IBM

PCI SCSI-2 Fast/Wide Single-Ended Adapter
Installation Guide

> **Note**
>
> Before using this information and the product it supports, be sure to read the general information under "Product Warranties and Notices" included with your system unit.

Second Edition (November 1996)

Contents

Safety Information

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.

When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.

About This Book

This book (when used with your system unit documentation) helps you install the PCI SCSI-2 Fast/Wide Single-Ended Adapter. It also provides information needed for installing and configuring the necessary software device drivers and how to verify that installation and configuration were successfully completed.

Related Publications

This book refers to the documentation that came with your system unit.

ISO 9000

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

Trademarks

AIX is a registered trademark of International Business Machines Corporation.

PowerPC is a trademark of International Business Machines Corporation.

Windows NT is a trademark of Microsoft Corporation.

Chapter 1. Overview

The PCI SCSI-2 Fast/Wide Single-Ended Adapter enables you to use internal and external small system unit system interface (SCSI) devices with system units containing a Peripheral Component Interconnect (PCI) bus. The adapter conforms to the American National Standards Institute (ANSI) SCSI-2 standard and the PCI local specification, revision 2.0.

The PCI SCSI-2 Fast/Wide Single-Ended Adapter supports fast and wide SCSI synchronous data rates up to 10 MHz. Wide (16-bit) SCSI supports a maximum transfer rate of 20 MB (20,000,000 bytes) per second. Narrow (8-bit) SCSI supports a maximum transfer rate of 10 MB per second.

The PCI SCSI-2 Fast/Wide Single-Ended Adapter allows the connection of internal and external SCSI devices.

SCSI Connectors

There are three SCSI connectors on the adapter:

- External connector:

    - J2   68-pin SCSI standard connector.

- Internal Connectors:

    - J3   68-pin high-density SCSI standard connector for 16-bit attachment
    - J4   50-pin (2 by 25) SCSI standard connector for 8-bit attachment.
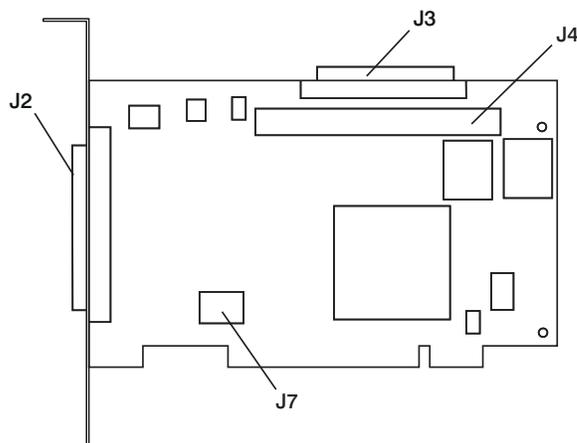
Figure   1-1. SCSI Connectors

The adapter provides built-in SCSI terminators that are automatically enabled or disabled depending on what cables are attached.

Handling the Adapter

Attention: Static electricity may damage your equipment. Leave the adapter in the static-protective bag until you are ready to install the adapter.

Chapter 2. Preparing for Installation

The installation process consists of:

- Taking an inventory of all pieces necessary for installation
- Determining your cable needs
- Installing the adapter
- Installing device drivers

Inventory

To install the PCI SCSI-2 Fast/Wide Single-Ended Adapter, you need:

- The adapter
- The documentation that came with your system unit
- A flat-blade screwdriver.

You also need the following items to connect SCSI devices to the adapter:

- The documentation that came with your SCSI devices
- External cables
- Internal cables
- A SCSI terminator.

Determining Cable Needs

External SCSI devices have a variety of connectors. Ensure that you have cables with the appropriate connectors for each external device in your planned SCSI chain.

You can attach external wide (16-bit) devices or narrow (8-bit) devices to the adapter with the proper cable. In both cases, the cable end that attaches to the adapter is a 68-pin connector. The device end varies with the type of device you are attaching.

Internal devices typically attach to a cable with one or more connectors allowing you to attach devices to the cable. You can use a wide or narrow SCSI internal cable. The wide cable attaches to the 68-pin internal connector, J3. The narrow cable attaches to the 50-pin connector, J4 (see Figure 1-1 on page 1-1).

Internal Cabling

If you plan to use internal SCSI devices in your system, you must first obtain the necessary cables for your system unit. Install the cables according to the instructions provided by your system unit's instructions.

There must be a SCSI terminator on the end of this cable. Some terminators are plugged into the last position of the internal cable. Some terminators are built onto the cable and can not be removed. Some terminators are built into the SCSI device. Still others can be built on to a backplane within the system unit. You need to understand your internal installation, in detail, in order to determine where and how to attach the internal SCSI terminator.

Important: You can attach an internal cable to only one of the adapter's two internal connectors at any time.

External Cabling

You can attach either narrow (8-bit) or wide (16-bit) SCSI devices to the external 68-pin connector.

You must have the proper SCSI cable to correctly attach a device. Narrow devices use a cable with a 50-pin connector on the device end and a 68-pin connector on the adapter end. Wide devices use a cable with a 68-pin connector on both ends.

SCSI specifications limit total cable length to 6 meters (approximately 20 feet). Total cable length of the SCSI chain includes internal and external cabling.

If you use a fast synchronous device, such as a narrow SCSI disk that can transfer up to 10 MB/second of data or a wide SCSI disk that can transfer up to 20 MB/second of data, the maximum cable length is limited to 3 meters (approximately 10 feet).

For more information on connecting SCSI devices to the adapter, see Appendix A, "Connecting SCSI Devices to the Adapter" on page A-1. Refer to Appendix B, "Cable Choices" on page B-1 for more information on cables choices.

Chapter 3. Installing the Adapter

Refer to Appendix C, "Jumper Settings and Multi-Adapter Configurations" on page C-1 to determine whether you need to change the default jumper settings on the adapter.

If you need to set the J7 jumpers on the adapter as described in Appendix C, "Jumper Settings and Multi-Adapter Configurations" on page C-1, do so now.

Remove Covers

Refer to the documentation that came with your system unit for direction on shutting down your system and removing the system unit covers.

Installing Internal SCSI devices

Follow your system unit documentation for installing PCI adapters in your system unit expansion slots.

After the adapter is installed, replace your system unit covers as described in the system unit documentation.

Connecting Internal Devices and Installing the Adapter

Refer to the documentation provided with your system unit to remove the system unit covers and to install an internal SCSI device.

Attention: Static electricity may damage your equipment. Leave the adapter in the static-protective bag until you are ready to install the adapter.

1. Attach the appropriate narrow or wide (8-bit or 16-bit) cable to the device and then install the device.

2. Ensure that there is a SCSI terminator on the end of the cable or that a terminator is supplied by the last SCSI device on the internal chain. If the terminator is supplied by the internal SCSI device, the internal SCSI device must be placed on the internal cable location farthest from the adapter.

3. Connect the adapter end of the internal cable to the correct internal connector on the PCI SCSI-2 Fast/Wide Single-Ended Adapter. Use either the 50-pin internal connector, J4, or the internal 68-pin connector, J3.

   All the connectors are built so they can only be plugged in one way.

4. Install the PCI SCSI-2 Fast/Wide Single-Ended Adapter into any available PCI slot.

After all your internal SCSI devices and the adapter are installed, replace your system unit covers as described in the system unit documentation.

Connecting External SCSI Devices

At this time the adapter should be installed and the system covers back on.

To connect external devices:

1. Connect the 68-pin connector to the external port (J2). Use the fastening screws on the cable connector to securely attach the connector to the adapter.

2. Connect the other end of the cable to your SCSI device.

3. If necessary, connect additional cables to additional SCSI devices.

4. When all devices are connected, ensure that a SCSI terminator is attached to the last device.

Diagnostics

Diagnostics may be supplied with your device driver, or may be found in a separate package. Refer to your system unit documentation for more information about running diagnostics.

Chapter 4. Installing, Configuring, and Verifying Software

Once you have completed installing the hardware, you need to verify that your PCI SCSI-2 Fast/Wide Single-Ended Adapter is available for use. If it is not available, you need to install the required device driver. Note that on many systems the required device driver software is already installed, in which case AIX configures the adapter automatically.

Additional device drivers may need to be installed for the SCSI devices attached to the adapter. Refer to the documentation that came with your devices for further information.

Verifying Device Driver Installation

To verify that your newly installed PCI SCSI-2 Fast/Wide Single-Ended Adapter is available for use, follow the steps below:

1. If the system unit is not on, turn it on.

2. Log in as **root**.

3. At the prompt, type the following and press Enter.

   `lsdev -Cc adapter | grep scsi`

4. A list of SCSI adapters displays. Verify that the PCI SCSI-2 Fast/Wide Single-Ended Adapter is in `Available` mode. The adapter will have a text description of "Wide SCSI I/O Controller."

If the PCI SCSI-2 Fast/Wide Single-Ended Adapter is `Available`, your adapter is ready to use. If the adapter was not listed, you must install the necessary device driver software.

AIX Device Driver Installation

1. If the system unit is not on, turn it on.

2. Log in as **root**.

3. Insert the media containing the device driver software (diskette or CD-ROM) into the appropriate media device.

4. Type:

   `smit cfgmgr`

   and press Enter.

5. The **Install/Configure Devices Added After IPL** screen is displayed. The "INPUT device/directory for software" option is highlighted.

6. You can either:

   - Press F4 to display a list of input devices from which you can select. Then select the appropriate device and press Enter.

   - Enter the input device you are using in the entry field where the cursor is positioned.

7. The following occurs when the **COMMAND STATUS** screen is displayed:

   - The term `RUNNING` is highlighted to indicate that the install and configure command is in progress.

   - When `RUNNING` changes into `OK`, scroll down to the bottom of the page and locate the Installation Summary.

   - At the bottom of the page, if the installation was successful, `SUCCESS` appears in the Result column of this summary.

8. Remove the installation media from the drive.

9. Press F10 to exit SMIT.

10. At the prompt type:

    `shutdown -Fr`

    and press Enter.

    This shuts down and reboots your system.

11. AIX configures the adapter automatically when the system reboots. Return to the "Verifying Software Installation" instructions to verify your PCI SCSI-2 Fast/Wide Single-Ended Adapter is available for use.

Windows NT (PowerPC Edition) Device Driver Installation - Version 3.51

This procedure installs the NCRSDMS.SYS driver for SCSI devices.

1. Log on to Windows NT (PowerPC Edition) as an Administrator.

2. Double-click on the Main program group icon.

3. Double-click on the Windows NT Setup icon.

4. Select **Options**.

5. Select **Add/Remove SCSI Adapters**.

6. Select **Add**.

7. On the SCSI Adapter list, go to the bottom and select **NCR PCI (53c810)**.

   Note: Do not change the path to the OEM SCSI adapter files.

8. Select **Continue**.

9. After selecting the driver, a window appears prompting whether or not tagged command queueing is desired. If so, click on **OK**, otherwise click on **Cancel**.

10. On the SCSI Adapter Setup menu, click on **Close**.

11. Reboot Windows NT (PowerPC Edition) to load the driver.

Windows NT (PowerPC Edition) Device Driver Installation - Version 4.0

On Windows NT (PowerPC Edition) Version 4.0, the device driver for this option is automatically installed by the operating system after the SCSI adapter is installed and the operating system rebooted.

Appendix A. Connecting SCSI Devices to the Adapter

Planning Your SCSI Device Layout

SCSI devices are attached to a SCSI adapter in a chain. Devices in the chain can be internal (inside your system unit) or external (connected outside your system unit).

If you are connecting more than one SCSI device, it is important that you plan the layout of your SCSI chain.

Note: At each end of the SCSI chain, a terminator is required.
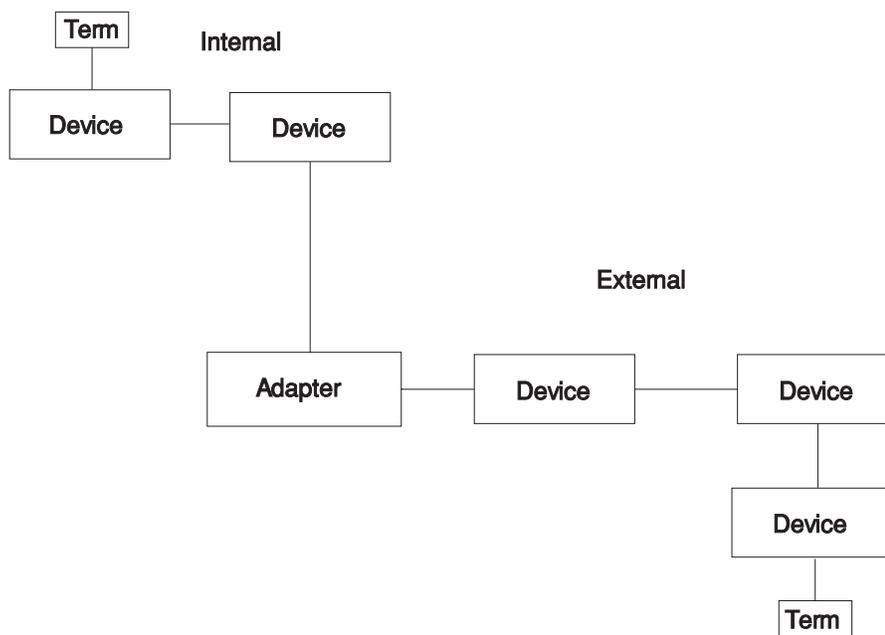
Figure   A-1. SCSI Chain with Internal and External Devices

Term is the SCSI terminator on the last device or the end of the cable.

Setting SCSI Addresses

Each SCSI device requires a unique SCSI address. The address is a number from 6 through 0 for narrow devices or from 6 through 0 and 15 through 8 for wide devices. If two SCSI devices have the same address, your system unit will not function properly. SCSI address 7 is reserved for the adapter, so additional SCSI devices can be set to addresses 6 through 0 and 15 through 8.

Determining Current SCSI Addresses

This section provides directions for installing the PCI SCSI-2 Fast/Wide Single-Ended Adapter.

Manufacturers use many different methods to set SCSI addresses, including jumpers, dual inline package (DIP) switches, push buttons, or dials. If your SCSI device is new, check the manual that shipped with the device to see if it specifies a default SCSI address. If one is not specified, check how SCSI addresses are set, then check the device itself for the current SCSI address. Be sure to maintain a list of all your SCSI addresses for future reference (your system unit documentation may provide a table where you can record them).

Important: Before you set the SCSI address, you must first determine which addresses are available; that is, not already in use by other SCSI devices and adpaters installed in your system. Each SCSI device or adapter must have a unique address. To determine the SCSI addresses of the devices/adapters already installed, enter the following command:

```
lsdev -Cs scsi
```

This command returns the following information:

```
Column 1: device name (for example, scsi0)
Column 2: device status (for example, Available)
Column 3: SCSI information (the format is: nn-nn-nn-s,b)
Column 4: device type (for example, CD-ROM drive, 2.3GB tape drive, etc.)
```

The *s* in the *nn-nn-nn* returned in Column 3 is the SCSI address of the associated device. The *b* is the SCSI bus number for that device.

Record the names and SCSI addresses of your installed SCSI devices in Table A-1 on page A-3. This helps you select non-conflicting addresses for any new devices you add.

Planning SCSI Addresses

Make sure no two SCSI devices have the same address, and that no device uses the SCSI address 7, which is reserved for the adapter. *Note:* SCSI addresses are not in sequential order from highest to lowest priority. Refer to Table A-1 on page A-3 for the priority associated with each SCSI address.

Table A-1. Data Access Priorities for SCSI Addresses		
Priority	**SCSI ID**	**Actual SCSI Device Name**
Highest	7	SCSI-2 Fast/Wide PCI Adapter
|	6	
|	5	
|	4	
|	3	
|	2	
|	1	
|	0	
|	15	
|	14	
|	13	
|	12	
|	11	
|	10	
V	9	
Lowest	8	

Changing SCSI Addresses

If you need to change SCSI addresses, follow the instructions supplied with each device.

Terminating the SCSI Devices and Adapter

Some SCSI devices have built-in terminators controlled by a DIP switch, jumper, or push button. Other devices use terminators on the cable. Some devices require a terminator be plugged into the device on a connector. After planning your installation, you need to supply the correct terminator to the SCSI device at each end of the chain. Refer to the device instructions to find out how it is terminated. If necessary, you should purchase terminators when you buy devices and cables.

Active terminators are required for all installations for reliable SCSI-2 operation.

The basic rules of terminating SCSI devices are:

- Terminate the ends of the chain
- Do not terminate devices in the middle of the chain.

Appendix B. Cable Choices

SCSI cables are available in many lengths and with connectors to attach to many
different SCSI devices. Below is a list of some of the more common types of cables
used to attach the adapter to the first external device on the SCSI chain:

```
F/C          Description

2111      Adapter to 8-bit external SE dual-ported device plus term, 1 meter.
          Cable P/N 06H6037     Terminator P/N 52G4260

2113      Adapter to 8-bit external SE single ported device plus term, 1.5 meter.
          Cable P/N 52G0174     Terminator P/N 52G4260

2115      Adapter to 16 bit external SE dual-ported device plus term, 1 meter.
          Cable P/N 06H6036     Terminator P/N 52G9907

2117      Y-cable 16 bit SE plus term.
          Cable P/N 52G0173     Terminator P/N 52G9907
```

Terms

SE   Single-ended

Single-ported   A device with only one SCSI connector for attaching a SCSI
                      cable or terminator.

Dual Ported   A device with two SCSI connectors for attaching a SCSI cable
                      or terminator.

Appendix C. Jumper Settings and Multi-Adapter Configurations

Jumper Settings and Multi-Adapter Configurations

The PCI SCSI-2 Fast/Wide Single-Ended Adapter contains built-in SCSI terminators. The adapter determines if it is in the middle of the SCSI chain or at the end of the chain and enables or disables the built-in terminators as required. This is accomplished by determining which, if any, cables are attached to the adapter.

Jumper Block J7: The default configuration for the adapter places all the jumper settings to OUT and is how the adapter is shipped. This configuration is for a single adapter on a SCSI chain allowing the adapter to sense where it is in the chain, in the middle or on the end. The adapter enables or disables its built-in SCSI terminator as required.

Typical installations use only one adapter with some internal or external SCSI devices. In these cases, the jumpers are left in the factory position.

Multi-Adapter Configurations: Using more than one SCSI adapter on any single SCSI bus may require the automatic termination sensing logic to be overridden by setting the individual jumpers on jumper block J7.

The automatic sensing logic that controls the enablement and disablement of the built-in terminators detects external and internal terminators on the external and internal SCSI bus. This control logic cannot sense other built-in terminators of another adapter on the SCSI bus. For those instances, you must tell the adapters that the external cabling is in use by moving the jumpers on jumper block J7.

Switch Setting Definitions: The various switch settings and cable attachments can be combined in many different ways. The following switch setting definitions explain how the terminators are affected:

S1   When placed in the OUT position, the termination control logic automatically determines the attachment or non-attachment of an internal narrow cable and terminator.

When placed in the IN position, the termination control logic indicates that an internal narrow cable and terminator is attached.

S2   When placed in the OUT position, the termination control logic automatically determines the attachment or non-attachment of an internal wide SCSI cable and terminator.

When placed in the IN position, the termination control logic indicates that an internal wide device is attached.

S3   When placed in the OUT position, the termination control logic automatically senses a narrow or wide SCSI cable and terminator on the external bus.

When placed in the IN position, the termination control logic indicates that an external narrow SCSI cable and terminator is attached.

This is useful in cases where a narrow device is incorrectly identified as wide. This is necessary if the SCSI cable improperly grounds all unused pins, which indicates to the logic that a wide cable and terminator is attached.

S4   When placed in the OUT position, the termination control logic automatically determines that a cable and terminator are attached to the external bus. This is used in conjunction with S3 to determine whether a cable and terminator is attached and whether it is narrow or wide.

When placed in the IN position, the termination control logic indicates that an external device is attached. This works in conjunction with S3 to determine narrow or wide device attachment.

When there are no cables attached, the jumpers are set to the default setting of OUT and the SCSI terminators are enabled for wide SCSI. This ensures that an adapter with nothing attached has SCSI terminators enabled to pass diagnostics.
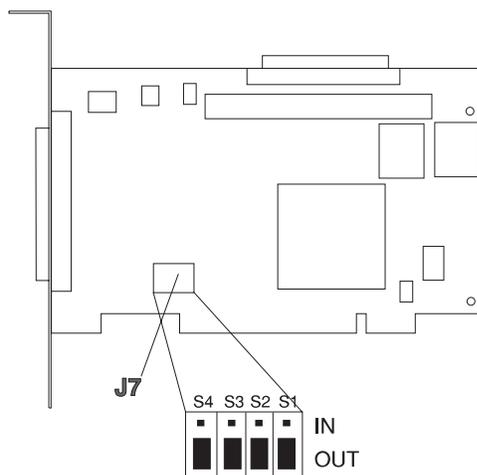
All jumpers shown in OUT position

Figure   C-1. Jumper Locations and Default Settings

Setting the Device Termination

Some devices have built-in termination that are controlled by a DIP switch, jumper, or push button. Other devices use terminators on a cable or on a connector where a terminator is plugged. To determine if a device has built-in termination, refer to its documentation.

The following example shows the default configuration for jumper block J7 on the SCSI adapter. The adapter was shipped with the jumpers in this configuration. This configuration is 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.

Typical installations use only one adapter and some number of internal or external SCSI devices. In these cases the jumpers are left in the factory-set default position.

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

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

If the adapter is on one end of the SCSI chain, you must provide a SCSI terminator at the other end of the chain after the last device. If the adapter is in the middle of the SCSI chain, you must provide a terminator at each end of the SCSI chain.
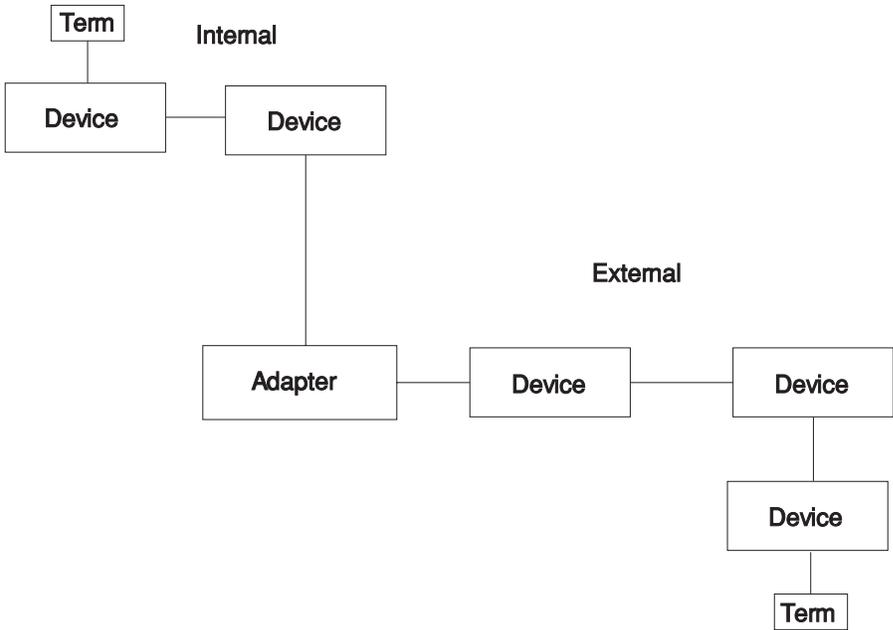
Figure   C-2. SCSI Chain with Internal and External Devices

Term is the SCSI terminator on the last device or the end of the cable.

Multi-Adapter Configurations

There are configurations that use more than one SCSI adapter on any single SCSI bus. In these cases the automatic termination 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 controls the enablement or disablement of the built on 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 can not sense the built-in adapter terminators of another adapter on the SCSI bus. Therefore, in these cases, you must specify to the adapters that external cabling is in use by moving the jumpers on J7.

These configurations also require that you change the default SCSI address of additional adapters to something other than 7. All devices and adapters that share a SCSI bus must have a unique SCSI ID. The default SCSI address setting on the adapter is modified by software. Refer to the software documentation for the operating system and device driver you are using to determine how to do this.

Typical Multi-Adapter Configurations

Two system unit systems sharing internal devices located on only one of the system unit systems.

Examples and Jumper Settings

This example shows two adapters with one sharing the internal devices of the other.

In this case, adapter A has internal devices connected and adapter B has access to those devices. The internal and external cabling must be the same width.

If the internal cabling is wide, the external cabling must be wide. A narrow device can be placed on the internal bus if a wide to narrow interposer is used.

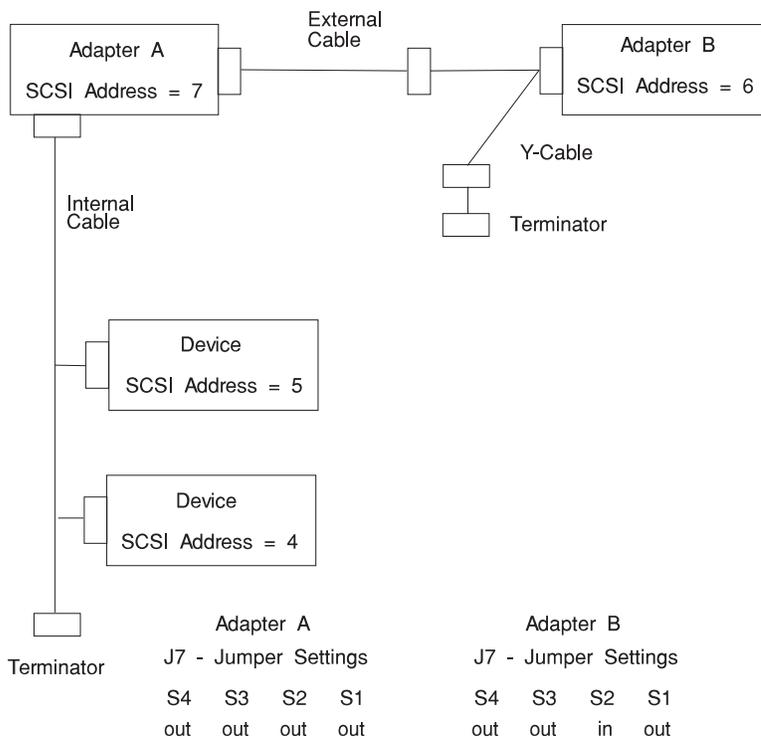|	Adapter A J7 - Jumper Settings					Adapter B J7 - Jumper Settings		
S4	S3	S2	S1		S4	S3	S2	S1
out	out	out	out		out	out	in	out

Figure C-3. Adapters Sharing Internal Devices

This example shows two adapters with one sharing the internal devices of the other, with simplified cabling.

The following shows a simplified cabling method for the previous example. This technique has a limitation that, if any external cable is removed, then adapter A is not properly terminated and does not function properly. If the external cable is removed, then adapter A must have jumpers reconfigured to the factory default prior to use, or an external terminator must be placed on the external adapter A's external connector. Failure to do so may make the adapter fail intermittently and may cause adapter diagnostics to fail.

If the external cable is removed from adapter A and left attached to adapter B, adapter B may fail to function since the non-terminated cable distorts the electrical signals on the SCSI bus.

When troubleshooting or diagnosing problems with this configuration, keep in mind that when removing external cables you must first take action to properly re-terminate or move jumpers before running diagnostics.

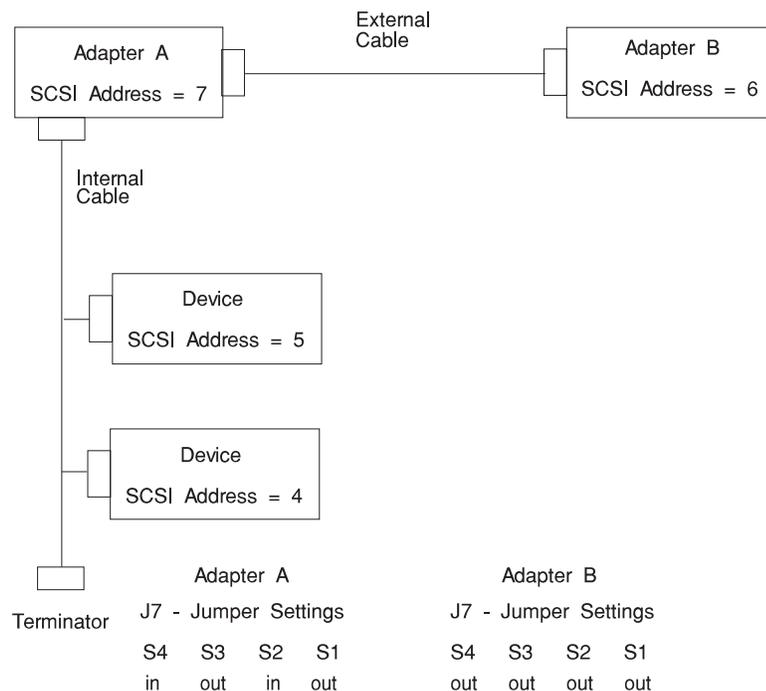|	Adapter A			Adapter B		
	J7 - Jumper Settings			J7 - Jumper Settings		
S4	S3	S2	S1	S4	S3	S2	S1
in	out	in	out	out	out	out	out

Figure C-4. Adapters Sharing Internal Devices with Simplified Cabling

Appendix D. SCSI-2 Fast/Wide PCI-Bus Adapter Connectors

The SCSI-2 Fast/Wide PCI-Bus Adapter Connectors supports two single-ended SCSI buses (internal and external).

There are two connectors provided for attaching to the internal SCSI bus. The 50-pin connector, shown below, is used for attaching a narrow (8-) SCSI cable. The 68-pin connector is used for attaching a wide (16-bit) SCSI cable, shown on page D-3. below.

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

Internal 50-Position SCSI Bus Connector
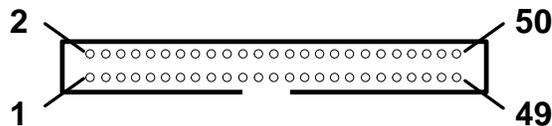
Figure   D-1. Internal 50-Pin SCSI Bus Connector

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	28	-ACK
Ground	39	40	-RST

Signal Name	Pin	Pin	Signal Name
Ground	41	42	-MSG
Ground	43	44	-SEL
Ground	45	46	-C/D
Ground	47	48	-REQ -I/O
Ground	49	50	-SI_O

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

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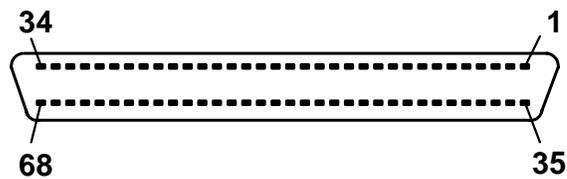


```
34                                      1
  ┌──────────────────────────────────┐
  │ ································· │
  │ ································· │
  └──────────────────────────────────┘
68                                     35
```

Figure   D-2. Internal, External 68-Pin Connector

Signal Name	Pin	Pin	Signal Name
Ground	1	35	-DB(12)
Ground	2	36	-DB(13)
Ground	3	37	-DB(14)
Ground/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

Signal Name	Pin	Pin	Signal Name
Ground	29	63	-REQ
Ground	30	64	-I/O
Ground	31	65	-DB(8)
Ground	32	66	-DB(0)
Ground	33	67	-DB(10)
Ground	34	68	-DB(11)

Note: * = External Connector Only

Appendix E. Communications Statements

The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying documentation.

Federal Communications Commission (FCC) Statement

Note: The &typemod. been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult an authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from authorized dealers. Neither the provider nor the manufacturer are responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party:

International Business Machines Corporation
New Orchard Road
Armonk, New York 10504
Telephone: (919) 543-2193

FCC Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The manufacturer cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards supplied by third parties. Consult with your dealer or sales representative for details on your specific hardware.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC Standard 950.

United Kingdom Telecommunications Safety Requirements

This equipment is manufactured to the International Safety Standard EN60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.

The network adapter interfaces housed within this equipment are approved separately, each one having its own independent approval number. These interface adapters, supplied by the manufacturer, do not use or contain excessive voltages. An excessive voltage is one which exceeds 70.7 V peak ac or 120 V dc. They interface with this equipment using Safe Extra Low Voltages only. In order to

maintain the separate (independent) approval of the manufacturer's adapters, it is essential that other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

Avis de conformité aux normes du ministère des Communications du Canada

Cet appareil numérique de la classe B est conform à la norme NMB-003 du Canada.

Canadian Department of Communications Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

VCCI Statement

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的
としていますが、この装置がラジオやテレビジョン受信機に近接して使用される
と、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

The following is a summary of the VCCI Japanese statement in the box above.

This product is a Class B Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). This product is aimed to be used in a domestic environment. When used near a radio or TV receiver, it may become the cause of radio interference. Read the instructions for correct handling.

Radio Protection for Germany

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG–Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

IBM ®

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