Adapter cable	Length 2m (6.5 ft.), 65G4892

POWER GXT1000 Graphics Accelerator Attachment Adapter Connector

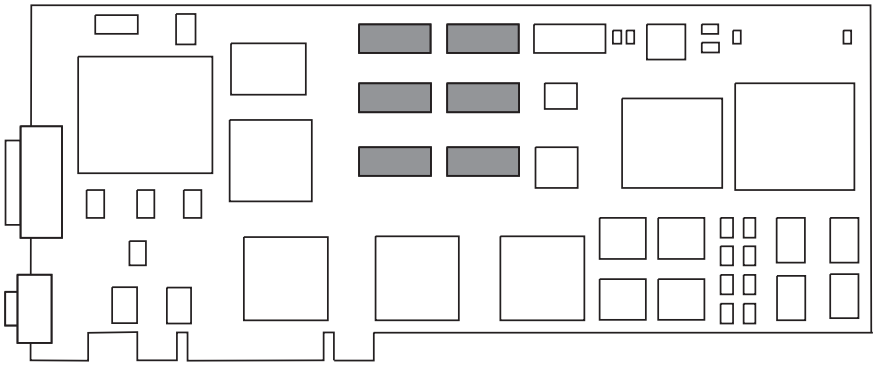


Position	Signal Name	Position	Signal Name
1	addr00	41	-req
2	addr01	42	-ccmrom
3	addr02	43	trans64/32
4	addr03	44	cpdmatc0
5	addr04	45	sedmatc0
6	addr05	46	-breq
7	addr06	47	-rdy
8	addr07	48	avail
9	addr08	49	data00
10	addr09	50	data01
11	addr10	51	data02
12	addr11	52	data03
13	addr12	53	data04
14	addr13	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

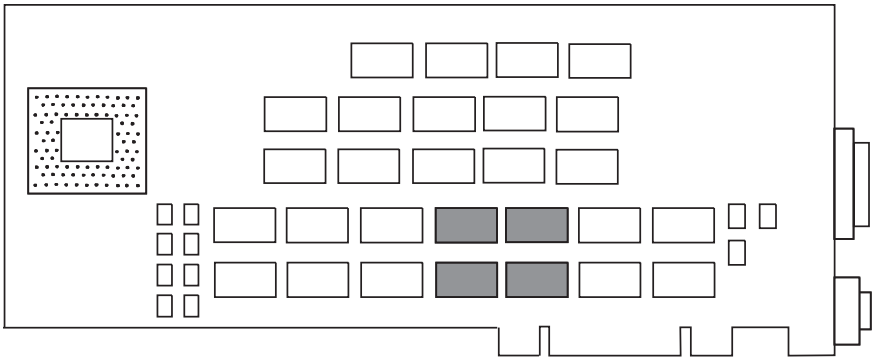
Position	Signal Name	Position	Signal Name
32	addr31	72	data23
33	-reset	73	data24
34	-busy	74	data25
35	-int	75	data26
36	poweron	76	data27
37	-chchk	77	data28
38	rw	78	data29
39	-strobe	79	data30
40	-bgnt	80	data31

Types 1-I and 1-J, POWER GXT500P and POWER GXT550P Graphics Accelerator Adapters (FC 2854, 2855)

The POWER GXT500P and POWER GXT550P graphics adapters are single card adapters that attach to your system unit in a PCI bus graphics slot. These adapters provide 3D graphics acceleration.



(GXT550P Top View; GXT500P does not include shaded technology)



(GXT550P Bottom View; GXT500P does not include shaded technology)

POWER GXT500P and POWER GXT550P Graphics Accelerator Adapter Specifications

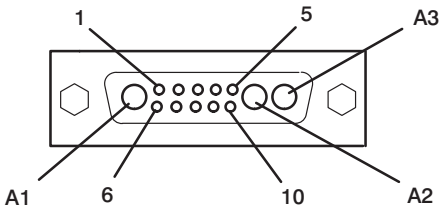
Item	Description
FRU numbers	GXT500P, 94H0028 GXT550P, 94H0029
Bus architecture	PCI
Bus width	32-bit
Maximum number	1
Number of colors supported	24-bit, 16.7 million
Screen resolutions	1024x768 at 60 - 85 Hz vertical refresh 1280x1024 at 60 - 85 Hz vertical refresh
Display power management	Supports video electronics standards association (VESA) and display power management signalling (DPMS)
Connectors	13-pin D-shell connector 9-pin D-shell connector

The POWER GXT500P Adapter supports the following:
- 8 and 12 bit double-buffered color
- 24 bit single-buffered (true) color
- 8 bit single-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 APIs
- 3D acceleration
  - Depth buffering
  - Antialiasing
  - Gouraud shading
  - Fog and atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering
- Display resolution: 1280x1024 and 1024x768 (supports monitors complying with ISO 9241, Part 3)
- Stereo viewing

The POWER GXT550P Adapter supports the following:
- 8, 12, or 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 APIs

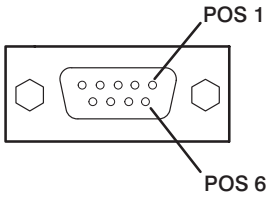
- 3D acceleration
  - Depth buffering
  - Antialiasing
  - Gouraud shading
  - Fog and atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering
- Display resolution: 1280x1024 and 1024x768 (supports monitors complying with ISO 9241, Part 3)
- Stereo viewing

POWER GXT500P and POWER GXT550P Graphics Accelerator Adapter 13-Pin Connector



Position	Signal Name
A1	Red
A2	Green
A3	Blue
1	Monitor ID Bit 2
2	Monitor ID Bit 3
3	(No Connection)
4	I/O GND
5	HSYNC
6	Monitor ID Bit 0
7	Monitor ID Bit 1
8	(No Connection)
9	VSYNC
10	I/O GND

POWER GXT500P and POWER GXT550P Graphics Accelerator Adapter 9-pin D-Shell Connector

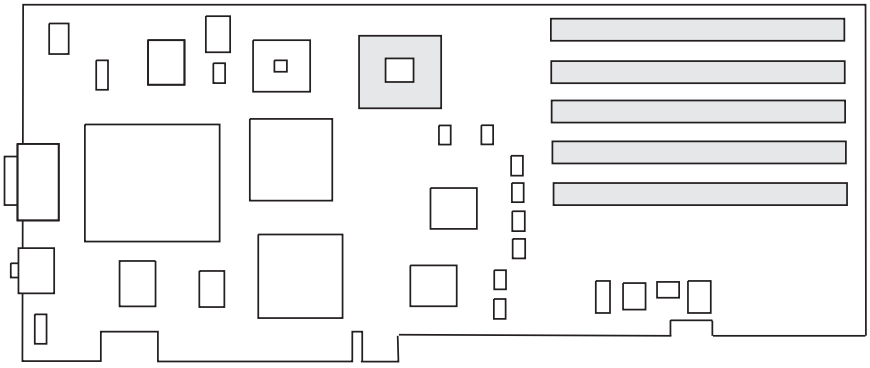


Position	Signal Name
1	(No Connection)
2	(No Connection)
3	(No Connection)
4	(No Connection)
5	(No Connection)
6	+12 Volt supply
7	12 Volt return
8	Stereo Signal
9	(No Connection)

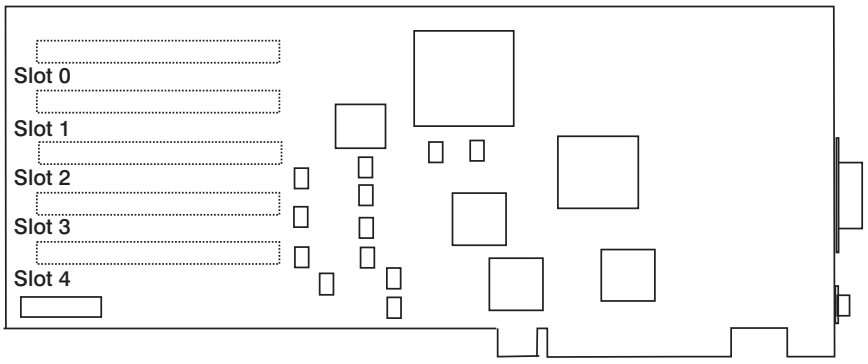
Type 1-K and 1-L, POWER GXT800P and GXT850P With Texture Memory 3D Graphics Adapters (FC 2853, 2859)

The POWER GXT800P graphics adapters, (POWER GXT800P (FC2853) with base memory and POWER GXT800P (FC2859) with texture memory) are single card adapters that attach to your system unit in a PCI bus graphics slot. Both adapters provide 3D graphics acceleration. The POWER GXT800P with base and texture memory also provides texture acceleration.

Attention: The DIMM memory modules stand about two inches from the card. There is a potential for physical contact between this and adjacent adapter cards.



GXT800P Front Side View



GXT800P Back Side View

POWER GXT800P Video Accelerator Adapter Specifications

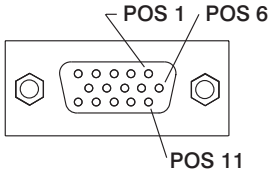
Item	Description
FRU numbers	Adapter, 07L7113 Base memory module, 93H6055 Texture memory module, 93H6057
Bus architecture	PCI
Bus width	32-bit
Maximum number	1
Number of colors supported	24-bit, 16.7 million
Screen resolutions	1024x768 at 60 - 85 Hz vertical refresh 1280x1024 at 60 - 75 Hz vertical refresh
Display power management	Supports video electronics standards association (VESA) and display power management signalling (DPMS)
Connectors	15-pin D-shell connector 3.5 mm stereo jack

The POWER GXT800P adapter with base memory supports the following:
- 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 APIs
- 3D acceleration
  - Depth buffering
  - Antialiasing
  - Gouraud shading
  - Fog and atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering
- Display resolution of 1280x1024 and 1024x768 (supports monitors complying with ISO 9241, Part 3)
- Stereo viewing

The POWER GXT800P adapter with base and texture memory supports the following:
- 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 APIs
- 3D acceleration
  - Depth buffering
  - Antialiasing
  - Gouraud shading
  - Fog and atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering
- Display resolution of 1280x1024 and 1024x768 (supports monitors complying with ISO 9241, Part 3)
- Stereo viewing

- The POWER GXT800P with base and texture supports HW acceleration of trilinear mipmapped textures up to 512 x 512

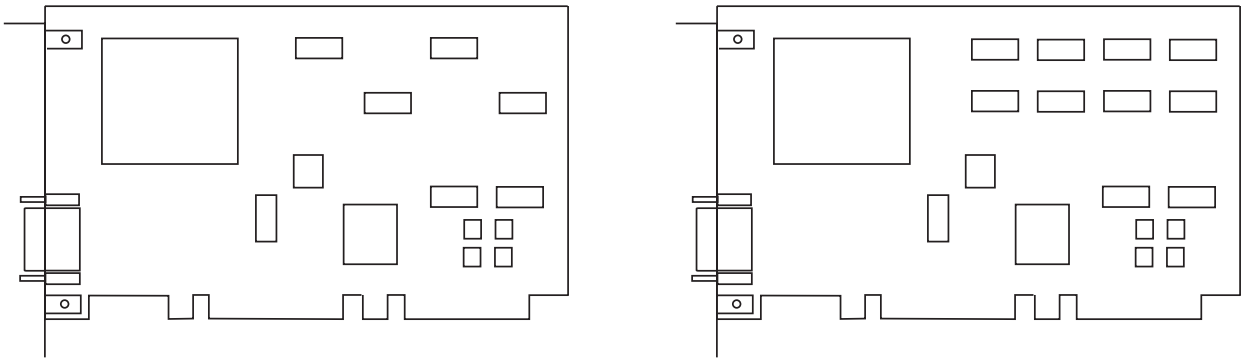
POWER GXT800P Graphics Adapter 15-Pin D-Shell Connector



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)

Types 1-M and 1-N, POWER GXT250P, and POWER GXT255P High-Performance Graphics Adapters (FC 2851, 2852)

The POWER GXT250P and POWER GXT255P Adapters are high-performance PCI graphics adapters. They are designed to operate in any computer that supports the Peripheral Component Interconnect (PCI) bus interface.

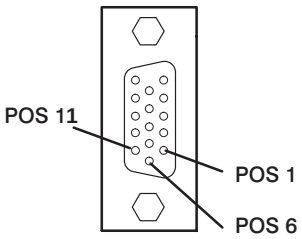


Note: In the illustration above, the GXT250P is on the left side and the GXT255P is on the right. The GXT255P has more modules in the upper-right quadrant of the adapter.

POWER GXT250P and POWER GXT255P High-Performance Graphics Adapters Specifications

Item	Description
FRU numbers	GXT250P, 93H6264 GXT255P, 93H6267
Bus architecture	PCI
Bus width	32-bit or 64-bit
Interrupt level	Int A
Maximum number	Can be put in all slots
Number of colors supported	GXT250P, 8-bit color GXT255P, 8-, 16-, and 24-bit color
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) and display power management signalling (DPMS)
Connector	15-pin D-shell connector

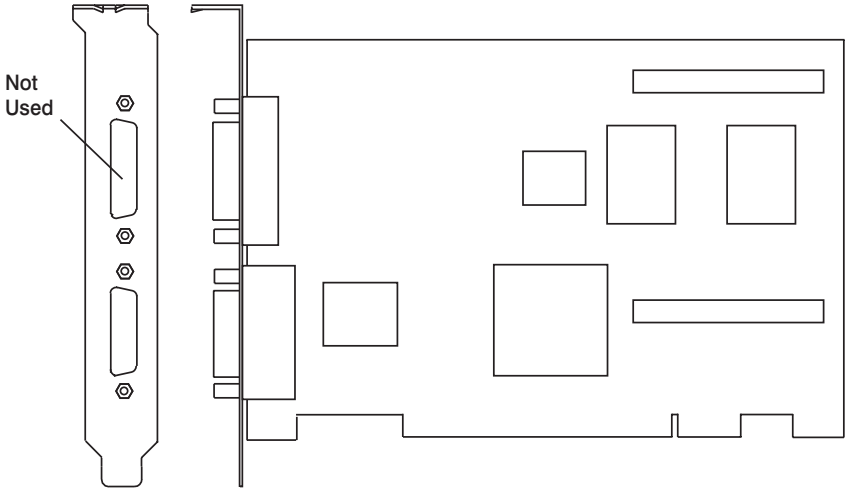
POWER GXT250P and POWER GXT255P Graphics Adapter 15-Pin D-Shell Connector



Position	Signal Name
1	Red
2	Green
3	Blue
4	Monitor ID Bit 2
5	Test (ground)
6	Red Video Return
7	Green Video Return
8	Blue Video Return
9	No Connection
10	SYNC Return (ground)
11	Monitor ID Bit 0
12	Monitor_ID Bit 1
13	HSYNC
14	VSYNC
15	Monitor_ID Bit 3

Type 1-P, POWER GXT120P 2D Video Accelerator Adapter PCI (FC 2838)

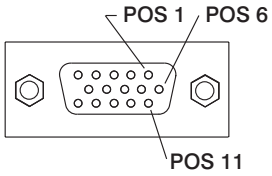
The POWER GXT120P 2D Video Accelerator Adapter is a high-performance PCI graphics adapter. It is designed to operate in any computer that supports the Peripheral Component Interconnect (PCI) bus interface.



POWER GXT120P 2D Video Accelerator Adapter Specifications

Item	Description
FRU number	93H2534
Bus architecture	PCI
Bus width	32-bit
Interrupt level	Int A
Maximum number	2
Number of colors supported	8-bit
Screen resolutions	640x480 at 60 - 85 Hz vertical refresh 800x600 at 60 - 85 Hz vertical refresh 1024x768 at 60 - 85 Hz vertical refresh 1280x1024 at 60 - 85 Hz vertical refresh
Display power management	Supports video electronics standards association (VESA) and display power management signalling (DPMS)
Connectors	15-pin D-shell connector 15-pin D-shell connector (Not Used)

POWER GXT120P Video Accelerator Adapter 15-Pin D-Shell Connector

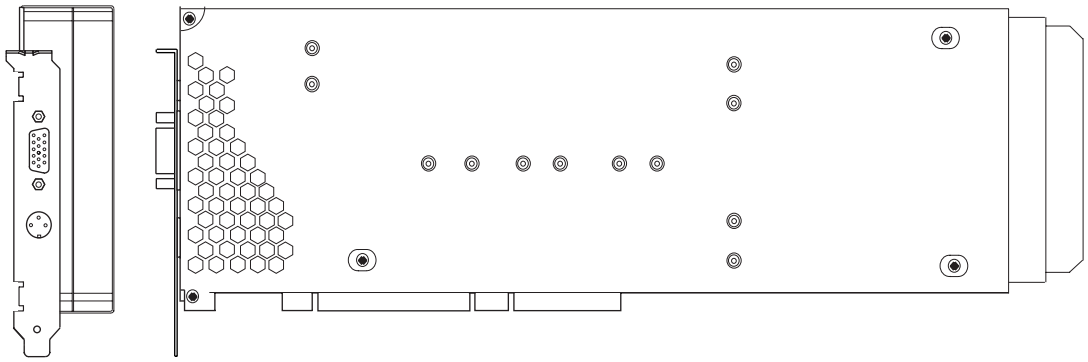


Position	Signal Name
1	Red
2	Blue

Position	Signal Name
3	Green
4	Reserved
5	DDC Return (ground)
6	Red Video Return
7	Green Video Return
8	Blue Video Return
9	Not Used
10	SYNC Return
11	Reserved
12	Bidirectional Data
13	HSYNC
14	VSYNC
15	Data Clock

Type 1-R, POWER GXT3000P 3D Graphics Adapter PCI (FC 2825)

The POWER GXT3000P 3D graphics adapter PCI is a mid-range single card adapter that attaches to your system unit in a PCI bus 64 or 32 bit slot. This adapter provides 3D graphics acceleration. The following illustration is the top view of the GXT3000P which features a black metal shield.



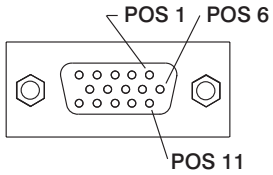
POWER GXT3000P 3D Graphics Adapter PCI Specifications

Item	Description
FRU number	24L0030
GXT3000P used on	MT 7043 Model 260 MT 7043 Model 150
Bus architecture	PCI
Bus width	32- or 64-bit
Maximum number	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Number of slots	Requires 2 slots
Number of colors supported	24-bit, 16.7 million
Screen resolutions	1024x768 at 75 - 120 Hz vertical refresh 1280x1024 at 60 - 85 Hz vertical refresh
Display power management	Supports video electronics standards association (VESA) and display power management signalling (DPMS)
Connectors	15-pin D-shell connector 3-pin mini-DIN stereo jack

The POWER GXT3000P adapter supports the following:

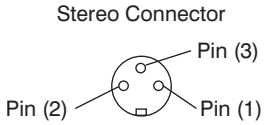
- 16-bit utility planes
- 8 and 24 bit double-buffered color
- 8 bit double-buffered alpha
- 8 bit single-buffered overlay
- 8 bits of window IDs
- 24 bit Z-buffer
- 8 bit stencil
- OpenGL, graPHIGS, and APIs
- 32 MB texture memory
- Separate gamma correction table
- Video Support
  - Point sampling and bilinear scaling
  - Color space conversion
- Scissor Registers
- 3D acceleration
  - Depth buffering
  - Antialiasing
  - Gouraud shading
  - Fog and atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering
- Display resolution: 1280x1024 and 1024x768 (supports monitors complying with ISO 9241, Part 3)
- Stereo viewing
- The POWER GXT3000P supports hardware acceleration of trilinear mipmapped textures up to 512 x 512

POWER GXT3000P Graphics Adapter 15-Pin D-Shell Connector



Position	Signal Name
1	RED
2	GREEN
3	BLUE
4	Not Used
5	DDC Return
6	RED_RTN
7	GREEN_RTN
8	BLUE_RTN
9	Not Used
10	Sync return
11	Not Used
12	DDC Data
13	H_SYNC
14	V_SYNC
15	DDC Clock

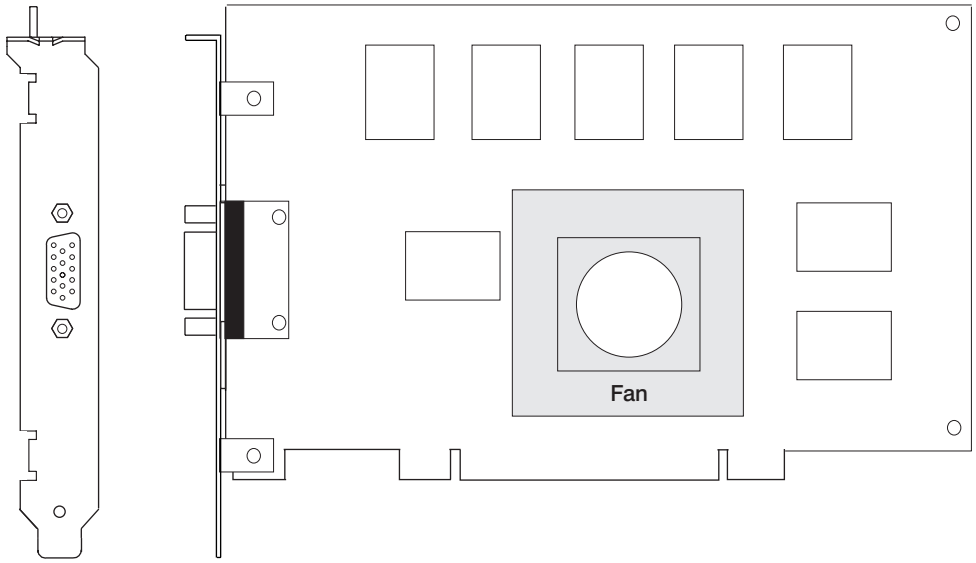
POWER GXT3000P Graphics Adapter 3-Pin mini-DIN Stereo Jack



Position	Signal Name
1	+5 vdc
2	GND
3	TTL out

Type 1-S, POWER GXT2000P 3D Graphics Adapter PCI (FC 2823)

The POWER GXT2000P 3D graphics adapter PCI is an entry level adapter that attaches to your system unit in a PCI bus 32- or 64-bit slot. This adapter provides 3D graphics acceleration. The following illustration is the top view of the GXT2000P.



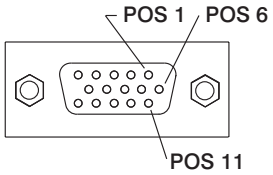
POWER GXT2000P 3D Graphics Adapter PCI Specifications

Item	Description
FRU number	07L7495
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Bus architecture	PCI
Bus width	32-bit or 64-bit
Maximum number	Up to 4 per system
Number of colors supported	24-bit, 16.7 million (all resolutions)
Screen resolutions	640x480 at up to 85 (Welcome Center only) 1024x768 at up to 85 1280x1024 at up to 85 1600x1280 at up to 85 1900x1200 at up to 76
Display Power Management	Supports video electronics standards association (VESA), and display power management signalling (DPMS).
Connectors	15-pin D-shell connector

The POWER GXT2000P adapter supports the following:

- 8, 16, or 24 bit double-buffered color
- 8 bit stored alpha
- 32 MB unified frame buffer
- 8 bit single-buffered or 4-bit double-buffered overlay
- 4 bits of window IDs
- 24 bit Z-buffer
- 8 bit stencil
- OpenGL, graPHIGS
- Trilinear texture mapping
  - 16 MB Texture Memory @1280x1024
- Separate Gamma Correction Table
- Video Support
  - Point Sampling and Bilinear Scaling
  - Color Space Conversion
- Scissor Registers
- 3D Acceleration:
  - Depth Buffering
  - Antialiasing
  - Gouraud shading
  - Fog and Atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering

POWER GXT2000P Graphics Adapter 15-Pin D-Shell Connector



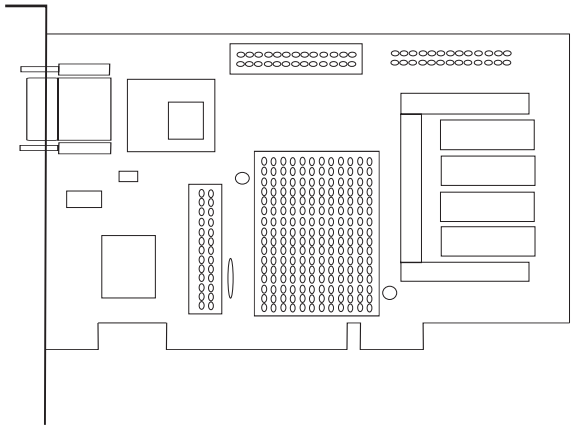
Position	Signal Name
1	RED
2	GREEN
3	BLUE
4	Not Used
5	DDC Return
6	RED_RTN
7	GREEN_RTN
8	BLUE_RTN
9	Not Used
10	Sync return
11	Not Used
12	DDC Data
13	H_SYNC
14	V_SYNC
15	DDC Clock

Type 1-T, POWER GXT130P PCI Graphics Adapter (FC 2830)

The POWER GXT130P PCI Graphics Adapter is a low-cost, medium-performance, entry-level, 2D graphics adapter.

This adapter supports multisync displays having a least 60 KHz horizonal scan capability. The GXT 130P adapter contains an 8 MB frame buffer. This provides for resolutions up to 1600 X 1200 pixels.

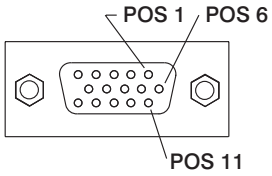
The GXT130P adapter also supports video electronics standards association (VESA) and display power management signalling (DPMS).



POWER GXT130P Graphics PCI Adapter Specifications

Item	Description
FRU number	11K0313
Bus architecture	PCI
Bus width	32-bit
Interrupt level	Int A
Maximum number	4
Number of colors supported	8-bit
Screen resolutions	640x480 at 60 - 85 Hz vertical refresh 800x600 at 60 - 85 Hz vertical refresh 1024x768 at 60 - 85 Hz vertical refresh 1280x1024 at 60 - 85 Hz vertical refresh 1600x1200 at 75 - 85 Hz vertical refresh
Display power management	Supports VESA and DPMS
Connector	15-pin D-shell connector

POWER GXT130P PCI Graphics Adapter 15-Pin D-Shell Connector

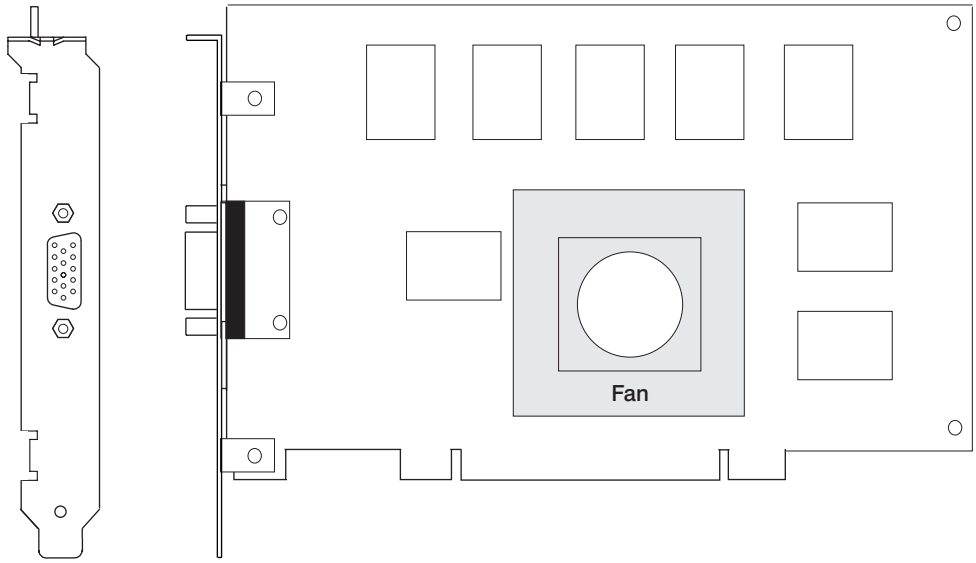


Position	Signal Name
1	Red

Position	Signal Name
2	Green
3	Blue
4	Reserved
5	DDC Return (ground)
6	Red Video Return
7	Green Video Return
8	Blue Video Return
9	Not Used
10	SYNC Return
11	Reserved
12	Bidirectional Data
13	HSYNC
14	VSYNC
15	Data Clock

Type 1-U, POWER GXT300P 2D Graphics Adapter (FC 2841)

The POWER GXT300P 2D Graphics Adapter is an entry level adapter that attaches to your system unit in a PCI bus 32- or 64-bit slot. This adapter provides 2D graphics acceleration. The following illustration is the top view of the GXT300P 2D Graphics Adapter.



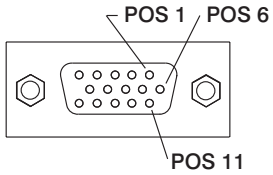
GXT300P 2D Graphics Adapter Specifications

Item	Description
FRU number	03N4169
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Bus architecture	PCI
Bus width	32-bit or 64-bit
Maximum number	Up to 4 per system
Number of colors supported	24-bit, 16.7 million (all resolutions)
Screen resolutions	640x480 at up to 85 (Welcome Center only) 1024x768 at up to 85 1280x1024 at up to 85 1600x1280 at up to 85
Display Power Management	Supports video electronics standards association (VESA), and display power management signalling (DPMS).
Connectors	15-pin D-shell connector

The GXT300P 2D graphics adapter supports the following:

- 8, 16, or 24 bit double-buffered color
- 8 bit stored alpha
- 32 MB unified frame buffer
- 8 bit single-buffered or 4-bit double-buffered overlay
- 4 bits of window IDs
- 8 bit stencil
- OpenGL, graPHIGS
- Separate Gamma Correction Table
- Video Support
  - Point Sampling and Bilinear Scaling
  - Color Space Conversion
- Scissor Registers
- 2D Acceleration:
  - Depth Buffering
  - Antialiasing
  - Gouraud shading
  - Fog and Atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering

GXT300P 2D Graphics Adapter 15-Pin D-Shell Connector

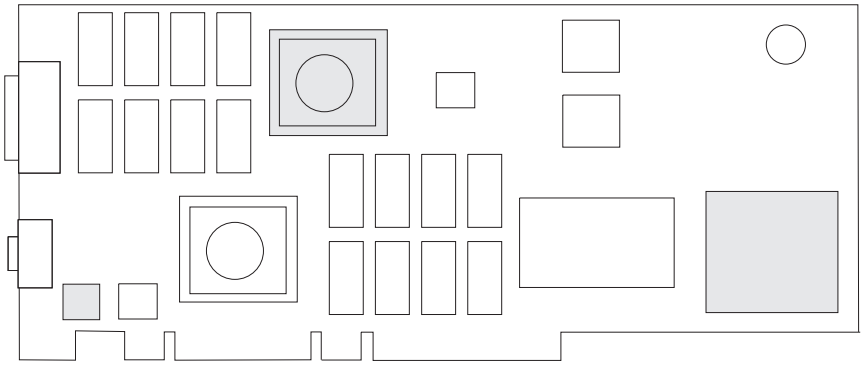


Position	Signal Name
1	RED
2	GREEN
3	BLUE
4	Not Used
5	DDC Return
6	RED_RTN
7	GREEN_RTN
8	BLUE_RTN
9	Not Used
10	Sync return
11	Not Used
12	DDC Data
13	H_SYNC
14	V_SYNC
15	DDC Clock

Type 1-V, POWER GXT4000P 3D Graphics Adapter PCI (FC 2826)

The POWER GXT4000P 3D Graphics Adapter is a single-card graphics adapter that attaches to your system unit in a PCI bus graphics slot. This adapter provides 3D graphics acceleration. Connection to the video monitor is made through a Digital Video Interface (DVI) connector.

The following illustration is the GXT4000P Graphics Adapter. The shaded components *are not* present on the POWER GXT4000P adapter.



GXT4000P 3D Graphics Adapter Specifications

Item	Description
FRU number	00P2429
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Bus architecture	PCI
Bus width	32-bit or 64-bit
Maximum number	Up to 4 per system
Number of colors supported	24-bit, 16.7 million (all resolutions)
Screen resolutions	1024x768 at 60 to 85 Hz vertical refresh 1280x1024 at 60 to 85 Hz vertical refresh
Display Power Management	Supports video electronics standards association (VESA), and display power management signalling (DPMS).
Connectors	29-pin DVI connector 3-pin mini-DIN stereo jack Optional 29-pin DVI to 15-pin D-shell video converter

The GXT4000P 3D graphics adapter supports the following:

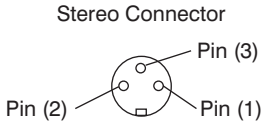
- 128 MB unified frame buffer
  - 24-Bit double-buffering up to 1920x1200
  - 24-Bit stereo quad-buffering up to 1280x1040
  - 8-Bit double-buffered alpha
  - 4/8-Bit single-buffered overlay
  - 8-Bits of window IDs
  - 24-Bit Z-buffer
  - 8-Bit stencil/clip planes
- 1 Rectangular scissor region
- 5 Hardware rectangular clippers
- Texture mapping
  - Up to 44 MB texture memory 1280x1200 at 76 Hz
  - Dual texture
  - 3-D texture
  - Texture color table

- Video support
  - Bilinear space conversion
  - Color space conversion
- 4 Hardware color maps
- Gamma corrected antialiasing lines
- Hardware occlusion culling
- OpenGL, graPHIGS, and GL 1.2 APIs
- 3D Acceleration:
  - Depth buffering
  - Antialiasing
  - Gouraud shading
  - Fog and atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering
- Display resolutions:
  - 640x480x24 at 85 Hz
  - 1024x768x24 at 85 Hz
  - 1280x1024x24 at 85 Hz
  - 1600x1200x24 at 85 Hz
  - 1920x1200x24 at 76 Hz
  - 1280x1024x24 at 120 Hz (quad buffer stereo)
  - 2048x1656x24 at 60 Hz
- Supports monitors complying with ISO 9241, part 3
- DDC2 support
- Analog and digital interfaces
- Stereo viewing

GXT4000P 3D Graphics Adapter Cable Information

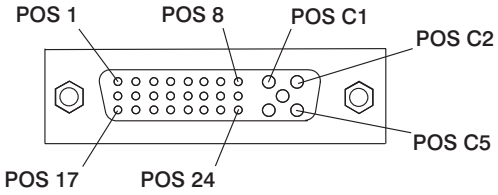
The following sections show the connector information and a cabling example.

GXT4000P Graphics Adapter 3-Pin Mini-DIN Stereo Jack



Position	Signal Name
1	+5 vdc
2	GND
3	TTL out

GXT4000P 3D Graphics Adapter DVI Connector

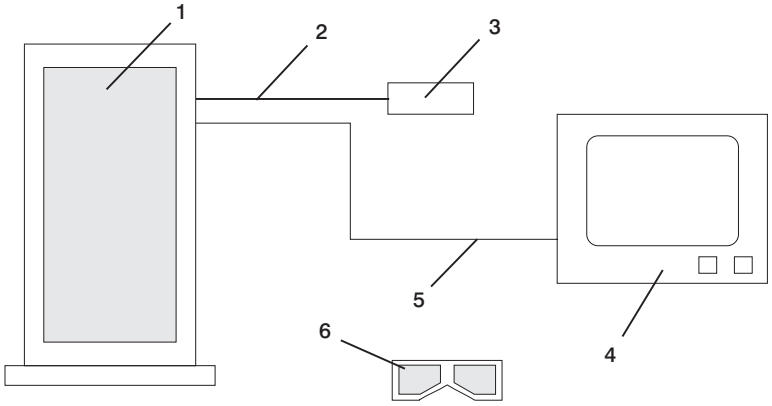


Pin	Signal	Pin	Signal
1	TMDS data 2-	16	Hot plug detect
2	TMDS data 2+	17	TMDS data 0-
3	TMDS data 2/4 shield	18	TMDS data 0+
4	TMDS data 4-	19	TMDS data 0/5 shield
5	TMDS data 4-	20	TMDS data 5-
6	DDC clock	21	TMDS data 5+
7	DDC data	22	TMDS clock shield
8	Analog vertical sync	23	TMDS clock+
9	TMDS data 1-	24	TMDS clock-
10	TMDS data 1+	C1	Analog red
11	TMDS data 1/3 shield	C2	Analog green
12	TMDS data 3-	C3	Analog blue
13	TMDS data 3+	C4	Analog horizontal sync
14	+5 vdc power	C5	Analog ground (return for analog red, green, blue)
15	Ground (return for +5 vdc, Hsync, Vsync)		

GXT4000P 3D Graphics Adapter Cabling Example

The GXT4000P 3D Graphics Adapter is stereo-ready (sync- and power-supplied). This requires attachment of a stereo device such as StereoGraphics Crystal Eyes Stereoscopic System. This system comes complete with eyewear (model CE-PC) and emitter (ENT REV B or higher).

Note: Use only an emitter that has a permanently attached cable with no connectors or switches on the rear. This emitter is manufactured to work with the GXT4000P 3D Graphics Adapter. Emitter models that have only a DB-9 connector do not work.



1 System unit with graphics adapter

2 3-Pin mini-DIN emitter cable

3 Emitter

4 Monitor

5 Monitor cable

6 Eyewear

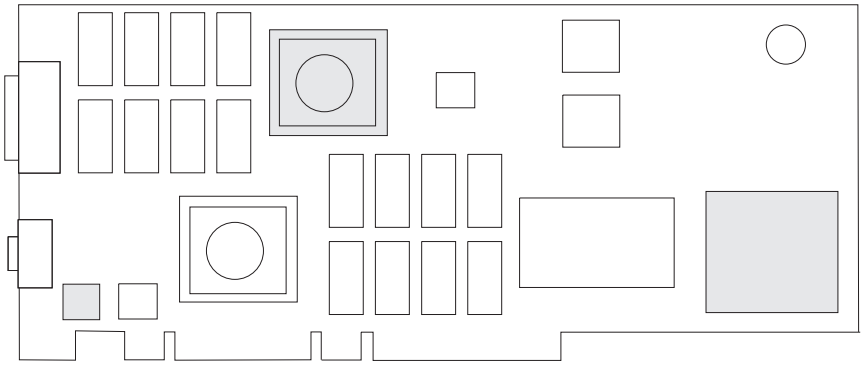
In this configuration, both sync signal and power are supplied by the adapter to the emitter.

Note: Attach your stereo cable to your graphics adapter prior to powering on your system unit. Omission of this step trips the fuse. To reset a tripped fuse, power off the system unit and wait approximately 15 minutes for the fuse to return to its base value.

Type 1-W, POWER GXT6000P 3D Graphics Adapter PCI (FC 2827)

The POWER GXT6000P 3D Graphics Adapter is a single-card graphics adapter that attaches to your system unit in a PCI bus graphics slot. This adapter provides 3D graphics acceleration. Connection to the video monitor is made through a Digital Video Interface (DVI) connector.

The following illustration is the GXT6000P Graphics Adapter. The shaded components *are* present on the POWER GXT6000P adapter.



GXT6000P 3D Graphics Adapter Specifications

Item	Description
FRU number	00P2368
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide* order number SA38-0538.
Bus architecture	PCI
Bus width	32-bit or 64-bit
Maximum number	Up to 2 per system
Number of colors supported	24-bit, 16.7 million (all resolutions)
Screen resolutions	1024x768 at 60 to 85 Hz vertical refresh
	1280x1024 at 60 to 85 Hz vertical refresh
Display Power Management	Supports video electronics standards association (VESA), and display power management signalling (DPMS).
Connectors	29-pin DVI connector
	3-pin mini-DIN stereo jack
	Optional 29-pin DVI to 15-pin D-shell video converter

The GXT6000P 3D graphics adapter supports the following:

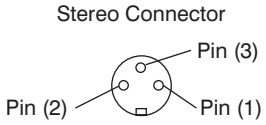
- 128 MB unified frame buffer
  - 24-Bit double-buffering up to 1920x1200
  - 24-Bit stereo quad-buffering up to 1280x1040
  - 8-Bit double-buffered alpha
  - 4/8-Bit single-buffered overlay
  - 8-Bits of window IDs
  - 24-Bit Z-buffer
  - 8-Bit stencil/clip planes
- 1 Rectangular scissor region

- 5 Hardware rectangular clippers
- Texture mapping
  - Up to 108 MB texture memory 1280x1200 at 76 Hz
  - Dual texture
  - 3-D texture
  - Texture color table
- Video support
  - Bilinear space conversion
  - Color space conversion
- 4 Hardware color maps
- Gamma corrected antialiasing lines
- Hardware occlusion culling
- OpenGL, graPHIGS, and GL 1.2 APIs
- 3D Acceleration:
  - Depth buffering
  - Antialiasing
  - Gouraud shading
  - Fog and atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering
- Display resolutions:
  - 640x480x24 at 85 Hz
  - 1024x768x24 at 85 Hz
  - 1280x1024x24 at 85 Hz
  - 1600x1200x24 at 85 Hz
  - 1920x1200x24 at 76 Hz
  - 1280x1024x24 at 120 Hz (quad buffer stereo)
  - 2048x1656x24 at 60 Hz
- Supports monitors complying with ISO 9241, part 3
- Supports TFT monitors complying to ISO 13406/2
- DDC2 support
- Analog and digital interfaces
- Stereo viewing

GXT6000P 3D Graphics Adapter Cable Information

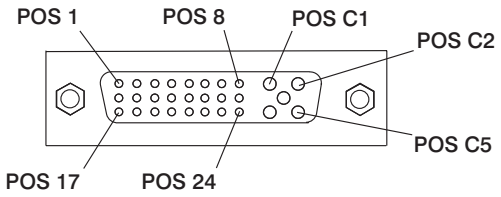
The following sections show the connector information and a cabling example.

GXT6000P Graphics Adapter 3-Pin Mini-DIN Stereo Jack



Position	Signal Name
1	+5 vdc
2	GND
3	TTL out

GXT6000P 3D Graphics Adapter DVI Connector

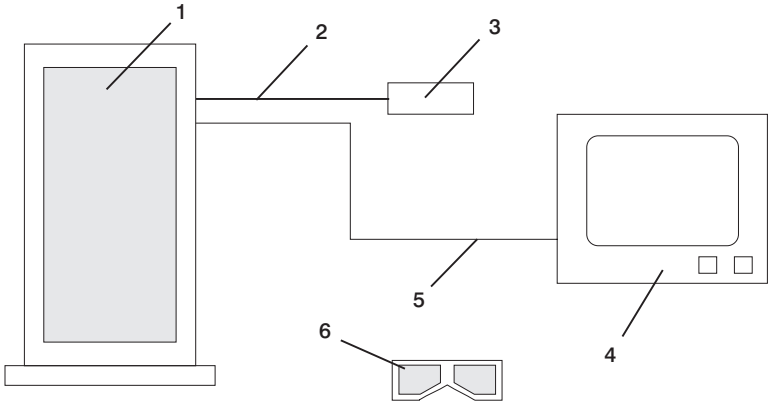


Pin	Signal	Pin	Signal
1	TMDS data 2-	16	Hot plug detect
2	TMDS data 2+	17	TMDS data 0-
3	TMDS data 2/4 shield	18	TMDS data 0+
4	TMDS data 4-	19	TMDS data 0/5 shield
5	TMDS data 4-	20	TMDS data 5-
6	DDC clock	21	TMDS data 5+
7	DDC data	22	TMDS clock shield
8	Analog vertical sync	23	TMDS clock+
9	TMDS data 1-	24	TMDS clock-
10	TMDS data 1+	C1	Analog red
11	TMDS data 1/3 shield	C2	Analog green
12	TMDS data 3-	C3	Analog blue
13	TMDS data 3+	C4	Analog horizontal sync
14	+5 vdc power	C5	Analog ground (return for analog red, green, blue)
15	Ground (return for +5 vdc, Hsync, Vsync)		

GXT6000P 3D Graphics Adapter Cabling Example

The GXT6000P 3D Graphics Adapter is stereo-ready (sync- and power-supplied). This requires attachment of a stereo device such as StereoGraphics Crystal Eyes Stereoscopic System. This system comes complete with eyewear (model CE-PC) and emitter (ENT REV B or higher).

Note: Use only an emitter that has a permanently attached cable with no connectors or switches on the rear. This emitter is manufactured to work with the GTX6000P 3D Graphics Adapter. Emitter models that have only a DB-9 connector do not work.



1 System unit with graphics adapter

2 3-Pin mini-DIN emitter cable

3 Emitter

4 Monitor

5 Monitor cable

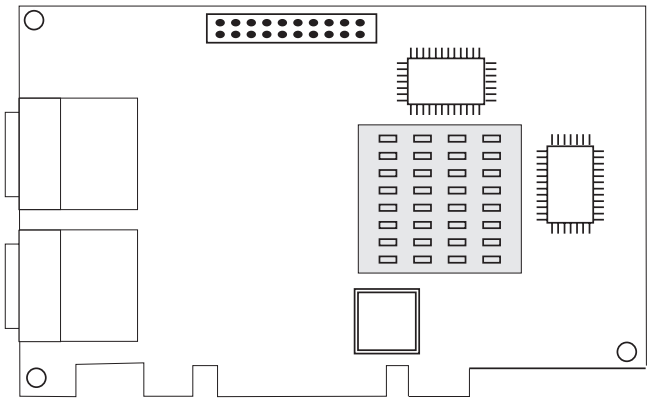
6 Eyewear

In this configuration, both sync signal and power are supplied by the adapter to the emitter.

Note: Attach your stereo cable to your graphics adapter prior to powering on your system unit. Omission of this step trips the fuse. To reset a tripped fuse, power off the system unit and wait approximately 15 minutes for the fuse to return to its base value.

Type 1-X, POWER GXT135P Graphics PCI Adapter (FC 2848)

The POWER GXT135P Graphics PCI Adapter is a high-performance PCI graphics adapter that accelerates and enhances your system unit video. POWER GXT135P Graphics PCI Adapter has no hardware switches to set. Mode selection is made through the software. Connection to the video monitor is made through a high density 15-pin D-shell connector.



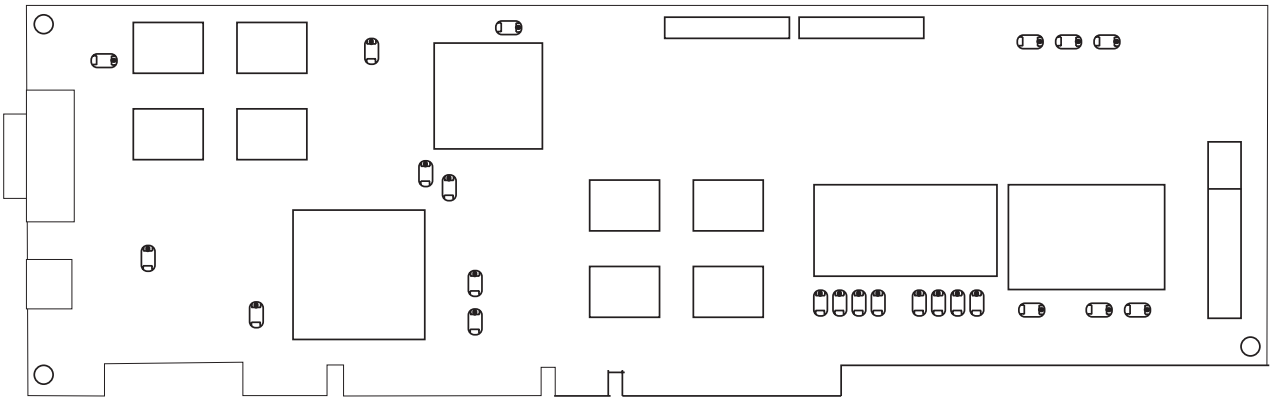
GXT135P Graphics Adapter Specifications

Item	Description
FRU number	09P5074
Bus architecture	PCI
Bus width	32-bit
Memory	16MB SDRAM
Number of colors supported	8-bit or 24-bit
Screen resolutions	640x480 at 60 Hz vertical refresh 1024x768 at 60 - 85 Hz vertical refresh 1280x1024 at 60 - 85 Hz vertical refresh 1600x1200 at 75 - 85 Hz vertical refresh 2048x1536 at 60 - 75 Hz vertical refresh
Display power management	Supports VESA and DPMS
Connector	15-pin D-shell connector

Type 1-Y and 1-Z, POWER GXT4500P and POWER GXT6500P Graphics Adapters (FC 2842, 2843)

The POWER GXT4500P and POWER GXT6500P graphics adapters are single card adapters that attach to your system unit in a PCI bus slot. The PCI bus interface provides 64 bit, 66MHz and bus master support and requires 3.3 volt power. These adapters provide 3D graphics acceleration. Connection to the video monitor is made through a DVI (Digital Video Interface) connector.

Refer to the *PCI Adapter Placement Reference* for supported system units and supported slot locations.



POWER GXT4500P and POWER GXT6500P 3D Graphics Adapter Specifications

Only POWER GXT6500P supports Hardware Geometry Acceleration and Lighting. Both the POWER GXT4500P and POWER GXT6500P have the following specifications:

Item	Description
FRU numbers	GXT4500P, 09P3425 GXT6500P, 09P3391
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide* order number SA38-0538.
Bus architecture	PCI 2.2
Bus width	32-bit or 64-bit
Maximum number	Up to 2 per system for GXT6500 Up to 4 per system for GXT4500
Number of colors supported	24-bit, 16.7 million (all resolutions)
Screen resolutions	1024x768 at 60 to 85 Hz vertical refresh 1280x1024 at 60 to 85 Hz vertical refresh 1600x1200 at 60 to 85 Hz vertical refresh 1920x1200 at 60 to 76 Hz vertical refresh 2048x1536 at 60 Hz vertical refresh
Display Power Management	Supports video electronics standards association (VESA), and display power management signalling (DPMS).
Connectors	29-pin DVI connector 3-pin mini-DIN stereo jack Optional 29-pin DVI to 15-pin D-shell video converter

The POWER GXT4500P and POWER GXT6500P 3D graphics adapters supports the following:

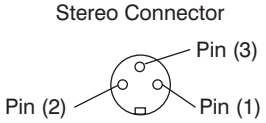
- 128 MB unified frame buffer
  - 24-Bit double-buffering up to 1920x1200
  - 24-Bit double-buffered stereo up to 1280x1040
  - 8-Bit double-buffered alpha

  - 4/8-Bit single-buffered overlay
  - 8-Bits of window IDs
  - 24-Bit Z-buffer
  - 4-Bit stencis planes
- 1 Rectangular scissor region
- 5 Hardware rectangular clippers
- Texture mapping
  - Up to 108 MB texture memory 1280x1200 at 76 Hz
  - Dual texture
  - 3-D texture
  - Texture color table
- Video support
  - Bilinear space conversion
  - Color space conversion
- 4 Hardware color maps
- Gamma corrected antialiasing lines
- Hardware occlusion culling
- OpenGL, graPHIGS, and GL 1.2 APIs
- 3D Acceleration:
  - Depth buffering
  - Antialiasing
  - Gouraud shading
  - Fog and atmospheric effects
  - Stencil test
  - Alpha test
  - Blending
  - Dithering
- Display resolutions:
  - 1024x768x24 at 85 Hz
  - 1280x1024x24 at 85 Hz
  - 1600x1200x24 at 85 Hz
  - 1920x1200x24 at 76 Hz
  - 1280x1024x24 at 120 Hz (double buffer stereo)
  - 2048x1536x24 at 60 Hz (analog only)
- Supports monitors complying with ISO 9241, part 3
- Supports TFT monitors complying to ISO 13406/2
- DDC2 support
- Analog and digital interfaces
- Stereo viewing

POWER GXT4500P and POWER GXT6500P 3D Graphics Adapter Cable Information

The following topics show the connector information and a cabling example.

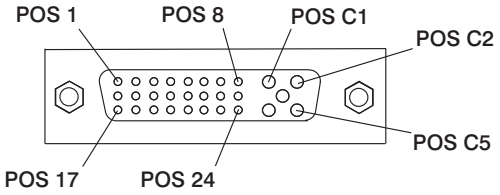
POWER GXT4500P and POWER GXT6500P Graphics Adapter 3-Pin Mini-DIN Stereo Jack



Position	Signal Name
1	+5 vdc

Position	Signal Name
2	GND
3	TTL out

POWER GXT4500P and POWER GXT6500P 3D Graphics Adapter DVI Connector

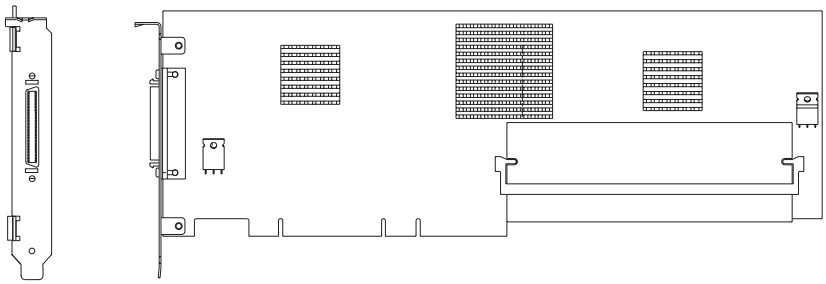


Pin	Signal	Pin	Signal
1	TMDS data 2-	16	Hot plug detect
2	TMDS data 2+	17	TMDS data 0-
3	TMDS data 2/4 shield	18	TMDS data 0+
4	TMDS data 4-	19	TMDS data 0/5 shield
5	TMDS data 4-	20	TMDS data 5-
6	DDC clock	21	TMDS data 5+
7	DDC data	22	TMDS clock shield
8	Analog vertical sync	23	TMDS clock+
9	TMDS data 1-	24	TMDS clock-
10	TMDS data 1+	C1	Analog red
11	TMDS data 1/3 shield	C2	Analog green
12	TMDS data 3-	C3	Analog blue
13	TMDS data 3+	C4	Analog horizontal sync
14	+5 vdc power	C5	Analog ground (return for analog red, green, blue)
15	Ground (return for +5 vdc, Hsync, Vsync)		

Type 276A, SP Switch2 PCI-X Attachment Adapter (FC 8398)

The SP Switch2 PCI-X Attachment Adapter connects the following systems to the SP Switch2 fabric for use as a clustered server/node.

- MT 7028 Model 6C4
- MT 7038 Model 6M2
- MT 7039 Model 651
- MT 7040 Model 61D
- MT 7311 Model D20

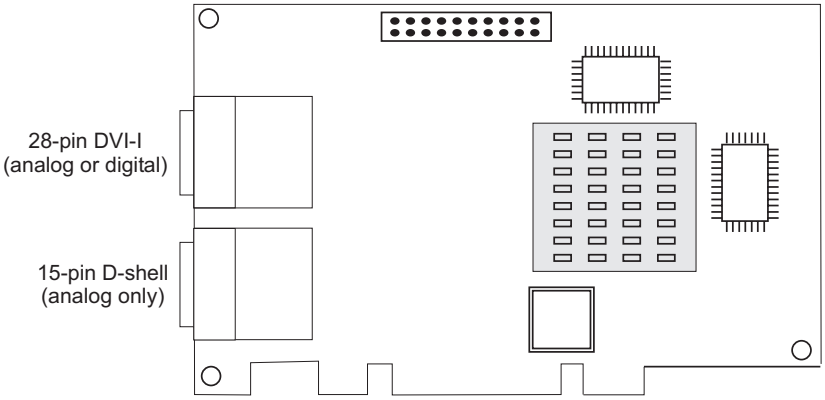


SP System Attachment Adapter Specifications

Item	Description
FRU number	44P021
Bus architecture	PCI-X
Busmaster	Yes
Card type	Full size
Maximum number and adapter slots	For system-specific adapter maximums and slot placement, see the *PCI Adapter Placement Reference Guide*, order Number SA38-0538.
Connector	50-pin high density
Wrap plug	77G0818
Cables	SPS2 (from MT 9076)

Type 2849, POWER GXT135P Graphics PCI Adapter (FC 2849)

The POWER GXT135P Graphics PCI Adapter is a high-performance PCI graphics adapter that accelerates and enhances your system unit video. POWER GXT135P Graphics PCI Adapter has no hardware switches to set. Mode selection is made through the software. Connection to the video monitor is made through a high-density 15-pin D-shell connector or a 28-pin DVI connector.

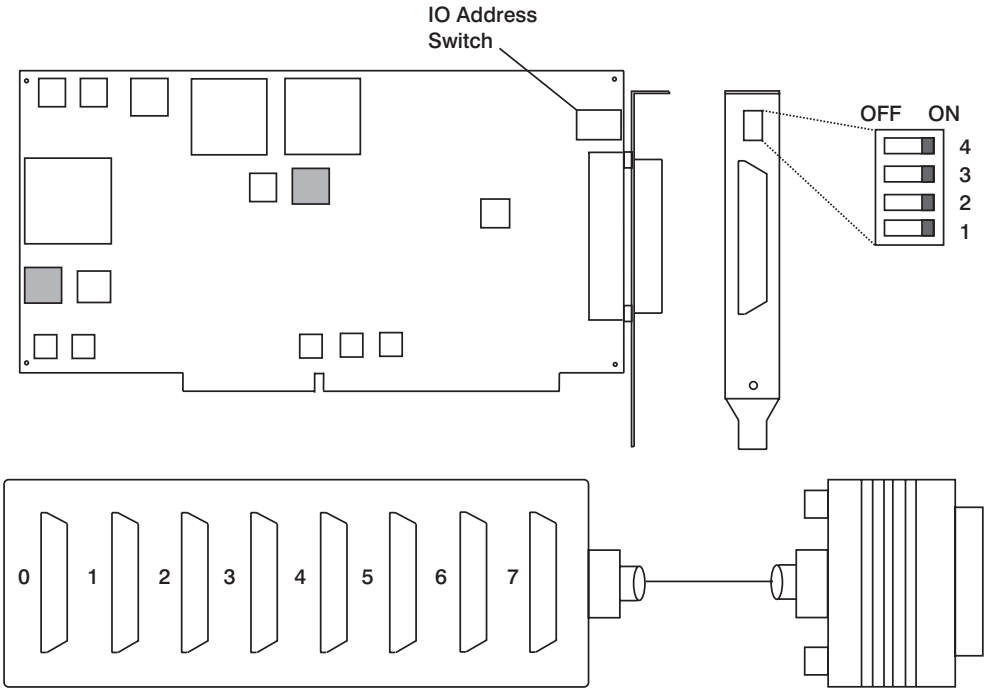


GXT135P Graphics Adapter Specifications

Item	Description
FRU number	09P5758
Bus architecture	PCI
Bus width	32-bit
Memory	16MB SDRAM
Number of colors supported	8-bit or 24-bit
Analog screen resolutions	640x480 at 60 Hz vertical refresh 1024x768 at 60 - 85 Hz vertical refresh 1280x1024 at 60 - 85 Hz vertical refresh 1600x1200 at 75 - 85 Hz vertical refresh 2048x1536 at 60 - 75 Hz vertical refresh
Digital screen resolutions	640x480 at 60 Hz vertical refresh 1024x768 at 60 Hz vertical refresh 1280x1024 at 60 Hz vertical refresh 1600x1200 at 30 Hz vertical refresh
Display power management	Supports VESA and DPMS
Connectors	15-pin D-shell connector 28-pin DVI-I connector

Type 3-8, 8-Port Asynchronous EIA-232 ISA Adapter (FC 2931)

The 8-Port Asynchronous ISA adapter is a multi-channel intelligent serial communications feature that supports speeds of 115 Kbps for each asynchronous port and is run by a 32-bit, 16 MHz, IDT 3041 processor.



8-Port Asynchronous ISA Adapter Specifications

Item	Description
FRU Number	11H5969
I/O addresses	Set with DIP switches; 0x104, 0x114, 0x124, 0x204, 0x224, 0x304, 0x324
I/O Bus	ISA
Interrupt levels	3, 5, 7, 10, 11, 12, 15, or disabled (set by the program)
Bit rate	50 - 115200 (set by the program)
Bits per character	5, 6, 7, 8 (set by the program)
Busmaster	No
Maximum number	7
Connector	78-pin, D-shell female
Wrap plug	EIA-232D 25-pin, part number 6298964
Cable	8-Port DB-25 connector box, part number 11H6011 or 07L9001 included with adapter
Modem cable	EIA-232 modem cable, part number 6323741, feature code 2936, length 3 meters or 10 feet
Terminal/printer cable	EIA-232 terminal/printer cable, part number 12H1204, feature code 2934, length 3 meters or 10 feet

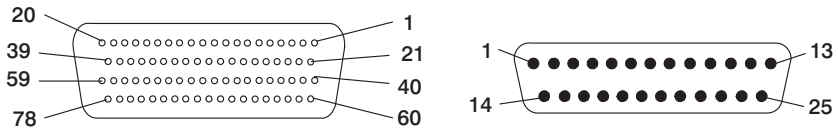
8-Port Asynchronous ISA Adapter I/O Address Switch Settings

I/O addresses are set with the switches at the rear of the adapter. The following table contains a description of the different switch settings.

Hex Addr	I/O Address Switch			
	1	2	3	4
104	Off	Off	On	On
114	Off	On	Off	On
124	Off	On	On	On
204	On	Off	Off	On
224	On	Off	On	On
304	On	On	Off	On
324	On	On	On	On

8-Port EIA-232-D Adapter 78-Position and 25-Position Connectors

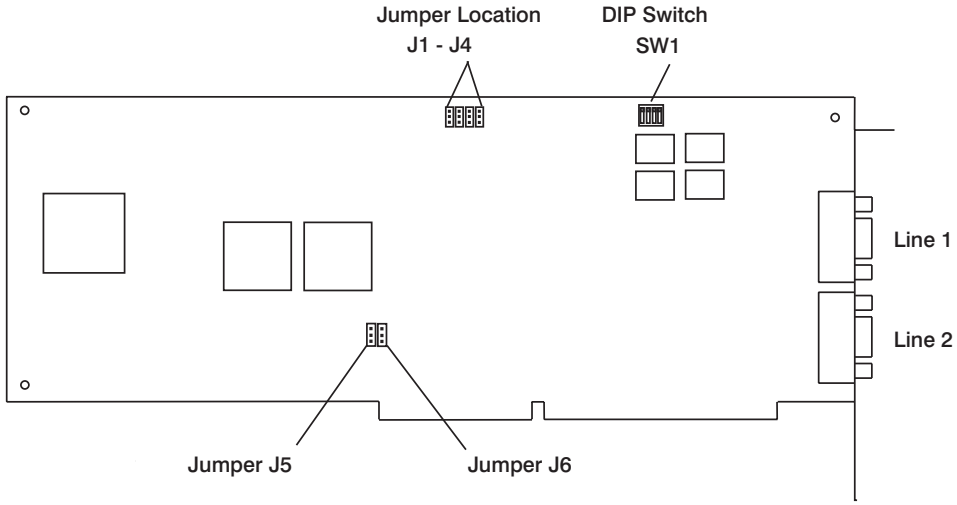
The 8-Port Asynchronous EIA-232 ISA adapter is shipped with a connector box that provides eight EIA-232 standard connectors.



Mnemonic	I/O	Port 0	Port 1	Port 2	Port 3	Port 4	Port 5	Port 6	Port 7	25-Position Connector
TxD	O	30	50	11	10	40	02	63	64	02
RxD	I	55	17	37	56	28	08	46	27	03
RTS	O	51	31	12	14	21	41	62	60	04
CTS	I	16	53	59	57	25	04	09	45	05
DCD	I	35	33	39	18	43	23	48	06	08
DTR	O	49	32	13	52	22	03	61	01	20
DSR	I	54	34	58	38	05	42	29	26	06
RI	I	36	15	20	19	44	24	47	07	22
SGND*	--	--	--	--	--	--	--	--	--	07
FGND*										01 cable shield
Note: * = Pins 65 through 78 are ground.										

Type 3-9, 128 Port Async Controller ISA (FC 2933)

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



128-Port Async Controller Specifications

Item	Description
FRU number	73H3384
Memory addresses	512 KB of continuous non-shared memory space
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
I/O bus architecture	ISA
Maximum number	7
Connectors	Two 15-pin D-shell connectors
Terminator plugs	Two 15-pin D-shell, part number 43G0938
Cables	0.2 m (9 inches) controller cable, part number 43G0936 4.6 m (15 feet) controller cable, part number 43G0937

Jumpers and Switches

The following sections show the jumpers and switches on the 128-port async adapter.

128-Port Jumpers

There are six jumpers on the adapter. These jumpers are set at the factory and must not be changed. The correct settings are as follows:



128-Port Bus I/O Address Switch

The I/O address switch is used to set the I/O address range that is used by each 128-port adapter. If more than one 128-port adapter is used in one system, they each must have a different address range.

Bus I/O Address	Address Switch 1	2	3	4
0x108	OFF	OFF	ON	ON
0x118	OFF	ON	OFF	ON
0x128	OFF	ON	ON	ON
0x208	ON	OFF	OFF	ON
0x228	ON	OFF	ON	ON
0x308	ON	ON	OFF	ON
0x328	ON	ON	ON	ON



15-Pin D-Shell Controller Connector

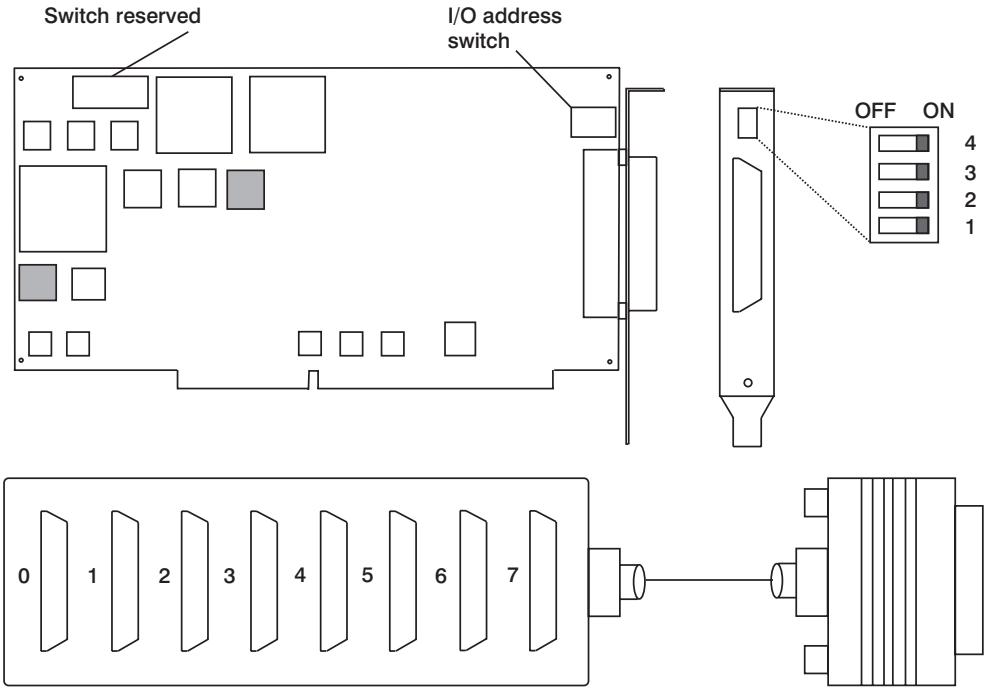
For information on the controller connector, see “15-Pin D-Shell Controller Connector” on page 58.

Remote Async Nodes

For information on Remote Async Nodes (RANs), see “Remote Async Nodes” on page 58.

Type 3-A, 8-Port Asynchronous EIA-232E/RS-422A ISA Adapter (FC 2932)

The 8-Port Asynchronous EIA-232E/RS-422A ISA adapter is a multi-channel intelligent serial communications feature that supports speeds of 115 Kbps for each asynchronous port and is run by a 32-bit, 16 MHz IDT 3041 processor.



8-Port Asynchronous EIA-232E/RS-422A ISA Adapter Specifications

Note: The eight (8) bit switch does not need to be set manually. The functions are set by software, which overrides the switch settings.

Item	Description
FRU number	40H6632
I/O addresses	Set with DIP switches; 0x104, 0x114, 0x124, 0x204, 0x224, 0x304, 0x324
I/O bus	ISA
Interrupt levels	3, 5, 7, 10, 11, 12, 15, or disabled (set by the program)
Bit rate	50 - 115200 (set by the program)
Bits per character	5, 6, 7, 8 (set by the program)
Busmaster	No
Maximum number	7
Connector	78-pin D-shell female
Wrap plug	EIA-232 25-pin, part number 6298964. This wrap plug tests all of the adapter functions for both EIA-232 and RS-422.
Cable	8-Port DB-25 connector box, part number 11H5967 included with adapter
Modem cable	EIA-232 modem cable, part number 6323741, feature code 2936, length 3 meters or 10 feet RS-422 modem cable, customer supplied (must meet RS-422 requirements)
Terminal/printer cable	EIA-232 terminal/printer cable, part number 12H1204, feature code 2934, length 3 meters or 10 feet

RS-422 terminal/printer cable, part number 30F8966, feature code 2945, length 20 meters or 66 feet

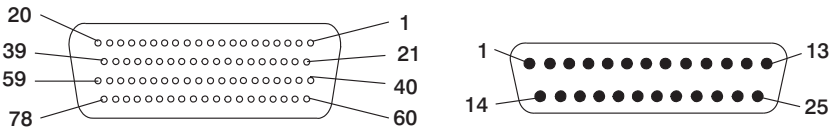
8-Port Asynchronous ISA Adapter I/O Address Switch Settings

I/O addresses are set with the switches at the rear of the adapter. The following table contains the different switch settings.

Hex Addr	I/O Address Switch			
	1	2	3	4
104	Off	Off	On	On
114	Off	On	Off	On
124	Off	On	On	On
204	On	Off	Off	On
224	On	Off	On	On
304	On	On	Off	On
324	On	On	On	On

8-Port EIA-232E/RS-422 Adapter 78-Position and 25-Position Connectors

The 8-Port Asynchronous EIA-232E/RS-422A ISA adapter is shipped with a connector box that provides eight 25-pin D-Shell standard connectors.

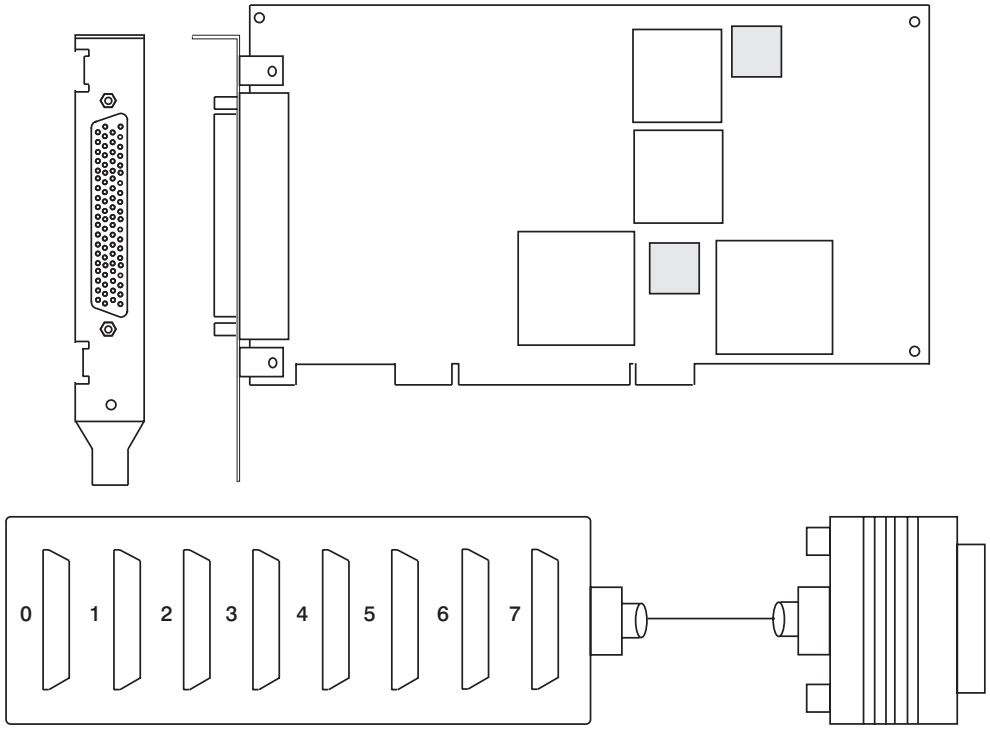


Mnemonic EIA-232E/ RS-422A	I/O	Port 0	Port 1	Port 2	Port 3	Port 4	Port 5	Port 6	Port 7	25-Position Connector
TxD/TxDb	O	30	50	11	10	40	02	63	64	02
RxD/RxDb	|	55	17	37	56	28	08	46	27	03
RTS/TxDa	O	51	31	12	14	21	41	62	60	04
CTS/RxDa	|	16	53	59	57	25	04	09	45	05
DCD/DCD	|	35	33	39	18	43	23	48	06	08
DTR/DTR	O	49	32	13	52	22	03	61	01	20
DSR/DSR	|	54	34	58	38	05	42	29	26	06
RI/NA*	|	36	15	20	19	44	24	47	07	22
SGND**	--	--	--	--	--	--	--	--	--	07
FGND										01 cable shield

Notes:
- * = RTS is wrapped internally to CTS and RI for each port in RS-422
- ** = Pins 65 through 78 are ground

Type 3-B, 8-Port Asynchronous EIA-232E/RS-422A PCI Adapter (FC 2943)

The 8-Port Asynchronous EIA-232E/RS-422A PCI adapter is a multi-channel intelligent serial communications feature that supports speeds of up to 230 Kbps for each asynchronous port and is run by a 32-bit, 20 MHz, IDT 3041 processor.

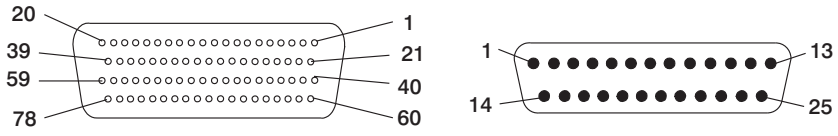


8-Port Asynchronous EIA-232E/RS-422A PCI Adapter Specifications

Item	Description
FRU number	93H6541
I/O bus	PCI
Bit rate	50 - 230,000 (set by the program)
Bits per character	5, 6, 7, 8 (set by the program)
Busmaster	No
Maximum number	8
Connector	78-pin D-shell female
Wrap plug	EIA-232 25-pin, part number 6298964. This wrap plug tests all of the adapter functions for both EIA-232 and RS-422.
Cable	8-Port DB-25 connector box, part number 11H5967 included with adapter
Modem cable	EIA-232 modem cable, part number 6323741, feature code 2936, length 3 meters or 10 feet RS-422 modem cable, customer supplied (must meet RS-422 requirements)
Terminal/printer cable	EIA-232 terminal/printer cable, part number 12H1204, feature code 2934, length 3 meters or 10 feet RS-422 terminal/printer cable, part number 30F8966, feature code 2945, length 20 meters or 66 feet

8-Port EIA-232E/RS-422A Adapter 78-Position and 25-Position Connectors

The 8-Port Asynchronous EIA-232E/RS-422A PCI adapter is shipped with a connector box that provides eight 25 pin D-Shell standard connectors.

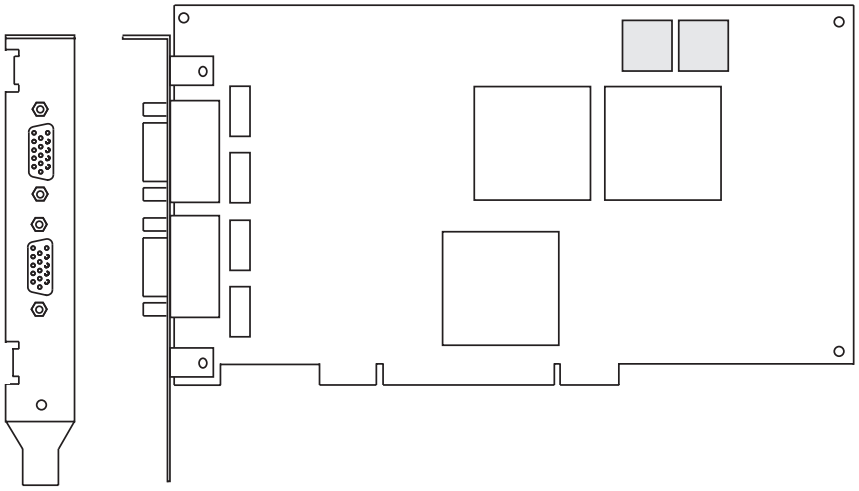


Mnemonic EIA-232E/ RS-422A	I/O	Port 0	Port 1	Port 2	Port 3	Port 4	Port 5	Port 6	Port 7	25-Position Connector
TxD/TxDb	O	30	50	11	10	40	02	63	64	02
RxD/RxDb	|	55	17	37	56	28	08	46	27	03
RTS/TxDa	O	51	31	12	14	21	41	62	60	04
CTS/RxDa	|	16	53	59	57	25	04	09	45	05
DCD/DCD	|	35	33	39	18	43	23	48	06	08
DTR/DTR	O	49	32	13	52	22	03	61	01	20
DSR/DSR	|	54	34	58	38	05	42	29	26	06
RI/NA*	|	36	15	20	19	44	24	47	07	22
SGND**	--	--	--	--	--	--	--	--	--	07
FGND										01, Cable Shield

Notes:
1. * = RTS is wrapped internally to CTS and RI for each port in RS-422
2. ** = Pins 65 through 78 are ground

Type 3-C, 128-Port Async Controller PCI (FC 2944)

This adapter provides the control function and connectors to attach eight 16-port remote async nodes (RANs). When all eight nodes are attached, this combination provides 128, EIA-232 or RS-422 communication ports. The remote async nodes are described in the following section. More information pertaining to the 128-Port Async Controller can be found in the *AIX Versions 3.2 and 4 Asynchronous Communications Guide*, order number SC23-2488.

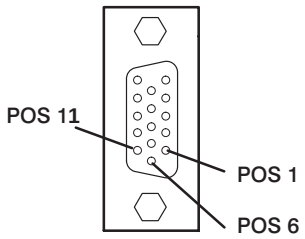


128-Port Async Controller PCI Specifications

Item	Description
FRU number	93H6545
Memory	1 M byte memory on card
Bit rate (synchronous)	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
I/O bus architecture	PCI
Maximum number	8
Connectors	Two, 15-pin D-shell connectors
Terminator plugs	Two, 15-pin D-shell, part number 43G0938
Cables	0.2 m (9 inches) controller cable, part number 43G0936 4.6 m (15 feet) controller cable, part number 43G0937

15-Pin D-Shell Controller Connector

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



Controller Connector (female)

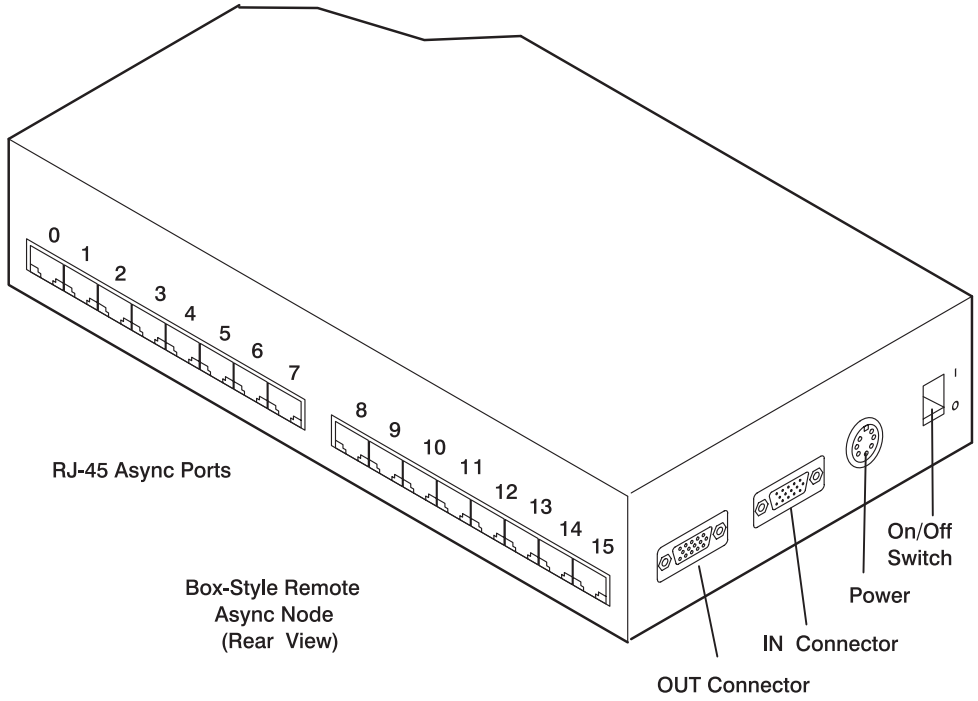
Position	Mnemonic
1	RxD-
2	RxD+
3	Reserved
4	RxC-
5	RxC+
6	TxD-
7	TxD+
8	Reserved
9	TxC-
10	TxC+
11	Reserved
12	GND (chassis)
13	Reserved
14	Reserved
15	Reserved

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 Two Adapters and the Four Different Remote Async Nodes” on page 414. 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 *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 (985 feet) from the controller at the maximum controller line data rate. Distances up to 1200 meters (3938 feet) are supported at lower data rates. See the Controller Line Data Rates table in “Line Length, 8-Wire” on page 416. Remote async nodes may also be remotely located through either RS-422 or EIA-232 synchronous modems.

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



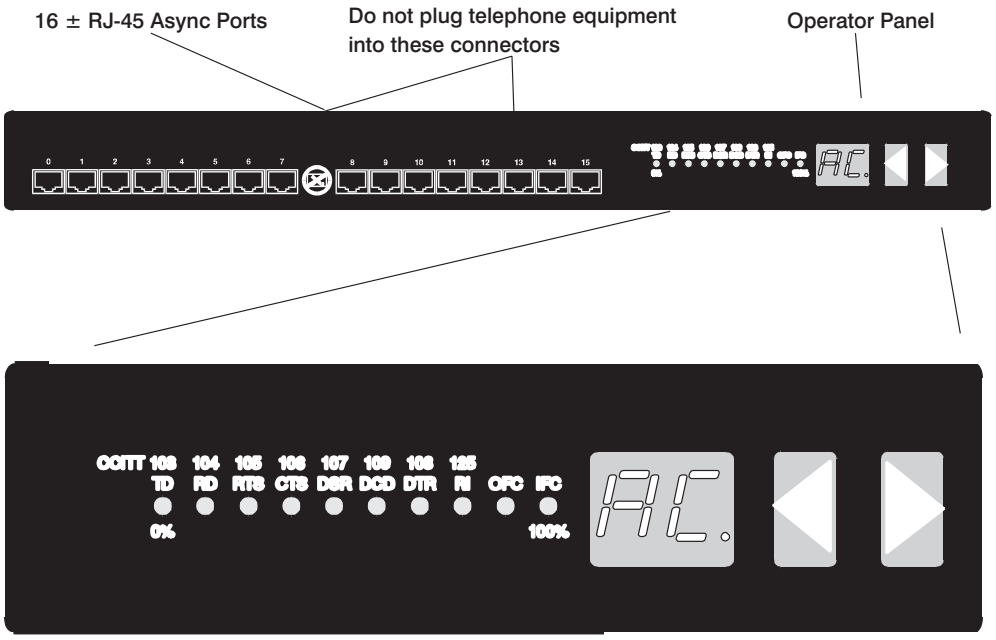
Feature code	RAN Description
8130	EIA-232 original
8137	EIA-232 enhanced
8138	RS-422 enhanced

(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 as the one on the box-style. Cabling for both styles is the same. The box-style RAN and the rack-style RAN differ in form factor, power supply, and physical shape. The box-style is powered by a transformer that supplies low voltage to the RAN. The rack-style is powered directly from the wall AC outlet at 100 or 200 volts AC.

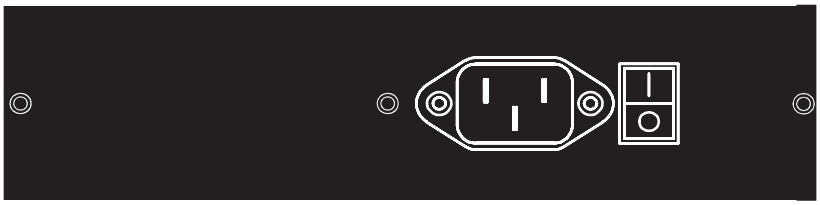
The rack-style of RAN comes with brackets (not shown) to enable mounting the unit in a rack. The rack-style RAN is one EIA unit high. The front of the rack has the 16 EIA-232 RJ-45 connectors and the operator panel.

Front of Rack Style Remote Async Node

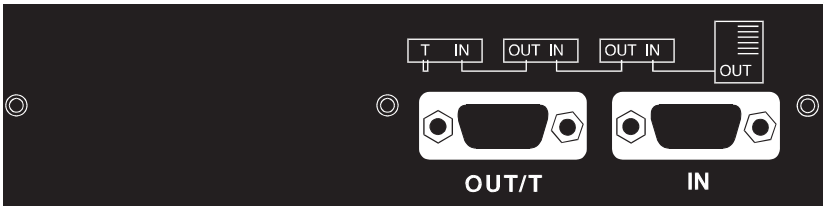


Operator Panel Detail

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



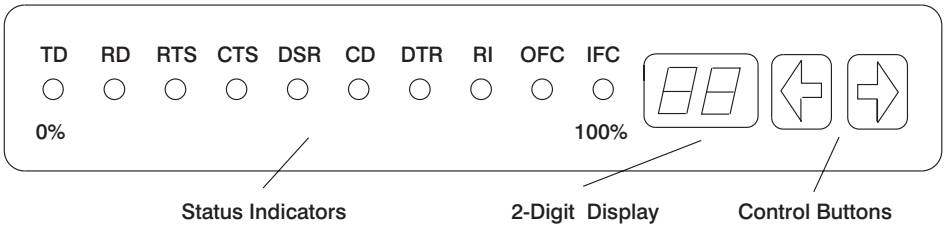
Connectors for Cabling Adapter and RANs Together

16-Port Remote Async Node Specifications

Item	Definition
FRU numbers	(FC 8130) 88G3842 (FC 8137) 93H6549 (FC 8138) 93H6563
Rack style	(FC 8136) 40H2589
Connectors	Sixteen,10 position RJ-45 connectors One 15-pin D-shell male connector One 15-pin D-shell female connector
Wrap plug	RJ-45, part number 43G0928
Terminator	HD-15, part number 43G0926
Cables	See “128-Port Async Controllers (FC 2933, 2944)” on page 291

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

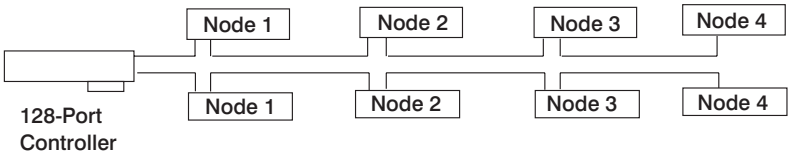
Following a successful boot, system activity displays, and the status indicators cycle at a rate proportional to async traffic. The following display modes can be viewed in the two-digit display by using the left and right arrow buttons on the front panel:

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.

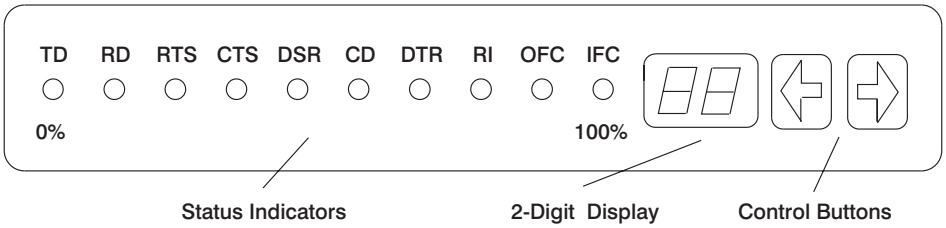
Programming the Remote Async Node

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.



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 P0 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:



   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.

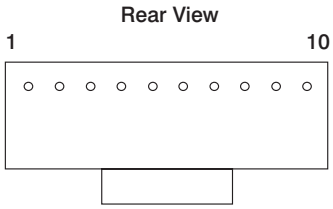
      Note: Node numbers must be assigned in ascending order on each controller line, beginning with the remote async node closest to the controller. That is, the remote async node closest to each controller connector would be assigned number 1. Numbers greater than 4 are not configured.

   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 assigned the same node number. The remote async node displaying the En has been programmed to the same node 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

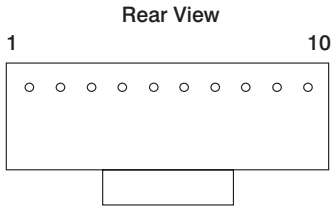
The connector positions and signals for each RJ-45 connector on the Remote Async Node are the same (see the following table). Chapter 5, “Cable Assembly and Pin-Outs”, on page 395 contains the information for building cables. For information about building converter cables (Cable NK) and cables that 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 424.



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 the following table). See Chapter 5, “Cable Assembly and Pin-Outs”, on page 395 for information on building converter cables. For information on building cables that can go directly from the Remote Async Node to RS-422 devices (cable NP), see “Cable NP” on page 430. Six wires are required to connect the RAN to a RS-422 device.

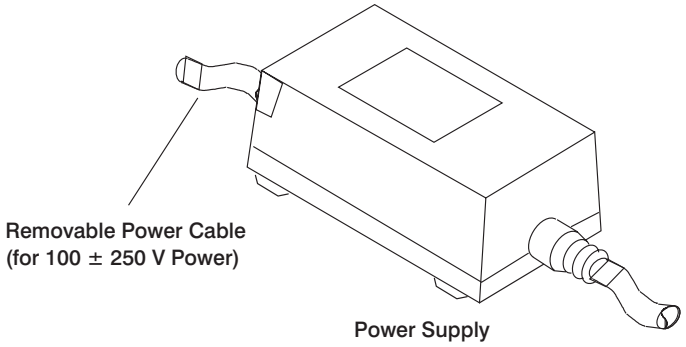


Positions	Mnemonic (Signal Name)
1	Reserved
2	Reserved
3	TxD + (+ transmit data)
4	GND (chassis ground)
5	TxD - (- transmit data)
6	RxD - (- receive data)
7	SG (signal ground)
8	RxD + (+ receive data)
9	Reserved
10	Reserved

16-Port Remote Async Node Power Supplies

Box-Style Power

The box-style remote async nodes use a transformer as shown in the following illustration.



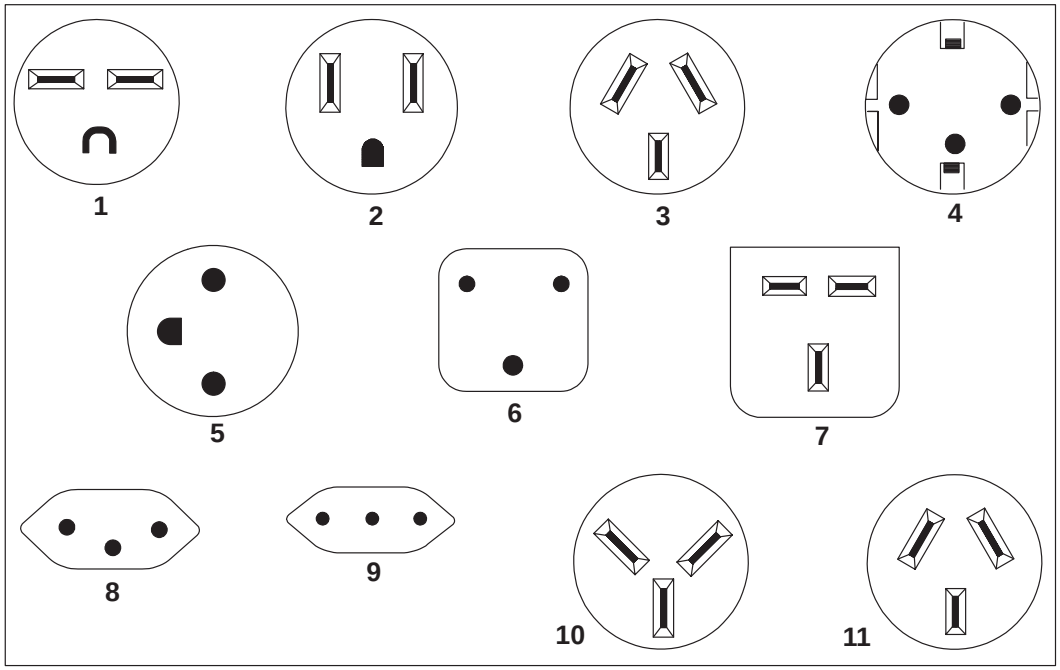
The following table lists the power supply, and the table in “16-Port Remote Async Node Removable Power Cables” on page 67 lists the removable power cables for the 16-port remote async node.

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 60 Hz.

16-Port Remote Async Node Removable Power Cables

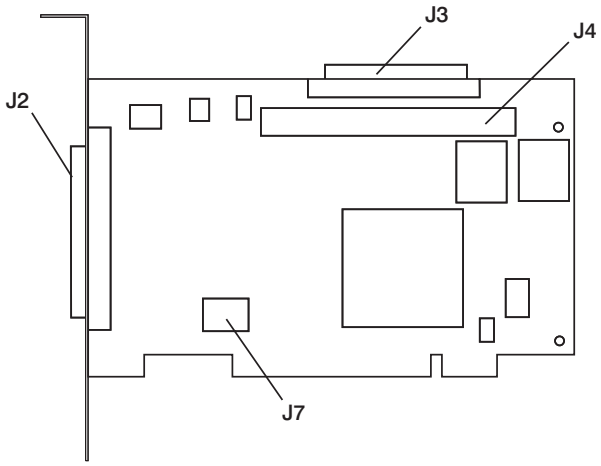


Index	Part Number	Country
1	1838574	Bahamas, Barbados, Bolivia, Canada, Costa Rica, Dominican Republic, El Salvador, Ecuador, Guatemala, Honduras, Jamaica, Japan, Netherlands Antilles, Panama, Peru, Trinidad, Philippines, Taiwan, Thailand, Venezuela
2	6952300	Bolivia, Dominican Republic, Ecuador, Guyana, 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, China (Hong Kong S.A.R.), Iraq, Ireland, Jordan, Kenya, Kuwait, Malawi, China (Macao S.A.R.), 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

Type 4-A or 4_A, PCI SCSI-2 Single-Ended Fast/Wide Adapter (FC 2408/6208)

Note: Early-ship versions of 73H3562 may have type label 4-E instead of 4_A.

The PCI SCSI-2 Fast/Wide Adapter enables you to use internal and external small computer system interface (SCSI) devices with computers containing the Peripheral Component Interconnect (PCI).



Jumper Settings and Multi-Adapter Configurations

The settings shown below are the default configuration for jumper block J7 on the SCSI adapter. The adapter is shipped with the jumpers in this configuration. This configuration is used for a single adapter on a SCSI chain. It allows the adapter to sense whether it is at the end of a SCSI chain or in the middle of a SCSI chain. The adapter then enables or disables its built-in SCSI terminators as required.

```
Default Position of Jumper Block J7
For Automatic Termination selection

Jumper J7 settings
   -------------
 s4  s3  s2  s1
out out out out
```

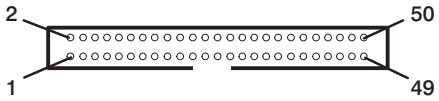
PCI SCSI-2 Fast/Wide Adapter Specifications

Item	Description
FRU number	73H3562
Microcode	No microcode required
I/O bus architecture	PCI
Interrupt level	PCI interrupt A
Maximum number	A controller may be installed in any/all available 32- or 64-bit, 33 MHZ PCI bus slots
Connector information	External 68-pin high-density micro D-Shell Internal 68-pin high-density plastic D-Shell Internal 50-pin header (2x25) connector
SCSI bus overcurrent protection device	Positive temperature coefficient (PTC) resistor

PCI SCSI-2 Single Ended Fast/Wide Adapter Connectors

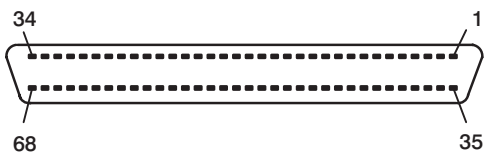
Note: Only one internal connector at a time can have a cable attached.

The following table shows the pinout for the internal 50-pin 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	CPRSNT
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

The following table shows the pinout for the internal and external 68-Pin 16-Bit SCSI connectors.



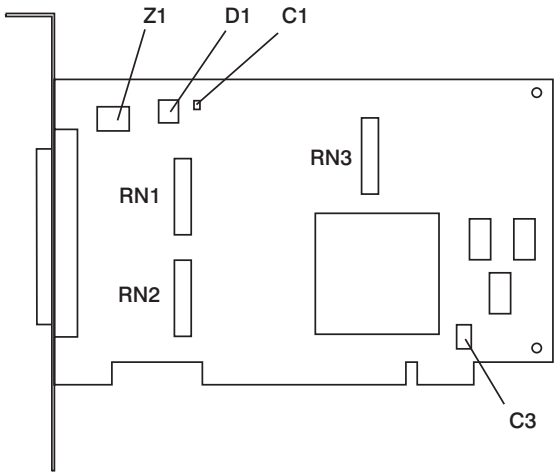
Signal Name	Pin	Pin	Signal Name
Ground	1	35	-DB(12)
Ground	2	36	-DB(13)

Signal Name	Pin	Pin	Signal Name
Ground	3	37	-DB(14)
Ground/CPRNST_16*	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)
Reserved*	12	46	-DB(6)
Ground	13	47	-DB(7)
Ground	14	48	-DB(P)
Ground	15	49	Ground
Ground	16	50	CPRNST
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)
Note: * = External Connector Only			

Type 4-B or 4_B, PCI SCSI-2 Differential Fast/Wide Adapter (FC 2409/6209)

Note: Early-ship levels of 73H3568 may have type label 4-F instead of 4_B.

The PCI SCSI-2 Differential Fast/Wide Adapter enables you to use external differential small computer system interface (SCSI) devices with computers containing the Peripheral Component Interconnect (PCI). The adapter conforms to the American National Standards Institute (ANSI) SCSI-2 standard and the PCI local specification, revision 2.0.

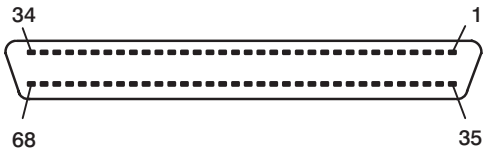


PCI SCSI-2 Differential Fast/Wide Adapter Specifications

Item	Description
FRU number	93H8407
Interrupt level	Int A
Microcode	No microcode required
I/O bus architecture	PCI
Maximum number	A controller may be installed in any/all available 32- or 64-bit, 33 MHz PCI bus slots
Connector information	External 68-pin high-density micro D-Shell
SCSI bus overcurrent protection device	Positive temperature coefficient (PTC) resistor

PCI SCSI-2 Fast/Wide SCSI-Bus Adapter Connector

The following table shows the pinout for the external 68-pin 16-bit SCSI connector.



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(P1)	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)

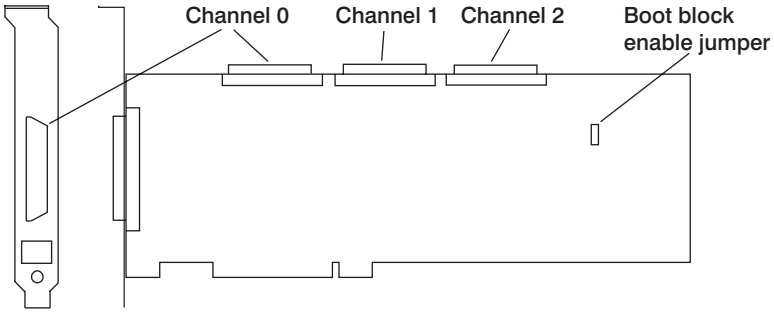
Signal Name	Pin	Pin	Signal Name
+DB(11)	34	68	-DB(11)

Type 4-H, PCI SCSI-2 F/W RAID Adapter (FC 2493)

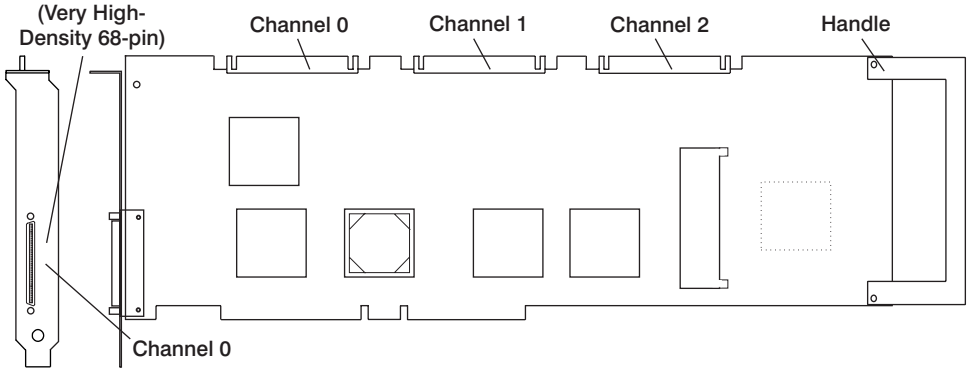
The PCI SCSI-2 F/W RAID Adapter allows you to use internal and external small computer system interface (SCSI) devices with computers containing the Peripheral Component Interconnect (PCI) in RAID configurations.

The types of the PCI SCSI-2 F/W RAID adapters are Type A and Type B. The main difference is the kinds of connectors. Type A has a 68-pin high-density micro D-shell external connector. Type B has a smaller very high-density connector interface (VHDCI) 68-pin connector and no boot block enable jumper.

Type A



Type B



See notes on page 75.

PCI SCSI-2 F/W RAID Adapter Specifications

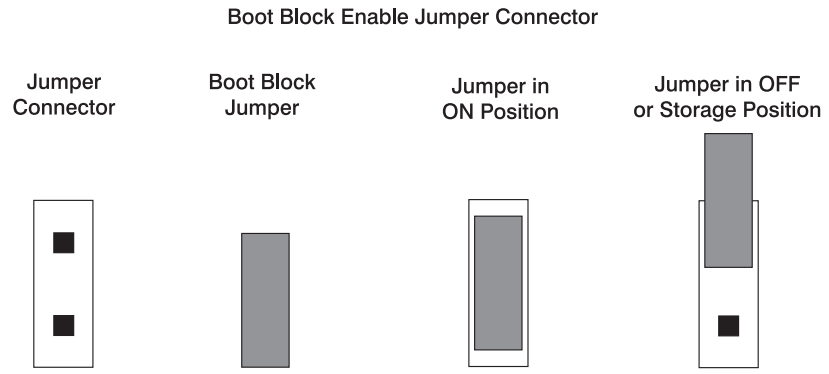
Item	Description
FRU number	Type A, 07L9287 Type B, 08L1319
Microcode	Provided on adapter
I/O bus architecture	PCI
Interrupt	PCI interrupt A
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Connector information	Type A external, 68-pin high-density micro D-Shell Type A internal, 68-pin high-density micro D-Shell Type B external, 68-pin VHDCI Type B internal 68-pin high-density micro D-Shell
SCSI bus overcurrent Protection device	Positive temperature coefficient (PTC) resistor

Note: For information on configuring disk arrays attached to this adapter, see *SCSI-2 F/W PCI RAID Adapter Reference Guide*, order number SC23-1889.

Note: Adapter types A and B each have two connectors labeled Channel 0. One is an external connector the other is an internal connector. These two connectors are directly connected to each other internally on the adapter. Because the attachment of devices to these two connectors is mutually exclusive, you can only have a cable with devices attached to the internal connector for Channel 0 or a cable with devices attached to the external connector for Channel 0, but not at the same time.

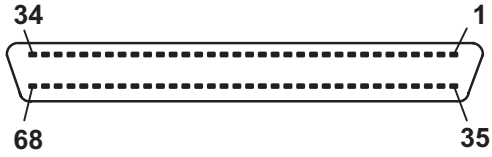
Jumper Settings

For adapter type A only, use the boot block enable jumper in those rare instances when you update the adapter boot initialization code. Under normal conditions, you must not use jumpers when you update the adapter run-time firmware or while the adapter is operating. When you download adapter boot initialization code, you must place a jumper in the On position of the boot block enable jumper block pins. The jumper must be moved to the Off position following the update operation.



Internal/External 68-Pin 16-Bit SCSI Connectors

The following table shows the pinout for the internal and external 68-pin SCSI connectors. There are two sizes of SCSI connectors on SCSI adapters types A and B. All of the connectors are wired the same way.

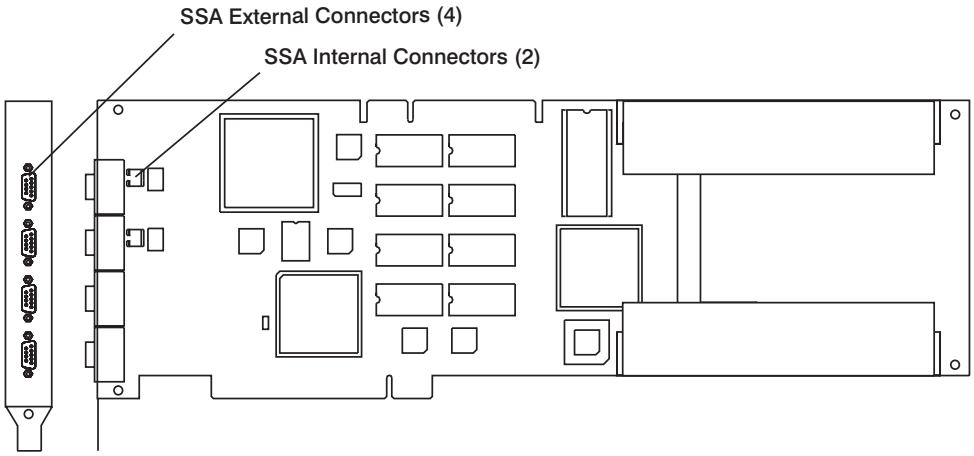


Signal Name	Pin	Pin	Signal Name
Ground	1	35	-DB(12)
Ground	2	36	-DB(13)
Ground	3	37	-DB(14)
Ground/CPRNST_16*	4	38	-DB(15)
Ground	5	39	-DB(P1)
Ground	6	40	-DB(0)
Ground	7	41	-DB(1)
Ground	8	42	-DB(2)
Ground	9	43	-DB(3)
Ground	10	44	-DB(4)
Ground	11	45	-DB(5)
Reserved*	12	46	-DB(6)
Ground	13	47	-DB(7)
Ground	14	48	-DB(P)
Ground	15	49	Ground
Ground	16	50	CPRNST
TERMPWR	17	51	TERMPWR
TERMPWR	18	52	TERMPWR
Reserved	19	53	Reserved
Ground	20	54	Ground
Ground	21	55	-ATN
Ground	22	56	Ground

Signal Name	Pin	Pin	Signal Name
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)
Note: * = External connector only			

Type 4-J, PCI SSA 4-Port RAID Adapter (FC 6218)

The PCI 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 the *PCI SSA 4-Port RAID Adapter, Technical Reference*.



PCI SSA 4-Port RAID Adapter Specifications

Item	Description
FRU numbers	Base card without DRAM, 32H3836 DRAM card, 73G3233
Bus architecture	PCI
Bus width	32
Maximum number	The maximum number of PCI SSA 4-Port adapters allowed is one-half of maximum number of PCI slots available in the system unit.
Bus architecture	PCI
Busmaster	Yes
Adapter Type	Long
Data transfer rate	20 MB/second per loop
Connector	9-pin, subminiature D
Cables	Serial link

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.

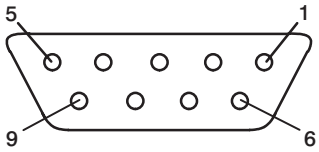
This adapter also contains array management software that provides RAID-5 functions to control the arrays of the RAID subsystem. An array can have from 3 to 16 member disk drives. Each array is handled as one large disk by the operating system. The array management software translates requests to this 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.

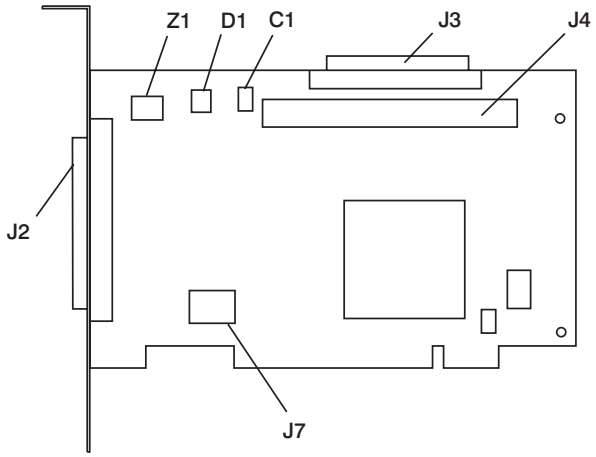
SSA 4-Port RAID Adapter 9-Pin Connector



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

Type 4-K, PCI Single-Ended Ultra SCSI Adapter (FC 6206)

The PCI Single-Ended Ultra SCSI Adapter enables you to use internal and external small computer system interface (SCSI) devices with computers containing the Peripheral Component Interconnect (PCI).



Jumper Settings and Multi-Adapter Configurations

The settings shown below are the default configuration for jumper block J7 on the SCSI adapter. The adapter is shipped with the jumpers in this configuration. This configuration is used for a single adapter on a SCSI chain. It allows the adapter to sense whether it is at the end of a SCSI chain or in the middle of a SCSI chain. The adapter then enables disables its built-in SCSI terminators as required.

```
Default Position of Jumper Block J7
For Automatic Termination selection

Jumper J7 settings
------------------
 s4  s3  s2  s1
out out out out
```

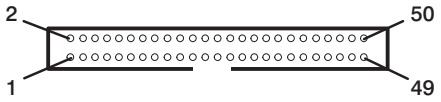
PCI Single-Ended Ultra SCSI Adapter Specifications

Item	Description
FRU number	93H3809
Microcode	No microcode required
I/O bus architecture	PCI
Interrupt level	PCI interrupt A
Maximum number	A controller may be installed in any/all available 32- or 64-bit, 33 MHZ PCI bus slots
Connector information	External, 68-pin high-density micro D-Shell Internal, 68-pin high-density plastic D-Shell Internal, 50-pin header (2x25) connector **Note:** Devices *cannot* be attached to both the internal and the external connector.
SCSI bus overcurrent protection device	Positive temperature coefficient (PTC) resistor

PCI Single-Ended Ultra SCSI Adapter Connectors

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

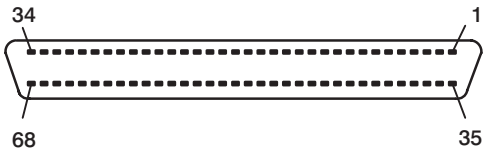
The following table shows the pinout for the internal 50-pin SCSI bus connector.



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	CPRSNT
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

Signal Name	Pin	Pin	Signal Name
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

The following table shows the pinout for the internal and external 68-pin 16-bit SCSI connectors.

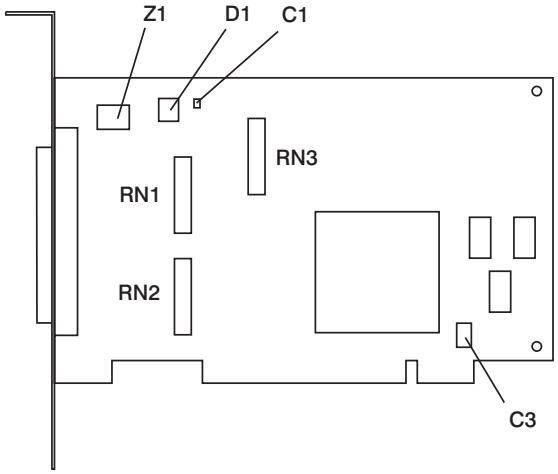


Signal Name	Pin	Pin	Signal Name
Ground	1	35	-DB(12)
Ground	2	36	-DB(13)
Ground	3	37	-DB(14)
Ground/CPRNST_16*	4	38	-DB(15)
Ground	5	39	-DB(P1)
Ground	6	40	-DB(0)
Ground	7	41	-DB(1)
Ground	8	42	-DB(2)
Ground	9	43	-DB(3)
Ground	10	44	-DB(4)
Ground	11	45	-DB(5)
Reserved*	12	46	-DB(6)
Ground	13	47	-DB(7)
Ground	14	48	-DB(P)
Ground	15	49	Ground
Ground	16	50	CPRNST
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

Signal Name	Pin	Pin	Signal Name
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)
Note: * = External Connector Only			

Type 4-L, PCI Differential Ultra SCSI Adapter (FC 6207)

The PCI Differential Ultra SCSI Adapter enables you to use external differential small computer system interface (SCSI) devices with computers containing the Peripheral Component Interconnect (PCI).

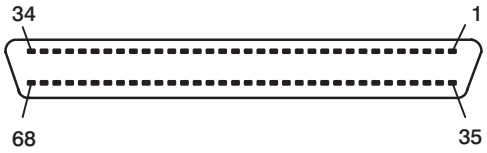


PCI Differential Ultra SCSI Adapter Specifications

Item	Description
FRU number	40H6595
Microcode	No microcode required
Interrupt level	Int A
I/O bus architecture	PCI
Maximum number	A controller may be installed in any/all available 32- or 64-bit, 33 MHZ PCI bus slots
Connector information	External 68-pin high-density micro D-Shell
SCSI bus overcurrent protection device	Positive temperature coefficient (PTC) resistor

PCI Differential Ultra SCSI Adapter Connector

The following table shows the pinout for the external 68-pin 16-bit SCSI connector.



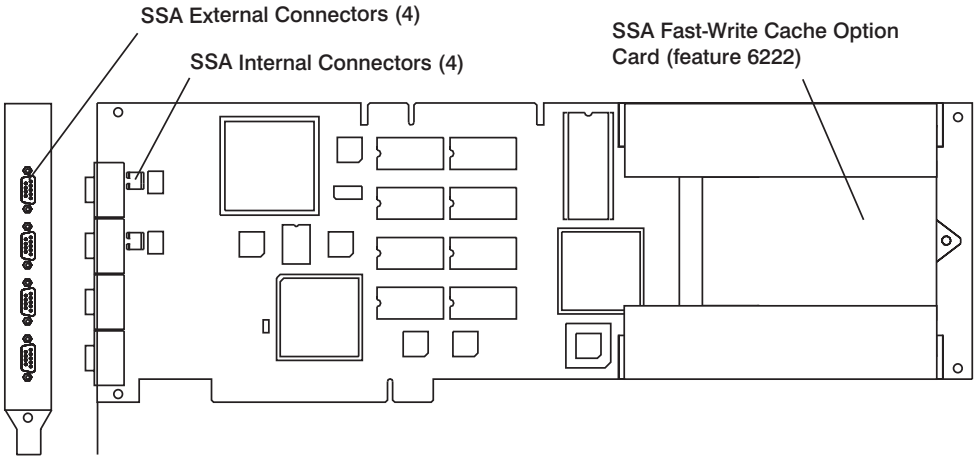
Signal Name	Pin	Pin	Signal Name
+DB(12)	1	35	-DB(12)
+DB(13)	2	36	-DB(13)
+DB(14)	3	37	-DB(14)
+DB(15)	4	38	-DB(15)
+DB(P1)	5	39	-DB(P1)
Ground	6	40	Ground
+DB(0)	7	41	-DB(0)
+DB(1)	8	42	-DB(1)

Signal Name	Pin	Pin	Signal Name
+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)

Type 4-N, PCI SSA Multi-Initiator/RAID EL Adapter and SSA Fast-Write Cache Option Card (FC 6215, 6222)

The PCI 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 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 the *PCI SSA RAID Adapters: Technical Reference*.



PCI SSA Multi-Initiator/RAID EL Adapter Specifications

Item	Description
FRU numbers	Base card without cache option, 96H9938 Cache option card, 74G7719 16 M DRAM SIMM, 89H5651
Bus architecture	PCI
Bus width	32
Maximum number	The maximum number of PCI SSA Multi-Initiator/RAID EL adapters and PCI SSA 4-Port adapters allowed is one-half of maximum number of PCI slots available in the system unit.
Bus architecture	PCI
Busmaster	Yes
Adapter type	Long
Data transfer rate	20 MB/second per loop
Connector	9-pin, subminiature D
Cables	Serial link

PCI 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.

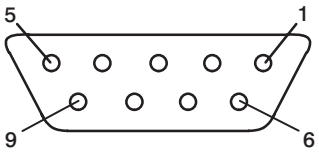
Other software in the adapter controls the Fast-Write Cache Option Card. This card provides 4 MB of cache, which can improve performance for jobs that include many write operations. The fast-write cache card has a standard PCMCIA connector.

Lights of the PCI SSA 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.

PCI SSA Multi-Initiator/RAID EL Adapter 9-Pin Connector

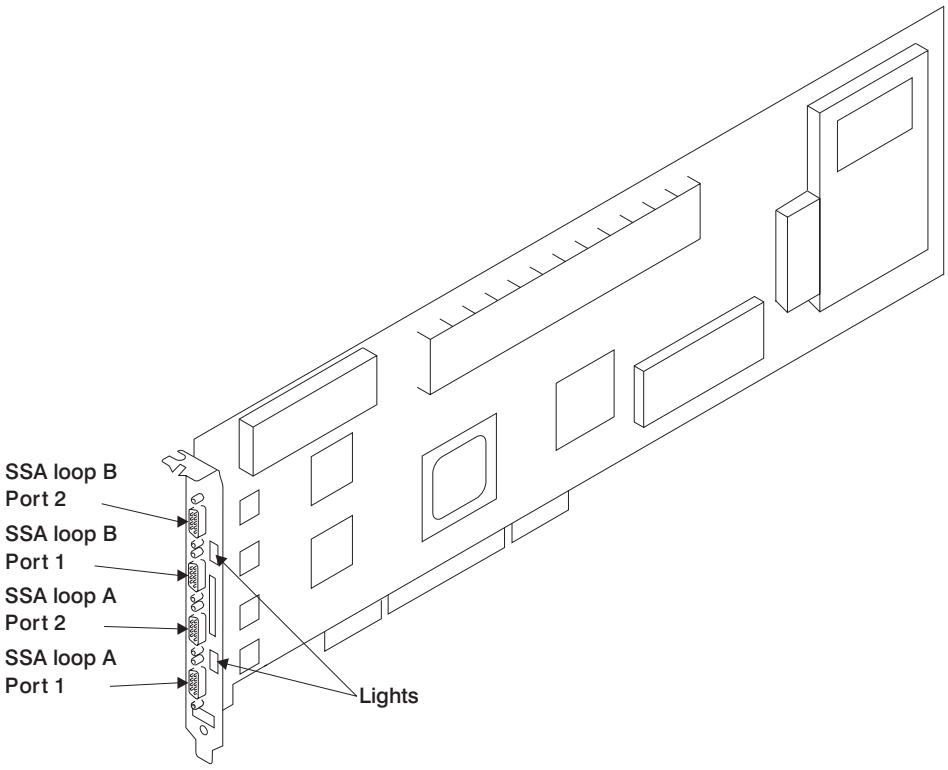


Position	Signal Name
1	Ground
2	- Line Out
3	Ground
4	- Line in
5	Ground
6	+ Line Out
7	Reserved
8	+ 5 V
9	+Line In

Type 4-P, Advanced SerialRAID Adapters (FC 6225, 6230, 6231, 6235)

Two serialRAID adapters use the same type number (4-P): the Advanced SerialRAID Adapter and the Advanced SerialRAID Plus Adapter. Also, there are two memory option cards: the Advanced SerialRAID Adapter Fast-Write Cache Option Card and the 128 MB DRAM Option Card.

The Advanced SerialRAID Adapters 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 the *Advanced SerialRAID Adapters: Technical Reference*.



Advanced SerialRAID Adapters Specifications

Item	Description
FRU numbers	Advanced SerialRAID Base card without DRAM, 09L2090 Advanced SerialRAID Plus Base card without DRAM, 34L5388 64 MB DRAM card, 09L2104 128 MB DRAM card, 09L5585
Bus architecture	PCI
Bus width	32
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Busmaster	Yes
Adapter type	Long
Data transfer rate	20/40 MB/second per loop
Connector	9-pin, subminiature D
Cables	Serial link

Lights of the Advanced SerialRAID Adapters

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.

Advanced SerialRAID Adapters Information

The adapter cards have 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.

These adapters also contain array management software that provides RAID functions to control the arrays of the RAID subsystem. These adapters provide RAID-0, RAID-1, RAID-5, and RAID-10 functions to control the arrays of the RAID subsystem as follows:

- The Advanced SerialRAID Adapter provides non-RAID, RAID-0, and RAID-5 functions.
- The Advanced SerialRAID Plus Adapter provides non-RAID, RAID-0, RAID-1, RAID-5, and RAID-10 functions.

RAID-0 provides data availability equivalent to that of a standard disk drive, but with better performance. A RAID-0 array can have from 2 to 16 member disk drives.

RAID-1 provides better data availability than a standard disk drive, but with slightly lower performance. A RAID-1 array can only have two member disk drives.

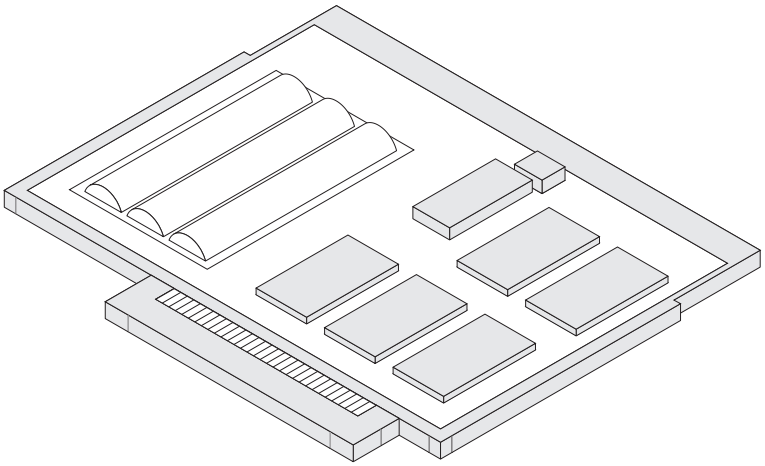
RAID-5 provides good data availability with good performance for workloads that include many read and write operations. RAID-5 enables the system to continue to access and move data in an array, although a member disk of that array has failed. A RAID-0 array can have from 3 to 16 member disk drives.

RAID-10 provides optimum data availability with slightly lower performance than a RAID-5 array, when workloads include many read and write operations. RAID-10 enables the system to continue to access and move data in an array, even though a member disk of that array has failed. A RAID-10 array can have from 4 to 16 member disk drives, but they must be installed in pairs.

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.

(FC 6235) Advanced SerialRAID Adapter Fast-Write Cache Option Card

The optional 32 MB Fast-Write Cache feature is available for the Advanced SerialRAID Adapters. This feature improves performance for jobs that include many write operations.

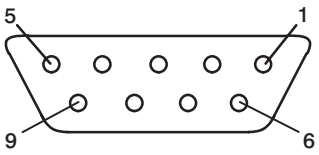


Item	Description
FRU numbers	Fast-write cache card, 09L2105 Fast-write cache battery, 09L5609
Maximum number	One fast-write cache per Advanced SerialRAID Adapters

(FC 6231) 128 MB DRAM Option Card

Item	Description
FRU numbers	128 MB DRAM option card, 09L5585
Maximum number	One 128 MB DRAM option card per Advanced SerialRAID Plus Adapter. If this option is installed, it replaces the existing 64 MB DRAM card.

Advanced SerialRAID Adapters 9-Pin Connector



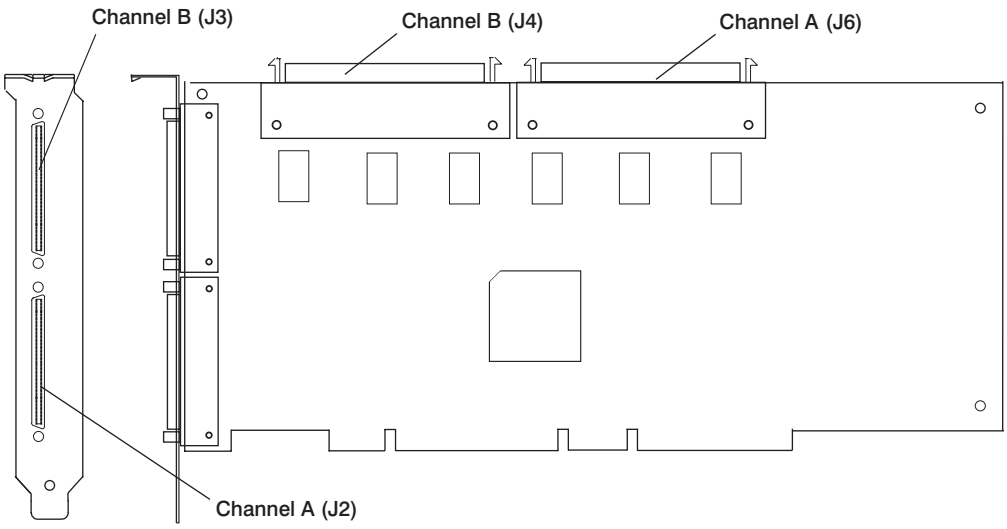
Position	Signal Name
1	External Cable Detection
2	- Line Out
3	Ground
4	- Line in
5	Ground
6	+ Line Out
7	Optical Extender Detector
8	+ 5 V
9	+Line In

Type 4-R, PCI Dual-Channel Ultra2 SCSI Adapter (FC 6205)

The PCI Dual-Channel Ultra2 SCSI Adapter enables you to use internal or external single-ended or low-voltage differential (LVD) small computer system interface (SCSI) devices with computers containing a peripheral component interconnect (PCI) type bus. This adapter provides two channels for SCSI devices (channel A and channel B).

The PCI Dual-Channel Ultra2 SCSI Adapter has both an internal and an external connector on each channel. Only one connector (internal or external) can be used on each channel.

Note: Devices *cannot* be attached to both the internal and the external connector on the same channel (A or B).

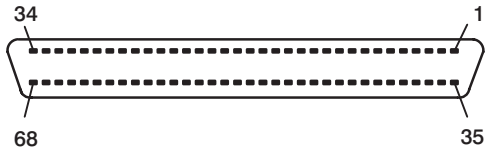


PCI Dual-Channel Ultra2 SCSI Adapter Specifications

Item	Description
FRU number	07L8732
Microcode	No microcode required
I/O bus architecture	PCI
Interrupt level	PCI interrupt A
Maximum number	A controller may be installed in supported 32- or 64-bit, 33MHZ PCI bus slots
Connector information	Each channel (A and B) has both an internal and an external connector; however, only one connector on each channel can have devices attached. External, 68-pin, very-high-density cable interconnect (VHDCI) Internal, 68-pin, high-density plastic D-Shell
SCSI bus overcurrent Protection device	Positive temperature coefficient (PTC) resistor

PCI Dual-Channel Ultra2 SCSI Adapter Connectors

The following table shows the pinout for the internal and external 68-pin 16-bit SCSI connectors.



Signal Name		Connector		Signal Name
SE	**LVD**	**Pin**	**Pin**	**SE and LVD**
Ground	+DB(12)	1	35	-DB(12)
Ground	+DB(13)	2	36	-DB(13)
Ground	+DB(14)	3	37	-DB(14)
Ground/CPRNST_16	+DB(15)	4	38	-DB(15)
Ground	+DB(P1)	5	39	-DB(P1)
Ground	+DB(0)	6	40	-DB(0)
Ground	+DB(1)	7	41	-DB(1)
Ground	+DB(2)	8	42	-DB(2)
Ground	+DB(3)	9	43	-DB(3)
Ground	+DB(4)	10	44	-DB(4)
Ground	+DB(5)	11	4	-DB(5)
Reserved	+DB(6)	12	46	-DB(6)
Ground	-DB(7)	13	47	-DB(7)
Ground	+DB(P)	14	48	-DB(P)
Ground	Ground	15	49	Ground
Ground	DIFFSENS	16	50	CPRNST
TERMPWR	TERMPWR	17	51	TERMPWR
TERMPWR	TERMPWR	18	52	TERMPWR
Reserved	Reserved	19	53	Reserved
Ground	Ground	20	54	Ground

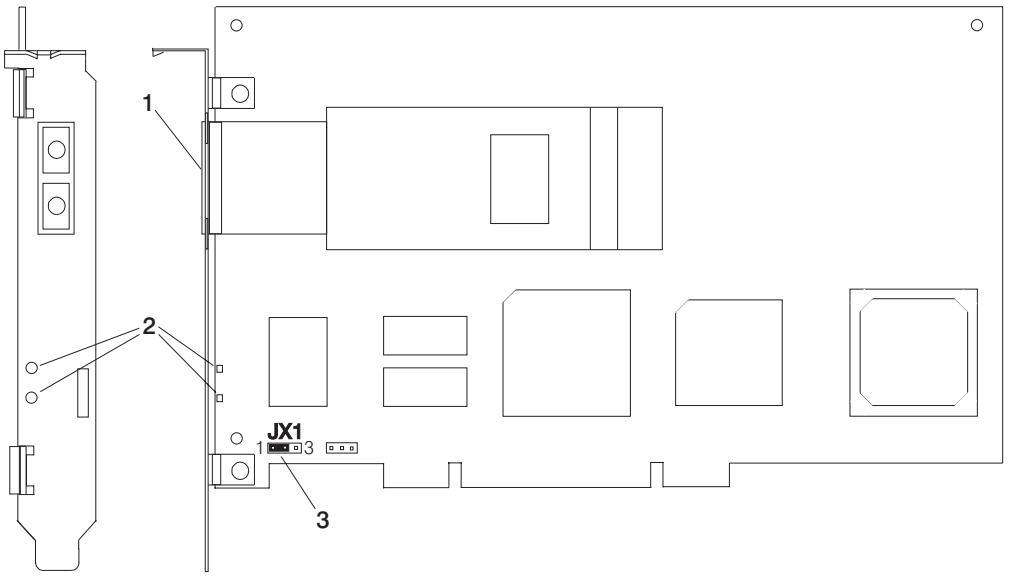
Signal Name		Connector		Signal Name
SE	**LVD**	**Pin**	**Pin**	**SE and LVD**
Ground	+ATN	21	55	-ATN
Ground	Ground	22	56	Ground
Ground	+BSY	23	57	-BSY
Ground	+ACK	24	58	-ACK
Ground	+RST	25	59	-RST
Ground	+MSG	26	60	-MSG
Ground	+SEL	27	61	-SEL
Ground	+C/D	28	62	-C/D
Ground	+REQ	29	63	-REQ
Ground	+I/O	30	64	-I/O
Ground	+DB(8)	31	65	-DB(8)
Ground	+DB(9)	32	66	-DB(9)
Ground	+DB(10)	33	67	-DB(10)
Ground	+DB(11)	34	68	-DB(11)

Notes:

1. For 8-bit SE devices that connect to the P-cable, tie the following signals inactive high: -DB(8), -DB(9), -DB(10), -DB(11), -DB(12), -DB(13), -DB(14), -DB(15), -DB(P1), or select Disable Wide Negations on the front Option Jumper Block and float the same signal lines.
2. For 8-bit LVD devices or SE mode, the following signals must be tied inactive (+ = inactive low, - = inactive high): +/-DB(8), +/-DB(9), +/-DB(10), +/-DB(11), +/-DB(12), +/-DB(13), +/-DB(14),+/-DB(15), +/-DB(P1). Floating these signals is not sufficient.
3. All other signals shall be connected as defined.

Type 4-S, Gigabit Fibre Channel Adapter for PCI Bus (FC 6227)

The Gigibit Fibre Channel Adapter for PCI Bus provides attachment of external storage using the Fibre Channel Arbitrated Loop protocol. The protocol is sent over a shortwave (multimode) fiber optic cable. The Gigabit Fibre Channel Adapter for PCI Bus features on-board protocol engine and buffers. The adapter is FC-PH and PCI 2.1 compliant.



1. Multimode Fiber SC Connector
2. Data Link Status LEDs
3. Jumper JX1, Pins 1 to 2 only

Gigabit Fibre Channel Adapter for PCI Bus Specifications

Item	Description
FRU number	09P1173
Bus architecture	PCI 2.1
Card type	Half
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order Number SA38-0538.
Connector	ANSI Specified SC duplex
Wrap plug	Shipped with assembly or 16G5609
Cables	50 or 62.5 micron multimode fiber-optic, customer provided

Attention: The adapters are designed with specifications for the cable to be a dual cable connector, transmit and receive cable ends clamped together. If a customer uses separate transmit and receive fiber cables, it is strongly recommended that the cables be clamped together to enhance the retention strength on the fiber transceiver connector. Clamping the cables together also improves the alignment of the fibers with the connector and improves overall performance.

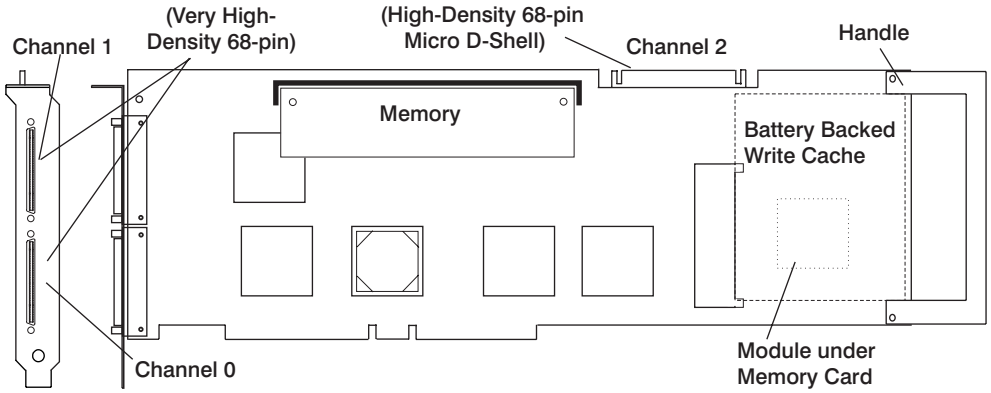
Gigabit Fibre Channel Adapter for PCI Bus LEDs

The Gigabit Fibre Channel Adapter has two LEDs: green and yellow located near the SC connector. Use these LEDs to determine the state of the adapter.

Green LED	Yellow LED	State
OFF	OFF	wakeup failure (adapter is defective)
OFF	ON	POST failure (adapter is defective)
OFF	slow blink (1HZ)	wakeup failure
OFF	fast blink (4HZ)	failure in POST
OFF	flashing (irregularly)	POST processing in progress
ON	OFF	failure while functioning
ON	ON	failure while functioning
ON	slow blink (1HZ)	Normal - inactive
ON	fast blink (4HZ)	Normal - busy
ON	flashing (irregularly)	Normal - active
slow blink	OFF	Normal - link down or not yet started
slow blink	slow blink (1HZ)	off-line for download
slow blink	fast blink (4HZ)	restricted off-line mode (waiting for restart)

Type 4-T, PCI 3-Channel Ultra2 SCSI RAID Adapter (FC 2494)

The PCI 3-Channel Ultra2 SCSI RAID Adapter allows you to use internal and external small computer system interface (SCSI) devices with computers containing the Peripheral Component Interconnect (PCI) in RAID configurations.



PCI 3-Channel Ultra2 SCSI RAID Adapter Specifications

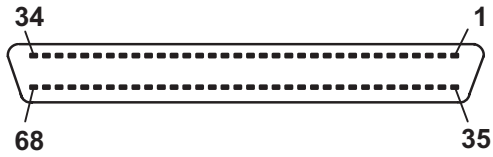
Item	Description
FRU number	Adapter, 01K7396 (No Write Cache or Battery) 32M Write Cache, 21H8979 (With Battery) Battery, 44H8429 (For Write Cache)
Microcode	Provided on adapter
I/O bus architecture	PCI
Interrupt	PCI interrupt A
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Connector information	External, two 68-pin very high-density D-Shell Internal, 68-pin high-density micro D-Shell
SCSI bus overcurrent Protection device	Positive temperature coefficient (PTC) resistor.

Notes:

1. For information on configuring disk arrays attached to this adapter, see *Ultra2 SCSI PCI RAID Adapter Reference Guide* , order number SC23-4302-00.
2. Only supported disk drives can be connected to the adapter. Other SCSI devices cannot be connected to the SCSI bus.

Internal/External 68-Pin 16-Bit SCSI Connector

The following table shows the pinout for the internal and external 68-pin SCSI connectors.



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

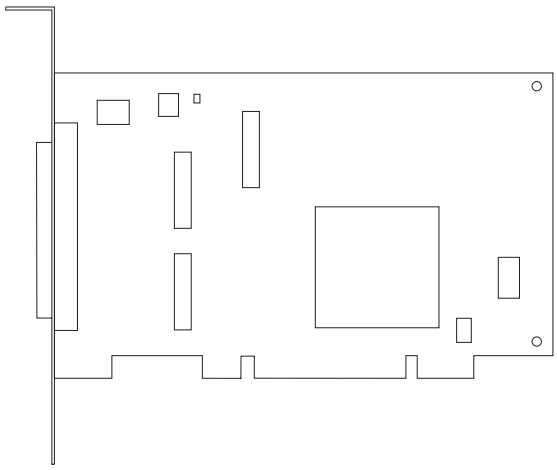
Signal Name		Connector		Signal Name
SE	**LVD**	**Pin**	**Pin**	**SE and LVD**
Ground	+DB(10)	33	67	-DB(10)
Ground	+DB(11)	34	68	-DB(11)

Type 4-U, PCI Universal Differential Ultra SCSI Adapter (FC 6204)

The PCI Universal Differential Ultra SCSI Adapter (4-U) is the same as the PCI Differential Ultra SCSI Adapter (4-L) with the following exceptions:

- The universal adapter can plug into PCI connectors that are keyed to accept both 3.3 volt or 5 volt adapters.
- The keying slots in the connector are different.
- The feature code is different.
- The FRU number is different.

The PCI Universal Differential Ultra SCSI Adapter enables you to use external differential small computer system interface (SCSI) devices with computers containing the Peripheral Component Interconnect (PCI).

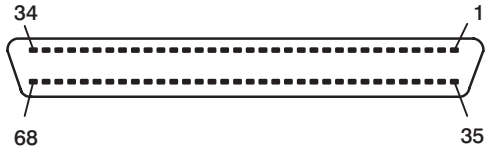


PCI Universal Differential Ultra SCSI Adapter Specifications

Item	Description
FRU number	11K0671
Microcode	No microcode required
Interrupt level	Int A
I/O bus architecture	PCI
Maximum number	A controller may be installed in any/all available 32- or 64-bit, 33 MHZ PCI bus slots
Connector information	External 68-pin high-density micro D-Shell
SCSI bus overcurrent protection device	Positive temperature coefficient (PTC) resistor

PCI Differential Ultra SCSI Adapter Connector

The following table shows the pinout for the external 68-pin 16-bit SCSI connector.

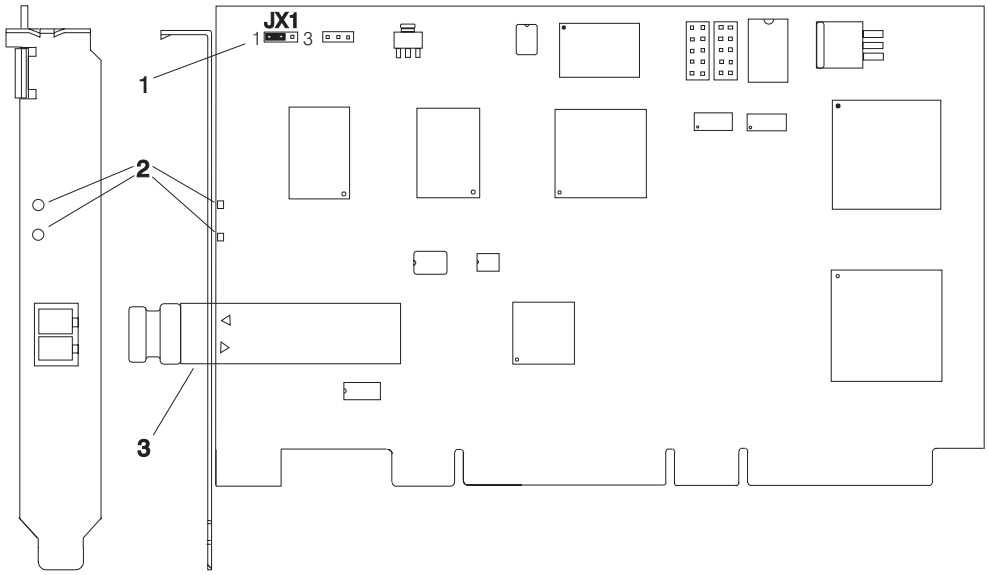


Signal Name	Pin	Pin	Signal Name
+DB(12)	1	35	-DB(12)
+DB(13)	2	36	-DB(13)
+DB(14)	3	37	-DB(14)
+DB(15)	4	38	-DB(15)
+DB(P1)	5	39	-DB(P1)
Ground	6	40	Ground
+DB(0)	7	41	-DB(0)
+DB(1)	8	42	-DB(1)
+DB(2)	9	43	-DB(2)
+DB(3)	10	44	-DB(3)
+DB(4)	11	45	-DB(4)
+DB(5)	12	46	-DB(5)
+DB(6)	13	47	-DB(6)
+DB(7)	14	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

Signal Name	Pin	Pin	Signal Name
+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)

Type 4-W, 2 Gigabit Fibre Channel Adapter for 64-bit PCI Bus (FC 6228)

The 2 Gigabit Fibre Channel Adapter for 64-bit PCI Bus provides attachment of external storage using the Fibre Channel Arbitrated Loop protocol. The protocol is sent over a shortwave (multimode) fiber optic cable. The 2 Gigabit Fibre Channel Adapter for 64-bit PCI Bus features on-board protocol engine and buffers. The adapter is FC and PCI 2.2 compliant.



1. Jumper JX1, Pins 1 to 2 only
2. Data Link Status LEDs
3. Multimode Fiber LC Connector

2 Gigabit Fibre Channel Adapter for 64-bit PCI Bus Specifications

Item	Description
FRU number	09P0102
Bus architecture	PCI 2.2
Card type	Half
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order Number SA38-0538.
Connector	ANSI Specified LC duplex
Wrap plug	Shipped with assembly or 05N6768
Cables	50 or 62.5 micron multimode fiber-optic, customer provided

Attention: The adapters are designed with specifications for the cable to be a dual cable connector, transmit and receive cable ends clamped together. If a customer uses separate transmit and receive fiber cables, it is strongly recommended that the cables be clamped together to enhance the retention strength on the fiber transceiver connector. Clamping the cables together also improves the alignment of the fibers with the connector and improves overall performance.

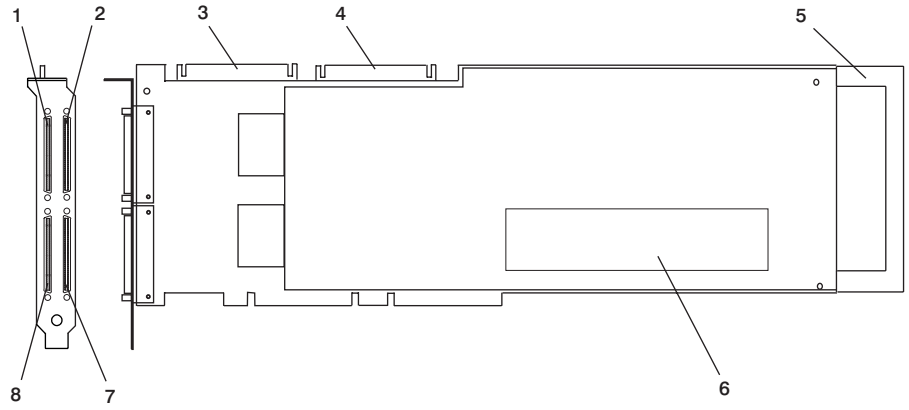
2 Gigabit Fibre Channel Adapter for 64-bit PCI Bus LEDs

The 2 Gigabit Fibre Channel Adapter for 64-bit PCI Bus has two LEDs: green and yellow located near the LC connector. Use these LEDs to determine the state of the adapter.

Green LED	Yellow LED	State
OFF	OFF	wakeup failure (adapter is defective)
OFF	ON	POST failure (adapter is defective)
OFF	slow blink (1HZ)	wakeup failure
OFF	fast blink (4HZ)	failure in POST
OFF	flashing (irregularly)	POST processing in progress
ON	OFF	failure while functioning
ON	ON	failure while functioning
ON	slow blink (1HZ)	Normal - inactive
ON	fast blink (4HZ)	Normal - busy
ON	flashing (irregularly)	Normal - active
slow blink	OFF	Normal - link down or not yet started
slow blink	slow blink (1HZ)	off-line for download
slow blink	fast blink (4HZ)	restricted off-line mode (waiting for restart)

Type 4-X, PCI 4-Channel Ultra3 SCSI RAID Adapter (FC 2498)

The PCI 4-Channel Ultra3 SCSI RAID Adapter allows you to use internal and external small computer system interface (SCSI) devices with computers containing the Peripheral Component Interconnect (PCI) in RAID configurations.



1 Channel 1 connector (68-pin VHDCI)
2 Channel 2 connector (68-pin VHDCI)
3 Channel 1 connector (68-pin high-density plastic D-shell)
4 Channel 2 connector (68-pin high-density plastic D-shell)
5 Handle
6 Memory
7 Channel 3 connector (68-pin VHDCI)
8 Channel 4 connector (68-pin VHDCI)

PCI 4-Channel Ultra3 SCSI RAID Adapter Specifications

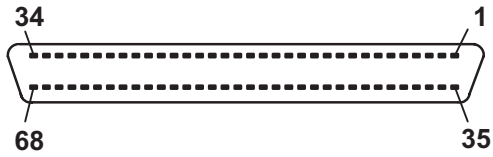
Item	Description
FRU numbers	Base card, 37L6892
	128 MB write cache with battery, 37L6902, U.S.
	128 MB write cache with battery, 19K0561, Japan
	Battery for write cache, 37L6903, U.S.
	Battery for write cache, 00N9561, Japan
Microcode	Provided on adapter
I/O bus architecture	PCI
Interrupt	PCI interrupt A
Adapter slots	For system specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Connectors	External, four 68-pin very high-density connector interface (VHDCI)
	Internal, two 68-pin high-density plastic D-Shell
SCSI bus overcurrent Protection device	
	Positive temperature coefficient (PTC) resistor

Notes:

1. For information on configuring disk arrays attached to this adapter, see *Ultra3 SCSI PCI RAID Adapter Reference Guide*, order number SC23-1239.
2. Only supported disk drives can be connected to the adapter. Other SCSI devices cannot be connected to the SCSI bus.

Internal/External 68-Pin 16-Bit SCSI Connector

The following table shows the pinout for the internal and external 68-pin SCSI connectors.



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

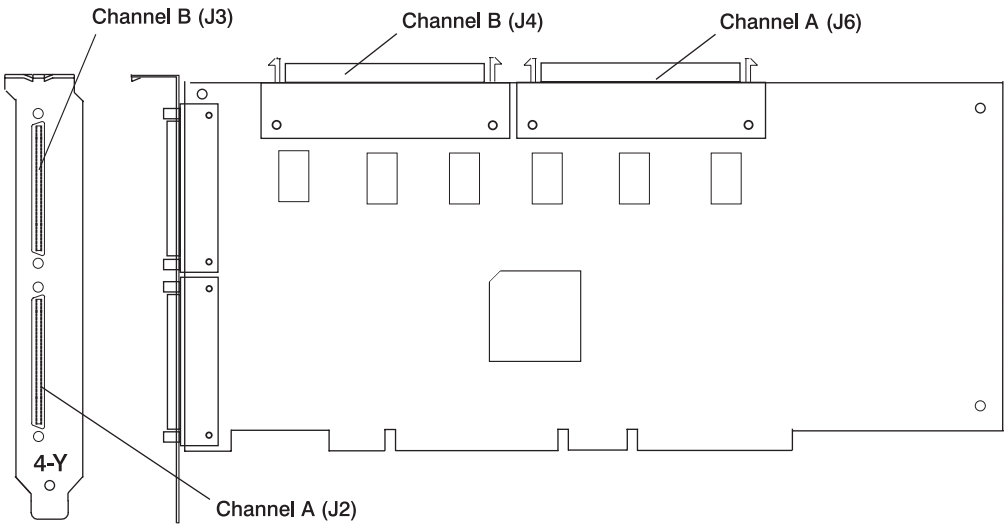
Signal Name		Connector		Signal Name
SE	**LVD**	**Pin**	**Pin**	**SE and LVD**
Ground	+DB(10)	33	67	-DB(10)
Ground	+DB(11)	34	68	-DB(11)

Type 4-Y, PCI Dual-Channel Ultra3 SCSI Adapter (FC 6203)

The PCI Dual-Channel Ultra3 SCSI Adapter enables you to use internal or external single-ended or low-voltage differential (LVD) small computer system interface (SCSI) devices with computers containing a peripheral component interconnect (PCI) type bus. This adapter provides two channels for SCSI devices (channel A and channel B).

The PCI Dual-Channel Ultra3 SCSI Adapter has both an internal and an external connector on each channel. Only one connector (internal or external) can be used on each channel.

Note: Devices *cannot* be attached to both the internal and the external connector on the same channel (A or B).

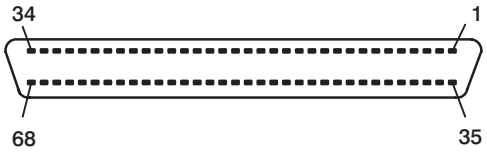


PCI Dual-Channel Ultra3 SCSI Adapter Specifications

Item	Description
FRU number	09P2544
Microcode	No microcode required
I/O bus architecture	PCI
Interrupt level	PCI interrupt A
Maximum number	A controller may be installed in supported 32- or 64-bit, 33 MHz or 66 MHz PCI bus slots
Connector information	Each channel (A and B) has both an internal and an external connector; however, only one connector on each channel can have devices attached. External, 68-pin, very-high-density cable interconnect (VHDCI) Internal, 68-pin, high-density plastic D-Shell
SCSI bus overcurrent Protection device	Positive temperature coefficient (PTC) resistor

PCI Dual-Channel Ultra3 SCSI Adapter Connectors

The following table shows the pinout for the internal and external 68-pin 16-bit SCSI connectors.



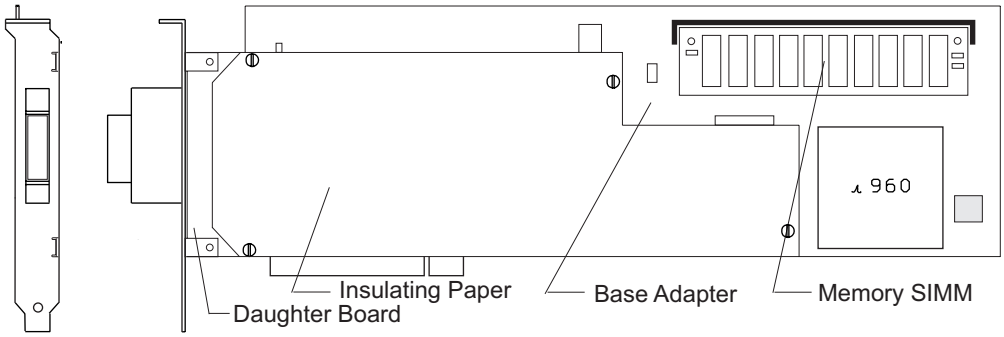
Signal Name		Connector		Signal Name
SE	**LVD**	**Pin**	**Pin**	**SE and LVD**
Ground	+DB(12)	1	35	-DB(12)
Ground	+DB(13)	2	36	-DB(13)
Ground	+DB(14)	3	37	-DB(14)
Ground/CPRNST_16	+DB(15)	4	38	-DB(15)
Ground	+DB(P1)	5	39	-DB(P1)
Ground	+DB(0)	6	40	-DB(0)
Ground	+DB(1)	7	41	-DB(1)
Ground	+DB(2)	8	42	-DB(2)
Ground	+DB(3)	9	43	-DB(3)
Ground	+DB(4)	10	44	-DB(4)
Ground	+DB(5)	11	4	-DB(5)
Reserved	+DB(6)	12	46	-DB(6)
Ground	-DB(7)	13	47	-DB(7)
Ground	+DB(P)	14	48	-DB(P)
Ground	Ground	15	49	Ground
Ground	DIFFSENS	16	50	CPRNST
TERMPWR	TERMPWR	17	51	TERMPWR
TERMPWR	TERMPWR	18	52	TERMPWR
Reserved	Reserved	19	53	Reserved
Ground	Ground	20	54	Ground

Signal Name		Connector		Signal Name
SE	**LVD**	**Pin**	**Pin**	**SE and LVD**
Ground	+ATN	21	55	-ATN
Ground	Ground	22	56	Ground
Ground	+BSY	23	57	-BSY
Ground	+ACK	24	58	-ACK
Ground	+RST	25	59	-RST
Ground	+MSG	26	60	-MSG
Ground	+SEL	27	61	-SEL
Ground	+C/D	28	62	-C/D
Ground	+REQ	29	63	-REQ
Ground	+I/O	30	64	-I/O
Ground	+DB(8)	31	65	-DB(8)
Ground	+DB(9)	32	66	-DB(9)
Ground	+DB(10)	33	67	-DB(10)
Ground	+DB(11)	34	68	-DB(11)

Notes:

1. For 8-bit SE devices that connect to the P-cable, tie the following signals inactive high: -DB(8), -DB(9), -DB(10), -DB(11), -DB(12), -DB(13), -DB(14), -DB(15), -DB(P1), or select Disable Wide Negations on the front Option Jumper Block and float the same signal lines.
2. For 8-bit LVD devices or SE mode, the following signals must be tied inactive (+ = inactive low, - = inactive high): +/-DB(8), +/-DB(9), +/-DB(10), +/-DB(11), +/-DB(12), +/-DB(13), +/-DB(14),+/-DB(15), +/-DB(P1). Floating these signals is not sufficient.
3. All other signals shall be connected as defined.

Type 5-5, S/390 ESCON Channel PCI Adapter (FC 2751)

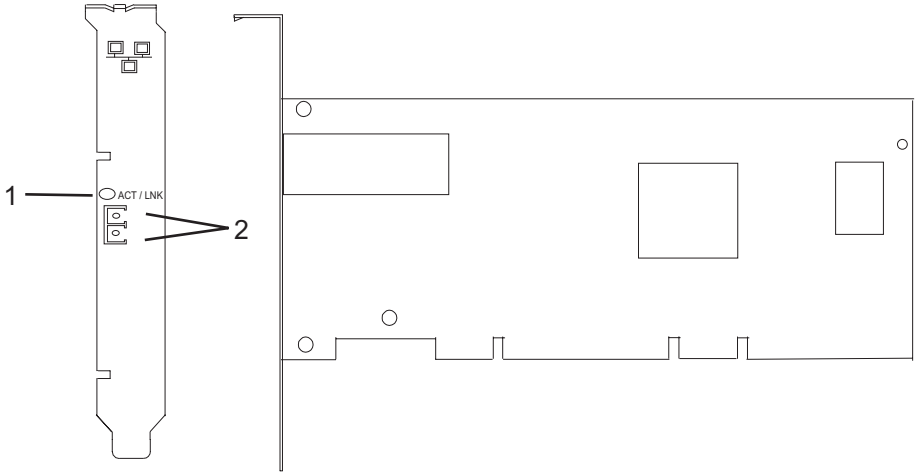


S/390 ESCON Channel PCI Adapter Specifications

Item	Description
FRU Number	S/390 ESCON Channel PCI Adapter, 31L7567
Busmaster	Yes
Bus architecture	PCI
Maximum number:	
S70	Four per system with the following slot restrictions: slots 10 and 14 on drawers 0 and 1
F50, H50:	Maximum of three per system in combination with DTQA FC 6309.
Slots 1, 2	Maximum 1
Slots 3,4,5	Maximum 2
Slots 6,7,8,9	Maximum 1
Microcode filenames:	**Functional microcode** esconCU.00.00 esconCU.3088.n.00 esconCU.3088.r.00 esconCU.3088.s.00 esconCU.CLAW.n.00 esconCU.CLAW.r.00 esconCU.CLAW.s.00 esconCU.mcm.con esconCU.mcm.dmp esconCU.mcm.exe esconCU.mcm.por **Diagnostic microcode** ec8fd.00.03 (base IBM ARTIC diagnostics) 00d00000d.00.01 (IBM ARTIC TU-23)
Connector	Standard ESCON duplex connector
Fiber cables	Installation-dependent, must have an ESCON duplex connector at adapter. Refer to *Fiber Optic Link Planning*, order number GA23-0367.
Wrap plug	5605670

Type 5700, Gigabit Ethernet-SX PCI-X Adapter (FC 5700)

The Gigabit Ethernet-SX PCI-X Adapter is a high-performance, highly integrated, universal, Ethernet LAN adapter for PCI-X and PCI systems. The adapter provides 1000 Mbps throughput on a standard shortwave (850 nm) 50/62.5 micron multimode optical cable and conforms to the IEEE 802.3z standards and supports distances of 260 meters for 62.5u MMF and 550 meters for 50.0u MMF. The adapter is designed to run in standard PCI-X V1.0a compliant systems with 32/64-bit PCI-X Bus Master slots at 66/133 MHz, and in PCI 2.2 compliant systems with 32/64-bit PCI bus master slots at 33/66 MHz. The adapter runs on 5.0 V.

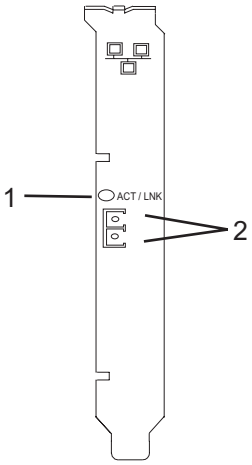


1 LED
2 Multimode Fiber LC Receptacle

Understanding the Adapter LED

The LED on the Gigabit Ethernet-SX PCI-X Adapter provides information about the card's operation status. The LED is visible through the card's mounting bracket and, when lit, indicates the following conditions:

LED	Status
Off	No Link/No Activity
On (Green)	Link, No Activity
Flashing (Green)	Link, Activity



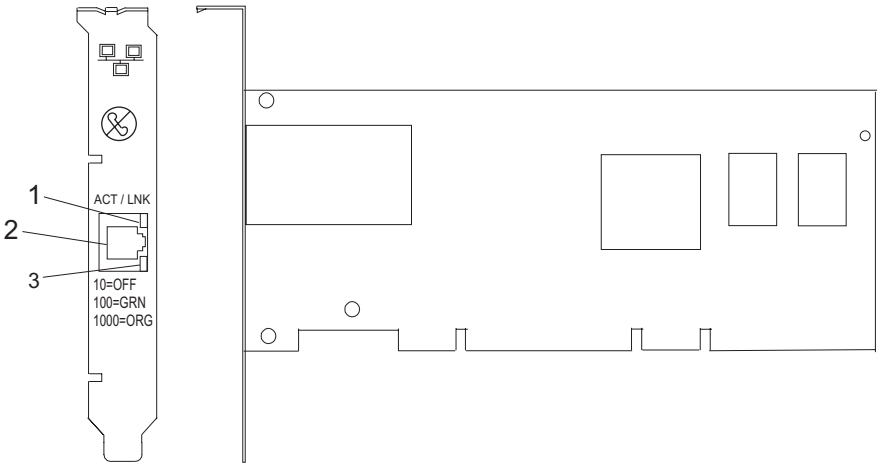
1 LED
2 Multimode Fiber LC Receptacle

Gigabit Ethernet-SX PCI-X Adapter Specifications

Item	Description
FRU number	00P3055
I/O bus architecture	PCI 2.2 and PCI-X V1.0a compliant
Busmaster	Yes
Maximum number	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Adapter size	PCI short form
Connector information	LC fiber optic
Wrap plug	LC fiber optic, part number 11P3847
Cables	Customer supplied. Optional LC-SC converter cable, part number 11P1374, FC 2459, is available.

Type 5701, 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 5701)

The 10/100/1000 Base-TX Ethernet PCI-X Adapter is a high-performance, highly integrated, universal Ethernet LAN adapter for PCI-X and PCI systems. The adapter provides 10/100/1000 Mbps connectivity over four pairs of standard CAT-5 cable up to 100 meters. It conforms to IEEE 802.3ab 1000 Base-T standard. The adapter is designed to run in standard PCI-X V1.0a compliant systems with 32/64-bit PCI-X Bus Master slots at 66/133 MHz, and in PCI 2.2 compliant systems with 32/64-bit PCI bus master slots at 33/66 MHz. The adapter runs on 5.0V and 3.3Vaux.

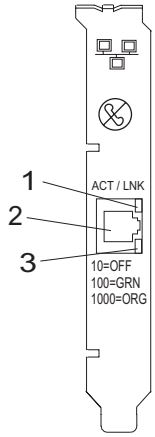


1 ACT/LNK LED
2 RJ-45 Connector
3 Link Speed LED

Understanding the Adapter LEDs

The LEDs on the 10/100/1000 Base-TX Ethernet PCI-X Adapter provide information about the card's operation status. The LEDs are visible through the card's mounting bracket and, when lit, indicate the following conditions:

LED	Light	Description
Link Speed	Off Green Orange	10 Mbps 100 Mbps 1000 Mbps
Link	Green Off Blinking	Good link No link: could be the result of a bad cable, bad connector, configuration mismatch, or not selected Indicates data activity



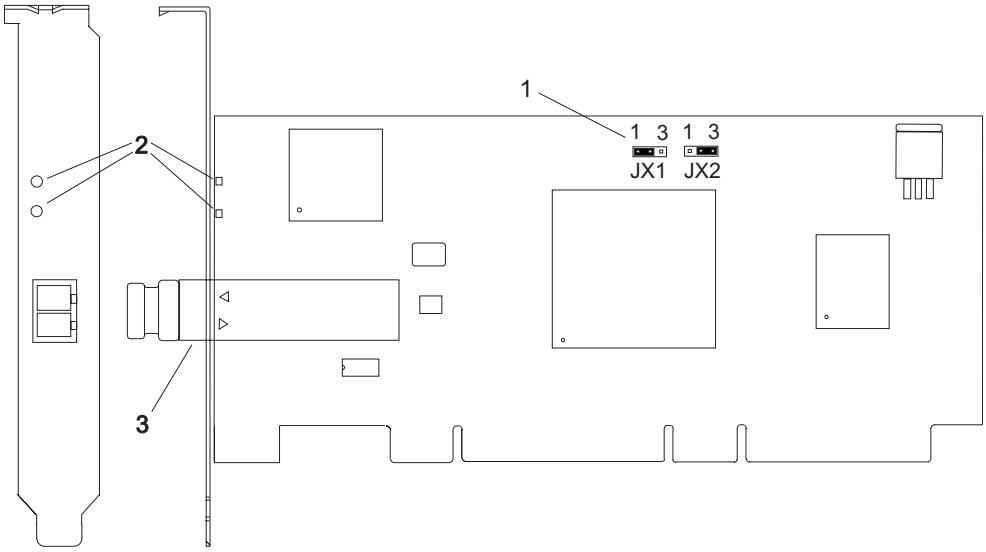
1 ACT/LNK LED
2 RJ-45 Connector
3 Link Speed LED

10/100/1000 Base-TX Ethernet PCI-X Adapter Specifications

Item	Description
FRU number	00P3056
I/O bus architecture	PCI 2.2 and PCI-X V1.0a compliant
Busmaster	Yes
Maximum number	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Adapter size	PCI short form
Connector information	RJ-45
Wrap plug	RJ-45, part number 00G2380
Cables	Customer supplied. Use CAT-5 twisted pair bulk cables (TIA/EIA 568A is recommended).

Type 5704, 2 Gigabit Fibre Channel PCI-X Adapter (FC 6239)

The 2 Gigabit Fibre Channel PCI-X Adapter is used to make high-speed connections between stand-alone system units and storage servers on a Fibre Channel network at speeds up to two Gigabits per second. This adapter requires a PCI 2.2, 32-bit, 33 MHz slot. For best performance, use of a 64-bit, 133 MHz slot is recommended.



1. Jumper JX1, Pins 1 to 2 only and Jumper JX2, Pins 2 to 3 only
2. Data Link Status LEDs
3. Multimode Fiber LC Connector

2 Gigabit Fibre Channel PCI-X Adapter Specifications

Item	Description
FRU number	00P4297
Bus architecture	PCI-X 1.0a, PCI 2.2
Card type	PCI low profile
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order Number SA38-0538.
Connector	FC-PH compliant, optical short-wave, non-OFC, multimode LC
Wrap plug	Shipped with assembly or part number 11P3847
Cables	50 or 62.5 micron multimode fiber-optic, customer provided

Attention: The adapters are designed with specifications for the cable to be a dual cable connector, transmit and receive cable ends clamped together. If a customer uses separate transmit and receive fiber cables, it is strongly recommended that the cables be clamped together to enhance the retention strength on the fiber transceiver connector. Clamping the cables together also improves the alignment of the fibers with the connector and can improve overall performance.

2 Gigabit Fibre Channel PCI-X Adapter LEDs

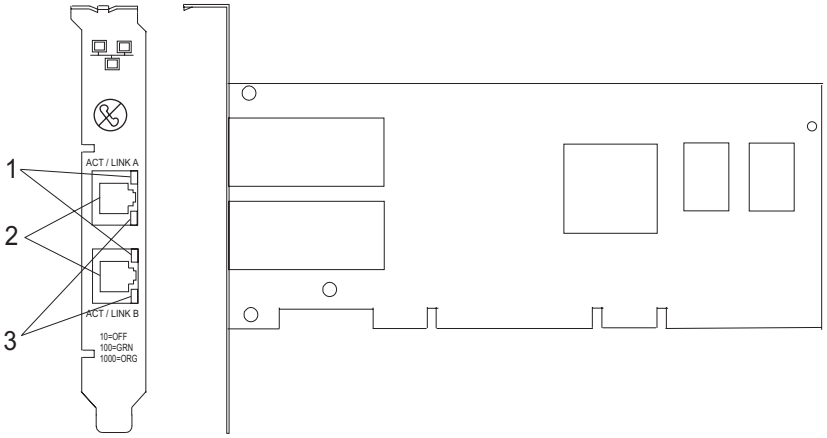
The 2 Gigabit Fibre Channel PCI-X Adapter has two LEDs: green and yellow located near the LC connector. Use these LEDs to determine the state of the adapter.

Green LED	Yellow LED	State
Off	Off	Wake up failure (dead board)

Green LED	Yellow LED	State
Off	On	POST failure (dead board)
Off	Slow blink	Wake up failure monitor
Off	Fast blink	Failure in POST
Off	Flashing	POST processing in progress
On	Off	Failure while functioning
On	On	Failure while functioning
On	Slow blink	1 Gb link rate - normal, link up
On	Fast blink	2 Gb link rate - normal, link up
Slow blink	Off	Normal, link down
Slow blink	On	Not defined
Slow blink	Slow blink	Off line for download
Slow blink	Fast blink	Restricted off-line mode, waiting for restart
Slow blink	Flashing	Restricted off-line mode, test active
Fast blink	Off	Debug monitor in restricted mode
Fast blink	On	Not defined
Fast blink	Slow blink	Debug monitor in text fixture mode
Fast blink	Fast blink	Debug monitor in remote debug mode
Fast blink	Flashing	Not defined

Type 5706, Dual Port 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 5706)

The Dual Port 10/100/1000 Base-TX Ethernet PCI-X Adapter is a high-performance, highly integrated, universal, Ethernet LAN adapter for PCI-X and PCI systems. The adapter presents one electrical load but appears as two independent devices to software. It provides 10/100/1000 Mbps connectivity over 4 pairs of standard CAT-5 cable up to 100m for each port. The adapter conforms to the IEEE 802.3ab 1000Base-T standard.



1 ACT/LNK LED

2 RJ-45 Connector

3 Link Speed LED

Understanding the Adapter LEDs

The LEDs on the Dual Port 10/100/1000 Base-TX Ethernet PCI-X Adapter provide information about the card's operation status. The LEDs are visible through the card's mounting bracket and, when lit, indicate the following conditions:

LED	Light	Description
ACT/LNK	Green Off Blinking	Good link No link (see note) Data activity
Link Speed	Off Green Orange	10 Mbps 100 Mbps 1000 Mbps
Note: The absence of a link could be the result of a bad cable, a bad connector, or a configuration mismatch.		

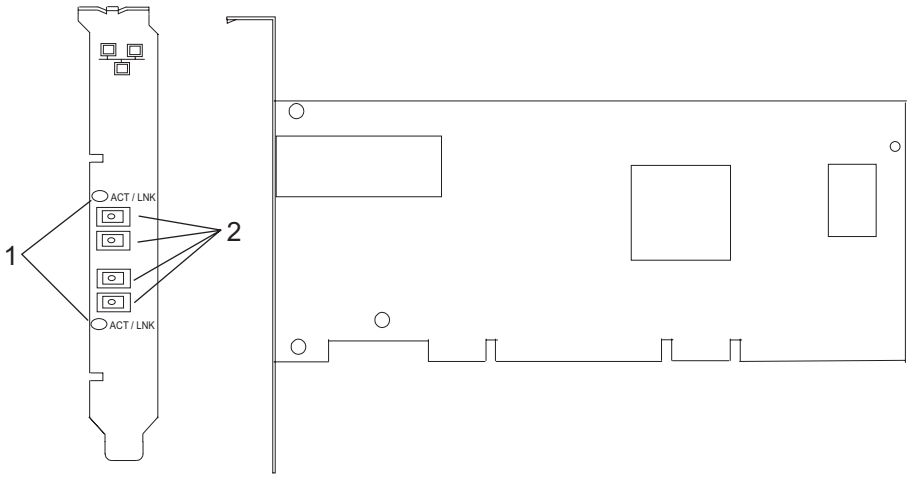
Dual Port 10/100/1000 Base-TX Ethernet PCI-X Adapter Specifications

Item	Description
FRU number	00P4289
I/O bus architecture	PCI 2.2 and PCI-X V1.0a compliant
Busmaster	Yes
Maximum number	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Adapter size	PCI short form
Connector information	RJ-45 (2)
Wrap plug	RJ-45, part number 00G2380

Cables	Customer supplied. Use CAT-5 twisted pair bulk cables (TIA/EIA 568A is recommended).

Type 5707, Dual Port Gigabit Ethernet-SX PCI-X Adapter (FC 5707)

The Dual Port Gigabit Ethernet-SX PCI-X Adapter is a high-performance, highly integrated, universal, Ethernet LAN adapter for PCI-X and PCI systems. The adapter presents one electrical load but appears as two independent devices to software. Duval-SX provides 1000Mbps throughput on a standard shortwave (850nm) 50/62.5 micron multimode optical cable and conforms to the IEEE 802.3z standard and supports distances of 260m for 62.5u MMF and 550m for 50.0u MMF.



1 LED
2 Multimode Fiber LC Receptacle

Understanding the Adapter LED

The LED on the Dual Port Gigabit Ethernet-SX PCI-X Adapter provides information about the card's operation status. The LED is visible through the card's mounting bracket and, when lit, indicates the following conditions:

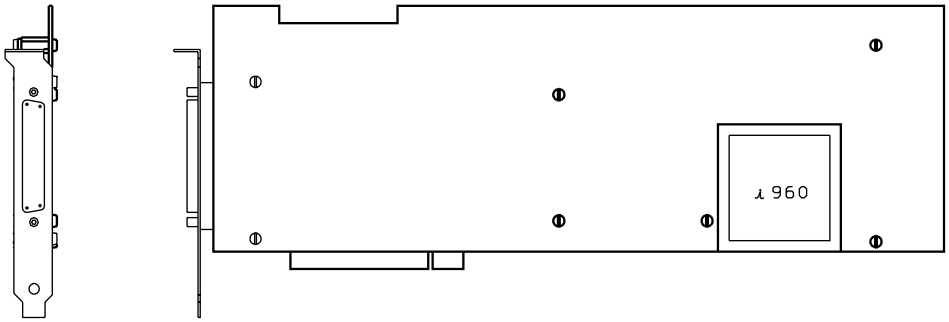
LED	Status
Off	No Link/No Activity
On (Green)	Link, No Activity
Flashing (Green)	Link, Activity

Gigabit Ethernet-SX PCI-X Adapter Specifications

Item	Description
FRU number	00P4290
I/O bus architecture	PCI 2.2 and PCI-X V1.0a compliant
Busmaster	Yes
Maximum number	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Adapter size	PCI short form
Connector information	LC fiber optic
Wrap plug	LC fiber optic, part number 11P3847
Cables	Customer supplied. Optional LC-SC 62.5 micron converter cable, part number 11P1374, FC 2459, is available. For 50 micron LC-SC connections, use converter cable part number 11P1373, FC 2456.

Type 6-B, Digital Trunk Quad PCI Adapter (FC 6309)

The Digital Trunk Quad PCI Adapter provides attachment of the 9295 or 9291 Digital Trunk Processor subsystem to telephone company T1 or E1 digital trunks.

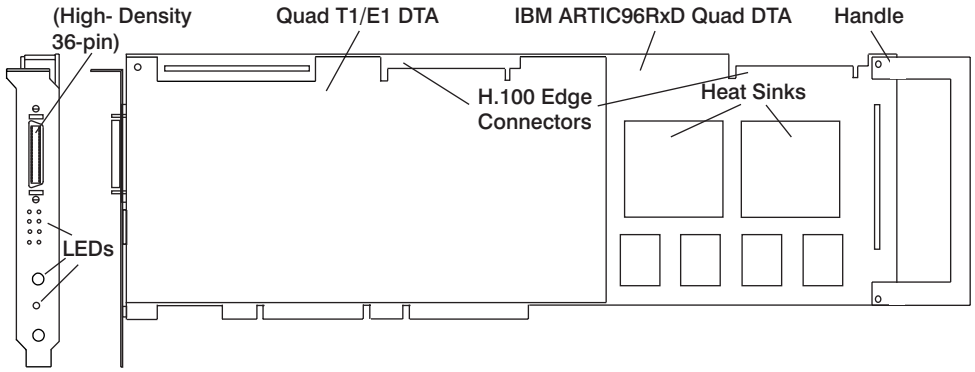


Digital Trunk Quad PCI Adapter Specifications

Item	Description
FRU numbers	Base, 39H8084 Daughter, 10J2272 Memory SIMM, 70F9973
I/O bus architecture	PCI
Busmaster	Yes
Interrupt levels	Zero to 15
I/O address	0x0 - 0xffffff00, 0x100
Adapter type	Full length, full height, full width
Maximum number	Up to two
Cables:	Supplied with adapter
FRU number	Quad cable kit, 51H4325 (includes wrap plug)
FRU number	SCBus cable, 10J2253

Type 6-E, IBM ARTIC960RxD Quad Digital Trunk PCI Adapter (FC 6310)

The IBM ARTIC960RxD Quad Digital Trunk PCI Adapter provides attachment to telephone company T1 or E1 digital trunks.



IBM ARTIC960RxD Quad Digital Trunk PCI Adapter Specifications

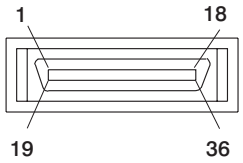
Item	Description
FRU number	IBM ARTIC960RxD Quad DTA, 87H3734 Quad T1/E1 DTA, 09J8829
I/O bus architecture	PCI 2.1 compliant
Busmaster	Yes
Interrupt levels	Zero to 15
I/O address	0x0 - 0xffffff00, 0x100
Adapter type	Full length, full height, full width
Adapter slots	Up to four. For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538. These adapters must be in adjacent slots.
Wrap plug	87H3502
Cables	Order separately, depending on the application T1, RJ-48: Cable FC - 2709 E1, RJ-48: Cable FC - 2710 T1, 100 Ohm Balanced: Cable FC - 2871 T1, 100 Ohm Extension: Cable FC - 2872 E1, 120 Ohm Balanced: Cable FC - 2873 E1, 120 Ohm Extension: Cable FC - 2874 E1, 75 Ohm Unbalanced/Grounded: Cable FC - 2875 E1, 75 Ohm Unbalanced/Ungrounded: Cable FC - 2876 H.100, 4-Drop Cable FC - 2877 SC-Bus, 5-Drop Cable FC - 2878 H.100, 4-Drop Cable with SC-Bus Converter FC - 2879 (This cable is referred to as the four-drop H.100 cable with SC-bus converter in other publications associated with this cable.)

Jumpers

See jumper settings in the*ARTIC960RxD Quad Digital Trunk PCI Adapter Installation and User's Guide* included with your system or adapter.

IBM ARTIC960RxD Quad Digital Trunk PCI Adapter 36-pin D-Shell Connector

The individual signals for all of the ports connect to the Quad DTA adapter through the 36-pin connector at the rear of the adapter. The following illustration shows the male 36-pin connector.



Note: The 36-pin connector's pinout is defined in the of *ARTIC960RxD Quad Digital Trunk PCI Adapter Installation and User's Guide* included with your system unit or adapter.

The 36-pin cable connector uses AMP part numbers 2-175677-5 and 176793-5 connectors. Use these with the pinout if custom cables or other combinations of the coax grounded/ungrounded cables are required.

IBM ARTIC960RxD Quad Digital Trunk PCI Adapter 68-pin (H.100) Card Edge Connector

The Quad DTA adapters have an internal bus that uses a 68-pin H.100 card edge connector. Multi-drop cable assemblies are used to connect the internal buses on the IBM ARTIC960RxD Quad Digital Trunk PCI Adapters. These internal cables are long enough to cable up to four adapters in adjacent slots. One cable (F/C 2877) connects Quad DTA adapters together when there are no SC-bus adapters in the same machine. Two cables (F/C 2878 and F/C 2879) are used as a pair to connect Quad DTAs together and to SC-bus adapters (F/C 6309) in the same machine. See "Internal Cabling" on page 326.

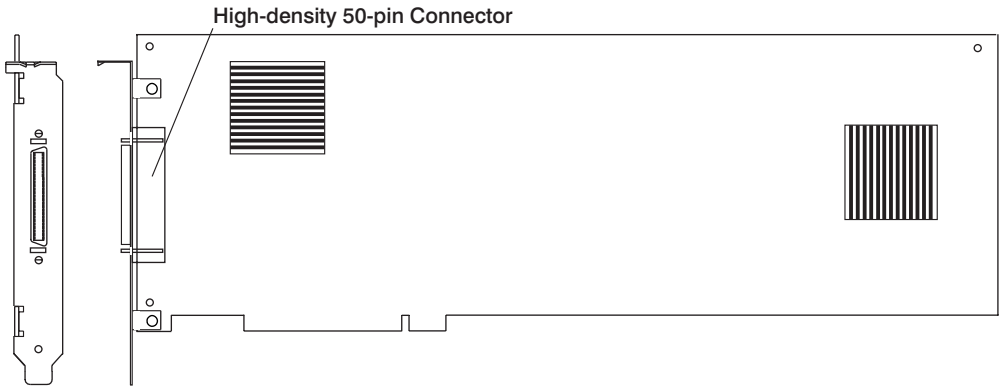
Type 6-F, SP System Attachment Adapter (FC 8396)

The SP System Attachment Adapter connects the following systems to the SP switch fabric for use as a node in an SP system.

- MT 7017 Model S70
- MT 7017 Model S7A
- MT 7017 Model S80
- MT 7017 Model S85
- MT 7026 Model 6H0
- MT 7026 Model 6H1
- MT 7026 Model 6M1
- MT 7026 Model H80
- MT 7026 Model M80
- MT 7040 Model 670
- MT 7040 Model 681

The SP System Attachment Adapter plugs on to the system PCI bus. The PCI bus is PCI 2.1 compliant.

Note: service point (SP)

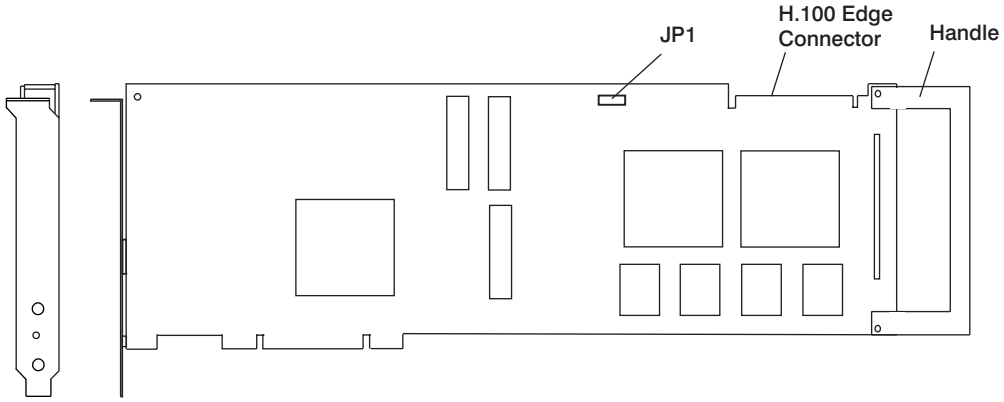


SP System Attachment Adapter Specifications

Item	Description
FRU number	08L0398
Bus architecture	PCI 2.1
Busmaster	Yes
Card type	Full size
Maximum number and adapter slots	For system-specific adapter maximums and slot placement, see the *PCI Adapter Placement Reference Guide*, order Number SA38-0538.
Connector	50-pin high density
Wrap plug	77G0818
Cables	Customer provided

Type 6-G, ARTIC960RxF Digital Trunk Resource Adapter (FC 6311)

The ARTIC960RxF Digital Trunk Resource Adapter (DTRA) is used with the ARTIC960RxD adapter (6-E) for voice recognition support. These two adapters must be placed in adjacent adapter slots, with the ARTIC960RxD adapter installed in the lower numbered slot.

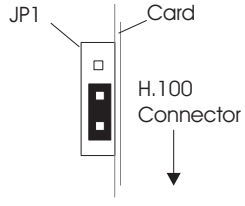


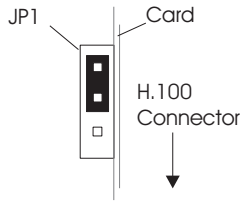
ARTIC960RxF DTRA Specifications

Item	Description
FRU number	47L8851
I/O bus architecture	PCI 2.1 compliant
Busmaster	Yes
Interrupt levels	Zero to 15
I/O address	0x0 - 0xffffff00, 0x100
Adapter type	Full length, full height, full width
Adapter slots	A maximum of three DTRA adapters per system is supported. These adapters must be used with the ARTIC960RxD adapter. The adapters must be in an adjacent slots. Install all the ARTIC960RxD adapters in the lower numbered slots, followed by up to three ARTIC960RxF adapters in the higher numbered adjacent slots. For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Cables	Order separately, depending on the application. H.100, 4-Drop Cable, part number 08L1215, FC - 2877 H.100, 8-Drop Cable, part number 03N3493, FC - 4353

Jumpers

Before installing this adapter, set jumper JP1 as follows:

Jumper Positions	Condition
	If the adapter being installed is connected to either end of the H.100 Cable (see the illustration on page 328), the jumper must be installed as shown in the illustration to the left. This is the factory setting.

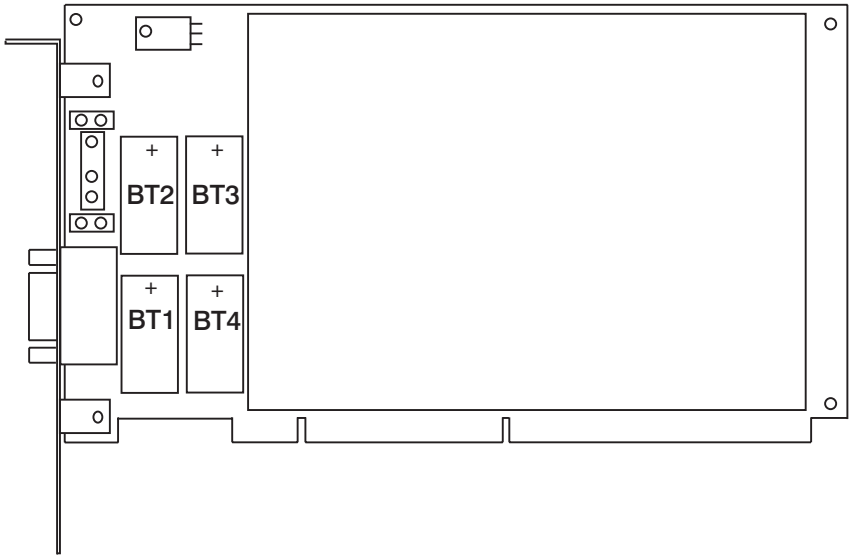
Jumper Positions	Condition
	If the adapter being installed is *not* connected to either end of the H.100 Cable (see the illustration on page 328), then set the jumper as shown in the illustration to the left. **Note:** Each end of the H.100 cable must be plugged onto an adapter. If there are less number of ARTIC960RxD and ARTIC960RxF adapters than there are connectors on the cable, leave the center connectors unplugged and be sure each end connector is attached to an adapter.

ARTIC960RxF DTRA 68-pin (H.100) Card Edge Connector

These adapters have an internal bus that uses a 68-pin H.100 card edge connector. Multi-drop cable assemblies are used to connect the internal buses on the ARTIC960RxF and ARTIC960RxD adapters. These internal cables are long enough to cable up to four or eight adapters in adjacent slots. For additional information, see “ARTIC960RxF Digital Trunk Resource (DTRA) Adapter (FC 6311)” on page 328.

Type 6-H, PCI Cryptographic Coprocessor (FC 4958)

The PCI Cryptographic Coprocessor is designed to provide data security functions for PCI bus systems. The PCI Cryptographic Coprocessor provides high-performance secure hardware engines, including methods of transmitting data, verifying electronic signatures, bulk data encryption, and decryption.



Each PCI Cryptographic Coprocessor is shipped from the factory with a certified device key. This electronic key, which is stored in the adapter's battery-powered and protected memory, digitally signs status messages to confirm that the PCI Cryptographic Coprocessor is genuine and that no tampering has occurred.

Notes:

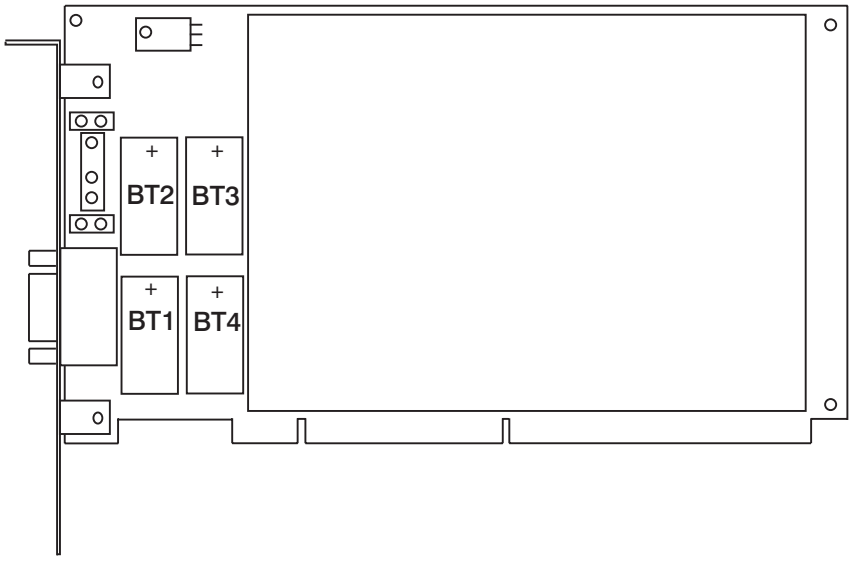
1. If any of the secure module's tamper sensors are triggered by tampering or by accident, the PCI Cryptographic Coprocessor erases all data in the protected memory, including the certified device key. Incorrect removal of the batteries triggers the tamper sensors and destroys the certified device keys. The PCI Cryptographic Coprocessor cannot operate without the certified device keys. To protect the keys, follow the guidelines given in the documentation provided with the coprocessor.
2. The batteries keep the coprocessor powered on even when it is not installed in a system. When handling, installing, or removing the coprocessor, do not let the coprocessor circuits come in contact with any conductive surface or tools. Doing so may render the adapter permanently inoperable.

PCI Cryptographic Coprocessor Specifications

Item	Description
FRU number	10J0593
Battery Kit	09J8199, Kit contains two batteries and a battery tray. Two kits are required for battery replacement.
Bus architecture	PCI version 2.1
Adapter Slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Temperature range, stored	+33.8 degrees F (+1 degree C) to +140 degrees F (+60 degrees C)
Temperature range, operating	+50 degrees F (+10 degrees C) to +104 degrees F (+40 degrees C)
Connector	For manufacturing test use only. Not for use by customer.

Type 6-I, PCI Cryptographic Coprocessor (FC 4963)

The PCI Cryptographic Coprocessor is designed to provide data security functions for PCI bus systems. The PCI Cryptographic Coprocessor provides high-performance secure hardware engines, including methods of transmitting data, verifying electronic signatures, bulk data encryption, and decryption. The adapter is designed to FIPS PUB 140-1 Security Level 4 Standards.



Each PCI Cryptographic Coprocessor is shipped from the factory with a certified device key. This electronic key, which is stored in the adapter's battery-powered and protected memory, digitally signs status messages to confirm that the PCI Cryptographic Coprocessor is genuine and that no tampering has occurred.

Notes:

1. If any of the secure module's tamper sensors are triggered by tampering or by accident, the PCI Cryptographic Coprocessor erases all data in the protected memory, including the certified device key. Incorrect removal of the batteries triggers the tamper sensors and destroys the certified device keys. The PCI Cryptographic Coprocessor cannot operate without the certified device keys. To protect the keys, follow the guidelines given in the documentation provided with the coprocessor.
2. The batteries keep the coprocessor powered on even when it is not installed in a system. When handling, installing, or removing the coprocessor, do not let the coprocessor circuits come in contact with any conductive surface or tools. Doing so can render the adapter permanently inoperable.

PCI Cryptographic Coprocessor Specifications

Item	Description
FRU number	10J0357
Battery Kit	09J8199, Kit contains two batteries and a battery tray. Two kits are required for battery replacement.
Bus architecture	PCI version 2.1
Adapter Slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Temperature range, stored	+33.8 degrees F (+1 degree C) to +140 degrees F (+60 degrees C)
Temperature range, operating	+50 degrees F (+10 degrees C) to +104 degrees F (+40 degrees C)
Connector	For manufacturing test use only. Not for use by customer.

Type 6-J, IBM Cryptographic Accelerator (FC 4960)

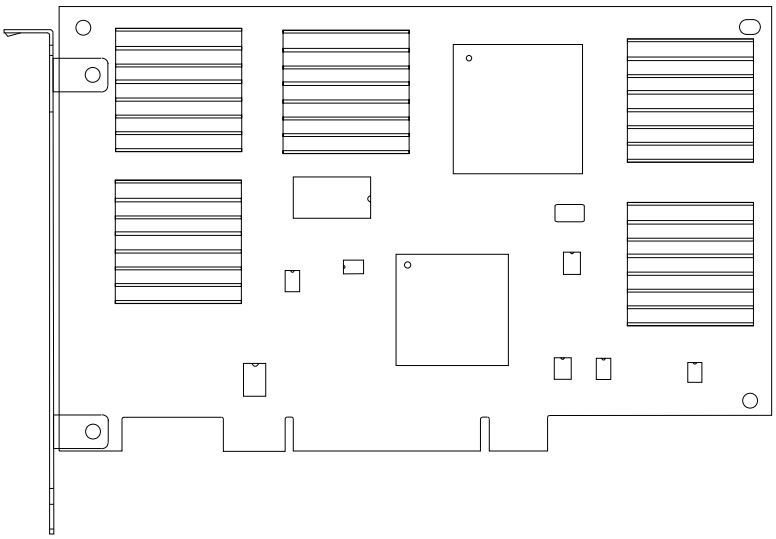
The IBM Cryptographic Accelerator provides high cryptographic performance through hardware acceleration by offloading computationally intensive public-key processing from a host processor. The overall operation control, including command decoding, is implemented in hardware. As a result, e-business applications requiring Public Key Cryptography can experience an increase in performance. At the same time, the IBM Cryptographic Accelerator releases the host processor to respond to other Internet transactions, database transactions, customer requests, and so on.

The adapter supports the following encryption/decryption functions:

- DES
- T-DES
- DES MAC
- T-DES MAC
- SHA-1
- Parallel processing of the same input data using DES and SHA
- DES to SHA
- Modular Exponentiation (with and without CRT)
- Modular Multiplication.

You install the IBM Cryptographic Accelerator in a PCI card slot.

Note: This adapter does not incorporate a microprocessor subsystem (CPU, DRAM, Flash), a secure programming environment, nor tamper detection and response functions. See “Type 6-H, PCI Cryptographic Coprocessor (FC 4958)” on page 129.



IBM Cryptographic Accelerator Specifications

The following items are requirements and specifications for the Accelerator.

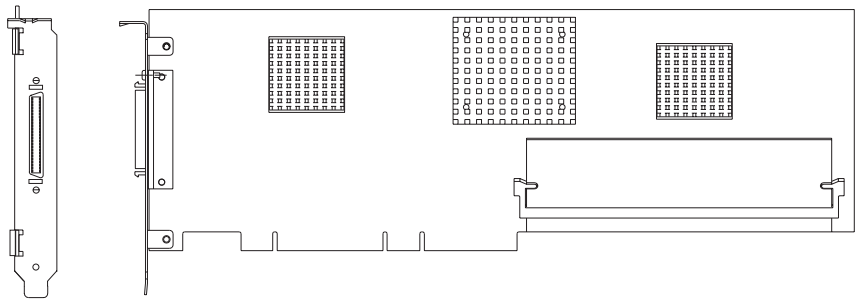
Power Consumption	Typical, 20 watts
Voltage	+5.0 Vdc ±10 percent
Temperature	Operating, +10 to +40 degrees C (50 to 104 degrees F)
	Storage, +1 to +40 degrees C (5 to 104 degrees F)

Relative Humidity	8 to 80 percent
Physical Dimensions	174.63 mm by 106.68 mm

Type 6-L, SP Switch2 PCI Attachment Adapter (FC 8397)

The SP Switch2 PCI Attachment Adapter connects the following systems to the SP Switch2 fabric for use as a clustered server/node.

- MT 7017 Models S7A, S80, and S85
- MT 7026 Models 6H0, 6H1, 6M1, H80, and M80
- MT 7028 Model 6C4
- MT 7040 Model 61D



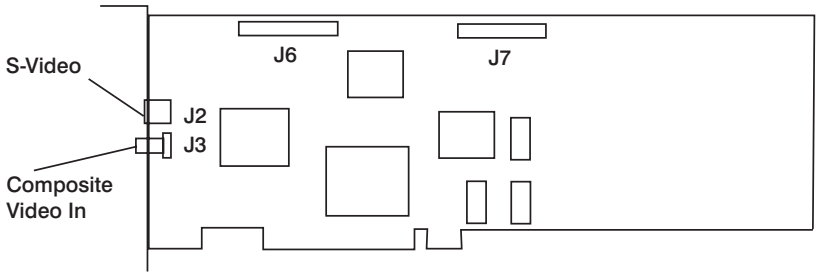
SP System Attachment Adapter Specifications

Item	Description
FRU number	00P3127 **Note:** This FRU number consists of the adapter enclosed in a double-wide blind-swap cassette.
Bus architecture	PCI 2.2
Busmaster	Yes
Card type	Full size, double wide
Maximum number and adapter slots	For system-specific adapter maximums and slot placement, see the *PCI Adapter Placement Reference Guide*, order Number SA38-0538.
Connector	50-pin high density
Wrap plug	77G0818
Cables	SPS2 (from MT 9076)

Type 7-9, Ultimedia Video Capture Adapter Style A (FC 2638)

Note: If your adapter does not match style A, shown in the following illustration, see “Type 7-9, Ultimedia Video Capture Adapter Style B (FC 2638)” on page 137.

The Ultimedia Video Capture Adapter supports the commonly required video functions of video capture composite video (NTSC, PAL, and SECAM), S-video, and high quality video scaling. The Ultimedia Video Capture Adapter also provides video to existing graphics subsystems through the system PCI bus.



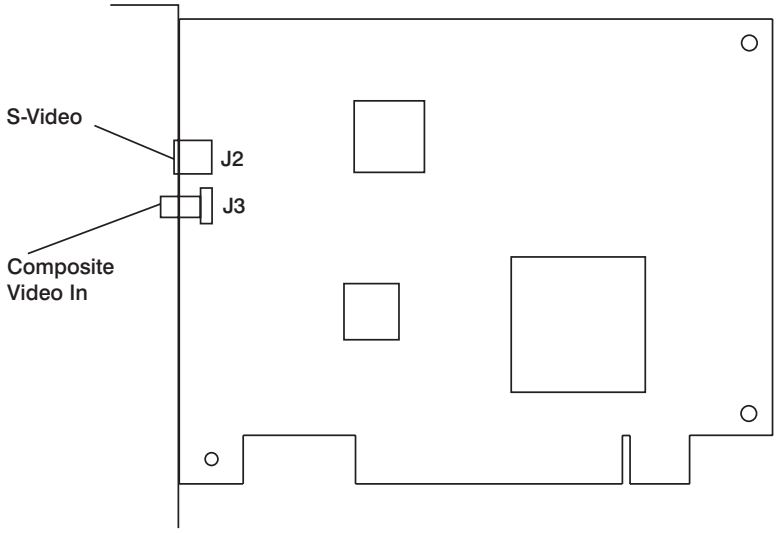
The Ultimedia Video Capture Adapter allows connection of the system unit to various video equipment.

Ultimedia Video Capture Adapter Style A Specifications

Item	Description
FRU number	07L9009
Bus architecture	PCI
Busmaster	Yes
Bus width	32-bit
Adapter form factor	PCI long
Interrupt level	Int. A
Maximum number	1
Connectors	S-video 4-pin mini-DIN Video in RCA jack
Screen resolution	Captures single field or full motion video from 80x60 pixels to 720x576 pixels.
Accepted video standards	NTSC, PAL, and SECAM

Type 7-9, Ultimedia Video Capture Adapter Style B (FC 2638)

The Ultimedia Video Capture Adapter Style B is a full-function Digital-Media Video Capture PCI adapter. The adapter supports all of the standard video capture capabilities. It provides inputs for standard composite video (NTSC, PAL, and SECAM) and S-video. The video scalar supports digitally filtered vertical and horizontal scaling of the digitized video and continually variable scale factors in both directions. The specific device drivers may only support a subset of the scaling options. Current AIX® operating system drivers support four, 640X480, 320X240, 180X160, and 80X60.



The Ultimedia Video Capture Adapter allows connection of the system unit to various video equipment.

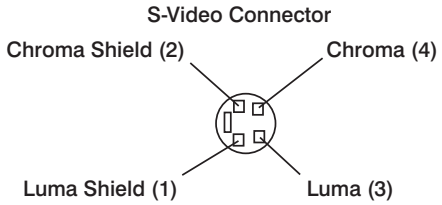
Ultimedia Video Capture Adapter Style B Specifications

Item	Description
FRU number	07L9009
Bus architecture	PCI
Busmaster	Yes
Bus width	32-bit
Adapter form factor	PCI short
Interrupt level	Int. A
Maximum number	1
Connectors	S-video 4-pin mini-DIN Video in RCA jack
Screen resolution	Captures single field or full motion video from 80x60 pixels to 720x576 pixels.
Accepted input video standards	NTSC, PAL, and SECAM

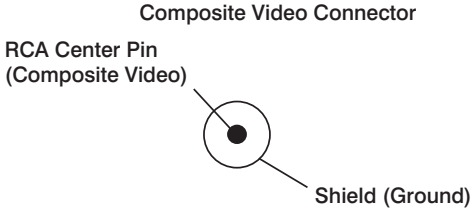
Ultimedia Video Capture Adapter Connectors

The following connectors are on the Ultimedia Video Capture Adapter.

Ultimedia Video Capture Adapter S-video Connector

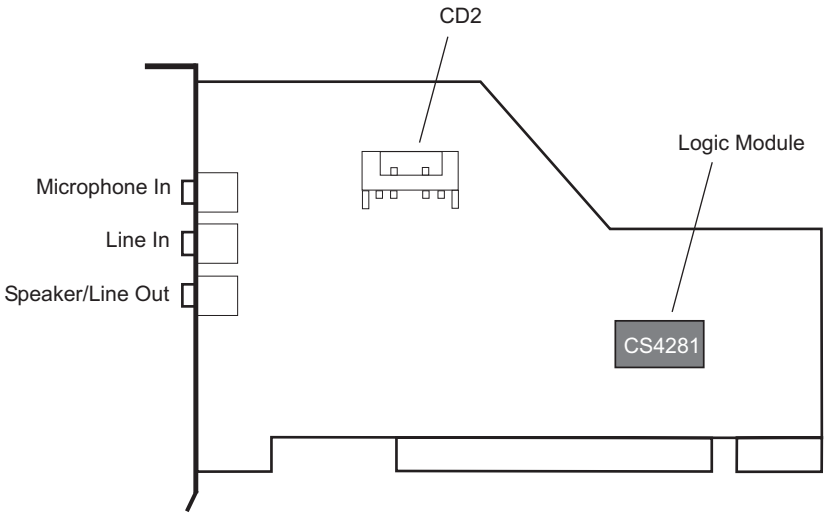


Ultimedia Video Capture Adapter RCA Connector



Type 8244, PCI Audio Adapter (FC 8244)

The PCI Audio Adapter provides audio playback and recording capability for your system. External jacks allow you to connect speakers, microphone, or other audio devices to your system. An internal connector and cable are provided for connection to your system's CD-ROM or DVD-ROM drive.



PCI Audio Adapter Specifications

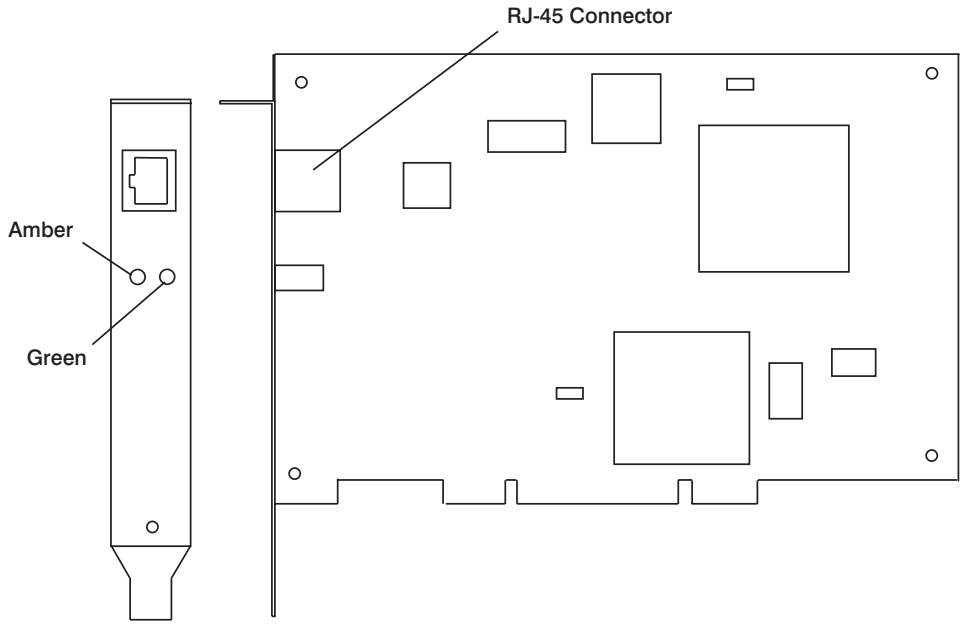
Item	Description
FRU number	00P4648
Bus architecture	PCI
Bus width	32-bit

Type 8-T, PCI Auto LANStreamer Token-Ring Adapter (FC 2979)

The PCI Auto LANStreamer Token-Ring Adapter is a high-performance, token-ring local area network (LAN) adapter designed to operate in systems that support the Peripheral Component Interconnect (PCI) bus interface.

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)*



PCI Auto LANStreamer Token-Ring PCI Adapter Specifications

Item	Description
FRU number	04H8098
I/O bus architecture	PCI 2.0
Bit rate	4 Mbps or 16 Mbps
Modes	Half or full duplex
Busmaster	Yes
Connector information	RJ-45
Cables	Token-Ring RJ-45 STP Adapter Cable (P/N 60G1063) or Token-Ring 9-pin D-Shell Network Adapter Cable (P/N 6339098) with Conversion Token-Ring cable (P/N 93H8894) supplied with adapter.

Interpreting the Adapter LEDs

The PCI Auto LANStreamer Token-Ring adapter's LEDs provide information for monitoring its status and for problem determination. If the green LED is on and the amber LED is off, the adapter is operating correctly. If the amber LED is blinking and the green LED is steady, the adapter has detected a potential problem.

In the following table, the first four LED states indicate the sequence that is displayed when power is first applied to the computer and the adapter successfully reaches the open state. Some of these states may be too brief to observe. The last three LED states listed in the table indicate adapter faults.

The following terms are used in the following table:

Auto-removal A state in which a token-ring adapter removes itself from the network to perform self-tests to determine whether it is the cause of a hard error. If the tests are successful, the adapter reattaches itself to the network.

Beaconing A state that a token-ring adapter enters after it detects a hard error. The adapter reports the error condition to the other devices on the network. Beaconing can result in the adapter removing itself from the network (auto-removal) to determine whether it is the cause of the hard error.

Hard error An error condition on a network that requires removing the source of the error or reconfiguring the network before the network can resume reliable operation.

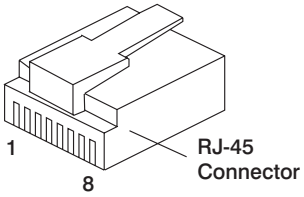
Initialization An action during which the adapter is prepared for use after its computer is booted. During initialization, the adapter runs its self-diagnostic tests.

Open A state in which the adapter has established connection with other devices on the ring.

Wire fault An error condition caused by a break or a short-circuit in the cable segment that connects the adapter to its access unit.

Amber	Green	Explanation
Blinking	Blinking	The adapter is waiting for initialization.
Off	Off	The adapter initialization is in progress, or the computer is powered off.
Off	Blinking	The adapter did not detect any problems during its self-diagnostic tests and is waiting to open.
		If this LED state occurs after the adapter is open, this state indicates that the adapter has closed.
Off	On	The adapter is open and operating correctly.
On	Off	The adapter self-diagnostic tests failed or there is a problem with the adapter.
Blinking	Off	The adapter is closed. One of the following conditions exists: • The adapter open failed. • The adapter detected a wire fault. • The adapter failed the auto-removal test.
Blinking	On	The adapter has detected beaconing or a hard error.
On	On	The adapter has failed.

PCI Auto LANStreamer Token-Ring Adapter RJ-45 Connector



Pin	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

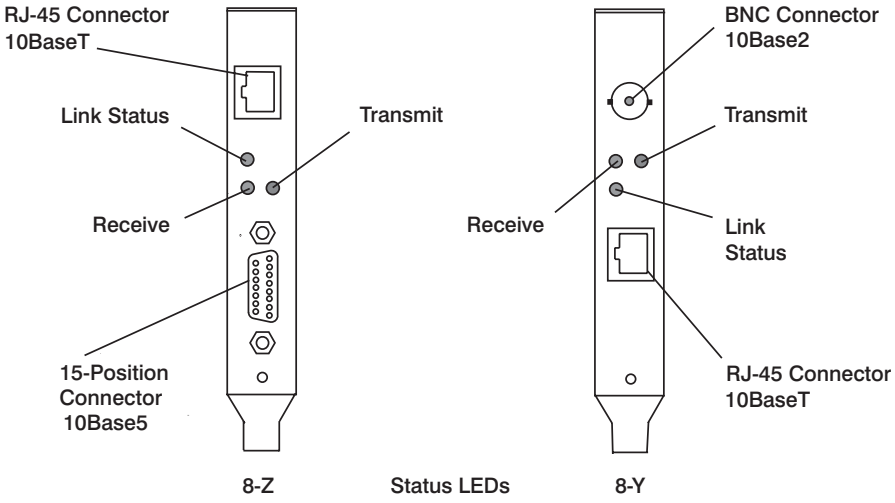
Types 8-Y and 8-Z, Ethernet PCI Adapter (FC 2985, 2987)

The Ethernet PCI Adapter provides attachment to a carrier sense multiple access/collision detection (CSMA/CD) Ethernet local area network (LAN) for systems designed to operate with the Peripheral Component Interconnect (PCI) bus interface. It uses the IEEE-802.3 standard for communications.

Card type 8-Y supports connections to 10Base2 networks through a BNC connector or 10BaseT unshielded twisted pair networks through an RJ-45 connector.

Card type 8-Z supports connections to 10Base5 networks through a 15-pin D-shell connector or 10BaseT unshielded twisted pair networks through an RJ-45 connector.

Only one connector can be used at a time.



Viewing the LEDs

The adapter features three LEDs that provide information on the status of the card's operation. The LEDs are visible through the card's mounting bracket and indicate the following conditions when lit.

- Receive LED (yellow) - Indicates packets are being received from the network.
- Transmit LED (yellow) - Indicates packets are being transmitted over the network.
- Link Status LED (green) - Indicates a valid network connection (10BaseT networks only).

Ethernet - T2 PCI Adapter Specifications

Item	Description
FRU number	93H1902
I/O bus architecture	PCI
Busmaster	Yes
Connector information	BNC coaxial, 8-postion RJ-45
Cables	Customer supplied (use Y type connection), BNC
Wrap plugs	Thin BNC, part number 02G7433, twisted-pair (8-pin RJ-45), part number 00G2380

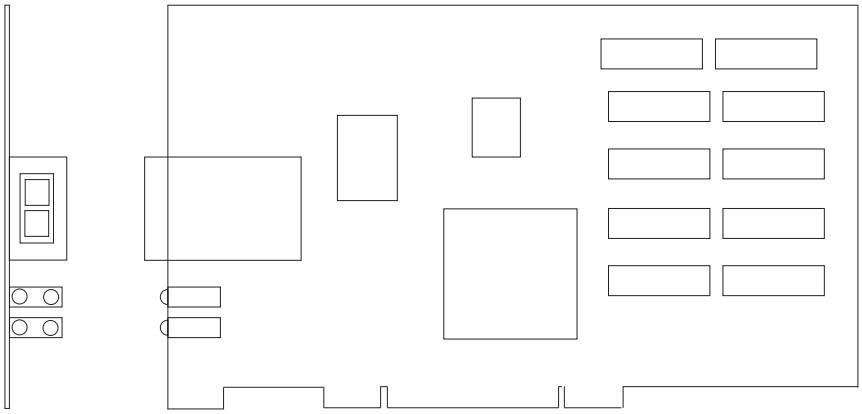
Ethernet - T5 PCI Adapter Specifications

Item	Description
FRU number	11G8130
I/O bus architecture	PCI
Busmaster	Yes
Connector information	15-pin D-shell, 8-pin RJ-45
Cables	Customer supplied
Transceiver	Thin, part number 02G7437
Transceiver cables	Adapter-to-transceiver, thick and thin, part number 02G7434
Wrap plugs	Thick - 15-pin D-shell, part number 71F1167 Thin - BNC, part number 02G7433 Twisted-pair -(8-pin RJ-45), part number 00G2380

Type 9-F, TURBOWAYS 155 PCI MMF ATM Adapter (FC 2988)

The TURBOWAYS 155 PCI multimode Fiber (MMF) Asynchronous Transfer Mode (ATM) Adapter provides the interface between the ATM 155 Mbit/sec fiber-optics network and the PCI Bus in your system.

Note: The 21H3890 FRU does *not* ship with a tailstock (bracket). The tailstock *must* be removed from the card that is being replaced and installed on the new adapter.



TURBOWAYS 155 PCI MMF ATM Adapter Specifications

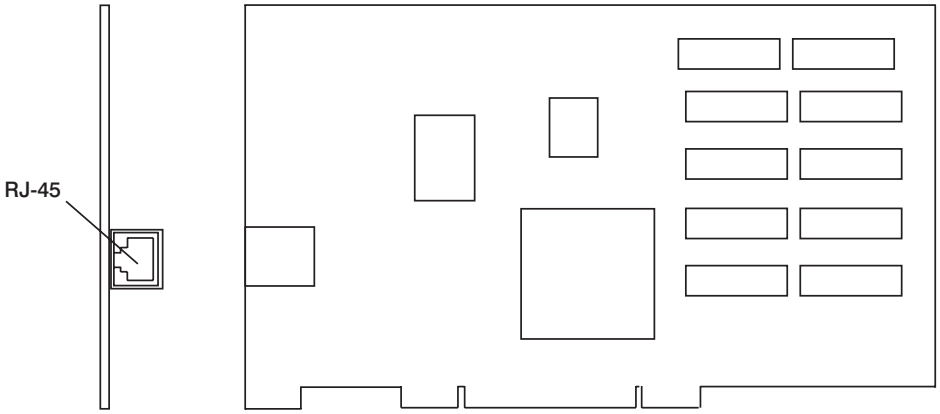
Item	Description
FRU number	21H3890
Bus architecture	PCI 2.1
Card type	Half
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Connector	ANSI Specified SC duplex
Wrap plug	21H3547, shipped with assembly or 16G5609
Cables	62.5 micron multimode fiber-optic, customer provided

Attention: The fiber adapters are designed with specifications for the cable to be a dual cable connector, transmit and receive cable ends clamped together. If a customer uses separate transmit and receive fiber cables, it is strongly recommended that the cables be clamped together to enhance the retention strength on the fiber transceiver connector. Clamping the cables together also improves the alignment of the fibers with the connector and improves overall performance.

Type 9-J, TURBOWAYS 155 PCI UTP ATM Adapter (FC 2963)

The TURBOWAYS 155 PCI Unshielded Twisted Pair (UTP) Asynchronous Transfer Mode (ATM) Adapter provides the interface between the ATM 155 Mbit/sec unshielded twisted pair network and the PCI Bus in your system.

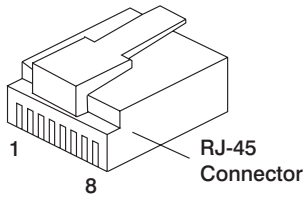
Note: The 21H7977 FRU does *not* ship with a tailstock (bracket). The tailstock *must* be removed from the card that is being replaced and installed on the new adapter.



TURBOWAYS 155 PCI UTP ATM Adapter Specifications

Item	Description
FRU number	21H7977
Bus architecture	PCI 2.1
Card type	Half
Adapter slots	For system specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Wrap plug	Supplied with adapter
Connector information	RJ-45
Cables	The cable can be unshielded twisted pair (UTP) or shielded twisted pair (STP), up to 100 meters in length.

TURBOWAYS 155 PCI UTP ATM Adapter Connector



Pin	Signal Name
1	Transmit A
2	Transmit B
3	No Connection
4	No Connection
5	No Connection
6	No Connection
7	Receive A
8	Receive B

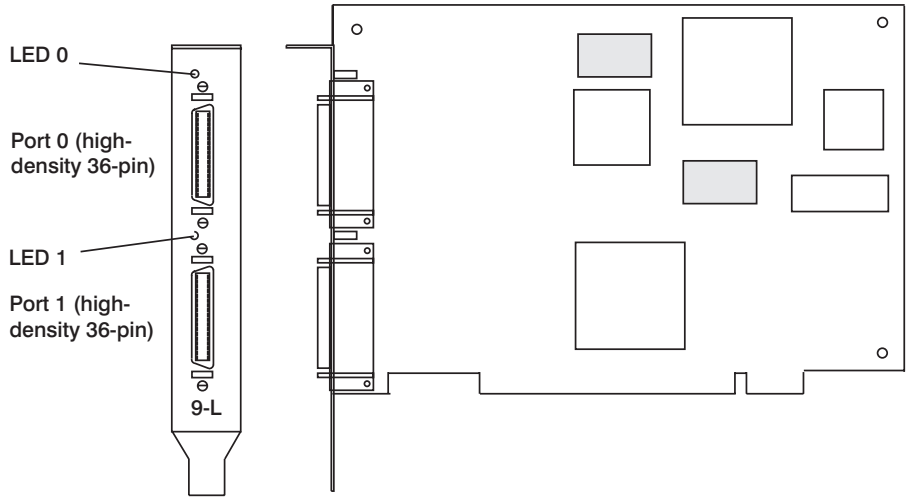
Type 9-L and 9-V, 2-Port Multiprotocol PCI Adapter (FC 2962)

The 2-Port Multiprotocol PCI Adapter is used to make high-speed connections between stand alone system units on a wide area network (WAN).

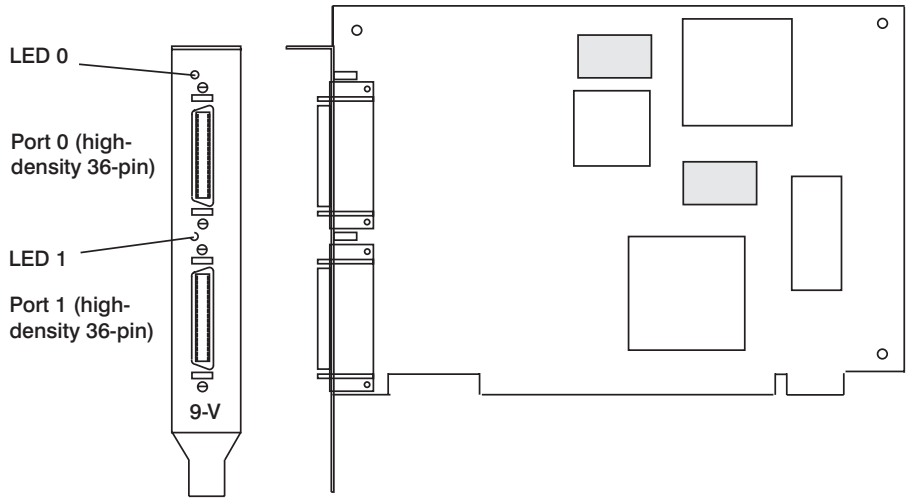
Attention: There are two types of this adapter. They perform the same function and share the same feature code. However, they require different device drivers so they are not plug-replaceable. The two adapters types are physically different. Adapter types 9-L and 9-V have different FRU part numbers.

For more information on the 2-Port Multiprotocol Adapter, see the *2-Port Multiprotocol PCI Adapter Installation and User's Guide*, which is a customer-installable option booklet that came with your system unit or the adapter.

Adapter Type 9-L



Adapter Type 9-V



2-Port Multiprotocol PCI Adapter Specifications

Item	Description

FRU number	Adapter type 9-L, 93H6086 Adapter type 9-V, 41L5235 replaced by 00P5920
I/O bus architecture	PCI
Bit rate	2.048 Mbits maximum per port
Busmaster	No
Adapter slots	For system-specific adapter placement, see the*PCI Adapter Placement Reference Guide*, order number SA38-0538.
Wrap plugs	36-pin, p/n 93H3662 (Assem. P/N 93H5270) V.24, p/n 33F8985 V.35, p/n 52G3379 V.36/EIA-449, p/n 73H2508 X.21, p/n 40F9904
Connector information	36-Pin high density (male)
Cables	V.24, p/n 93H5263 V.35, p/n 93H5264 V.36/EIA-449, p/n 93H5265 X.21, p/n 93H5267

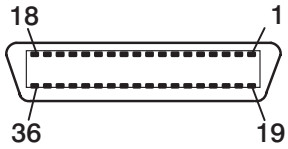
Interpreting the Adapter LEDs (Connection Status Indicators)

The green LED next to each port on the 2-Port Multiprotocol PCI Adapter indicates the port connection status. See the end view of the adapter on page 148.

LED status explanations are as follows:

LED State	Connection Status	Remedy
Off	The port is not loaded (the configuration file describing protocol and interface parameters was not read by the device driver on the system unit.)	Consult your networking software for instructions to load a configuration file and to start a connection.
Flash	The connection is up and data is being transmitted or received.	
On	The port is active and the connection is good.	

2-Port Multiprotocol PCI Adapter Connector



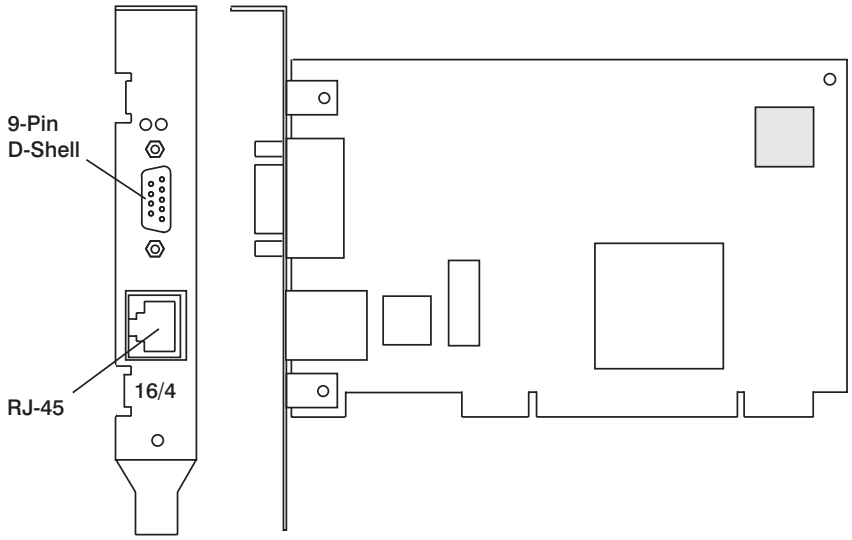
Each port on this adapter supports several different interfaces. See the 2-Port Multiprotocol PCI Adapter sections in Chapter 3, “Cables and Cabling”, on page 271 and Chapter 5, “Cable Assembly and Pin-Outs”, on page 395 of this book.

Type 9-O, PCI Token-Ring Adapter (FC 2920)

The PCI Token-Ring Adapter is a high-performance, 32-bit bus master, adapter designed to operate in systems that incorporate the Peripheral Component Interconnect (PCI) bus interface. Featuring an enhanced system interface for higher throughput and lower system utilization, coupled with RJ-45 and DB9 connectors, this adapter is equipped to handle the LAN environment requirements of servers and high-end workstations running I/O-intensive applications on the network.

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).



PCI Token-Ring Adapter Specifications

Item	Description
FRU number	93H6594
I/O bus architecture	PCI
Bit rate	4 Mbps or 16 Mbps (set manually or automatically sensed)
Modes	Half or full duplex
Busmaster	Yes
Connector information	RJ-45 and 9-pin D-Shell
Cables for STP	Token-Ring RJ-45 STP Adapter Cable (P/N 60G1063) or Token-Ring 9-pin D-Shell Network Adapter Cable, (p/n 6339098).
Cables for UTP	Standard UTP adapter cable with an RJ-45 connector on one end for the adapter and the appropriate connector for the wall outlet on the other end.

Interpreting the Adapter LEDs

The PCI Token-Ring adapter's LEDs provide information for monitoring its status and for problem determination. If the green LED is on and the amber LED is off, the adapter is operating correctly. If the amber LED is blinking and the green LED is steady, the adapter has detected a potential problem.

In the following table, the first four LED states indicate the sequence that is displayed when power is first applied to the computer and the adapter successfully reaches the open state. Some of these states may be too brief to observe. The last three LED states listed in the table indicate adapter faults.

The following terms are used in the following table:

auto-removal A state in which a token-ring adapter removes itself from the network to perform self-tests to determine whether it is the cause of a hard error. If the tests are successful, the adapter reattaches itself to the network.

Beaconing A state that a token-ring adapter enters after it detects a hard error. The adapter reports the error condition to the other devices on the network. Beaconing can result in the adapter removing itself from the network (auto-removal) to determine whether it is the cause of the hard error.

Hard error An error condition on a network that requires removing the source of the error or reconfiguring the network before the network can resume reliable operation.

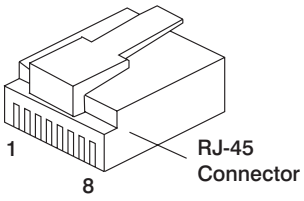
Initialization An action during which the adapter is prepared for use after its computer is booted. During initialization, the adapter runs its self-diagnostic tests.

Open A state in which the adapter has established connection with other devices on the ring.

Wire fault An error condition caused by a break or a short-circuit in the cable segment that connects the adapter to its access unit.

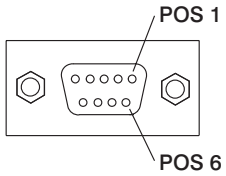
Amber	Green	Explanation
Blinking	Blinking	The adapter is waiting for initialization.
Off	Off	The adapter initialization is in progress, or the computer is powered off.
Off	Blinking	The adapter did not detect any problems during its self-diagnostic tests and is waiting to open.
		If this LED state occurs after the adapter is open, this state indicates that the adapter has closed.
Off	On	The adapter is open and operating correctly.
On	Off	The adapter self-diagnostic tests failed or there is a problem with the adapter.
Blinking	Off	The adapter is closed. One of the following conditions exists: • The adapter open failed. • The adapter detected a wire fault. • The adapter failed the auto-removal test.
Blinking	On	The adapter has detected beaconing or a hard error.
On	On	The adapter has failed.

PCI Token-Ring PCI Adapter RJ-45 Connector



Pin	Signal Name
1	No Connection
2	No Connection
3	Ring Out A
4	Ring in B
5	Ring in A
6	Ring Out B
7	No Connection
8	No Connection

PCI Token-Ring Adapter 9-Pin D-shell Connector

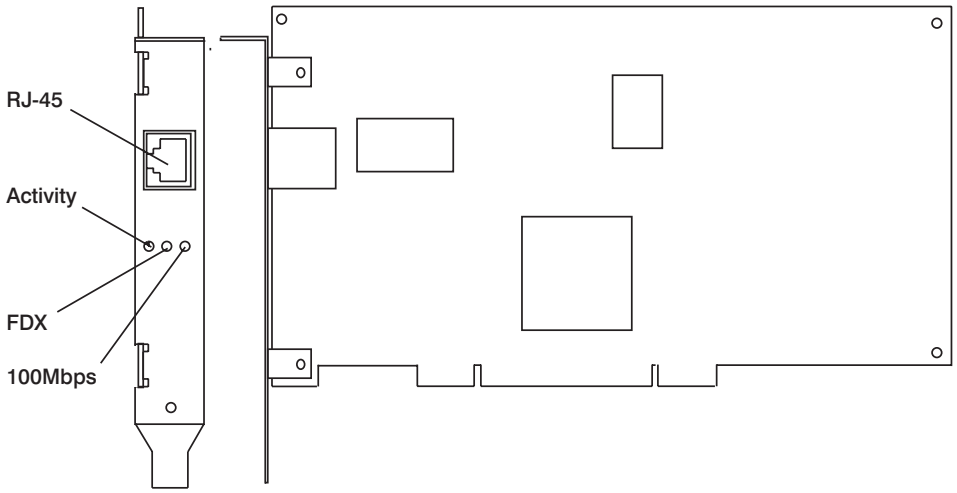


Pin	Signal Name
1	Ring Out A
2	Gnd
3	+5v
4	Gnd
5	Ring In B
6	Ring Out B
7	Gnd
8	Gnd
9	Ring In A

Type 9-P, 10/100 Ethernet Tx PCI Adapter (FC 2968)

The 10/100 Ethernet Tx PCI Adapter provides attachment at 10 Mbps or 100 Mbps to a carrier sense multiple access/collision detection (CSMA/CD) Ethernet local area network (LAN) for systems designed to operate with the Peripheral Component Interconnect (PCI) bus interface. It uses the IEEE-802.3u standard for communications.

The adapter supports connections to 10BaseT or 100BaseTx on unshielded twisted pair networks through an RJ-45 connector.



10/100 Ethernet - 10/100 PCI Adapter Specifications

Item	Description
FRU number	94H0823
I/O bus architecture	PCI
Busmaster	Yes
Connector information	8-position RJ-45
Cables:	Customer supplied (use Y type connection)
For 10 Mbps	Use category 3, 4, or 5 unshielded twisted pair
For 100 Mbps	Use category 5 only unshielded twisted pair
Wrap plug	Twisted-pair, part number 00G2380

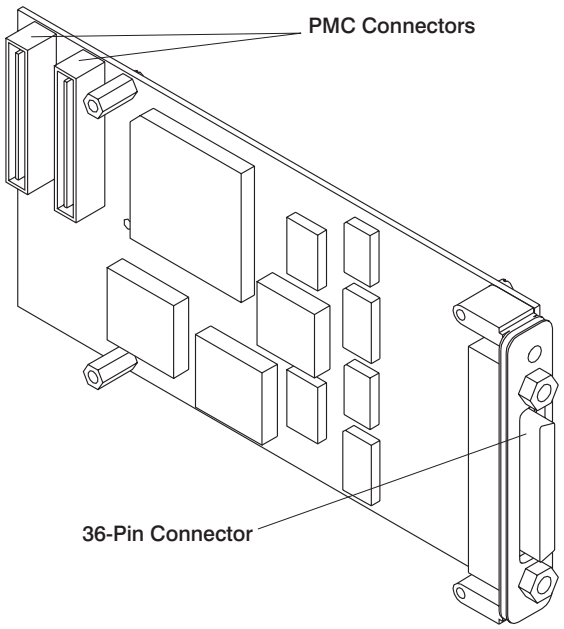
Viewing the LEDs

The adapter features three LEDs that provide information on the status of the card's operation. The LEDs are visible through the card's mounting bracket and indicate the following conditions when lit.

- 100 Mbps LED (yellow) - indicates 100 Mbps operation
- FDX LED (green) - indicates full duplex operation
- Activity LED (green) - indicates transmit or receive activity

Type 9-R, IBM ARTIC960Hx 4-Port Selectable PCI Adapter (FC 2947)

The IBM ARTIC960Hx 4-Port Selectable PCI Adapter consists of an IBM ARTIC960Hx Base PCI Adapter, an IBM ARTIC960Hx 4-Port Selectable PMC, and an 8MB DRAM Memory card. The IBM ARTIC960Hx 4-Port Selectable PCI Mezzanine Card (PMC) is an optional PCI mezzanine card that is used with the IBM ARTIC960Hx base adapter. See “IBM ARTIC960Hx Base PCI Adapter” on page 159.



The IBM ARTIC960Hx 4-Port Selectable PMC connects to the IBM ARTIC960Hx base adapter by two 64-pin connectors. See “PMC Connector” on page 160.Interface signals exit the 4-Port Selectable PCI Mezzanine Card through the 120-pin connector at the rear of the card. The IBM ARTIC960Hx base adapter and the attached 4-Port Selectable PMC occupy a single 32-bit expansion slot.

IBM ARTIC960Hx 4-Port Selectable PCI Adapter Specifications

Item	Description
FRU number	Base adapter, 87H3427 4-Port selectable mezzanine card, 87H3413
DRAM memory	See “IBM ARTIC960Hx Base PCI Adapter” on page 159.
I/O bus	PCI
Connectors	120-pin D shell Two 64-pin for PMC
Wrap plugs	See “Wrap Plugs”.
Cables	EIA-232 (ISO 2110) cable EIA-530 (ISO 2110) cable V.35 DTE (ISO 2593) cable RS 449 (ISO 4902) cable X.21 (ISO 4903) cable

Wrap Plugs

Description of Wrap Plug	FRU Number
120-pin connector	87H3311
25-pin wrap plug (EIA-232 (ISO 2110) or EIA-530 (ISO 2110))	87H3439
34-pin wrap plug (V.35 DTE (ISO 2593) 34-pin male block)	87H3442
37-pin wrap plug (RS-449 (ISO 4902))	87H3440
15-pin wrap plug (X.21 (ISO 4903))	53G0638

Port Speeds

When clocks are supplied by an external device (all interfaces except EIA-232), the 4-Port Selectable PMC supports four ports running simultaneously at a maximum data rate of 2.048 Mbps, duplex, and synchronous. The following table shows the maximum speed supported for each electrical interface.

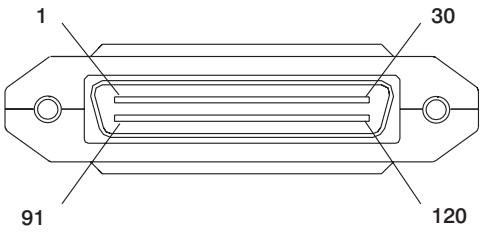
Electrical Interface	Maximum Speed (per port)
EIA-232 (ISO 2110)	38.4 Kbps (U.S. only) 19.2 Kbps (EMEA only)
EIA-530 (ISO 2110)	2.048 Mbps
V.35 DTE (ISO 2593)	2.048 Kbps (US only) 64 Kbps (EMEA only)
RS 449 (ISO 4902)	2.048 Mbps
X.21 (ISO 4903)	2.048 Mbps

Clocks supplied by a Dual Universal Serial Communications Controller (DUSCC) on the 4-Port Selectable PMC provide synchronous data rates up to 230.4 Kbps, duplex. In addition, an on-card clock generator can provide data rates of either 1.544 Mbps or 2.048 Mbps for each port. Selection of the clock frequency is programmable.

IBM ARTIC960Hx 4-Port Selectable PCI Mezzanine Card 120-Pin Connector

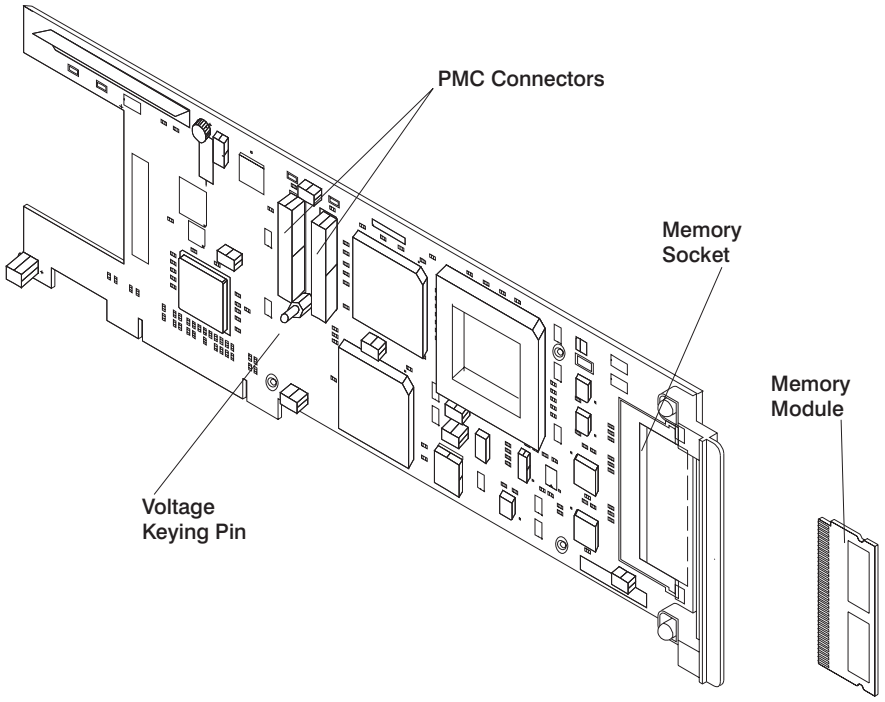
The individual signals for all ports connect to the 4-Port Selectable PMC through the 120-pin connector at the rear of the card.

Each cable has a single 120-pin, male, D-shell connector that branches into four individual cables, each of which provides access to one of four independent ports. The 120-pin D-shell connector is shown in the following illustration.



IBM ARTIC960Hx Base PCI Adapter

The IBM ARTIC960Hx Base PCI Adapter provides high-function control of I/O operations and serves to off-load input/output tasks from the system microprocessor. It has a memory connector that supports 8 MB of Extended-data output (EDO) Dynamic random-access memory (DRAM). It also has a PMC connector to attach a PCI Mezzanine Card (PMC). See “PMC Connector” on page 160.



IBM ARTIC960Hx Base PCI Adapter Specifications

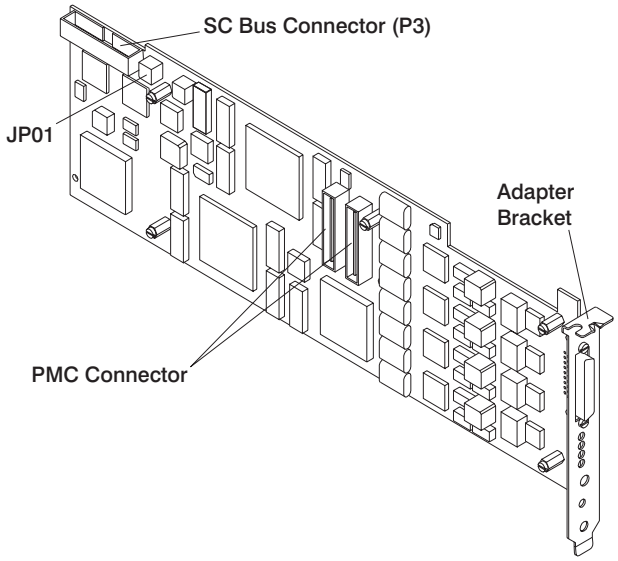
Item	Description
FRU number	Base adapter without memory, 87H3427 8 MB memory module, 87H3621
I/O bus architecture	PCI
Busmaster	Yes
Bus size	32-bit
Connectors	Two 64-pin PMC. See “PMC Connector”.
Cable	None supplied with base PCI adapter

PMC Connector

The PMC connector provides a 32-bit PCI interface for attaching a single, or single-extended, PCI Mezzanine Card (PMC). A PCI mezzanine card provides a high-function, application-specific interface that expands the capability of a base adapter such as the IBM ARTIC960Hx Base PCI Adapter.

Type 9-S, IBM ARTIC960Hx 4-Port T1/E1 PCI Adapter (FC 2948)

The IBM ARTIC960Hx 4-Port T1/E1 PCI Adapter consists of an IBM ARTIC960Hx Base PCI Adapter, an 4-Port T1/E1 Mezzanine Card, and an 8MB DRAM Memory card. The IBM ARTIC960Hx 4-Port T1/E1 Mezzanine Card is an optional PCI mezzanine card (PMC) that is used with the IBM ARTIC960Hx base adapter. See “IBM ARTIC960Hx Base PCI Adapter” on page 159.



This IBM ARTIC960Hx 4-Port T1/E1 Mezzanine Card connects to the IBM ARTIC960Hx Base PCI Adapter by two 64-pin connectors. See “PMC Connector” on page 160. The interface signals exit the 4-Port T1/E1 Mezzanine Card through the 36-pin connector at the rear of the card. The IBM ARTIC960Hx Base PCI Adapter and the attached 4-Port T1/E1 Mezzanine Card occupy a single full-size 32-bit PCI expansion slot.

IBM ARTIC960Hx 4-Port T1/E1 PCI Adapter Specifications

Item	Description
FRU number	Base adapter, 87H3427 4-Port T1/E1 Mezzanine Card, 87H3428
DRAM memory	See “IBM ARTIC960Hx Base PCI Adapter Specifications” on page 160.
I/O bus	PCI
Connectors	36-pin D-Shell 26-pin SC-Bus
Wrap plugs	36-pin, part number 87H3502 RJ-48, part number 87H3588
Cables	4-port T1 RJ-48: Cable FC - 2709 4-port E1 RJ-48: Cable FC - 2710
Surge protection	RJ-48 cable, part number 87H3651

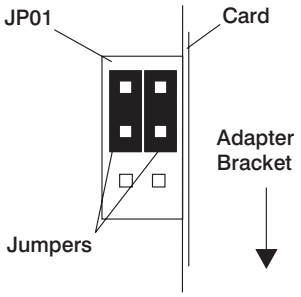
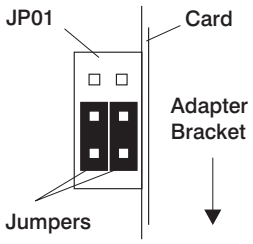
Port Speeds

The 4-Port T1/E1 mezzanine card supports four ports running simultaneously at a maximum data rate of 2.048 Mbps duplex. The following table shows the maximum port speed supported for each electrical interface.

Electrical Interface	Maximum Speed (per port)
T1	1.544 Mbps
E1	2.048 Mbps

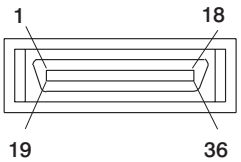
IBM ARTIC960Hx 4-Port T1/E1 PCI Adapter Jumpers

The jumpers at JP01 must be positioned based on the following conditions:

Jumper Positions	Condition
	If no cable will be connected to the SC bus connector (P3), or if the card will be connected to the end of the SC bus cable, ensure that the two jumpers at JP01 are installed, parallel with the card surface, on the pins that are farthest from the adapter bracket.
	If the above conditions do not apply, install the jumpers on the JP01 pins that are closest to the adapter bracket.

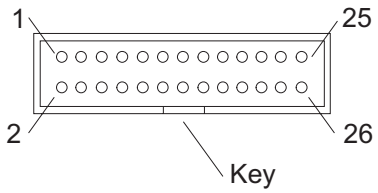
IBM ARTIC960Hx 4-Port T1/E1 PCI Adapter 36-pin D-Shell Connector

The individual signals for all ports connect to the mezzanine card through the 36-pin connector at the rear of the card. The following illustration shows the male 36-pin connector at one end of the cable.



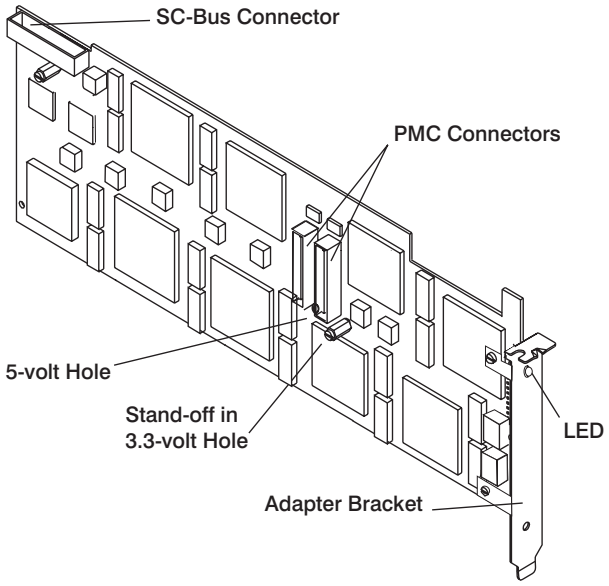
IBM ARTIC960Hx 4-Port T1/E1 PCI Adapter 26-pin Connector

The 26-pin SC-Bus connector allows the mezzanine card to connect to the SC buses on similarly capable neighboring adapters in the system unit. The mezzanine card SC-bus conforms to the Signal Computing System Architecture (SCSA) hardware model for real-time computer telephony.


1
25
2
26
Key

Type 9-T, IBM ARTIC960Hx DSP Resource PCI Adapter (FC 2949)

The IBM ARTIC960Hx DSP Resource PCI Adapter Consists of an IBM ARTIC960Hx Base PCI Adapter, an IBM ARTIC960Hx DSP Resource Mezzanine Card, and an 8 MB DRAM Memory card. The IBM ARTIC960Hx DSP Resource PCI Adapter is an optional PCI mezzanine card that is used with the IBM ARTIC960Hx base adapter. See “IBM ARTIC960Hx Base PCI Adapter” on page 159.



The IBM ARTIC960Hx DSP Resource PCI Adapter connects to the ARTIC960Hx Base Adapter by two 64-pin connectors. See “PMC Connector” on page 160. The interface signals exit the DSP Resource PCI Adapter through the 26-pin signal-computing bus (SC-bus) connector at the top of the PCI Adapter. The IBM ARTIC960Hx base adapter and the attached DSP Resource Adapter occupy a single full-size 32-bit PCI expansion slot.

IBM ARTIC960Hx DSP Resource PCI Adapter Specifications

Item	Description
FRU number	Base adapter, 87H3427 DSP Resource PCI Adapter, 87H3701
DRAM memory	See “IBM ARTIC960Hx Base PCI Adapter Specifications” on page 160.
I/O bus	PCI
Busmaster	Yes
Adapter form factor	PCI long
Connector	26 pin SC-bus
Adapter cable	Optional internal SC-bus ribbon cable.

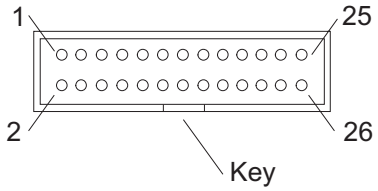
Status LED

The DSP Resource PCI Adapter has a two-color LED located at the rear of the card and visible through an opening in the adapter bracket.

The color of the LED depends on the condition or status of the SC-bus. The LED is Green when the SC-bus is active and synchronized. The LED is Yellow when the SC-bus is inactive or it is not synchronized.

SC-Bus Connector 26-Pin

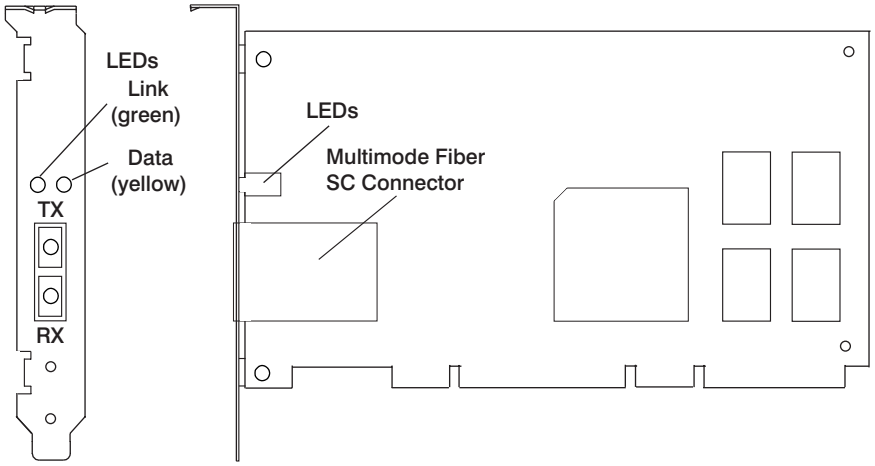
The 26-pin SC-Bus connector allows the DSP Resource PCI Adapter to connect to the SC buses on similarly capable neighboring adapters in the system unit. The DSP Resource PCI Adapter SC-bus conforms to the Signal Computing System Architecture (SCSA) hardware model for real-time computer telephony.



Type 9-U, Gigabit Ethernet-SX PCI Adapter (FC 2969)

The Gigabit Ethernet-SX PCI Adapter provides attachment at 1000 Mbps to an Ethernet local area network (LAN). It is designed to operate on systems with 32- or 64-bit Peripheral Component Interconnect (PCI) bus interface. The adapter uses the IEEE-802.3z standard for communications.

The adapter supports connections at 1000 Mbps with full-duplex operation on fiber optic networks through an SC connector.



Gigabit Ethernet-SX PCI Adapter Specifications

Item	Description
FRU number	41L6396 replaced by 09P2098
I/O bus architecture	PCI 2.1 compliant
Busmaster	Yes
Maximum number	MT 7025 Model F50, two 32-bit only, 1 per PCI bus MT 7026 Model H50, two 32-bit only, 1 per PCI bus MT 7043 Model 260, two 64-bit only PCI Slots MT 7017 Model S70 or MT 7017 Model S7A, 64-bit only, 1 per PCI bus, 4 per I/O drawer, 8 per system.
Adapter size	PCI short form
Connector information	SC fiber optic
Wrap plug	SC fiber optic, part number 21H3547
Cables	Customer supplied

Attention: The fiber adapters are designed with specifications for the cable to be a dual cable connector, transmit and receive cable ends clamped together. If a customer uses separate transmit and receive fiber cables, it is strongly recommended that the cables be clamped together to enhance the retention strength on the fiber transceiver connector. Clamping the cables together also improves the alignment of the fibers with the connector and improves overall performance.

Viewing the LEDs

The adapter features two LEDs that provide information on the status of the adapter's operation. The LEDs are visible through the card's mounting bracket and indicate the following conditions when lit.

LED	Status	Meaning
Link LED (green)	On	Link is up
	Blinking	Port is disabled by software
Data LED (yellow)	On	Transmit or receive activity

Gigabit Ethernet-SX PCI Adapter, Cable Length

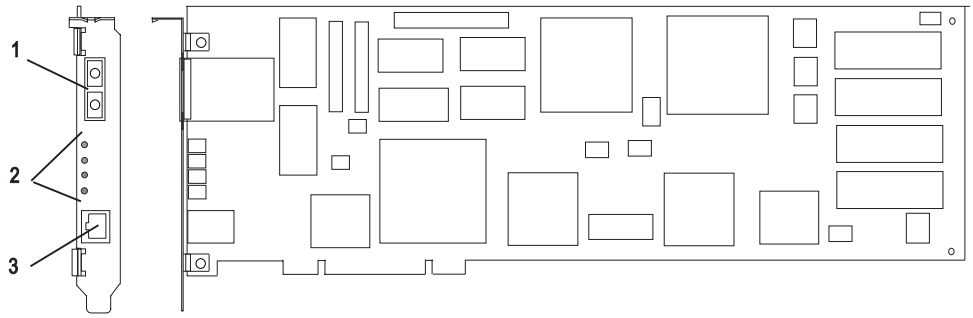
The 1000 Mbps adapter uses multimode fiber optic cable. The following table shows the allowable cable length from the adapter to the local switch:

Fiber Type	Modal bandwidth (MHZ-km)	Range (meters)
62.5 µm MMF	160	2 to 220
62.5 µm MMF	200	2 to 275
50 µm MMF	400	2 to 500
50 µm MMF	500	2 to 500
Note: MMF = Multimode Fiber		

Types 9-W and 9-X, Serial HIPPI PCI Adapters (FC 2732 and 2733)

The Serial HIPPI PCI Adapter provides a serial connection for HIPPI communications. The data is converted from parallel format to serial format before transmission, then converted back to parallel format at the receive end.

The following serial HIPPI PCI adapters are available: feature code 2732 (type 9-W) provides a short-wave adapter, while feature code 2733 (type 9-X) provides a long-wave adapter. Both adapters have 1 MB transmit and 1 MB receive buffers.



1 Fiber SC connector
2 Status LEDs
3 RJ-45 connector

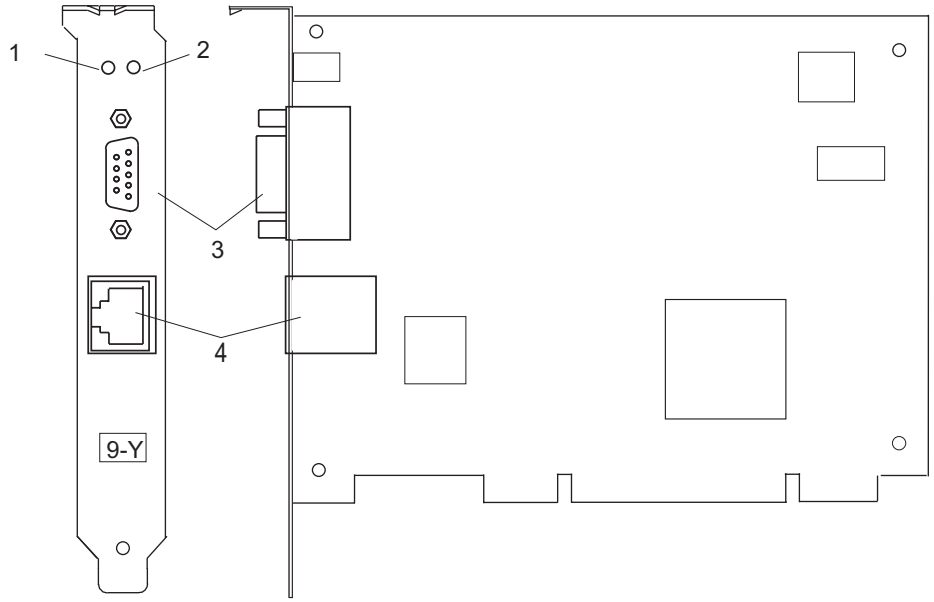
Serial HIPPI PCI Adapter Specifications

Item	Description
FRU number	Obtain part number from label on adapter
Bus architecture	PCI
Bus width	32-bits
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Connector information	Optical, ANSI specified SC duplex Communication, RJ-45
Cables	Short wave, 50-125 micron multimode optical cable with dual-SC connector Long wave, 9-125 micron single-mode optical cable with dual-SC connector **Attention:** The adapters are designed with specifications for the cable to be a dual cable connector, transmit and receive cable ends clamped together. If a customer uses separate transmit and receive fiber cables, it is strongly recommended that the cables be clamped together to enhance the retention strength on the fiber transceiver connector. Clamping the cables together also improves the alignment of the fibers with the connector and improves overall performance.
Wrap plugs	Optical, 21H3547 RJ-45, 43G0928

Type 9-Y, High-Speed Token-Ring PCI Adapter (FC 4959)

The High-Speed Token-Ring PCI Adapter provides up to 16 Mbps of token-ring performance in systems that incorporate the peripheral component interconnect (PCI) bus interface. By providing 16 Mbps operation for both UTP category 5 and STP type 1A cables, this adapter is capable of auto-sensing both speeds (16 and 4 Mbps), and offers high performance without requiring significant cabling changes.

The High-Speed Token-Ring PCI Adapter provides automatic ring-speed selection and full duplex operation at both speeds (16 and 4 Mbps).



1 Amber
2 Green
3 9-Pin D-Shell Connector
4 RJ-45 Connector

High-Speed Token-Ring PCI Adapter Specifications

Item	Description
FRU number	03N3554
I/O bus architecture	PCI
Bit rate	16 Mbps and 4 Mbps
Modes	Half or full duplex
Busmaster	Yes
Connector information	RJ-45 and 9-pin D-Shell
Wrap Plugs	RJ-45 (P/N 04H7648), 9-pin D-shell (P/N 6165899 or 55F4896)
Converter cable	RJ-45 to 9-Pin D-shell pigtail (P/N 60G1066)
Cables for STP	Token-Ring 9-pin D-Shell Network Adapter Cable, part number 6339098
Cables for UTP	Standard UTP adapter cable with an RJ-45 connector on one end for the adapter and the appropriate connector for the wall outlet on the other end.

Interpreting the Adapter LEDs

The PCI Token-Ring adapter's LEDs provide information for monitoring its status and for problem determination. If the green LED is on and the amber LED is off, the adapter is operating correctly. If the amber LED is blinking and the green LED is steady, the adapter has detected a potential problem.

In the following table, the first four LED states indicate the sequence that is displayed when power is first applied to the computer and the adapter successfully reaches the open state. Some of these states may be too brief to observe. The last three LED states listed in the table indicate adapter faults.

The following terms are used in the following table:

auto-removal A state in which a token-ring adapter removes itself from the network to perform self-tests to determine whether it is the cause of a hard error. If the tests are successful, the adapter reattaches itself to the network.

Beaconing A state that a token-ring adapter enters after it detects a hard error. The adapter reports the error condition to the other devices on the network. Beaconing can result in the adapter removing itself from the network (auto-removal) to determine whether it is the cause of the hard error.

Hard error An error condition on a network that requires removing the source of the error or reconfiguring the network before the network can resume reliable operation.

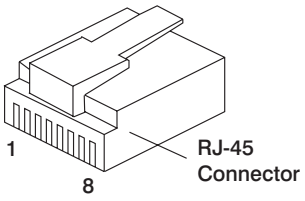
Initialization An action during which the adapter is prepared for use after its computer is booted. During initialization, the adapter runs its self-diagnostic tests.

Open A state in which the adapter has established connection with other devices on the ring.

Wire fault An error condition caused by a break or a short-circuit in the cable segment that connects the adapter to its access unit.

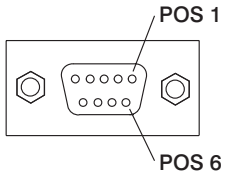
Amber	Green	Explanation
Blinking	Blinking	The adapter is waiting for initialization.
Off	Off	The adapter initialization is in progress, or the computer is powered off.
Off	Blinking	The adapter did not detect any problems during its self-diagnostic tests and is waiting to open.
		If this LED state occurs after the adapter is open, this state indicates that the adapter has closed.
Off	On	The adapter is open and operating correctly.
On	Off	The adapter self-diagnostic tests failed or there is a problem with the adapter.
Blinking	Off	The adapter is closed. One of the following conditions exists: • The adapter open failed. • The adapter detected a wire fault. • The adapter failed the auto-removal test.
Blinking	On	The adapter has detected beaconing or a hard error.
On	On	The adapter has failed.

PCI Token-Ring PCI Adapter RJ-45 Connector



Pin	Signal Name
1	No Connection
2	No Connection
3	Ring Out A
4	Ring in B
5	Ring in A
6	Ring Out B
7	No Connection
8	No Connection

PCI Token-Ring Adapter 9-Pin D-shell Connector

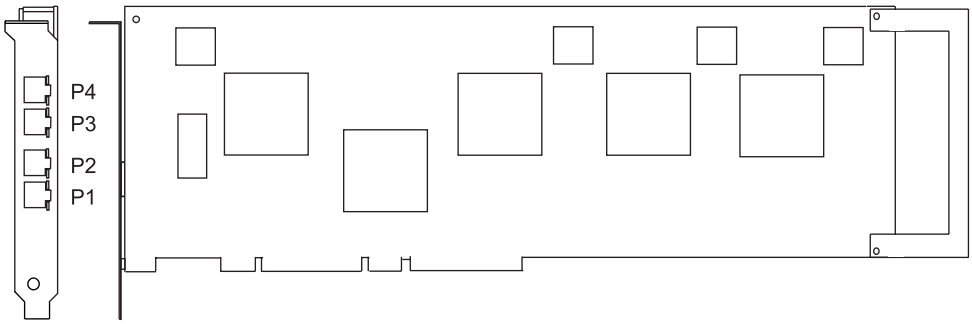


Pin	Signal Name
1	Ring Out A
2	Ground
3	+5v
4	Ground
5	Ring In B
6	Ring Out B
7	Ground
8	Ground
9	Ring In A

Type 9-Z, 4-Port 10/100 Base-TX Ethernet PCI Adapter (FC 4951)

The 4-Port 10/100 Base-TX Ethernet PCI Adapter provides attachment at 10 Mbps or 100 Mbps to a carrier sense multiple access/collision detection (CSMA/CD) Ethernet local area network (LAN) for systems designed to operate with the PCI bus interface. The adapter uses the IEEE-802.3u standard for communications.

The adapter supports connections to 10BaseT or 100BaseTx on unshielded twisted pair networks through an RJ-45 connector.



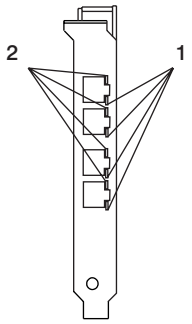
4-Port 10/100 Base-TX Ethernet PCI Adapter Specifications

Item	Description
FRU number	03N3952
I/O bus architecture	PCI 2.1
Busmaster	Yes
Connector information	8-position RJ-45
Cables:	Customer supplied (use Y type connection)
For 10 Mbps	Use category 3, 4, or 5 unshielded twisted pair
For 100 Mbps	Use category 5 only unshielded twisted pair
Wrap plug	Twisted-pair, part number 00G2380

Viewing the LEDs

The adapter has two LEDs for each port to provide status on the adapter's operation. The LEDs are visible on the mounting bracket at each port's connector. They indicate the following conditions when lit:

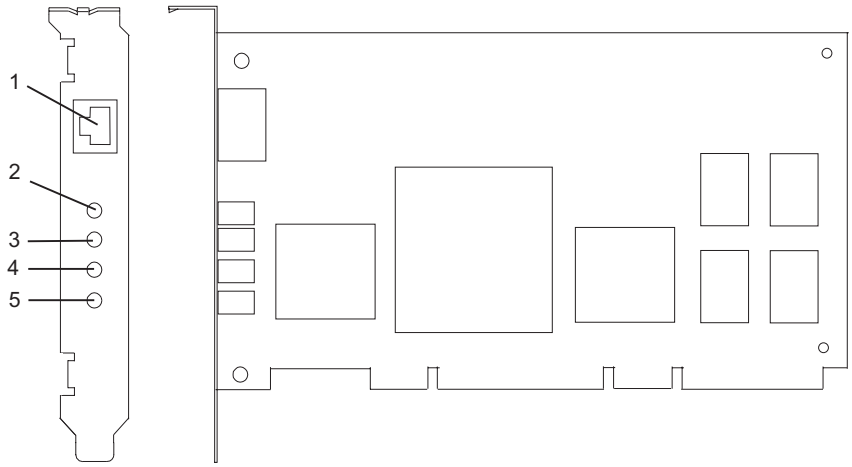
- Green LED (1) - indicates 100 Mbps operation
- Yellow LED (2) - indicates transmit or receive activity



Type A-A, 10/100/1000 Base-T Ethernet PCI Adapter (FC 2975)

The 10/100/1000 Base-T Ethernet PCI Adapter provides copper-cabling attachment that uses an RJ-45 connector. This adapter provides operating speeds of 10, 100, or 1000 Mbps to an Ethernet local area network (LAN). At speeds of 10 or 100 Mbps, it supports full-duplex and half-duplex modes. At the speed of 1000 Mbps, it supports only full-duplex mode. This adapter auto-negotiates to the highest available link speed.

This adapter is designed to operate on systems with 32-bit or 64-bit Peripheral Component Interconnect (PCI) bus interface. This adapter uses the IEEE-802.3z standard for communications.



1 RJ-45 Connector
2 Yellow LED (data)
3 Green LED (1000 Mbps Speed)
4 Green LED (100 Mbps Speed)
5 Green LED (10 Mbps Speed)

10/100/1000 Base-T Ethernet PCI Adapter Specifications

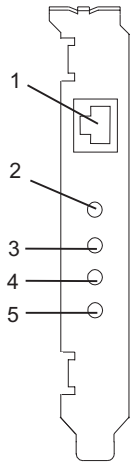
Item	Description
FRU number	00P1690
I/O bus architecture	PCI 2.1 compliant
Busmaster	Yes
Maximum number	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.

Connector	RJ-45
Wrap plug	RJ-45, part number 00P1689
Cables	Customer supplied. Use CAT-5 twisted pair bulk cables (TIA/EIA 568A is recommended). See “10/100 Ethernet PCI Adapter (FC 2968)” on page 299.

10/100/1000 Base-T Ethernet PCI Adapter LEDs

The adapter has four LEDs that provide information on the status and speed of the adapter’s operation. The LEDs are visible through the card’s mounting bracket and indicate the following conditions when lit.

Any of the three green Link LEDs	On	Indicates the speed of the link (10, 100, 1000 Mbps), and the fact the link is operational
	Blinking	Port is disabled by software
Yellow data LED	On	Indicates transmit or receive activity
Note: If all LEDs are on, the adapter link is not set up.		



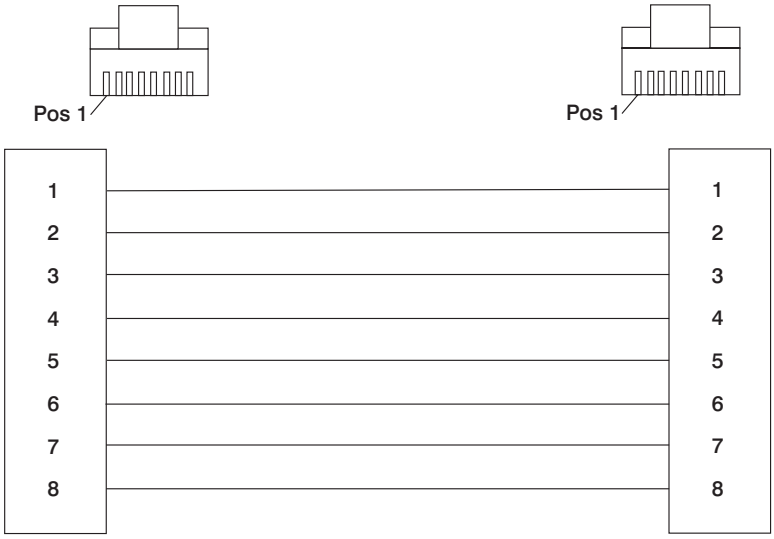
1 RJ-45 Connector
2 Yellow LED (data)
3 Green LED (1000 Mbps Speed)
4 Green LED (100 Mbps Speed)
5 Green LED (10 Mbps Speed)

10/100/1000 Base-T Ethernet PCI Adapter Cables

The following topics describe the pin-outs for an RJ-45 Ethernet Straight-through cable and an RJ-45 Ethernet Crossover cable.

RJ-45 Ethernet Straight-through Cable Pin-outs

The Straight-through cable attaches the adapter to a switch device. A straight cable should also be used to connect two Gigabit adapters in a point-to-point configuration at 1Gps if autonegotiate is set.The following wiring diagram shows the connections required to construct an Ethernet Straight-through cable.

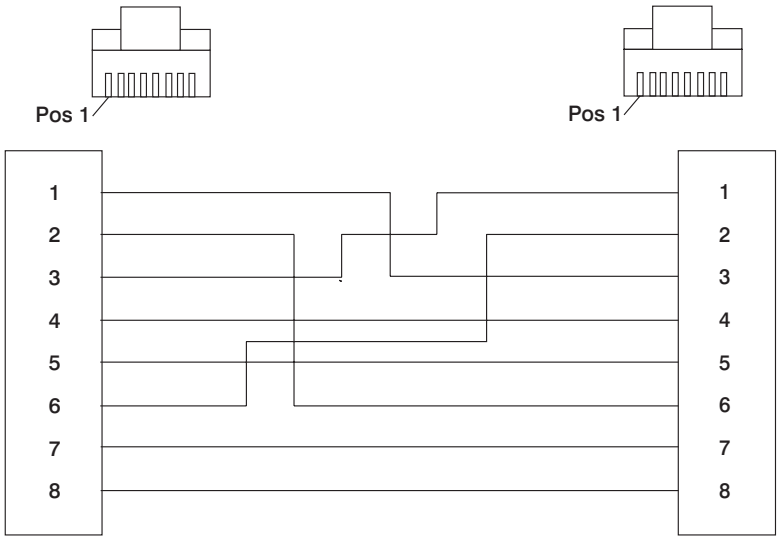


This cable is to be constructed using CAT-5 twisted-pair bulk cable (TIA/EIA 568A is recommended). The pairs must be wired as shown in the following table (the colors may differ; ensure that pin connections are correct). For additional information, see Ethernet specification IEEE-802.3u.

Twisted- Pair (left connector)	Positions (left connector)
1	1,2 (white-orange, orange)
2	3,6 (white-green, green)
3	4,5 (blue, white-blue)
4	7,8 (white-brown, brown)

RJ-45 Ethernet Crossover Cable Pin-outs

Use the Crossover cable to attach one adapter to another adapter, that is, point-to-point, only if the adapters are to be run at 10/100 Mbps. The following wiring diagram shows the connections required to construct an Ethernet crossover cable.

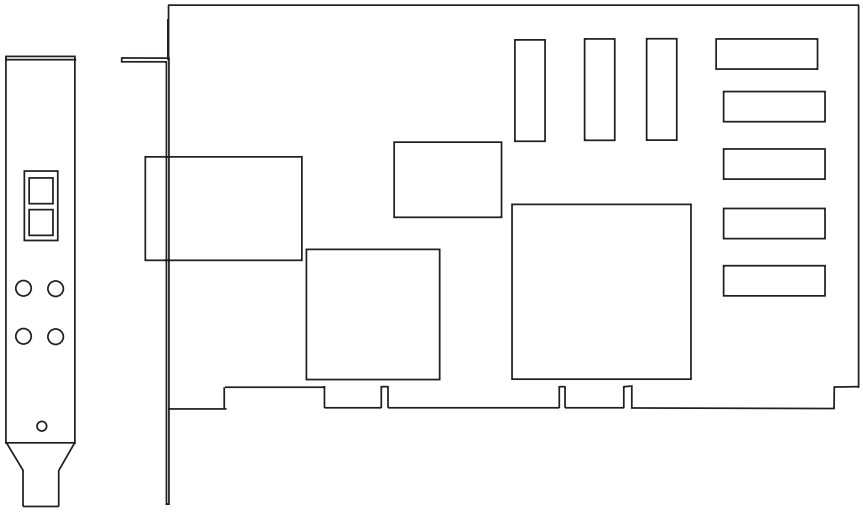


This cable is to be constructed using CAT-5 twisted-pair bulk cable (TIA/EIA 568A is recommended). The pairs must be wired as shown in the following table (the colors may differ; ensure that pin connections are correct). For additional information, see Ethernet specification IEEE-802.3u.

Twisted- Pair (left connector)	Positions (left connector)
1	1,2 (white-orange, orange)
2	3,6 (white-green, green)
3	4,5 (blue, white-blue)
4	7,8 (white-brown, brown)

Type A-B, TURBOWAYS 622 Mbps PCI MMF ATM Adapter (FC 2946)

The TURBOWAYS 622 Mbps PCI MMF ATM Adapter is a 64-bit, Universal PCI Adapter that provides direct access to ATM networks through a dedicated 622 Mbps full-duplex connection. It is a PCI short form-factor adapter and connects to the 622 ATM network by using an LED-driven, dual-SC type, multimode fiber optics cable. The 622 Mbps PCI MMF ATM Adapter uses 16 MB of SDRAM for control and 16 MB of SDRAM for packet memory.



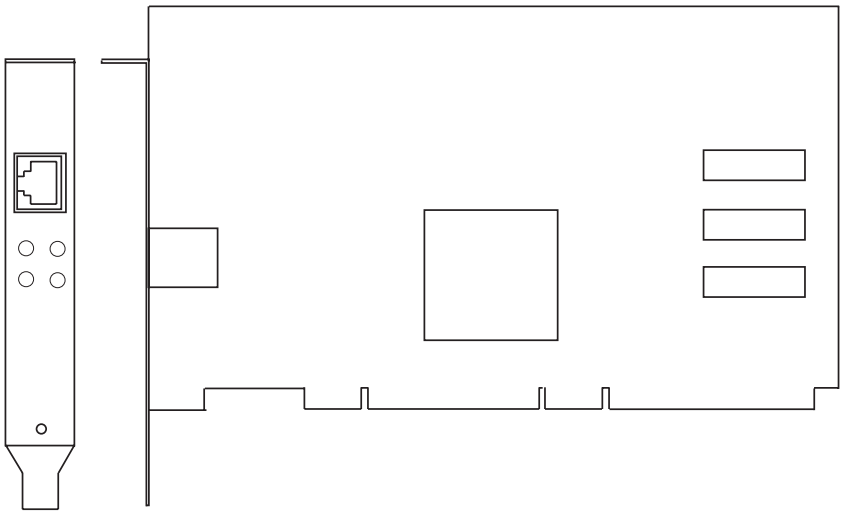
622 Mbps PCI MMF ATM Adapter Specifications

Item	Description
FRU number	97H7782
Bus architecture	PCI
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Connector	ANSI Specified SC duplex
Wrap plug	04P9438
Cables	62.5 micron multimode fiber-optic, customer provided

Attention: The fiber adapters are designed with specifications for the cable to be a dual cable connector, transmit and receive cable ends clamped together. If a customer uses separate transmit and receive fiber cables, it is strongly recommended that the cables be clamped together to enhance the retention strength on the fiber transceiver connector. Clamping the cables together also improves the alignment of the fibers with the connector and improves overall performance.

Type A-C, 64-bit/66MHz PCI ATM 155 UTP Adapter (FC 4953)

The 64-bit/66MHz PCI ATM 155 UTP Adapter provides the interface between the ATM 155 Mbit/sec unshielded twisted pair network and the 64-bit/66 MHz PCI Bus in your system.

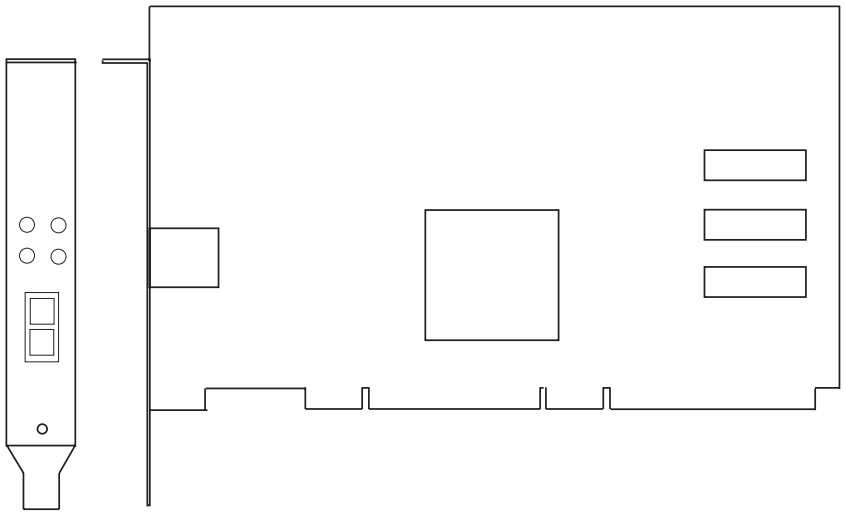


64-bit/66MHz PCI ATM 155 UTP Adapter Specifications

Item	Description
FRU number	21P4112
Bus architecture	PCI 2.2
Card type	Half
Adapter slots	For system specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Wrap plug	21P8009 (Supplied with adapter) or 42H0540
Connector information	RJ-45
Cables	The cat5 cable can be unshielded twisted pair (UTP) or shielded twisted pair (STP), up to 100 meters in length.

Type A-D, 64-bit/66MHz PCI ATM MMF Adapter (FC 4957)

The 64-bit/66MHz PCI ATM MMF Adapter provides the interface between the ATM 155 Mbit/sec fiber-optics network and the 64-bit/66 MHz PCI Bus in your system.



64-bit/66MHz PCI ATM MMF Adapter Specifications

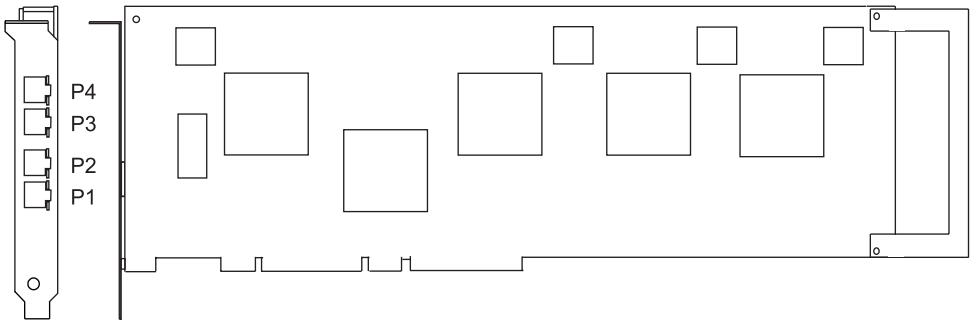
Item	Description
FRU number	21P4106 or 53P1154
Bus architecture	PCI 2.2
Card type	Half
Adapter slots	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Connector	ANSI Specified SC duplex
Wrap plug	21H3547 or 04P9438
Cables	62.5u/125u multimode fiber-optic, customer provided

Attention: The fiber adapters are designed with specifications for the cable to be a dual cable connector, transmit and receive cable ends clamped together. If a customer uses separate transmit and receive fiber cables, it is strongly recommended that the cables be clamped together to enhance the retention strength on the fiber transceiver connector. Clamping the cables together also improves the alignment of the fibers with the connector and improves overall performance.

Type A-E, 4-Port 10/100 Base-TX Ethernet PCI Adapter (FC 4961)

The 4-Port 10/100 Base-TX Ethernet PCI Adapter provides attachment at 10 Mbps or 100 Mbps to a carrier sense multiple access/collision detection (CSMA/CD) Ethernet local area network (LAN) for systems designed to operate with the PCI bus interface. The adapter uses the IEEE-802.3u standard for communications. The adapter will occupy a single slot but will appear to the system to be four unique 10/100 Ethernet adapters.

The adapter supports connections to 10BaseT or 100BaseTx on unshielded twisted pair networks through an RJ-45 connector.



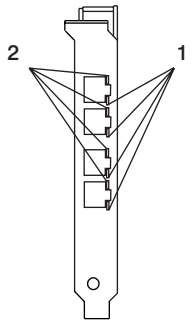
4-Port 10/100 Base-TX Ethernet PCI Adapter Specifications

Item	Description
FRU number	09P1421
I/O bus architecture	PCI
Busmaster	Yes
Connector information	8-position RJ-45
Cables:	Customer supplied (use Y type connection)
For 10 Mbps	Use category 3, 4, or 5 unshielded twisted pair
For 100 Mbps	Use category 5 only unshielded twisted pair
Wrap plug	Twisted-pair, part number 00G2380

Viewing the LEDs

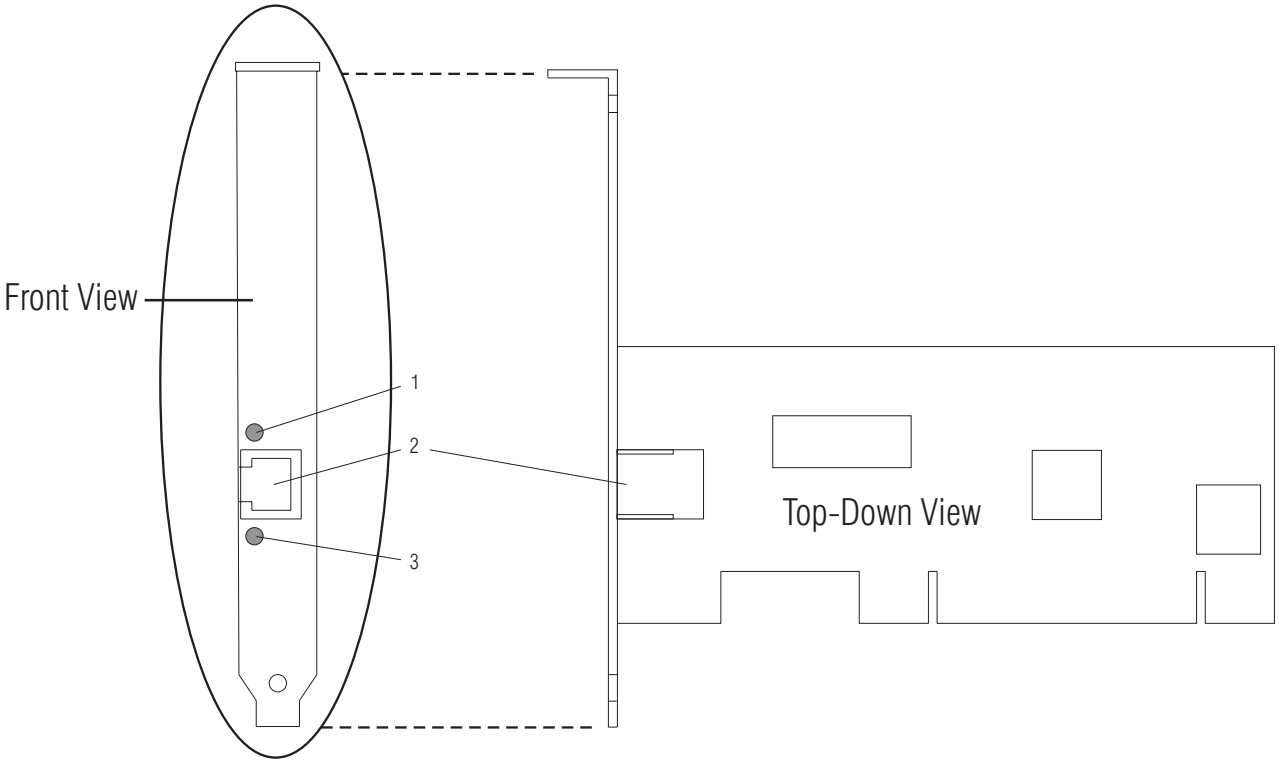
The adapter has two LEDs for each port to provide status on the adapter's operation. The LEDs are visible on the mounting bracket at each port's connector. They indicate the following conditions when lit:

- Green LED (1) - indicates 100 Mbps operation
- Yellow LED (2) - indicates transmit or receive activity



Type A-F, 10/100 Mbps Ethernet PCI Adapter II (FC 4962)

The 10/100 Mbps Ethernet PCI Adapter II is a 32-bit, 33 MHz high performance expansion adapter card for systems adhering to the Peripheral Component Interconnect (PCI) and IEEE 802.3 standards. The adapter connects the system to an Ethernet LAN at either 10 Mbps or 100 Mbps data rate.



1 ACT/LINK LED
2 RJ-45 connector
3 100 TX LED

10/100 Mbps Ethernet PCI Adapter II Specifications

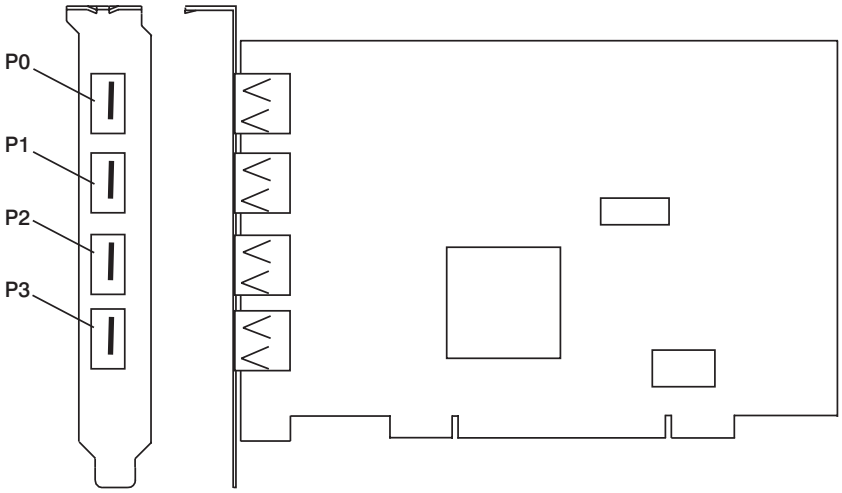
Item	Description
FRU number	09P5023
I/O bus architecture	PCI 2.2 compliant
Busmaster	Yes
Maximum number	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Connector	RJ-45
Wrap plug	RJ-45, part number 00G2380
Cables	Customer supplied. Use CAT-5 twisted pair bulk cables (TIA/EIA 568A is recommended). See “10/100 Ethernet PCI Adapter (FC 2968)” on page 299.

Type N-D, Keyboard/Mouse Attachment Card-PCI (FC 2737)

The Keyboard/Mouse Attachment Card-PCI is a 32-bit, 33 MHz high performance expansion adapter card for systems adhering to the Peripheral Component Interconnect (PCI) standards.

The Keyboard/Mouse Attachment Card-PCI provides the following features:

- 32-bit, 33MHz *PCI Local Bus Specification Revision 2.2*
- Single Slot, Half-Size PCI Card
- +5V or +3.3V Signaling
- FCC Class-A
- Four downstream USB Ports
- Full 12 MHz Bandwidth on each port
- Full Compliance with *Universal Serial Bus Specifications Revision 1.1*
- Compatible with *OpenHCI Open Host Controller Interface Specifications for USB Release 1.0a*
- Integrated Dual-Speed USB Transceivers
- Supports up to 127 Devices per Port
- Supports Peripheral Hot-swap and wake up



Keyboard/Mouse Attachment Card-PCI Specifications

Item	Description
FRU number	09P2470
I/O bus architecture	PCI 2.2 compliant
Busmaster	Yes
Maximum number	For system-specific adapter placement, see the *PCI Adapter Placement Reference Guide*, order number SA38-0538.
Connector	Standard USB Single Pin-Type Series ″A″ Receptacle
Wrap plug	None
Cables	None

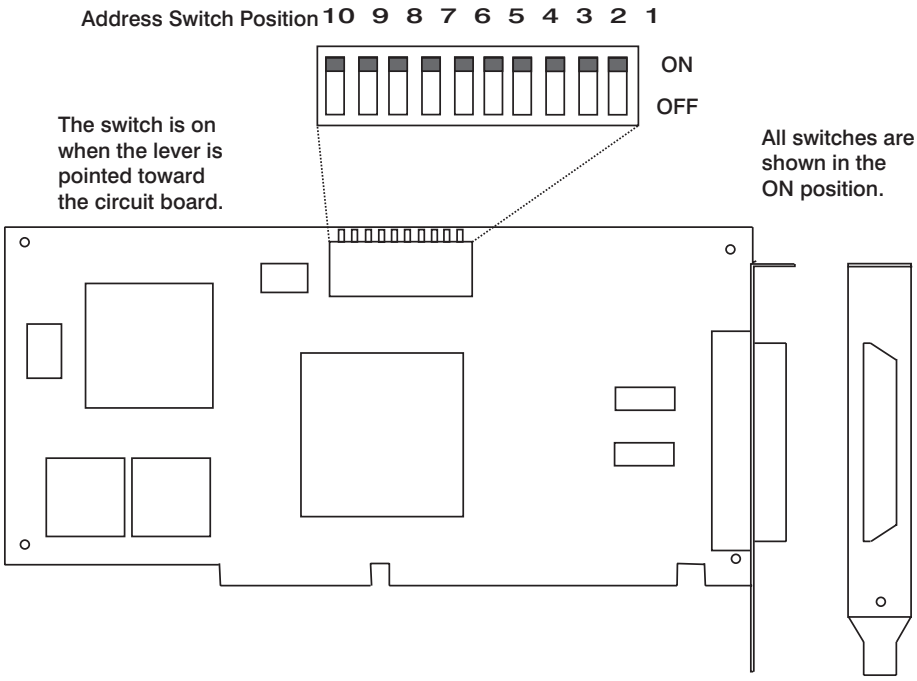
Type *, X.25 Interface Co-Processor ISA Adapter (FC 2961)

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

The X.25 Interface Co-Processor, with supporting software, enables the attachment of an ISA-bus-compatible (AT-bus) personal computer system to an X.25 packet-switched network so that the computer system can operate as a packet terminal.

The X.25 Interface Co-Processor adapter has its own microprocessor and memory, allowing it to perform communications functions.

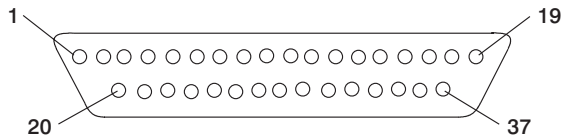
In the followng illustration, the X.25 Interface Co-Processor adapter's 10-pin option switch is shown with all of the switches set to the ON position.



X.25 Interface Co-Processor Adapter Specifications

Item	Description
FRU number	40H1937
I/O bus architecture	ISA
Busmaster	No
Maximum number	5
Connector	37-pin, D-shell
Wrap plugs	X.25 adapter wrap plug, part number 07F3132 X.21 cable wrap plug, part number 07F3153 V.24 cable wrap plug, part number 07F3163 V.35 cable wrap plug, part number 07F3173
Cables	X.21 3m cable, part number 07F3151 X.21 6m cable, part number 53F3926 V.24 3m cable, part number 07F3160 V.24 6m cable, part number 53F3927 V.35 3m cable, part number 07F3171 V.35 6m cable, part number 53F3928

X.25 Interface Co-Processor 37-Pin Connector



Position	Signal Name (Mnemonic)	Position	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)
16	Receive click (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]		

X.25 Interface Co-Processor Adapter's 10-pin Option Switch

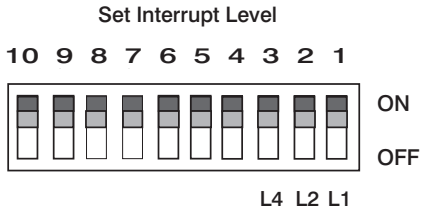
This section contains a description of setting the switches on the X.25 Interface Co-Processor.

Setting the Interrupt Level

Switch positions 1, 2, and 3 (L1, L2, and L4, as shown in the illustration) configure the X.25 adapter for any one of eight interrupt priority levels if the expansion slot that holds the adapter is a two-edge connector. If the expansion slot that holds the adapter is a one-edge connector, the valid interrupt levels are 3, 4, 7, and 2.

Note: For an explanation of edge connectors, see "Setting the Edge Connector (ED)" on page 189.

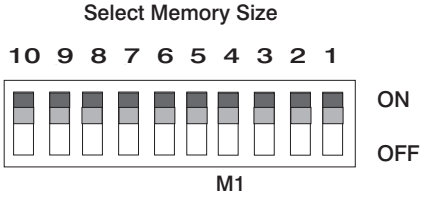
The *X.25 Interface ISA Co-Processor Adapter Installation Guide* has additional information that is useful when setting the interrupt level. It explains how to find out what interrupt levels are in use using the **lsresource** command.



Switch Settings			Interrupt Level
L4	L2	L1	
ON	ON	ON	3
ON	ON	OFF	4
ON	OFF	ON	7
ON	OFF	OFF	2 or 9
OFF	ON	ON	10
OFF	ON	OFF	11
OFF	OFF	ON	12
OFF	OFF	OFF	15

Verifying the Memory-Size-Switch Position

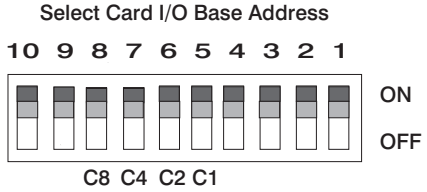
Switch position 4 is factory-set for the size of the RAM installed on the X.25 adapter. Verify that switch position 4 is ON to indicate that 512 K bytes of RAM are installed on the X.25 adapter (M1, as shown in the following illustration).



Switch Setting for the M1 Switch	Memory Size
ON	512 KB
OFF	Reserved

Setting the Card I/O Base Address

Set switch positions 5, 6, 7, and 8 (C1, C2, C4, and C8) as indicated in the following.

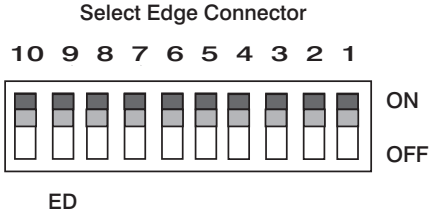


Switch Settings				Base Address (hex)	Physical Card Designation
C8	C4	C2	C1		
ON	ON	ON	ON	2A0	0
ON	ON	ON	OFF	6A0	1
ON	ON	OFF	ON	AA0	2
ON	ON	OFF	OFF	EA0	3
ON	OFF	ON	ON	12A0	4
ON	OFF	ON	OFF	16A0	5
ON	OFF	OFF	ON	1AA0	6
ON	OFF	OFF	OFF	1EA0	7
OFF	ON	ON	ON	22A0	8
OFF	ON	ON	OFF	26A0	9
OFF	ON	OFF	ON	2AA0	10
OFF	ON	OFF	OFF	2EA0	11
OFF	OFF	ON	ON	32A0	12
OFF	OFF	ON	OFF	36A0	13
OFF	OFF	OFF	ON	3AA0	14
OFF	OFF	OFF	OFF	3EA0	15

Setting the Edge Connector (ED)

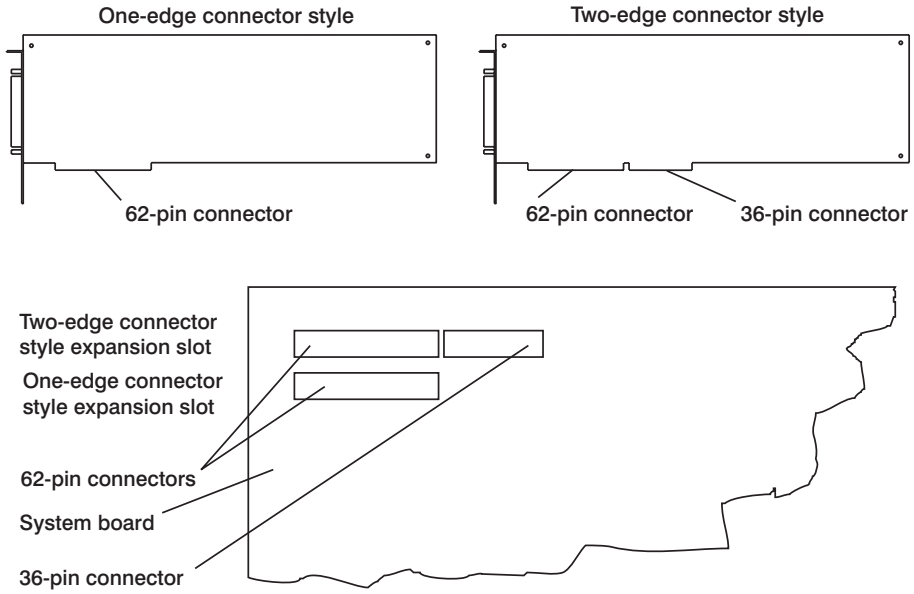
Switch position 9, the edge connector switch (ED, as shown in the following illustration), indicates whether a one-edge (62-pin) connector or a two-edge (62-pin and 36-pin) connector is in the expansion slot that holds your X.25 adapter.

Note: The edge connector switch is set to ON for use with your system.



Switch Setting for the ED Switch	Edge Connector
OFF	Co-Processor is in a one-edge connector expansion slot.

Switch Setting for the ED Switch	Edge Connector
ON	Co-Processor is in a two-edge connector expansion slot.

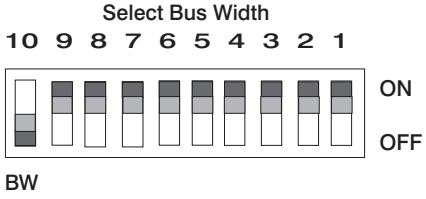


Setting the Bus Width (BW)

Switch position 10 (BW, as shown in the following illustration) sets the bus width. If the expansion slot that holds your X.25 adapter has one edge connector, (a 62-pin connector) set BW for an 8-bit bus width. If the expansion slot has two edge connectors, a 62-pin and a 36-pin connector, BW can be set for an 8-bit or 16-bit bus width, depending on the application.

Notes:

1. For an explanation of edge connectors, see “Setting the Edge Connector (ED)” on page 189.
2. The bus width switch is set to OFF (16-bit bus) for use with your system.

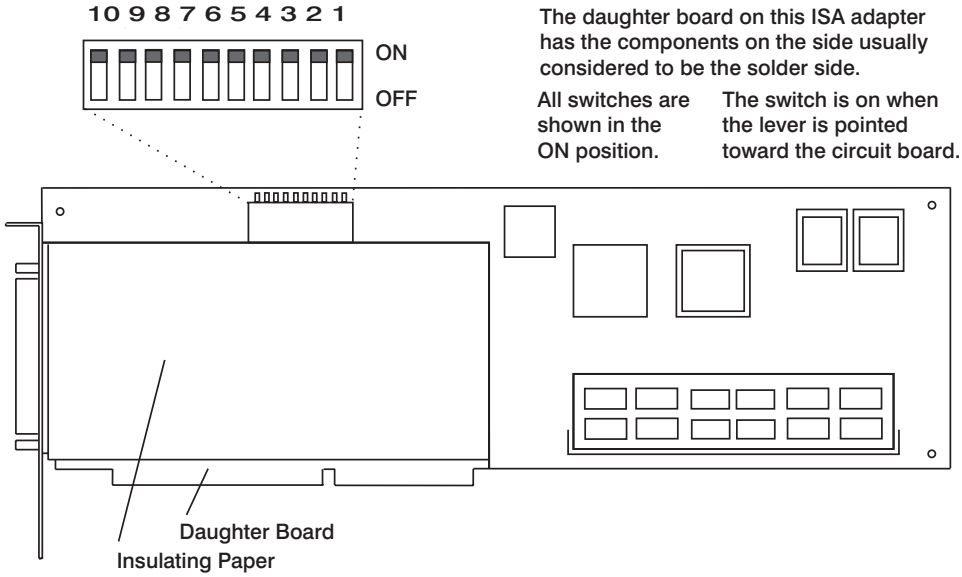


Switch Setting for the BW Switch	Bus Width Connector
ON	8-bit bus
OFF	16-bit bus

Type *, Co-Processor Multiport Adapter, Model 2 ISA (FC 2701)

Note: * = This adapter has no assigned adapter type.

The Co-Processor Multiport Adapter (is the same as the 4-Port Multi-Protocol Communications Controller) is a high-performance adapter designed to operate with any computer that supports the ISA bus interface.



Note: The 10-pin switch on this adapter is labeled ″Open″ and ″Closed″. This publication uses ″on″ and ″off″ to indicate the state of the switch.

Open and Closed are defined as follows:

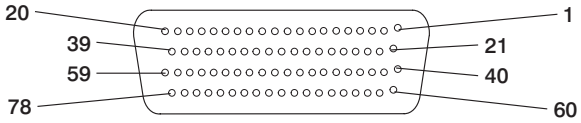
- Closed = on
- Open = off

Co-Processor Multiport Adapter Specifications

Item	Description
FRU number	Base, 0MB, 33F8967 Daughter (see note), 84F7540 1 MB SIMM, 53F2662
I/O bus architecture	ISA
Interrupt levels	3, 4, 7, 2 or 9, 10, 11, 12, 15
Maximum number	Up to four adapters in available ISA bus slots
Connector information	78-position, D-shell Connector
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	Interface/breakout box, part number 53F2622/40F9897 X.21, part number 71F0164 V.35, part number 71F0162 EIA-232D, part number 71F0165 EIA-422A, customer supplied

Note: To install the new daughter card, the customer or customer representative must replace the original bracket on the new daughter card with the ISA bracket from the daughter card that is being replaced.

Co-Processor Multiport Adapter Model 2, 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	

Mnemonic	Signal Name (Type of Interface)	Port 0	Port 1	Port 2	Port 3
-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)	-ReceiveClock (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			

Co-Processor Multiport Adapter's 10-Position Option Switch

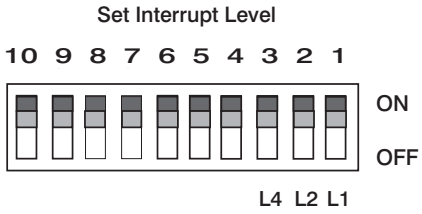
This section contains a description of setting the switches on the Co-Processor Multiport Adapter.

Setting the Interrupt Level

Switch positions 1, 2, and 3 (L1, L2, and L4, as shown in the illustration) configure the co-processor multiport adapter for any one of eight interrupt priority levels if the expansion slot that holds the adapter is a two-edge connector. If the expansion slot that holds the adapter is a one-edge connector, the valid interrupt levels are 3, 4, 7, and 2.

Note: For an explanation of edge connectors, see "Setting the Edge Connector (ED) Switch" on page 197.

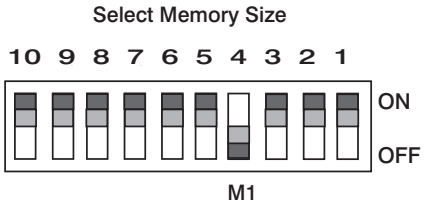
The *4-Port Multi-Protocol Communications Controller, ISA Installation Guide* has additional information that is useful when setting the interrupt level. The guide explains how to determine what interrupt levels are in use by using the **lsresource** command.



Switch Settings			Interrupt Level
L4	**L2**	**L1**	
ON	ON	ON	3
ON	ON	OFF	4
ON	OFF	ON	7
ON	OFF	OFF	2 or 9
OFF	ON	ON	10
OFF	ON	OFF	11
OFF	OFF	ON	12
OFF	OFF	OFF	15

Verifying the Memory-Size-Switch Position

Switch position 4 (M1, as shown in the following illustration) is factory set to indicate the size of the RAM installed on the Multiport adapter. Verify switch position 4 is OFF to indicate that 1M byte of RAM installed on the co-processor multiport adapter.



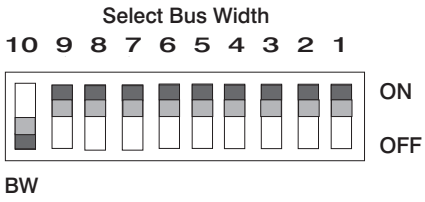
Switch Setting for the M1 Switch	Memory Size
ON	Reserved
OFF	1 Mbyte

Setting the Bus Width (BW) Switch

Switch position 10 (BW, as shown in the following illustration) sets the bus width. If the expansion slot that holds your multiport adapter model 2 has one edge connector, (a single 62-pin connector) set BW for an 8-bit bus width. See the following illustration. If the expansion slot has two edge connectors, (a 62-pin and a 36-pin connector) BW can be set for an 8-bit or 16-bit bus width, depending on the application.

Notes:

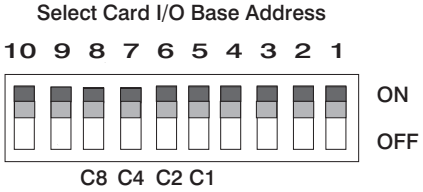
1. For an explanation of edge connectors, see “Setting the Edge Connector (ED) Switch” on page 197.
2. The bus width switch is set to OFF (16-bit bus) for use with your system.



Switch Settings for the BW Switch	Bus Width Connector
ON	8-bit bus
OFF	16-bit bus

Setting the Card I/O Base Address

Set switch positions 5, 6, 7, and 8 (C1, C2, C4, and C8) as indicated in the following.

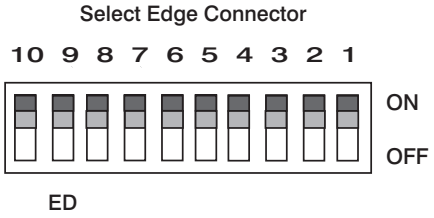


Switch Settings				Base Address (hex)	Physical Card Designation
C8	C4	C2	C1		
ON	ON	ON	ON	2A0	0
ON	ON	ON	OFF	6A0	1
ON	ON	OFF	ON	AA0	2
ON	ON	OFF	OFF	EA0	3
ON	OFF	ON	ON	12A0	4
ON	OFF	ON	OFF	16A0	5
ON	OFF	OFF	ON	1AA0	6
ON	OFF	OFF	OFF	1EA0	7
OFF	ON	ON	ON	22A0	8
OFF	ON	ON	OFF	26A0	9
OFF	ON	OFF	ON	2AA0	10
OFF	ON	OFF	OFF	2EA0	11
OFF	OFF	ON	ON	32A0	12
OFF	OFF	ON	OFF	36A0	13
OFF	OFF	OFF	ON	3AA0	14
OFF	OFF	OFF	OFF	3EA0	15

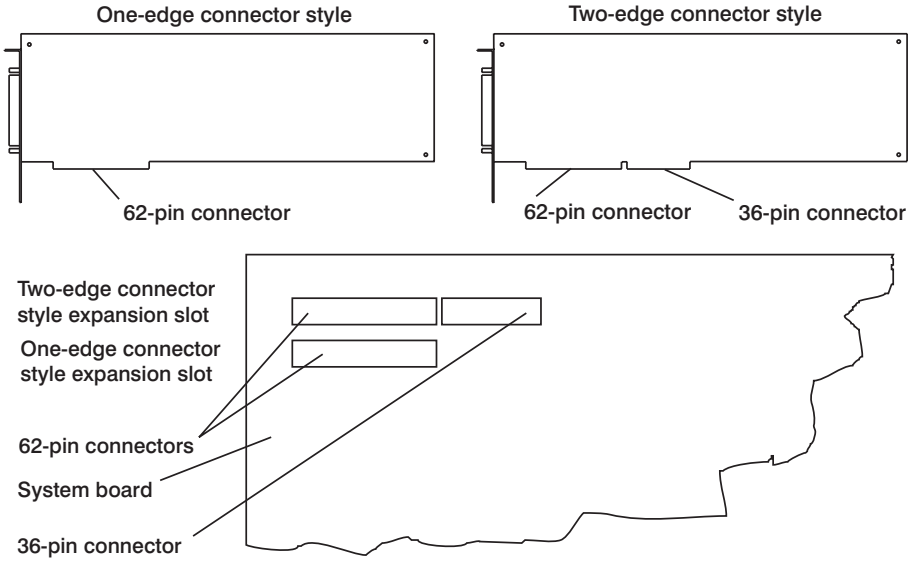
Setting the Edge Connector (ED) Switch

Switch position 9, the edge connector switch (ED, as shown in the following illustration), indicates whether a one-edge (62-pin) connector or a two-edge (62-pin and 36-pin) connector is in the expansion slot that holds your Multiport adapter Model 2.

Note: The edge connector switch must be set to ON for use with your system.



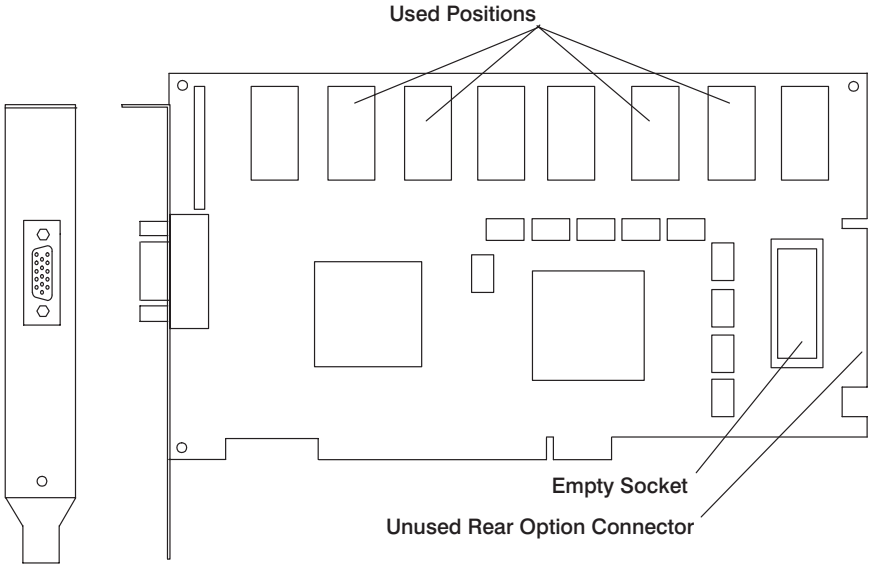
Switch Setting for the ED Switch	Edge Connector Type
OFF	Co-Processor is in a one-edge connector expansion slot.
ON	Co-Processor is in a two-edge connector expansion slot.



Type *, S15 PCI Graphics Adapter (FC 2657)

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

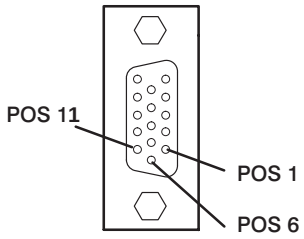
The S15 Graphics Adapter is a high-performance VRAM-based adapter. It is designed to operate with any computer that supports the Peripheral Component Interconnect (PCI) bus interface. It has an integrated video co-processor and graphical user interface (GUI) accelerator. It supports multisync monitors having at least 64 KHz horizontal scan capability.



S15 PCI Graphics Adapter Specifications

Item	Description
FRU number	11H6095
Interrupt levels	Int A
I/O bus architecture	PCI
Maximum number	Two adapters may be installed in available PCI bus slots. However, due to a limitation in the system boot firmware, only one adapter on the PCI bus will be initialized at power on.
Resolutions	640 x 480 x 8bpp 640 x 480 x 16bpp 640 x 480 x 24bpp 800 x 600 x 8bpp 800 x 600 x 16bpp 800 x 600 x 24bpp 1024 x 768 x 8bpp 1024 x 768 x 16bpp 1280 x 1024 x 8bpp 1600 x 1280 x 8bpp
Colors	Up to 16M
Connector information	External 15-pin D-shell connector Internal Card Edge Connector (Not Used)
Cables	11H4003, 7091-7S1 15-pin D-shell to 13W3 ID=1010 (not P series) 58F2901, 4217 15-pin D-shell to 5 BNC, POWERdisplay 17, 20 96G2156, 4238 DDC 15-pin D-shell to 13W3 with DDC, P70, P200 96G1712, 4237 15-pin D-shell to13W3 DDC/ID switch, P201 only 15-pin D-shell attached to display, P50

S15 Graphics Adapter 15-Pin D-Shell Connector

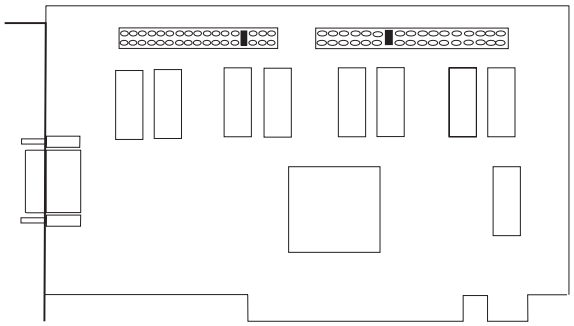


Pin	Signal Name
1	Red
2	Green
3	Blue
4	Monitor ID Bit 2
5	Test (ground)
6	Red Video Return
7	Green Video Return
8	Blue Video Return
9	No Connection
10	SYNC Return
11	Monitor ID Bit 0
12	Monitor ID Bit 1
13	HSYNC
14	VSYNC
15	Monitor ID Bit 3

Type *, POWER GXT110P Video Accelerator Adapter PCI (FC 2839)

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

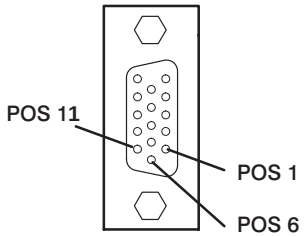
The POWER GXT110P Video Accelerator Adapter is a high-performance PCI graphics adapter. It is hardware-compatible to any computer supporting the Peripheral Component Interconnect (PCI) bus interface.



POWER GXT110P Video Accelerator Adapter Specifications

Item	Description
FRU number	93H7983
Bus architecture	PCI
Bus width	32-bit
Interrupt level	Int A
Maximum number	2
Number of colors supported	8-bit
Screen resolutions	640x480 at 60 - 85 Hz vertical refresh 800x600 at 56 - 85 Hz vertical refresh 1024x768 at 60 - 85 Hz vertical refresh 1280x1024 at 60 - 75 Hz vertical refresh
Display power management	Supports video electronics standards association (VESA) and display power management signalling (DPMS)
Connector	15 pin, D-shell connector

POWER GXT110P Video Accelerator Adapter 15-Pin D-Shell Connector



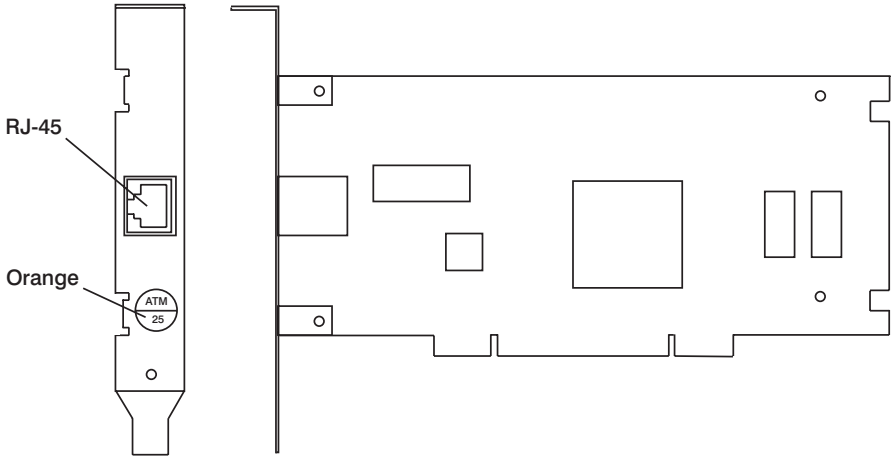
Pin	Signal Name
1	Red
2	Blue
3	Green
4	Reserved

Pin	Signal Name
5	DDC Return (ground)
6	Red Video Return
7	Green Video Return
8	Blue Video Return
9	+ 5V supply
10	SYNC Return
11	Reserved
12	Bidirectional Data
13	HSYNC
14	VSYNC
15	Data Clock

Type *, TURBOWAYS 25 ATM PCI Adapter (FC 2998)

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

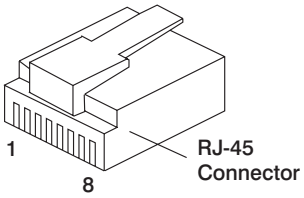
The TURBOWAYS 25 ATM PCI Adapter provides direct access to ATM networks. The TURBOWAYS 25 ATM PCI adapter provides dedicated 25 Mbit/second full duplex connection using PVCs or SVCs and enables TCP/IP to run over an ATM network. The adapter also supports communication with devices located on an ATM network or bridged to a Token Ring, Ethernet, or other LAN.



TURBOWAYS 25 ATM PCI Adapter Specifications

Item	Description
FRU number	93H5513
I/O bus architecture	PCI
Bit rate	25.6 Mbits per second
Busmaster	Yes
Wrap plug	Supplied with adapter
Connector information	RJ-45
Cables	The cable can be unshielded twisted pair (UTP) or shielded twisted pair (STP), up to 100 meters in length.

TURBOWAYS 25 ATM PCI Adapter Connector



Pin	Signal Name
1	Transmit A
2	Transmit B
3	No Connection
4	No Connection

Pin	Signal Name
5	No Connection
6	No Connection
7	Receive A
8	Receive B

Type *, SCSI-to-IDE Interface Bridge for Optical Devices (FC 4253)

This section describes the features of the Low Voltage Differential (LVD) SCSI-to-IDE interface bridge card and provides instructions for handling the interface bridge card.

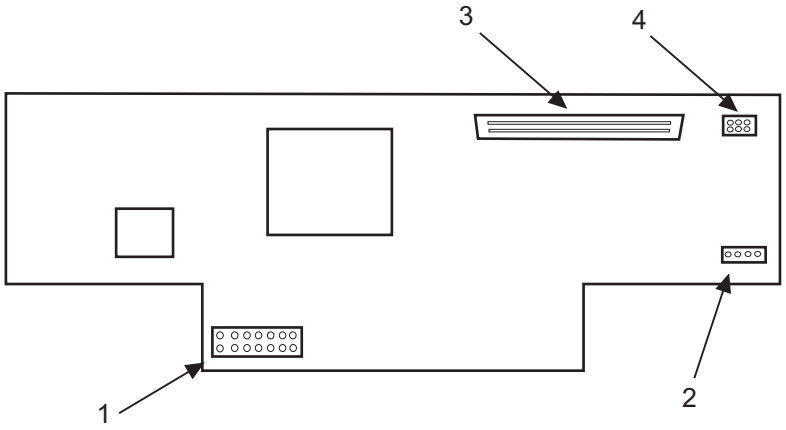
The LVD SCSI-to-IDE interface bridge card is a general-purpose bridge SCSI to IDE interface. It features an LVD SCSI interface for host linking and a Ultra Direct Memory Access (UDMA) IDE interface for high-performance AT Attachment with Packet Interface (ATAPI) devices. The SCSI-to-IDE interface bridge card supports the 16X/48X IDE DVD-ROM Drive and can be attached to a SCSI bus. Distinctive features include the following:

- On-chip high-speed RISC microcontroller, SCSI controller, and IDE controller.
- SCSI host interface synchronous transfer rate up to 80 MB per second for LVD SCSI
- Programmable IDE access modes, including:
  - Programmed Input/Output (PIO) mode 0,1,2,3,4
  - Multiword Direct Memory Access (DMA) mode 0,1, 2
  - Ultra DMA mode 0,1,2,3,4 (with transfer rate up to 66 MB)
- Onboard flash ROM for firmware upgrading

For additional information about the 16X/48X IDE DVD-ROM Drive, see “16X/48X IDE DVD-ROM Drive” on page 217.

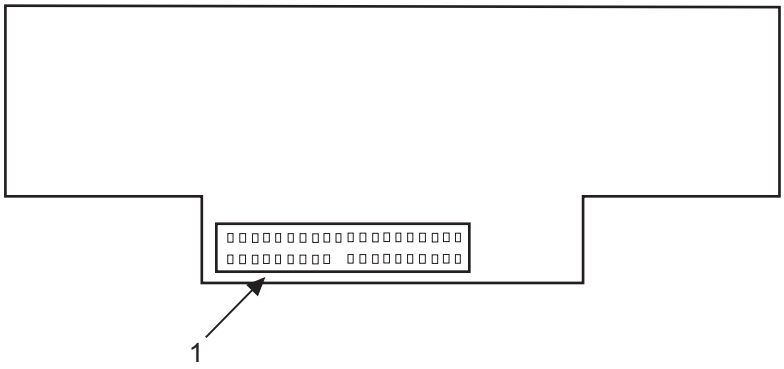
For additional information about the 16X/48X SCSI DVD-ROM Drive, see “16X/48X SCSI DVD-ROM Drive” on page 223.

Front View of the SCSI-to-IDE Interface Bridge for Optical Devices



1 SCSI ID Jumper block
2 Power connector
3 68-pin SCSI connector
4 Jumper block (Not Used)

Rear View of the SCSI-to-IDE Interface Bridge for Optical Devices

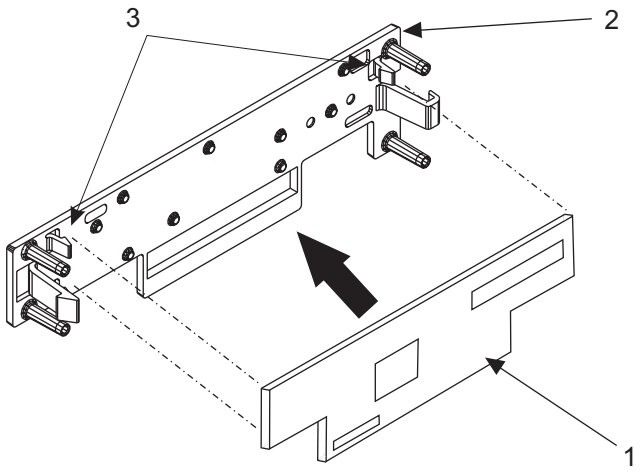


Note: Audio is not enabled on server systems.
1 40-pin IDE connector

Installing the SCSI-to-IDE Interface Bridge Card

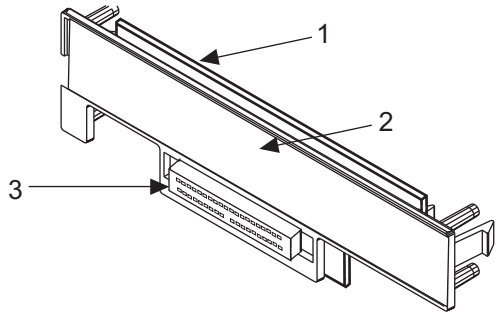
To install the adapter on to your 16X/48X IDE DVD-ROM Drive, do the following:

1. Place the SCSI-to-IDE interface bridge card into the bottom clip and press down on the side of the adapter until it snaps into the card retainers.



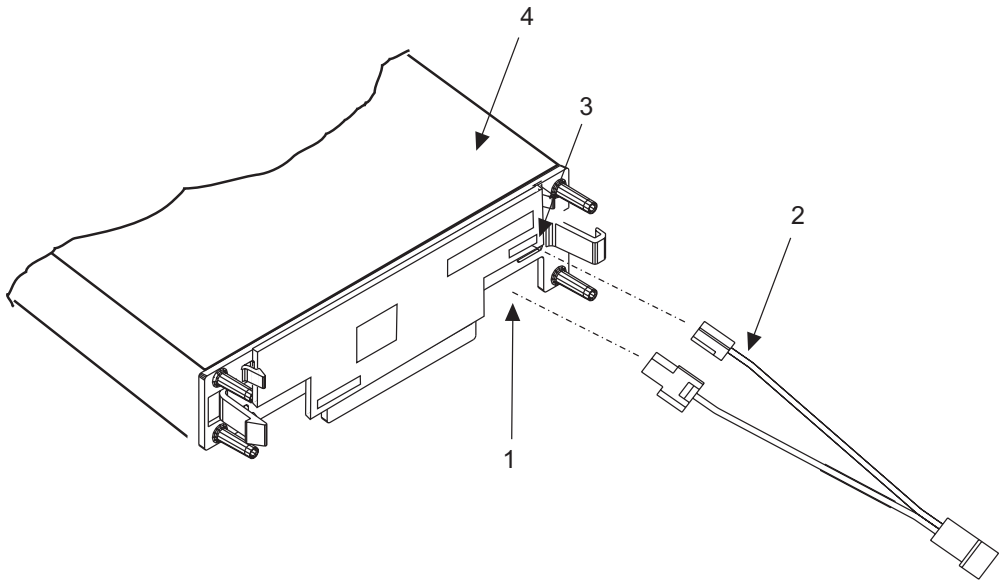
1 Adapter
2 Bottom clip
3 Card retainers

2. Remove the adhesive backing from the bottom clip.



1 Adapter
2 Adhesive backing
3 40-pin IDE connector

3. Align the IDE connector on the adapter with the IDE connector on the drive and install the adapter. Gently press the sides of the adapter to ensure that the adapter is securely attached to the back of the drive.
4. Attach the power cable to the drive and to the adapter card.



1 Drive power connector
2 Power cable
3 Adapter power connector
4 Drive

Save this book and store any extra parts in a safe place in case you change your configuration.

Chapter 2. Device Information

This chapter provides service information on setting Small Computer System Interface (SCSI) addresses and other service information for the devices.

CD-ROM Drives

The CD-ROM drive is a read-only device that reads compact optical discs. The compact disc (CD) is removable. There are four versions of CD-ROM drives: quad-speed, 8X speed, 12 to 20X speed, and 14 to 32X speed.

All four drives have tray-loading mechanisms that can operate horizontally or vertically.

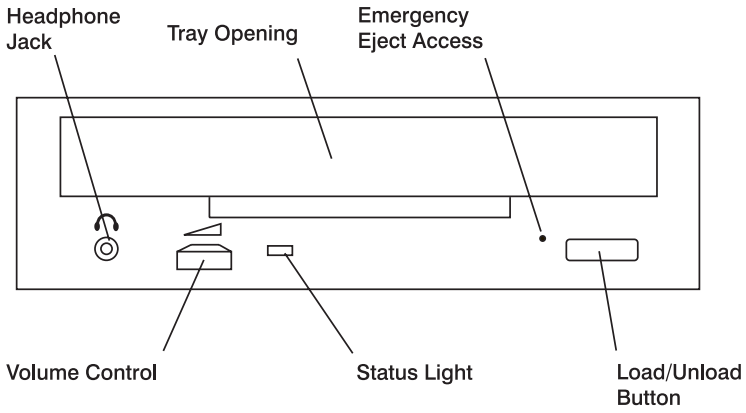
The quad speed and 8X speed drives look the same on the outside. However, the tray in the quad-speed CD-ROM is white, while the tray in the 8X speed CD-ROM is black. Their status light blinks amber, is located left of center on the bezel, and has a 50-pin SCSI connector.

The 12 to 20X speed drives and the 14 to 32X speed drives look similar to the other drives on the outside. The main differences from other drives are as follows:

- Their status light blinks green.
- Their status light is horizontally centered on the bezel.
- Their 68-pin SCSI connector plugs directly onto the SCSI bus cable.

The CD-ROM drive connects to the internal SCSI bus cable coming from the standard SCSI input/output (I/O) controller.

Quad Speed and 8X Speed Drives



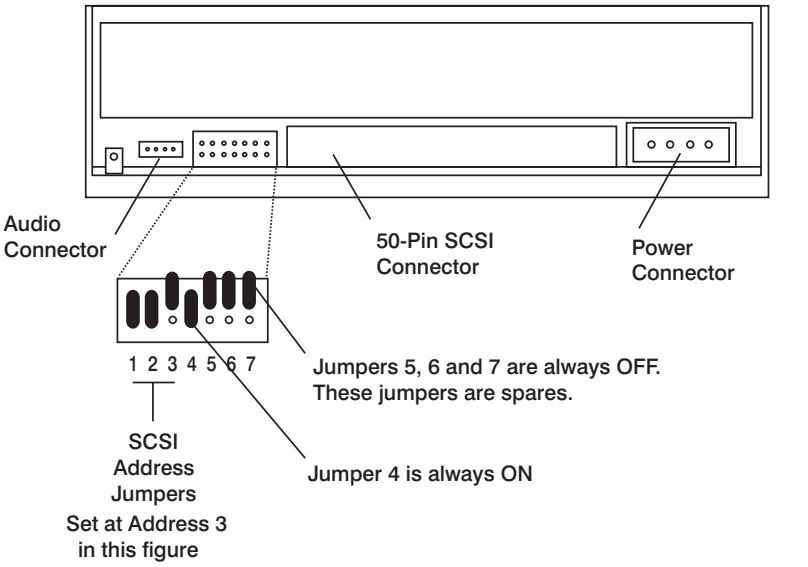
Setting SCSI Addresses

The steps for setting the SCSI address on all four CD-ROM drives are identical.

The SCSI address is set with jumpers located on the rear of the drive.

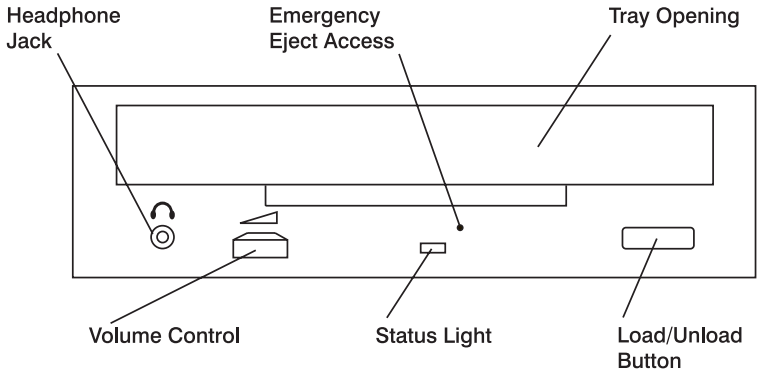
Jumper Settings on Quad and 8X Speed Drives

Use the following table and diagram to locate and set the SCSI address jumpers.



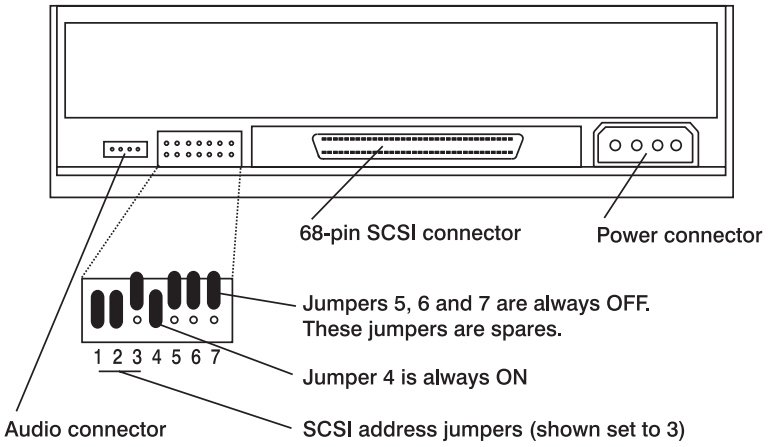
Address	Jumper 1	Jumper 2	Jumper 3
0	Off	Off	Off
1	On	Off	Off
2	Off	On	Off
3	On	On	Off
4	Off	Off	On
5	On	Off	On
6	Off	On	On

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



Jumper Settings on 12 to 20X, and 14 to 32X Speed Drives

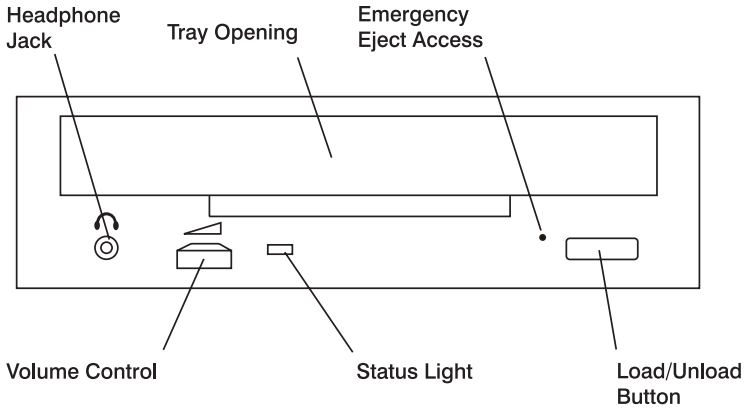
Use the following table and diagram to locate and set the SCSI address jumpers.



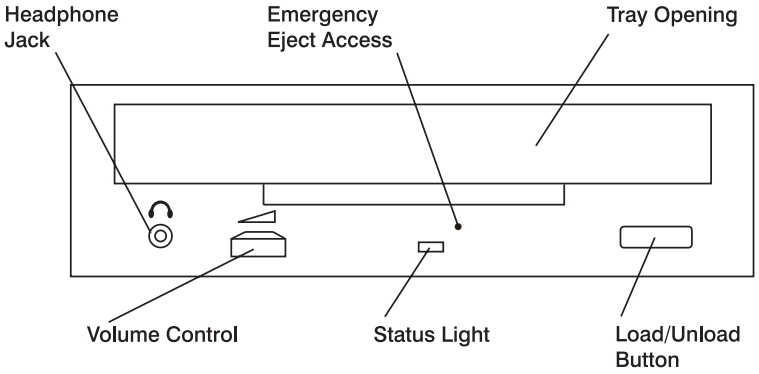
Address	Jumper 1	Jumper 2	Jumper 3
0	Off	Off	Off
1	On	Off	Off
2	Off	On	Off
3	On	On	Off
4	Off	Off	On
5	On	Off	On
6	Off	On	On

Manually Removing the Disc

Quad Speed and 8X Speed Drives



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



Note: Use the following procedure only if other methods have not worked successfully.

The steps for manually removing a CD from all four CD-ROM drives are identical.

To remove a disc, press and hold the load/unload button for about 2 seconds.

When a power failure or a drive failure prevents the disc from unloading normally, use the following procedure to remove the CD.

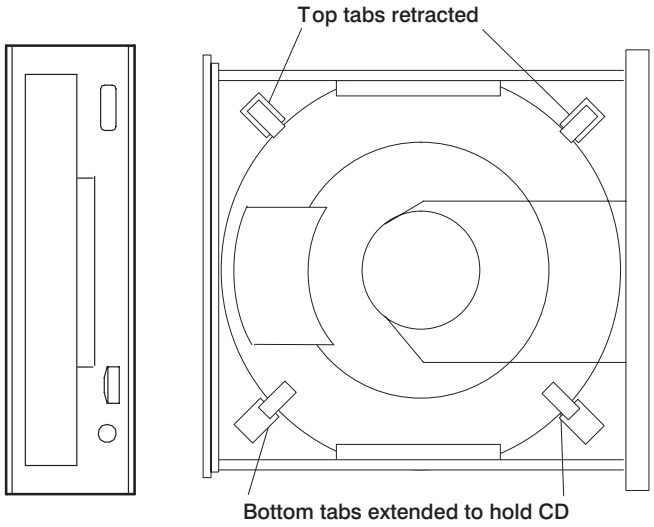
Note: Execute the following procedure only in an emergency (such as the tray does not eject after pressing the load/unload button).

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 preceding illustrations for the location of the emergency eject hole.)
3. Push in on the tool until you feel some resistance.
4. Maintain a small amount of pressure on the rod while pulling on the tray with your fingernail.
5. Pull the tray open and lift out the disc.

   Note: A ratcheting sound accompanies the action of pulling the tray. This is normal and does not damage the drive.

Vertical Orientation

All four drives use a tray, which has tabs on both sides of it. The drives can be oriented either way vertically. The two tabs at the bottom of the tray must be extended to hold the disc in place when operating vertically.



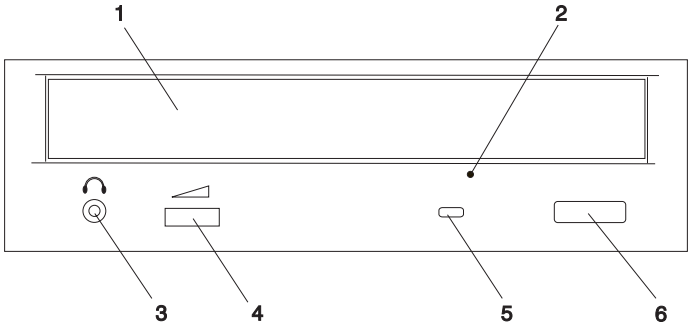
Note: All four tabs must be retracted when the drive is used horizontally.

48X EIDE CD-ROM Drive

This section describes the features of the 48X EIDE CD-ROM Drive and provides instructions for handling the drive and CD-ROM discs. The CD-ROM drive is a half-high, 5.25″, single-ended, tray-loading drive. Its distinctive features include the following:

- High-speed data transfer rate of 3300 KB per second (22X) at inner diameter and 7200 KB per second (48X) at outer diameter
- 7200 KB per second (48X) at outer diameter
- High-speed burst rate of 16.67 MB per second in PIO mode 4 and 33.3 MB per second in DMA mode 2
- Average random access time of 75 ms
- Can be installed in either a vertical or horizontal orientation
- Loading tray accommodates both 8cm discs (in the horizontal orientation only) and 12cm discs
- Reads multi-session discs
- Reads CD-recordable discs
- Reads CD-RW discs
- Supports all major CD-ROM formats: Mode 1, Mode 2, XA, CDDA, and audio

Front View of the 48X EIDE CD-ROM Drive



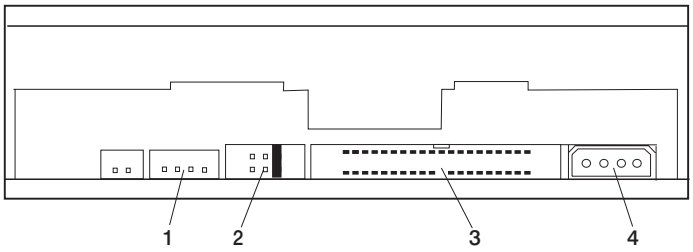
1 Compact Disc Tray
2 Emergency Eject Hole
3 Headphone Jack
4 Volume Control
5 Status Light
6 Load/Unload Button

Opening the Tray Manually

The tray automatically opens when you press the Load/Unload button. If it does not automatically open, follow these steps to force it open manually:

1. Shut down and turn off the power to your system unit.
2. Insert the straightened end of a paper clip into the emergency eject hole until you feel some resistance. See “Front View of the 48X EIDE CD-ROM Drive” on page 212 if you are not sure where the emergency eject hole is located.
3. Continue to push in the paper clip while you pull out the tray with your fingernail.
4. Pull the tray completely open and remove the disc. It is normal for the tray to make a clicking sound while you are pulling it open.

Rear View of the 48X EIDE CD-ROM Drive



Note: Sound is currently not used on server systems.
1 Audio Line Out Connector
2 Jumper Block and Pins
3 40-pin E-IDE Interface Connector
4 Power Connector

Jumper Settings

The mode select jumpers are three pin pairs located at the rear of the CD-ROM drive. By placing a jumper on the appropriate pin set, you can select (from left to right): CS (configures drive to use host interface CSEL signal), SL (configures drive as Slave), and MA (configures drive as Master (default mode)).

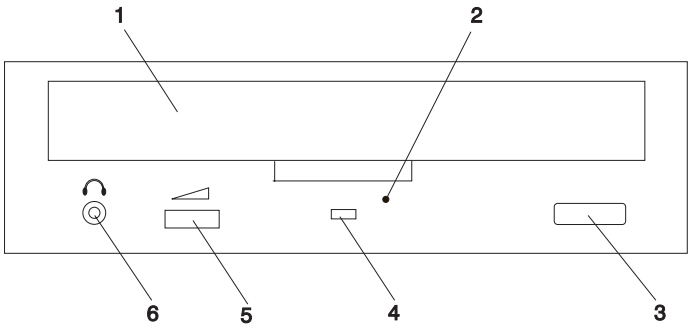
For most installations, the jumper should remain in the MA position (default as illustrated above). It is recommended that the CD-ROM be installed on the secondary IDE bus as Master. If the CD-ROM drive must be installed on the primary IDE bus, ensure that the existing hard drive is configured as the Master, and configure the CD-ROM drive as the Slave (SL). If the first two options are not available, ensure that the first drive on the secondary IDE bus is configured as Master, and set the CD-ROM drive as that bus's Slave.

4.7 GB SCSI-2 DVD-RAM Drive

The 4.7 GB SCSI-2 DVD-RAM drive is a half-height, 5.25", 8-bit, single-ended, tray-loading drive. It reads and writes 2.6 GB, 4.7 GB, and 9.4 GB (double-sided) DVD media and reads all major CD-ROM formats. The loading tray accommodates both 8 cm discs, 12 cm discs (CD-ROM), and 4.7 GB DVD cartridges. Its SCSI-2 interface supports both synchronous and asynchronous data transfer. The drive is configurable for vertical or horizontal orientation, with the exception of 8cm discs (horizontal only).

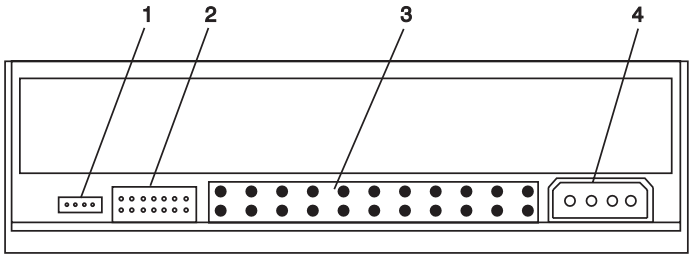
Front View of 4.7 GB SCSI-2 DVD-RAM Drive

There are two 4.7 GB SCSI-2 DVD-RAM drives available. FRU 04N5967 has a black bezel; FRU 04N5968 has a white bezel. Otherwise, the drives are identical.



1 CD/DVD Tray
2 Emergency Eject Hole
3 Headphone Jack
4 Volume Control
5 Status Light
6 Load/Unload Button

Rear View of 4.7 GB SCSI-2 DVD-RAM Drive



1 Audio Line Out Connector
2 Jumper Block and Pins
3 50-pin SCSI Interface Connector
4 Power Connector

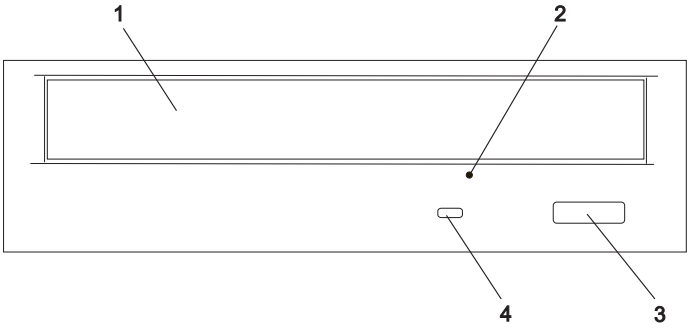
16X/48X IDE DVD-ROM Drive

This section describes the features of the 16X/48X IDE DVD-ROM Drive. The 16X/48X IDE DVD-ROM Drive is a half-high, 5.25-inch, single-ended, tray-loading drive. Its features include the following:

- CD media high-speed data transfer rate of 3300 KB per second (22X) at the inner diameter, and 7200 KB per second (48X) at the outer diameter.
- DVD media high-speed transfer rate is 8.91 MB per second (6.6x) at the inner diameter and 21.6 MB (16X) at the outer diameter.
- High-speed burst rate of 16.6 MB per second in PIO mode 4 and 33.3 MB per second in UDMA mode 2.
- Average random access time of 90 ms for CD media and 105 ms for DVD media.
- Can be installed in either a vertical or horizontal orientation.
- Loading tray accommodates both 8 cm discs (in the horizontal orientation only) and 12 cm discs.
- Reads multisession discs.
- Reads CD-recordable discs.
- Reads CD-RW discs.
- Supports all major CD-ROM formats: Mode 1, Mode 2, XA, CDDA, and audio.
- Reads DVD-RAM discs as defined by the *DVD Specification for Rewritable Discs, Version 2.1*.

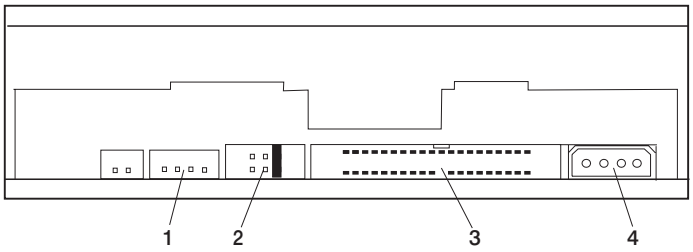
For information about the SCSI-to-IDE Interface Bridge for Optical Devices, see “Type *, SCSI-to-IDE Interface Bridge for Optical Devices (FC 4253)” on page 204.

Front View of the 16X/48X IDE DVD-ROM Drive



1 Compact Disc Tray
2 Emergency Eject Hole
3 Load/Unload Button
4 Status Light

Rear View of the 16X/48X IDE DVD-ROM Drive



Note: Audio is currently not enabled on server systems.

1 Audio Line-Out Connector
2 Jumper Block and Pins
3 40-pin IDE Interface Connector
4 Power Connector

Opening the Tray Manually

The tray should automatically open when you press the Load/Unload button. If it does not automatically open, follow these steps to manually open the tray:

1. Follow your operating system instructions for shutting down your system, then turn off the power to your system unit. Unplug the power cord from the wall outlet.
2. Insert the straightened end of a paper clip into the emergency eject hole until you feel some resistance.
3. Continue to push in the paper clip while you pull out the tray with your fingernail.
4. Pull the tray completely open and remove the disc. It is normal for the tray to make a clicking sound while you are pulling it open.

DVD-RAM Type II Disc

The DVD-RAM Type II disc can be removed from its cartridge and played in a DVD-ROM drive that is compatible with DVD-RAM.

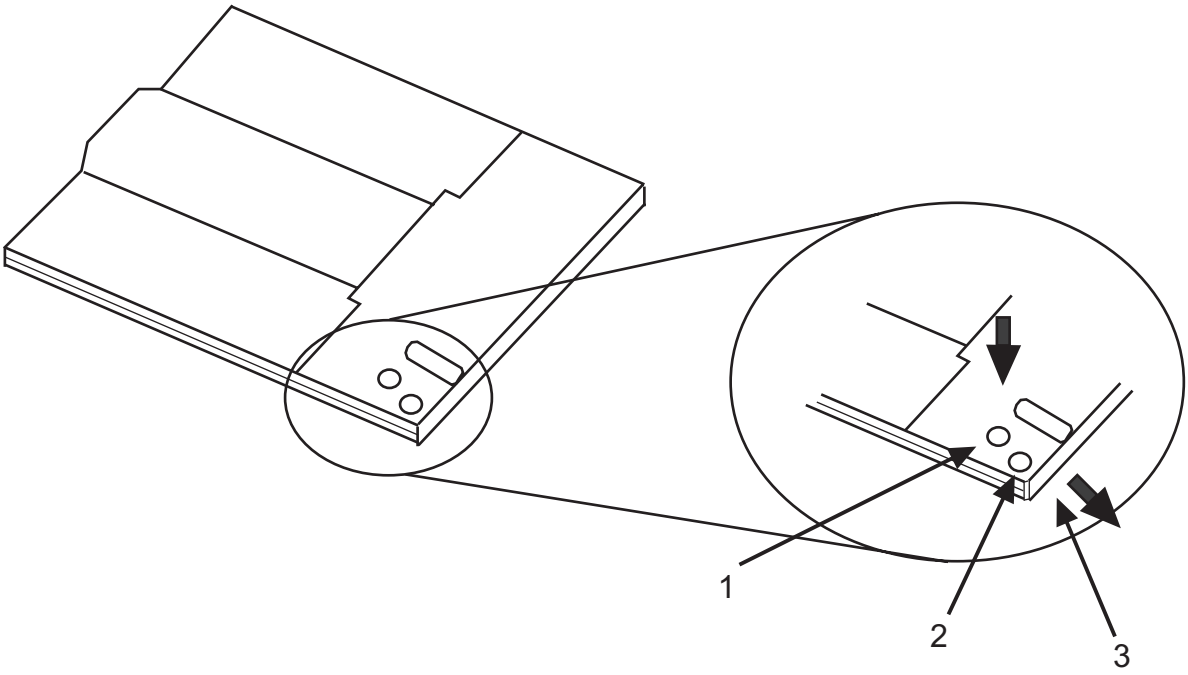
Note: Be careful when handling removed discs. Debris, dust particles, fingerprints, smears, or scratches can affect recording and playback of discs. To clean dust or other debris, use the IBM DVD-RAM/CD-ROM Cleaning Kit. Do not use solvents to clean disc surfaces. When labeling a disc, write only on the printed label side, using a soft felt-tip marker. Do not use a hard-tip pen to write on disc surface. Keep out of direct sunlight, high temperatures, and humidity. Do not attach labels to either side of the disc.

Removing a Disc from the Cartridge

To remove a disc from the cartridge, do the following:

1. Use the tip of a ballpoint pen to push the locking pin up and out of the disc cartridge.
2. Use the tip of a ballpoint pen to push down on the lock button while pulling the cartridge lid open.
3. With the cartridge lid open, slide the disc out of the cartridge.

   Note: Handle the disc only by its edges.



1 Locking Pin
2 Lock Button
3 Cartridge Lid

Returning a Disc to the Cartridge

To return a disc to the cartridge, do the following:

Note: Both the disc label and the cartridge label should be facing up.

1. Slide the disc into the cartridge.
2. Close the cartridge lid. Make sure the lock button snaps into position.
3. Install the locking pin.

   Note: Handle the disc only by its edges.

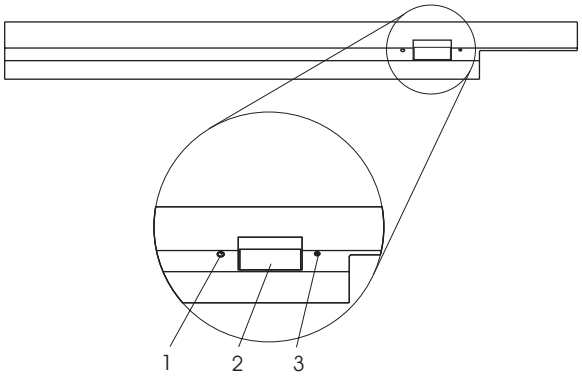
8X/24X Slimline IDE DVD-ROM Drive

The 8X/24X Slimline IDE DVD-ROM Drive is a tray-loading drive. Its features include the following:

- CD media high-speed data transfer rate of 1545 KB per second (10.3X) at inner diameter, and 3600 KB per second (24X) at outer diameter.
- DVD media high-speed transfer rate is 4.59 MB per second (3.4X) at the inner diameter and 11.07 MB (8.2X) at the outer diameter.
- High-speed burst rate of 16.6 MB per second in PIO mode 4 and 33.3 MB per second in UDMA mode 2.
- Average random access time of 95 ms for CD media and 150 ms for DVD media.
- Can be installed in either a vertical or horizontal orientation.
- Loading tray accommodates both 8-cm discs and 12-cm discs.
- Reads multi-session discs.
- Reads CD-recordable discs.
- Reads CD-RW discs.
- Supports all major CD-ROM formats: Mode 1, Mode 2, XA, CDDA, and audio.
- Reads DVD-RAM discs as defined by the *DVD Specification for Rewritable Discs, Version 2.1*.

Note: The firmware for the 8X/24X Slimline IDE DVD-ROM Drive is set to Cable Select at the factory. This setting configures the drive as master (if it is the first drive installed) or slave (if it is the second drive installed). Jumpers are not needed to change the configuration.

Front View of the 8X/24X Slimline IDE DVD-ROM Drive



1 Power light
2 Eject button
3 Manual eject hole

DVD-RAM Type II Disc

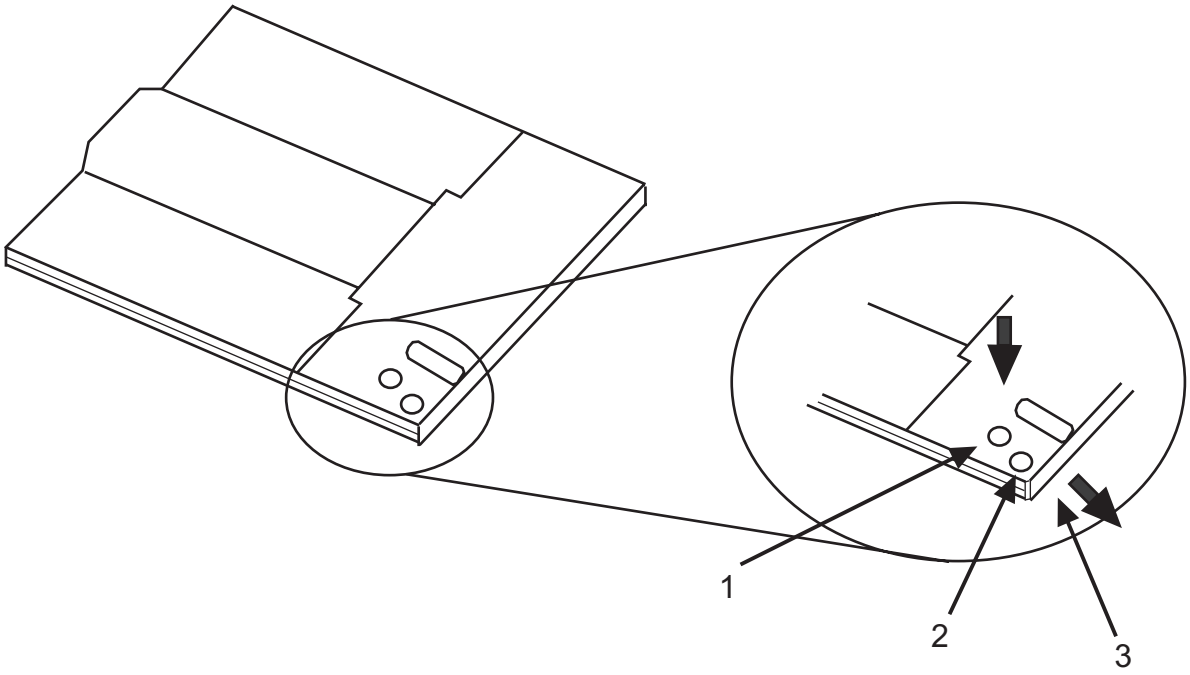
The DVD-RAM Type II disc can be removed from its cartridge and played in a DVD-ROM drive that is compatible with DVD-RAM.

Note: Be careful when handling removed discs. Debris, dust particles, fingerprints, smears, or scratches can effect recording and playback of discs. To clean dust or other debris, use the IBM DVD-RAM/CD-ROM Cleaning Kit. Do not use solvents to clean disc surfaces. When labeling a disc, write only on the printed label side by using a soft felt-tip marker. Do not use a hard-tip pen to write on the disc surface. Keep out of direct sunlight, high temperatures, and humidity. Do not attach labels to either side of the disc.

Removing a Disc from the Cartridge

1. Use the tip of a ballpoint pen to push the locking pin up and out of the disc cartridge.
2. Use the tip of a ballpoint pen to push down on the lock button while pulling the cartridge lid open.
3. With the cartridge lid open, slide the disc out of the cartridge.

   Note: Handle the disc only by its edges.



1 Locking Pin
2 Lock Button
3 Cartridge Lid

Returning a Disc to the Cartridge

Note: Both the disc label and the cartridge label should be facing upward.

1. Slide the disc into the cartridge.
2. Close the cartridge lid. Make sure the lock button snaps into position.
3. Install the locking pin.

   Note: Handle the disc only by its edges.

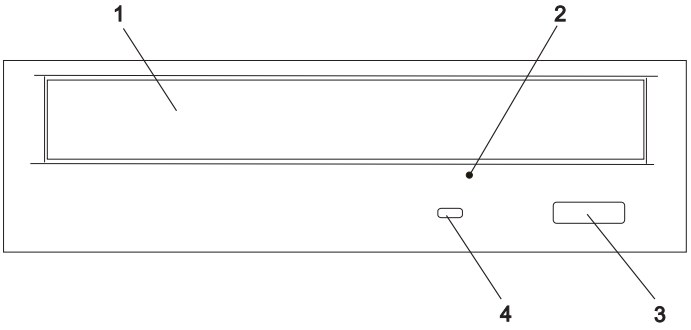
16X/48X SCSI DVD-ROM Drive

This section describes the features of the 16X/48X SCSI DVD-ROM Drive. The 16X/48X IDE DVD-ROM Drive is a half-high, 5.25-inch, tray-loading drive with a Low-Voltage-Differential (LVD) SCSI interface. Its features include the following:

- CD media high-speed data transfer rate of 3300 KB per second (22X) at the inner diameter, and 7200 KB per second (48X) at the outer diameter.
- DVD media high-speed transfer rate is 8.91 MB per second (6.6x) at the inner diameter and 21.6 MB (16X) at the outer diameter.
- Average random access time of 90 ms for CD media and 105 ms for DVD media.
- Can be installed in either a vertical or horizontal orientation.
- Loading tray accommodates both 8 cm discs (in the horizontal orientation only) and 12 cm discs.
- Reads multisession discs.
- Reads CD-recordable discs.
- Reads CD-RW discs.
- Supports all major CD-ROM formats: Mode 1, Mode 2, XA, CDDA, and audio.
- Reads DVD-RAM discs as defined by the *DVD Specification for Rewritable Discs, Version 2.1*.

For information about the SCSI-to-IDE Interface Bridge for Optical Devices, see “Type *, SCSI-to-IDE Interface Bridge for Optical Devices (FC 4253)” on page 204.

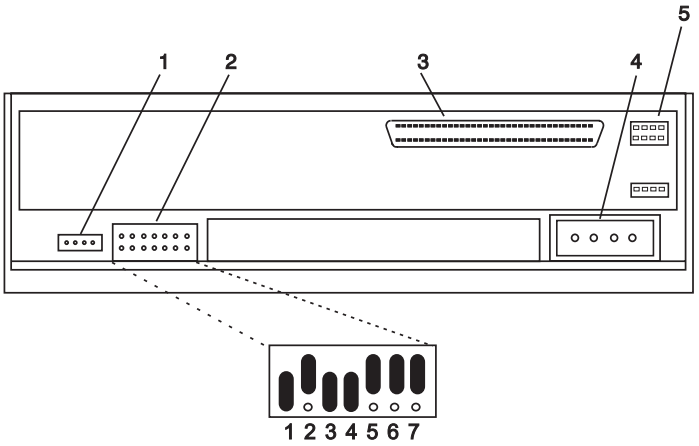
Front View of the 16X/48X SCSI DVD-ROM Drive



1 Compact Disc Tray
2 Emergency Eject Hole
3 Load/Unload Button
4 Status Light

Rear View and Jumper Pin Positions on the 16X/48X SCSI DVD-ROM Drive

The following figure shows the jumper pins as they are set at the factory.



1 Audio line-out connector
2 Jumper block and jumper pins
3 68-pin SCSI interface connector
4 Power connector
5 SCSI mode/term power (Not Used)

SCSI ID	Jumper 1	Jumper 2	Jumper 3	Jumper 4
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1
9	1	0	0	1
10	0	1	0	1
11	1	1	0	1
12	0	0	1	1
13	1	0	1	1
14	0	1	1	1
15	1	1	1	1
Note: The 12.0 GB 4-mm tape drive is shipped with the three jumpers installed and set to address zero.				

DVD-RAM Type II Disc

The DVD-RAM Type II disc can be removed from its cartridge and played in a DVD-ROM drive that is compatible with DVD-RAM.

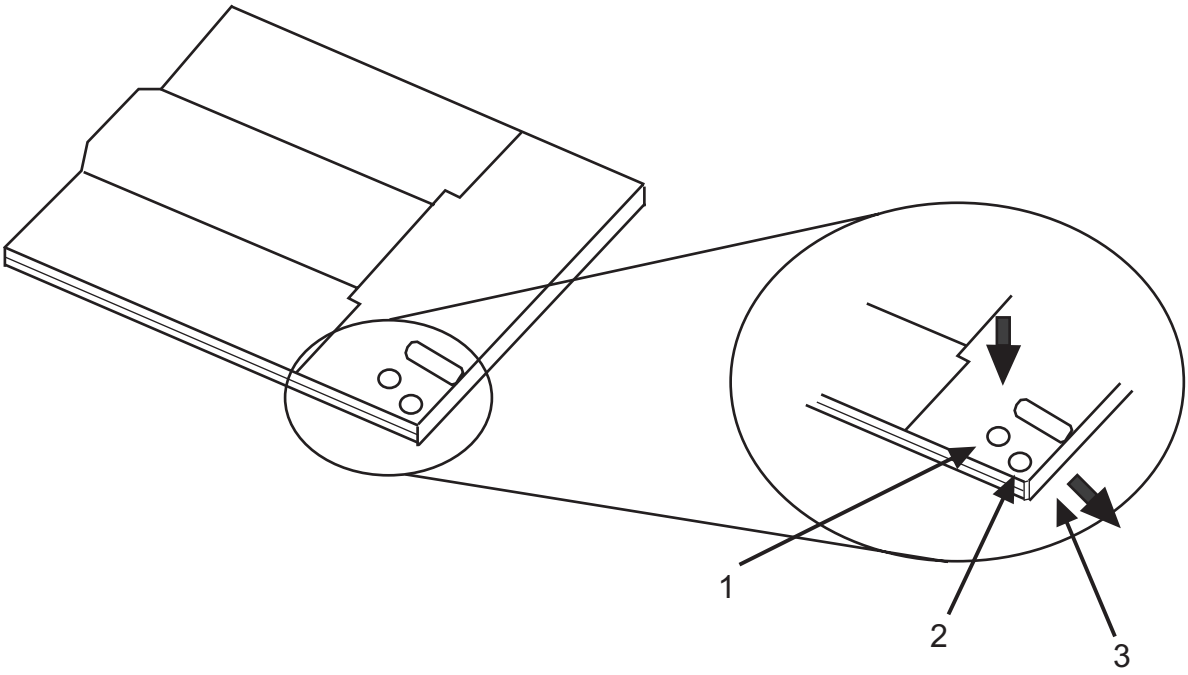
Note: Be careful when handling removed discs. Debris, dust particles, fingerprints, smears, or scratches can affect recording and playback of discs. To clean dust or other debris, use the IBM DVD-RAM/CD-ROM Cleaning Kit. Do not use solvents to clean disc surfaces. When labeling a disc, write only on the printed label side, using a soft felt-tip marker. Do not use a hard-tip pen to write on disc surface. Keep out of direct sunlight, high temperatures, and humidity. Do not attach labels to either side of the disc.

Removing a Disc from the Cartridge

To remove a disc from the cartridge, do the following:

1. Use the tip of a ballpoint pen to push the locking pin up and out of the disc cartridge.
2. Use the tip of a ballpoint pen to push down on the lock button while pulling the cartridge lid open.
3. With the cartridge lid open, slide the disc out of the cartridge.

   Note: Handle the disc only by its edges.



1 Locking Pin
2 Lock Button
3 Cartridge Lid

Returning a Disc to the Cartridge

To return a disc to the cartridge, do the following:

Note: Both the disc label and the cartridge label should be facing up.

1. Slide the disc into the cartridge.
2. Close the cartridge lid. Make sure the lock button snaps into position.
3. Install the locking pin.

   Note: Handle the disc only by its edges.

Opening the Tray Manually

The tray should automatically open when you press the Load/Unload button. If it does not automatically open, follow these steps to manually open the tray:

1. Follow your operating system instructions for shutting down your system, then turn off the power to your system unit. Unplug the power cord from the wall outlet.
2. Insert the straightened end of a paper clip into the emergency eject hole until you feel some resistance.
3. Continue to push in the paper clip while you pull out the tray with your fingernail.
4. Pull the tray completely open and remove the disc. It is normal for the tray to make a clicking sound while you are pulling it open.

4.0 GB 4-mm Tape Drives

Two types of 4.0 GB 4-mm tape drives are available, and they are designated as type A and B. Identify the drives 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

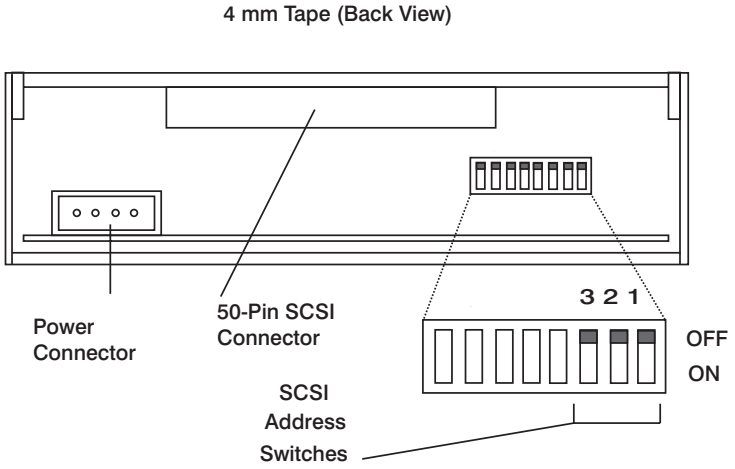
Attention: The SCSI address must be set while both the system unit and the tape drive are turned off. Attaching the tape drive to an active system unit may damage the drive or the system unit.

Note: Prior to installing the SCSI media device into the media bay, set the device's address for any available SCSI address.

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

Setting the SCSI Address for Type A Drives

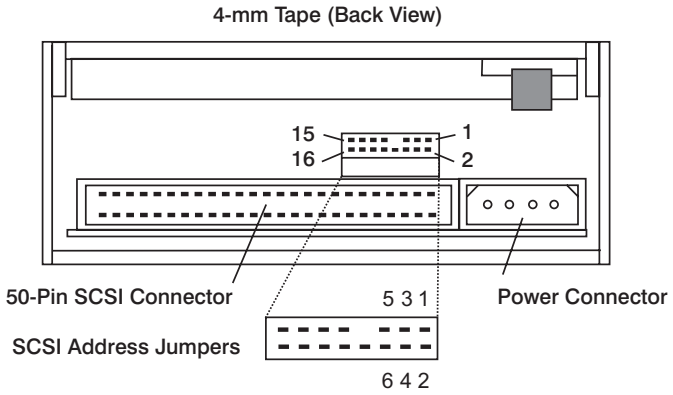
Set the SCSI address by using switches 1 through 3 as shown in the illustration. The switches are located of the rear panel or the drive.



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

Setting for the SCSI Address for Type B Drives

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



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 4.0 GB 4-mm Tape Drive.

Attention: This procedure is very delicate. Use care to avoid damaging the tape cartridge, the tape drive, or both. Use this procedure *only* when you have exhausted the other options for removing the tape cartridge. These options 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.

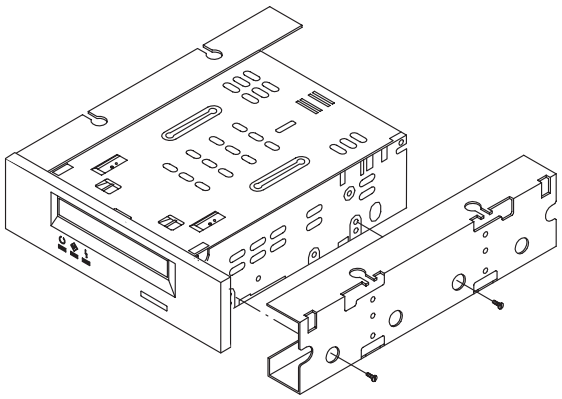
Removing a Loaded Tape Cartridge

Perform the following steps to remove the tape drive from the system unit:

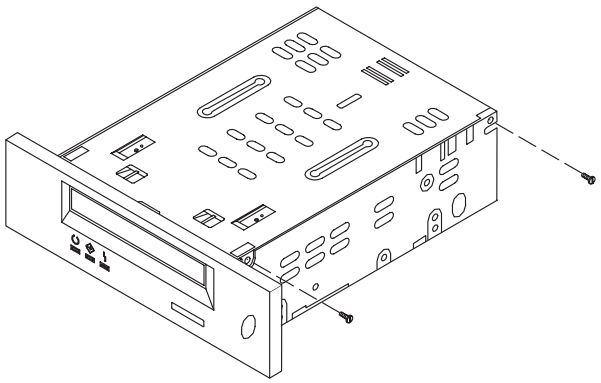
1. Disconnect the power to the system unit by doing the following:
2. Disconnect the tape drive from the system unit.
   - Disconnect the SCSI connections to the host system.
   - Disconnect the power connections to the tape drive.
3. Remove the tape drive and any attached mounting hardware from the system unit. Depending on which type of drive you have, use the procedure in “Removing Tape Cartridge from Type A Drives” or “Removing Tape Cartridge from Type B Drives” on page 231.

Removing Tape Cartridge from Type A Drives

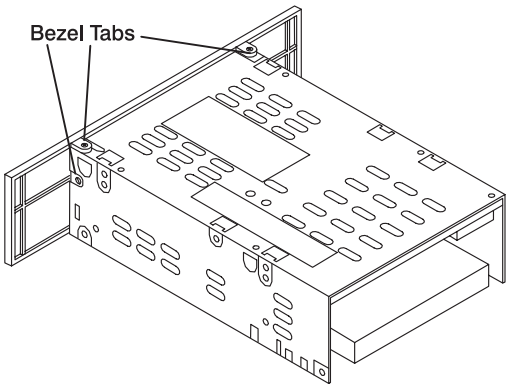
1. Remove the mounting brackets by removing the four screws near the lower edge of the tape drive assembly (two on each side) that are accessed through holes in the side of each bracket.



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

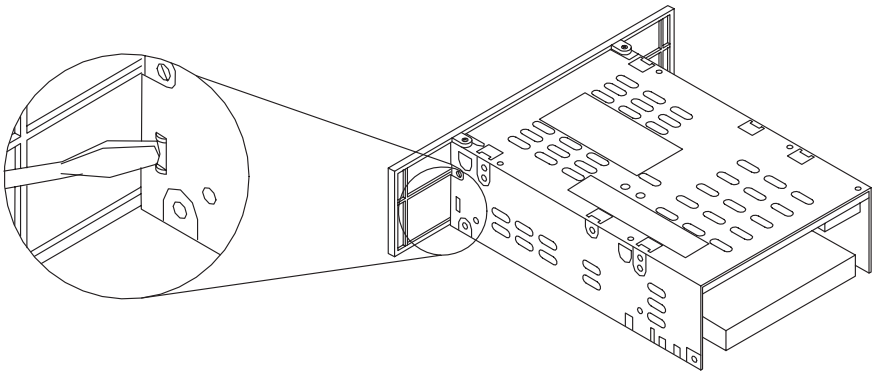


3. Remove the front bezel by doing the following:
   a. Turn the tape drive upside down, and remove the two screws that secure the front bezel on the bottom and one screw on the left side of the bezel.

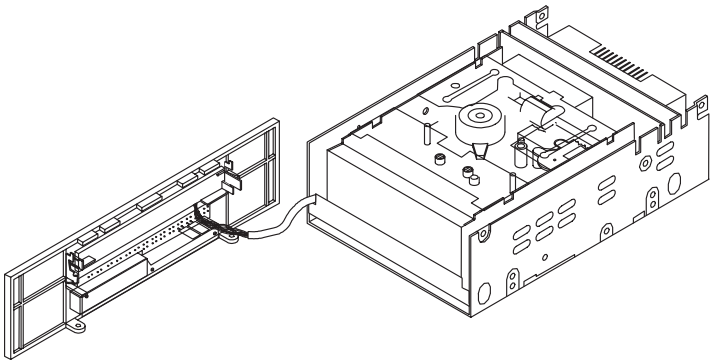


   b. Place the drive assembly on its right side. Facing the drive assembly, use a small screwdriver to gently press on the bezel tab (through the rectangular hole in the drive assembly). Continue to press on the bezel tab until the latch on the bezel tab clears the hole and the bezel can be pulled away from the drive assembly.

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

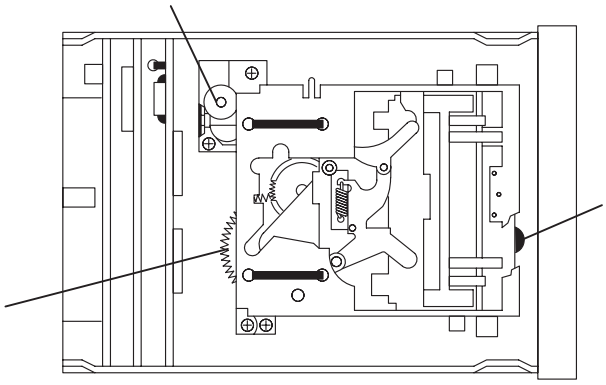


   c. Move the bezel aside to provide access to the front of the drive assembly.



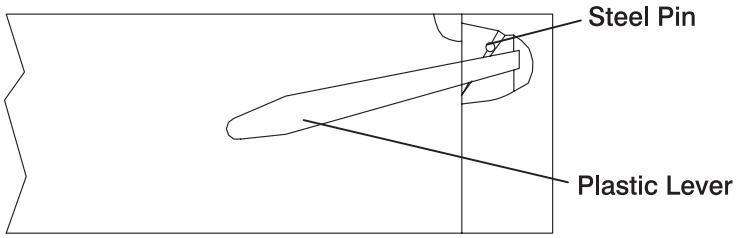
4. Turn the mode motor shaft counterclockwise until the mode motor stops.

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



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

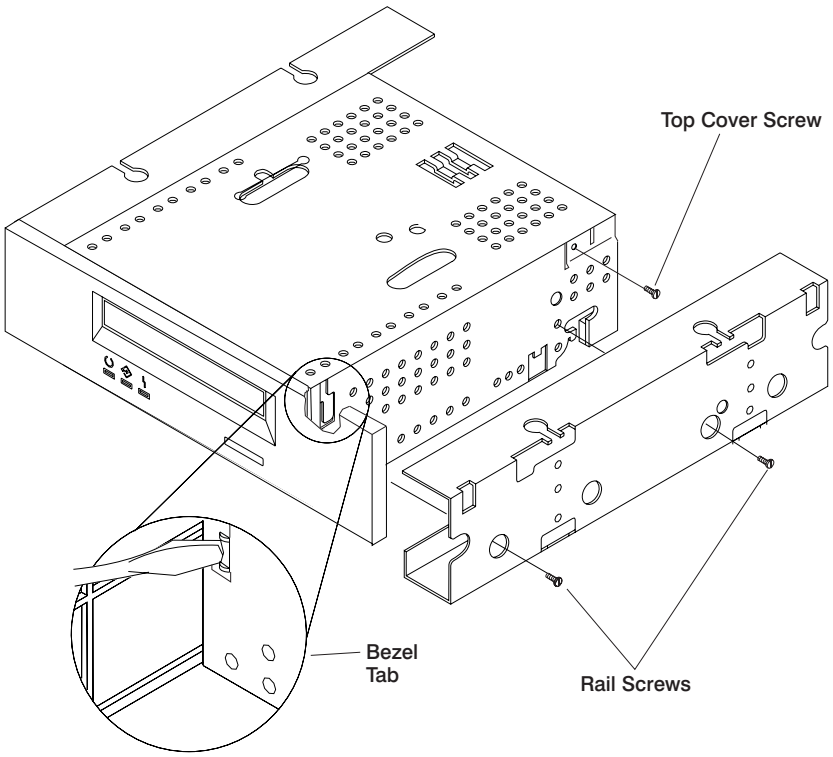
   Note: It may require many turns before the front roller stops.
6. Use a small screwdriver to rotate the rear cartridge gear counterclockwise until the cartridge ejects.
7. Reassemble the tape drive and reconnect it to the system unit.



Attention: When attaching the bezel, the cassette door must 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.

Removing Tape Cartridge from Type B Drives

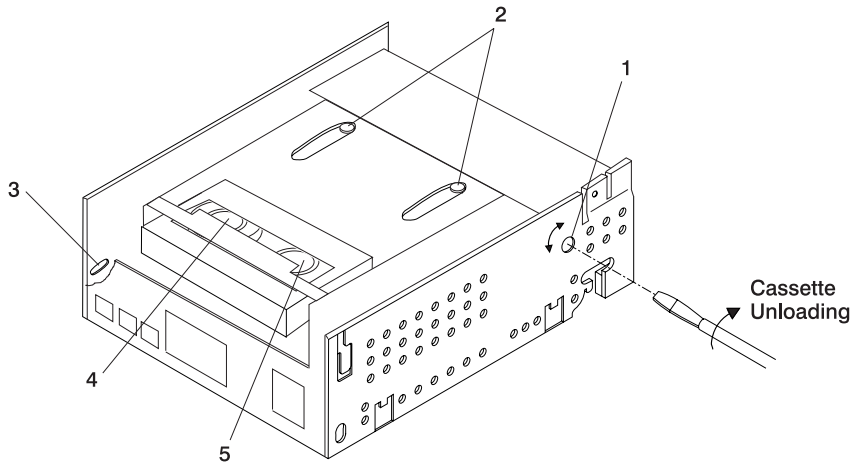
1. Remove the drive assembly from the system. Use the documentation that was provided with your system.
2. Remove the mounting rails by removing the four screws near the lower edge of the drive assembly (two on each side) that are accessed through holes in the side of each rail.



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 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.



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 action can take many turns 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 action pulls the excess tape back into the tape cartridge.
8. Continue turning the left spindle until the right spindle **5** begins to move, indicating that 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 action can take many turns of the screwdriver.
10. Assemble the drive in reverse order.

12.0 GB 4-mm Tape Drive

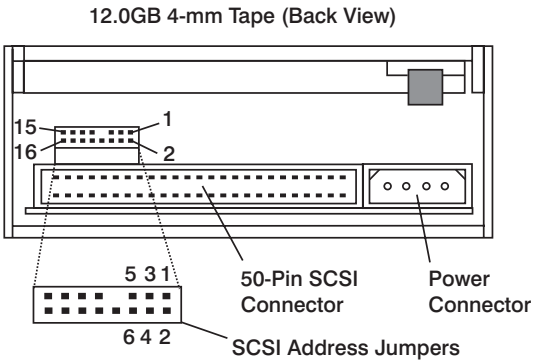
This section is used to set SCSI addresses and to give instructions for manually removing a stuck tape.

Setting the SCSI Address

Note: Prior to installing the SCSI media device into the media bay, set the device's address for any available SCSI address.

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.



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

Manually Removing the Tape Cartridge From the 12.0 GB 4-mm Tape Drive

Use the following procedure to manually remove the data cartridge.

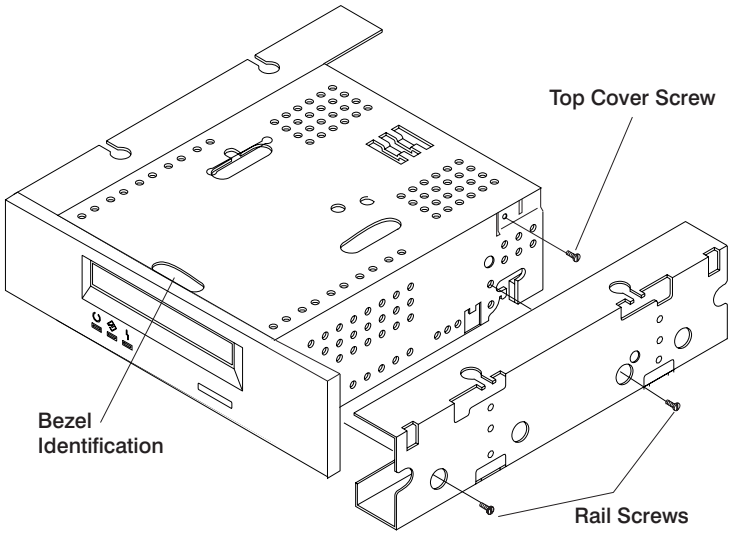
If a power outage occurs while a tape cartridge is loaded or the automatic unload procedure fails, you may want to manually unload a cartridge from the drive. The following steps outline the manual tape cartridge unloading and removal procedure.

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.

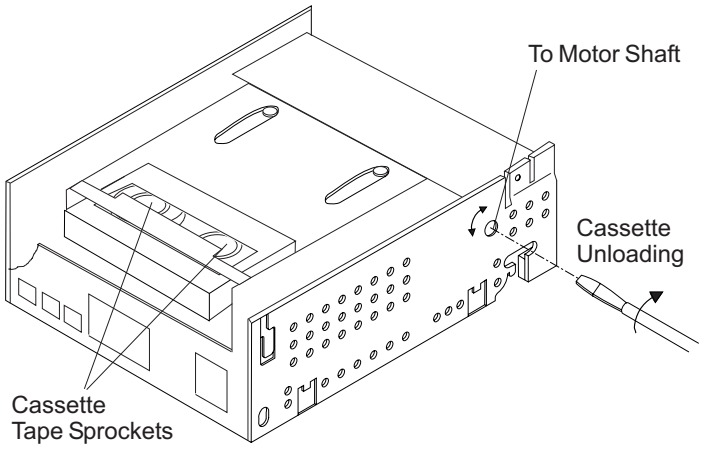
After the front bezel has been removed, you can access the tape drive reel motor sprockets from the front of the drive. Just below the cartridge opening and above the flex cable, there is an opening for access to

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.

1. For the external model:
   - Remove the drive from your system using the documentation that was provided 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 was provided with your system.



   - 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.



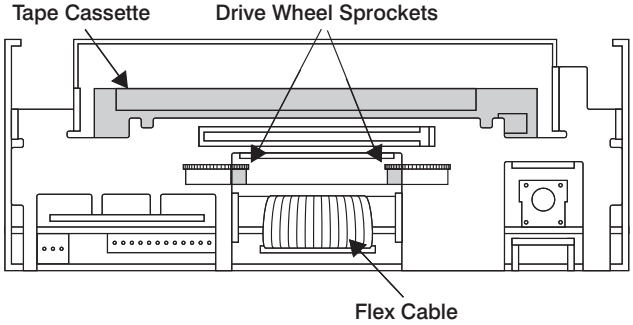
The following steps attempt to remove the tape from the drive without damaging the tape. In the following steps, it can take many turns of the screwdriver before the tape cartridge can be removed.

Attention: *Do not* turn the mode motor shaft counter-clockwise. The mode motor gear can be damaged if cycled in the wrong direction.

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. After the rollers have completely retracted, you must 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 235.

   Note: Be sure to rewind all of the loose tape back into the cartridge before completing cartridge removal. Otherwise, tape damage can occur.



   After 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. After 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 was provided with your external drive.
8. For the internal model:
   - Replace the front bezel by angling the two plastic feet at the bottom of the bezel into the two aligning 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 was provided with your external drive.

20.0 GB 4-mm Tape Drive

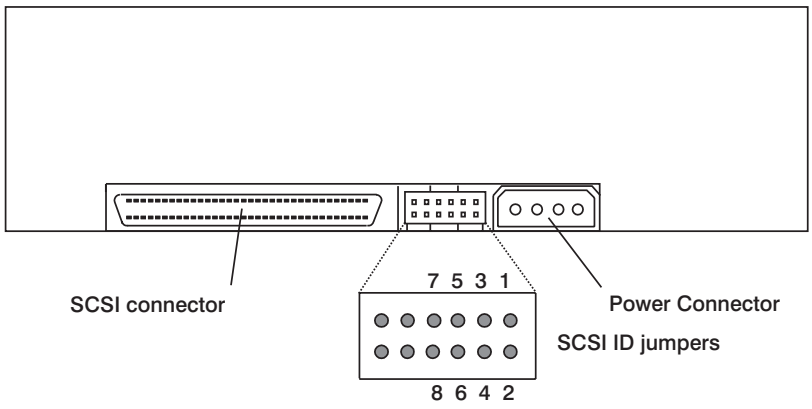
This section is used to set SCSI addresses and to give instructions for manually removing a stuck tape on the 20.0 GB 4-mm Tape Drive.

The 20.0 GB 4-mm Tape Drive uses low-voltage differential/single-ended (LVD/SE) wide SCSI-2 interface.

Setting the SCSI Address

Note: Prior to installing the SCSI media device into the media bay, set the device's address for any available SCSI address.

The SCSI address (ID) is set by placing jumpers on the address pins located on the rear panel of the drive. See "Valid Addresses (SCSI IDs)" on page 238 to set the jumpers.



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: * = Address 7 is reserved for the adapter.				

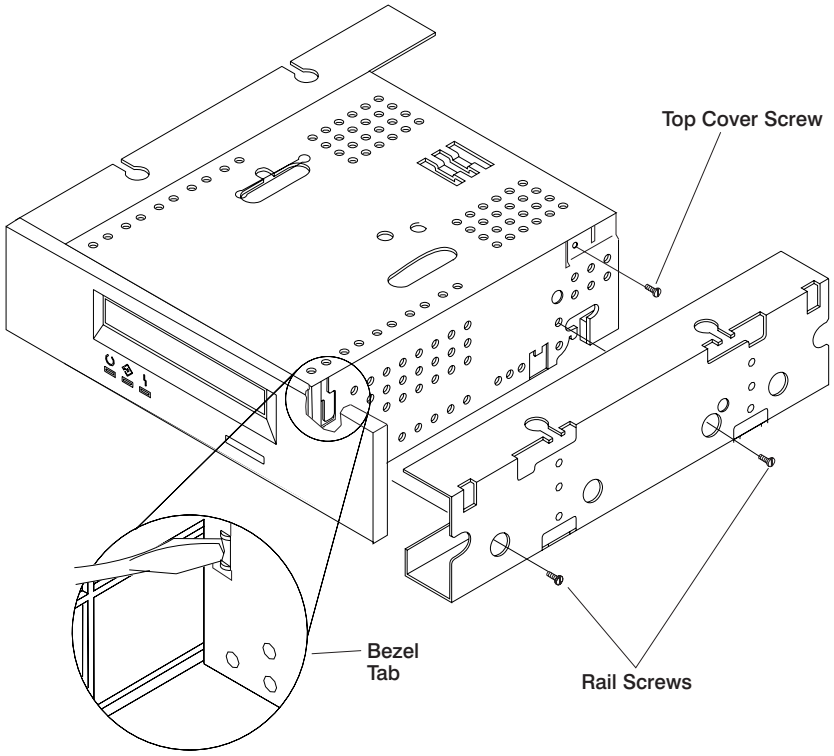
Manually Removing the Tape Cartridge from a 20 GB 4-mm Tape Drive

Use the following procedure to manually remove the data cartridge from a nonfunctioning 20 GB 4-mm tape drive:

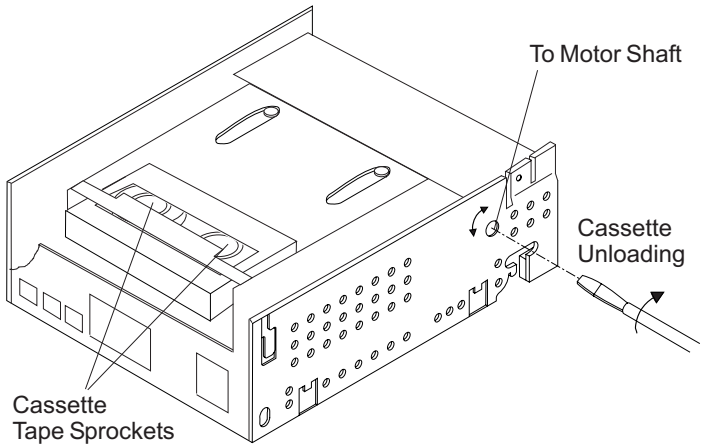
Attention:

1. This procedure is very delicate. Use care to avoid damaging the tape, the tape drive, or both.
2. Use this procedure *only* as a last option after you have attempted to clear the hang condition by powering the tape drive on and off.
3. If you use this procedure to remove a data cartridge from the tape drive, replace the tape drive.

Use the service information for your system to remove the tape drive. Then move the tape drive to a suitable work area and perform the following steps:



1. Remove the mounting rails by removing the four rail screws (two for each side).
2. Remove the front bezel (depress the bezel tab, then rotate the top of the bezel away from the drive and lift out of the bottom slots).
3. Remove the top cover of the drive (four screws).



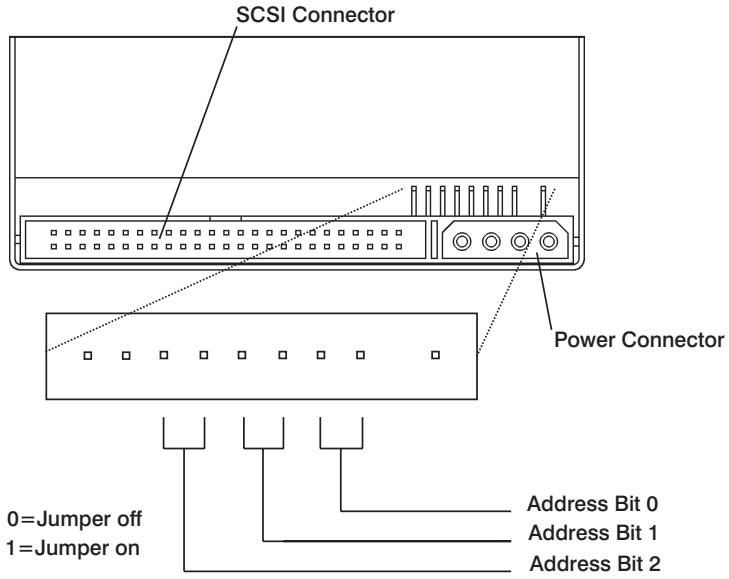
4. Insert a 1.5 mm hexagonal key or small Phillips screwdriver into the aperture on the right side of the drive near the rear. This gives you access to the motor worm wheel. Turn the hexagonal key or small Phillips screwdriver counter clockwise to release the cartridge (this action can take many turns of the screwdriver).
5. Reassemble the tape drive in reverse order.

24/48 GB DDS-2 4-mm Tape Autoloader

The 4-mm tape autoloader is a 5.25 inch full-height device. It consists of a 4-mm tape drive with an autoloading mechanism. The autoloading mechanism accepts a magazine that holds six 4-mm tapes.

Setting the SCSI ID

The SCSI ID is set by using jumpers on the pins near the SCSI connector at the rear of the drive.



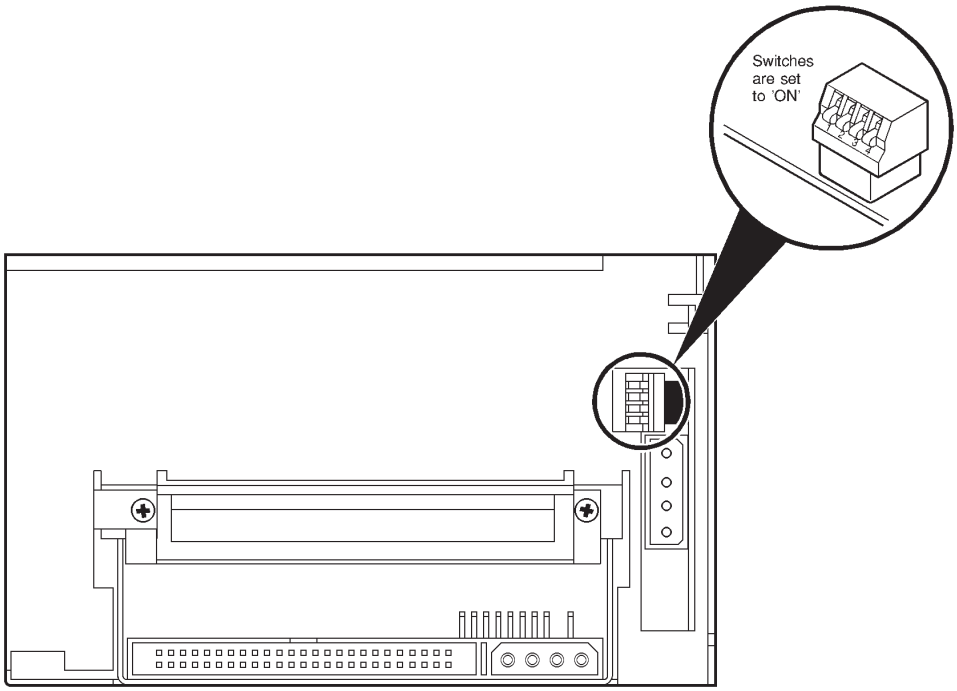
There are two pins for each bit. When a jumper is on (shorting two pins together) that represents a 1 in the following SCSI ID table. The three bits in the ID give a range of 0 through 7 as follows:

SCSI ID	Bit 2	Bit 1	Bit 0
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1

The 4-mm tape autoloader software reads the SCSI ID at power-up time and during self-test. The 4-mm tape autoloader is shipped with the SCSI ID set to 0.

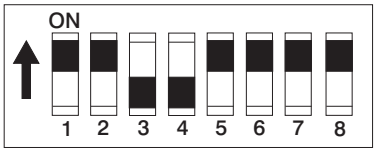
Option Switches

The option switches are located on the back of the 24/48 GB DDS-2 4-mm tape Autoloader. These switches must be in the *on* position. The 4-mm tape autoloader software reads the option switches at power-up time and during self-test.



Configuration Switches

The configuration switches are located on the bottom of the 4-mm tape Autoloader. Switches 3 and 4 must be *off*, and all the other switches must be *on*. The 4-mm tape autoloader software reads the configuration switches at power-up time and during self-test.



5.0 GB 8-mm Tape Drive

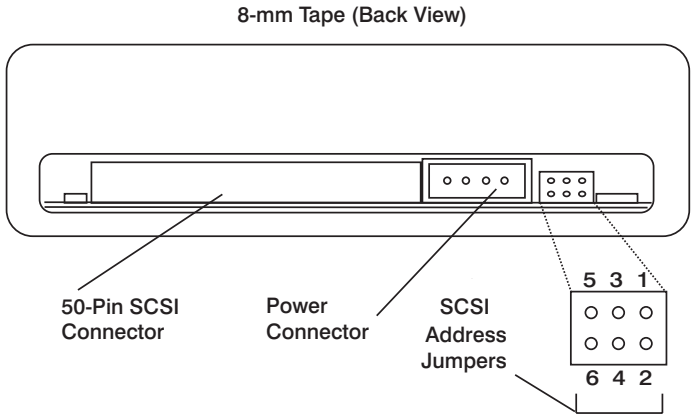
This section is used to set SCSI addresses and to give instructions for manually removing a stuck tape.

Setting the SCSI Address

Note: Prior to installing the SCSI media device into the media bay, set the device's address for any available SCSI address.

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.



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 8-mm Tape Drive is shipped with three jumpers installed.

Manually Removing the Tape Cartridge From an 8-mm Tape Drive

If the tape cartridge has not been loaded into the into the operational tape path, Perform Steps 1, 4, and 5 of this procedure only. Use the entire procedure to manually remove the data cartridge from a non-functioning 8-mm tape drive when a tape cartridge is loaded into the tape path:

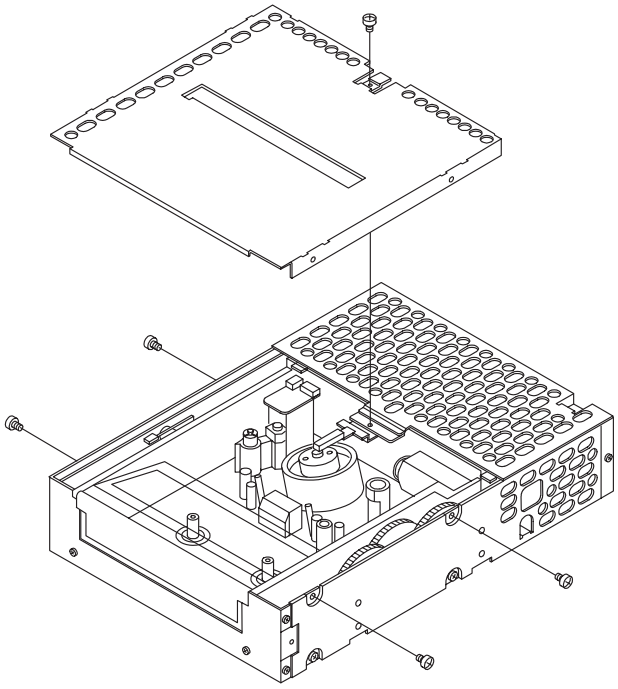
Attention:

1. This procedure is very delicate. Use care to avoid damaging the cartridge, the tape drive or both.
2. 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.
3. This procedure destroys the tape.

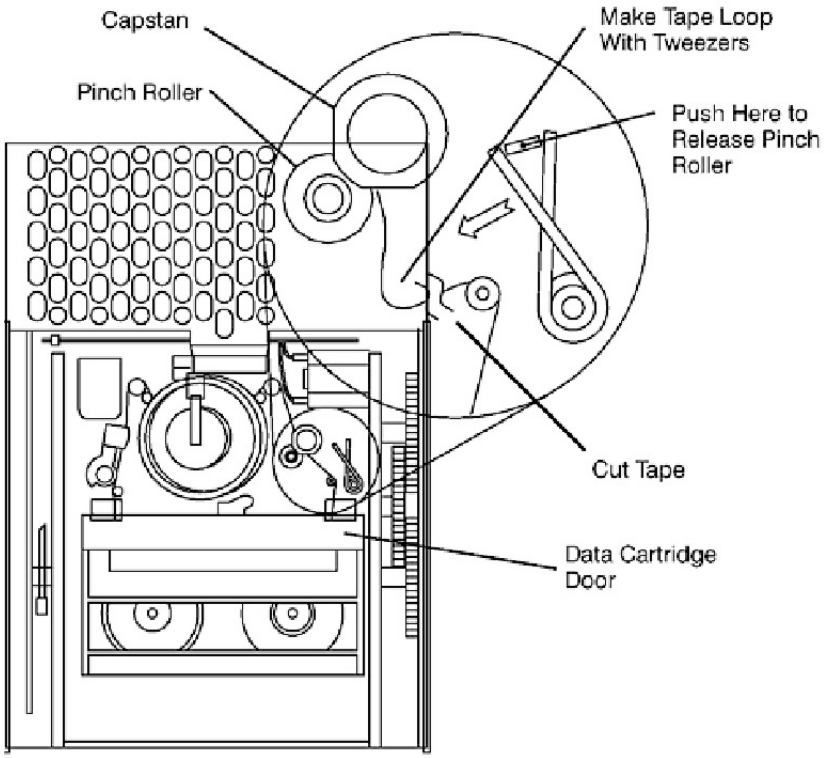
Removing the Tape Cartridge

To remove the tape cartridge, do the following:

1. Remove the five screws from the top cover of the tape drive.

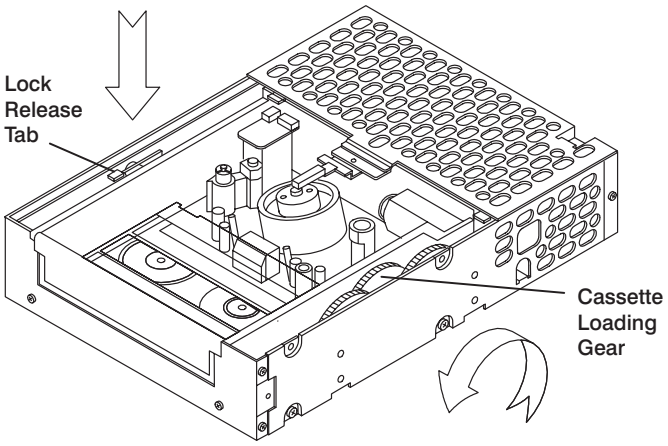


2. Using tweezers, loosen the tape as shown in the following illustration. If the pinch roller is engaged, push the indicated spring to release the pinch roller and loosen the tape.



3. Make a loop in the tape with the tweezers, and cut the tape as indicated in the preceding figure.

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, as shown in the following figure. Unless there is an obstruction, the cartridge ejects.



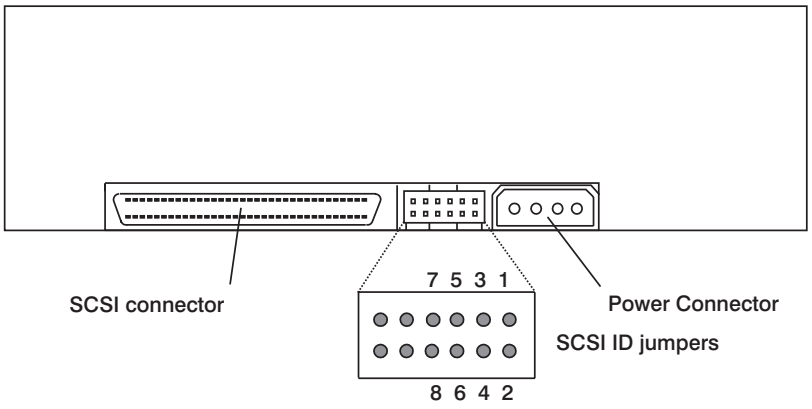
20.0 GB 8-mm Tape Drive

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, set the device's address for any available SCSI address.

The SCSI address (ID) is set by placing jumpers on the address pins located on the rear panel of the drive. See "Valid Addresses (SCSI IDs)" to set the jumpers.



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: * = Address 7 is reserved for the adapter.				

Note: The 20 GB 8-mm tape drive is shipped with three jumpers installed.

Manually Removing the Tape Cartridge From an 20 GB 8-mm Tape Drive

Use the following procedure to manually remove the data cartridge from a non-functioning 20 GB 8-mm tape drive:

Attention:

1. This procedure is very delicate. Use care to avoid damaging the tape, the tape drive, or both.
2. Use this procedure only as a last option after you have attempted to clear the hang condition by powering the tape drive on and off.

Use the service information for your system to remove the tape drive. Then move the tape drive to a suitable work area.

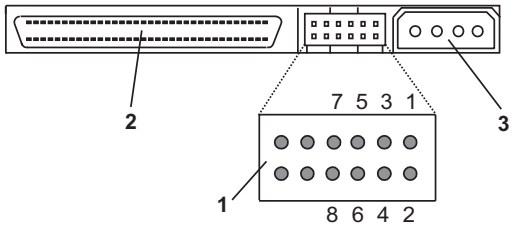
1. Remove the three T6 screws that hold the top cover of the tape drive; then remove the top cover. This allows you to observe the tape unload progress.
2. Alternate between moving the trolleys toward the unloaded position and moving the supply reel motor to take up slack in the media. Do not touch the media itself. As the drive faces you, the trolleys are moved by inserting a 2.5 mm 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 nonmetallic probe into the hole marked UNLOAD on the drive's 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. (If you use a metal tool, it may damage the supply reel motor.) This process is complete when the trolleys stop moving and the media is fully retracted into the cartridge.
3. Unload the cartridge by inserting a 2.5 mm Allen driver in the hole marked UNLOAD at the left front, as the drive faces you, and turning in the marked direction (counter-clockwise). This process is complete when the cartridge is ejected.
4. Replace the top cover.

60/150 GB 8MM Internal Tape Drive

This section provides information for setting SCSI addresses.

Setting the SCSI Address

To set a SCSI address, insert jumpers onto pin positions reserved on the jumper block specifically for setting the address. To set a position to On, insert a jumper onto both the top and bottom pins. To set a position to Off, either insert a jumper onto the top pin only or remove the jumper from the jumper block.



1 SCSI Address Block
2 68-pin SCSI Connector
3 Power Connector

Note: The 60/150GB 8MM Internal Tape Drive is shipped with four jumpers.

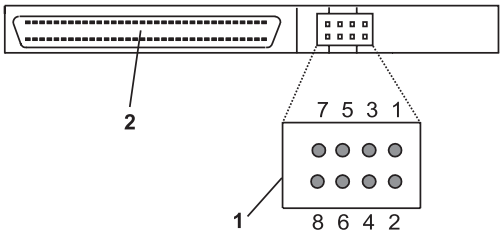
Address	Jumper 7-8	Jumper 5-6	Jumper 3-4	Jumper 1-2
0	Off	Off	Off	Off
1	Off	Off	Off	On
2	Off	Off	On	Off
3	Off	Off	On	On
4	Off	On	Off	Off
5	Off	On	Off	On
6	Off	On	On	Off
7*	Off	On	On	On
8	On	Off	Off	Off
9	On	Off	Off	On
10	On	Off	On	Off
11	On	Off	On	On
12	On	On	Off	Off
13	On	On	Off	On
14	On	On	On	Off
15	On	On	On	On
Note: * = Address 7 is reserved for the adapter.				

80/160 GB Internal Tape Drive with VXA Technology

This section provides information for setting SCSI addresses.

Setting the SCSI Address

To set a SCSI address, insert jumpers onto pin positions reserved on the jumper block specifically for setting the address. To set a position to On, insert a jumper onto both the top and bottom pins. To set a position to Off, either insert a jumper onto the top pin only or remove the jumper from the jumper block.



1 SCSI Address Block
2 68-pin SCSI Connector

Note: The 80/160 GB Internal Tape Drive with VXA Technology is shipped with four jumpers.

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: * = Address 7 is reserved for the adapter.				

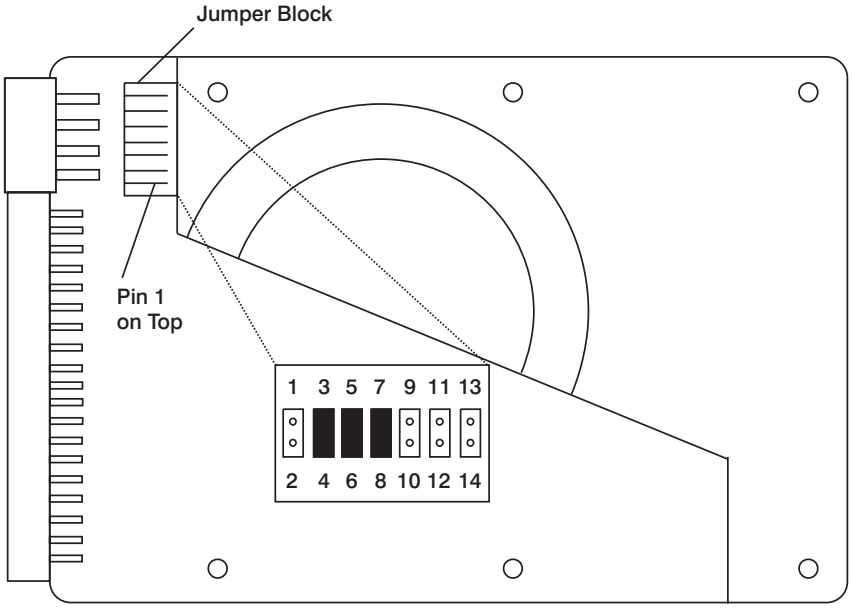
1080 MB SCSI-2 Disk Drive

The 1080 MB SCSI-2 disk drive has a 3.5 inch form factor and mounts in a half-height media position.

Setting the SCSI Address Jumpers

Notes:
1. The device illustrated in the following figure is configured for SCSI Address 6.
2. Pins 7-8 must always have a jumper.
3. Pins 9-10, 11-12, and 13-14 must never have a jumper.

The jumpers on the 1080 MB SCSI-2 Disk Drive's logic card set the SCSI address. Refer to the following diagram and table to set these jumpers.



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

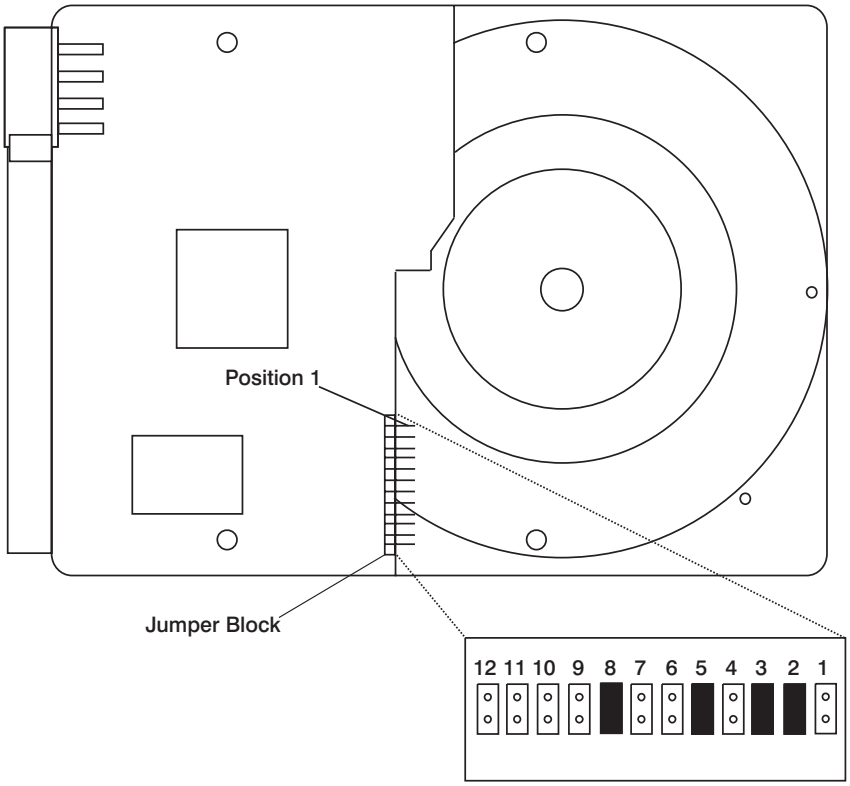
2.1 GB SCSI-2 Disk Drive

The 2.1 GB 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 illustrated in the following figure is configured for SCSI Address 6.

The jumpers on the 2.1 GB SCSI-2 disk drive's logic card set the SCSI address. Refer to the following diagram and the "SCSI Address Table for Jumpers Numbered 4 to 1" on page 256 to set these jumpers.



- Positions 5, and 8 must have jumpers.
- Positions 1, 6, 7, 9, 10, 11, and 12 must not have jumpers.

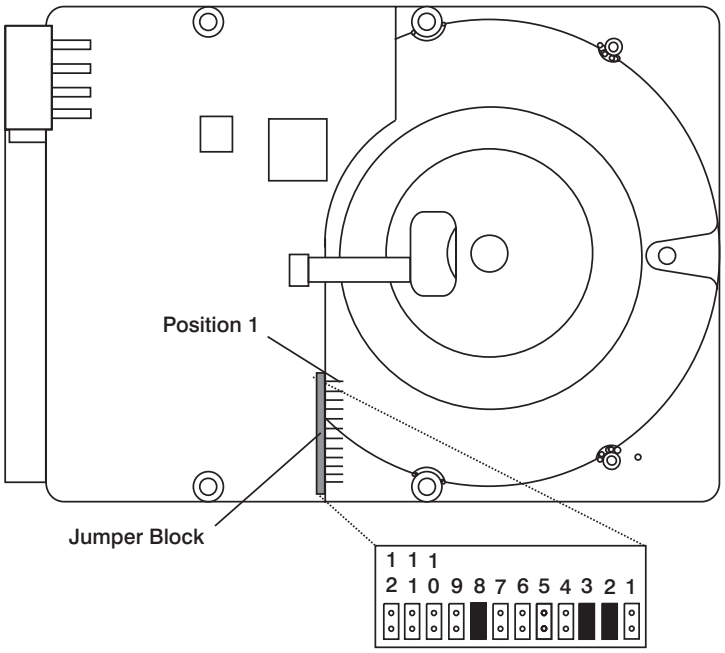
4.5 GB SCSI-2 Disk Drive - Type F1

The 4.5 GB SCSI-2 disk drive has a 3.5 inch form factor and mounts in a half-height media position. Refer to the table in “SCSI-2 Single-Ended Disk Drives” on page 257 for a description of disk drive Type F1.

Setting the SCSI Address Jumpers

Note: The device illustrated in the following figure is configured for SCSI Address 6.

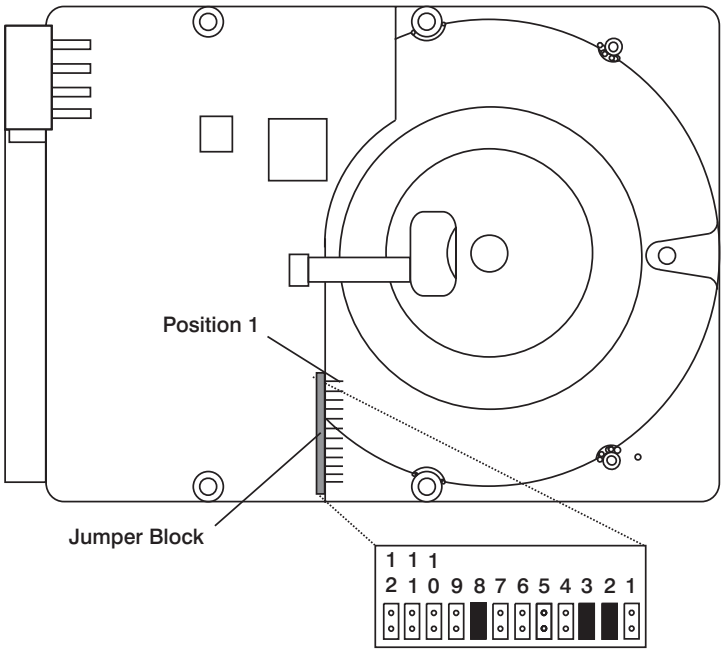
The jumpers on the 4.5 GB SCSI-2 disk drive’s logic card set the SCSI address. Refer to the following diagram and the “SCSI Address Table for Jumpers Numbered 4 to 1” on page 256 table to set these jumpers.



- Position 8 must have a jumper.
- Positions 5, 6, 7, 9, 10, 11, and 12 must not have jumpers.

Ultra SCSI Disk Drives Type G1

The jumper locations for the 4.5, 9.1, and 18.2 GB ultra SCSI disk drives are shown below. Refer to the table in “SCSI-2 Single-Ended Disk Drives” on page 257 for a description of disk drive Type G1.



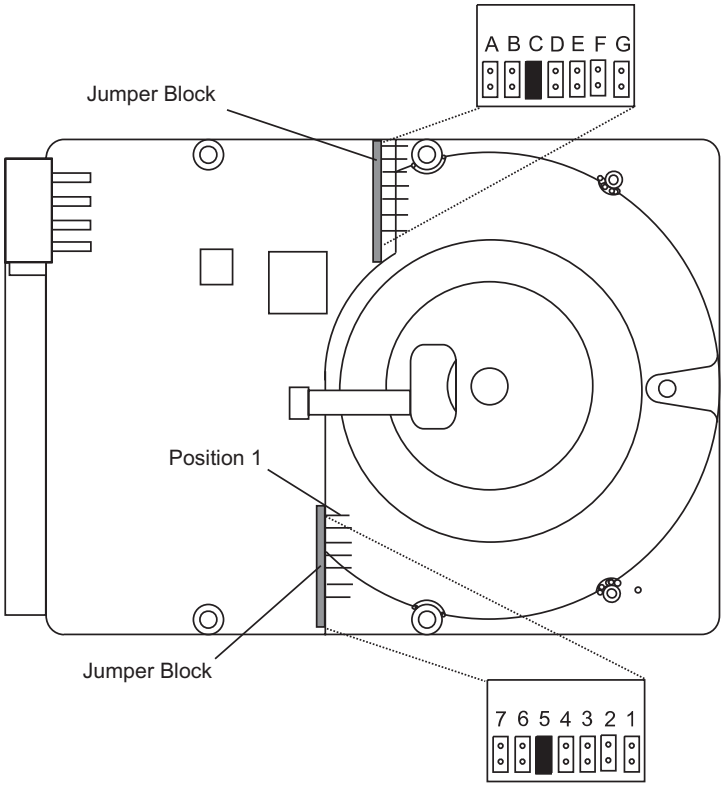
Notes:

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

The following diagram shows the SCSI jumper locations for the 9.1 and 18.2 GB Ultra SCSI disk drives. Refer to the table in “SCSI-2 Single-Ended Disk Drives” on page 257 for a description of disk drive Type I1.

Use the “SCSI Address Table for Jumpers Numbered 4 to 1” on page 256 to set the SCSI address jumpers.



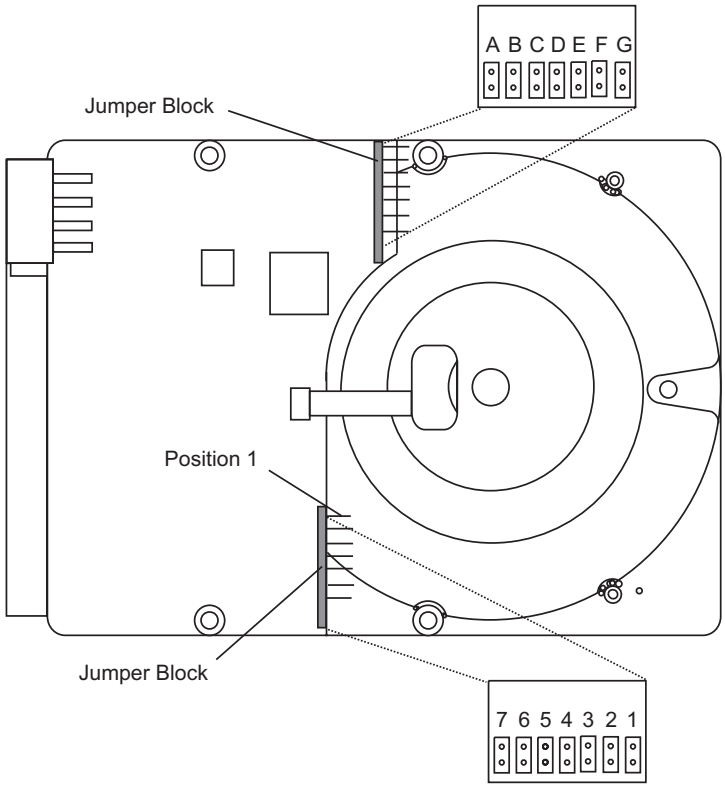
Notes:

1. Positions 1 through 4 are used to set the SCSI address.
2. Positions 5 and C must have jumpers installed.
3. There is no SCSI bus termination on this disk drive. See “For Machine Type 7043 Model 140 Systems” on page 270.

Type I2 Drive

The following diagram shows the SCSI jumper locations for the 9.1, 18.2, and 36.4 GB Ultra SCSI disk drives. Refer to the table in “SCSI-2 Single-Ended Disk Drives” on page 257 for a description of disk drive Type I2.

Use the “SCSI Address Table for Jumpers Numbered 4 to 1” on page 256 to set the SCSI address jumpers.



Notes:

1. Positions 1 through 4 are used to set the SCSI address.
2. There is no SCSI bus termination on this disk drive. See “For Machine Type 7043 Model 140 Systems” on page 270.

SCSI Address Table for Jumpers Numbered 4 to 1

Address	Jumper 4	Jumper 3	Jumper 2	Jumper 1[2]
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[1]	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

Notes:

[1] = Address 7 is reserved for the adapter.

[2] = There is no jumper 1 on 50 pin drives, thus SCSI addresses 8 to 15 are not valid.

SCSI-2 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 following table 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
H1	1"	9.1/18.2	68-pin	None	32	DMVS
H2	1.6"	36.4	68-pin	None	32	DMVS
I1	1.6"	9.1/18.2	68-pin	None	14	DPSS
I2	1.6"	9.1/18.2/36.4	68-pin	None	14	DDYS

Notes:

[1] = Factory-installed jumpers

[2] = A customer or customer representative installed jumpers

[3] = See jumper setting in “SCSI Address Table for Jumpers Numbered 4 to 1” on page 256

[4] = A 68-pin drive used as a 50-pin drive

Other differences to look for are the number of jumper block pins, and SCSI connector size.

SCSI-2 Disk Drives

The following figures show the location of the jumper blocks and the jumper settings for SCSI address or SCSI ID. There are three jumpers to set on 50-pin models and four on 68-pin models.

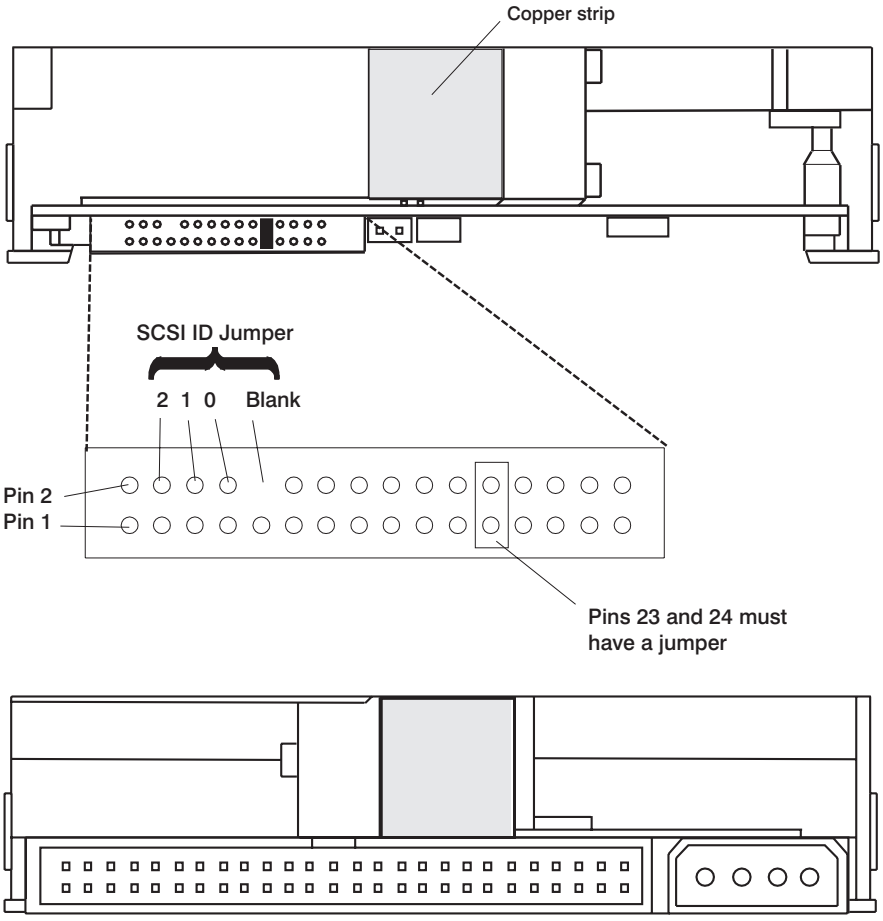
Setting the SCSI address or SCSI ID

To set the SCSI address or SCSI ID, see the “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269.

Type A1 Drive

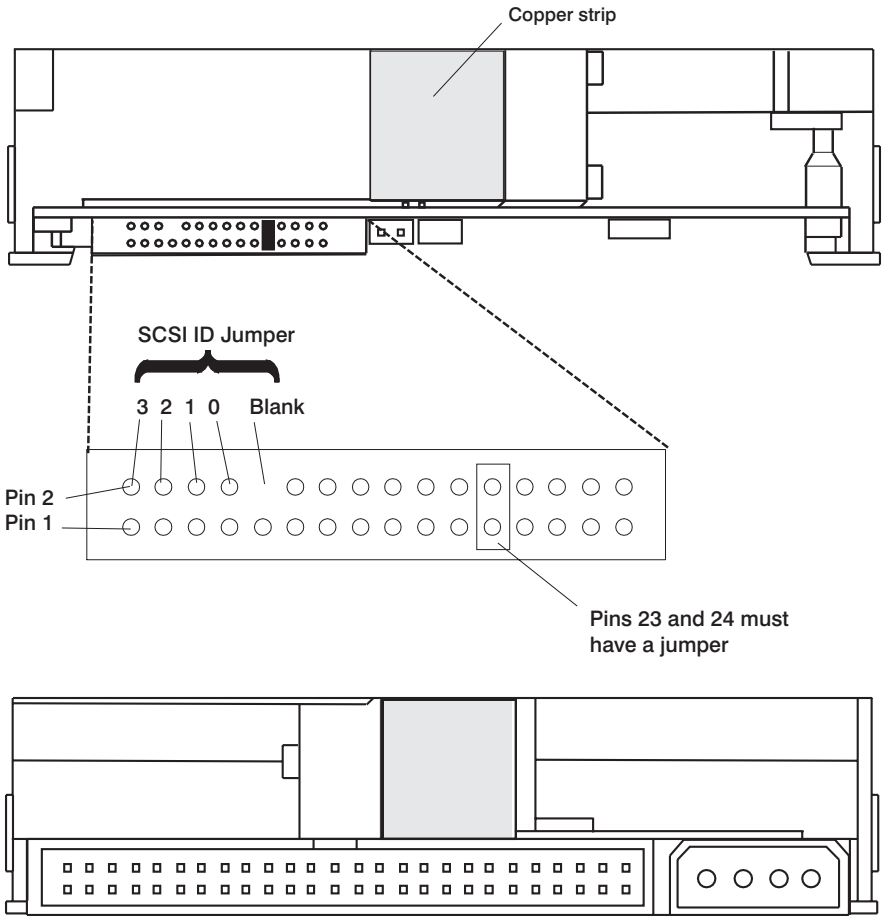
For 1.1 GB, and 2.2 GB drives, 50-pin models.

Note: Type A disk drives have one factory-installed jumper. Do not change the factory-installed jumper.



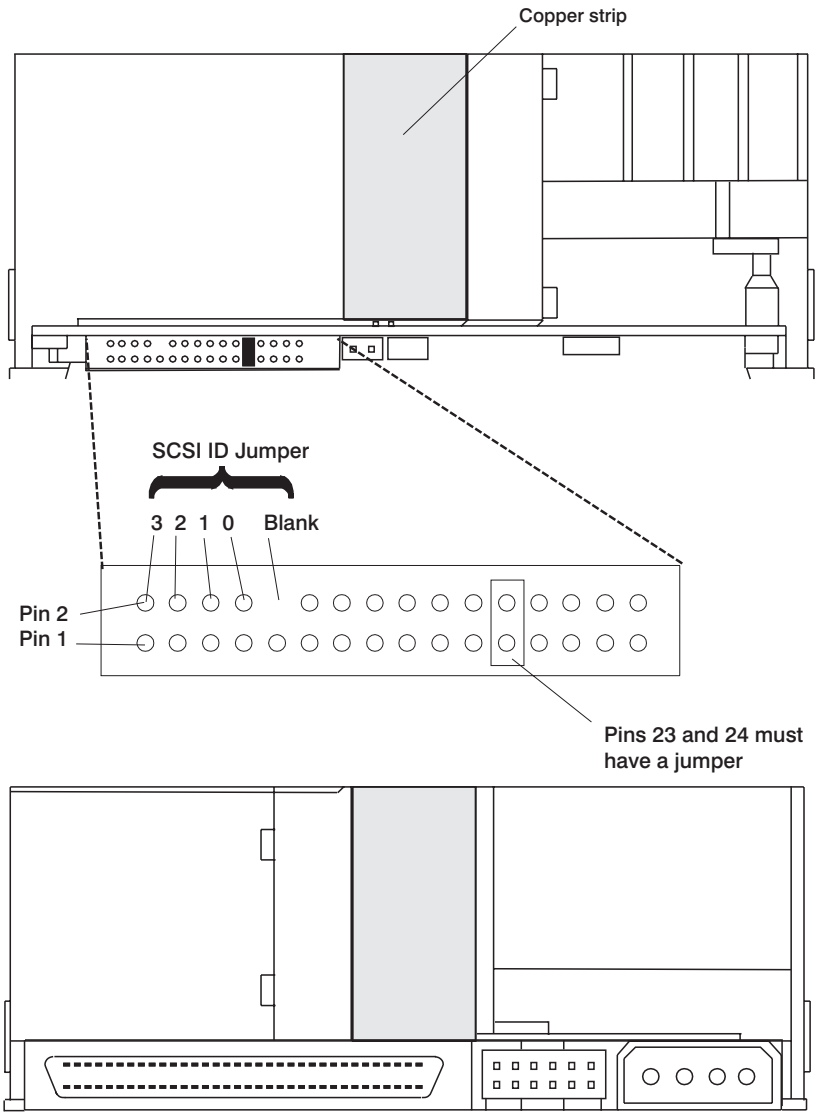
Type A2 Drive

For 1.1 GB, and 2.2 GB drives, 68-pin models. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.


Copper strip
SCSI ID Jumper
3 2 1 0 Blank
Pin 2
Pin 1
Pins 23 and 24 must
have a jumper

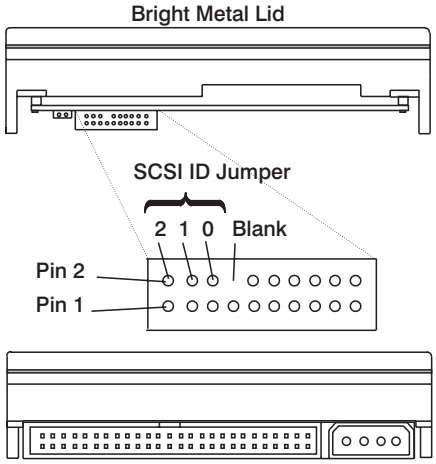
Type A3 Drive

For 4.5 GB drives, 68-pin model. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



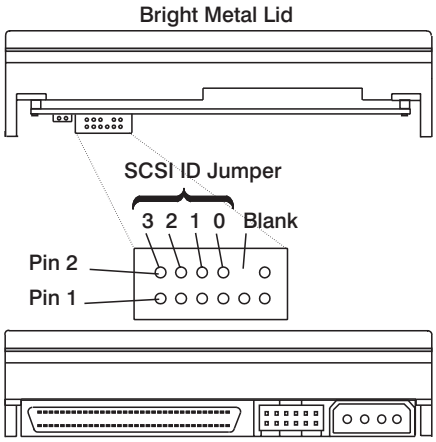
Type B1 Drive

For 1.1 GB, and 2.2 GB drives, 50-pin models. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



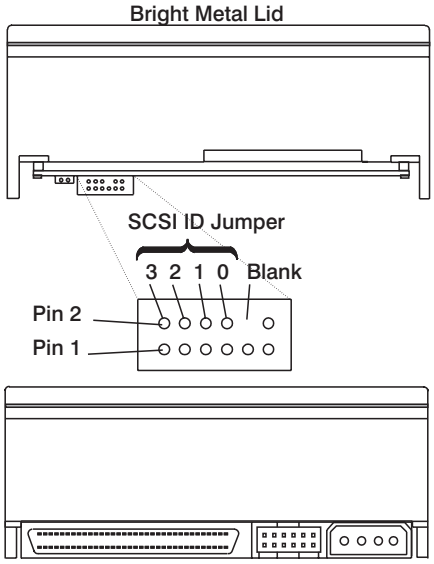
Type B2 Drive

For 1.1 GB, and 2.2 GB drives, 68-pin models. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



Type B3 Drive

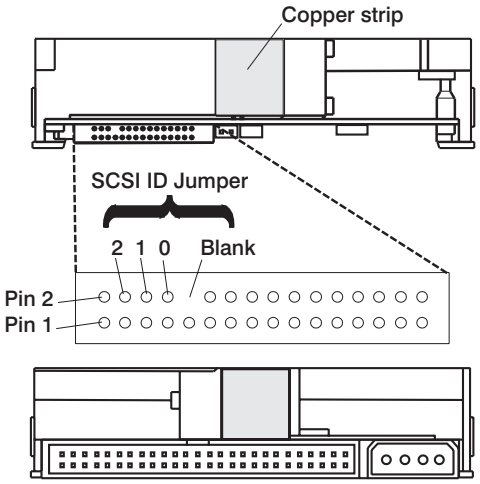
For 4.5 GB drives, 68-pin model.



Type C1 Drive

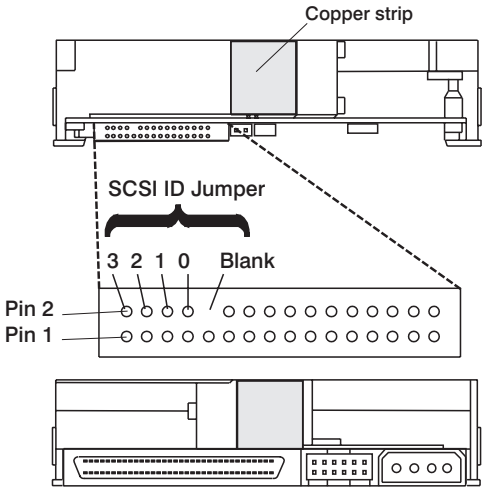
For 2.2 GB drives, 50-pin model. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.

Note: Jumper 3 is not used.



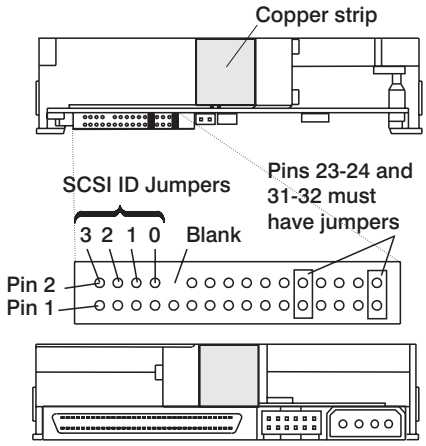
Type C2 Drive

For 2.2 GB drives, 68-pin model. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



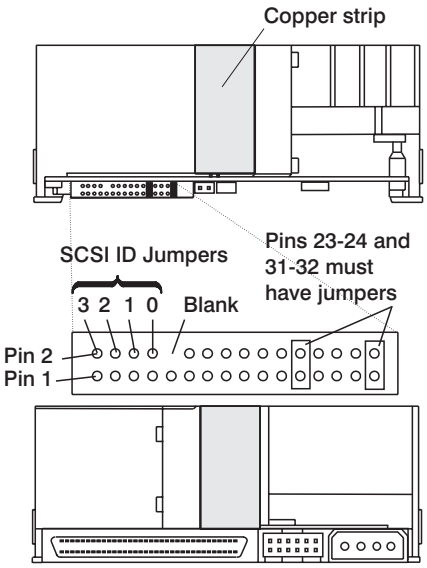
Type C3 Drive

For 4.5 GB drives, 68-pin model. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



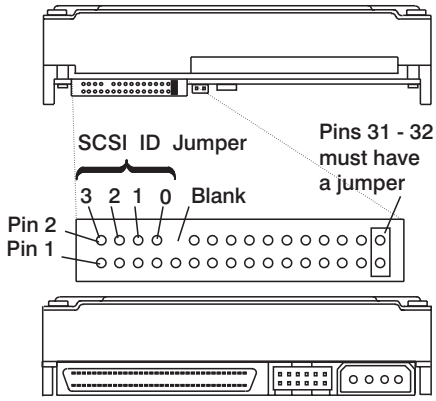
Type C4 Drive

For 9.1 GB drives, 68-pin model. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



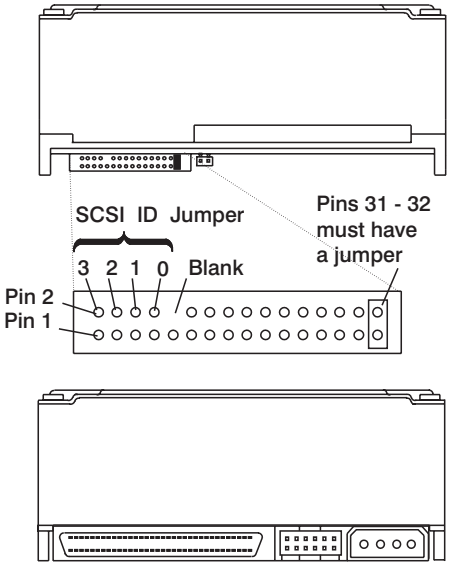
Type D1 Drive

For 2.2 GB and 4.5 GB drives, 68-pin models. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



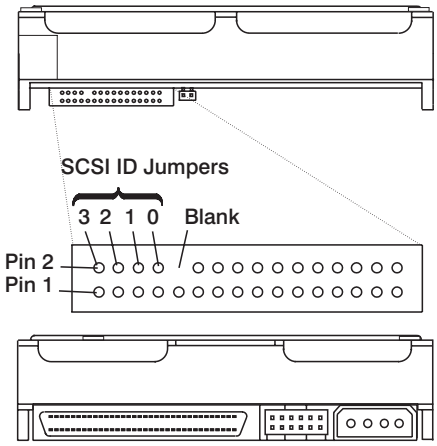
Type D2 Drive

For 9.1 GB drives, 68-pin models. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



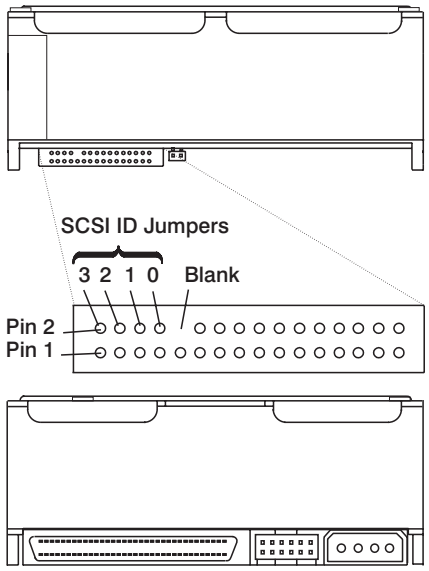
Type E1 Drive

For 9.1 GB drive, 68-pin model. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



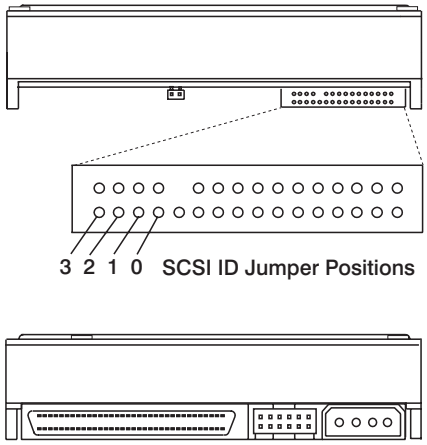
Type E2 Drive

Jumper locations for the 18.2 GB ultra SCSI disk drive. See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



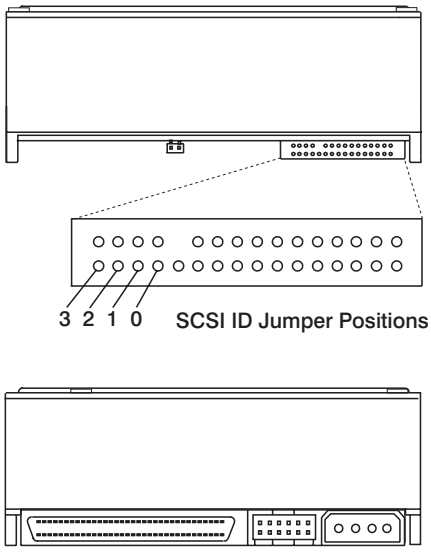
Type H1 Drive

Jumper locations for the 9.1 and 18.2 GB ultra SCSI disk drives (68-pin model). See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.


3 2 1 0 SCSI ID Jumper Positions

Type H2 Drive

Jumper locations for the 36.4 GB ultra SCSI disk drive (68-pin model). See “SCSI Address Table for Jumpers Numbered 3 to 0” on page 269 for SCSI address settings.



SCSI Address Table for Jumpers Numbered 3 to 0

Address	Jumper 3[2]	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[1]	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

Notes:

[1] = Address 7 is reserved for the adapter.

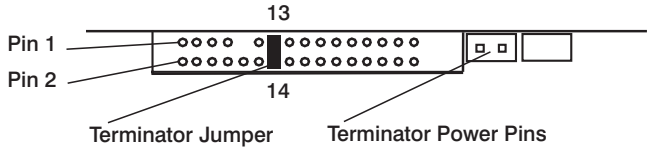
[2] = There is no jumper 3 on 50 pin drives, thus SCSI addresses 8 to 15 are not valid.

For Machine Type 7043 Model 140 Systems

Every SCSI bus consists of at least a controller, a cable, a device, and two terminators. One terminator is permanently mounted at the controller end of the cable, and the other is mounted at the opposite end. Most systems have this terminator attached to the cable connector furthermost from the controller. In Machine Type 7043 Model 140 only, the terminator is located on the drive at the end of the cable. The terminator is enabled by installing two jumpers on drive types A1, A2, A3, C1, C2, D1, D2, and D3. One jumper, between jumper pins 13 and 14, enables the terminator, and the other (larger jumper) attaches to the pins labelled Term Power Pins.

It is very important that every SCSI bus have only two terminators installed. Intermittent operation or device damage may occur otherwise. If the drive on the end of a SCSI bus is moved or removed (from a Machine Type 7043 Model 140), ensure that what is now the last drive on that SCSI bus is properly terminated. If a drive is moved to other positions in a Machine Type 7043 Model 140 or to another system, you must remove the two (2) terminator jumpers. For more general information on SCSI buses, see Chapter 4, “SCSI Cabling”, on page 329.

The position of the terminator jumper and the terminator power pins are shown in the following illustration.



Disk drive types I1 and I2 do not support on-board termination. When you use these drive types in a Machine Type 7043 Model 140 system, you must have an in-line terminator between the last disk drive and the SCSI cable connector for that disk drive.

Chapter 3. Cables and Cabling

This chapter contains information for those servicing installed systems and for those planning for new installations. Also included is information that describes cabling to many of the optional adapters that are used with the system.

Generally when a system unit is being 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, “SCSI Cabling”, on page 329 has information about SCSI cabling.

Chapter 5, “Cable Assembly and Pin-Outs”, on page 395 has information about 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. Some general purpose cables are described in this section. However, there are cases where custom cables are required when installing large or complicated systems.

Communications Adapter Cabling

You can connect communications cables and devices in many ways. Because each installation may have unique requirements, the following topics present attachment configurations using part-numbered 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 does not guarantee compliance with FCC EMI/RFI regulations.

- Cable directly from the adapter, fanout box, or remote async node to the using device, such as an async terminal or printer. Direct cabling must not leave an 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 persons who are not static-protected to touch conductors, leads, or pins.
- 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:
  - Use ground straps and grounded floor mats.
  - Before access, ensure that grounded equipment covers that require touching are in use.

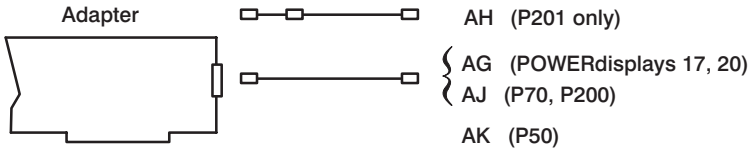
  These precautions must be taken even if power is off, because ESD damage is independent of circuit power.
- Eight- and 128-port adapter cables are not designed for outdoors use. If used outdoors, it is at the customer’s risk. Appropriate transient voltage suppression devices must be used on every signal 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.
- Shielded cables are essential to prevent damaging high-voltage noise impulses from coupling onto signal lines. The shielded cable must be data grade, at least 24 AWG, and of individual shielded twisted pairs. Shielding must have both overall shorted aluminum foil to suppress high frequency noise and

tinned copper braid (capacitance approximately 12 pF per foot, not to exceed 2500 pF 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 must be connected to the metal shell of the connector at the system end. At the I/O device end, the drain wire must be connected to Pin 1, and the shields must 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 must 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 EIA-232 specification states that the total capacitance of a cable with connectors must be less than 2500 pf.
- The cable must not contain wires that are not terminated (wires that are connected at one end only). Wires that are not terminated 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.

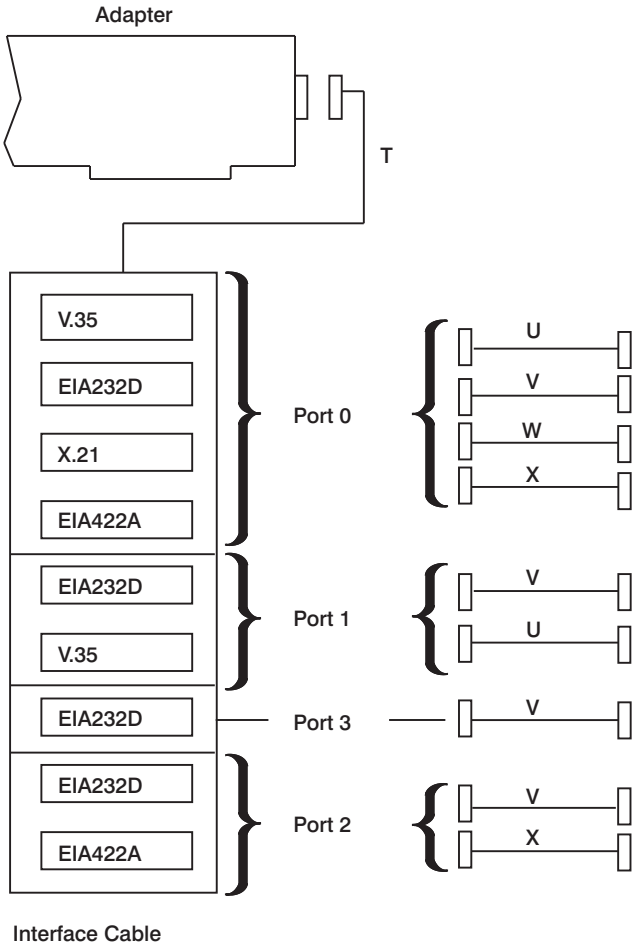
S15 Graphics Adapter (FC 2657)



Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
AG	Display cable, 15-pin D-shell to 5 BNC connectors	58F2901	4217	N/A	N/A
AH	Display conversion cable, 15-pin D-shell to 13W3 DDC ID switch	96G1712	4237	0.3	1
AJ	Display cable, DDC 15-pin D-shell to 13W3 with DDC	96G2156	4238	1.83	6
AK	Display cable, use 15 pin D-shell attached to display	N/A	N/A	N/A	N/A

Coprocessor Multiport Adapter, Model 2 (FC 2701)

The following figure illustrates the Coprocessor Multiport Adapter with the Coprocessor Multiport Adapter 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	N/A

POWER GXT2000P 3D Graphics Adapter (FC 2823)

Display Type	Screen Resolution (Non-Interlaced)	Refresh Freq (Hz)	Adapter Cable Part Number
6091-16 Color POWERdisplay 16	1280 x 1024	60 *	39H8683
		77	39H8683
6091-19i Color POWERdisplay 19	1280 x 1024	60 *	39H8683
		77	39H8683
16.1 TFT LCD display	1280 x 1024	60 *	58F2901
POWERdisplay 17 POWERdisplay 20	1024 x 768	75	39H8683
		85	39H8683
	1280 x 1024	60 *	39H8683
		75	39H8683
G52, G54	1024 x 768	75	Cable Included with Display
		85	Cable Included with Display
	1280x1024	60 *	Cable Included with Display
P70, P72	1024x768	75	96G2156
		85	96G2156
	1280 x 1024	60 *	96G2156
		75 [2]	96G2156
P200, P92	1024 x 768	75	96G2156
		85	96G2156
	1280 x 1024	60 *	96G2156
		75	96G2156
		85 [1,2]	96G2156
P201, P202	1024 x 768	75	96G1712
		85	96G1712
		120	96G1712
	1280 x 1024	60 *	96G1712
		75	96G1712
		85	96G1712
Other VESA Resolutions/Refresh Rates	1024 x 768	75	
		85	
		120	
	1280 x 1024	60*	
		75	
		85	

Notes:

* = Default display mode. Monitors listed are selectable via the AIX utility (SMIT) except where noted.

[1] = Only P200 Monitors with the N2 Chassis (M/T 6555, Model 77x) support 1280x1024 at 85Hz.

[2] = This monitor at this refresh rate and screen resolution complies with the ISO 9241, Part 3 video ergonomics standard. ISO 9241, Part 3 compliance is dependent on a complete ISO capable platform of system unit, monitor, video subsystem, operating system, and fonts.

POWER GXT3000P 3D Graphics Adapter (FC 2825)

Display Type	Screen Resolution (Non-Interlaced)	Refresh Freq (Hz)	Adapter Cable Part Number
6091-16 Color POWERdisplay 16	1280 x 1024	60 *	39H8683
		77	39H8683
6091-19i Color POWERdisplay 19	1280 x 1024	60 *	39H8683
		77	39H8683
16.1 TFT LCD display	1280 x 1024	60 *	58F2901
POWERdisplay 17 POWERdisplay 20	1024 x 768	75	39H8683
		85	39H8683
	1280 x 1024	60 *	39H8683
		75	39H8683
G52, G54	1024 x 768	75	Cable Included with Display
		85	Cable Included with Display
	1280x1024	60 *	Cable Included with Display
P70, P72	1024x768	75	96G2156
		85	96G2156
	1280 x 1024	60 *	96G2156
		75 [2]	96G2156
P200, P92	1024 x 768	75	96G2156
		85	96G2156
	1280 x 1024	60 *	96G2156
		75	96G2156
		85 [1,2]	96G2156
P201, P202	1024 x 768	75	96G1712
		85	96G1712
		120	96G1712
	1280 x 1024	60 *	96G1712
		75	96G1712
		85	96G1712
Other VESA Resolutions/Refresh Rates	1024 x 768	75	
		85	
		120	
	1280 x 1024	60*	
		75	
		85	

Notes:

* = Default display mode. Monitors listed are selectable using the AIX utility (SMIT) except where noted.

[1] = Only P200 Monitors with the N2 Chassis (M/T 6555, Model 77x) support 1280x1024 at 85Hz.

[2] = This monitor at this refresh rate and screen resolution complies with the ISO 9241, Part 3 video ergonomics standard. ISO 9241, Part 3 compliance is dependent on a complete ISO capable platform of system unit, monitor, video subsystem, operating system, and fonts.

POWER GXT130P PCI Graphics Adapter (FC 2830)

Display Type	Screen Resolution (Non-Interlaced)	Refresh Freq (Hz)	Adapter Cable Part Number
POWERdisplay 17 and POWERdisplay 20	1024 x 768	75 *	39H8683
		85	39H8683
	1280 x 1024	60	39H8683
		75	39H8683
P70, P72	1024x768	75	96G2156
		85	96G2156
	1280 x 1024	60	96G2156
		75 *	96G2156
P200, P92 [2]	1024 x 768	75	96G2156
		85	96G2156
	1280 x 1024	60	96G2156
		75	96G2156
		85 [1], *	96G2156
P201, P202 [2]	1024 x 768	75	96G1712
		85	96G1712
		120	96G1712
	1280 x 1024	60	96G1712
		75	96G1712
		85 *	96G1712
	1600 x 1200	75	96G1712
		85	96G1712
9516-B (TFT) display	1280 x 1024	60 *	39H8683

Notes:

* = Default display mode. Monitors listed are selectable using the AIX utility (SMIT) except where noted.

[1] = Only P200 Monitors with the N2 Chassis (M/T 6555, Model 77x) support 1280x1024 at 85Hz.

[2] = This monitor at this refresh rate of 85Hz and screen resolution of 1280 x 1024 complies with the ISO 9241, Part 3 video ergonomics standard. ISO 9241, Part 3 compliance is dependent on a complete ISO capable platform of system unit, monitor, video subsystem, operating system, and fonts.

POWER GXT300P 2D Graphics Adapter (FC 2841)

Display Type	Screen Resolution (Non-Interlaced)	Refresh Freq (Hz)	Adapter Cable Part Number
9516-B TFT display	1280 x 1024	60	39H8683
POWERdisplay 17 POWERdisplay 20	1024 x 768	75	39H8683
		85	39H8683
	1280 x 1024	60	39H8683
		75	39H8683
P70, P72	1024x768	75	96G2156
		85	96G2156
	1280 x 1024	60	96G2156
		75	96G2156
P200, P92	1024 x 768	75	96G2156
		85	96G2156
	1280 x 1024	60	96G2156
		75	96G2156
		85	96G2156
P76, P260	1024 x 768	60	Cable included with display
		75	
		85	
	1280 x 1024	60	
		75	
		85	
	1600 x 1200	75	
P201, P202	1024 x 768	75	96G1712
		85	96G1712
		120	96G1712
	1280 x 1024	60	96G1712
		75	96G1712
		85	96G1712

POWER GXT250P and POWER GXT255P High-Performance Graphics Adapters (FC 2851, 2852)

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 [6]
5081-16 Color	1280 x 1024	60*	39H8683
6091-19 Color	1280 x 1024	60*	39H8683
6091-23 Color	1280 x 1024	60*	39H8683
6314 Color 6317 Color [4] 6319 Color	1024 x 768	60*	Cable Included with Display
6324 Color 6325 Color 6327 Color 9524 Color 9525 Color	1024 x 768	60*	Cable Included with Display
		75.8	Cable Included with Display
	1280 x 1024	60	Cable Included with Display
7091-7S1 [5]	1024 x 768	60*	11H4003 (select with 7091 order)
		75.8	11H4003 (select with 7091 order)
	1280 x 1024	60	11H4003 (select with 7091 order)
		77	11H4003 (select with 7091 order)
8508 Mono	1280 x 1024	67*	Cable Included with Display
8517 Color	1024 x 768	70*	Cable Included with Display
9521 Color 9527 Color	1024 x 768	60*	Cable Included with Display
		75.8	Cable Included with Display
	1280 x 1024	60	Cable Included with Display
		77	Cable Included with Display
POWERdisplay 17 POWERdisplay 20	1024 x 768	75.8	39H8683
	1280 x 1024	60*	39H8683
		77	39H8683
P50	1024 x 768	60*	Cable Included with Display
		85	Cable Included with Display
P70	1024 x 768	60*	96G2156
		85	96G2156
	1280 x 1024	60	96G2156
		77	96G2156
G50	1024 x 768	60*	Cable Included with Display
		70	Cable Included with Display

Display Type	Screen Resolution (Non-Interlaced)	Refresh Freq (Hz)	Adapter Cable Part Number
G70	1024 x 768	60*	Cable Included with Display
		75	Cable Included with Display
	1280 x 1024	60	Cable Included with Display
G200	1024 x 768	60*	Cable Included with Display
		85	Cable Included with Display
	1280 x 1024	60	Cable Included with Display
		75	Cable Included with Display
P200	1024 x 768	60*	96G2156
		85	96G2156
	1280 x 1024	60	96G2156
		77	96G2156
	1600 x 1280	60	96G2156
P201	1024 x 768	60*	92G1712
		85	92G1712
	1280 x 1024	60	92G1712
		85	92G1712
	1600 x 1280	60	96G1712
Other VESA Resolutions/Refresh Rates	1024 x 768	60	
		70	
		75	
		85	
	1280 x 1024	75	
		85	

Notes:

* = Default display mode. Monitors listed are selectable using 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] = The 6317 color display is not explicitly included in SMIT. To run the 6317 in a mode other than 1024 x 768 at 60 Hz, use SMIT to select a display type of IBM-17V.

[5] = The 7091-7S1 display is not explicitly included in SMIT. To run the 709-7S1 in a mode other than 1024 x 768 at 60 Hz, use SMIT to select a display type of IBM-21P.

[6] = When installing cable P/N 09G3599, the black-leaded BNC connector (labeled ″V″) *must* be connected to the ″VD″ sync out connector on the back of the display.

POWER GXT800P 3D Graphics Adapter (FC 2853, 2859)

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 [6]	96G2156
		85	96G2156
	1280 x 1024	60*	96G2156
		75 [6]	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 [5,6]	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*	39H8683
Other VESA Resolutions/Refresh Rates	1024 x 768	60	
		70	
		75	
		85	
	1280 x 1024	60*	
		75	
		85	

Notes:

* = Default display mode. Monitors listed are selectable using 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.

[6] = This monitor at this refresh rate and screen resolution complies with the ISO 9241, Part 3 video ergonomics standard. ISO 9241, Part 3 compliance is dependent on a complete ISO capable platform of system unit, monitor, video subsystem, operating system, and fonts.

POWER GXT500P and POWER GXT550P 3D Graphics Adapters (FC 2854, 2855)

Display Type	Screen Resolution (Non-Interlaced)	Refresh Freq (Hz)	Adapter Cable Part Number
6091-16 Color POWERdisplay 16	1280 x 1024	60 [1] *	09G3539
		77 [2]	09G3541
6091-19i Color POWERdisplay 19	1280 x 1024	60 [3] *	09G3539
		77	09G3541
1091-051 Color POWERdisplay 16S	1280 x 1024	72*	09G3589 [5]
5081-16 Color 5081-019 w/ RPQ	1280 x 1024	60*	09G3539
6091-19 Color	1280 x 1024	60*	09G3539
6091-23 Color	1280 x 1024	60*	09G3539
6317 Color [4] 14V 15V 17V 14P 15P	1024 x 768	60	Cable Included with Display [6]
		70	Cable Included with Display [6]
		76	Cable Included with Display [6]
	1280 x 1024	60*	Cable Included with Display [6]
7091-7S1	1024 x 768	60	11H4004 (select with 7091 order)
		74	11H4004 (select with 7091 order)
		76	11H4004 (select with 7091 order)
	1280 x 1024	60*	11H4004 (select with 7091 order)
		77	11H4004 (select with 7091 order)
21P 17P	1024 x 768	60	Cable Included with Display [6]
		76	Cable Included with Display [6]
	1280 x 1024	60*	Cable Included with Display [6]
		60*	09G3539
		77	Cable Included with Display [6]
		77	09G3541
POWERdisplay 17 POWERdisplay 20	1024 x 768	74	09G3539
		76	09G3539
	1280 x 1024	60*	09G3539
		77	09G3541
P50	1024 x 768	74	Cable Included with Display [6]
		75	Cable Included with Display [6]
		85	Cable Included with Display [6]
	1280x1024	60*	Cable Included with Display [6]

Display Type	Screen Resolution (Non-Interlaced)	Refresh Freq (Hz)	Adapter Cable Part Number
P70	1024 x 768	70	96G2157
		74	96G2157
		75 [8]	96G2157
		85	96G2157
	1280 x 1024	60*	96G2157
		75 [8]	96G2157
		77	96G2157
P200	1024 x 768	70	96G2157
		74	96G2157
		75	96G2157
		85	96G2157
	1280 x 1024	60*	96G2157
		75	96G2157
		77	96G2157
		85 [7,8]	96G2157
P201	1024 x 768	70	60H7742
		74	60H7742
		75	60H7742
		85	60H7742
	1280 x 1024	60*	60H7742
		75	60H7742
		77	60H7742
		85	60H7742
9516-A03 (US/EMEA) 9516-A04 (AP)	1280 x 1024	60*	09G3539
Other VESA Resolutions/Refresh Rates	1024 x 768	60	
		70	
		75	
		85	
	1280 x 1024	60*	
		75	
		85	

Notes:

* = Default display mode. Monitors listed are selectable using 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] = The 6317 color display is not explicitly included in SMIT. To run the 6317 in a mode other than 1024 x 768 at 60 Hz, use SMIT to select a display type of 17V.

[5] = When installing cable P/N 09G3589, the black leaded BNC connector (labeled ″V″) *must* be connected to the ″VD″ sync out connector on the back of the display.

[6] = A 13W3 to 15-pin D shell converter cable (p/n 52G3255) is required to attach to display cable.

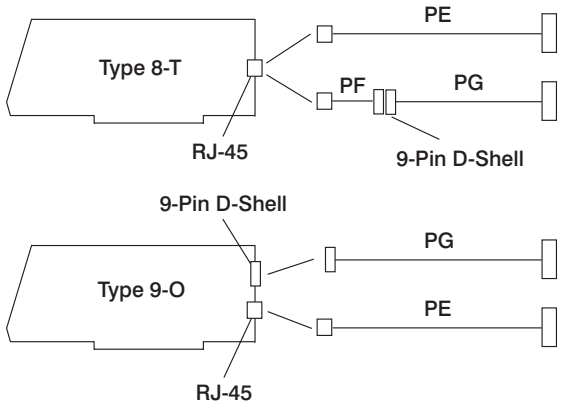
[7] = Only P200 Monitors with the N2 Chassis (M/T 6555, Model 77x) support 1280x1024 at 85Hz.

[8] = This monitor at this refresh rate and screen resolution complies with the ISO 9241, Part 3 video ergonomics standard. ISO 9241, Part 3 compliance is dependent on a complete ISO capable platform of system unit, monitor, video subsystem, operating system, and fonts.

Token-Ring Adapters (FC 2920, 2979, 4959)

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).

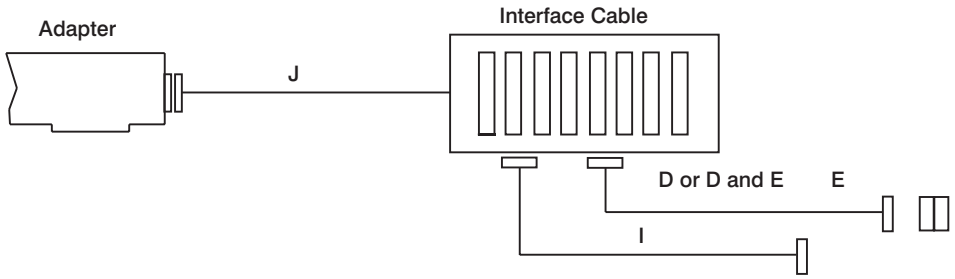
The following figure illustrates the Token-Ring Adapters with an attachment cable for the Token-Ring LAN.



Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
PE	RJ-45 to IBM Cabling System data connector cable	60G1063	N/A	3.04	10
	Token-Ring Unshielded Twisted Pair (UTP) cable, two twisted pairs of UTP cabling (Customer supplied)	N/A	N/A	N/A	N/A
PF	For Feature Code 2979, the conversion cable is shipped with the adapter. It converts from an RJ-45 connector to a 9-pin D-shell connector.	93H8894	N/A	0.3	1
	For Feature Code 2920, the conversion cable is available but **NOT** shipped with the adapter. It converts from an RJ-45 connector to a 9-pin D-shell connector.	93H8894	N/A	0.3	1
PG	IBM Cabling System data Connector to 9-pin D-shell token-ring Shielded Twisted Pair (STP) cable.	6339098	N/A	N/A	N/A

8-Port Async Adapter EIA-232E (FC 2931)

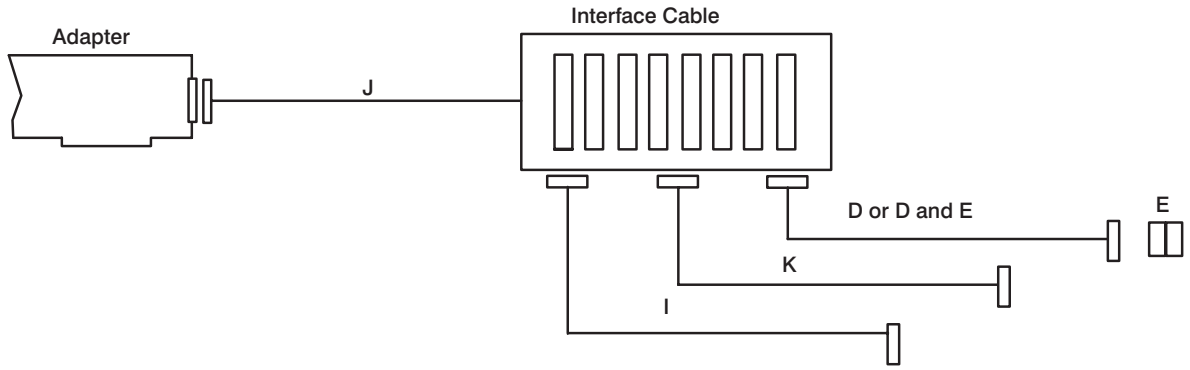
The following figure illustrates the 8-Port Async Adapter EIA-232E with the Multiport Interface Cable and attachment cables. The cable assembly ports are labeled 0 through 7. Attachment cables can connect to any of the eight ports. To make the necessary connections to this adapter, your setup person needs to know the devices and persons assigned to each port. See Chapter 5, “Cable Assembly and Pin-Outs”, on page 395 for cable building information.



Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
J	Cable assembly supplied with adapter	11H6011	N/A	1.5	5
		07L9001	N/A	3	10
D	Async Cable EIA-232E/V.24, if customer-supplied, must meet EIA-232E requirements.	6323741	2936	3	10
E	Printer/Terminal Interposer EIA-232E	58F2861	2937	.004	.17
I	Printer/Terminal Cable EIA-232E if customer-supplied, must meet EIA-232E requirements.	12H1204	2934	3	10

8-Port Async Adapters EIA-232E/RS-422A (FC 2932 and 2943)

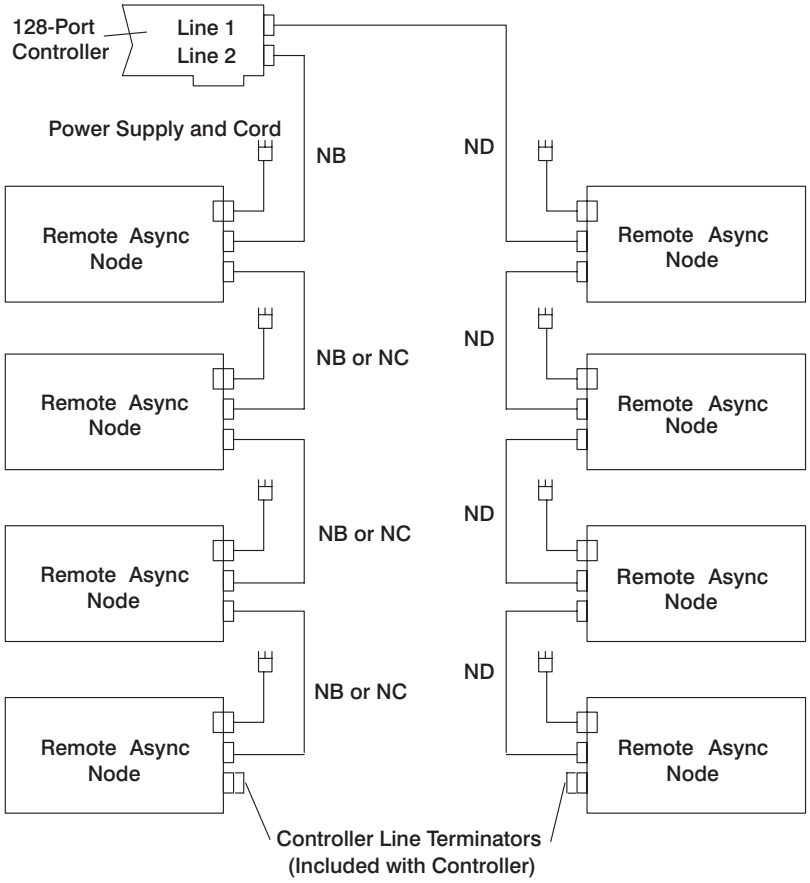
The following figure illustrates the 8-Port Async Adapter EIA-232E/RS-422A with the Multiport Interface Cable and attachment cables. The cable assembly ports are labeled 0 through 7. Attachment cables can connect to any of the eight ports. To make the necessary connections to this adapter, your setup person needs to know the devices and persons assigned to each port. See Chapter 5, “Cable Assembly and Pin-Outs”, on page 395 for cable building information.



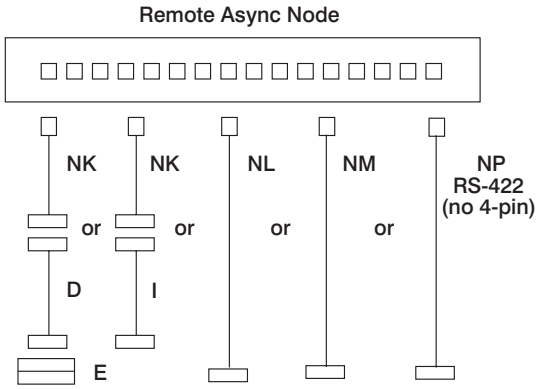
Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
J	Cable assembly supplied with adapter	11H6011	N/A	3	10
D	Async Cable EIA-232E/V.24, if customer-supplied, must meet EIA-232E requirements.	6323741	2936	3	10
E	Printer/Terminal Interposer EIA-232E	58F2861	2937	.004	.17
I	Printer/Terminal Cable EIA-232E if customer-supplied, must meet EIA-232E requirements.	12H1204	2934	3	10
K	Printer/Terminal Cable RS-422A, if customer-supplied, must meet RS-422A requirements.	30F8966	2945	20	65.5

128-Port Async Controllers (FC 2933, 2944)

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 following illustration, 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 this example is a customer-supplied cable. See “128-Port Async Controllers” on page 414.



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.



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 Controllers" on page 414 for information on cables that you can build yourself.

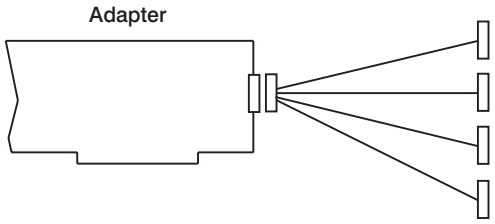
Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length m (ft)
NB	128-Port Async Controller Cable, 8-wire	43G0937	8131	4.57 (15)
NC	128-Port Async Controller Cable, 8-wire	43G0936	8132	.23 (.75)
ND	128-Port Async Controller Cable, 4-wire, customer-supplied.	N/A	N/A	N/A
NE	128-Port Async 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)
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

Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length m (ft)
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 (package 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.

IBM ARTIC960Hx 4-Port Selectable PCI Adapter (FC 2947)

The following figure illustrates the IBM ARTIC960Hx Base PCI Adapter with a 4-Port Selectable Mezzanine card. See Chapter 5, “Cable Assembly and Pin-Outs”, on page 395 for cable building information.



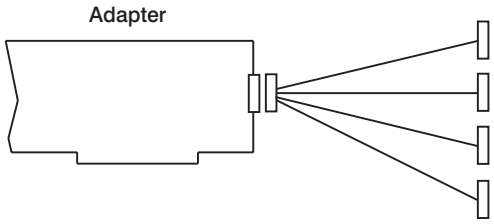
Each cable has a single 120-pin, male, D-shell connector that branches into four individual cables, each of which provides access to one of four independent ports.

The following table lists the FRU number and feature codes for each optional cable and the electrical interface it supports.

Cable Letter	Cable Name/ Description	FRU Part Number	Feature Code	Length	
				m	ft
PK	EIA-232 (ISO 2110) if customer-supplied, must meet EIA-232/(ISO 2110) requirements.	87H3405	2861	1.8	6
PL	EIA-530 (ISO 2110) if customer-supplied, must meet EIA-530/(ISO 2110) requirements.	87H3402	2865	1.8	6
PM	V.35 DTE (ISO 2593) if customer-supplied, must meet V.35 DTE/(ISO 2593) requirements.	87H3399	2864	1.8	6
PP	RS-449 (ISO 4902) if customer-supplied, must meet RS-449/(ISO 4902) requirements.	87H3396	2862	1.8	6
PR	X.21 (ISO 4903) if customer-supplied, must meet X.21/(ISO 4903) requirements.	87H3408	2863	1.8	6

IBM ARTIC960Hx 4-Port T1/E1 PCI Adapter (FC 2948)

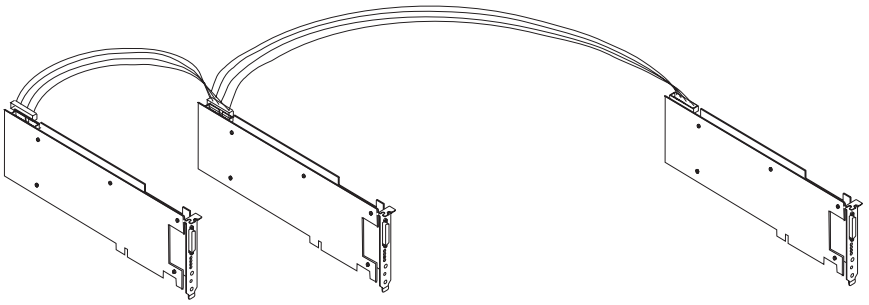
The T1 RJ-48 and the E1 RJ-48 assemblies consist of a 36-pin male connector at one end of a cable that branches into four individual cables, each of which provides access to one of four independent ports.



Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
PS	4-Port T1 RJ-48 cable	87H3518	2709	1.8	6
	4-Port E1 RJ-48 cable	87H3515	2710	1.8	6

IBM ARTIC960Hx DSP Resource PCI Adapter (FC 2949)

The following figure shows the cabling of the SC-Bus on the adapters.

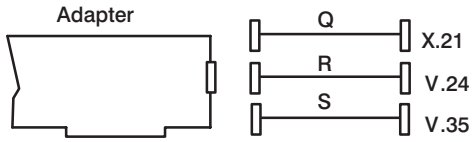


SC-Bus Ribbon Cabling

Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
PN	SC-Bus Ribbon Cable is customer-supplied. See build instructions in Chapter 5.	N/A	N/A	N/A	N/A

X.25 Interface Coprocessor Adapter (FC 2961)

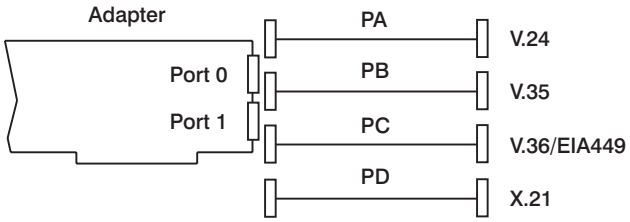
The following figure illustrates the X.25 Interface Coprocessor Adapter with attachment cables for each of the three supported interfaces. To make the necessary connections to this adapter, your setup person needs to know the type of network interface to be used.



Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
Q	X.25 Attachment Cable-X.21	07F3150/07F3151 53F3926	2965	3	10
			2976	6	20
R	X.25 Attachment Cable-V.24	07F3160/07F3161 53F3927	2966	3	10
2977	6	20			
S	X.25 Attachment Cable-V.35	07F3170/07F3171 53F3928	2967	3	10
2978	6	20			

2-Port Multiprotocol PCI Adapter (FC 2962)

The following figure illustrates the 2-Port Multiprotocol PCI Adapter and attachment cables. The adapter has two ports; each port can handle all of the available protocols. See Chapter 5, “Cable Assembly and Pin-Outs”, on page 395 for cable building information.



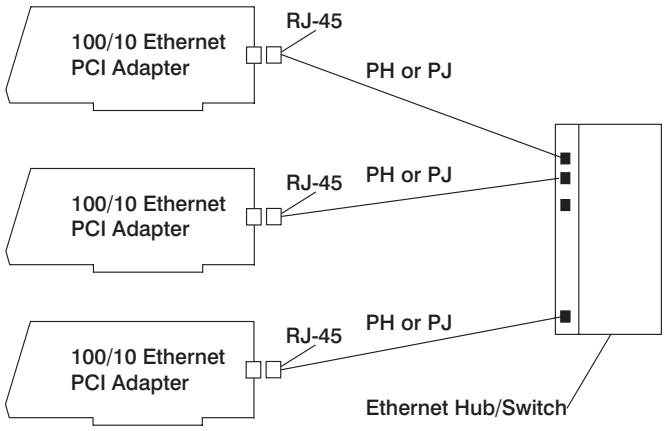
Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
PA	V.24 if customer-supplied, must meet V.24 requirements.	93H5263	2951	3	10
PB	V.35 if customer-supplied, must meet V.35 requirements.	93H5264	2952	3	10
PC	V.36/EIA-449 if customer-supplied, must meet V.36/EIA-449 requirements.	93H5265	2953	3	10
PD	X.21 if customer-supplied, must meet X.21 requirements.	93H5267	2954	3	10

10/100 Ethernet PCI Adapter (FC 2968)

Use the following cable rules when obtaining cables:

- For 10 Mbps - Use unshielded, twisted-pair category 3, 4, or 5 cable. Category 5 is recommended. Maximum length is 100 meters.
- For 100 Mbps - Use unshielded, twisted-pair category 5 cable only. Maximum length is 100 meters.

Twisted-pair (100/10BaseT) and Uses RJ-45 Connectors



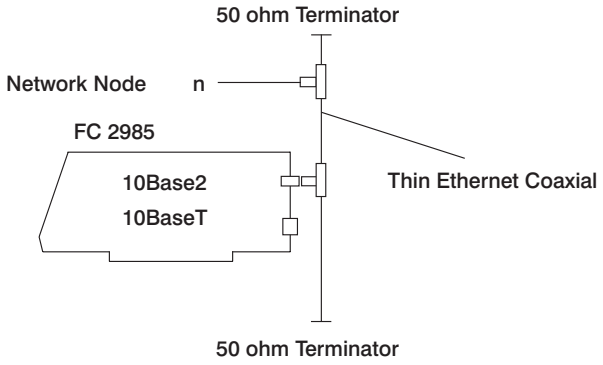
Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length Meters
PH	Straight thru Ethernet cable - Customer supplied unshielded RJ-45 twisted-pair cable, must meet IEEE 802.3 requirements. This type of cable is typically used on switches. Consult your manual.	N/A	N/A	Maximum 100M
PJ	Crossover Ethernet cable - Customer-supplied RJ-45 unshielded twisted-pair cable, must meet IEEE 802.3 requirements. Refer to your Hub/Switch manual for proper cable type.	N/A	N/A	Maximum 100M

Note: See Chapter 5, “Cable Assembly and Pin-Outs”, on page 395.

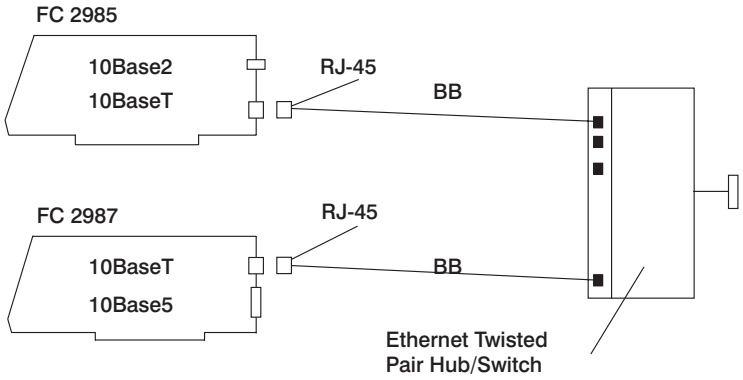
Ethernet PCI Adapter (FC 2985, 2987)

The following figures illustrate the Ethernet Adapter with attachment cables.

The Thin (10Base2) BNC Connector is the Ethernet Standard Connector

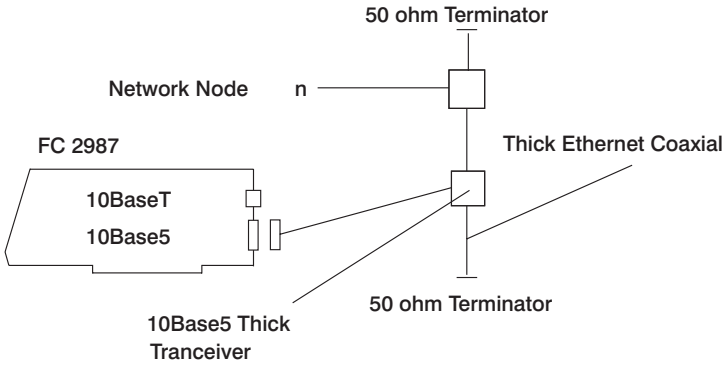


Twisted-pair (10BaseT) and Uses RJ-45 Connectors



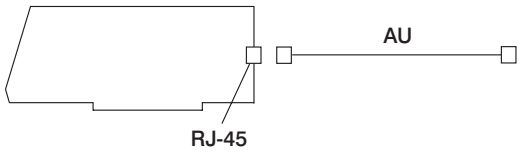
Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length
BB	Customer-supplied RJ-45 unshielded twisted-pair cable, must meet IEEE 802.3 requirements.	N/A	N/A	N/A

The Thick (10Base5) Connector is the Ethernet Standard Connector



TURBOWAYS 25 ATM PCI Adapter (FC 2998)

The following figure illustrates the TURBOWAYS 25 ATM PCI Adapter with an attachment cable for the TURBOWAYS 25 ATM LAN.



Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
AU	RJ-45 to RJ-45 shielded Twisted Pair (STP) cable, two twisted pairs of STP cabling (Customer supplied).	N/A	N/A	100	325
AU	RJ-45 to RJ-45 Unshielded Twisted Pair (UTP) cable, two twisted pairs of UTP cabling (Customer supplied).	N/A	N/A	100	325

Cabling SSA Subsystems to SSA Adapters (FC 6215, 6218 and 6225)

Use this section when connecting SSA subsystem units as follows:
- MT 7133 Models 010, 020, 500, and 600
- MT 7131 Model 405

This cabling information applies to SSA Adapters such as the following:
- PCI SSA Multi-Initiator/RAID EL RAID Adapter
- PCI SSA 4-Port RAID Adapter
- Advanced SerialRAID Adapter

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 contain additional 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.

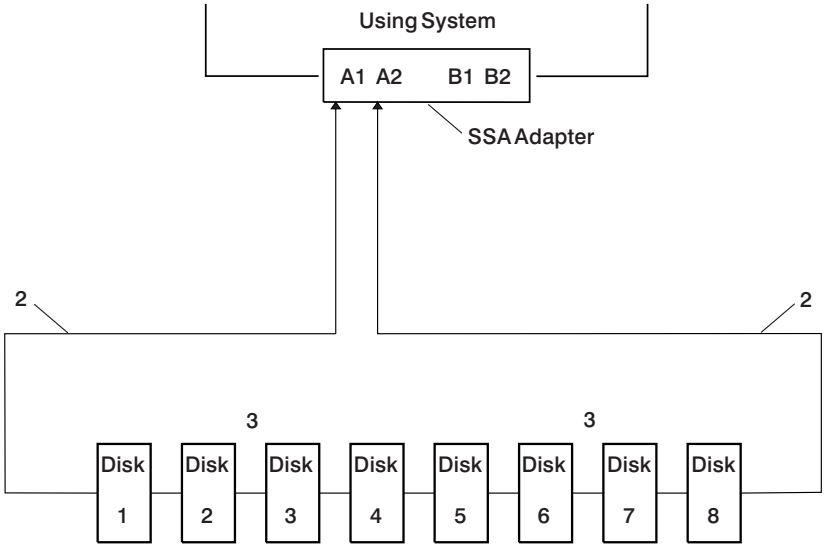
The maximum permitted length for an external copper cable that connects two SSA nodes (disk drives or adapters) is 25 meters (82 feet).

Nodes that have the SSA Fiber Extender feature can be connected by fiber-optic cable over a maximum permitted length of 2.4 kilometers (7874 feet).

Nodes that have the Advanced SSA Optical Extender feature can be connected by fiber-optic cable over a maximum permitted length of 10 kilometers (32800 feet).

All devices that are attached to a SSA adapter (1) 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.

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. At this point, 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.

SSA Link Speed

Some SSA devices can run at 20 MB per second; others can run at 40 MB per second. Both types of devices can exist in the same configuration. For optimum performance, all links must run at the same speed.

The speed at which a link runs is automatically agreed on between its two nodes. Under some fault conditions, a link that normally runs at 40 MB per second might run at 20 MB per second.

Two types of SSA cable are available:
- 20 MB per second SSA cables (color coded black)
- 40 MB per second SSA cables (color coded blue)

Rules for SSA Loops

For SSA loops that include the PCI SSA 4-Port RAID Adapter (FC 6218, type 4-J), 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.
- Ports B1 and B2 have two sets of connectors: an internal B1, B2 pair and an external B1, B2 pair. Only one pair of these loop connectors can be used at a time.

For SSA loops that include the PCI SSA Multi-Initiator/RAID EL Adapter (FC 6215, type 4-N), 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 SSA Multi-Initiator/RAID EL adapter can be connected in the loop.
- Ports B1 and B2 have two sets of connectors: an internal B1, B2 pair and an external B1, B2 pair. Only one pair of these loop connectors can be used at a time.

For SSA loops that include the Advanced SerialRAID Adapters (FC 6225, type 4-P), the following rules apply:

- Each SSA loop must be connected to a valid pair of connectors on the same SSA adapter (that is, either connectors A1 and A2, or connectors B1 and B2).
- Only one pair of adapter connectors can be connected in a particular SSA loop.
- Only one adapter can be connected in a particular loop if any drives in that loop are configured for RAID-0.
- Only one adapter can be connected in a particular loop if any disk drive or array is configured for fast-write operations.
- Only two adapters can be connected in a particular loop if any drives in that loop are configured for RAID-5.
- All member disk drives of an array must be on the same loop.
- A maximum of 48 devices can be connected in a particular SSA loop.
- A maximum of eight adapters can be connected in a particular SSA loop.
- When an SSA adapter is connected to two SSA loops, and each loop is connected to other adapters, all adapters must be connected to both loops.
- When attaching to devices capable of running at 40 MB per second, the blue coded SSA cables must be used.
- When connecting directly between two adapters, the blue coded SSA cables must be used.
- The SSA loop can provide support for any SSA Multi-Initiator/RAID EL Adapter in the same loop if the configuration rules for those adapters are also observed. See the *SSA Adapters: User's Guide and Maintenance Information*, SA33-3272 (Version 01 or later) for more information.

SSA Cables for MT 7133 Models 010, 020, 500, and 600

See “Rules for SSA Loops” on page 304 for information on setting up your system.

See “SSA Cables for 7133 Models D40 and T40” on page 315 for cabling 7133 models D40 and T40.

Important: The following SSA cables are available as features of the 7133 models 010, 020, 500, and 600:

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, the adapter, or both. The cables supplied depends on the number of disk drives that are installed in the 7133 unit. The following SSA Cables are provided with a 7133 Model 010 or 020:

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.

SSA Cabling for MT 7131 Model 405

This section provides information on cabling for 7131 Model 405 to the following adapters:

- PCI SSA 4-Port RAID Adapter
- PCI SSA Multi-Initiator/RAID EL Adapter
- Advanced SerialRAID Adapters.

See “Rules for SSA Loops” on page 304 for information on setting up your system.

“Base Configuration” and “Loop Configuration using Four 7131 Units” on page 309 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 easily identify the disk drives.

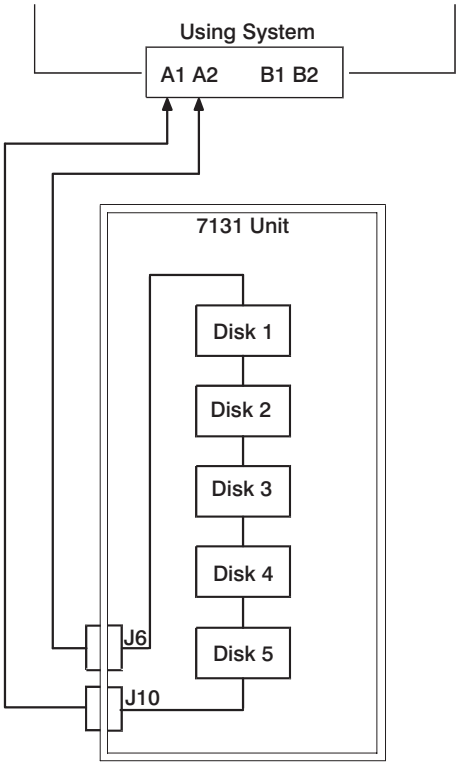
Important: All of the feature codes listed for the SSA copper cables (item 2) in the following table are feature codes of machine type 7131.

Item	Description	Part Number	Feature Code	Length	
				m	ft
1	PCI SSA 4-Port RAID Adapter	32H3835	6218 feature of system unit	N/A	N/A
1	PCI SSA Multi-Initiator/RAID RAID EL Adapter	96H9938	6215 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 three disk drive positions contain dummy disk drive carrier assemblies.

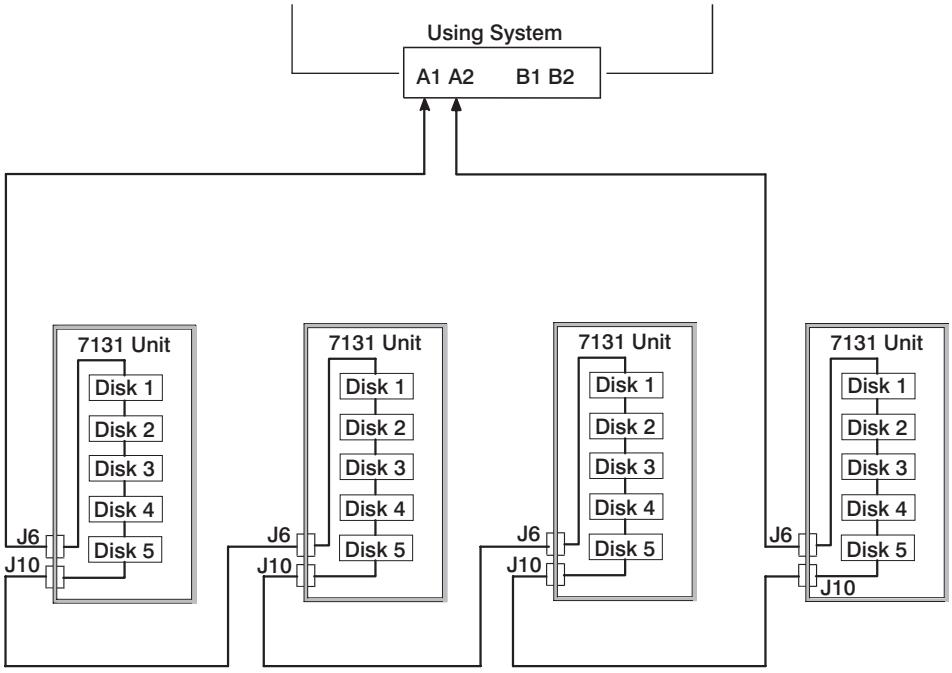
In the simplest configuration, the SSA loop is completed by connecting the two SSA connectors on the 7131 unit to one of the two pairs of connectors on an SSA adapter card in the using system:



Note: The cables shown in the preceding diagram are described on page 307.

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 preceding diagram are described on page 307.

Cabling SSA Adapters Using External Cables to Internal Devices

This section contains information about connecting SSA adapter external ports to internal SSA disk drives for:

- PCI SSA 4-Port RAID Adapter
- PCI SSA Multi-Initiator/RAID EL Adapter
- Advanced SerialRAID Adapters

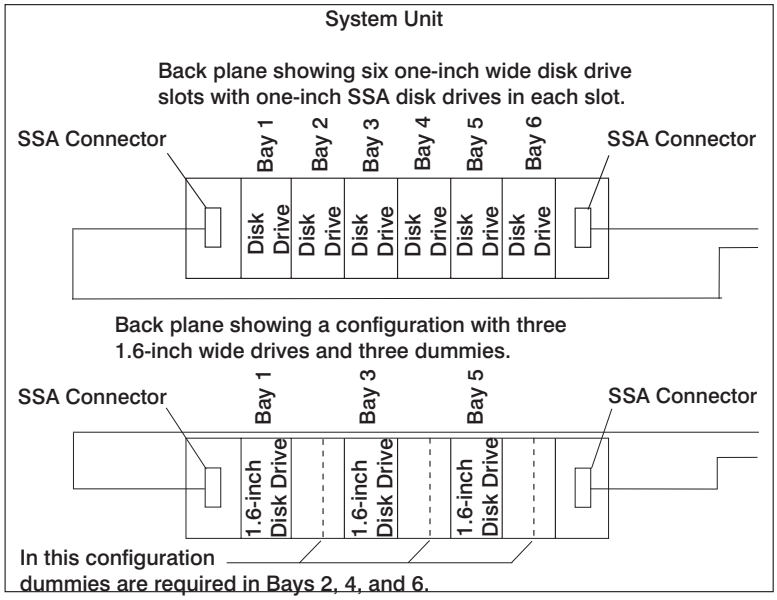
Some system units have a pair of SSA bulkhead connectors at the rear of the system unit. The bulkhead connectors allow a pair of the SSA adapters external ports to be used to support internal SSA devices. This configuration is used when it is necessary to support both internal and external SSA disk drives on a single pair of SSA ports.

A pair of SSA ports A1 and A2, or B1 and B2, can support a maximum of 48 SSA disk drives.

For more detailed information on cabling the SSA subsystem, see “Cabling SSA Subsystems to SSA Adapters (FC 6215, 6218 and 6225)” on page 303.

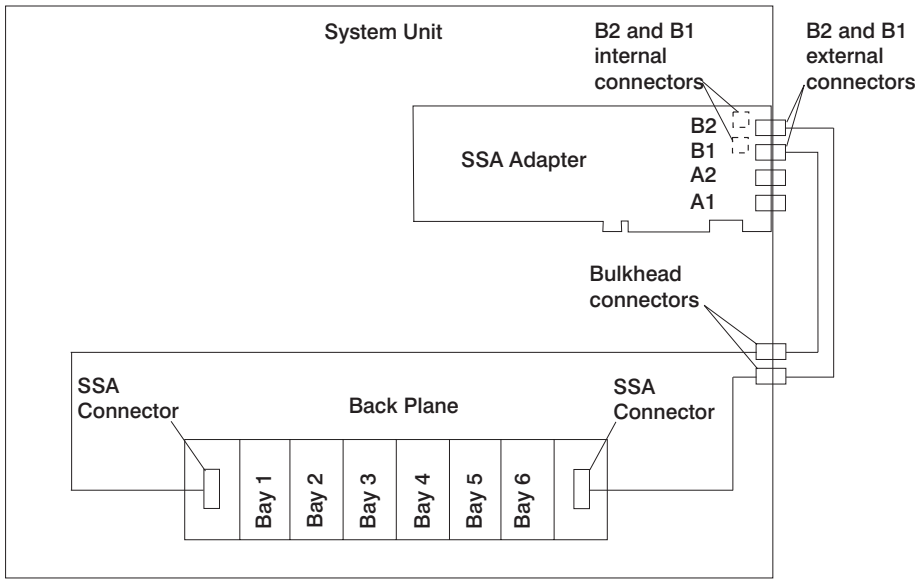
Internal SSA Backplanes

The internal SSA backplanes support up to 18 one-inch SSA drives. The backplanes are shown with six one-inch wide bays or SSA drives. When 1.6 inch SSA drives are used, only three drives can be installed (each drive takes two bays) and a dummy is required in each of the three unused bays to complete the loop. See the following illustration.



Simple SSA Loop to Internal SSA Drives

The following illustration shows a simple loop configuration using two short (0.6m or 2ft. P/N 93H4340) external cables from the SSA adapters external ports to the bulkhead connectors.

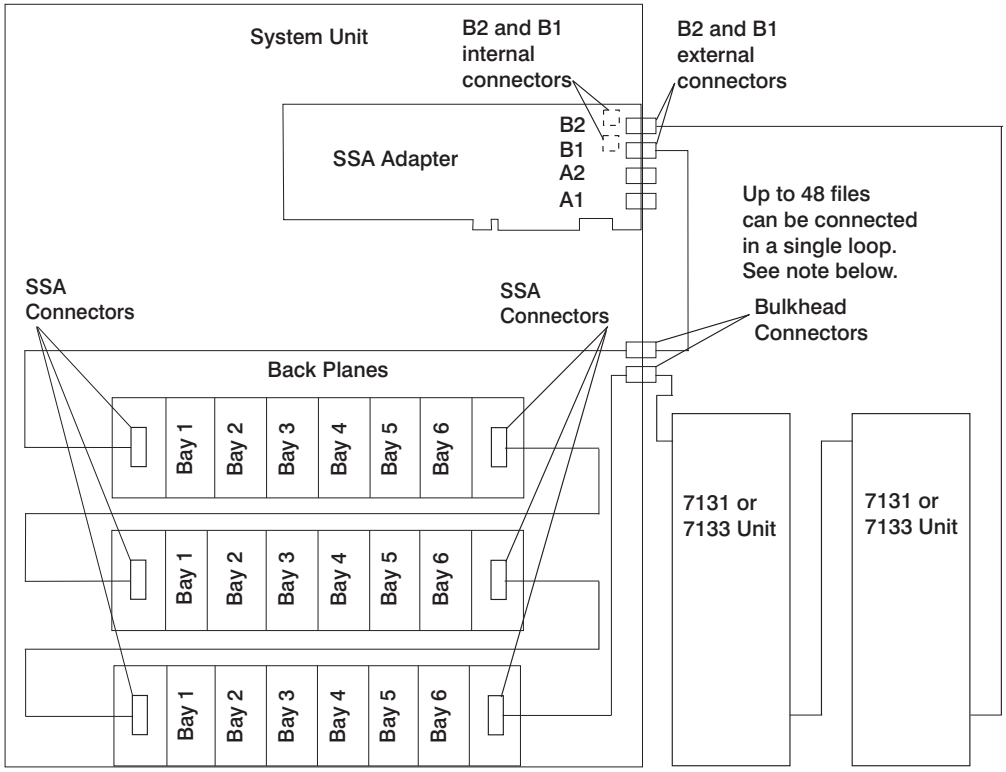


Notes:

1. The cables required to cable SSA subsystems are described on page 307.
2. When cabling to external cable pair B1 and B2, ensure that the internal cable pair B1 and B2 is not being used. These port pairs are mutually exclusive; they cannot be used at the same time.
3. The Advanced SerialRAID Adapters do not have internal SSA cable connectors. External cables only can be used.

SSA Loop to Internal and External SSA Drives

The following illustration shows a configuration using both internal and external SSA disk drives to form the SSA loop. The external SSA devices can be installed in any combination of 7131 Model 405 or 7133 external SSA subsystem storage units.



Notes:

1. A pair of SSA ports can support up to 48 disk drives. Two to 18 disk drives can be internal and the remainder can be external. Two 7131/7133 disk drive units are shown in the preceding illustration. Several can be cabled together until a total of 48 disk drives are in a single SSA loop.
2. The cables required to cable SSA subsystems are described on page 307.
3. When cabling to external cable pair B1 and B2, ensure that the internal cable pair B1 and B2 is not being used. These port pairs are mutually exclusive; they cannot be used at the same time.
4. For information on cabling the internal SSA backplanes to the internal connectors on the SSA adapter, see your system unit user's guide.
5. The Advanced SerialRAID Adapters does not have internal SSA cable connectors. Only external cables can be used.

Cabling SSA Subsystems to MT 7133 Model D40 and T40 to an SSA Adapter (FC 6218 and 6225)

Use this section when connecting SSA subsystem units as follows: MT 7133 Models D40 and T40 to the PCI SSA 4-port RAID Adapter and the Advanced SerialRAID Adapters.

This section provides the configuration rules for SSA adapter FC 6218, a general introduction to SSA cabling, and details of the SSA cables.

The installation and service manuals for each SSA subsystem unit contain additional 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.

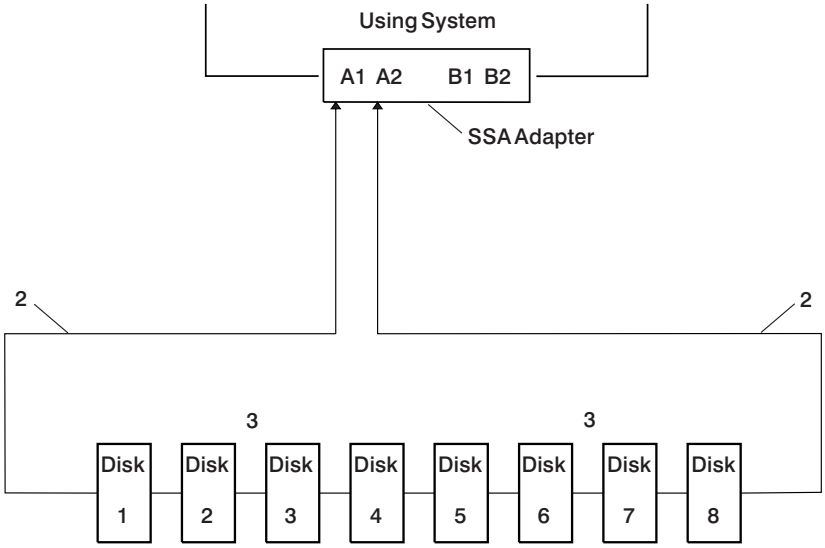
The maximum permitted length for an external copper cable that connects two SSA nodes (disk drives or adapters) is 25 meters (82 feet).

Nodes that have the SSA Fiber 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).

Nodes that have the Advanced SSA Optical Extender (feature code 8851 on MT 7133) feature can be connected by fiber optic-cable over a maximum permitted length of 10 kilometers (32800 feet).

All devices that are attached to a SSA adapter card (1) 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. Use the following illustration and the cables shown in the table on page 315.

Data can travel in either direction around 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. At this point, 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.

SSA Link Speed

Some SSA devices can run at 20 MB per second; others can run at 40 MB per second. Both types of devices can exist in a particular configuration, but for optimum performance, all links must run at the same speed.

The speed at which a link runs is automatically agreed between its two nodes. Under some fault conditions, a link that normally runs at 40 MB per second might run at 20 MB per second.

Two types of SSA cable are available:
- 20 MB per second SSA cables (color coded black)
- 40 MB per second SSA cables (color coded blue)

Rules for SSA Loops

For SSA loops that include the PCI SSA 4-Port RAID Adapter (FC 6218, type 4-J), 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.
- Ports B1 and B2 have two sets of connectors: an internal B1, B2 pair and an external B1, B2 pair. Only one pair of these loop connectors can be used at a time.

For SSA loops that include the Advanced SerialRAID Adapters (FC 6225, type 4-P), the following rules apply:

- Each SSA loop must be connected to a valid pair of connectors on the same SSA adapter (that is, either connectors A1 and A2, or connectors B1 and B2).
- Only one pair of adapter connectors can be connected in a particular SSA loop.
- Only one adapter can be connected in a particular loop if any drives in that loop are configured for RAID-0.

- Only one adapter can be connected in a particular loop if any disk drive or array is configured for fast-write operations.
- Only two adapters can be connected in a particular loop if any drives in that loop are configured for RAID-5.
- All member disk drives of an array must be on the same loop.
- A maximum of 48 devices can be connected in a particular SSA loop.
- A maximum of eight adapters can be connected in a particular SSA loop.
- When an SSA adapter is connected to two SSA loops, and each loop is connected to other adapters, all adapters must be connected to both loops.
- When attaching to devices capable of running at 40 MB per second, the blue-coded SSA cables must be used.
- When connecting directly between two adapters, the blue-coded SSA cables must be used.
- The SSA loop can provide support for any SSA Multi-Initiator/RAID EL Adapter in the same loop if the configuration rules for those adapters are also observed. See the *SSA Adapters: User's Guide and Maintenance Information* , SA33-3272 (Version 01 or later) for more information.

SSA Cables for 7133 Models D40 and T40

This section provides information on cabling for the 7133 Models D40 and T40 SSA disk drive subsystems, to the PCI SSA 4-Port RAID adapter and Advanced SerialRAID Adapters.

See "Rules for SSA Loops" on page 314 for information on setting up your system.

Important: The following SSA cables are available as features of the MT 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
Note: When connecting between Advanced SerialRAID Adapters, use only the above cables.			

Gigabit Fibre Channel Adapters (FC 6227 and 6228)

The Gigabit Fibre Channel adapters have different connectors and capabilities, but share the same systemic features.

Fibre Channel Devices and Configurations

This section discusses Fibre Channel devices and configurations.

Fibre Channel Devices

The following Fibre Channel devices are available for direct connection to a Gigabit Fibre Channel PCI Adapter (F/C 6227) Port in a Fibre Channel Storage Area Network (SAN) configuration:

- McDATA ED-5000 Enterprise Fibre Channel Director
- 2109-S08 and S16 SAN Fibre Channel Switch
- 2103-H07 Fibre Channel Hub
- 2108-G07 SAN Data Gateway
- 2102-F10 Fibre Channel RAID Storage Subsystem
- 2105-E10, E20, F10, and F20 Enterprise Storage Server with Fibre Channel Ports
- EMC Symmetrix, Version 4.8, 3000 and 5000 Enterprise Storage Systems
- Magstar 3590 Models E11 and E1A Tape Subsystems

The following SCSI devices are available for connection to a 2108-G07 SAN Data Gateway SCSI interface in a Fibre Channel SAN configuration:

- 2105-E10, E20, F10, and F20 Enterprise Storage Server with SCSI interfaces
- Magstar MP (Multi-purpose) 3570 Tape Subsystem Models C00 - C22
- Magstar MP (Multi-purpose) 3575 Tape Library DataServer Models L06 - L32
- Magstar 3590 Tape Subsystem
- Ultrium 3580 Tape Subsystem

The following Fibre Channel devices are available for connection to a 2103-H07 Fibre Channel Hub Port in a SAN configuration:

- 2103-H07 Hub (both long- and short-wave port connections)
- 2102-F10 Fibre Channel RAID Storage Subsystem
- 2105-E10, E20, F10, and F20 Enterprise Storage Server with Fibre Channel Ports
- EMC Symmetrix, version 4.8, 3000 and 5000 Enterprise Storage Systems
- Magstar 3590 Models E11 and E1A Tape Subsystems

The following Fibre Channel devices are available for connection to a McDATA ED-5000 Enterprise Fibre Channel Director port, or a 2109-S08 or S16 SAN Fibre Channel Switch in a SAN configuration:

- 2105-E10, E20, F10, and F20 Enterprise Storage Server with Fibre Channel Ports
- EMC Symmetrix, version 4.8, 3000 and 5000 Enterprise Storage Systems
- Magstar 3590 Model E11 and E1A Tape Subsystem (non-cascaded switch). Attachment to the McData ED-5000 also requires a McData ED-1000 between the ED-5000 and the 3590.
- 2108-G07 SAN Data Gateway
- A port of a 2109-S08 or S16 connected in cascade to another 2109-S08 or S16 only
- A port of a McData ED-5000 connected in cascade to another McData ED-5000 only

Cascading is a configuration method in which the fabric can be greatly enlarged by interconnecting Fibre Channel switches. Links within the fabric, that is links between two cascaded switches, are called *hops*. Both switch ports involved in a cascaded connection must be of the E_Port type. While cascading enables much larger fabrics, it can reduce performance. Therefore, cascading must be carefully planned. It is

recommended that the fabric be configured so that no Host/Device path includes more than four cascaded switches (three hops). Also, a host/device path must not contain more than one long-wave link.

When cascading 2109 switches, the following 2109 parameters must be set:

- In-Order-Delivery (IOD) set to ON
- Dynamic-Load-Sharing (DLS) set to OFF

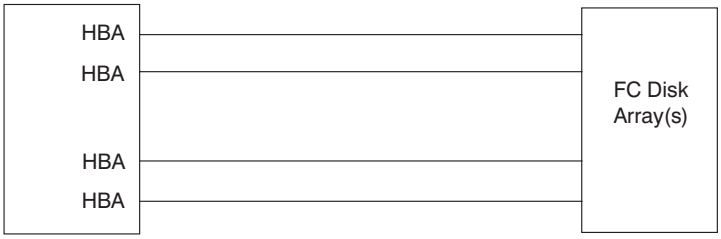
Fibre Channel Configurations

This section discusses Fibre Channel configurations in SAN environments. Representative configurations are shown as examples of the wide variety of configurations possible. Refer to the *IBM Fibre Channel Planning and Integration: User's Guide and Service Information*, order number SC23-4329, for descriptions of the basic Fibre Channel topologies used in these configurations.

In the following configurations, HBA (Host Bus Adapter) is the Fibre Channel adapter in the host system. The number of adapters that can be installed in an AIX system is dependent upon the type and model of that system. Refer to the *PCI Adapter Placement Reference*, order number SA38-0538, to determine the maximum number of adapters allowed in your AIX system.

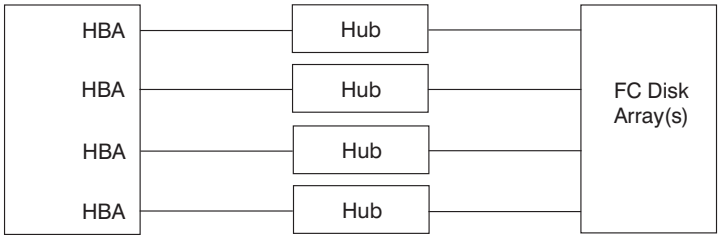
In configurations where multiple HBAs in the same system unit have access to the same Fibre Channel Disk Storage Subsystem, each HBA must be assigned its own drive groups, or Logical Units (LUNs). Refer to the publications for your Disk Storage Subsystem for information on how to assign LUNs.

Point-to-Point Configurations: Fibre Channel devices, such as Disk Storage Subsystems, can be directly attached to an AIX system host. An example of this type of configuration is shown in the following illustration. The host system on the left is shown here with four HBAs connected to a Fibre Channel disk array. The host system can have one or more HBAs connecting to ports on the same, or different, Fibre Channel disk arrays.

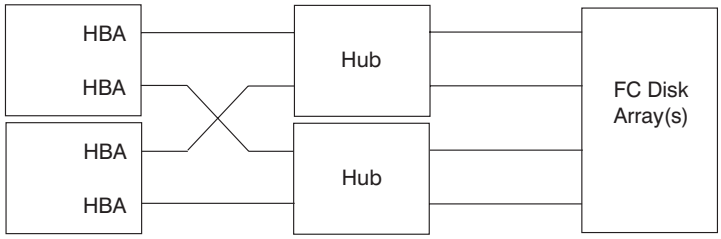


Hub Configurations: One or more hubs can be included in a Fibre Channel configuration allowing a host system HBA and one or more Fibre Channel devices to be connected in a Fibre Channel Arbitrated Loop (FC-AL) topology. Hubs can be cascaded, that is, a port of one hub can be connected to a port of another hub.

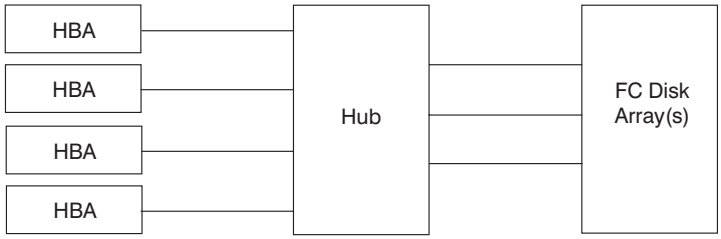
Hub Configuration With One Host System: The following illustration shows an example of a single host system connected through hubs to a Fibre Channel disk array. The host system can have one, and only one, HBA connected to each hub. Each Fibre Channel device can have from one to four ports also connected to the hubs.



Hub Configuration With Two Host Systems: The following illustration shows an example of two host systems connected through hubs to a Fibre Channel disk array. In this example, each system is connected to both hubs.



Hub Configuration With Four Host Systems: The following illustration shows an example of four host systems connected through a single hub to a Fibre Channel disk array. This example also illustrates the maximum of seven connections available on a hub.



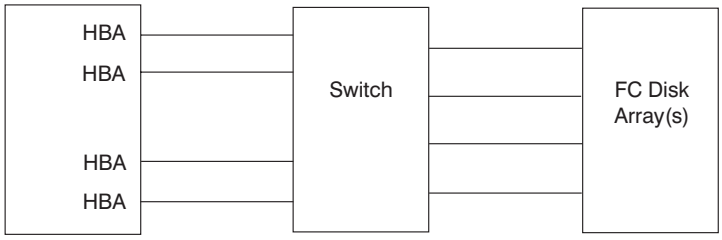
Switch Configurations: Switches can be included in a Fibre Channel configuration allowing multiple host system HBAs and multiple Fibre Channel devices to be connected in a Fibre Channel fabric topology.

Switches allow you to set zones of permitted and non-permitted port-to-port connections. You can block certain ports from connecting to each other. You can use zoning to prevent multiple HBAs in the same system unit from accessing the same LUNs in a Disk Storage Subsystem. Refer to the publications for your switch for information on how to configure zones.

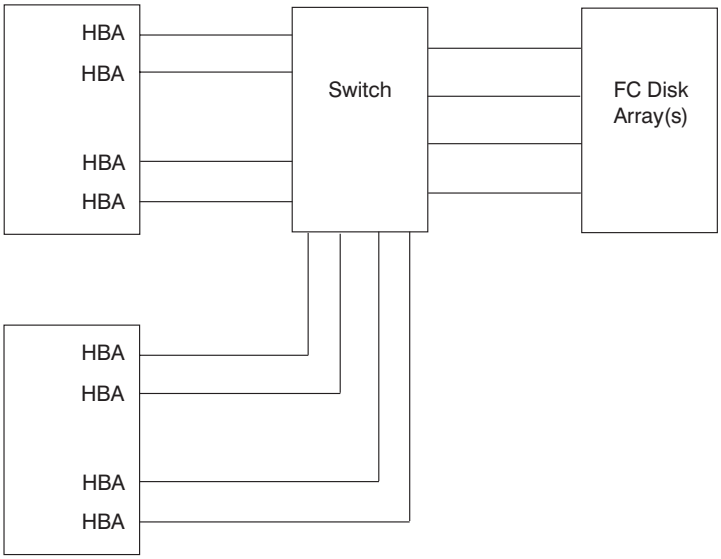
Note: Anytime a switch configuration is changed by soft rezoning or reblocking ports, or by host-to-switch cabling changes, the **cfgmgr** AIX command must be run to set up the new configuration parameters.

Switches can also be interconnected, or cascaded, to create a much larger and complex configuration.

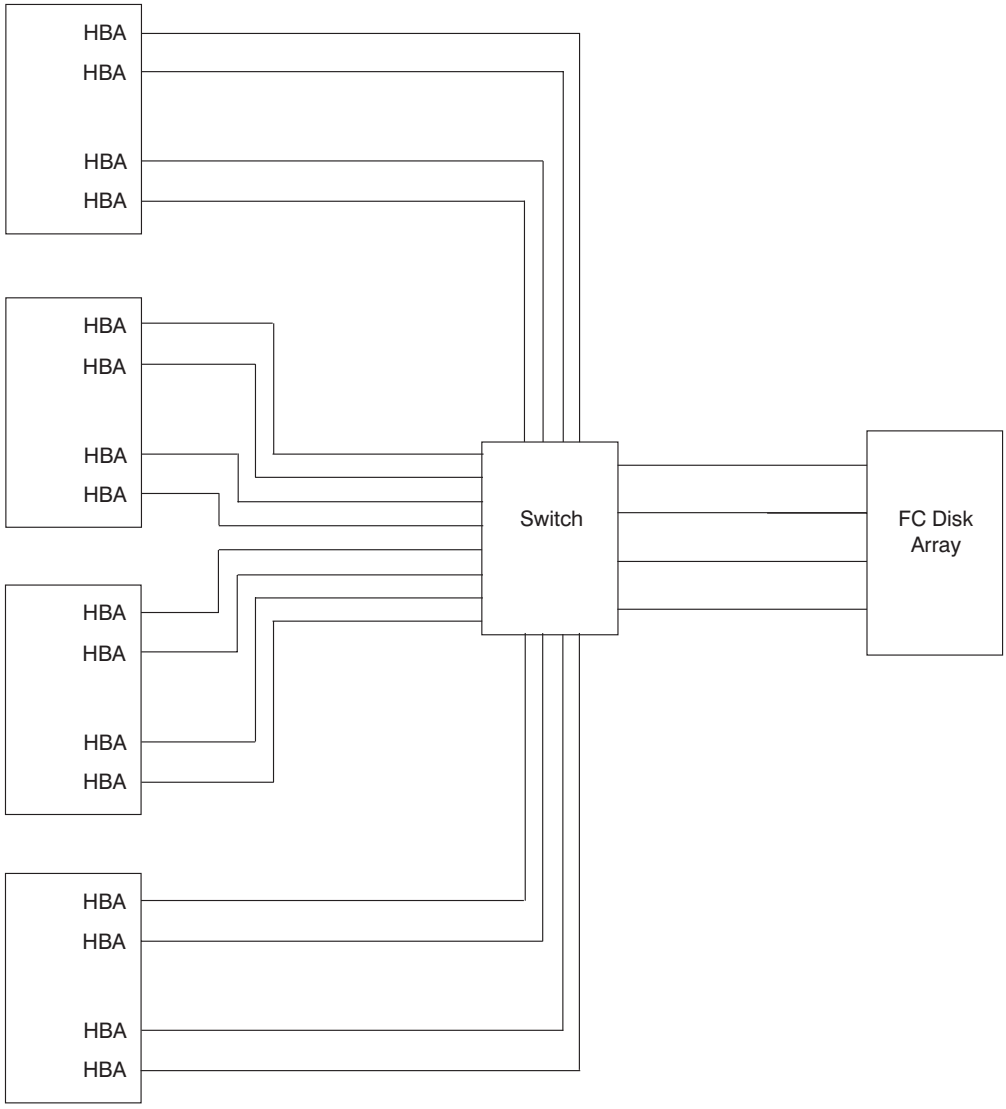
Switch Configuration with One Host System: The following illustration shows an example of a single host system connected through a switch to a Fibre Channel disk array. The host system can have one or more HBAs, each connected to the switch. Each Fibre Channel device can have from one to four ports also connected to the switch.



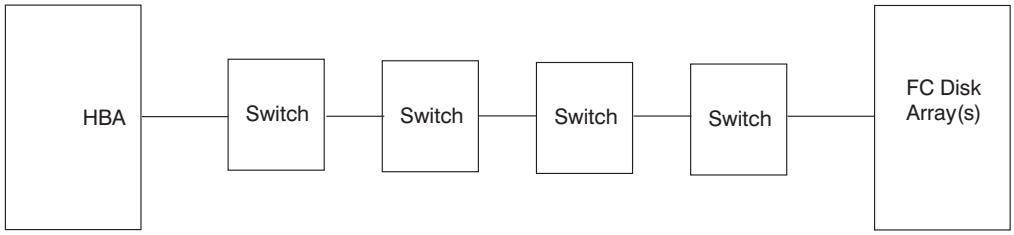
Switch Configuration with Two Host Systems: The following illustration shows an example of two host systems connected through a switch to a Fibre Channel disk array.



Switch Configuration with Four Host Systems: The following illustration shows an example of four host systems connected through a switch to a Fibre Channel disk array.

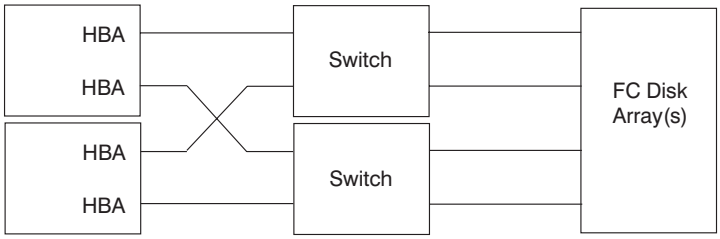


Cascaded Switch Configuration: The following illustration shows an example of switch cascading. In this example, one HBA and one FC Disk port are shown connected through four cascaded switches.

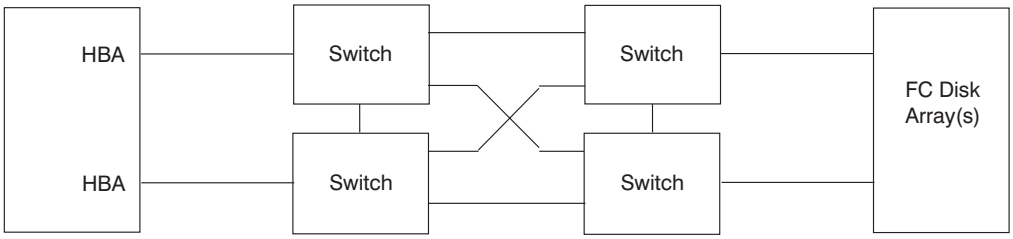


Switches in a High Availability Configuration: Due to its nature, Fibre Channel lends itself well to High Availability Cluster Multi-Processing (HACMP) environments. Switch configurations employing two or more host systems and two or more switches provide high availability capabilities so that in the event of failure of any one component, access to the data remains intact through an alternate path.

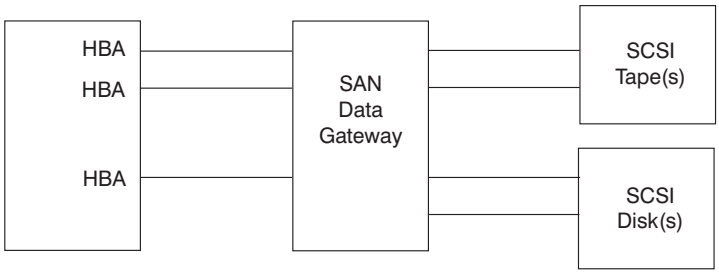
The following illustration shows an example of a High Availability switch configuration. Here, the second host provides backup for the primary host. The failure of the primary host results in a transfer of the task (failover) to the second host without loss of access to the data. The second switch performs a similar function in providing an alternate path to the data in case of complete failure of one of the switches. In addition, each host system has two HBAs allowing a single port failure to occur at the host or switch without loss of the path.



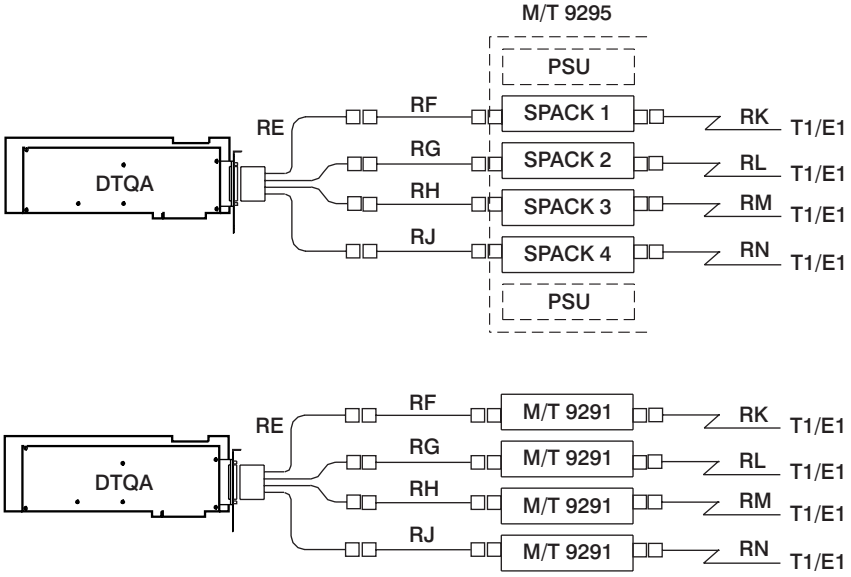
The following illustration shows an example of a high-availability cascaded switch configuration. In this example, four switches are cascaded in such a way that if any one switch port (or even one whole switch) fails, the remaining three switches still form a fully functional fabric.



SAN Data Gateway Configurations: SAN Data Gateways can be included in a Fibre Channel configuration allowing SCSI devices to be connected into the Fibre Channel Environment. The following illustration shows a single host system with three HBAs connected to a SAN Data Gateway. On the right, a Tape and Disk Subsystem are shown connected through two SCSI interfaces each. The SAN Data Gateway can have up to three Fibre Channel ports, each connected to an HBA in one or more hosts. It provides four SCSI interfaces for attaching SCSI Tape and Disk Subsystems.



Digital Trunk Quad PCI Adapter (FC 6309)



Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length m (ft)
RE	Quad Cable	10J2560	None	0.3 (1)
RF, RG, RH, RJ	SPACK	34F0873	None	2 (6)
RK, RL, RM, RN	T1	54F0740	None	15 (45)
	E1 120 ohms	05F2045	None	2 (6)
	E1 75 ohms	58G6195	None	1.5 (7.5)

IBM ARTIC960RxD Quad Digital Trunk PCI Adapter (FC 6310)

The IBM ARTIC960RxD Quad Digital Trunk PCI Adapter has both internal and external cables.

External Cabling

The IBM ARTIC960RxD Quad Digital Trunk PCI Adapter external cable assemblies consist of a 36-pin male connector at one end of a cable that branches into four individual cables, each of which connects to an independent T1 or E1 digital trunk interface.

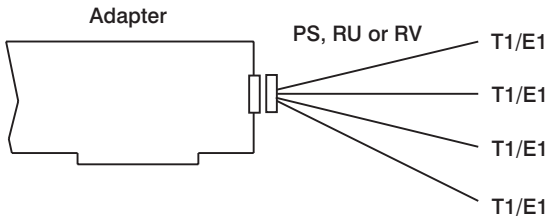


Figure 1. Illustration of IBM ARTIC960RxD Quad DTA With a 4-port T1/E1 Cable

Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
PS	T1, RJ-48 cable	87H3518	2709	1.8	6
	E1, RJ-48 cable	87H3515	2710	1.8	6
RU	E1, 75 ohm Unbalanced/Grounded	87H3521	2875	1.8	6
RV	E1, 75 ohm Unbalanced/Ungrounded	87H3629	2876	1.8	6

The only difference between cables RU and RV is that cable RU has the outer coax shields of *both* transmit and receive cables connected to frame ground in the 36-pin connector whereas cable RV has *only* the transmit coax cable shields connected to ground. To avoid earth loops, it is recommended that only one end of each coax cable shield be connected to frame ground and that this must be done at the transmit end of each cable.

Note: Transmit at the Quad DTA end becomes Receive at the other end of the cable and vice versa.

Cable RU must be used only when both cables are ungrounded at the network end. Other cable configurations (TX ungrounded, RX ungrounded and TX ungrounded, RX grounded) can only be handled with a custom-made cable.

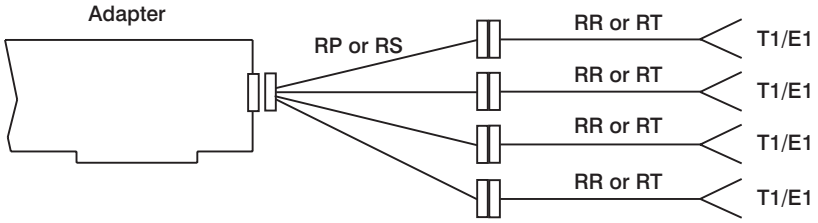


Figure 2. Illustration of IBM ARTIC960RxD Quad DTA With a 4-port T1/E1 Cable and a T1/E1 Extension Cable

Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
RP	T1, 100 ohm Balanced	87H3793	2871	3	10

Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
RR	T1, 100 ohm Balanced Extension	87H3791	2872	15	50
RS	E1, 120 ohm Balanced	87H3790	2873	3	10
RT	E1, 120 ohm Balanced Extension	05F2045	2874	7.5	25

Note: If it is necessary to connect Cable RT to telecommunications equipment that provides Insulation Displacement Connectors (IDC), this must be done using a terminal block that allows a short length of IDC-compatible solid cored cable to be added to the end of Cable RT. Suitable terminal blocks are available from AMP as part numbers AMP-601716-4 and 601717-4.

Internal Cabling

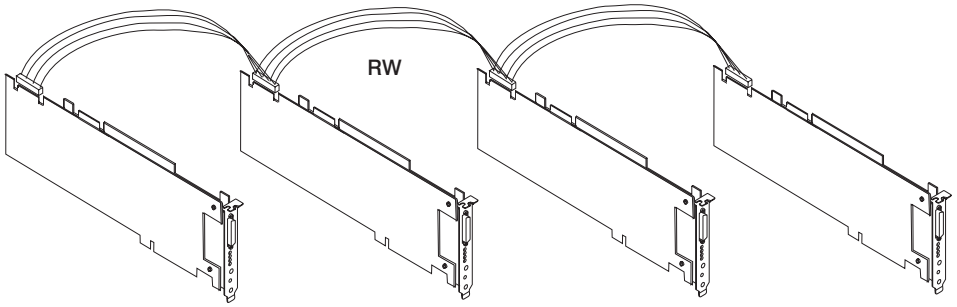
Multidrop cable assemblies are used to connect the internal buses on up to four Quad Digital Trunk PCI Adapters. There are three top card cables: RW, RX, and RY. RW is used to connect multiple IBM ARTIC960RxD Quad DTAs to each other as well as other adapters with H.100 connectors. See the following figure. Cables RX and RY are used to connect Quad DTAs or other adapters that have H.100 connectors, as well as adapters that have SC-Bus connectors.

These cables are long enough to connect four adapters that support H.100 connectors in adjacent slots.

H.100, 4-Drop Cabling

The IBM ARTIC960RxD Quad DTAs have H.100 top card connectors.

The following figure illustrates the internal cabling for the IBM ARTIC960RxD Quad DTAs with the H.100 top card connectors cabled together. Up to four IBM ARTIC960RxD Quad DTAs are supported and must be in adjacent slots.



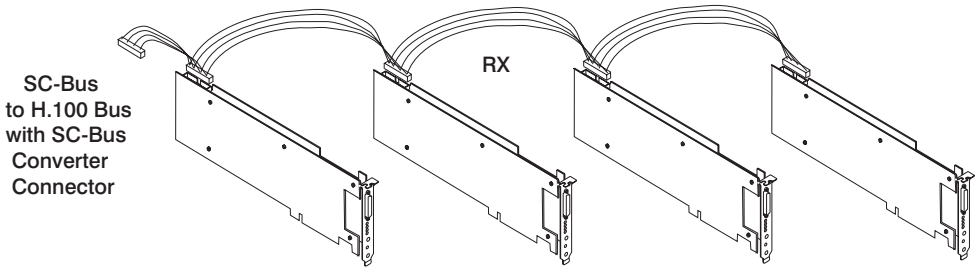
H.100, 4-Drop Ribbon Cabling

Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
RW	H.100, 4-drop Internal Cable	08L1215	2877	0.09	0.3

SC-Bus, 5-Drop Cable

This multidrop cable assembly is used to connect up to four adapters with SC-Bus internal connectors. The assembly has an additional SC-Bus connector which connects to cable RY. See “H.100, 4-Drop Cable With SC-Bus Converter Connector” on page 327. This allows adapters with SC-Bus connectors to be used with the IBM ARTIC960RxD Quad DTAs and with other adapters that have H.100 top card connectors.

The following figure illustrates the internal cabling for up to four adapters with SC-Buses and an additional SC-Bus connector that goes to the H.100 4-drop Cable with SC-Bus converter connector.



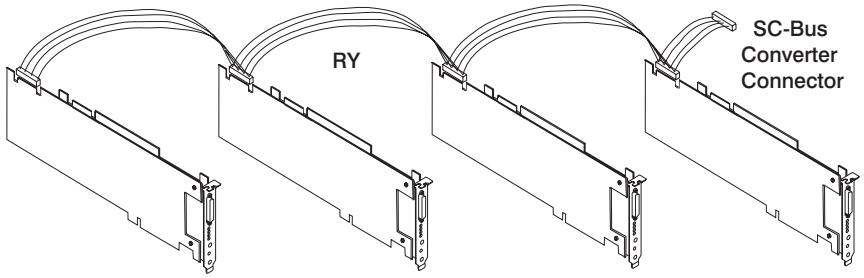
SC-Bus, 5-Drop Cable

Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
RX	SC-Bus, 5-Drop cable	08L1217	2878	0.176	0.58

H.100, 4-Drop Cable With SC-Bus Converter Connector

This multidrop cable assembly is used to connect the internal buses on up to four IBM ARTIC960RxD Quad DTAs with H.100 connectors. The assembly has an additional connector to connect to cable RX. See “SC-Bus, 5-Drop Cable” on page 326. This allows adapters with SC-Bus connectors to be used with the IBM ARTIC960RxD PCI Adapters and other adapters that have H.100 connectors.

The following figure illustrates the internal cabling for up to four IBM ARTIC960RxD Quad DTAs with an additional connector to the SC-Bus 5-drop cable with SC-Bus converter connector.



H.100, 4-Drop cable with SC-Bus Converter Connector

Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
RY	H.100, 4-Drop Cable with SC-Bus Converter Connector	08L1219	2879	0.176	0.58

Note: In other publications, this cable is referred to as the 4-Drop H.100 Cable with SC-Bus Converter.

ARTIC960RxF Digital Trunk Resource (DTRA) Adapter (FC 6311)

The ARTIC960RxF DTRA has only internal cables.

The ARTIC960RxF DTRA is used with an ARTIC960RxD Quad Digital Trunk Adapter (DTXA). Two multidrop cable assemblies are available to connect the adapters. Cable RW may be used to attach combinations of the two adapters up to a total of four adapters. Cable RZ may be used to attach combinations of the two adapters up to a total of eight adapters. However, only three of each type of adapter are allowed. All the ARTIC960RxD DTXA adapters must be in lower numbered slots than the ARTIC960RxF DTRAs attached to it. The ARTIC960RxD DTXA can have up to three ARTIC960RxF DTRAs attached to it. The adapters must be placed in adjacent adapter slots.

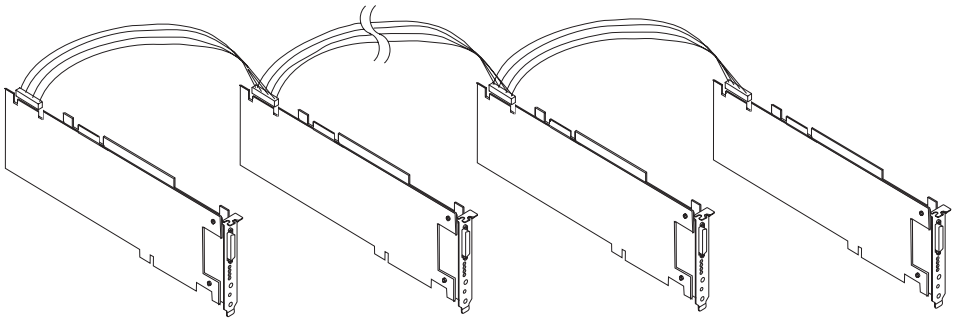
H.100, 4-Drop and 8-Drop Cables

The following figure illustrates the internal cabling for the ARTIC960RxF DTRA and ARTIC960RxD DTXA.

Install all the ARTIC960RxD DTXA in the lower numbered slot, followed by the ARTIC960RxF DTRAs (up to three) in the higher numbered slots adjacent to the ARTIC960RxD.

RW is a H.100, 4-Drop Cable

RZ is a H.100, 8-Drop Cable



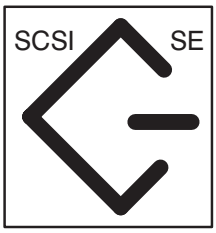
Cable Letter	Cable Name/ Description	Part Number	Feature Code	Length	
				m	ft
RW	H.100, 4-drop Internal Cable	08L1215	2877	0.9	0.3
RZ	H.100, 8-drop Internal Cable	03N3493	4353	0.18	0.6

Chapter 4. SCSI Cabling

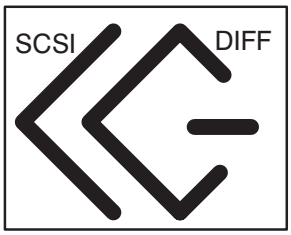
This chapter describes the cabling for SCSI adapters and devices that are used with the system.

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

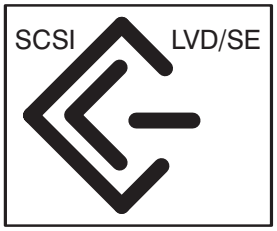
OEM SCSI-1, SCSI-2 single-ended, low-voltage differential, and SCSI-2 differential adapters may carry one of the following ANSI icons:



Single-Ended



Differential



Low Voltage Differential/ Single-Ended

Fast Path to SCSI Cable Information

The following section contains information on all SCSI adapters, cables, terminators, and SCSI rules. To attach one SCSI device to a SCSI adapter, perform the following procedure. If you are attaching more than one device to an adapter, see the information in this chapter.

To attach one device, do the following:

1. Go to table “External SCSI Devices” on page 332 and locate the device you want to attach. Make a note of its characteristics.
2. Go to table “Cabling SCSI Devices” on page 331 and in the first column, locate the adapter to which you want to attach the device. (Note: You cannot attach single-ended (SE) devices to differential adapters or visa versa). Note the page number from the first column.
3. Go to the page for the selected adapter and continue until you come to the “Adapter-to-First Device Cable Table”. Locate the cable you need. Note the feature code number and the part number provided. The machine type (MT) column indicates if the cable is ordered with the system or with the device.

For example: You want to attach a 7204-010 external 1.0 GB disk drive:

- From the table “External SCSI Devices” on page 332, you record that the 7204-010 is an 8-bit, single-ended dual connector device.
- You decide to connect this device to the PCI SCSI-2 Fast/Wide adapter. From “Cabling SCSI Devices” on page 331, you see that the cabling information for this adapter starts on “Cabling the PCI SCSI-2 Fast/Wide Single-Ended Adapter FC 2408 or 6208” on page 337.
- You go to the “Adapter-to-First Device Cables” on page 338. From this table you choose feature code 2111, which is the cable to attach an 8-bit device that has two 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 this chapter.

Cabling SCSI Devices

The following table indicates where to locate information on cabling specific SCSI configurations:

Note: To understand the cabling for the SCSI adapters, read “General SCSI Considerations” on page 333, and then refer to the sections described in the table for information on specific SCSI cabling configurations.

Reference and Page	ID	Type	Label
“Cabling the PCI SCSI-2 Fast/Wide Single-Ended Adapter FC 2408 or 6208” on page 337	SCSI-2	Single-ended	4-A, 4_A
“Cabling the PCI Single-Ended Ultra SCSI Adapter FC 6206” on page 345	SCSI	Single-ended	4-K
“Cabling the PCI SCSI-2 Fast/Wide Differential Adapter FC 2409 or 6209” on page 351	SCSI-2	Differential	4-B, 4_B
“Cabling the PCI Differential Ultra SCSI Adapters FC 6204 or 6207” on page 365	SCSI	Differential	4-L, 4-U
“Cabling the PCI SCSI-2 F/W RAID Adapter (FC 2493)” on page 369	SCSI-2	Single-ended	4-H
“Cabling the PCI 3-Channel Ultra2 SCSI RAID Adapter (FC 2494)” on page 373	SCSI-2	Single-ended, low-voltage differential	4-T
“Cabling the PCI Dual-Channel Ultra2 SCSI Adapter (FC 6205)” on page 376	SCSI	Single-ended, low-voltage differential	4-R
“Cabling the PCI 4-Channel Ultra3 SCSI RAID Adapter (FC 2498)” on page 384	SCSI-2	Single-ended, low-voltage differential	4-X
“Cabling the PCI Dual-Channel Ultra3 SCSI Adapter (FC 6203)” on page 388	SCSI	Single-ended, low-voltage differential	4-Y

External SCSI Devices

The following table provides some characteristics of some External SCSI Devices:

Machine Type - Model	Bus Width	SE or Diff	Connectors
2104 - DL1, TL1, DU3, TU3	16 Bit	Low-voltage Differential	Single
7203 - 001 7204 - 001 7204 - 010 7204 - 112	8 Bit 8 Bit 8 Bit 16 Bit	Single-ended Single-ended Single-ended Single-ended	Single Single Dual Dual
7204 - 113 7204 - 114 7204 - 139	16 Bit 16 Bit 16 Bit	Single Ended Single Ended Single Ended	Dual Dual Dual
7204 - 215 7204 - 315 7204 - 317 7204 - 320	8 Bit 16 Bit 16 Bit 8 Bit	Differential Differential Differential Single-ended	Dual Dual Dual Single
7204 - 325 7204 - 339 7206 - 001 7206 - 005 7207 - 001	16 Bit 16 Bit 8 Bit 8 Bit 8 Bit	Differential Differential Single-ended Single-ended Single-ended	Dual Dual Dual Dual Single
7207 - 011 7207 - 012 7207 - 315 7208 - 001 7208 - 011 7208 - 341	8 Bit 8 Bit 16 Bit 8 Bit 8 Bit 16 Bit	Single-ended Single-ended Differential Single-ended Single-ended Differential	Single Single Dual Single Single Dual
7209 - 001 7209 - 002 7209 - 003 7210 - 001 7210 - 005	8 Bit 8 Bit 8 Bit 8 Bit 8 Bit	Single-ended Single-ended Single-ended Single-ended Single-ended	Single Dual Dual Single Dual
7210 - 010 7210 - 015 7331 - 205 7331 - 305 7332 - 005	8 Bit 8 Bit 16 Bit 16 Bit 8 Bit	Single-ended Single-ended Differential Differential Single-ended	Dual Dual Quad Quad Dual
7131 - 105 7131 - 105	16 Bit 16 Bit	Single-ended Differential	Single Dual
7336 - 205	16 Bit	Differential	Quad

General SCSI Considerations

SCSI Terminators

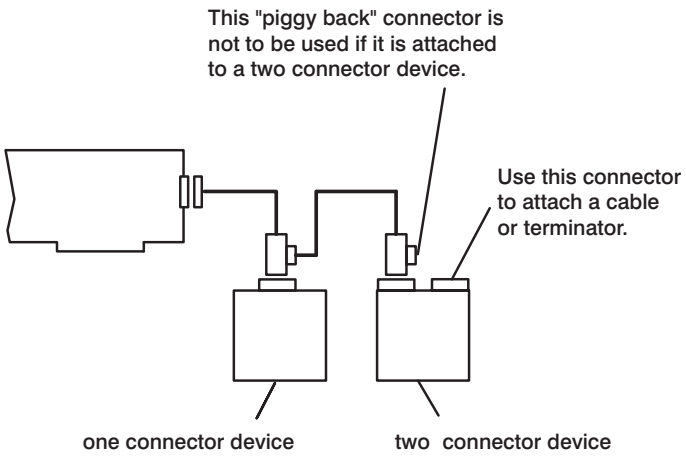
- The SCSI bus must have two terminators, and the terminators must be located at each end of the bus.
- If the configuration consists of an adapter with external devices only, make sure that the appropriate SCSI terminator is connected to the last device on the bus. Refer to the adapter installation guide for instructions on verifying proper jumper settings on the adapter.
- If the configuration consists of an adapter with internal devices only, make sure that the appropriate SCSI terminator is connected to the end of the internal SCSI cable. Refer to the adapter installation guide for instructions on verifying proper jumper settings on the adapter.
- If the configuration uses both internal and external devices, make sure that the appropriate SCSI terminator is connected to the last device on the external bus and that the end of the internal SCSI cable has been properly terminated. Refer to the adapter installation guide for instructions on verifying proper jumper settings on the adapter.
- Some devices may be shipped with terminators installed. These terminators must be removed before adding a device onto an existing SCSI bus.

SCSI Bus-Length General Guidelines

SCSI bus length is the distance between terminators at either end of a SCSI bus. In the case of single-ended SCSI bus, the maximum bus length depends on the type of bus and the type of devices attached.

- For configurations using both internal and external cabling length restrictions, refer to the length from the end of the internal cable (where the internal termination is located) to the terminator on the last device on the external bus.
- Devices that have two SCSI connectors have internal cabling. This cabling must be included when calculating total cable length. When attaching these devices to a SCSI chain, connect one cable to one connector, and the other cable to the other connector (terminator instead of cable if this is the last device on the bus). Do not ″piggyback″ the second cable/terminator onto the first as you would with a device that had only one SCSI connector (see the following illustration).

Single-Ended External Narrow Bus



- A dedicated adapter is recommended for attachment of any external enclosure containing multiple SCSI devices.

Single-Ended

The maximum supported cable length depends on what type of devices are attached (SCSI-1, SCSI-2 and so forth). Device types are classified as follows:

- SCSI-1 - maximum transfer rate of 5 MB/sec (one byte transfers)
- SCSI-2 Fast - maximum transfer rate of 10 MB/sec (one byte transfers)
- SCSI-2 Fast/Wide - maximum transfer rate of 20 MB/sec (two byte transfers)
- Ultra SCSI - maximum transfer rate of 20 MB/sec (one byte transfers)
- Ultra SCSI Wide - maximum transfer rate of 40 MB/sec (two byte transfers)

The maximum supported cable length for configurations without any SCSI-2 fast or ultra SCSI devices is 6 meters (approximately 20 feet).

The maximum supported cable length for configurations that include SCSI-2 fast, but not ultra-SCSI, is 3 meters (approximately 10 feet).

The maximum supported cable length for configurations of four or less Ultra SCSI devices is 3 meters (approximately 10 feet); for configurations larger than four Ultra SCSI devices, 1.5 meters (approximately 5 feet).

High-Voltage Differential

The maximum supported cable length for high-voltage differential is 25 meters (approximately 80 feet).

Low-Voltage Differential/Single-Ended

If a single-ended device is attached to a low-voltage differential adapter, the entire bus will operate as a single-ended bus, with the same cable length limitations. See “Single-Ended” on page 334. To operate in low-voltage differential mode all devices on the bus must be low-voltage differential including the terminator. High-voltage differential devices are not supported on a low-voltage differential bus and will prevent any devices on the bus from working correctly.

The maximum allowed cable length for point-to-point low-voltage differential SCSI bus configurations is 25 meters (approximately 80 feet). The maximum cable length for multidrop low-voltage differential connections is 12 meters (approximately 40 feet).

SCSI Device Addresses

The SCSI-2 Fast/Wide and Ultra2 adapters support a maximum of 16 SCSI addresses, including devices and adapters. The default address for an adapter is 7.

- All devices on the SCSI bus must have a unique SCSI ID.
- The SCSI bus address determines priority on the bus. Address priority from highest to lowest is as follows:
  - 7, 6, 5, 4, 3, 2, 1, 0, and 15, 14, 13, 12, 11, 10, 9, 8, with the 15 through 8 addresses being used in 16-bit configurations only.
  - Generally, the highest priority is assigned to the adapter.
- For any single-adapter, 8-bit configuration, a maximum of 7 devices is permitted, provided that the supported configuration specific bus lengths are not exceeded. For 16-bit configurations, a maximum of 15 devices is permitted, provided that the supported configuration-specific bus lengths are not exceeded.
- The default ID of the SCSI adapter in a single adapter 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 adapter 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 a 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 adapters and devices. Choosing SCSI IDs other than 7 for both adapters prevents problems when using standalone diagnostics on systems in HA clusters or in multi-initiator configurations.
- Check the documentation for your specific SCSI subsystem to ensure that there are be no SCSI ID conflicts if the adapters are addressed at ID(s) other than 6 or 7.

SCSI Bus Width Guidelines

- Operation of both 8-bit and 16-bit devices on the same external SCSI bus is not recommended due to termination and cabling restrictions.
- Operation of both 8-bit and 16-bit devices on the same internal bus is supported concurrently as long as a 16-bit internal cable and 68-pin to 50-pin interposers (for attachment of 8-bit devices) are used. The FRU part number for this interposer is 92F0324 (assem. P/N 92F2565).
- Mixed-width internal attachment is supported concurrently with single-width external attachment, as long as maximum cable length restrictions are not exceeded.

Overload Protection and Terminator Power (TERMPWR)

The SCSI adapters provide TERMPWR for the SCSI bus; configure devices on the bus so that they do not provide TERMPWR.

The adapter uses a positive temperature coefficient (PTC) resistor to control TERMPWR on the bus - when an overload condition is sensed, the PTC electrically ″opens″ and TERMPWR is no longer be present on the SCSI bus. The PTC resets within five minutes after removal of the cause for the overload condition.

The PTC may be tripped by a defective, miswired or improper cable, terminator, or device, but typically not by a defective adapter.

In general, do not connect or disconnect any SCSI device while power is on. Hot plugging of SCSI devices is not supported without specially designed connectors and chassis developed for that purpose, unless you first ensure that the SCSI bus is in an inactive (quiescent) state at the time of device attachment or detachment. Otherwise, undetectable data errors might occur.

Cabling the PCI SCSI-2 Fast/Wide Single-Ended Adapter FC 2408 or 6208

To understand the cabling for this adapter, read the “General SCSI Considerations” on page 333, then read the following for specific information.

SCSI-2 Single-Ended Cable Lengths Using This Adapter

The maximum supported cable length for configurations without any SCSI-2 Fast devices is 6 meters (approximately 20 feet).

If a configuration includes SCSI-2 Fast devices (devices that support data rates of up to 10 MB/sec for 8-bit or 20 MB/sec for 16-bit transfers), the maximum cable length supported is 3 meters (approximately 10 feet).

The maximum length includes the internal cabling of any device that has two SCSI connectors. Observe the following rules:

- When connecting external devices, a maximum of four independent physical enclosures is allowed, provided each physical enclosure presents one device load to the SCSI bus. For example, a 7131-105 cannot be attached in combination with any other internal or external load, but up to four external devices such as the 7204-112 can be attached. If four external devices are attached and any one device is capable of SCSI-2 fast transfers, then total bus length is limited to 3 meters. In this case, the maximum bus length has been reached and therefore no additional external or internal devices can be attached to the SCSI bus.
- A single enclosure containing any amount of multiple SCSI device loads attached externally to this adapter is supported, but subject to the following restrictions:
  - Maximum combined internal and external cable length is 3 meters.
  - Loads on the cable (cable length between devices) must be 0.1 meters apart at a minimum.
  - No mixing of device widths (8-bit and 16-bit) unless the 68-pin to 50-pin interposer (P/N 92F2565 or equivalent) is used.
  - SCSI-2 architectural restrictions (timing requirements and skew restrictions) must be observed.
  - No internal devices are allowed to be attached to the adapter. It is recommended that dedicated adapters be used for external SCSI enclosures that contain more than two devices.
- Only one multi-initiator (High-Availability) configuration is supported with this adapter.

Cable and Terminator Tables for the PCI SCSI-2 Fast/Wide Single-Ended Adapter

Adapter-to-First Device Cables

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
Host System	2111	Adapter-to-first device (where first device has two connectors), 8-bit narrow bus	06H6037	1.0
Host System	2113	Adapter-to-first device (where first device has one connector), 8-bit narrow bus	52G0174	1.5
Host System	2115	Adapter-to-first device (where first device has two connectors), 16-bit wide bus	70G9857	1.0
Host System	2117	16-bit Y-cable	52G0173	0.94

Notes:

1. When cables are ordered by Feature Code, the appropriate terminator is included with the order. When cables are ordered by part number, only the cable is included. For terminator part numbers, refer to “Terminators for Use with This Adapter” on page 339.
2. For this adapter, the same cable can be used for either single-ended or differential attachments. The difference in Feature Code orders is the terminator type.
3. The external connector on this adapter is the SCSI-3 standard, 68-pin P cable connector. Many of the 16-bit SCSI devices also use this connector type, and as a result some cables can be used as either adapter-to-first device or device-to-device cables, depending upon what type of SCSI connectors are present on the devices.

Device-to-Device Cables

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
SE External Device	2840	Device-to-device (where second device has two connectors), 8-bit narrow bus	33F4607	0.7
SE External Device	3130	Device-to-device (where second device has one connector), 8-bit narrow bus	31F4222	0.66
SE External Device	2860/ 9139	Device-to-device (where second device has two connectors), 16-bit wide bus	52G9921	0.3
SE External Device	2884/ 9160	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4291	0.6
SE External Device	2883/ 9150	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4233	2.5
7027 HST	2425			
7027 HST	3132	Device-to-device (where second device has two connectors), 16-bit wide bus	40H7351	6.0

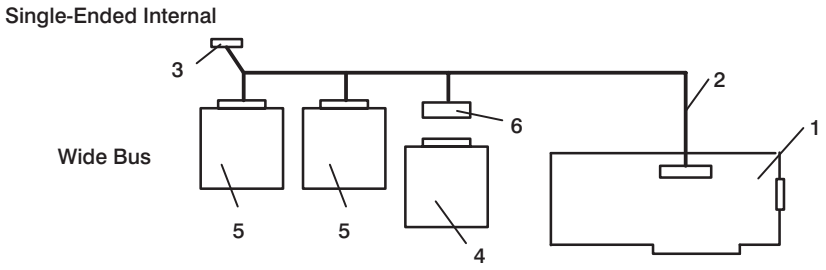
Note: Most feature codes for cables can only be ordered against the attachment device (7204, 7206, 7208, and so on). For some cables, the feature codes have been made available on the system units. In these cases the system feature code will be listed. Otherwise, the attachment device feature codes will be used.

Terminators for Use with This Adapter

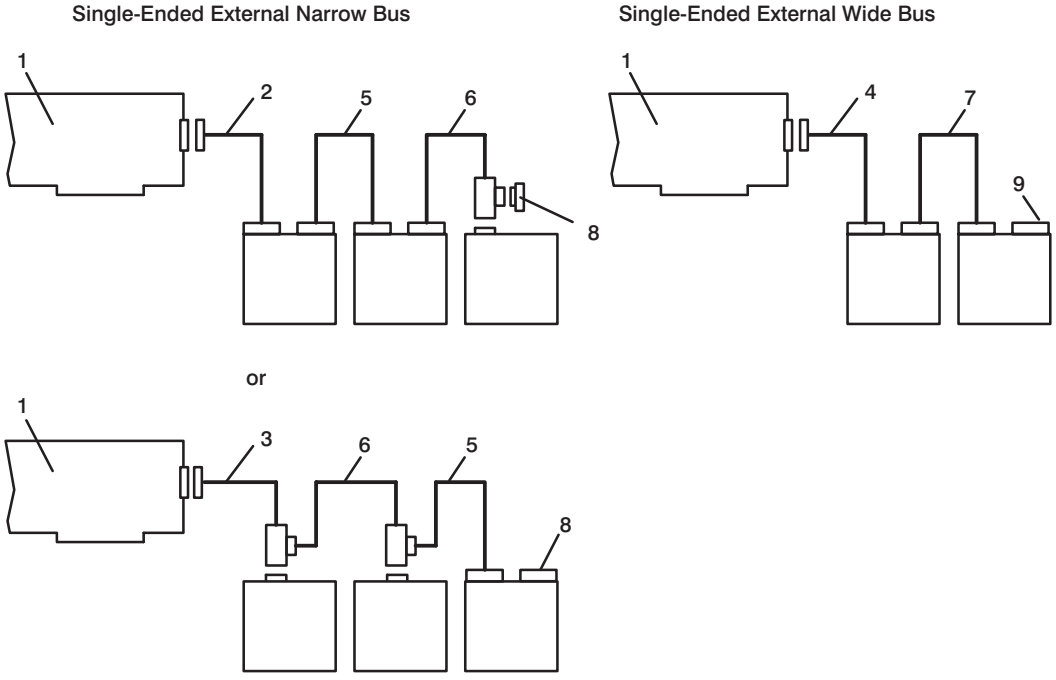
This adapter has on-board terminators that can be enabled or disabled by automatic sensing logic. This sensing logic can detect the presence or absence of external termination and enables or disables the on-card termination when needed. This automatic feature can also be disabled by jumpers on the adapter. Refer to the adapter installation guide for more information on jumpers and automatic termination detection logic.

M/T	F/C	Terminator Description	Part Number	Connector
SE External Devices	part of cable F/C	8-bit external FPT18C terminator	52G4260	50-pin low density
SE External Devices	part of cable F/C	16-bit external Boulay terminator	92F0432 (52G9907)	68-pin high density
SE Internal Cabling	part of cable F/C	16-bit internal bus terminator	92F0322 (92F2566)	68-pin high density

Cabling Examples for the PCI SCSI-2 Fast/Wide adapter



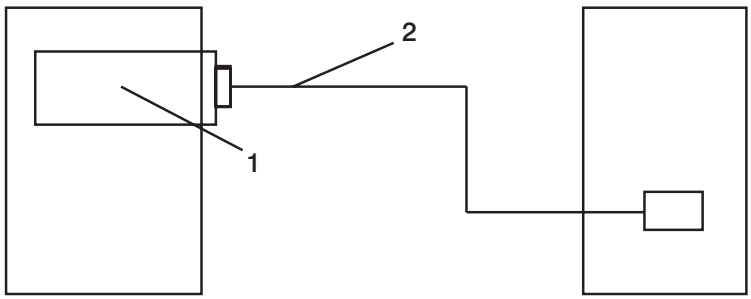
Item Number	Description
1	Adapter
2	Internal SCSI cable and terminator assembly (wide)
3	System Specific Terminator
4	Narrow device (50-pin connector)
5	Wide device (68-pin connector)
6	68-pin to 50-pin interposer FRU 92F0324 (assem. P/N 92F2565)



Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	N/A
2	06H6037	Adapter-to-dual-connector device (narrow 8-bit)	1.0
3	52G0174	Adapter-to-single-connector device (narrow 8-bit)	1.5
4	70G9857	Adapter-to-dual-connector device (wide 16-bit)	1.0

Item Number	Part Number	Description	Cable Length (meters)
5	33F4607	Device-to-dual-connector device (narrow 8-bit)	0.7
6	31F4222	Device-to-single-connector device (narrow 8-bit)	0.66
7	52G9921	Device-to-dual-connector device (wide 16-bit)	0.3
	52G4291		0.6
8	52G4260	Terminator (8-bit)	
9	92F0432	Terminator (16-bit)	

Special Cabling Considerations for the 7131 Single-Ended Interface



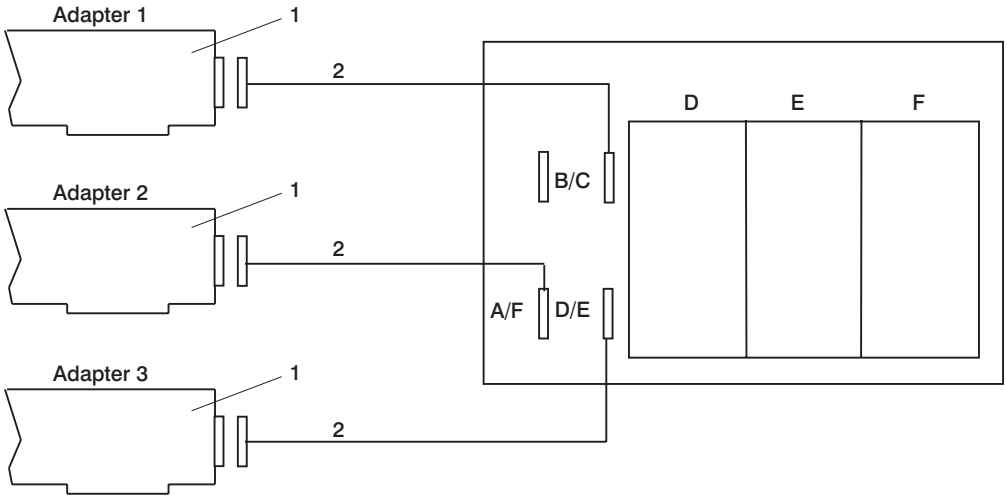
7131 - 105

Item Number	Part Number	Description	Cable Length (meters)
1		SCSI-2 Fast/Wide Adapter	N/A
2	70G9857	Adapter-to-dual-connector device (16-bit)	1.0

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 - High-Capacity Storage Drawer Single-Ended Interface

The following figure shows the back of the 7027. Banks A, B, and C are on the front of the 7027.



- Adapter 1 controls Banks B and C.
- Adapter 2 controls Banks A and F.
- Adapter 3 controls Banks D and E.

Note: Up to three adapters can be connected as shown. The adapters are on different SCSI-Buses. This is not a multi-initiator setup.

Item Number	Part Number	Description	Cable Length (meters)
1		SCSI-2 Fast/Wide Adapter	NA
2	52G4233	Adapter-to-Dual-Connector device (16-bit)	2.5
	40H7351		6.0

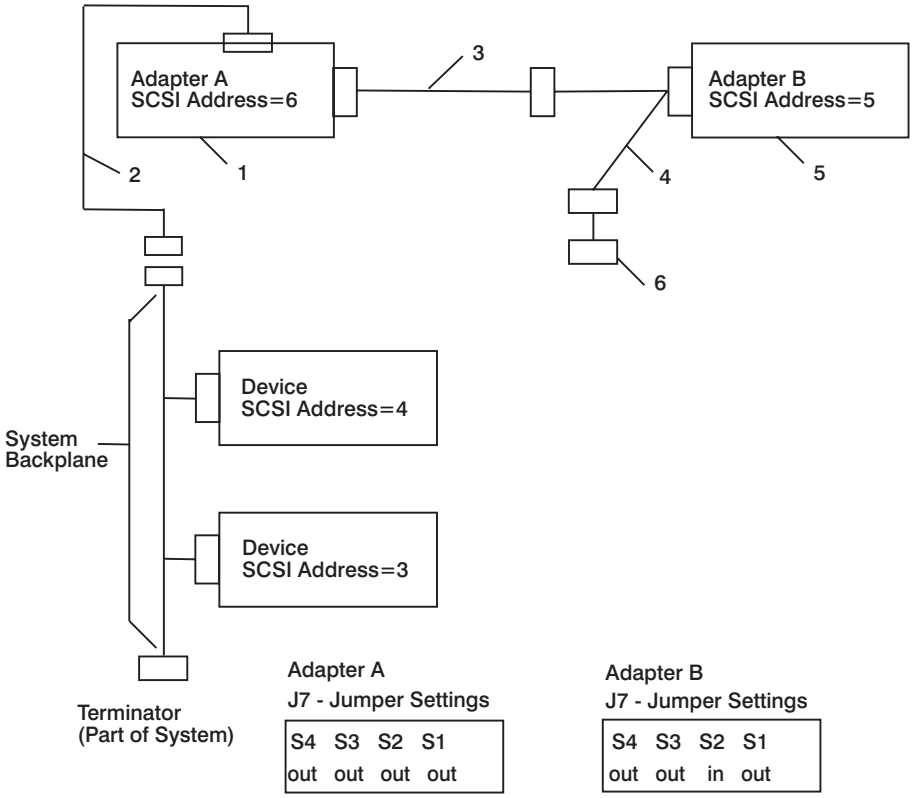
Multi-Initiator SCSI-2 Fast/Wide Single-Ended Cabling

The multi-initiator configuration has more than one SCSI adapter on the SCSI bus. The automatic sensing logic must be overridden by setting the individual jumpers S1, S2, S3, and S4 located on jumper block J7.

The automatic sensing logic, which enables or disables the built-in terminators, works by detecting an external terminator on the external SCSI bus, or by detecting an internal terminator on the internal SCSI bus. This control logic cannot sense the built-in adapter terminators of another adapter on the SCSI bus. Therefore, configure the adapters manually to use external cabling by moving the jumpers of J7.

This configuration requires that you change the default SCSI ID of the additional adapter to something other than 7. All devices and adapters sharing a SCSI bus must have unique SCSI IDs. The default SCSI ID setting on the adapter is modified by software. Refer to the documentation for the operating system and device driver you are using to determine how to do this.

Attention: The following illustration shows the only supported hardware configurations for Multi-Initiator setups with this adapter. These configurations may not be supported by your software application. Be sure that your software application supports this configuration before you set up and use your system in this way. Only one adapter per system per SCSI bus is allowed.



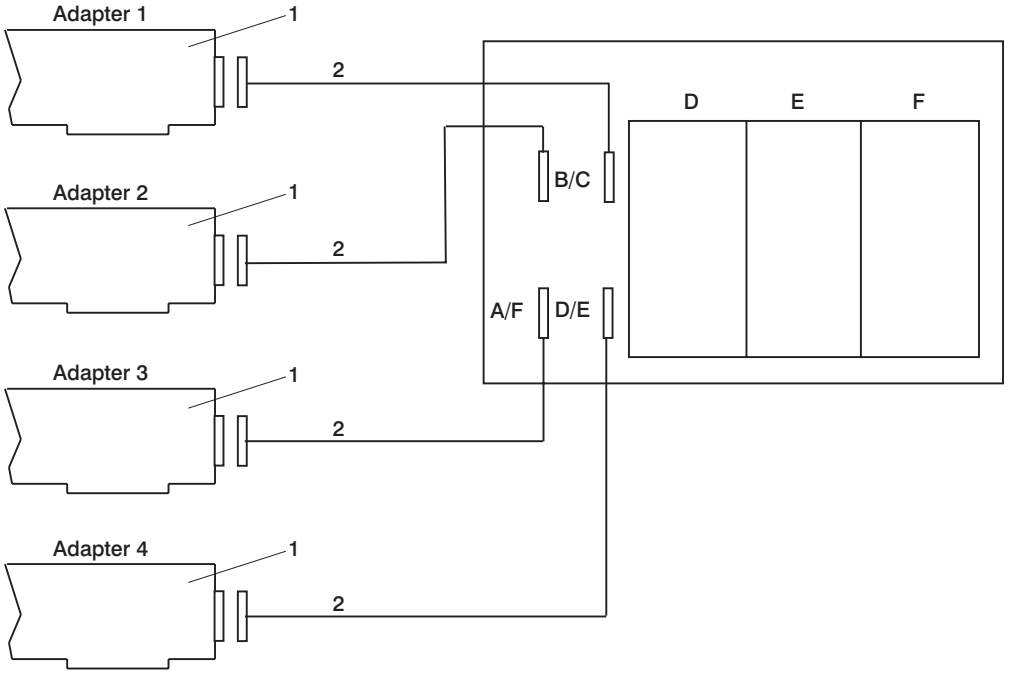
Attention: Adapters A and B must be in different host systems.

Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	
2	06H6660	Internal Cable	1.0
3	70G9857	Adapter-to-dual connector device	1.0
4	52G0173	Y-cable	0.94
5		Adapter	
6	92F0432	Terminator	

Special Cabling Considerations for the 7027 - High-Capacity Storage Drawer Single-Ended Interface with the Twin Initiator Option

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.

Attention: Only one adapter per system per SCSI bus is allowed.



Notes:

1. 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.
2. 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.
3. 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	52G4233	Adapter-to-Dual-Connector device (16-bit)	2.5
	40H7351		6.0

Cabling the PCI Single-Ended Ultra SCSI Adapter FC 6206

For general information, read the “General SCSI Considerations” on page 333, then read the following for specific information.

Note: Devices `cannot` be attached to both the internal and the external connector.

SCSI Single-Ended Cable Lengths Using This Adapter

The maximum supported cable length for this adapter depends on what type of devices are attached (SCSI-1, SCSI-2, and so on) and where they are attached (to the internal or external connector). Device types are classified as follows:

- SCSI-1 - maximum transfer rate of 5 MB/sec (one byte transfers)
- SCSI-2 Fast - maximum transfer rate of 10 MB/sec (one byte transfers)
- SCSI-2 Fast/Wide - maximum transfer rate of 20 MB/sec (two byte transfers)
- Ultra SCSI - maximum transfer rate of 20 MB/sec (one byte transfers)
- Ultra SCSI Wide - maximum transfer rate of 40 MB/sec (two byte transfers)

For this adapter:

- The maximum supported cable length for configurations without any SCSI-2 fast or ultra SCSI devices is 6 meters (approximately 20 feet).
- The maximum supported cable length for configurations that include SCSI-2 fast (but not ultra) is 3 meters (approximately 10 feet) with the exception of the 7027 High-Capacity Storage Drawer, which can be attached with up to 6 meters of cable.
- To ensure optimum signal quality for Ultra SCSI transfers, attachment of multiple Ultra SCSI devices is only recommended for devices mounted inside the system unit. This adapter has circuitry that can detect the presence of a cable on the external connector, and the default configuration limits the SCSI bus speed to SCSI-2 fast and wide (20 MB/sec).
- To ensure optimum signal quality for Ultra SCSI transfers, it is recommended that only Ultra SCSI devices be attached to a backplane that is driven by a PCI Single-Ended Ultra SCSI adapter.

This default setting can be changed (using SMIT or the **chdev** command) to allow attachment of external Ultra SCSI devices, with the restriction that there are no SCSI devices attached to the internal connector.

Supported Ultra Configurations for This Adapter

- Internal Ultra devices running at Ultra speeds:
  - Up to 6 ultra devices attached to the internal port (dependent on internal configuration and cabling).
  - No external attachments are allowed.
- External Ultra devices running at Ultra speeds:
  - No internal attachments allowed.
  - Up to 2 external Ultra wide (16-bit) devices can be attached to the external port. Maximum cable length must not exceed 3 meters.
  - Up to 2 external Ultra (8-bit) devices can be attached to the external port. Maximum cable length must not exceed 3 meters.
- Ultra or SCSI-2 Fast devices running at SCSI-2 Fast speeds:
  - Up to 6 devices attached to the internal port (dependant on internal system configuration and cabling).
  - External attachment of up to 4 independent physical enclosures are allowed, provided each physical enclosure presents only one load to the SCSI bus. The total bus length must not exceed 3 meters. Total bus length includes internal and external cable length.
- Multiple SCSI-2 Fast devices in external enclosures:

– No internal attachments allowed.
– Maximum combined internal (to enclosure) and external cable length is 3 meters.
– Loads on the cable must be 0.1 meters apart at a minimum (cable length between devices must be 0.1 meters apart at a minimum).
– No mixing of bus widths (8-bit and 16-bit) unless the 68-pin to 50-pin interposer (P/N 92F2565 or equivalent) is used.

Cable and Terminator Tables for the PCI Single-Ended Ultra SCSI Adapter

Adapter-to-First Device Cables

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
Host System	2111	Adapter-to-first device (where first device has two connectors), 8-bit narrow bus	06H6037	1.0
Host System	2113	Adapter-to-first device (where first device has one connector), 8-bit narrow bus	52G0174	1.5
Host System	2115	Adapter-to-first device (where first device has two connectors), 16-bit wide bus	70G9857	1.0

Notes:

1. When cables are ordered by Feature Code, the appropriate terminator is included with the order. When cables are ordered by part number, only the cable is included. For terminator part numbers, refer to “Terminators for Use With This Adapter” on page 347.
2. For this adapter, the same cable can be used for either single-ended or differential attachments. The difference in Feature Code orders is the terminator type.
3. The external connector on this adapter is the SCSI-3 standard, 68-pin ″P″ cable connector. Many of the 16-bit SCSI devices also use this connector type, and as a result, some cables can be used as either adapter-to-first device or device-to-device cables, depending upon what type of SCSI connectors are present on the devices.

Device-to-Device Cables

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
SE External Device	2840	Device-to-device (where second device has two connectors), 8-bit narrow bus	33F4607	0.7
SE External Device	3130	Device-to-device (where second device has one connector), 8-bit narrow bus	31F4222	0.66
SE External Device	2860/ 9139	Device-to-device (where second device has two connectors), 16-bit wide bus	52G9921	0.3
SE External Device	2884/ 9160	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4291	0.6
SE External Device	2883/ 9150	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4233	2.5
7027 HST	2425			
7027 HST	3132	Device-to-device (where second device has two connectors), 16-bit wide bus	40H7351	6.0

Notes:

1. Most feature codes for cables can only be ordered against the attachment device (7204, 7206, 7208, and so on). For some cables the feature codes have been made available on the system units. In these cases, the system feature code will be listed, otherwise the attachment device feature codes will be used.
2. Refer to “SCSI Single-Ended Cable Lengths Using This Adapter” on page 345 for guidelines concerning maximum cable lengths.

Terminators for Use With This Adapter

This adapter has on-board terminators that can be enabled or disabled by automatic sensing logic. This sensing logic can detect the presence or absence of external termination and enables or disables the on-card termination when needed. This automatic feature can also be disabled by jumpers on the adapter. Refer to the adapter installation guide for more information on jumpers and automatic termination-detection logic.

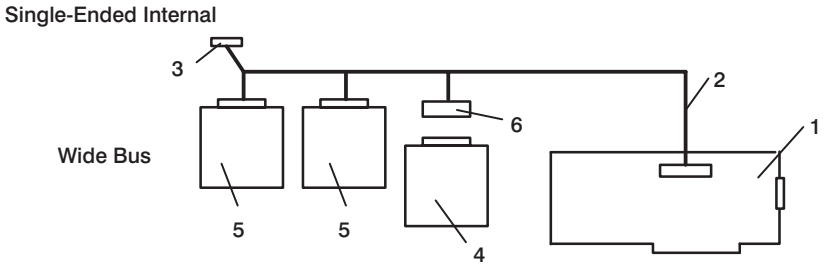
Note: Devices `cannot` be attached to both the internal and the external connector.

M/T	F/C	Terminator Description	Part Number	Connector
SE External Devices	part of cable F/C	8-bit external FPT18C terminator	52G4260	50-pin low density
SE External Devices	part of cable F/C	16-bit external Boulay terminator	92F0432 (52G9907)	68-pin high density
SE Internal Cabling	part of cable F/C	16-bit internal bus terminator	92F0322 (92F2566)	68-pin high density

Automatic Bus Speed Selection, External Devices

This adapter will automatically sense the presence of an external device. The default mode of operation is for the adapter to limit negotiations to fast (10 MB/sec for 8-bit, 20 MB/sec for 16-bit) operation whenever there is an external device attached.

Cabling Examples for the PCI Ultra SCSI Adapter

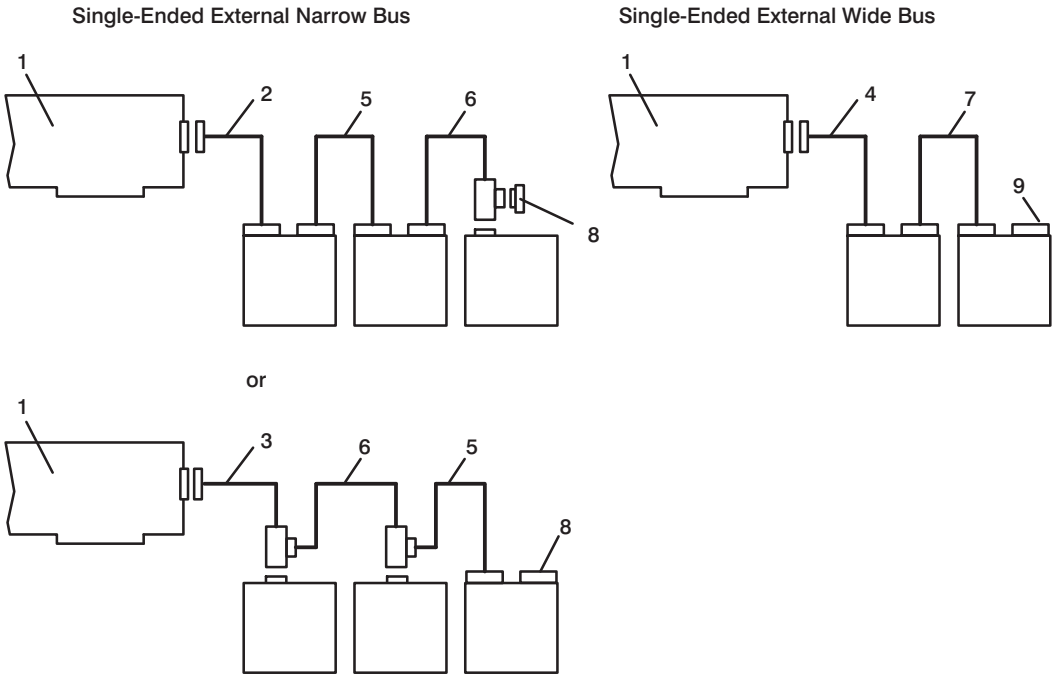


Item Number	Description
1	Adapter
2	Internal SCSI cable and terminator assembly (wide)
3	System Specific Terminator (88G3977)
4	Narrow device (50-pin connector)
5	Wide device (68-pin connector)
6	68-pin to 50-pin interposer FRU 92F0324 (assem. P/N 92F2565)

Internal System Cables for Use with This Adapter

Machine Type	Feature Code	Part Number	Devices Supported
7043-140	2445	93H6151	3
7043-240	2445	93H6151	3
7024-Exx	2442	40H6637	4
7025-Fxx, 7026-Hxx	2447	06H6660	6

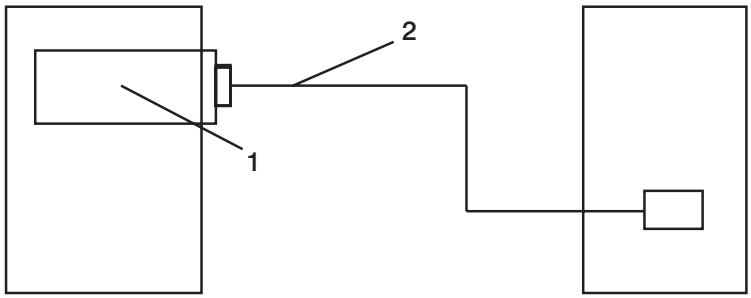
Note: Feature codes for internal cables can only be ordered against the system unit. Some include the terminator as part of the cable feature code, some have a separate feature code for the terminators, and others require no terminator. This means you will use the on-board terminator on the last SCSI device on the SCSI bus (activated by a jumper) to terminate the cable. If you are unsure of your system's configuration, refer to the system user's guide for more information.



Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	N/A
2	06H6037	Adapter-to-dual-connector device (narrow 8-bit)	1.0
3	52G0174	Adapter-to-single-connector device (narrow 8-bit)	1.5
4	70G9857	Adapter-to-dual-connector device (wide 16-bit)	1.0
5	33F4607	Device-to-dual-connector device (narrow 8-bit)	0.7
6	31F4222	Device-to-single-connector device (narrow 8-bit)	0.66
7	52G9921	Device-to-dual-connector device (wide 16-bit)	0.3
	52G4291		0.6
8	52G4260	Terminator (8-bit)	
9	92F0432	Terminator (16-bit)	

Note: Refer to “SCSI Single-Ended Cable Lengths Using This Adapter” on page 345 for guidelines concerning maximum cable lengths.

Special Cabling Considerations for the 7131 Single-Ended Interface



7131 - 105

Item Number	Part Number	Description	Cable Length (meters)
1		PCI single-ended ultra SCSI Adapter	N/A
2	70G9857	Adapter-to-dual-connector device (16-bit)	1.0

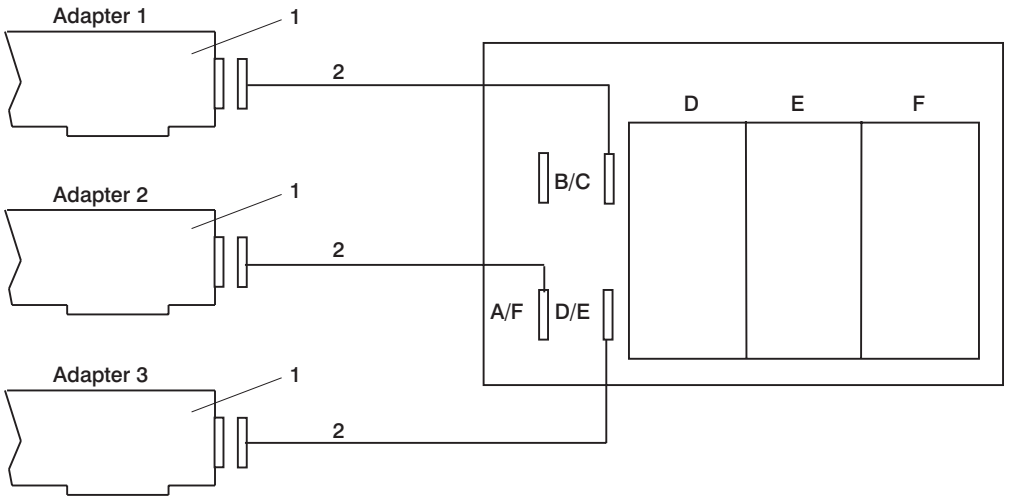
Notes:

1. This configuration does not support any Ultra SCSI devices.
2. 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 - High-Capacity Storage Drawer Single-Ended Interface

Note: This configuration does not support any Ultra SCSI devices.

The following figure shows the back of the 7027. Banks A, B, and C are on the front of the 7027.



- Adapter 1 controls Banks B and C.
- Adapter 2 controls Banks A and F.
- Adapter 3 controls Banks D and E.

Note: Up to three adapters can be connected as shown. The adapters are on different SCSI-Buses. This is not a multi-initiator setup.

Item Number	Part Number	Description	Cable Length (meters)
1		PCI Single-Ended Ultra SCSI Adapter	NA
2	52G4233	Adapter-to-Dual-Connector device (16-bit)	2.5
	40H7351		6.0

Multi-Initiator PCI Single-Ended Ultra SCSI Cabling

The multi-initiator configuration is not supported on the adapter.

Cabling the PCI SCSI-2 Fast/Wide Differential Adapter FC 2409 or 6209

To understand the cabling for this adapter, read “General SCSI Considerations” on page 333, then read the following for specific information.

SCSI-2 Differential Cable Lengths Using This Adapter

The maximum allowed cable length for configurations is 25 meters (approximately 80 feet).

Adapter-to-First Device Cables

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
Host System	2112	Adapter-to-first device (where first device has two connectors), 8-bit narrow bus	06H6037	1.0
Host System	2114	16-bit Y-cable	52G0173	0.94
Host System	2116	Adapter-to-first device (where first device has two connectors), 16-bit wide bus	70G9857	1.0

Notes:

1. When cables are ordered by Feature Code, the appropriate terminator is included with the order. When cables are ordered by part number, only the cable is included. For terminator part numbers, refer to “Terminators for Use with This Adapter” on page 353.
2. For this adapter, the same cable can be used for either single-ended or differential attachments. The difference in Feature Code orders is the terminator type.
3. The external connector on this adapter is the SCSI-3 standard, 68-pin ″P″ cable connector. Many of the 16-bit SCSI devices also use this connector type, and as a result, some cables can be used as either adapter-to-first device or device-to-device cables, depending upon what type of SCSI connectors are present on the devices.

Device-to-Device Cables

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
DE External Device	2848/ 9134	Device-to-device (where second device has two connectors), 8-bit narrow bus	74G8511	0.6
DE External Device	2860/ 9139	Device-to-device (where second device has two connectors), 16-bit wide bus	52G9921	0.3
DE External Device	2884/ 9160	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4291	0.6
DE External Device	2846/ 9132	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4233	2.5
7027 HSD	2425			
DE External Device	2885/ 9161	Device-to-device (where second device has two connectors), 16-bit wide bus	88G5749	4.5
7027 HSD	3132	Device-to-device (where second device has two connectors), 16-bit wide bus	40H7351	6.0
DE External Device	2870/ 9146	Device-to-device (where second device has two connectors), 16-bit wide bus	88G5747	12.0
7027 HSD	3135			
DE External Device	2869/ 9145	Device-to-device (where second device has two connectors), 16-bit wide bus	88G5748	14.0
DE External Device	2868/ 9144	Device-to-device (where second device has two connectors), 16-bit wide bus	88G5746	18.0
7027 HSD	3136			

Notes:

1. Most feature codes for cables can only be ordered against the attachment device (7204, 7206, 7208, and so on). For some cables, the feature codes have been made available on the system units. In these cases, the system feature code is listed. Otherwise the attachment device feature codes are used.
2. 9xxx feature codes are used for new build orders; 2xxx feature codes are used for MES orders.

Terminators for Use with This Adapter

This adapter has on-card SCSI terminators that must be removed before the adapter can be used in a high-availability configuration. The high-availability configuration is implemented by removing the three on-card differential terminating resistors (labeled RN1, RN2, and RN3) on the adapter, then attaching the middle leg connector of the high-availability configuration Y-cable to the adapter's 68-pin external connector. The remaining two legs of the Y-cable are used to attach other systems and devices to the SCSI bus.

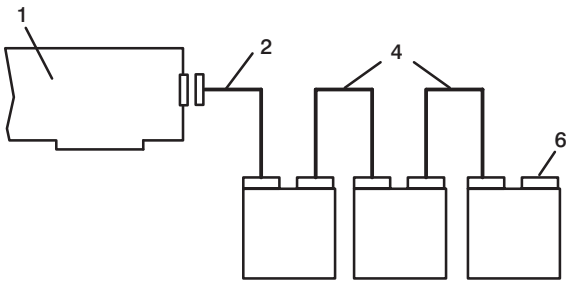
If the PCI SCSI-2 Fast/Wide Differential adapter is at the end of the SCSI bus, the shorter leg of the Y-cable must be terminated with the appropriate terminator.

Note: The high-availability configuration (Y-cable with a terminator on the shorter leg) allows disconnection of the adapter 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 adapter, the noise generated may create undetected data errors if the bus is in use at the time of removal. To maintain data integrity, the SCSI bus must be inactive during the removal of adapters, cables, or terminators.

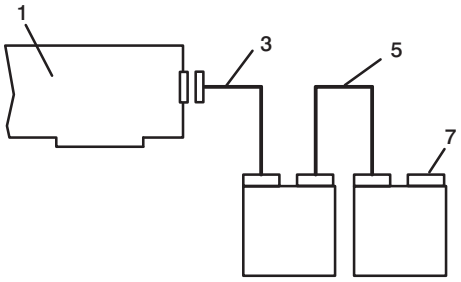
M/T	F/C	Terminator Description	Part Number	Connector
DE External Devices	part of cable F/C	8-bit external bus terminator	87G1356	50-pin low density
DE External Devices	part of cable F/C	16-bit external bus terminator	61G8324	68-pin high density

Cabling Examples for the PCI SCSI-2 Fast/Wide Differential Adapter

Differential External Narrow Bus



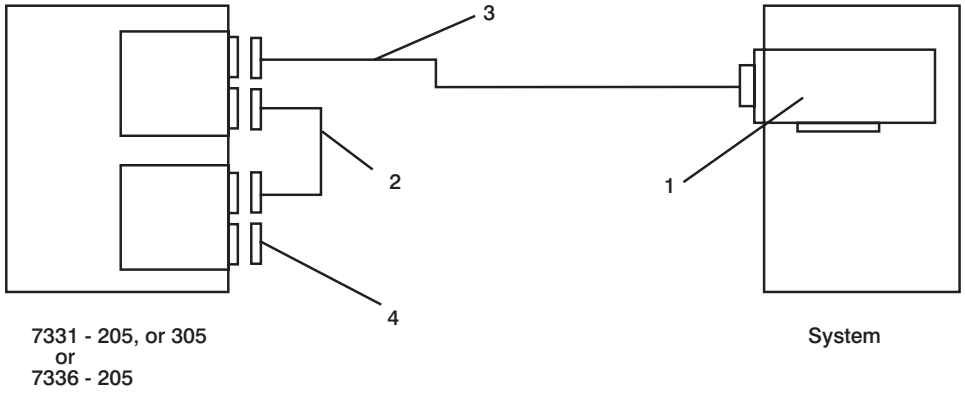
Differential External Wide Bus



Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	N/A
2	06H6037	Adapter-to-dual-connector device (narrow 8-bit)	1.0
3	70G9857	Adapter-to-dual connector device (wide 16-bit)	1.0
4	74G8511	Device-to-dual-connector device (narrow 8-bit)	0.6
5	52G4291	Device-to-dual connector device (wide 16-bit)	0.6
	52G9921		0.3
6	87G1356	Terminator (8-bit)	
7	61G8324	Terminator (16-bit)	

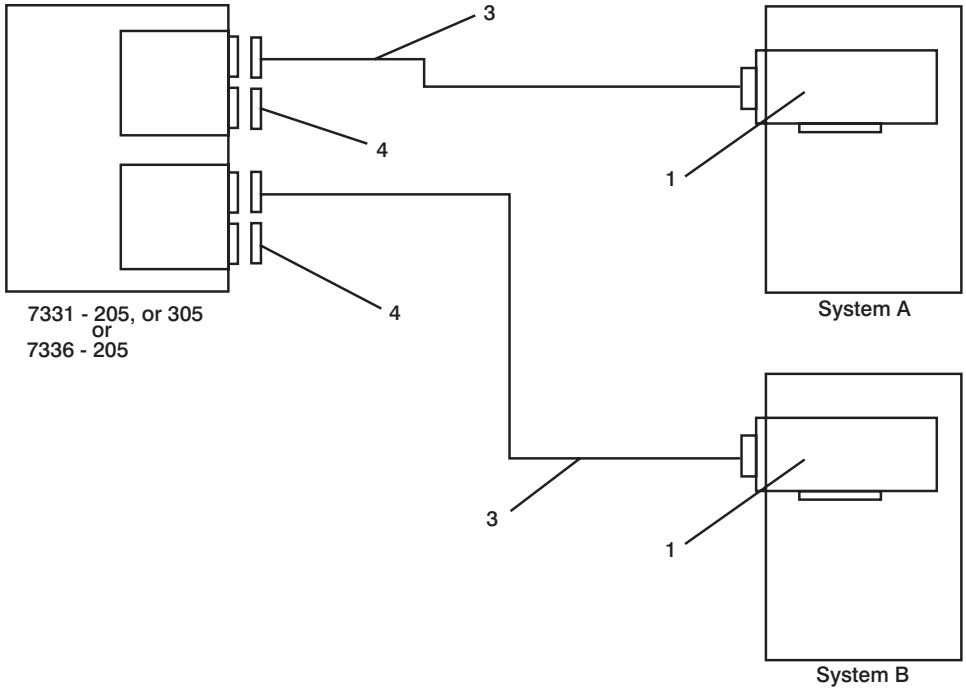
Special Cabling Considerations for the 7331-205, 7331-305 8 mm Tape Library or the 7336-205 4 mm Tape Library

Single Drive - Single Host or Dual Drive - Single Host



Item Number	Part Number	Description	Cable Length (meters)
1		SCSI-2 Differential Fast/Wide Adapter	
2		Cable - SCSI jumper	
3	70G9857 52G4233 88G5749 88G5747 88G5746	Device-to-Device cable (wide 16-bit)	1.0 2.5 4.5 12.0 18.0
4	61G8324	Terminator (16-bit)	

Dual Drive - Dual Host

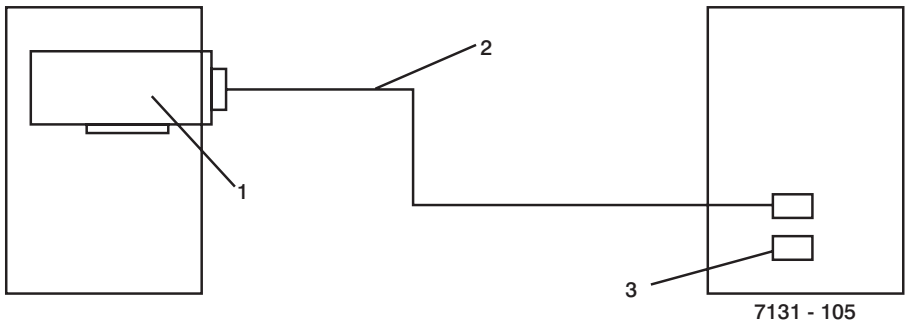


Note: For more information on these configurations, refer to the *7331 Model 205 Installation Guide*, order number SA26-7110, or the *7336 Operator Guide*, order number SA37-0309.

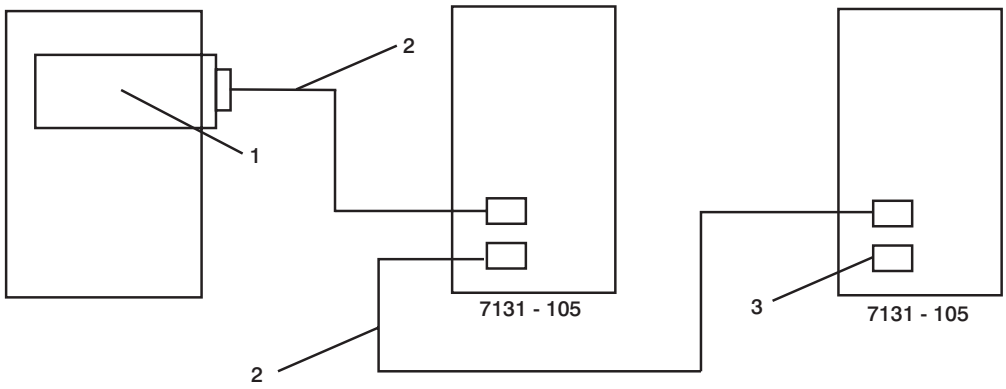
Item Number	Part Number	Description	Cable Length (meters)
1		SCSI-2 Differential Fast/Wide Adapter	
2		Cable - SCSI jumper	
3	70G9857 52G4233 88G5749 88G5747 88G5746	Device-to-Device cable (wide 16-bit)	1.0 2.5 4.5 12.0 18.0
4	61G8324	Terminator (16-bit)	

Special Cabling Considerations for the 7131 Differential Interface (FC 2508)

Single Host - Single Tower



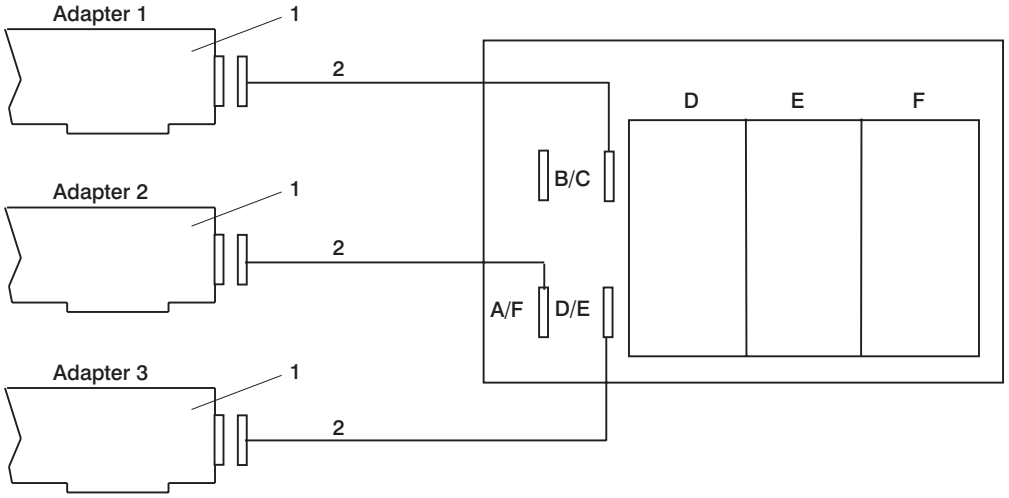
Single Host - Dual Tower



Item Number	Part Number	Description	Cable Length (meters)
1		SCSI-2 Differential Fast/Wide Adapter	
2	52G4291 70G9857 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)	

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.



- Adapter 1 controls Banks B and C.
- Adapter 2 controls Banks A and F.
- Adapter 3 controls Banks D and E.

Note: Up to three adapters can be connected as shown. The adapters are on different SCSI-Buses. This is not a multi-initiator setup.

Item Number	Part Number	Description	Cable Length (meters)
1		SCSI-2 Differential Fast/Wide Adapter	NA
2	52G4233 40H7351 88G5747 88G5746	Adapter-to-Dual-Connector device (16-bit)	2.5 6.0 12.0 18.0

High-Availability Multi-Initiator SCSI-2 Fast/Wide Differential Cabling

A high-availability configuration can be implemented with the PCI SCSI-2 Fast/Wide Differential adapter by removing the three built-in differential terminator resistors (labeled RN1, RN2, and RN3) on the adapter, then attaching the middle leg connector of the high-availability configuration Y-cable to the adapter's external 68-pin connector. See "Multi-Initiator With Y-Cables". The remaining two legs of the Y-cable are used to attach other systems and devices to the SCSI bus.

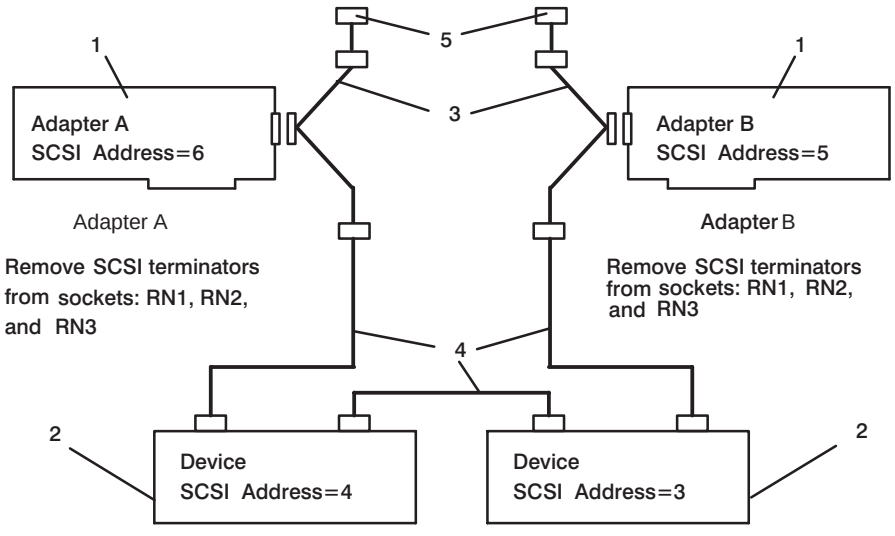
If the PCI SCSI-2 Fast/Wide adapter is at the end of the SCSI bus, the shorter leg of the high-availability configuration Y-cable must be terminated with the appropriate terminator.

With this configuration, if a Y-cable is removed from one adapter, the other adapter can still use the SCSI bus. The bus remains properly terminated because the Y-cable with the attached external terminator is still connected to the SCSI bus. The adapter from which the Y-cable was removed is no longer terminated and may fail diagnostics due to the lack of a terminator. To run diagnostics, on this adapter, replace RN1, RN2, and RN3, or attach a wide differential SCSI terminator to the adapter's external connector.

When the multi-initiator configuration, as described in "Multi-Initiator With Standard Cables" on page 360 is used, and any adapter-to-device cable is removed, the result is an improperly terminated SCSI bus. Do not attempt to run diagnostics on the SCSI bus without proper termination. Diagnostics, however, may be run on any adapter in this configuration without disconnecting any cables or adding a terminator to the adapter's external port.

Attention: The following illustrations show the only supported hardware configurations for multi-initiator setups with this adapter. These configurations may not be supported by your software application. Be sure that your software application can support this type of configuration before you set up and use your system in this way. Only one adapter per system per SCSI bus is allowed.

Multi-Initiator With Y-Cables



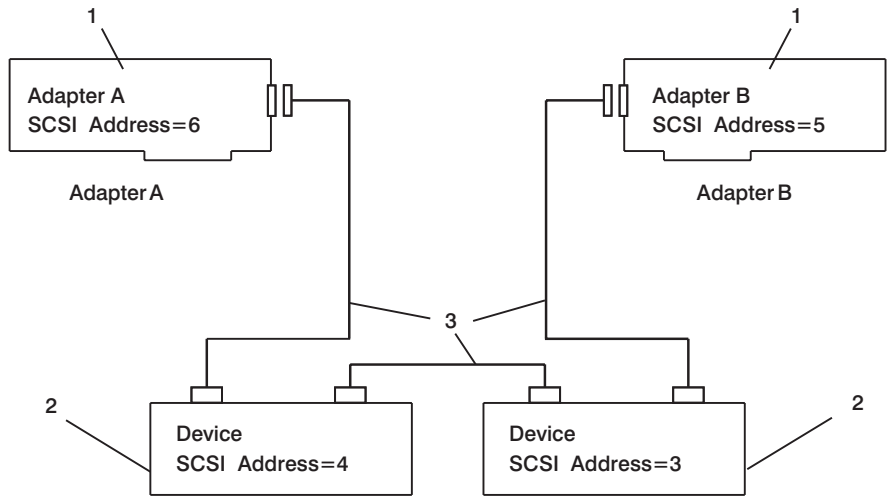
Attention: Adapters A and B must be in different host systems.

Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	
2		Dual port device	

Item Number	Part Number	Description	Cable Length (meters)
3	52G0173	Y-cable	0.94
4	52G4291 52G4233 88G5749 88G5747 88G5748	Device-to-Device cable (wide 16-bit)	0.6 2.5 4.5 12.0 14.0
5	61G8324	Terminator (16-bit)	

Note: Any Y-cable may be removed from any adapter and the SCSI bus remains properly terminated and functional for the remaining adapters. Because all terminators have been removed from their sockets, the adapter removed from the SCSI bus must have the terminators replaced or a terminator placed on its external connector before running diagnostics or booting the system.

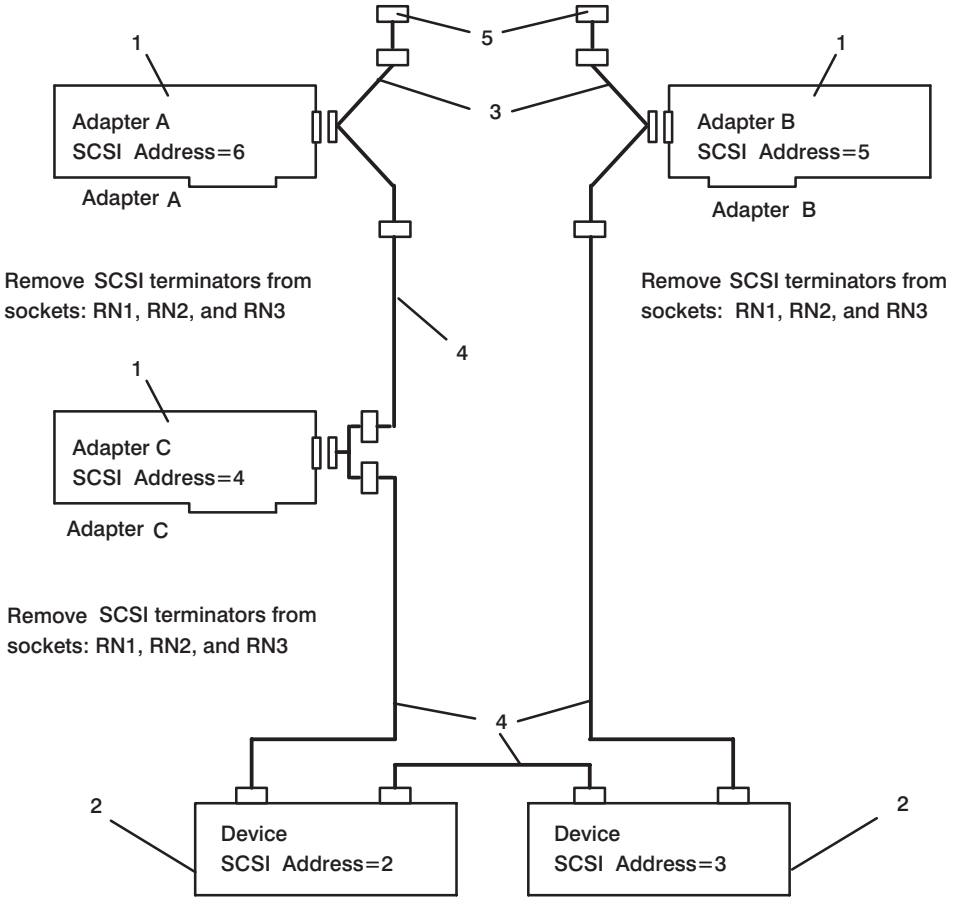
Multi-Initiator With Standard Cables



Attention: Adapter A and Adapter B must be in different host systems.

Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	
2		Dual Port Device	
3	52G4291 52G4233 88G5749 88G5747 88G5748 88G5746	Device-to-Device Cable (wide 16-bit)	0.6 2.5 4.5 12.0 14.0 18.0

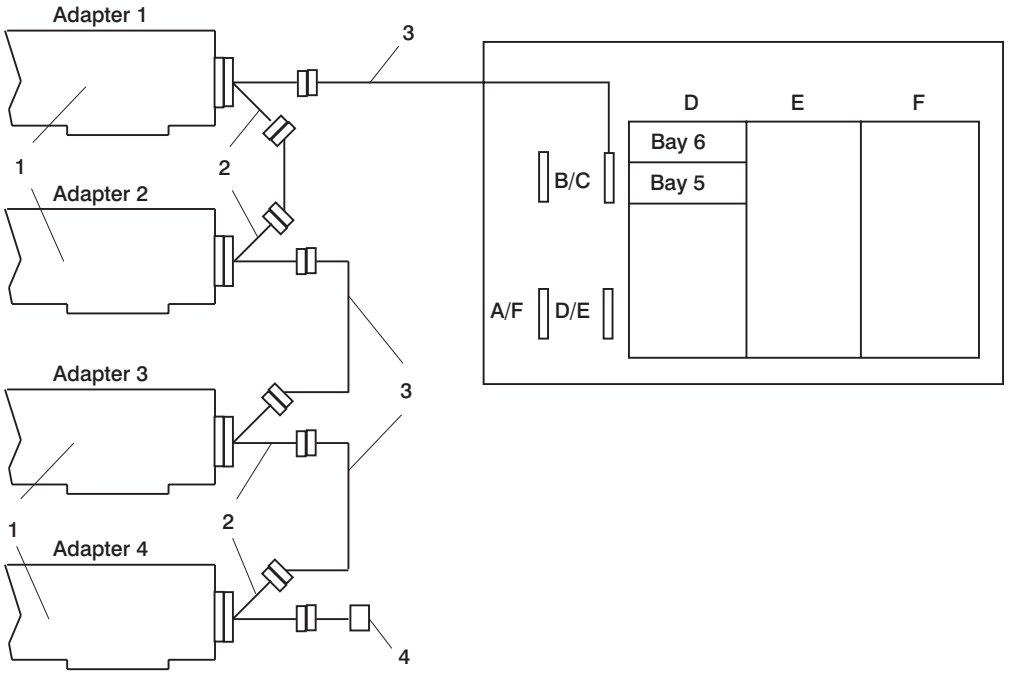
Multi-Initiator With Three Adapters



Attention: Adapter A and Adapter B must be in different host systems.

Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	
2		Dual Port Device	
3	52G0173	Y-cable	0.94
4	52G4291 52G4233 88G5749 88G5747	Device-to-Device Cable (wide 16-bit)	0.6 2.5 4.5 12.0
5	61G8324	Terminator (16-bit)	

Special Cabling Considerations for the 7027 - HSD Differential Interface With Multiple Initiators



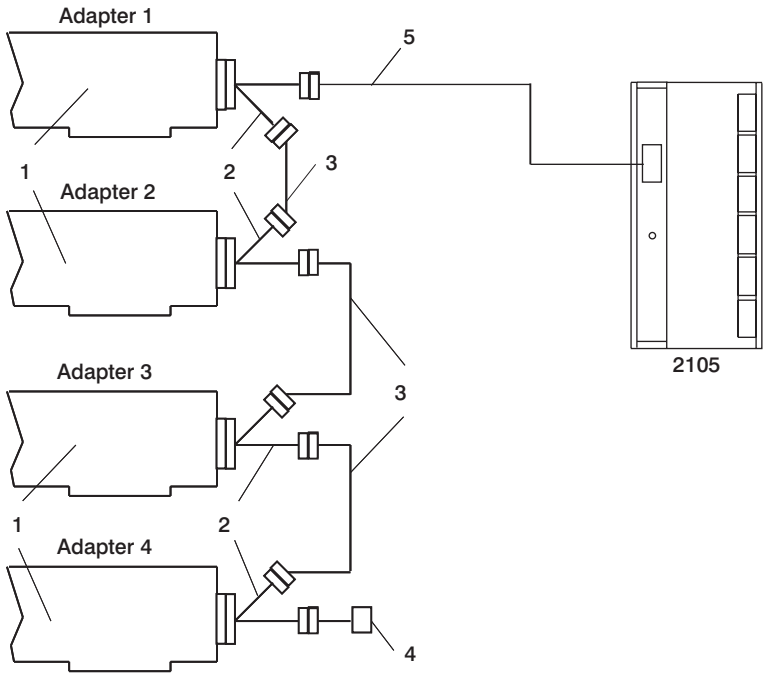
Attention: Adapters 1, 2, 3, and 4 must be in different host systems.

Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	
2	52G0173	Y-cable	0.94
3	52G4291 52G4233 40H7351 88G5747	Device-to-Device Cable (wide 16-bit)	0.6 2.5 6.0 12.0
4	61G8324	Terminator (16-bit)	

Notes:

1. This configuration shows four adapters in a multiple-initiator configuration with the devices in banks B and C. If four adapters are used, 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.
2. 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



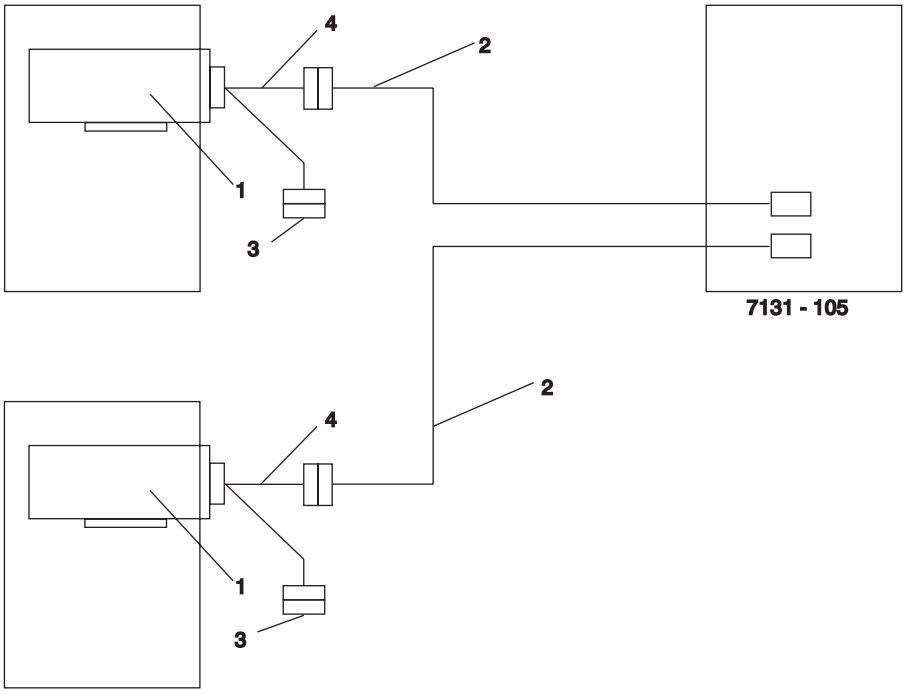
Attention: Adapters 1, 2, 3, and 4 must be in different host systems.

Item Number	Part Number	Description	Cable Length (meters)
1		SCSI-2 Differential Fast/Wide Controller (4-B or 4_B)	
2	52G0173	Y-cable	0.94
3	52G4291 52G4233 40H7351 88G5747	Device-to-Device Cable (wide 16-bit)	0.6 2.5 6.0 12.0
4	61G8324	Terminator (16-bit)	
5	05J7336 05J7337 09L0315 09L0316	SCSI Cable to 2105 VSS (except E20) SCSI Cable to 2105 VSS (except E20) Note: Interposer P/N 50G0460 required with above cables. SCSI Cable to 2105 VSS Model E20 SCSI Cable to 2105 VSS Model E20	10 20 10 20

Note: When Y-cables are used on card, terminating resistors must be removed from the adapters.

Special Cabling Considerations for the 7131 Differential Interface (FC 2508) High Availability

Dual Host - Single Tower



Item Number	Part Number	Description	Cable Length (meters)
1		SCSI-2 Differential Fast/Wide Controller (4-B or 4_B)	
2	52G4291 70G9857 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	52G0173	Y-cable	0.94

Notes:

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 can be used, as long as the total bus length is 25 meters or less.
3. See the 7131 documentation for SCSI-addressing limitations. If there are any devices in the upper media bay of the 7131, the adapters will be restricted to certain SCSI IDs.

Cabling the PCI Differential Ultra SCSI Adapters FC 6204 or 6207

Note: Use these instructions for both the PCI Universal Differential Ultra SCSI Adapter (FC 6204) and the PCI Differential Ultra SCSI Adapter (FC 6207).

To understand the cabling for these adapters, read “General SCSI Considerations” on page 333, then read the following for specific information.

SCSI Differential Cable Lengths Using This Adapter

The maximum allowed cable length for configurations is 25 meters (approximately 80 feet).

Adapter-to-First Device Cables

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
Host System	2112	Adapter-to-first device (where first device has two connectors), 8-bit narrow bus	06H6037	1.0
Host System	2114	16-bit Y-cable	52G0173	0.94
Host System	2116	Adapter-to-first device (where first device has two connectors), 16-bit wide bus	70G9857	1.0

Notes:

1. When cables are ordered by feature code, the appropriate terminator is included with the order. When cables are ordered by part number, only the cable is included. For terminator part numbers, refer to “Terminators for Use with This Adapter” on page 367.
2. For this adapter, the same cable can be used for either single-ended or differential attachments. The difference in feature code orders is the terminator type.
3. The external connector on this adapter is the SCSI-3 standard, 68-pin ″P″ cable connector. Many of the 16-bit SCSI devices also use this connector type, and as a result, some cables can be used as either adapter-to-first device or device-to-device cables, depending upon what type of SCSI connectors are present on the devices.

Device-to-Device Cables

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
DE External Device	2848 9134	Device-to-device (where second device has two connectors), 8-bit narrow bus	74G8511	0.6
DE External Device	2860 9139	Device-to-device (where second device has two connectors), 16-bit wide bus	52G9921	0.3
DE External Device	2884 9160	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4291	0.6
DE External Device	2846 9132	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4233	2.5
7027 HSD	2425			
DE External Device	2885 9161	Device-to-device (where second device has two connectors), 16-bit wide bus	88G5749	4.5
7027-HSD	3132	Device-to-device (where second device has two connectors), 16-bit wide bus	40H7351	6.0
DE External Device	2870 9146	Device-to-device (where second device has two connectors), 16-bit wide bus	88G5747	12.0
7027 HSD	3135			
DE External Device	2869 9145	Device-to-device (where second device has two connectors), 16-bit wide bus	88G5748	14.0
DE External Device	2868 9144	Device-to-device (where second device has two connectors), 16-bit wide bus	88G5746	18.0
7027 HSD	3136			

Notes:

1. Most feature codes for cables can only be ordered against the attachment device (7204, 7206, 7208, and so on). For some cables, the feature codes have been made available on the system units. In these cases, the system feature code is listed. Otherwise the attachment device feature codes are used.
2. 9xxx feature codes are used for new build orders; 2xxx feature codes are used for MES orders.

Terminators for Use with This Adapter

This adapter has on-card SCSI terminators that must be removed before the adapter can be used in a high-availability configuration. The high-availability configuration is implemented by removing the three on-card differential terminating resistors (labeled RN1, RN2, and RN3) on the adapter, then attaching the middle leg connector of the high-availability configuration Y-cable to the adapter's 68-pin external connector. The remaining two legs of the Y-cable are used to attach other systems and devices to the SCSI bus.

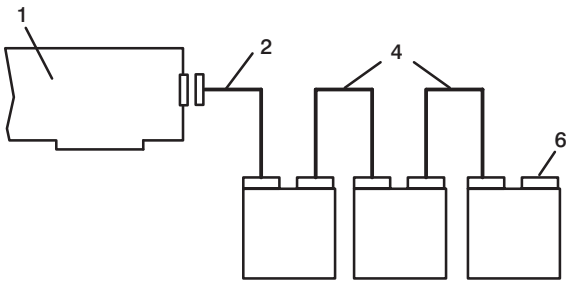
If the PCI Differential Ultra SCSI adapter is at the end of the SCSI bus, the shorter leg of the Y-cable must be terminated with the appropriate terminator.

Note: The high-availability configuration (Y-cable with a terminator on the shorter leg) allows disconnection of the adapter 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 adapter, the noise generated may create undetected data errors if the bus is in use during time of removal. To maintain data integrity, the SCSI bus must be inactive during the removal of adapters, cables, or terminators.

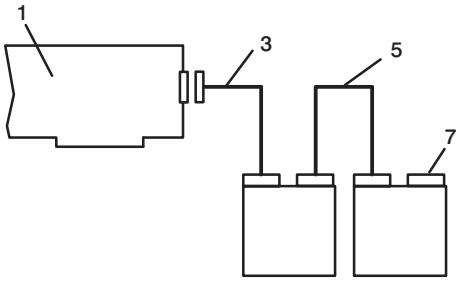
M/T	F/C	Terminator Description	Part Number	Connector
DE External Devices	Part of cable F/C	8-bit external bus terminator	87G1356	50-pin low density
DE External Devices	Part of cable F/C	16-bit external bus terminator	61G8324	68-pin high density

Cabling Examples for the PCI Differential Ultra SCSI Adapter

Differential External Narrow Bus



Differential External Wide Bus



Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	N/A
2	06H6037	Adapter-to-dual-connector device (narrow 8-bit)	1.0
3	70G9857	Adapter-to-dual connector device (wide 16-bit)	1.0
4	74G8511	Device-to-dual-connector device (narrow 8-bit)	0.6
5	52G4291	Device-to-dual connector device (wide 16-bit)	0.6
	52G9921		0.3
6	87G1356	Terminator (8-bit)	
7	61G8324	Terminator (16-bit)	

Cabling the PCI SCSI-2 F/W RAID Adapter (FC 2493)

This section provides specific cabling information for the PCI SCSI-2 F/W RAID Adapter. For more general cabling information, see “General SCSI Considerations” on page 333.

Note: This adapter cannot be used as a boot adapter. The **rootvg** volume group cannot be placed on any disk drive connected to this adapter.

SCSI-2 Single-Ended Cable Lengths for This Adapter

The maximum cable length supported for configurations without any SCSI-2 fast devices is 6 meters (approximately 20 feet). (SCSI-2 fast devices support data rates of up to 10 MB per second for 8-bit or 20 MB per second for 16-bit transfers.) If a configuration includes SCSI-2 fast devices, the maximum cable length supported is 3 meters (approximately 10 feet). The maximum length includes the internal cabling of any device that has two SCSI connectors.

When you connect external devices, you can attach only one independent physical enclosure per SCSI bus (also called a *channel*). For example, you cannot attach a 7131-105 in combination with another external load. If you attach any external devices and any one device is capable of SCSI-2 fast transfers, total bus length is limited to 3 meters.

You can externally attach a single enclosure that contains any amount of multiple SCSI device loads to the PCI SCSI-2 F/W RAID Adapter, but the following restrictions apply:

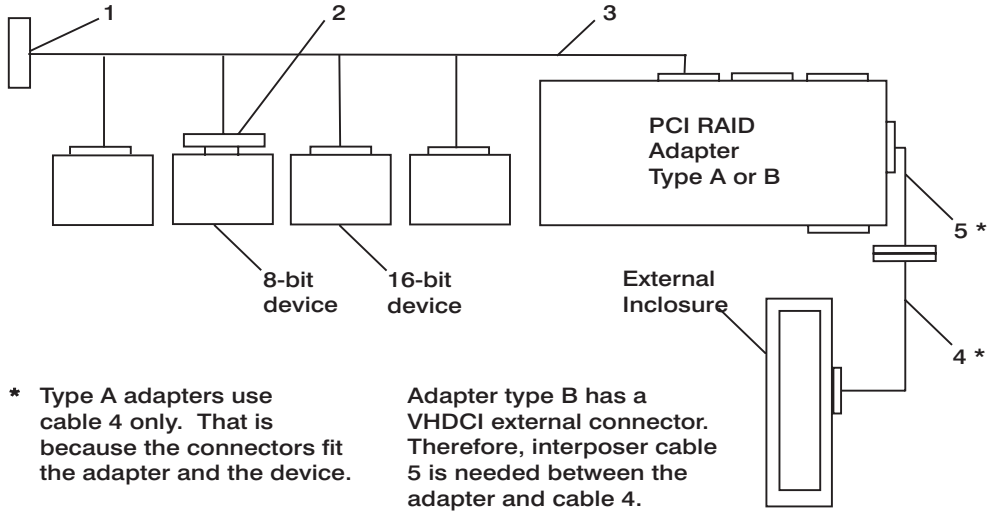
- The maximum combined internal and external cable length is 3 meters.
- Loads on the cable (cable length between devices) must be a minimum of 0.1 meters apart.
- You can mix device widths (8-bit and 16-bit) only if you use the 68-pin to 50-pin interposer (FRU 92F0324, assem. 92F2565).
- You must observe SCSI-2 architectural restrictions (timing requirements and skew restrictions).
- You cannot attach any internal devices to the internal port adapter (J10) when the external port (J11) is in use.

No other adapters can be connected to any of the adapter SCSI ports. The adapter must have exclusive use of all attached drives. The adapter has on-board terminators that are always enabled. No terminator is needed at the adapter end of a SCSI cable.

The Feature 3131 extender cable allows internal adapter SCSI ports to be made available for external connection through an unused card slot.

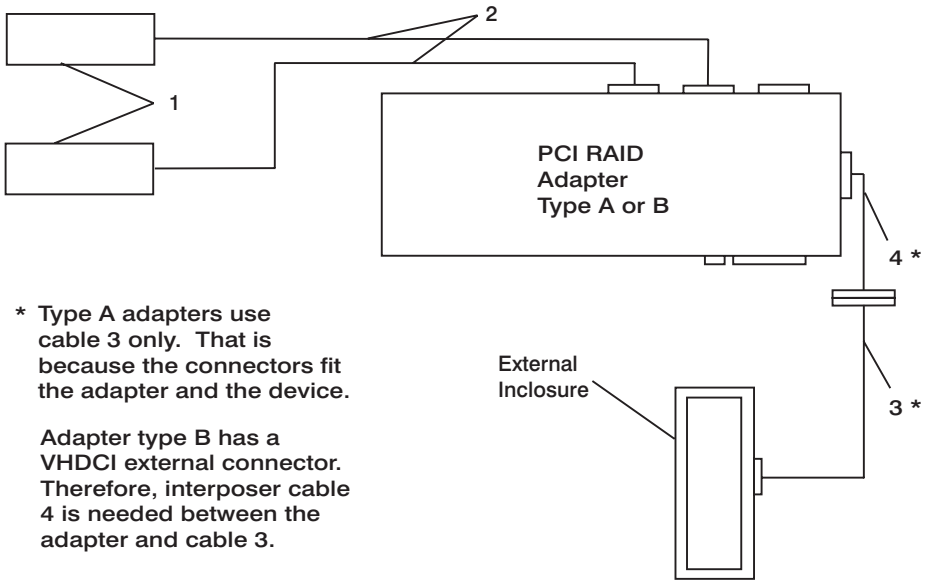
Cabling Examples for the PCI SCSI-2 F/W RAID Adapter

Internal and External Drive Connections for 7024



Item Number	F/C	Part Number	Description	Cable Length (meters)
1			System Specific Terminator	
2	6513	92F0324	68-pin to 50-pin Interposer	
3	2442	40H6637	Four drop internal cable for M/T 7024	
4	9158 2425 3132	70G9857 52G4233 40H7351	Device-to-Device Cable (wide 16-bit)	1.0 2.5 6.0
5	2118	01K6497	Interposer cable	0.30

Combination Internal and External Connection for 7025

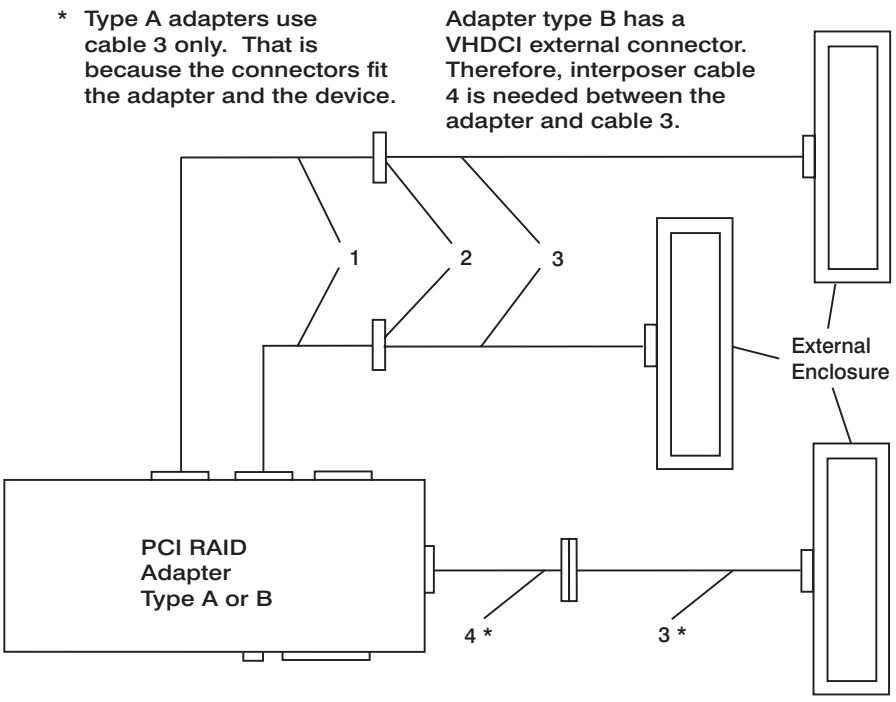


* Type A adapters use cable 3 only. That is because the connectors fit the adapter and the device.

Adapter type B has a VHDCI external connector. Therefore, interposer cable 4 is needed between the adapter and cable 3.

Item Number	F/C	Part Number	Description	Cable Length (meters)
1			System specific SCSI Hot Plug Backplane	
2	2447	06H6660	One drop internal cable	
3	9158 2425 3132	70G9857 52G4233 40H7351	Device-to-Device Cable (wide 16-bit)	1.0 2.5 6.0
4	2118	01K6497	Interposer cable	0.30

External Connections (Maximum of Three Per Adapter)



Item Number	F/C	Part Number	Description	Cable Length (meters)
1	3131	73H3142	Internal Extender Cable	
2			Card Slot Opening	
3	9158 2425 3132	70G9857 52G4233 40H7351	Device-to-Device Cable (wide 16-bit)	1.0 2.5 6.0
4	2118	01K6497	Interposer cable	0.30

Cabling the PCI 3-Channel Ultra2 SCSI RAID Adapter (FC 2494)

This section provides specific cabling information for the PCI 3-Channel Ultra2 SCSI RAID Adapter. For more general cabling information, refer to “General SCSI Considerations” on page 333.

Note: This adapter is not a bootable device; the operating system must load from another device.

SCSI-2/Ultra Single-Ended Cable Lengths for This Adapter

The maximum cable length supported for configurations without any SCSI-2 fast/Ultra devices is 6 meters (approximately 20 feet). SCSI-2 fast/Ultra devices support data rates of up to 10 MB per second for 8-bit or 40 MB per second for 16-bit transfers. If a configuration includes SCSI-2 fast/Ultra devices, the maximum cable length supported is 3 meters (approximately 10 feet). The maximum length includes the internal cabling of any device that has two SCSI connectors. SCSI-2 Ultra2 devices support a data rate of up to 80 MB per second for 16-bit transfers and a maximum cable length of 25 meters. The maximum cable length for multidrop low-voltage differential connections is 12 meters.

When you connect external devices, you can attach only one independent physical enclosure per SCSI bus (also called a *channel*). For example, you cannot attach a 7131-105 in combination with another external load. If you attach any external devices and any one device is capable of SCSI-2 fast/Ultra transfers, total bus length is limited to 3 meters.

Note: If a single-ended device is attached to a low-voltage differential adapter the entire bus will operate as a single-ended bus, see “Single-Ended” on page 334 for single-ended bus limitations. To operate in low-voltage differential mode, all devices on the bus must be low-voltage differential, including the terminator. High-voltage differential devices are not supported on a low-voltage differential bus and will prevent any devices on the bus from working.

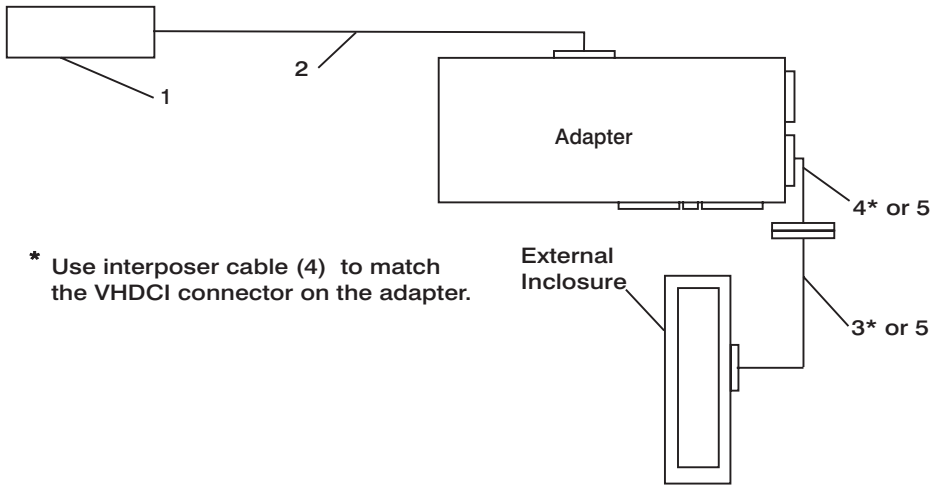
You can externally attach a single enclosure that contains any amount of multiple SCSI device loads to the PCI 3-Channel Ultra2 SCSI RAID Adapter, but the following restrictions apply:

- The maximum allowed cable length for point-to-point low-voltage differential SCSI bus configurations is 25 meters (approximately 80 feet). The maximum cable length for multidrop low-voltage differential connections is 12 meters (approximately 40 feet).
- Loads on the cable (cable length between devices) must be a minimum of 0.1 meters apart.
- You can mix device widths (8-bit and 16-bit) only if you use the 68-pin to 50-pin interposer (FRU 92F0324, assem. 92F2565).

No other adapters can be connected to any of the adapter SCSI ports. The adapter must have exclusive use of all attached drives. The adapter has on-board terminators that are always enabled. No terminator is needed at the adapter end of a SCSI cable.

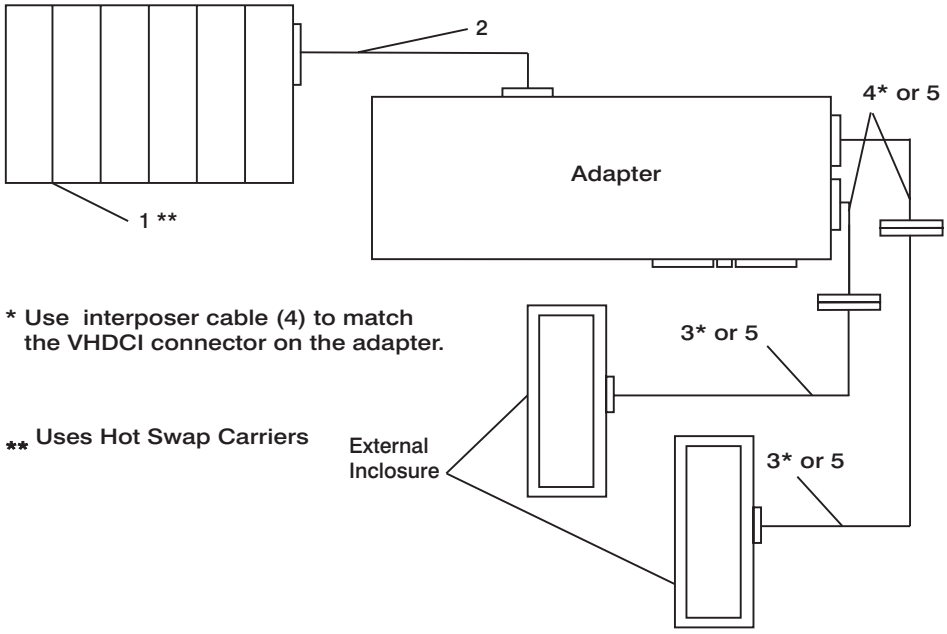
Cabling Examples for the PCI 3-Channel Ultra2 SCSI RAID Adapter

Internal and External Drive Connections Example 1



Item Number	F/C	Part Number	Description	Cable Length (meters)
1			System Specific Backplane	
2	2447	70G9857	One-drop internal cable	
3	9158 2425 3132	70G9857 52G4233 40H7351	Device-to-Device Cable (wide 16-bit)	1.0 2.5 6.0
4	2118	01K6497	Interposer Cable	0.30
5	9301 9303 9305 9310 9320	09L3299 09L3301 09L3303 09L3305 09L3307	Device-to-device cable (VHDCI, 16-bit wide bus)	1.0 3.0 5.0 10.0 20.0

Combination Internal and External Connection Example 2



Item Number	F/C	Part Number	Description	Cable Length (meters)
1			System specific SCSI hot-plug backplane	
2	2447	06H6660	One drop internal cable	
3	9158 2425 3132	70G9857 52G4233 40H7351	Device-to-Device Cable (wide 16-bit)	1.0 2.5 6.0
4	2118	01K6497	Interposer Cable	0.30
5	9301 9303 9305 9310 9320	09L3299 09L3301 09L3303 09L3305 09L3307	Device-to-device cable (VHDCI, 16-bit wide bus)	1.0 3.0 5.0 10.0 20.0

Cabling the PCI Dual-Channel Ultra2 SCSI Adapter (FC 6205)

To understand the cabling for this adapter, read the “General SCSI Considerations” on page 333, then read the following for specific information.

Supported Ultra2 SCSI Configurations for Each Channel of this Adapter

Use the following rules for connecting external devices running at Ultra2 speeds in a 2104 Expandable Storage Plus subsystem:

- One dual-port 2104 Expandable Storage Plus subsystem can be attached. The maximum allowed cable length for differential and point-to-point low-voltage differential SCSI bus configurations is 25 meters (approximately 80 feet). The maximum cable length for multi-drop low-voltage differential connections is 12 meters (approximately 40 feet).
- One dual-port 2104 Expandable Storage Plus subsystem can be attached with its second port driven from another PCI Dual-Channel Ultra2 SCSI Adapter so that the drives in the subsystem are shared between the two systems. When the 2104 Expandable Storage Plus subsystem is driven by two adapters, the cable limits apply to each channel separately.

Low-Voltage Differential Device-to-Device Cables

The maximum allowed cable length for point-to-point low-voltage differential SCSI bus configurations is 25 meters (approximately 80 feet). The maximum cable length for multidrop low-voltage differential connections is 12 meters (approximately 40 feet).

Note: If a single-ended device is attached to a low-voltage differential adapter the entire bus will operate as a single-ended bus, see “Single-Ended” on page 334 for single-ended bus limitations. To operate in low-voltage differential mode, all devices on the bus must be low-voltage differential, including the terminator. High-voltage differential devices are not supported on a low-voltage differential bus and will prevent any devices on the bus from working.

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
2104 DL1, TL1	9301	Device-to-device very-high-density cable interconnect (VHDCI) 16-bit wide bus	09L3299	1.0
2104	9303	Device-to-device VHDCI 16-bit wide bus	09L3301	3.0
2104	9305	Device-to-device VHDCI 16-bit wide bus	09L3303	5.0
2104	9310	Device-to-device VHDCI 16-bit wide bus	09L3305	10.0
2104	9320	Device-to-device VHDCI 16-bit wide bus	09L3307	20.0

Terminators for Low-Voltage Differential Mode of This Adapter

The 2104 Expandable Storage Plus subsystem contains low-voltage differential (LVD) terminators that operate in single-ended mode if any single-ended devices are on the SCSI bus. Otherwise, the bus operates in LVD mode at Ultra2 speeds (80 MB/sec).

Single-Ended SCSI Cable Lengths Using This Adapter

The maximum supported cable length for this adapter depends on the device types attached (SCSI-1, SCSI-2 and so forth) and where attached (internal or external). The device types are as follows:

- SCSI-1 - maximum transfer rate of 5 MB/sec (one byte transfers)
- SCSI-2 Fast - maximum transfer rate of 10 MB/sec (one byte transfers)
- SCSI-2 Fast/Wide - maximum transfer rate of 20 MB/sec (two byte transfers)
- Ultra SCSI - maximum transfer rate of 20 MB/sec (one byte transfers)

- Ultra SCSI Wide - maximum transfer rate of 40 MB/sec (two byte transfers)
- Ultra2 SCSI - maximum transfer rate of 80 MB/sec (two byte transfers)

For this adapter:

- The maximum supported cable length for single-ended configurations without any SCSI-2 fast or Ultra SCSI devices is 6 meters (approximately 20 feet).
- The maximum supported cable length for single-ended configurations that include SCSI-2 fast and Ultra SCSI devices is 3 meters (approximately 10 feet) with the exception of the 7027-High-Capacity Storage Drawer, which can be attached with up to 6 meters of cable.

Supported Single-Ended Configurations for This Adapter

- Internal Ultra devices running at Ultra speeds:
  - Up to six Ultra devices in a backplane attached to each internal port (dependent on internal configuration and cabling).
  - No external attachments are allowed.
- External Ultra devices:
  - No internal attachments allowed.
  - Up to two external Ultra wide (16-bit) devices can be attached to the external port. Maximum cable length must not exceed 3 meters.
  - Up to two external Ultra (8-bit) devices can be attached to the external port. Maximum cable length must not exceed 3 meters.
- Ultra and/or SCSI-2 fast devices running at SCSI-2 fast speeds:
  - Up to six devices in a backplane attached to each internal port (dependent on internal system configuration and cabling). No external attachments are allowed.
  - External attachment of up to four independent physical enclosures is allowed, provided each physical enclosure presents only one load to the SCSI bus. The total bus length must not exceed 3 meters. Total bus length includes internal and external cable length. No internal attachments are allowed.
- Multiple SCSI-2 fast devices in external enclosures:
  - No internal attachments allowed.
  - Maximum combined cable length is 3 meters (internal (to enclosure) and external).
  - Loads on the cable must be 0.1 meters apart at a minimum (cable length between devices must be 0.1 meters apart at a minimum).
  - Do not mix bus widths (8-bit and 16-bit) without the use of the 68-pin to 50-pin interposer (P/N 92F2565 or equivalent).

Note: This adapter has circuitry that can detect the presence of a cable on the external connector, and the default configuration limits the SCSI bus speed to SCSI-2 fast (10 MB/sec).

This default setting can be changed (using the **SMIT** or the **chdev** commands) to allow attachment of external Ultra SCSI devices, with the restriction that there are no SCSI devices attached to the internal connector. The speed can be changed to Ultra SCSI and bus width can be changed to Wide.

Cable and Terminator Tables for the Single-Ended Mode of the PCI Dual-Channel Ultra2 SCSI Adapter

Adapter to Converter Cable

Source	F/C	Cable Description	Part Number	Cable Length (meters)
Host System	2118	Adapter VHDCI connector to high-density micro D-shell connector on the converter cable	01K6497	0.3

Converter Cable to First Device Cables

Source	F/C	Cable Description	Part Number	Cable Length (meters)
Converter cable	2111	Converter-cable to first device (where first device has two connectors), 8-bit narrow bus	06H6037	1.0
Converter cable	2113	Converter cable to-first device (where first device has one connector), 8-bit narrow bus	52G0174	1.5
Converter cable	2115	Converter cable to-first device (where first device has two connectors), 16-bit wide bus	70G9857	1.0

Notes:

1. When cables are ordered by feature code, the appropriate terminator is included with the order. When cables are ordered by part number, only the cable is included. For terminator part numbers, refer to “Terminators for Single-Ended Mode of This Adapter” on page 379.
2. The external connector on this adapter is the SCSI-3 standard, 68-pin VHDCI connector. The converter-cable allows external devices with 68-pin high-density micro D-shell ″P″ type cable connectors to attach to the VHDCI external connector on the PCI Dual-Channel Ultra2 SCSI Adapter. Many of the 16-bit SCSI devices also use this connector type, and as a result, some cables can be used as either converter-cable to first-device or device-to-device cables, depending upon what type of SCSI connectors are present on the devices.

Single-Ended Device-to-Device Cables

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
SE External Device	2840	Device-to-device (where second device has two connectors), 8-bit narrow bus	33F4607	0.7
SE External Device	3130	Device-to-device (where second device has one connector), 8-bit narrow bus	31F4222	0.66
SE External Device	2860 9139	Device-to-device (where second device has two connectors), 16-bit wide bus	52G9921	0.3
SE External Device	2884 9160	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4291	0.6
SE External Device	2883 9150	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4233	2.5
7027 HST	2425			
7027 HST	3132	Device-to-device (where second device has two connectors), 16-bit wide bus	40H7351	6.0

Notes:

1. Most feature codes for cables can only be ordered against the attachment device (7204, 7206, 7208, and so on). For some cables, the feature codes have been made available on the system units. In these cases, the system feature code will be listed. Otherwise the attachment device feature codes will be used.
2. Refer to “Single-Ended SCSI Cable Lengths Using This Adapter” on page 376 for guidelines concerning maximum cable lengths.

Terminators for Single-Ended Mode of This Adapter

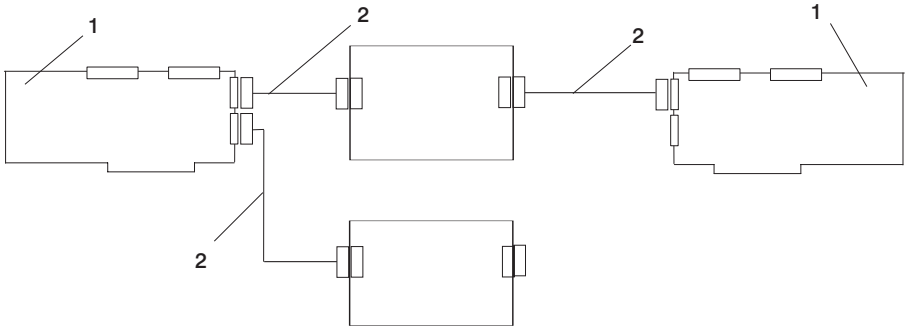
This adapter has on-board terminators that can be enabled or disabled by automatic sensing logic. This sensing logic can detect the presence or absence of external termination and enables or disables the on-card termination when needed. Refer to the adapter installation guide for more information on automatic termination-detection logic.

M/T	F/C	Terminator Description	Part Number	Connector
SE external Devices	Part of cable F/C	8-Bit external FPT18C terminator	52G4260	50-Pin low density
SE external Devices	Part of cable F/C	16-Bit external Boulay terminator	92F0432 (52G9907)	68-Pin high density

Automatic Bus Speed Selection for Single-Ended Mode External Devices

This adapter will automatically sense the presence of an external device. The default speed of this adapter is fast (10 MB/sec for 8-bit, 20 MB/sec for 16-bit) operation whenever there is a single-ended external device attached.

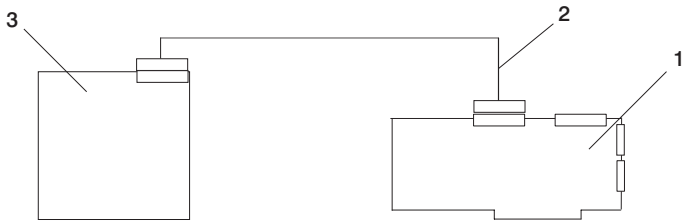
Special Ultra2 Cabling Considerations for the 2104 Expandable Storage Plus subsystem LVD Interface



Item Number	Part Number	Description	Cable Length (meters)
1	03N3606	PCI dual-channel ultra2 SCSI adapter	N/A
2	09L3299 09L3301 09L3303 09L3305 09L3307	Device to device VHDCI cables	1.0 3.0 5.0 10.0 20.0
3	03K9312	LVD adapter to device cable	12.0

Note: This configuration does not support any Ultra SCSI devices.

Cabling Examples for the PCI Dual-Channel Ultra2 SCSI Adapter to Internal Backplanes

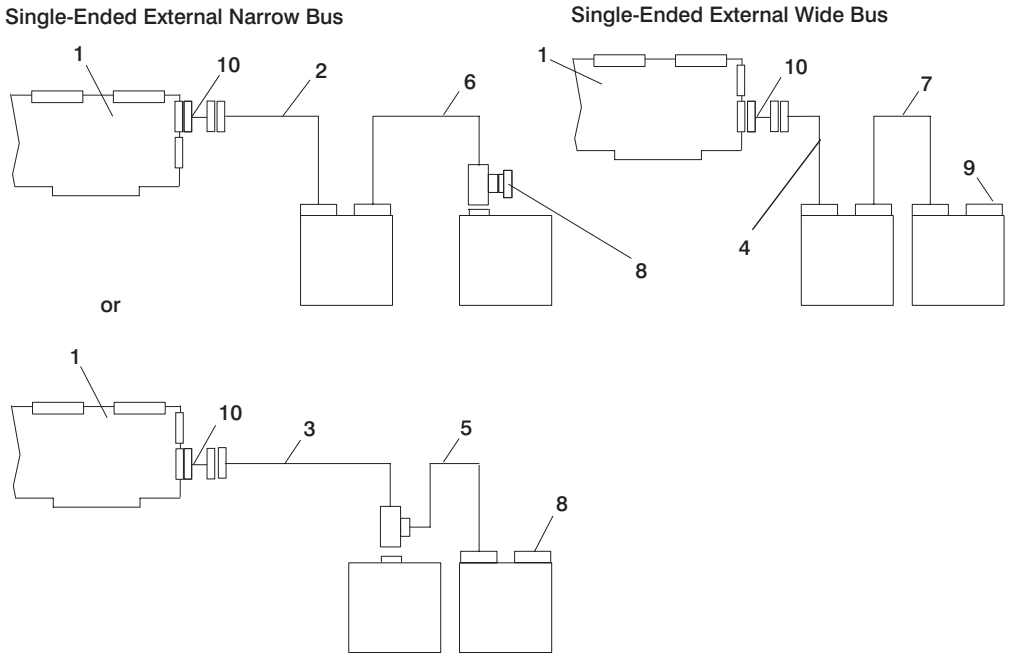


Item Number	Description
1	Adapter
2	Internal SCSI adapter to backplane cable
3	Backplane (1 to 6 drives)

Internal System Cables for Use With This Adapter

Machine Type	Feature Code	Part Number	Devices Supported
7026-H70	2447	06H6660	6
7017-S7A	2447	06H6660	6

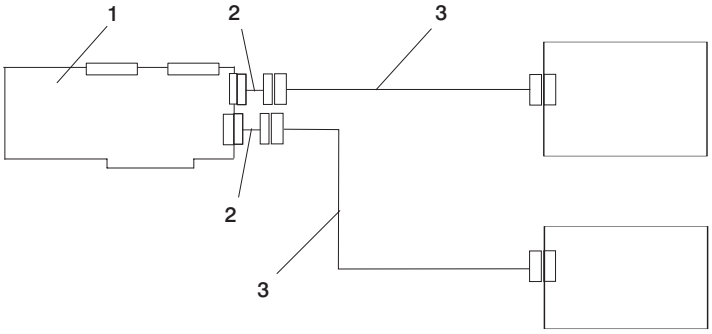
Note: Feature codes for internal cables can only be ordered against the system unit. The backplanes connected to these cables contain the required terminators. If you are unsure of your system's configuration, refer to the system user's guide for more information. Only one backplane can be attached to the internal connector on each adapter.



Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	N/A
2	06H6037	Converter-cable to dual-connector device (narrow 8-bit)	1.0
3	52G0174	Converter-cable to-single-connector device (narrow 8-bit)	1.5
4	70G9857	Converter-cable to-dual-connector device (wide 16-bit)	1.0
5	33F4607	Device-to-dual-connector device (narrow 8-bit)	0.7
6	31F4222	Device-to-single-connector device (narrow 8-bit)	0.66
7	52G9921	Device-to-dual-connector device (wide 16-bit)	0.3
	52G4291		0.6
8	52G4260	Terminator (8-bit)	
9	92F0432	Terminator (16-bit)	
10	01K6497	Converter cable	0.3

Note: Refer to "Single-Ended SCSI Cable Lengths Using This Adapter" on page 376 for guidelines concerning maximum cable lengths.

Special Cabling Considerations for the 7131 Single-Ended Interface



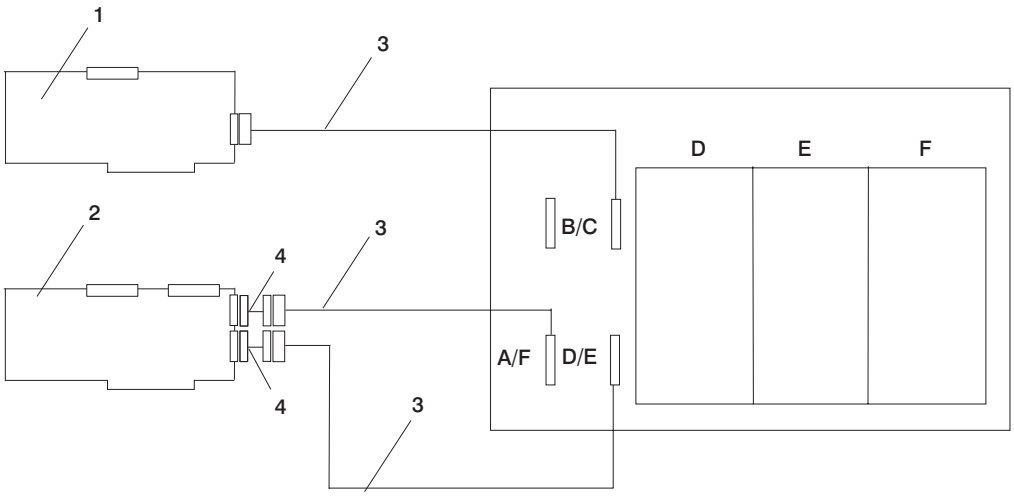
Item Number	Part Number	Description	Cable Length (meters)
1	03N3606	PCI dual-channel ultra2 SCSI adapter	N/A
2	01K6497	Converter cable	0.3
3	70G9857	Converter-cable to dual-connector device (16-bit)	1.0

Note: This configuration does not support any Ultra SCSI devices.

Special Cabling Considerations for the 7027 - High-Capacity Storage Drawer Single-Ended Interface

Note: This configuration does not support any Ultra SCSI devices.

The following figure shows the back of the 7027. Banks A, B, and C are on the front of the 7027.



- Adapter 1 controls banks B and C.
- Adapter 2 controls both banks A and F and banks D and E.

Note: The adapters are on different SCSI buses. This is not a multi-initiator setup.

Item Number	Part Number	Description	Cable Length (meters)
1		PCI single-ended ultra SCSI adapter	N/A
2		PCI dual-channel ultra2 SCSI adapter	N/A
3	52G4233 40H7351	Adapter to dual-connector device (16-bit)	2.5 6.0
4	01K6497	Converter cable	0.3

Multi-Initiator PCI Single-Ended Ultra SCSI Cabling

This adapter does not support the multi-initiator configuration.

Cabling the PCI 4-Channel Ultra3 SCSI RAID Adapter (FC 2498)

This section provides specific cabling information only for the PCI 4-Channel Ultra3 SCSI RAID Adapter. For more general cabling information, see “General SCSI Considerations” on page 333.

Notes:

1. This adapter cannot be used as a boot adapter.
2. Devices *cannot be* attached to both the internal connector and external connector on the same channel.

Single-Ended SCSI-2/Ultra Cable Connections

Internal Connections

Backplanes with up to six SCSI-2 or Ultra SCSI hard disk drives can be attached to the two internal 68-pin high-density plastic D-shell connectors. Termination for the SCSI cables is built into the adapter and backplanes.

External Connections

When you connect external devices, you can attach only one independent physical enclosure per SCSI bus (also called a *channel*). For example, you cannot attach a 7131-105 in combination with another external load. If you attach any external devices and any one device is capable of SCSI-2 fast/Ultra transfers, total bus length is limited to 3 meters.

You can externally attach a single enclosure that contains any amount of multiple SCSI device loads to the PCI 4-Channel Ultra3 SCSI RAID Adapter, but the following restrictions apply:

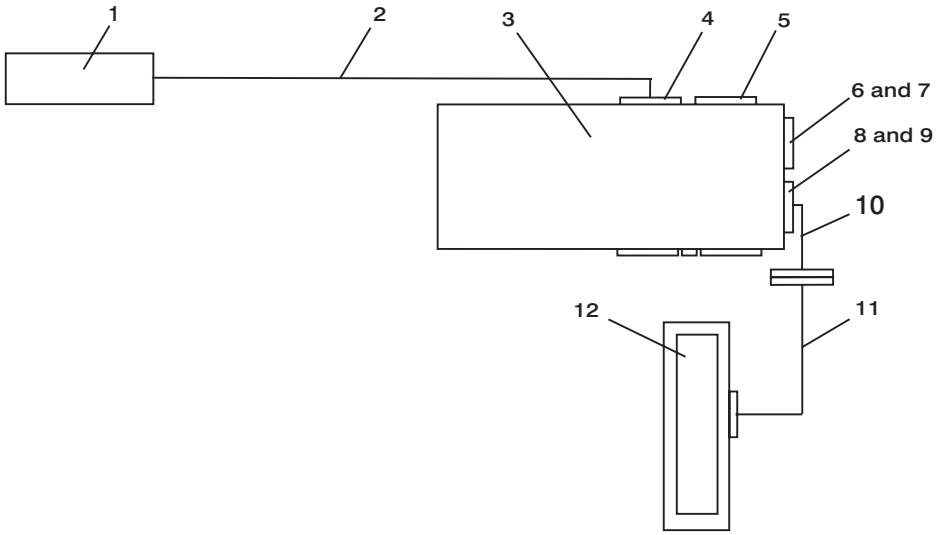
- The maximum combined internal and external cable length is 3 meters for single-ended operation.
- Loads on the cable (cable length between devices) must be a minimum of 0.1 meters apart.

No other adapters can be connected to any of the adapter SCSI ports. The adapter must have exclusive use of all attached drives. The adapter has on-board terminators that are always enabled. No terminator is needed at the adapter end of a SCSI cable.

Single-Ended SCSI-2/Ultra Cabling Example

The following example is for reference only. Actual cabling can vary depending on the devices you have connected.

Devices *cannot be* attached to both the internal connector and external connector on the same channel.



Item Number	Feature Code	Part Number	Description	Cable Length (meters)
1			SCSI backplane in system unit	
2	2447	06H6660 09P0934	One-drop internal cable (for 7013, 7015, 7017, 7025, and 7026-H10/H50) One-drop internal cable (for 7026-H70)	
3			4-channel ultra3 SCSI RAID adapter	
4			Channel 2 internal connector	
5			Channel 1 internal connector	
6			Channel 1 external connector	
7			Channel 2 external connector	
8			Channel 3 external connector	
9			Channel 4 external connector	
10	2118	01K6497	Interposer Cable	0.30
11	9158 2425	70G9857 52G4233	Device-to-device cable (wide 16-bit)	1.0 2.5
12			External enclosure	

Low-Voltage Differential SCSI Cable Connections

Internal Connections

Backplanes with up to six Ultra2 or Ultra3 (80 or 160 Mbps) SCSI hard disk drives can be attached to the two internal 68-pin high-density plastic D-shell connectors.

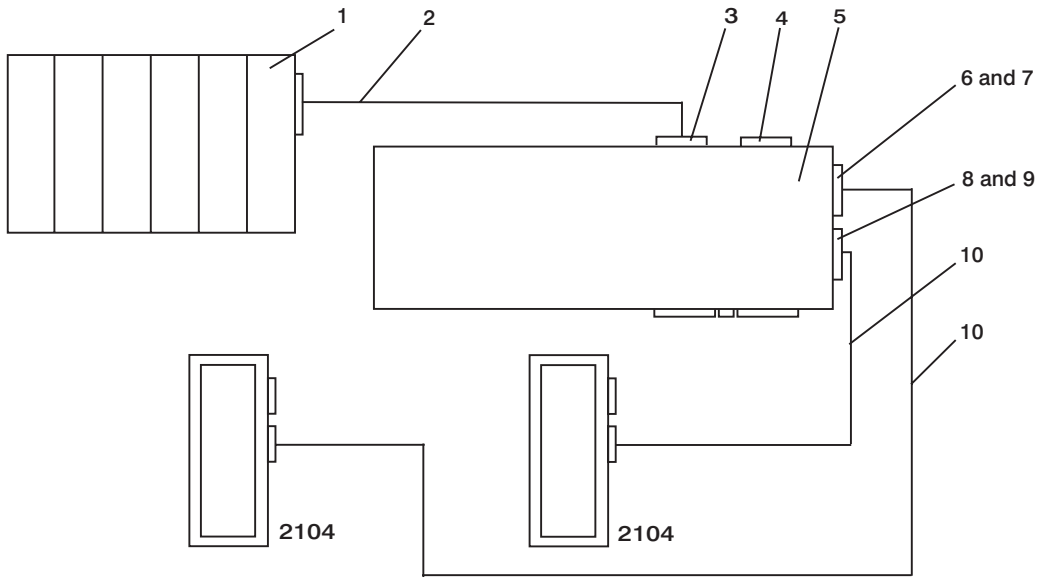
Devices *cannot be* attached to both the internal connector and external connector on the same channel.

External Connections

Connect only one independent physical enclosure port per SCSI bus (also called a *channel*). If the external enclosure has two ports, only one of the ports can be connected to this adapter (also only one per system).

Low-Voltage Differential SCSI Cabling Example

Devices *cannot be* attached to both the internal connector and external connector on the same channel.



Item Number	Feature Code	Part Number	Description	Cable Length (meters)
1			SCSI hot-plug backplane in system unit	
2			One-drop internal SCSI cable (system specific)	
3			Channel 2 internal connector	
4			Channel 1 internal connector	
5			4-channel ultra3 SCSI RAID adapter	
6			Channel 1 external connector	
7			Channel 2 external connector	
8			Channel 3 external connector	
9			Channel 4 external connector	
10	9301 9303 9305 9310 9320	09L3299 09L3301 09L3303 09L3305 09L3307	Device-to-device cable (VHDCI, 16-bit wide bus)	1.0 3.0 5.0 10.0 20.0

Cabling the PCI Dual-Channel Ultra3 SCSI Adapter (FC 6203)

To understand the cabling for this adapter, read the “General SCSI Considerations” on page 333, then read the following for specific information.

Support in Ultra2 or Ultra3 SCSI Configurations for Each Channel of this Adapter

This adapter will support Low-Voltage Differential devices running at Ultra2 or Ultra3 speeds:

- Ultra2 SCSI (Wide) - maximum transfer rate of 80 MB/sec (two byte transfers)
- Ultra3 SCSI (Wide) - maximum transfer rate of 160 MB/sec (two byte transfers)

The following rules apply for connecting external devices running at Ultra2 or Ultra3 speeds in a 2104 Expandable Storage Plus subsystem:

Note: Devices running at Ultra2 speeds may coexist on the SCSI bus with devices running at Ultra3 speeds.

- One dual-port 2104 subsystem can be attached. The maximum allowed cable length for point-to-point low-voltage differential SCSI bus configurations is 25 meters (approximately 80 feet).
- One dual-port 2104 subsystem can be attached with its second port driven from another PCI Dual-Channel Ultra2 or Ultra3 SCSI adapter so that the drive in the subsystem are shared between the two systems. When the 2104 subsystem is driven by the two adapters, the cable limits apply to each channel separately.

  Note: With an adapter connected to each port of the 2104, it is recommended that the adapter SCSI addresses be set to 7 and 6 respectively. Any drive or device existing at address 6 must be removed or its address changed to avoid SCSI addressing conflicts.

The following rules apply for connecting other Low-Voltage Differential devices:

- Up to 25 meters point-to-point or 12 meters multidrop with a maximum of four devices spaced at least three meters apart.

Low-Voltage Differential Device-to-Device Cables

The maximum allowed cable length for point-to-point low-voltage differential SCSI bus configurations is 25 meters (approximately 80 feet). The maximum cable length for multidrop low-voltage differential connections is 12 meters (approximately 40 feet).

Note: If a single-ended device is attached to a low-voltage differential adapter, the entire bus will operate as a single-ended bus, see “Single-Ended” on page 334 for single-ended bus limitations. To operate in low-voltage differential mode, all devices on the bus must be low-voltage differential, including the terminator. High-voltage differential devices are not supported on a low-voltage differential bus and will prevent any devices on the bus from working.

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
2104 DU3, TU3	9301	Device-to-device very-high-density cable interconnect (VHDCI) 16-bit wide bus	09L3299	1.0
2104	9303	Device-to-device VHDCI 16-bit wide bus	09L3301	3.0
2104	9305	Device-to-device VHDCI 16-bit wide bus	09L3303	5.0
2104	9310	Device-to-device VHDCI 16-bit wide bus	09L3305	10.0
2104	9320	Device-to-device VHDCI 16-bit wide bus	09L3307	20.0

Terminators for Low-Voltage Differential Mode of This Adapter

The 2104 Expandable Storage Plus subsystem contains low-voltage differential (LVD) terminators that operate in single-ended mode if any single-ended devices are on the SCSI bus. Otherwise, the bus operates in LVD mode at Ultra2 speeds (80 MB/sec) or Ultra3 speeds (160 MB/sec).

Single-Ended SCSI Cable Lengths Using This Adapter

The maximum supported cable length for this adapter depends on the device types attached (SCSI-1, SCSI-2 and so on) and where attached (internal or external). The device types are as follows:

- SCSI-1 - maximum transfer rate of 5 MB/sec (one byte transfers)
- SCSI-2 Fast - maximum transfer rate of 10 MB/sec (one byte transfers)
- SCSI-2 Fast Wide - maximum transfer rate of 20 MB/sec (two byte transfers)
- Ultra SCSI - maximum transfer rate of 20 MB/sec (one byte transfers)
- Ultra SCSI Wide - maximum transfer rate of 40 MB/sec (two byte transfers)

For this adapter:

- The maximum supported cable length for single-ended configurations without any SCSI-2 fast or Ultra SCSI devices is 6 meters (approximately 20 feet).
- The maximum supported cable length for single-ended configurations that include SCSI-2 fast and Ultra SCSI devices is 3 meters (approximately 10 feet) with the exception of the 7027 - High-Capacity Storage Drawer, which can be attached with up to 6 meters of cable.

Supported Single-Ended Configurations for This Adapter

- External Ultra devices:
  - No internal attachments allowed.
  - Up to two external Ultra wide (16-bit) devices can be attached to the external port. Maximum cable length must not exceed 3 meters.
  - Up to two external Ultra (8-bit) devices can be attached to the external port. Maximum cable length must not exceed 3 meters.
- Ultra and/or SCSI-2 fast devices running at SCSI-2 fast speeds:
  - No internal attachments allowed.
  - External attachment of up to four independent physical enclosures is allowed, provided each physical enclosure presents only one load to the SCSI bus. The total bus length must not exceed 3 meters. Total bus length includes internal and external cable length.
  - Loads on the cable must be 0.1 meters apart at a minimum (cable length between devices must be 0.1 meters apart at a minimum).
  - Do not mix bus widths (8-bit and 16-bit) without the use of the 68-pin to 50-pin interposer (P/N 92F2565 or equivalent).

Note: This adapter has circuitry that can detect the presence of a cable on the external connector, and the default configuration limits the SCSI bus speed in single-ended operation to SCSI-2 fast (10 MB/sec).

This default setting can be changed (using the **SMIT** or the **chdev** commands) to allow attachment of external Ultra SCSI devices, with the restriction that there are no SCSI devices attached to the internal connector. The speed can be changed to Ultra SCSI and bus width can be changed to Wide.

Cable and Terminator Tables for the Single-Ended Mode of the PCI Dual-Channel Ultra3 SCSI Adapter

Adapter to Converter Cable

Source	F/C	Cable Description	Part Number	Cable Length (meters)
Host System	2118	Adapter VHDCI connector to high-density micro D-shell connector on the converter cable	01K6497	0.3

Converter Cable to First Device Cables

Source	F/C	Cable Description	Part Number	Cable Length (meters)
Converter cable	2111	Converter-cable to first device (where first device has two connectors), 8-bit narrow bus	06H6037	1.0
Converter cable	2113	Converter cable to-first device (where first device has one connector), 8-bit narrow bus	52G0174	1.5
Converter cable	2115	Converter cable to-first device (where first device has two connectors), 16-bit wide bus	70G9857	1.0

Notes:

1. When cables are ordered by feature code, the appropriate terminator is included with the order. When cables are ordered by part number, only the cable is included. For terminator part numbers, refer to “Terminators for Single-Ended Mode of This Adapter” on page 392.
2. The external connector on this adapter is the SCSI-3 standard, 68-pin VHDCI connector. The converter-cable allows external devices with 68-pin high-density micro D-shell ″P″ type cable connectors to attach to the VHDCI external connector on the PCI Dual-Channel Ultra2 SCSI Adapter or PCI Dual-Channel Ultra3 SCSI Adapter. Many of the 16-bit SCSI devices also use this connector type, and as a result, some cables can be used as either converter-cable to first-device or device-to-device cables, depending upon what type of SCSI connectors are present on the devices.

Single-Ended Device-to-Device Cables

M/T	F/C	Cable Description	Part Number	Cable Length (meters)
SE External Device	2840	Device-to-device (where second device has two connectors), 8-bit narrow bus	33F4607	0.7
SE External Device	3130	Device-to-device (where second device has one connector), 8-bit narrow bus	31F4222	0.66
SE External Device	2860 9139	Device-to-device (where second device has two connectors), 16-bit wide bus	52G9921	0.3
SE External Device	2884 9160	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4291	0.6
SE External Device	2883 9150	Device-to-device (where second device has two connectors), 16-bit wide bus	52G4233	2.5
7027 HST	2425			
7027 HST	3132	Device-to-device (where second device has two connectors), 16-bit wide bus	40H7351	6.0

Notes:

1. Most feature codes for cables can only be ordered against the attachment device (7204, 7206, 7208, and so on). For some cables, the feature codes have been made available on the system units. In these cases, the system feature code will be listed, otherwise the attachment device feature codes will be used.
2. Refer to “Single-Ended SCSI Cable Lengths Using This Adapter” on page 389 for guidelines concerning maximum cable lengths.

Terminators for Single-Ended Mode of This Adapter

This adapter has on-board terminators that can be enabled or disabled by automatic sensing logic. This sensing logic can detect the presence or absence of external termination and enables or disables the on-card termination when needed. Refer to the adapter installation guide for more information on automatic termination detection logic.

M/T	F/C	Terminator Description	Part Number	Connector
SE external Devices	Part of cable F/C	8-Bit external FPT18C terminator	52G4260	50-Pin low density
SE external Devices	Part of cable F/C	16-Bit external Boulay terminator	92F0432 (52G9907)	68-Pin high density

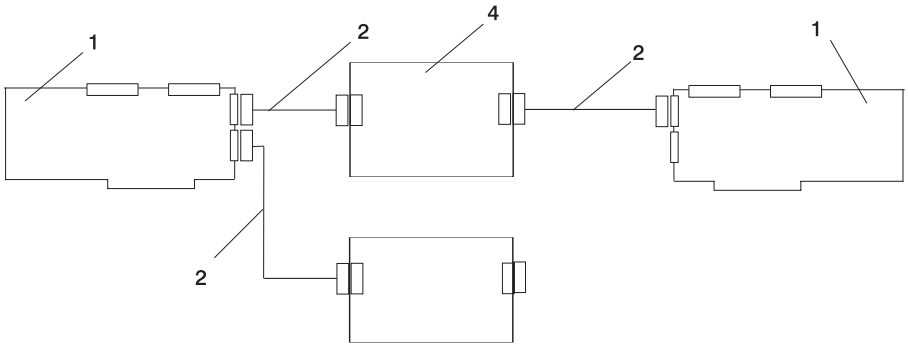
Automatic Bus Speed Selection for Single-Ended Mode External Devices

This adapter will automatically sense the presence of an external device. The default speed of this adapter is fast (10 MB/sec) operation whenever there is a single-ended external device attached.

Low-Voltage Differential Cabling Examples

The following are examples of various low-voltage differential cable configurations.

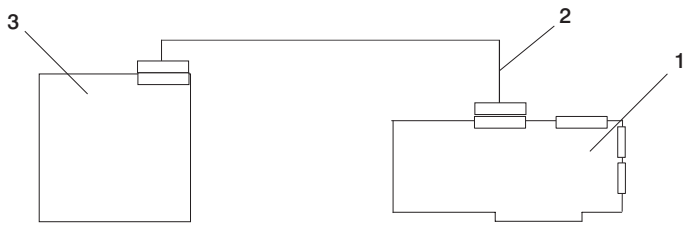
Special Ultra3 Cabling Considerations for the 2104 Expandable Storage Plus subsystem LVD Interface



Item Number	Part Number	Description	Cable Length (meters)
1	03N3606 09P2544	PCI Dual-Channel Ultra2 SCSI Adapter PCI Dual-Channel Ultra3 SCSI Adapter **Note:** Ultra2 devices can share the SCSI bus with Ultra3 devices.	N/A
2	09L3299 09L3301 09L3303 09L3305 09L3307	Device to device VHDCI cables	1.0 3.0 5.0 10.0 20.0
3	03K9312	LVD adapter to device cable	12.0
4	N/A	2104 Storage Subsystem	N/A

Note: This configuration supports Ultra2 and Ultra3. It does not support any Ultra SCSI devices.

Cabling Example for PCI Dual-Channel Ultra3 SCSI Adapter to Internal LVD Backplanes at Ultra3 Speeds



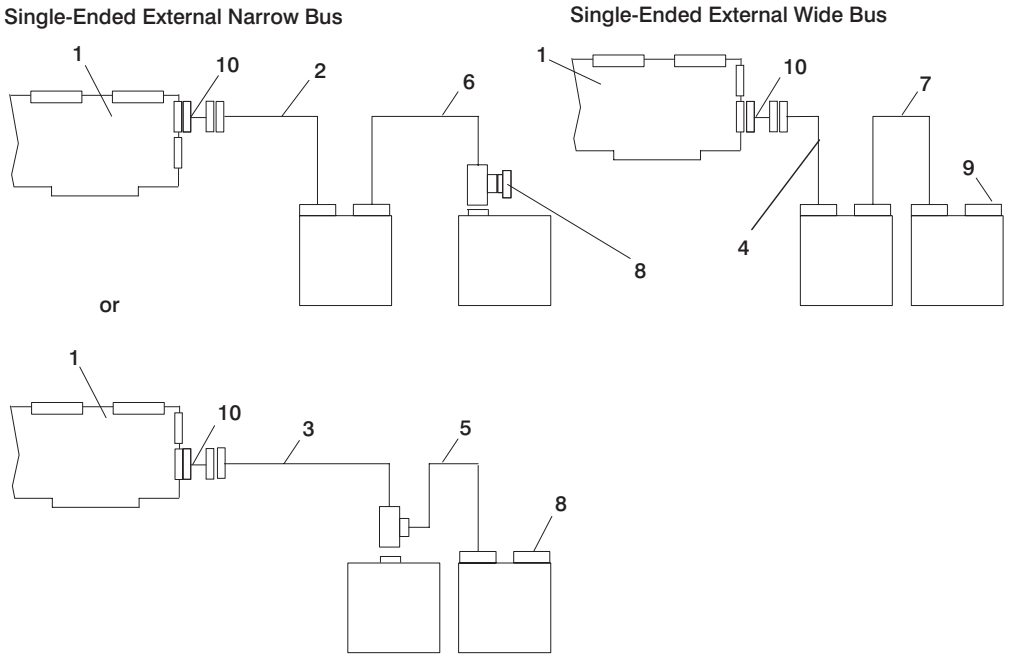
Item Number	Description
1	Adapter
2	Internal SCSI adapter to backplane cable
3	Backplane (1 to 6 drives)

Internal System Cables for Use With This Adapter

Machine Type	Feature Code	Part Number	Devices Supported
7026-F80	2432	04N2273	6
7026-6F1	2432	04N2273	6

Note: Feature codes for internal cables can only be ordered against the system unit. The backplanes connected to these cables contain the required terminators. If you are unsure of your system's configuration, refer to the system user's guide for more information. Only one backplane can be attached to the internal connector on each adapter.

Single-Ended Cabling Examples



Item Number	Part Number	Description	Cable Length (meters)
1		Adapter	N/A
2	06H6037	Converter-cable to dual-connector device (narrow 8-bit)	1.0
3	52G0174	Converter-cable to-single-connector device (narrow 8-bit)	1.5
4	70G9857	Converter-cable to-dual-connector device (wide 16-bit)	1.0
5	33F4607	Device-to-dual-connector device (narrow 8-bit)	0.7
6	31F4222	Device-to-single-connector device (narrow 8-bit)	0.66
7	52G9921	Device-to-dual-connector device (wide 16-bit)	0.3
	52G4291		0.6
8	52G4260	Terminator (8-bit)	
9	92F0432	Terminator (16-bit)	
10	01K6497	Converter cable	0.3

Note: Refer to “Single-Ended SCSI Cable Lengths Using This Adapter” on page 389 for guidelines concerning maximum cable lengths.

Multi-Initiator PCI Single-Ended Ultra SCSI Cabling

This adapter does not support the multi-initiator configuration.

Chapter 5. Cable Assembly and Pin-Outs

The information presented in this chapter does not guarantee functionality or compliance with any RFI or EMI regulations.

This information must be used along with other information about the location and use of the cables to help provide custom cabling that is acceptable for the customer.

Chapter 3, “Cables and Cabling”, on page 271 has general information on cabling that can be helpful if you are considering building your own cables.

General Cable Building Information

Consider the following information 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 applies.

1. Any communications cable being run outdoors must have an appropriate lightning arrester on it. All outer foil shields must be connected to the metal shell of the connector at both ends.
2. Be sure any wire that is connected at one end is terminated at the other end. Wires that are not terminated act like an antennas, receiving and transmitting electrical noise.
3. On modem cables for async communications, ground wires for twisted pairs must be connected together and to position 7 of the connector at each end of the cable.
4. On other than modem async communications cables, the outer foil drain wire must connect to the metal shell of the connector on the system end of the cable. The outer foil drain wire must be connected to position 1 of the connector on the device end of the cable.
5. The connectors on all cables must provide strain relief to prevent breaking the wires.

Adapter-Specific Cable-Building Information

The following information is presented to help the person who is 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 271.

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

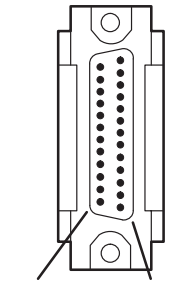
Most of the cables in this chapter are arranged alphabetically by cable letter.

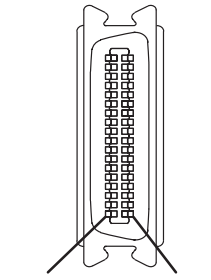
Cable	Description	Page
A	PC Parallel Printer Cable	398
D	Async Cable EIA-232/V.24	400
E	Printer/Terminal Interposer	401
I	Printer/Terminal Interface Cable	402
K	Terminal Cable EIA-422A	403
Q	X.25 Attachment Cable X.21	404
R	X.25 Attachment Cable V.24	405
S	X.25 Attachment Cable V.35	406
T	4-Port Multiprotocol Communications Interface Cable	406
U	V.35 cable for use with 4-Port Multiprotocol Communications Controller	406
V	EIA-232D/V.24 cable for use with 4-Port Multiprotocol Communications Controller	408
W	X.21 cable for use with 4-Port Multiprotocol Communications Controller	409
X	EIA-422A cable for use with 4-Port Multiprotocol Communications Interface Cable (Port 0 only)	410
AR	Serial Port Cable (EIA-232) for systems with a nine (9) pin serial port connector	411
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	411
AU	This cable attaches a TURBOWAYS 25 ATM PCI adapter to an ATM switch or concentrator.	412
NB&NC	128-Port Async Controller Cable, 8-wire	415
ND	128-Port Async Controller to Remote Async Node Cable	417
NE	128-Port Async Controller EIA-232 Modem Cable, System Side	418
NF	128-Port Async Controller EIA-232 Modem Cable, Device Side	420
NG	128-Port Async Controller EIA-422 Modem Cable, System Side	422
NH	128-Port Async Controller EIA-422 Modem Cable, Device Side	423
NK	10-pin RJ-45 to DB-25 Converter Cable for use with the Remote Async Node	424

Cable	Description	Page
NL	Cable for Connecting Remote Async Node to a Printer or Terminal Device	425
NM	Cable for Connecting Remote Async Node to a Modem Device	427
NP	RS-422 Cable for 16-port RAN	430
PA	Cable for Connecting the 2-Port Multiprotocol adapter to a V.24 network	432
PB	Cable for Connecting the 2-Port Multiprotocol adapter to a V.35 network	434
PC	Cable for Connecting the 2-Port Multiprotocol adapter to a V.36/EIA-449 network	436
PD	Cable for Connecting the 2-Port Multiprotocol adapter to a X.21 network	438
PH	Ethernet Straight through Cable	440
PJ	Ethernet Crossover Cable	441
PK	EIA-232 (ISO 2110) Cable for the IBM ARTIC960Hx 4-Port Selectable PCI Adapter	442
PL	EIA-530 (ISO 2110) Cable for the IBM ARTIC960Hx 4-Port Selectable PCI Adapter	442
PM	V.35 DTE (ISO 2593) Cable for the IBM ARTIC960Hx 4-Port Selectable PCI Adapter	444
PN	SC-Bus Cable 26-Pin Ribbon Cable for the IBM ARTIC960Hx DSP Resource PCI Adapter	445
PP	RS-449 (ISO 4902) Cable for the IBM ARTIC960Hx 4-Port Selectable PCI Adapter	446
PR	X.21 (ISO 4903) Cable for the IBM ARTIC960Hx 4-Port Selectable PCI Adapter	448
PS	T1/E1 RJ-48 Cable for the IBM ARTIC960Hx 4-Port T1/E1 PCI Adapter	449

Cable A

Description: PC Parallel Printer Cable.



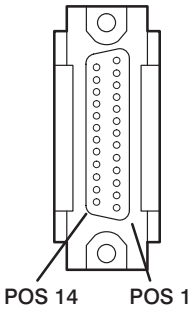


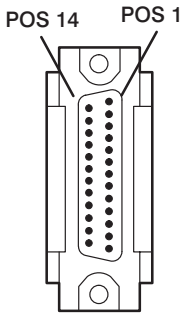
System End Connector Pin (Male)	Signal	Device End Connector Socket (Female)
1	Strobe	1
2	Data	2
3	Data	3
4	Data	4
5	Data	5
6	Data	6
7	Data	7
8	Data	8
9	Data	9
10	ACK	10
11	Busy	11
12	PE	12
13	Select	13
14	Autofeed XT	14
18	Ground	15
19	Ground	16
Not Used		17
Not Used		18
21	Ground	19
21	Ground	20
21	Ground	21
22	Ground	22
22	Ground	23
23	Ground	24
23	Ground	25
24	Ground	26
24	Ground	27
24	Ground	28

System End Connector Pin (Male)	Signal	Device End Connector Socket (Female)
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

Cable D

Description: Async Cable EIA-232/V.24.





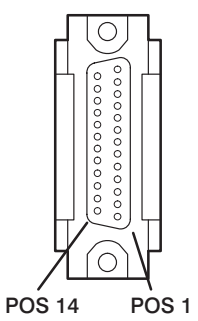
System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
Shell	Shield Ground	1, Shell
2	TxD	2
3	RxD	3
4	RTS	4
5	CTS	5
6	DSR	6
7	Signal Ground	7
8	CD	8
20	DTR	20
22	RI	22

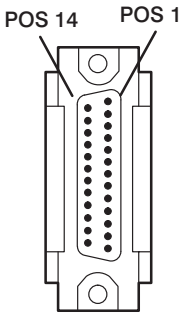
For applications where the Coprocessor Multiport Adapter Model 2 is used, the following additional pins are required.

System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
15	Tx CLK	15
17	Rx CLK	17

Cable E

Description: Printer/Terminal Interposer EIA-232. Use this to convert modem cables to use with Printer or terminal connections. This cable is a printer/terminal interposer, approximately two inches long and connects the pins from input to output, as shown in the following figure.

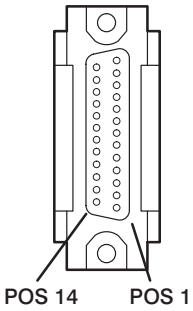


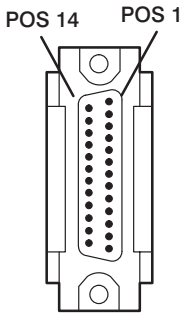


System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
1	Shield Ground	shell
2	TxD	3
3	RxD	2
4	RTS	5
5	CTS	4
6, 8	DSR, CD	20
7	Signal Ground	7
20	DTR	6, 8

Cable I

Description: Printer/Terminal Cable-EIA-232 - 3m or 10 feet long.

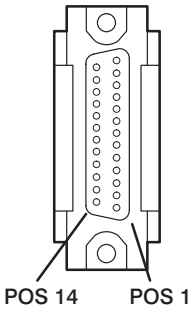


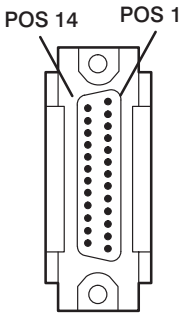


System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
Shell	Shield Ground	Shell, 1
2	TxD	3
3	RxD	2
4	RTS	5
5	CTS	4
6, 8	DSR, CD	20
7	Signal Ground	7
20	DTR	6, 8

Cable K

Description: Terminal Cable RS-422A

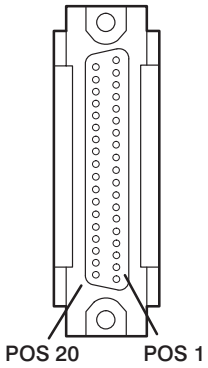


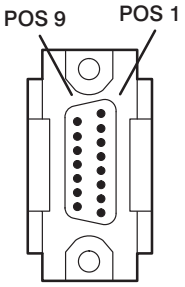


System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
Shell	Shield Ground	1
2	TxA	15
3	RxA	19
4	TxB	17
5	RxB	25
7	Signal Ground	7

Cable Q

Description: X.25 Attachment Cable-X.21.



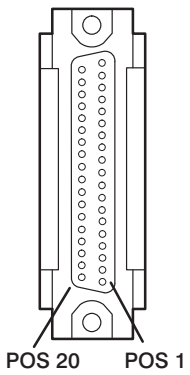


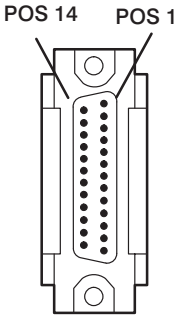
System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
10	T (A)	2
28	T (B)	9
11	C (A)	3
29	C (B)	10
12	R (A)	4
30	R (B)	11
13	I (A)	5
31	I (B)	12
14	S (A)	6
32	S (B)	13
7*	Ground	8
9*	Ground	8

*Tied together at system end connector.

Cable R

Description: X.25 Attachment Cable-V.24.



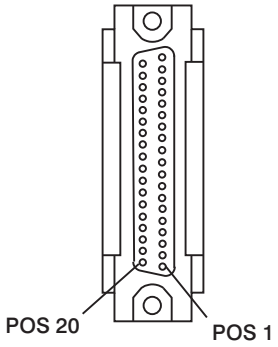


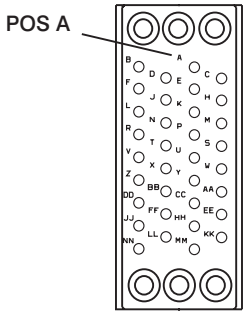
System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
2	TxD	2
3	RxD	3
4	RTS	4
5	CTS	5
6	DSR	6
8	CD	8
24	Tx CLK	15
26	Rx CLK	17
27	LLBT	18
20	DTR	20
21	RLBT	21
22	CI	22
25	TI	25
7*	Ground	7
9*	Ground	7
15*	Ground	7

*Tied together at system end connector.

Cable S

Description: X.25 Attachment Cable-V.35.





System End Connector Socket (Female)	Signal	Device End Connector 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	Clk (A)	V
16	Rx Clk (B)	X
7	Ground	B
15	Ground	B

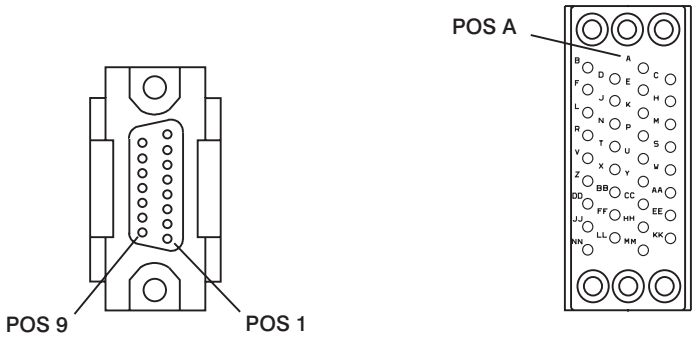
Cable T

Description: This cable comes with an Interface/Breakout box. It has nine connectors for the four ports. For a description of the Coprocessor Multiport Adapter, Model 2 interface cable, see Chapter 3, “Cables and Cabling”, on page 271 of this book. The interface cable is used with the Coprocessor Multiport Adapter, Model 2.

Cable U

Description: V.35 Cable for use with the Coprocessor Multiport Adapter, Model 2.

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.

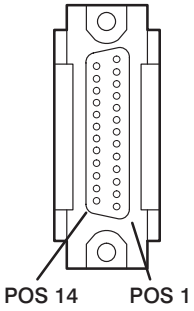


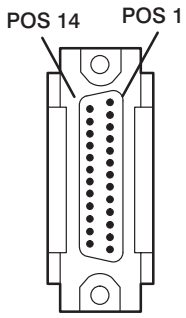
System End Connector Socket (Female)	Signal	Twisted Pair Number	Device End Connector Pin (Male)
1	Ground Shield		A (Shield)
2	TxD (B)	1	S
3	RTS		C
4	RxD (B)	2	T
5	CTS		D
6	DSR		E
7	CD		F
8	Signal Ground		B
9	TxD (A)	1	P
10	Tx Clk (A)	3	Y
11	RxD (A)	2	R
12	Tx Clk (B)	3	AA
13	Rx Clk (B)	4	X
14	Rx Clk (A)	4	V
15	DTR		H

Cable V

Description: EIA-232D/V.24 cable for use with the Coprocessor Multiport Adapter, Model 2.

Use a 25-position male connector and a 25-position female connector. Use bulk cable that has individually shielded wires.



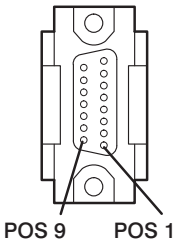


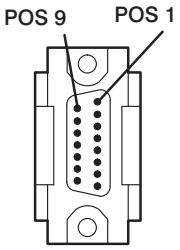
System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
2	TxD	2
3	RxD	3
4	RTS	4
5	CTS	5
6	DSR	6
7	Signal Ground	7
8	CD	8
15	Tx Clk	15
17	Rx Clk	17
20	DTR	20
22	RI	22
23	HRS	23
24	DTE Clk	24
1	Shield Ground	

Cable W

Description: X.21 cable for use with the Coprocessor Multiport Adapter, Model 2.

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).

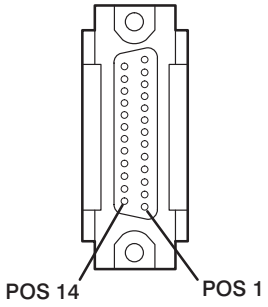




System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
	Shield	
2	T(A)	2
3	C(A)	3
4	R(A)	4
5	I(A)	5
6	S(A)	6
8	Signal Ground	8
9	T(B)	9
10	C(B)	10
11	R(B)	11
12	I(B)	12
13	S(B)	13

Cable X

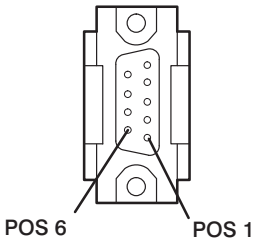
Description: EIA-422A cable for use with the Coprocessor Multiport Adapter, Model 2. This cable is customer-supplied.

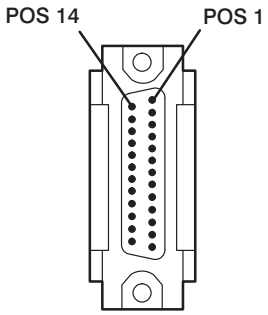


System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
	Ground Shield	
2	TxA	-
3	RxA	-
4	TxB	-
5	RxB	-
7	Signal Ground	-
17	RxB Clk	-
22	RxA Clk	-
23	TxA Clk	-
24	TxB Clk	-

Cable AR

Description: This Serial Port cable (Async Cable EIA-232) is for systems that have a nine-pin serial port connector.

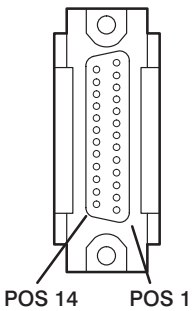


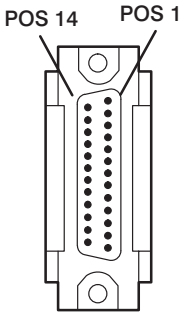


System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
Shell	Shield Ground	1, Shell
3	TxD	2
2	RxD	3
7	RTS	4
8	CTS	5
6	DSR	6
5	Signal Ground	7
1	CD	8
4	DTR	20
9	RI	22

Cable AS

Description: This Serial Port fan-out cable (Async Cable EIA-232) 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, Serial Port (1) is available. This serial port fan-out cable is a ″Y″ cable with three connectors. Each of these three connectors 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).

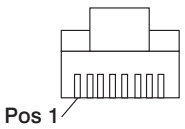


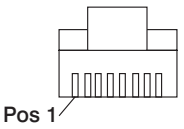


System End Connector Socket (Female)	Signal	Device End Connector Pin (Male)
Shell	Shield Ground	1, Shell
2	TxD (1)	2
3	RxD (1)	3
4	RTS (1)	4
5	CTS (1)	5
6	DSR (1)	6
7	Signal Ground	7
8	CD (1)	8
20	DTR (1)	20
22	RI (1)	22
Shell	Shield Ground	1, Shell
14	TxD (2)	2
16	RxD (2)	3
19	RTS (2)	4
13	CTS (2)	5
15	DSR (2)	6
7	Signal Ground	7
12	CD (2)	8
24	DTR (2)	20
17	RI (2)	22
Others	Reserved	Others

Cable AU

Description: This cable attaches a TURBOWAYS 25 ATM PCI adapter to an ATM switch or concentrator. The TURBOWAYS 25 ATM Cable is made from unshielded twisted pair or shielded twisted pair. The cable must meet ATM standards. The maximum length is 100 meters (325 feet).





Adapter End (RJ-45)		Device End (RJ-45)	
Signal Name	Pin	Pin	Signal Name
Transmit A	1	1	Receive A
Transmit B	2	2	Receive B
Reserved	3	3	Reserved
Reserved	4	4	Reserved
Reserved	5	5	Reserved
Reserved	6	6	Reserved
Receive A	7	7	Transmit A

Adapter End (RJ-45)		Device End (RJ-45)	
Signal Name	**Pin**	**Pin**	**Signal Name**
Receive B	8	8	Transmit B

128-Port Async Controllers

The following information is for custom built cables connecting the 128-Port Async Controllers 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 Adapters

- FC (2933) 128-Port Async Adapter is an ISA adapter that can communicate with a Remote Async Node (RAN) at bit rates up to 1.2 Mbps.
- FC (2944) 128-Port Async Adapter is an PCI adapter that can communicate with a Remote Async Node (RAN) at bit rates up to 2.4 Mbps.

Cabling the Two Adapters and the Four Different Remote Async Nodes

The following table shows the bit rates when different adapters and remote async nodes are connected:

Adapter Feature Code	Adapter Description	Remote Async Node	Maximum RAN to device Bit Rate in bps
2933/ 2944	ISA and PCI 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	

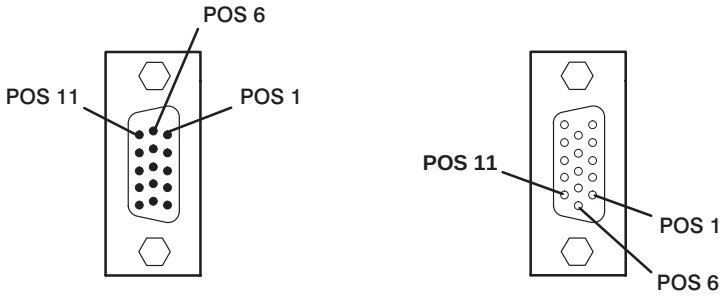
128-Port Async Controller to Remote Async Node Cables

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 must be no smaller than 28 AWG (stranded wire) with a capacitance rating of no more than 52 pF/m (16 pF/ft) (Belden type 9806 or equivalent). For lengths greater than 300 m (1000 ft), conductors must be no smaller than 24 AWG (stranded wire) with a capacitance rating of no more than 52 pF/m (16 pF/ft) (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.

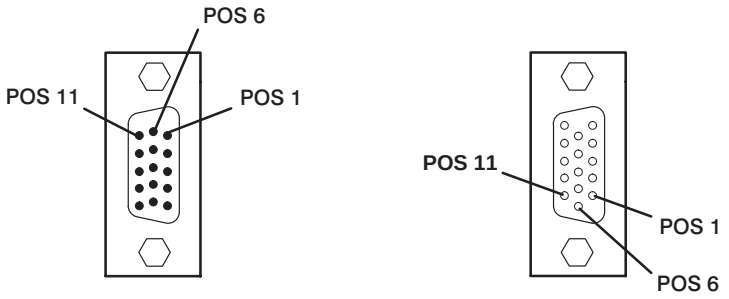
Controller Line Baud Rate	Total Controller Cable Length	
bps	m	ft
2,400	1200	3930
4,800	1200	3930
9,600	1200	3930
19,200	1200	3930
38,400	1200	3930
57,600	1200	3930
76,800	1200	3930
115,000	900	2950
230,000	400	1350
460,000	300	1000
920,000	300	1000
1,200,000	300	1000
2,400,000	90	300

Note: The preceding 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 must be no smaller than 28 AWG (stranded wire) with a capacitance rating of no more than 52 pF/m (16 pF/ft) (Belden type 9804 or equivalent). For lengths greater than 300 m (1000 ft), conductors must be no smaller than 24 AWG (stranded wire) with a capacitance rating of no more than 52 pF/m (16 pF/ft) (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.

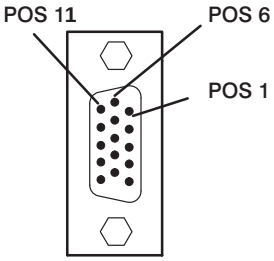
Controller Line Baud Rate	Total Controller Cable Length	
bps	**m**	**ft**
230000	400	1350
460000	300	1000

Note: The preceding 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.

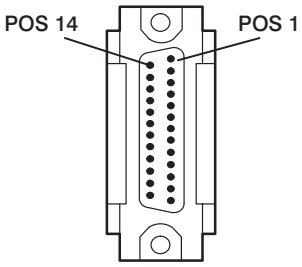
Cable NE

Description: 128-Port Async Controller EIA-232 Modem Cable, System-Side.

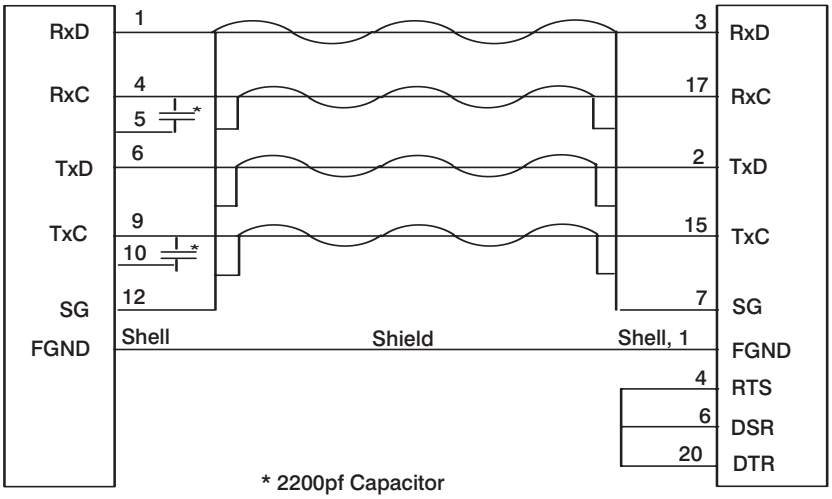
The cable has eight twisted-pair conductors and is shielded on the outside. Cable length can be from 1.8 m (6 ft) to 3.7 m (12 ft). Conductors must be no smaller than 24 AWG (stranded wire) with a capacitance rating of no more than 41 pF/m (12.5 pF/ft).



System End
HD-15 Male



Modem End
DB-25 Male



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 must be limited to 50 feet. If there is a requirement to go up to 1000 feet, EIA-422 modems must be used.

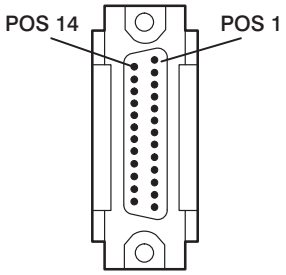
Testing Recommendations

- Connect 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 troubleshoot when all components are local.
- Consult the modem's documentation 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 ensure low error rates.
- Using EIA232 modems, the length to the furthest RAN including modem cable must be limited to 50 feet.
- If there is a requirement to go up to 1000 feet, EIA422 modems must be used.

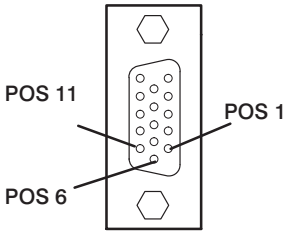
Cable NF

Description: 128-Port Async Controller EIA-232 Modem Cable, Device-side.

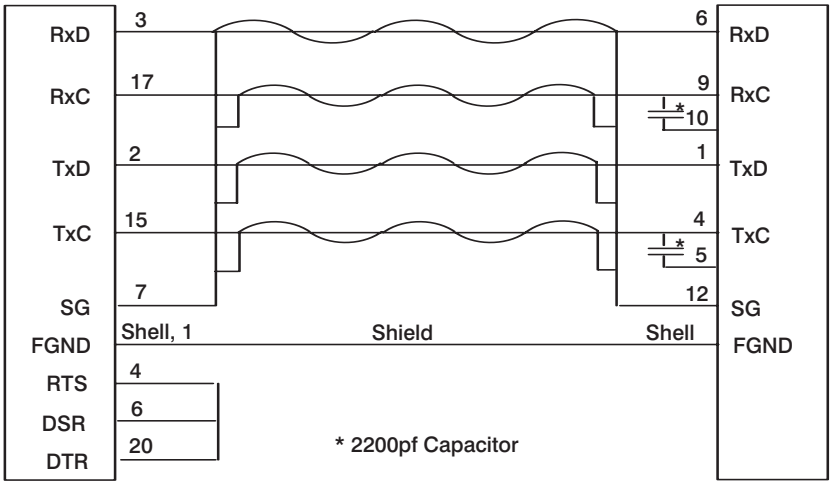
The cable has eight twisted-pair conductors and is shielded on the outside. Cable length can be from 1.8 m (6 ft) to 3.7 m (12 ft). Conductors must be no smaller than 24 AWG (stranded wire) with a capacitance rating of no more than 41 pF/m (12.5 pF/ft).



Modem End
DB-25 Male



Device End
HD-15 Female



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.

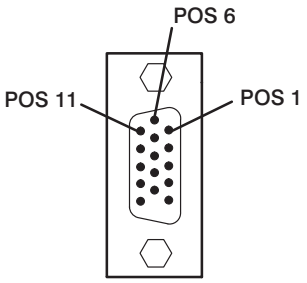
Note: The length to the furthest RAN including modem cable must be limited to 50 feet. If there is a requirement to go up to 1000 feet, EIA-422 modems must be used.

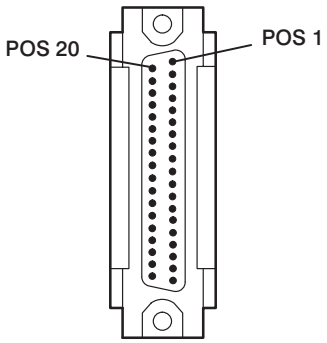
See “Testing Recommendations” on page 419.

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 must be no smaller than 28 AWG (stranded wire) with a capacitance rating of no more than 52 pF/m (16 pF/ft) (Belden type 9806 or equivalent). For lengths greater than 300 m (1000 ft), conductors must be no smaller than 24 AWG (stranded wire) with a capacitance rating of no more than 52 pF/m (16 pF/ft) (Belden type 9831 or equivalent).





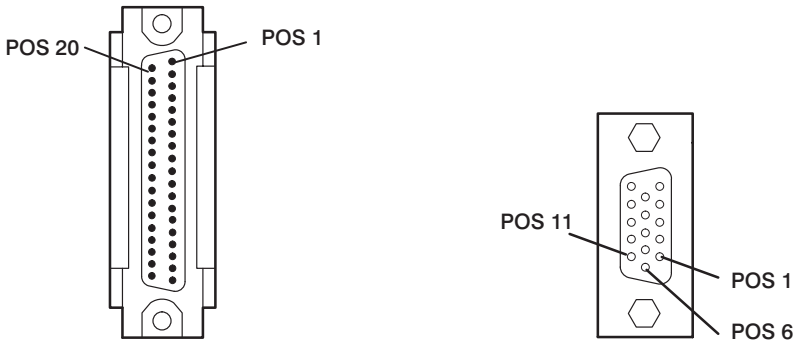
System End Connector		Device End Connector	
Pin (Male	**Signal**	**Signal**	**Socket (Female)**
1	RxD -	RD -	6
2	RxD +	RD +	24
4	RxC -	RT -	8
5	RxC +	RT +	26
6	TxD -	SD -	4
7	TxD +	SD +	22
9	TxC -	ST -	5
10	TxC +	ST +	23
12	Shield Ground	Shield Ground	19

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 416.

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 must be no smaller than 28 AWG (stranded wire) with a capacitance rating of no more than 52 pF/m (16 pF/ft) (Belden type 9806 or equivalent). For lengths greater than 300 m (1000 ft), conductors must be no smaller than 24 AWG (stranded wire) with a capacitance rating of no more than 52 pF/m (16 pF/ft) (Belden type 9831 or equivalent).



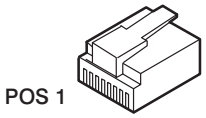
System End Connector		Device End Connector	
Pin (Male)	**Signal**	**Signal**	**Socket (Female)**
6	RD -	RxD -	6
24	RD +	RxD +	7
8	RT -	RxC -	9
26	RT +	RxC +	10
4	SD -	TxD -	1
22	SD +	TxD +	2
5	ST -	TxC -	4
23	ST +	TxC +	5
19	Shield Ground	Shield Ground	12

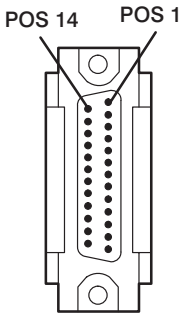
The 128-port async controller supports multiple controller line baud rates in EIA-422 synchronous-modem-attach mode. See the Controller Line Baud Rate table for Cable NB “Line Length, 8-Wire” on page 416.

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

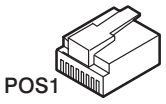
Note:

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.

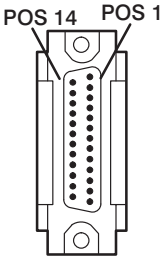
Cable NL

Description: Customer-supplied cable for connecting Remote Async Node 16-Port EIA-232 to a printer or terminal device.

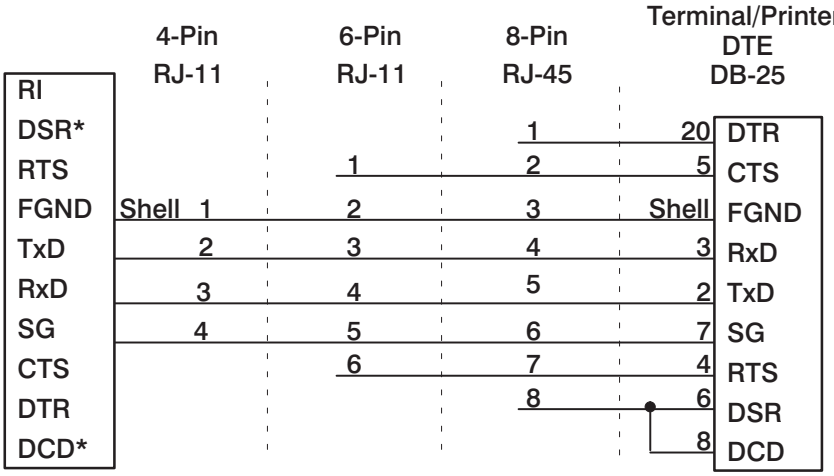
Cable length can be up to 30 m (100 ft) for baud rates up to 57.6 Kbps. See RAN to device cable length table on page 2 on page 428. Use overall foil/braid shielded multiconductor cable with a capacitance rating of 41 pF/m (12.5 pF/ft) or less. Conductors must be no smaller than 28 AWG (stranded wire). 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.



4-, 6-, and 8-Pin
RJ-11 or RJ-45 Plug
(Male)



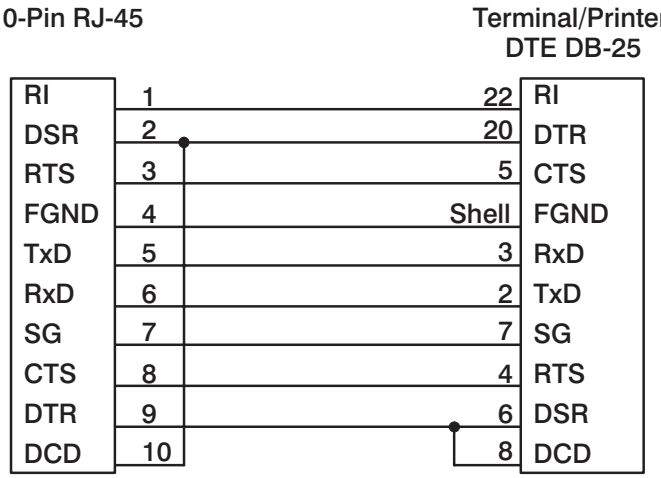
DB-25 Pin (Male)



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.



RAN to Printer/T erminal Cable (NL)
for 10-Pin RJ-45 Plug

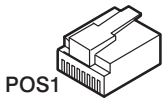
Attention: The receivers and drivers used in most asynchronous communications devices are sensitive to electrostatic discharge (ESD). To reduce the possibility of exposure to ESD, observe the following cabling practices when building or using device cables for attachment to the Remote Async Node 16-Port 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. If 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. Both ends of all wires must be terminated, not floating. The shield must be connected to shield ground at the remote async node.

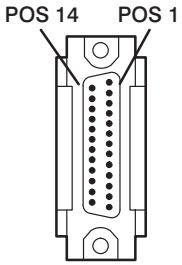
Cable NM

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 length table 2 on page 428. Use overall foil/braid shielded multiconductor cable with a capacitance rating of 41 pF/m (12.5 pF/ft) or less. Conductors must be no smaller than 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.



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:

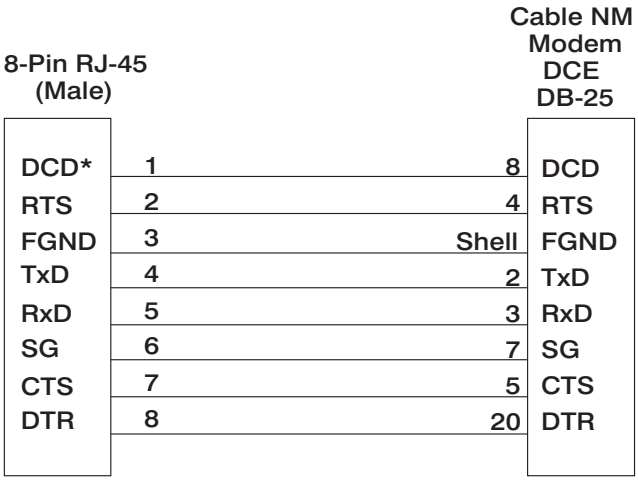
1. Do not build a cable that has exposed conductors, leads, or pins that could be touched by someone not protected against ESD. Avoid the use of punchdown blocks and patch panels, which have exposed terminator/pins. If you use intermediate connectors or cables, be sure to discharge them to ground before 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. Both ends of all wires must be terminated, not floating. The shield must 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 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.



RAN to Modem Cable (NM)
for 8-Pin RJ-45 Plug

Note: * The physical location of DCD is switched with DSR through software control.

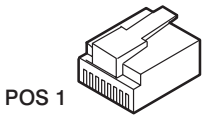
Attention: The receivers and drivers used in most asynchronous communications devices are sensitive to electrostatic discharge (ESD). To reduce the possibility of exposure to ESD, observe the following:

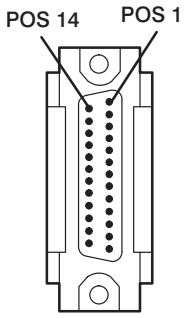
1. Do not build a cable that has exposed conductors, leads, or pins that could be touched by someone not protected against ESD. Avoid the use of punchdown blocks and patch panels, which have exposed terminator/pins. If you use intermediate connectors or cables, discharge them to ground before plugging 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. Both ends of all wires must be terminated, not floating. The shields must 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: If available, an NK cable (an EIA-232 cable) is a suitable substitute for an NP cable.





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.

2-Port Multiprotocol PCI Adapter

The information in this section discusses custom-built cables connecting the 2-Port Multiprotocol PCI Adapter to the interfaces supported by the adapter. Each interface cable (PA through PD) is covered.

Cable Construction Information

If you plan to build your own cables for your 2-port multiprotocol installation, be sure to follow the following guidelines.

Wire Gauge, Grounding, and Pairing

- Use 28 AWG: 7-strand wire with 0.020--0.028 inch insulation and shielded with braid and drain wire.
- The chassis must be grounded both by a drain wire and by the braid. Both must be connected to the connector case and shell at each end of the cable. The braid must be connected through its full circumference.
- Wires identified under the heading ″Twisted Pairs″ must be paired. If you do not install twisted pairs correctly, the cable will not work.

The type of connector for each cable is shown at the end of this chapter. See “Connector Descriptions” on page 450.

Cable PA

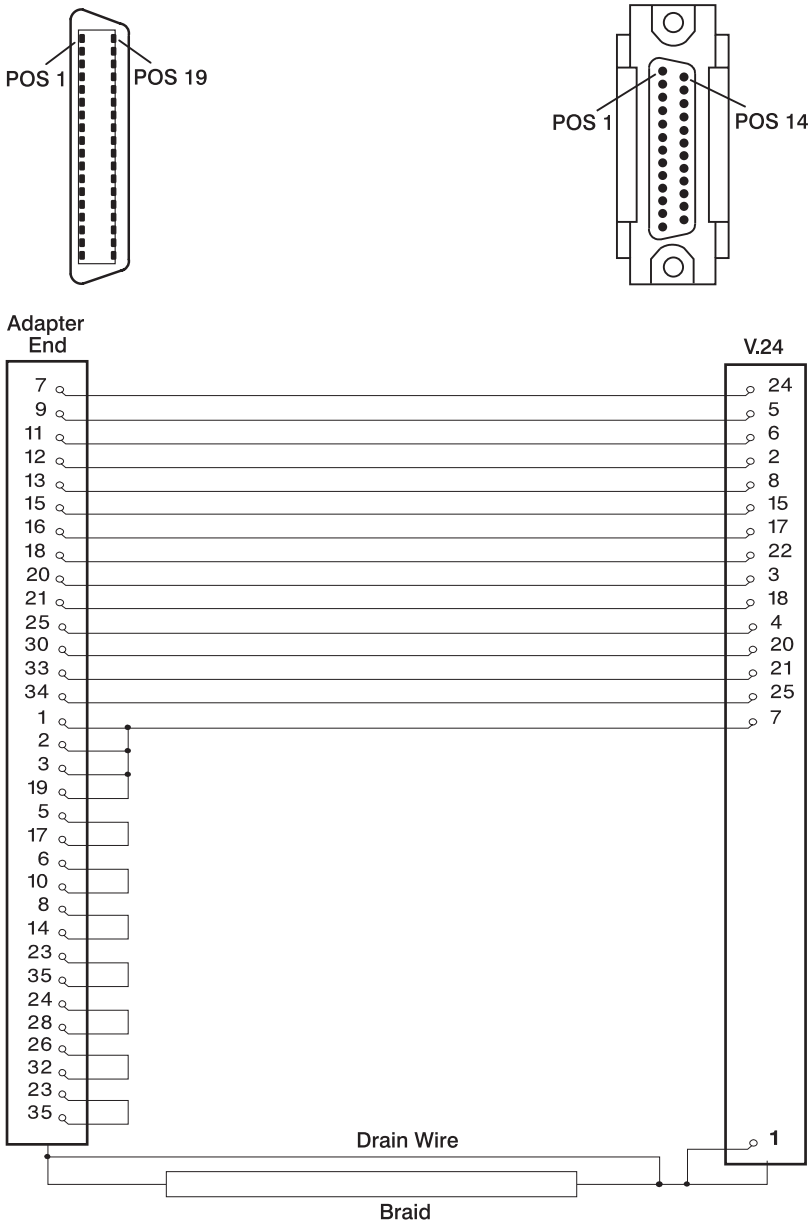
Description: V.24 cable for use with the 2-Port Multiprotocol PCI adapter.

A pin-out diagram with signal names and a wiring diagram for the V.24 interface are shown in the following.

Pin No.	Signal	Name
1	PGND	Protective Ground
2	TXD	Transmit Data
3	RXD	Receive Data
4	RTS	Request to Send
5	CTS	Clear to Send
6	DSR	Data Set Ready
7	SGND	Signal Ground
8	DCD	Data Carrier Detect
15	TCLK	Transmit Clock (DCE)
17	RCLK	Receive Clock
18	TEST	Local LoopbackActivation
20	DTR	Data Terminal Ready
21	RLB	Remote Loopback
22	RI	Ring Indicator
24	DTECLK	Transmit Clock (DTE)
25	TI	Test Indicator

V.24 Connections

The following wiring diagram shows the connections required to construct a V.24 cable. For additional information to construct your own cable, see “Cable Construction Information” on page 431.



Cable PB

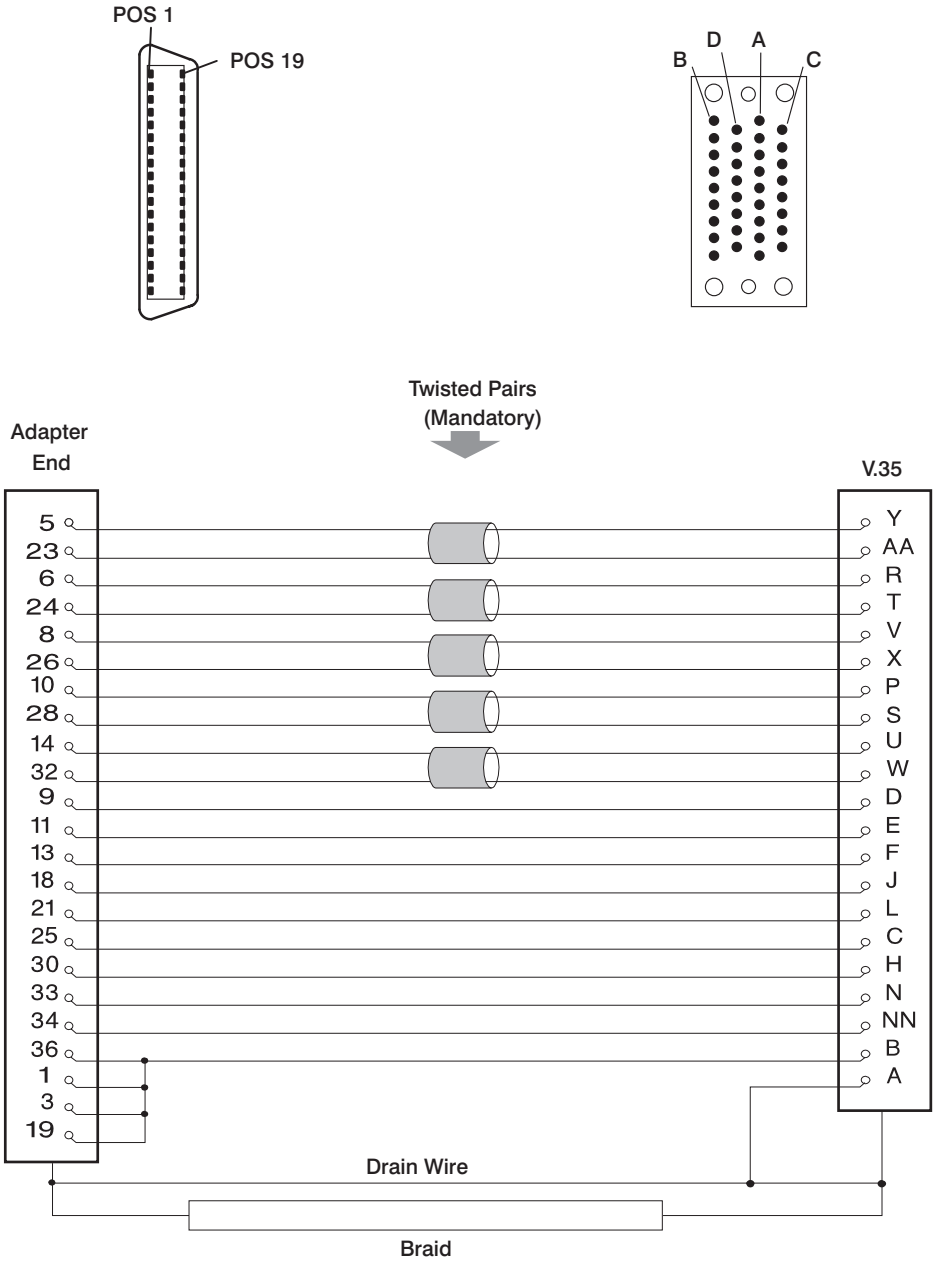
Description: V.35 cable for use with the 2-Port Multiprotocol PCI adapter.

A pin-out diagram with signal names and a wiring diagram for the V.35 interface are shown in the following.

Pin No.	Signal	Name
A	PGND	Protective Ground
B	SGND	Signal Ground
C	RTS	Request to Send
D	CTS	Clear to Send
E	DSR	Data Set Ready
F	DCD	Data Carrier Detect
H	DTR	Data Terminal Ready
J	RI	Ring Indicator
L	TEST	Local Loopback Activation
N	RLB	Remote Loopback
P	TXD+	Transmit Data
R	RXD+	Receive Data
S	TXD-	Transmit Data
T	RXD-	Receive Data
U	CLK+	Transmit Clock (DTE)
V	RCLK+	Receive Clock (DCE)
W	CLK-	Transmit Clock (DTE)
X	RCLK-	Receive Clock (DCE)
Y	TCLK+	Transmit Clock (DCE)
AA	TCLK-Transmit Clock (DCE)	
NN	TI	Test Indicator

V.35 Connections

The following wiring diagram shows the connections required to construct a V.35 cable. For additional information to construct your own cable, see “Cable Construction Information” on page 431.



Cable PC

Description: V.36/EIA-449 cable for use with the 2-Port Multiprotocol PCI Adapter.

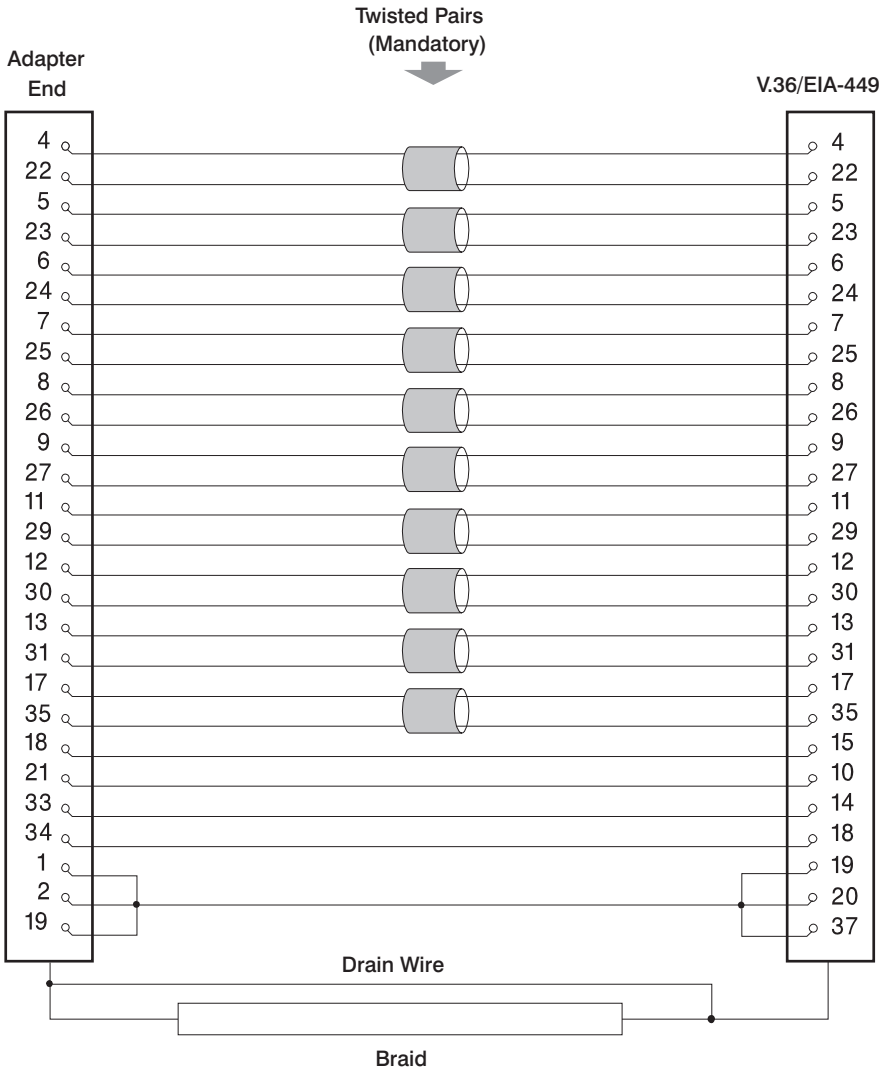
A pin-out diagram with signal names and a wiring diagram for the V.36/EIA-449 interface are shown in the following.

Pin No.	Signal	Name
Case	PGND	Protective Ground
4	TXD+	Transmit Data
5	TRXC+	Transmit Clock (DCE)
6	RXD+	Receive Data
7	RTS+	Request to Send
8	RTXC+	Receive Clock (DCE)
9	CTS+	Clear to Send
10	TEST	Local Loopback Activation
11	DSR+	Data Set Ready
12	DTR+	Data Terminal Ready
13	DCD+	Data Carrier Detect
14	RLB	Remote Loopback
15	RI	Ring Indicator
17	CLK+	Transmit Clock (DTE)
18	TI	Test Indicator
19	GND	DTE Common Return
22	TXD-	Transmit Data
23	TRXC-	Transmit Clock (DCE)
24	RXD-	Receive Data
25	RTS-	Request to Send
26	RTXC-	Receive Clock (DCE)
27	CTS-	Clear to Send
29	DSR-	Data Set Ready
30	DTR-	Data Terminal Ready
31	DCD-	Data Carrier Detect
35	CLK-	Transmit Clock (DTE)

V.36/EIA-449 Connections

The following wiring diagram shows the connections required to construct a V.36/EIA-449 cable. For additional information to construct your own cable, see “Cable Construction Information” on page 431.





Cable PD

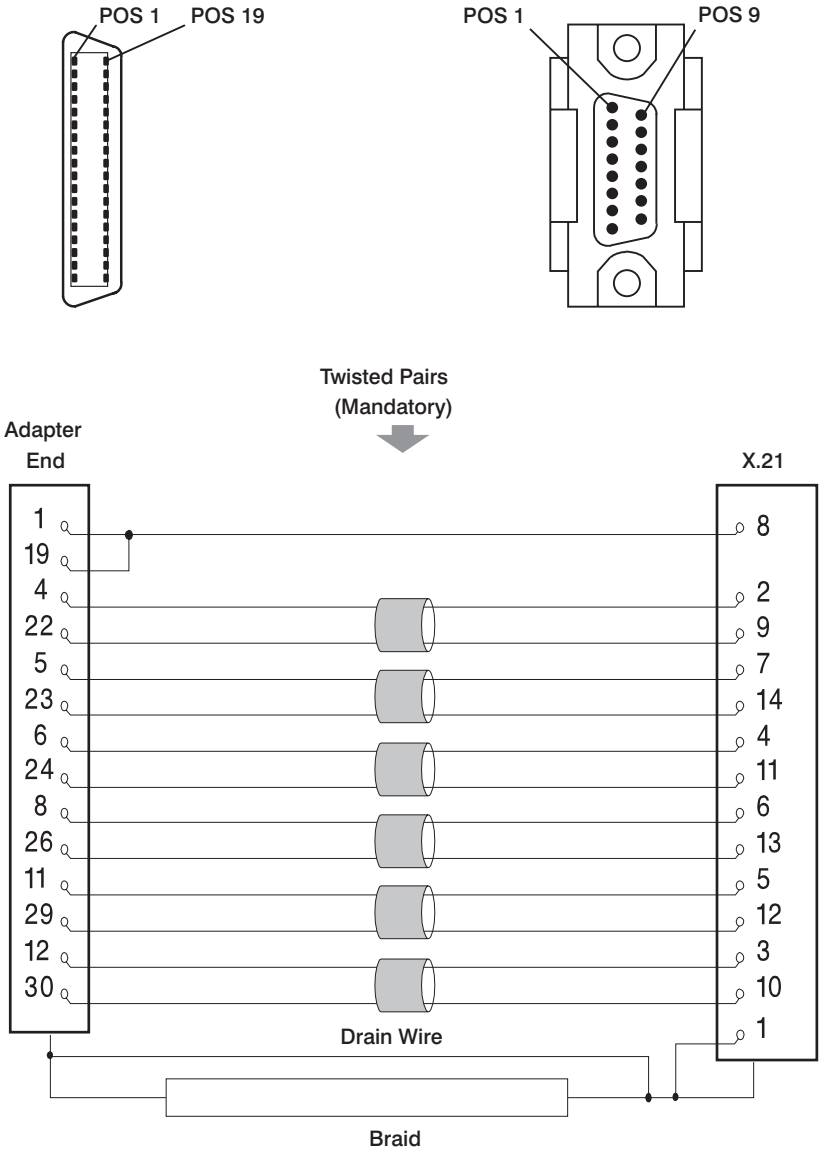
Description: X.21 cable for use with the 2-Port Multiprotocol PCI Adapter.

A pin-out diagram with signal names and a wiring diagram for the X.21 interface are shown in the following.

Pin No.	Signal	Name
1/15	PGND	Protective Ground
2	T(A)	Transmit Data (+)
3	C(A)	Control Signal (+)
4	R(A)	Receive Data (+)
5	I(A)	Indication (+)
6	S(A)	Signal Element Timing (+)
7	B(A)	Byte Timing (+)
8	SGND	Signal Ground
9	T(B)	Transmit Data (-)
10	C(B)	Control Signal (-)
11	R(B)	Receive Data (-)
12	I(B)	Indication (-)
13	S(B)	Signal Element Timing (-)
14	B(B)	Byte Timing (-)

X.21 Connections

The following wiring diagram shows the connections required to construct a X.21 cable. For additional information to construct your own cable, see “Cable Construction Information” on page 431.



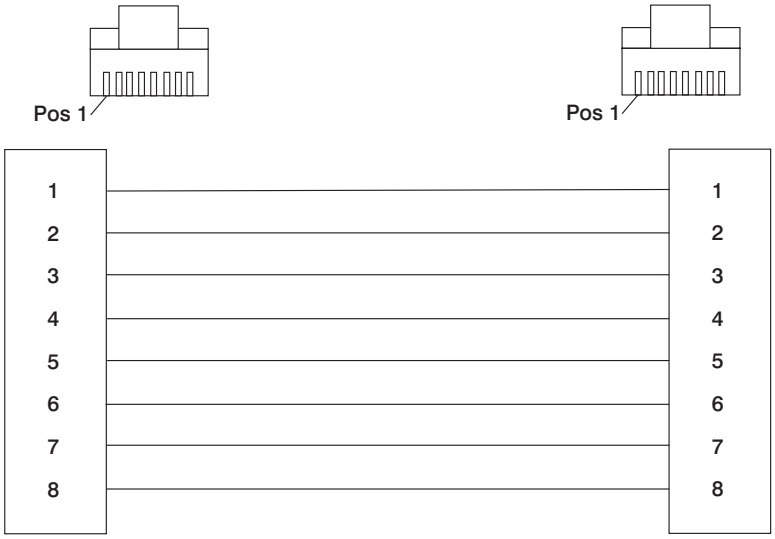
10/100 Ethernet Tx PCI Adapter

Cable PH

Description: Ethernet cable for use with the 10/100 Ethernet Tx PCI Adapter.

Ethernet Straight-through Connections

The following wiring diagram shows the connections required to construct an Ethernet Straight-through cable.



This cable is to be constructed using twisted-pair cable. The twisted-pairs of wires must be wired as shown in the following table. For additional information to construct your own cable, see Ethernet specification IEEE-802.3u. Ethernet cables must meet Ethernet specification IEEE-802.3u.

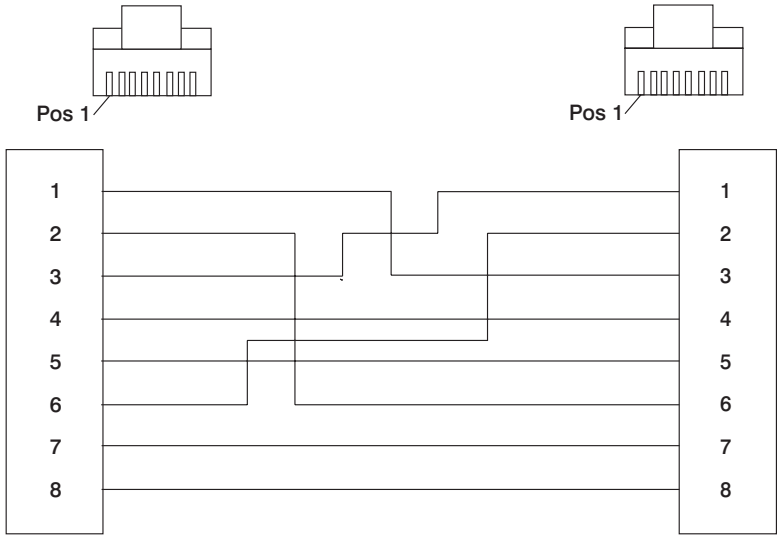
Twisted-Pair	Positions
1	1,2
2	3,6
3	4,5
4	7,8

Cable PJ

Description: Ethernet crossover cable for use with the 10/100 Ethernet Tx PCI Adapter.

Ethernet Crossover Connections

The following wiring diagram shows the connections required to construct an Ethernet crossover cable.



This cable is to be constructed using twisted-pair cable. The twisted-pairs of wires must be wired as shown in the following table. For additional information to construct your own cable, see Ethernet specification IEEE-802.3u. Ethernet cables must meet Ethernet specification IEEE-802.3u.

Twisted-Pair	Positions
1	1,2
2	3,6
3	4,5
4	7,8

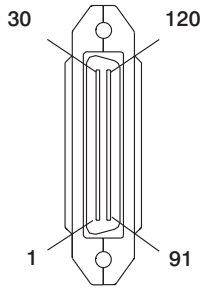
IBM ARTIC960Hx Series of Adapters

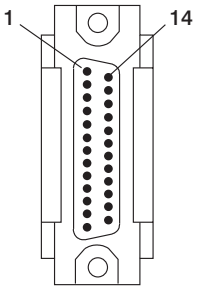
The information in this section discusses custom-built cables connecting the IBM ARTIC960Hx Series of PCI Adapters to the interfaces supported by the adapter. Each interface cable (PK through PS) is covered.

Cable PK

Description: EIA-232 (ISO 2110) cable for use with the ARTIC960Hx 4-Port Selectable PCI Adapter.

The following illustration shows a 25-pin, male, D-shell connector. The other end is a 120 pin D-Shell. The following table lists the pin assignments for the EIA-232 (ISO 2110) electrical interface. Each signal is identified as input (I) or output (O), as viewed from the PMC card. The *x* in the signal name is the number of the port. The ID for the EIA-232 cable is 02h.



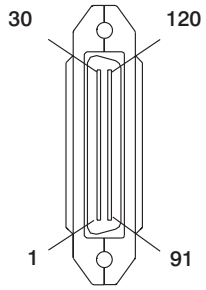


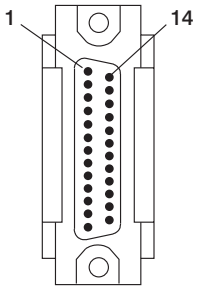
Signal Name	I/O	Port 0	Port 1	Port 2	Port 3	25-Pin Connector
TXDx	O	105	45	17	77	02
RXDx	I	104	44	16	76	03
RTSx	O	114	54	06	66	04
CTSx	I	120	60	15	75	05
CDx	I	094	34	26	86	08
DTRx	O	112	52	08	68	20
DSRx	I	098	38	22	82	06
TXCLKOx	n/a	111	51	11	71	24
TXCLKIx	n/a	091	31	30	90	15
RXCLKx	n/a	106	46	01	61	17
GND	n/a	110	50	10	70	07
Shield	n/a	Housing				01/Housing

Cable PL

Description: EIA-530 (ISO 2110) cable for use with the IBM ARTIC960Hx 4-Port Selectable PCI Adapter.

The following illustration shows a 25-pin, male, D-shell connector. The other end is a 120 pin D-Shell. The following table lists the pin assignments for the EIA-530 (ISO 2110) electrical interface. Each signal is identified as input (I) or output (O), as viewed from the PMC card. The *x* in the signal name is the number of the port. The ID for the EIA-530 cable is F7h.



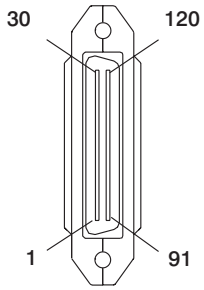


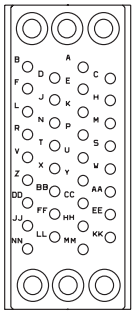
Signal Name	I/O	Port 0	Port 1	Port 2	Port 3	25-Pin Connector
TXDxA	O	118	58	02	62	02
TXDxB	O	119	59	03	63	14
RTSxA	O	114	54	06	66	04
RTSxB	O	115	55	07	67	19
RXDxA	I	096	36	24	84	03
RXDxB	I	097	37	25	85	16
CTSxA	I	100	40	20	80	05
CTSxB	I	101	41	21	81	13
CDxA	I	094	34	26	86	08
CDxB	I	095	35	27	87	10
RCLKIxA	I	108	48	12	72	17
RCLKIxB	I	109	49	13	73	09
TCLKOxA	O	116	56	04	64	24
TCLKOxB	O	117	57	05	65	11
TCLKIxA	I	102	42	18	78	15
TCLKIxB	I	103	43	19	79	12
DSRxA	I	098	38	22	82	06
DSRxB	I	099	39	23	83	22
DTRxA	O	112	52	08	68	20
DTRxB	O	113	53	09	69	23
GND	n/a	110	50	10	70	07
Shield	n/a	Housing				01/Housing

Cable PM

Description: V.35 DTE (ISO 2593) cable for use with the IBM ARTIC960Hx 4-Port Selectable PCI Adapter.

The following shows a 34-pin male connector. The other end is a 120 pin D-Shell. The following table lists pin assignments for the V.35 DTE (ISO 2593) electrical interface. Each signal is identified as input (I) or output (O), as viewed from the PMC card. The *x* in the signal name is the number of the port. The ID for the V.35 DTE cable is FBh.





Signal Name	I/O	Port 0	Port 1	Port 2	Port 3	34-Pin Connector
TXDxA	O	118	58	02	62	P
TXDxB	O	119	59	03	63	S
RTSx	O	114	54	06	66	C
RXDxA	I	096	36	24	84	R
RXDxB	I	097	37	25	85	T
CTSx	I	120	60	15	75	D
DSRx	I	098	38	22	82	E
DTRx	O	112	52	08	68	H
CDx	I	094	34	26	86	F
RCLKIxA	I	108	48	12	72	V
RCLKIxB	I	109	49	13	73	X
TCLKOxA	O	116	56	04	64	U
TCLKOxB	O	117	57	05	65	W
TCLKIxA	I	102	42	18	78	Y
TCLKIxB	I	103	43	19	79	AA
GND	n/a	110	50	10	70	B
Shield	n/a					A

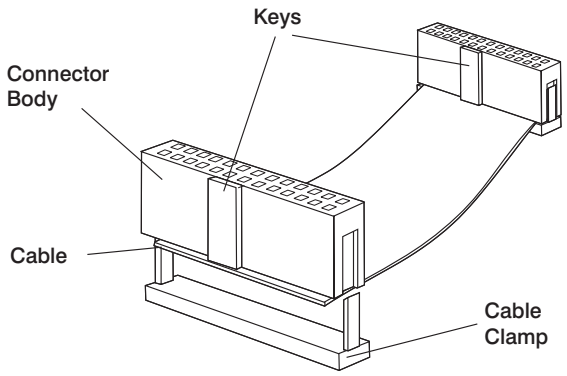
Cable PN

Description: A 26-pin ribbon cable to connect the SC buses on similarly-capable neighboring adapters in the system unit.

This optional SC-bus cable can be constructed using 26 conductor, flat ribbon cable 28 AWG.

Note:

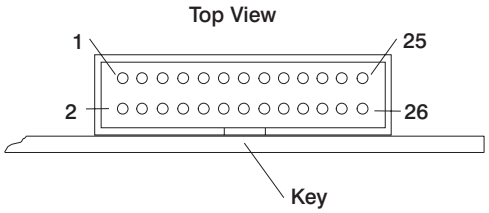
- The 26 pin-cable connector comes in two pieces and requires a special tool such as a 3M™ Scotchflex press (or equivalent).
- The cable assembly can have several connectors; however, the minimum distance between connectors is 25.4 mm (1.0 in).
- When assembling the cable, make sure that all of the connectors are facing in the same direction.



Item	Description
26-pin cable connector	Amphenol 842-812-2633-134 (or equivalent)
26-conductor ribbon cable	- 3M 3365/26 - Amphenol 843-191-2801-126 - Berg 65088-126 (or equivalent)

SC-Bus Connector Pin Numbering and Assignments

The following figures show the 26-pin, male connector and the signal assignments for the connector.

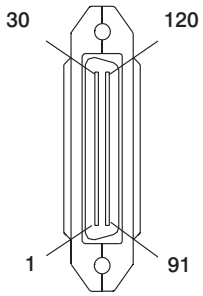


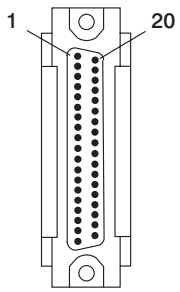
Pin Number	Signal Name	Pin Number	Signal Name
1	SCLKx2	2	Ground
3	SCLK	4	Reserved
5	FSYNC	6	CLKFAIL
7	SD0	8	Ground
9	SD1	10	SD2
11	SD3	12	SD4
13	SD5	14	SD6
15	Ground	16	SD7
17	SD8	18	SD9
19	SD10	20	SD11
21	Ground	22	SD12
23	SD13	24	SD14
25	SD15	26	MC Data
Note: MC Data (pin-26) is not implemented on the IBM ARTIC960 DSP Resource Mezzanine Card.			

Cable PP

Description: RS-449 (ISO 4902) cable for use with the IBM ARTIC960Hx 4-Port Selectable PCI Adapter.

The following illustration shows a 37-pin, D-shell connector. The following table lists pin assignments for the RS-449 (ISO 4902) electrical interface. The other end is a 120 pin D-Shell. Each signal is identified as input (I) or output (O), as viewed from the PMC card. The *x* in the signal name is the number of the port. The ID for the RS-449 cable is FDh.



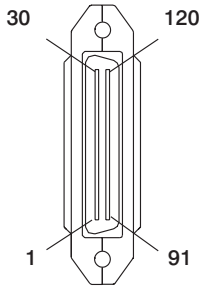


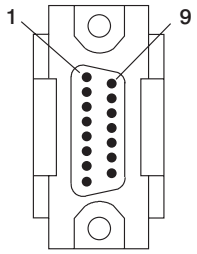
Signal Name	I/O	Port 0	Port 1	Port 2	Port 3	37-Pin Connectors
TXDxA	O	118	58	02	62	04
TXDxB	O	119	59	03	63	22
RXDxA	I	096	36	24	84	6
RXDxB	I	097	37	25	85	24
RTSxA	O	114	54	06	66	07
RTSxB	O	115	55	07	67	25
CTSxA	I	100	40	20	80	09
CTSxB	I	101	41	21	81	27
DSRxA	I	098	38	22	82	11
DSRxB	I	099	39	23	83	29
DTRxA	O	112	52	08	68	12
DTRxB	O	113	53	09	69	30
CDxA	I	094	34	26	86	13
CDxB	I	095	35	27	87	31
RCLKIxA	I	108	48	12	72	08
RCLKIxB	I	109	49	13	73	26
TCLKOxA	O	116	56	04	64	17
TCLKOxB	O	117	57	05	65	35
TCLKIxA	I	102	42	18	78	05
TCLKIxB	I	103	43	19	79	23
GND	n/a	100	50	10	70	19,20,37

Cable PR

Description: X.21 (ISO 4903) cable for use with the IBM ARTIC960Hx 4-Port Selectable PCI Adapter.

The following illustration shows a 15-pin, male, D-shell connector. The following table lists the pin assignments for the X.21 (ISO 4903) electrical interface. The other end is a 120 pin D-Shell. Each signal is identified as input (I) or output (O), as viewed from the PMC card. The *x* in the signal name is the number of the port. The ID for the X.21 cable is DFh.



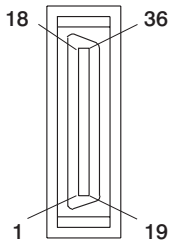


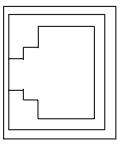
Signal Name	I/O	Port 0	Port 1	Port 2	Port 3	15-Pin Connector
TXDxA	O	118	58	02	62	02
TXDxB	O	119	59	03	63	09
RTSxA	O	114	54	06	66	03
RTSxB	O	115	55	07	67	10
RXDxA	I	096	36	24	84	04
RXDxB	I	097	37	25	85	11
CTSxA	I	100	40	20	80	05
CTSxB	I	101	41	21	81	12
RCLKIxA	I	108	48	12	72	06
RCLKIxB	I	109	49	13	73	13
TCLKOxA	O	116	56	04	64	07
TCLKOxB	O	117	57	05	65	14
GND	n/a	110	50	10	70	08
Shield	n/a	Housing				01/Housing

Cable PS

Description: RJ-48 Jack for use with the IBM ARTIC960Hx 4-Port T1/E1 PCI Adapter.

The following illustration shows an RJ-48 jack connector. The following table lists the pin assignments for the T1 and E1 electrical interfaces. The *x* in the signal name is the number of the port. The ID is 9h for the T1; 1h for the E1.





Signal Name	I/O	Port 0	Port 1	Port 2	Port 3	RJ-48 Connector
TX1_x	O	33	29	23	19	04
TX2_x	O	34	30	24	20	05
FGND_x	n/a	16	12	08	04	06,03
RX1_x	I	35	31	25	21	01
RX2_x	I	36	32	26	22	02
FGND	n/a	Housing				Housing

Connector Descriptions

Cable Letter	Cable Name	Connector Descriptions (adapter end/device end)
A	PC Parallel Printer Cable	25-pin D male/36-pin D male barrier
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
K	Terminal Cable-EIA-422A	25-pin D 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
AR	Serial Port Cable EIA-232 with 9-pin	9-pin D female/25-pin D male
AS	Serial Port fanout Cable makes second serial port	25-pin D female/two 25-pin D male
AU	Customer-supplied cable for connecting the TURBOWAYS 25 ATM adapter to an ATM switch or concentrator	RJ-45/RJ-45
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 ModemCable, System	15-pin HD male/25-pin D male
NF	128-Port Async Controller EIA-232 ModemCable, Device	25-pin D male/15-pin HD female
NG	128-Port Async Controller EIA-422 ModemCable, System	15-pin HD male/37-pin D male
NH	128-Port Async Controller EIA-422 ModemCable, Device	37-pin D male/15-pin HD female
NK	RJ-45 to DB-25 Converter 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
PA	Customer-supplied cable for connecting the 2-Port Multiprotocol adapter to a V.24 network	high density 36-pin male/25-pin D male
PB	Customer-supplied cable for connecting the 2-Port Multiprotocol adapter to a V.35 network	high density 36-pin male/34-pin Type M male
PC	Customer-supplied cable for connecting the 2-Port Multiprotocol adapter to a V.36/EIA-449 network	high density 36-pin male/37-pin D male

Cable Letter	Cable Name	Connector Descriptions (adapter end/device end)
PD	Customer-supplied cable for connecting the 2-Port Multiprotocol adapter to a X.21 network	high density 36-pin male/15-pin D male
PH	Customer-supplied cable for connecting the Ethernet adapter to an Ethernet hub	RJ-45/RJ-45
PJ	Customer-supplied cable for connecting the Ethernet adapter to an Ethernet adapter	RJ-45/RJ-45
PK	Customer-supplied cable for connecting the 4-Port Selectable PCI adapter to four EIA-232 (ISO 2110) devices	120-pin D male/25-pin D male
PL	Customer-supplied cable for connecting the 4-Port Selectable PCI adapter to four EIA-530 (ISO 2110) devices	120-pin D male/25-pin D male
PM	Customer-supplied cable for connecting the 4-Port Selectable PCI adapter to four V.35 DTE (ISO 2593) networks	120-pin D male/34-pin Type M male
PN	Customer-supplied cable for connecting the SC-Buses together on the mezzanine adapters	26-pin ribbon cable connectors
PP	Customer-supplied cable for connecting the 4-Port Selectable PCI adapter to four RS-449 (ISO 4902) network	120-pin D male/37-pin D male
PR	Customer-supplied cable for connecting the 4-Port Selectable PCI adapter to four X.21 (ISO 4903) networks	120-pin D male/15-pin D male
PS	Customer-supplied cable for connecting the 4-Port T1/E1 PCI adapter to four T1/E1 networks	36-pin D male/15-pin D male

Appendix. Notices

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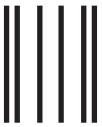
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