PCI-X Dual Channel Ultra320 SCSI Adapter

Installation and Using Guide

SA23-1303-01

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Note

Before using this information and the product it supports, read the general information under ″Product Warranties and Notices″ included with your system unit.

Second Edition (October 2003)

Before using this information and the product it supports, read the information in “Safety Information” on page v, and Appendix B, “Notices,” on page 25.

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 communications lines.
D05

Handling Static-Sensitive Devices

Attention: Static electricity can damage this device and your system unit. To avoid damage, keep this device in its antistatic protective bag until you are ready to install it. To reduce the possibility of electrostatic discharge, follow the precautions listed below:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or other printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- While the device is still in its antistatic package, touch it to an unpainted metal part of the system unit for at least two seconds. (This drains static electricity from the package and from your body).
- Remove the device from its package and install it directly into your system unit without setting it down. If it is necessary to set the device down, place it on its static-protective package. (If your device is an adapter, place it component-side up). Do not place the device on your system unit cover or on a metal table.
- Take additional care when handling devices during cold weather, as heating reduces indoor humidity and increases static electricity.
- If you have an antistatic wrist strap available, use it while handling the device.

About This Book

This book provides information about the PCI-X Dual Channel Ultra320 SCSI Adapter and its associated device-driver software.

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.

References to AIX and Linux Operating Systems

This document contains references to the AIX® and Linux 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 and Linux provide this support. If you are using another operating system, consult the appropriate documentation for that operating system regarding support for those features and functions.

Related Publications

The following publications contain related information:

- System unit documentation specific to your hardware configuration
- Operating system documentation for information specific to your software configuration
- *PCI Adapter Placement Reference* (for the latest version, you may need to contact your marketing representative)

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

- AIX
- AIX 5L
- @server
- pSeries
- RS/6000

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

Chapter 1. Overview

Note: This guide refers to various hardware and software features and functions. The support for these features and functions depends upon the limitations of your hardware and software. AIX and Linux support all functions mentioned. If you are using another operating system, consult the appropriate documentation for that operating system regarding support for the mentioned features and functions.

This guide describes how to install the PCI-X Dual Channel Ultra320 SCSI Adapter in a system unit with a PCI (peripheral component interconnect) bus. The PCI-X Dual Channel Ultra320 SCSI Adapter enables you to use internal and external SCSI (small computer system interface) 8-bit or 16-bit devices. Each channel operates independently with external LVD (low voltage differential) subsystems, internal LVD devices, or external SE (single-ended) devices (see Appendix C, “Connecting SCSI Devices to the Adapter,” on page 27). None of these configurations can be connected simultaneously on a channel (see “PCI-X Dual Channel Ultra320 SCSI Adapter SCSI Connectors” on page 2).

The adapter conforms to the ANSI (American National Standards Institute) SCSI Standard X3T10/1365D and to the PCI local bus specification, revision 2.2.

The PCI-X Dual Channel Ultra320 SCSI Adapter runs on the following:

- 3.3V slots only
- Either 32-bit or 64-bit slots

The PCI-X Dual Channel Ultra320 SCSI Adapter supports up to Ultra320 SCSI synchronous data rates. Maximum transfer rates are as follows:

- 16-bit Ultra320 SCSI device: 320 MB/s
- 16-bit Ultra3 SCSI device: 160 MB/s
- 16-bit Ultra2 SCSI device: 80 MB/s
- 16-bit Ultra SCSI device in single-ended Ultra operation: 40 MB/s
- 8-bit Fast SCSI device: 10 MB/s

PCI-X Dual Channel Ultra320 SCSI Adapter SCSI Connectors

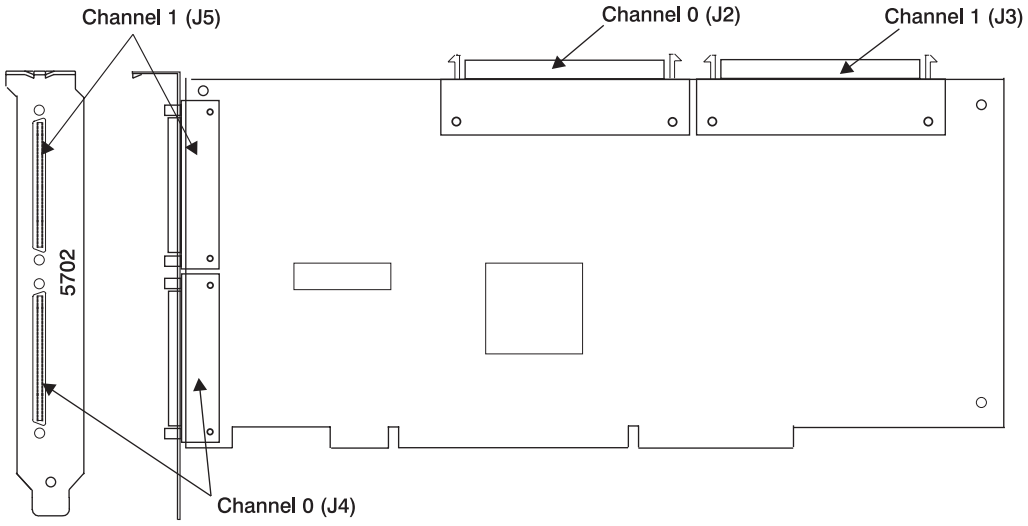
The adapter has the following external and internal connectors:

- External connectors:
  - Channel 0 (J4), Channel 1 (J5), 68-position, VHDCI (very high density cable interconnect)
- Internal connectors:
  - Channel 0 (J2), Channel 1 (J3), 68-position, high-density plastic D-shell SCSI standard connector for 16-bit attachment

Connectors J2 and J4 are connected as Channel 0. Connectors J3 and J5 are connected as Channel 1.

Attention: Simultaneous use of internally and externally attached devices on the same channel is not supported with this adapter. The following figure shows the external and internal channels.

Note: The adapter has built-in SCSI terminators on each channel that are automatically enabled when a cable is attached to either the external or internal connector.



This adapter might be preinstalled in a hot-swap carrier for use in certain system types. This carrier allows the adapter to be installed and removed without removing the top cover of the system in which it is installed. Refer to the adapter installation and removal procedures located in your system's user or service guide.

Verifying Operating System Requirements

Ensure that your operating system will support the PCI-X Dual Channel Ultra320 SCSI Adapter, use the following appropriate procedure to verify your operating system requirements.

Using AIX

The PCI-X Dual Channel Ultra320 SCSI Adapter is supported on the following levels of AIX or higher:

- AIX 5L Version 5.1 with the 5100-04 Recommended Maintenance Package (APAR IY44478)
- AIX 5L Version 5.2 with the 5200-01 Recommended Maintenance Package (APAR IY44479)

To determine which maintenance level is installed on your system, type `oslevel -r`. Verify that the maintenance level displayed is 5100-04, 5200-01, or higher. If no maintenance level is installed on your system, the following is an example of the data that displays on your screen:

```
No recommended maintenance level information is available.
```

If updates are needed, the latest maintenance packages and update instructions can be downloaded from the pSeries and RS/6000 Support Web site. The Web address is: http://techsupport.services.ibm.com/server/support. Updates can also be ordered by calling IBM Support.

Using Linux

The PCI-X Dual Channel Ultra320 SCSI Adapter is supported on the following Linux distributions:

- Any distribution based on United Linux 1.0 Service Pack 3, such as SuSE Linux Enterprise Server 8 Service Pack 3 or newer
- Red Hat Enterprise Linux 3 or newer

To determine which maintenance level is installed on your system, refer to your Linux distributor's documentation. To determine which release is installed on your system, refer to your Linux distributor's documentation. If updates are needed, obtain them from your Linux distributor or download them from the IBM Support Web Site. The Web address is: http://www6.software.ibm.com/dl/linuxsdd/linuxsdd-p.

Chapter 2. Preparing for Installation

This chapter helps you prepare to install the PCI-X Dual Channel Ultra320 SCSI Adapter. Preparing to install the adapter involves the following tasks:

- Verifying your hardware requirements
- Gathering tools and documentation

Verifying Your Hardware Requirements

To connect the PCI-X Dual Channel Ultra320 SCSI Adapter to SCSI devices, you may need the following hardware:

- External cables
- Internal cables
- A single-ended SCSI terminator
- A 68-position high-density plastic D-shell VHDCI to 68-position high-density plastic D-shell SCSI standard 16-bit interposer cable
- A 68-position to 50-position interposer connector

Determining Cable Needs

Use this section to determine your cable needs.

External Cable Connectors

External SCSI devices are manufactured with a variety of connectors. Ensure that you have cables with the correct connectors for each external 8-bit or 16-bit device in your planned SCSI chain.

LVD subsystems come with a cable having a VHDCI connector to attach to the adapter's VHDCI connector.

For either external 8-bit or 16-bit single-ended devices, the cable end going to the adapter is a 68-position high-density plastic D-shell connector. This connector joins to a VHDCI to P-shell converter cable, which plugs into the adapter.

External Cable Lengths

SCSI specifications limit the total cable length attached as a function of SCSI bus speed as follows:

- To attach an LVD subsystem running at Ultra2 speed (80 MB/s), Ultra3 speed (160 MB/s), or Ultra320 speed (320 MB/s), the maximum cable length is 20 meters (approximately 60 feet).
- To attach an Ultra, 20 MHz synchronous device (such as a 16-bit SCSI disk drive that can transfer up to 40 MB/s of data), the maximum cable length is 3 meters (approximately 10 feet). Up to two devices can be attached.
- To attach a fast, 10 MHz synchronous device (such as an 8-bit SCSI disk that can transfer up to 10 MB/s of data or a 16-bit SCSI disk that can transfer up to 20 MB/s of data), the maximum cable length is 3 meters (approximately 10 feet). Up to four devices can be attached.

For information about connecting SCSI devices to your adapter, see Appendix C, "Connecting SCSI Devices to the Adapter," on page 27.

Internal Cable Connectors

Depending on your machine type, up to six (6) SCSI devices can be plugged into a backplane. A 16-bit cable attaches the adapter's internal connector Channel 0 (J2) or Channel 1 (J3) to the backplane. For an illustration of the SCSI connectors, see "PCI-X Dual Channel Ultra320 SCSI Adapter SCSI Connectors" on page 2.

To use internal SCSI devices in your system, obtain the necessary cables for your system unit. Terminators are built onto the backplane within your system unit.

Gathering Tools and Documentation

To install the PCI-X Dual Channel Ultra320 SCSI Adapter, you need the following items:

- Your system unit installation guide
- *PCI Adapter Placement Reference*, order number SA38-0538
- Documentation provided with your SCSI devices
- IBM @server pSeries & RS/6000 Standalone Diagnostics CD-ROM (Version 5.2.0.11 or higher)
- Flat-blade screwdriver

Using AIX

In addition to the preceding items listed, you will need the following AIX-specific items:

- AIX 5.1 Update CD-ROM (Recommended Maintenance Package 5100-04 or higher)
- AIX 5.2 Update CD-ROM (Recommended Maintenance Package 5200-01 or higher)
- *PCI-X SCSI RAID Controller Reference Guide for AIX*, order number SA23-1323

Using Linux

In addition to the preceding items listed, you will need the following Linux-specific items:

- Linux Operating System CD-ROMs
- *PCI-X SCSI RAID Controller Reference Guide for Linux*, order number SA23-1327

Chapter 3. Installing Device Driver Software (AIX)

This chapter explains how to install device driver software. The device driver is provided for the AIX operating system.

Note: If you are using Linux, see “Installing the Downloaded Device Driver and Utility Software” on page 17. If you have another operating system installed, refer to your operating system documentation for information regarding installing the device driver software and configuring your system.

Read Chapter 2, “Preparing for Installation,” on page 5 to determine:

- If you should install your device driver software first, go to step 1 and continue with this section.
- If you should install your adapter hardware first, go to “Installing the Adapter” on page 9. When you install AIX, your adapter device driver automatically installs.

Note: Additional device drivers may also be required for the SCSI devices attached to the adapter. For installation instructions, refer to the documentation provided with your devices.

To install the device driver software on an AIX system, do the following:

1. Turn on the system unit power.
2. At the system prompt, log in as root user.
3. Insert the media (diskette or CD-ROM) containing the device driver software into the appropriate media device.
4. To start SMIT, type `smitty install_all`, and then press Enter.
5. The Install and Update from All Available Software screen appears and highlights the **INPUT Device/directory for software** option.
6. Select or type the input device using one of the following methods:
   - Press F4 to display the input device list. Select the name of the input device that you are using (for example, *CD-ROM*), and press Enter.
   - In the entry field, type the name of the input device you are using, and press Enter.
7. The Install and Update from All Available Software screen appears and highlights the **Software to Install** option.
8. Press F4 to display a list of the device software you can install.
9. To display the Find screen, type /.
10. Type `devices.pci.14106602` and then press Enter (The system finds and highlights this device driver software). A message similar to the following is displayed:

    ```
    devices.pci.14106602          ALL
    ```

11. Press F7 to select it.
12. Press Enter.
13. The INSTALL AND UPDATE FROM ALL AVAILABLE SOFTWARE window displays. Entry data fields are automatically updated. Highlight the **ACCEPT new license agreements?** option. Ensure that this option is set to **yes**. Press Enter to accept the data.
14. The `Are You Sure` screen displays. Press Enter to accept the data.
15. The command Status screen displays.
16. The term `RUNNING` is highlighted to indicate that the install and configure command is in progress.

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

    After a successful installation, `SUCCESS` appears in the Result column of the summary at the bottom of the page.
17. Remove the installation media from the drive.

18. Press F10 to exit SMIT.
19. Go to Chapter 4, “Installing the PCI-X Dual Channel Ultra320 SCSI Adapter Hardware (AIX),” on page 9.

Chapter 4. Installing the PCI-X Dual Channel Ultra320 SCSI Adapter Hardware (AIX)

This chapter provides instructions for installing the PCI-X Dual Channel Ultra320 SCSI Adapter and connecting your SCSI devices. Before you begin, be sure you have read “Handling Static-Sensitive Devices” on page vii. Also refer to the *PCI Adapter Placement Reference* guide.

Attention: Do not remove the PCI-X Dual Channel Ultra320 SCSI Adapter from its antistatic package at this time.

Installing the Adapter

To install the adapter, do the following:

1. Refer to the option installation documentation that shipped with your system unit to perform the following:
   a. Some systems support the hot-plugging of adapters. Prepare your system to hot plug this adapter while system power is on. Shut down your system unit if your system does not support hot-plugging.
   b. Install the PCI Adapter into your system unit.
2. To determine if any placement restrictions apply to your adapter, refer to the *PCI Adapter Placement Reference*. Return here to complete the installation procedure.

Attention

Failure to install your PCI adapter into the correct slot can cause your adapter or system unit to function incorrectly.

Connecting External or Internal Devices

To connect external or internal devices, use the following procedures.

Note: Attachment cables are usually shipped with the attaching subsystem or device.

Connecting External Devices

Note: Depending on your system unit, you may not need to shut down the system before connecting external devices. For more information, refer to the documentation provided with your system unit.

To connect external devices, do the following:

1. If the cable from your subsystem or device has a VHDCI connector on the end going to the adapter, connect the cable directly to the external port Channel 0 (connector J4) or Channel 1 (connector J5). Use the fastening screws on the cable connector to securely attach the connector to the adapter.

   If the cable from your subsystem or device has a high-density D-shell connector on the end going to the adapter, attach it to a VHDCI to D-shell converter cable *before* attaching it to the adapter. Then connect the cable to external port Channel 0 (connector J4) or Channel 1 (connector J5). Use the fastening screws on the cable connector to securely attach the connector to the adapter.
2. If necessary, connect additional cables to additional SCSI devices.
3. When all devices are connected, ensure that a SCSI terminator is attached to the last device if needed.
4. If you have turned off your system unit, turn it back on.

5. Turn on any external devices.
6. If you have turned off your display, turn it back on and follow any instructions on the screen.

Connecting Internal Devices

Note: All the connectors are built so that they can only be plugged in correctly one way.

To connect internal devices, do the following:

1. Attach a 16-bit cable to the correct internal system drive or backplane.
2. Connect the adapter end of the cable to the correct internal connector on the PCI-X Dual Channel Ultra320 SCSI Adapter. Use either connector Channel 0 (J2) or Channel 1 (J3).
3. When completed, refer to your system unit installation guide to install the covers and to power on the system unit, as well as all other attached devices.

Note: For more information about connecting internal devices, refer to the documentation provided with your system unit.

Chapter 5. Setting Up the PCI-X Dual Channel Ultra320 SCSI Adapter (AIX)

This chapter provides hardware and software installation verification, adapter configuration, and problem determination procedures for the PCI-X Dual Channel Ultra320 SCSI Adapter. If you have problems with your adapter in the future, use the procedures described in this chapter.

Note: If you are using Linux, see “Verifying the Installation” on page 15. If you have another operating system installed, refer to your operating system documentation for information regarding installing the device driver software and configuring your system.

Verifying the Installation

Verify the initial installation by using the following procedures:

- Verifying AIX Software Installation (lslpp)
- Verifying Hardware Installation (lsdev)

Verifying AIX Software Installation

To verify that the device driver for the PCI-X Dual Channel Ultra320 SCSI Adapter is installed, do the following:

1. If necessary, log in as root user.
2. Type

   ```
   lslpp -l devices.pci.14106602*
   ```

   Press Enter.

If the PCI-X Dual Channel Ultra320 SCSI Adapter device software is installed, the following is an example of the data that displays on your screen:

```
devices.pci.14106602.diag  5.2.0.11 COMMITTED PCI-X Dual Channel Ultra320 SCSI Adapter Diagnostics
devices.pci.14106602.rte   5.2.0.11 COMMITTED PCI-X Dual Channel Ultra320 SCSI Adapter Device Software
devices.pci.14106602.ucode 5.2.0.0 COMMITTED PCI-X Dual Channel Ultra320 SCSI Adapter Device Microcode
```

Note: The fileset number (shown as 5.2.0.11) might be different in your output example.

If no data displays on your screen, the PCI-X Dual Channel Ultra320 SCSI Adapter device driver did not install. Return to “Installing the Adapter” on page 9. Then continue with “Verifying Hardware Installation.”

If you continue to experience problems, it may be necessary to call your system support organization. Refer to your operating system documentation for instructions.

Verifying Hardware Installation

To verify that your system unit recognizes the PCI-X Dual Channel Ultra320 SCSI Adapter, do the following:

1. If necessary, log in as root user.
2. Type

   ```
   lsdev -C | grep scsi
   ```

   Press Enter.

If the PCI-X Dual Channel Ultra320 SCSI Adapter installed correctly, the following is an example of the data that displays on your screen:

```
sisscsia0  Available 20-58        PCI-X Dual Channel Ultra320 SCSI Adapter
scsi0      Available 20-58-00     PCI-X Dual Channel Ultra320 SCSI Adapter bus
scsi1      Available 20-58-01     PCI-X Dual Channel Ultra320 SCSI Adapter bus
```

If the message on your screen indicates your adapter is `Defined` instead of `Available`, shut down your machine. Check the PCI-X Dual Channel Ultra320 SCSI Adapter to ensure it is installed correctly. Go to “Installing the Adapter” on page 9. Then return to this section and repeat step 1.

Note: If the message on your screen indicates your adapter is `Defined` a second time, it may be necessary to contact your service representative.

Updating Hard Disk Drive and Adapter Microcode

Disk drives attached to this adapter must contain the latest microcode level.

The latest microcode level for your drive model and PCI-X Dual Channel Ultra320 SCSI Adapter can be found at the Download pSeries and RS/6000 Microcode Updates Web site: https://techsupport.services.ibm.com/server/mdownload/download.html.

The drive microcode download you need should match the name of one of the drive model numbers located under the DASD Microcode listing found on the Web site. The drive machine type and model of the drive you are updating can be identified by reading its VPD (Vital Product Data). Similarly, the name of the PCI-X Dual Channel Ultra320 SCSI Adapter Microcode download you need can be found under the Adapter Microcode listing on the Web site.

Configuring the PCI-X Dual Channel Ultra320 SCSI Adapter

The PCI-X Dual Channel Ultra320 SCSI Adapter permits up to 320 MB/s operation with LVD devices on a wide bus. With single-end (SE) devices, it can run up to 40 MB/s. The maximum speed and bus width are automatically negotiated based on the characteristics of the attached device.

You can use SMIT to control speed and bus width for devices as described in the following sections.

Limit Adapter Speed Using the Maximum SCSI Bus Speed in MB/s

The default maximum adapter speed is 320 MB/s for LVD mode and 40 MB/s for SE mode. If you are not successful running at these speeds, you can reduce the adapter speed by changing the Maximum SCSI Bus Speed.

To limit adapter speed, do the following:

1. At the command prompt, type `smit`, and press Enter.
2. Select **Devices** and press Enter.
3. Select **SCSI Adapter** and press Enter.
4. Select **Change/Show Characteristics of a SCSI Adapter** and press Enter.
5. Select your adapter SCSI bus from the list and press Enter.

   Note: This screen content varies based on the adapter that you select.

```
    Change / Show Characteristics of a SCSI Adapter

                                          [Entry Fields]
SCSI Adapter                             scsi5
Description                              PCI-X Dual Channel U1>
Status                                   Available
Location                                 20-58-00
Adapter card SCSI ID                     [7]
Wide bus enabled                         yes
Maximum SCSI Bus Speed in MB/s           320
QAS (Quick Arbitration) Capability       Enable
Apply changes to DATABASE only           no
```

6. Select **Maximum SCSI Bus Speed in MB/s**.
7. Press F4.
8. Select the desired bus speed: **5**, **10**, **20**, **40**, **80**, **160**, or **320** MB/s, and press Enter.
9. Press Enter again.
10. If the change was successful, press F10 to exit SMIT.

If you were not successful in performing the procedure in “Limit Adapter Speed Using the Maximum SCSI Bus Speed in MB/s” on page 12, do the following:

1. Select **Apply change to DATABASE only**.
2. Press F4 and select **yes**.
3. Press Enter.
4. Press F10 to exit SMIT.
5. At this point, the adapter and its child devices must be reconfigured. To reboot your system, log in as root user and type `shutdown -Fr` at the command prompt.

Wide Bus Enabled

If you are attaching an external device with an 8-bit SCSI interface cable, set **Wide bus enabled** to **no**. Follow the steps in “Limit Adapter Speed Using the Maximum SCSI Bus Speed in MB/s” on page 12.

Quick Arbitration and Select (QAS) Capability

The QAS capability is automatically controlled by the adapter.

Problem Determination

If you encounter any problems with the adapter after the installation, refer to your system unit documentation for information about running diagnostics or other problem-determination procedures.

Chapter 6. Installing and Setting Up Software and the PCI-X Dual Channel Ultra320 SCSI Adapter (Linux)

This chapter provides instructions for installing and verifying hardware and software that pertains to the Linux operating system.

Note: If you are using AIX, see “Verifying the Installation” on page 11. If you have another operating system installed, refer to your operating system documentation for information regarding installing the device driver software and configuring your system.

Installing the PCI-X Dual Channel Ultra320 SCSI Adapter

Install your PCI-X Dual Channel Ultra320 SCSI Adapter using the instructions found in this section.

Note: If you are using AIX, follow the steps in Chapter 4, “Installing the PCI-X Dual Channel Ultra320 SCSI Adapter Hardware (AIX),” on page 9.

Attention: Do not remove the PCI-X Dual Channel Ultra320 SCSI Adapter from its antistatic package at this time.

To install the adapter,

1. Refer to the option installation documentation that shipped with your system unit to perform the following:
   a. Some systems support the hot-plugging of adapters. If supported, prepare your system to hot-plug this adapter while system power is on. Shut down your system unit if your system does not support hot-plugging.

      Note: The 2.4 Linux kernel does not support PCI hot-plugging for SCSI host adapters.
   b. To determine if any placement restrictions apply to your adapter, refer to the PCI Adapter Placement Reference guide.
   c. Install the PCI Adapter into your system unit.

Attention

Failure to install your PCI adapter into the correct slot can cause your adapter or system unit to function incorrectly.

Connecting External or Internal Devices

To connect external or internal devices, use the procedures in “Connecting External or Internal Devices” on page 9.

Note: Attachment cables are usually shipped with the attaching subsystem or device.

Verifying the Installation

Verify the initial installation by using the following procedures:

- Verifying Linux Software Installation
- Verifying Hardware Installation

Verifying Linux Software Installation

Software for the PCI-X Dual Channel Ultra320 SCSI Adapter consists of a device driver and a set of utilities. This software is provided with the supported Linux distribution, and should have been installed along with the operating system.

Verify the initial software installation by using the following procedures:

- Verifying Device Driver Version (ibmsis)
- Verifying Utility Version (sisconfig)

Verifying Device Driver Version

The PCI-X Dual Channel Ultra320 SCSI Adapter requires Version 1 Revision 19 (or later) of the **ibmsis** device driver. To verify the version number of **ibmsis**, do the following:

1. If necessary, log in as root user.
2. Type:

   ```
   modinfo ibmsis
   ```

   Press Enter.
3. Type:

   ```
   strings filename | grep "ibmsis version"
   ```

   where *filename* is the file name displayed after the **modinfo** command was typed in the previous step. Press Enter.

The following is an example of the data that displays on your screen:

```
ibmsis version=Ver. 1 Rev. 19.10 SMP
```

Note: The version displayed in the example might be different from the output displayed on your screen.

If the version displayed is not at the recommended level and updates are needed, obtain them from your Linux distributor or download them from the IBM Support Web site. The Web address is: http://www6.software.ibm.com/dl/linuxsdd/linuxsdd-p.

Verifying Utility Version

The PCI-X Dual Channel Ultra320 SCSI Adapter requires Version 1 Revision 19 (or later) of the **sisconfig** utility. To verify the version number of the **sisconfig** utility, do the following:

1. If necessary, log in as root user.
2. Type:

   ```
   sisconfig --version
   ```

   Press Enter.

The following is an example of the data that displays on your screen:

```
sisconfig: Ver. 1 Rev. 19.10
```

Note: The version displayed in the example might be different from the output displayed on your screen.

If the version displayed is not at the recommended level and updates are needed, obtain them from your Linux distributor or download them from the IBM Support Web site. The Web address is: http://www6.software.ibm.com/dl/linuxsdd/linuxsdd-p.

Installing the Downloaded Device Driver and Utility Software

Software required for the PCI-X Dual Channel Ultra320 SCSI Adapter is usually installed when the Linux operating system is installed. Software installation is not necessary unless verification has failed.

If it is necessary to install software, obtain it from one of the following sources in the order listed:

1. Your supported Linux operating system CD-ROM
2. Your Linux distributor
3. Online at the IBM Support Web site: http://www6.software.ibm.com/dl/linuxsdd/linuxsdd-p

After downloading the needed software package, install the software by continuing with the instructions in this section. Then, return to “Verifying Linux Software Installation” on page 16, and follow the procedure to ensure that the installation was successful.

Installing Device Driver Software

If you downloaded the **ibmsis** device driver package, do the following:

1. Turn on the power to your system unit.
2. At the system prompt, log in as root user.
3. If necessary, untar the device driver package. Type:

   ```
   tar -xzvf ibmsis-$ver.tgz
   ```

   Press Enter.
4. Compile and install the device driver. For instructions on how to compile and install the **ibmsis** device driver, see the readme file located in the **ibmsis/src/** directory.
5. Reboot your system.

Installing the Utility Software

If you downloaded the **sisutils** utility package, do the following:

1. Turn on the power to your system unit.
2. At the system prompt, log in as root user.
3. If necessary, untar the utility package. Type:

   ```
   tar -xzvf sisutils-$ver.tgz
   ```

   Press Enter.

4. Compile and install the **sisutils** utility package. For instructions on how to compile and install the utility package, see the readme file located in the **sisutils/** directory.

Verifying Hardware Installation

To verify that your system unit recognizes the PCI-X Dual Channel Ultra320 SCSI Adapter, do the following:

1. If necessary, log in as root user.
2. Type:

   ```
   sisconfig
   ```

   Press Enter.
3. Select the **Display disk hardware status** option and press Enter.

If the PCI-X Dual Channel Ultra320 SCSI Adapter installed correctly, data displays for the adapter and each disk attached to it. The following is an example of the data that displays on your screen:

```
              Display Disk Hardware Status

 Serial   Vendor  Product            Resource      Hardware
 Number    ID       ID        Model  Name          Status
03000001  IBM     5702001      001   /dev/ibmsis0  Operational
000012F0  IBM     ST3146807LC  020   /dev/sdb      Operational
00001315  IBM     ST3146807LC  020   /dev/sdc      Operational
000012F5  IBM     ST3146807LC  020   /dev/sdd      Operational
00001304  IBM     ST3146807LC  020   /dev/sde      Operational


Press Enter to continue.

e=Exit           q=Cancel       r=Refresh   f=PageDn   b=PageUp
d=Display disk unit details     p=Display device parity status
```

If the message on your screen indicates your newly installed card, shown in the example as `/dev/ibmsis0`, is `Not Operational` instead of `Operational` or if it is not listed, shut down your machine. Go to “Installing the PCI-X Dual Channel Ultra320 SCSI Adapter” on page 15 to ensure that the PCI-X Dual Channel Ultra320 SCSI Adapter is installed correctly. Then return to this section, and repeat this hardware installation procedure.

Updating Hard Disk Drive and Adapter Microcode

Disk drives attached to this adapter must contain the latest microcode level.

Microcode updates for hard disk drives attached to the PCI-X Dual Channel Ultra320 SCSI Adapter are handled automatically by the **sisupdate** utility, which executes each time the system is booted.

The latest microcode level for your drive model and PCI-X Dual Channel Ultra320 SCSI Adapter is shipped as part of the Linux distribution. If an update or replacement is needed, the latest microcode can be obtained from your Linux distributor, or found as part of the device driver package at the following Web site: http://www6.software.ibm.com/dl/linuxsdd/linuxsdd-p.

If you downloaded new microcode from the Web site, install it as follows:

1. If necessary, log in as root user.
2. Untar the package, type:

   ```
   tar –xzvf ibmsis-$ver.tgz
   ```

   Press Enter.
3. Change directories to **ibmsis/obj/firmware/**. Type:

   ```
   cd ibmsis/obj/firmware/
   ```
4. Install the microcode. Type:

   ```
   make install
   ```
5. Update the microcode. Type:

   ```
   sisupdate
   ```

   Press Enter.

Configuring the PCI-X Dual Channel Ultra320 SCSI Adapter

The PCI-X Dual Channel Ultra320 SCSI Adapter permits up to 320 MB/s operation with LVD devices on a wide bus. With single-end (SE) devices, it can run up to 40 MB/s. The maximum speed and bus width are automatically negotiated based on the characteristics of the attached device.

You can use the **sisconfig** utility to control speed and bus width for devices as described in the following sections.

Limit Adapter Speed Using the Maximum SCSI Bus Speed in MB/s

The default maximum adapter speed is 320 MB/s for LVD mode and 40 MB/s for SE mode. If you are not successful running at these speeds, you can reduce the adapter speed by changing the **Maximum SCSI Bus Throughput**.

Note: The device driver will default to 80 MB/s until the **sisconfig** utility is run. After the **sisconfig** utility completes, higher speeds will be attempted. The **sisconfig** utility is configured to run automatically each time the system is booted.

To limit adapter speed, do the following:

1. At the command prompt, type `sisupdate`, and press Enter.
2. Select **Work with configuration** and press Enter.
3. Select **Work with SCSI bus configuration** and press Enter.
4. Select your adapter from the list by pressing 1, then press Enter.

   Note: This screen content varies based on the adapter that you select.

```
           Change SCSI Bus Configuration

Current Bus configurations are shown.  To change
setting hit "c" for options menu.  Highlight desired
option then hit Enter

c=Change Setting

/dev/ibmsis0
 BUS 0
   Host SCSI ID . . . . . . . . :  7
   Maximum Bus Throughput . . :  320 MB/s    320 MB/s
 BUS 1                                      *160 MB/s
   Host SCSI ID . . . . . . . . :  7          80 MB/s
   Wide Enabled . . . . . . . . :  Yes        40 MB/s
   Maximum Bus Throughput . . :  320 MB/s     20 MB/s
                                              10 MB/s
                                               5 MB/s

Press Enter to Continue

e=Exit   q=Cancel
```

5. Select the **Maximum Bus Throughput** field under the desired bus and press c.
6. Select the desired bus speed: **5**, **10**, **20**, **40**, **80**, **160**, or **320** MB/s, and press Enter.

   Note: Depending on your hardware, some of these options may not be available.
7. Press Enter to continue.
8. Press c to confirm the changes.

Wide Bus Enabled

If you are attaching an external device with an 8-bit SCSI interface cable, set **Wide enabled** to **no**. Follow the steps in “Limit Adapter Speed Using the Maximum SCSI Bus Speed in MB/s” on page 19.

Quick Arbitration and Select (QAS) Capability

The QAS capability is automatically controlled by the adapter.

Problem Determination

If you encounter any problems with the adapter after the installation, refer to your system unit documentation for information about running diagnostics or other problem-determination procedures. Refer to the *PCI-X SCSI RAID Controller Reference Guide for Linux,* order number SA23-1327.

Appendix A. 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: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Neither the provider nor the manufacturer is 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.

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 A Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC 60950.

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 A est conforme à la norme NMB-003 du Canada.

Canadian Department of Communications Compliance Statement

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

VCCI Statement

この装置は、クラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 ＶＣＣＩ－Ａ

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

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Electromagnetic Interference (EMI) Statement - Taiwan

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

The following is a summary of the EMI Taiwan statement above.

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user will be required to take adequate measures.

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 A. Für diese von Geräten gilt folgende Bestimmung nach dem EMVG:

Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.

(Auszug aus dem EMVG vom 9.Nov.92, Para.3, Abs.4)

Hinweis

Dieses Genehmigungsverfahren ist von der Deutschen Bundespost noch nicht veröffentlicht worden.

Appendix B. Notices

This information was developed for products and services offered in the U.S.A.

The manufacturer may not offer the products, services, or features discussed in this document in other countries. Consult the manufacturer's representative for information on the products and services currently available in your area. Any reference to the manufacturer's product, program, or service is not intended to state or imply that only that product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any intellectual property right of the manufacturer may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any product, program, or service.

The manufacturer may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to the manufacturer.

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This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. The manufacturer may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Information concerning products made by other than the manufacturer was obtained from the suppliers of those products, their published announcements, or other publicly available sources. The manufacturer has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to products made by other than the manufacturer. Questions on the capabilities of products made by other than the manufacturer should be addressed to the suppliers of those products.

Appendix C. Connecting SCSI Devices to the Adapter

This appendix describes how to lay out a SCSI chain, set SCSI addresses, and terminate SCSI devices and the adapter.

SCSI devices are attached to a SCSI adapter in a chain. Devices in a 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.

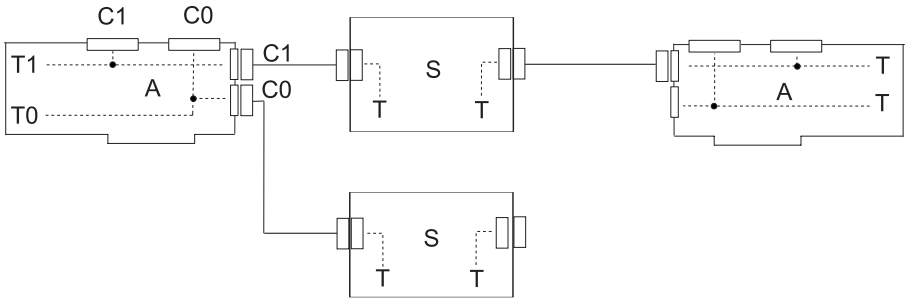
Note: A terminator is required at each end of the SCSI chain. Each channel on the adapter has a terminator that is automatically enabled when a cable is attached to either the external or internal connector.

The PCI-X Dual Channel Ultra320 SCSI Adapter does not support simultaneously attaching to the internal and external connectors on a channel.

To share a subsystem with a second adapter, see the following figure. The subsystem redirects each adapter to a common internal SCSI bus.

External Low-Voltage Differential Connection

The interconnection cable, which has VHDCI connectors, is provided with the external subsystem.



A Adapter

C0 Channel 0 connector

C1 Channel 1 connector

S Low voltage differential subsystem

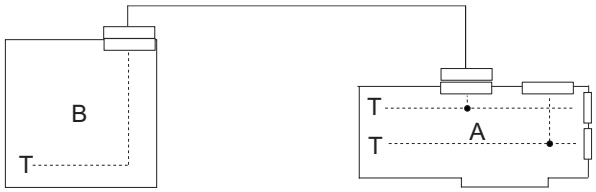
T Terminator

T0 Channel 0 terminator

T1 Channel 1 terminator

Internal Low-Voltage Differential Connection

Terminators are built into the adapter and the backplane.



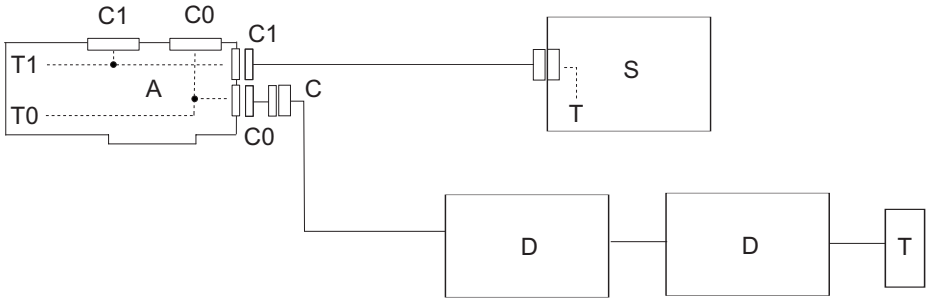
A Adapter

B Backplane

T Terminator

Concurrent External Single-Ended Connection and Low-Voltage Differential Connection on the Same Adapter

A converter cable may be used to attach VHDCI connectors on the adapter and P-shell connector on external cables. The terminator may be built into the last device or it may be externally attached.



A Adapter

C Converter cable

C0 Channel 0 connector

C1 Channel 1 connector

D Single-ended device

S Low voltage differential subsystem

T Terminator

T0 Channel 0 terminator

T1 Channel 1 terminator

Setting SCSI Addresses

Each SCSI device requires a different SCSI address. The address is a number from 6 through 0 for 8-bit devices, or from 6 through 0 and 15 through 8 for 16-bit devices. If two SCSI devices have the same address, your system will not function correctly. SCSI address 7 is usually assigned to the adapter, so additional SCSI devices can be set to addresses 6 through 0 and 15 through 8.

Determining Current SCSI Addresses

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 documentation that was provided with the device to see if it specifies a default SCSI address. If a default address is not specified, check how SCSI devices 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).

Planning SCSI Addresses

No two SCSI devices (on the same SCSI bus channel) should have the same SCSI address. Address 7 is usually assigned to the adapter (address 6 is usually assigned to a second adapter).

Subsystems typically have fixed SCSI IDs that are preassigned to each drive slot on the bus. The subsystems might also split the buses. For details, see your subsystem documentation.

In subsystems that have drives shared between two systems, each port of the subsystem is connected to a different SCSI adapter. The second adapter's SCSI address must not conflict with that of any other device. SCSI address 6 is often used for the second adapter. It may be necessary to remove a drive to provide an address for the second adapter.

Note: System or subsystem backplane services may require an address of their own. This address is usually ID 15.

Changing SCSI Addresses

To change SCSI addresses, follow the instructions in the documentation provided with each device.

Terminating the SCSI Devices and Adapter

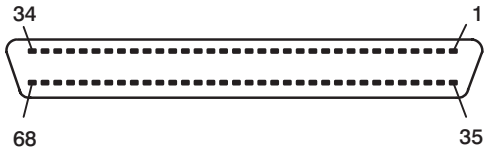
Some SCSI devices have built-in terminators controlled by a DIP switch, jumper, or push button. Other devices use terminators on the cable. Some devices require a terminator be plugged into the device on a connector. After planning your installation, supply the correct terminator to the SCSI device on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

For reliable SCSI operation, active terminators are required for all installations.

The basic rules of terminating SCSI buses are as follows:
- Terminate the ends of the chain.
- Do not terminate devices in the middle of the chain.

Appendix D. Internal, External 68-Position, 16-Bit Single-Ended High-Density VSCSI or VHDCI Bus Connector

This appendix illustrates the Internal, External 68-Pin Connector (shown below), and signal information for each of its pins.



The following table shows the pinout for the internal and external 68-position, high-density plastic D-shell 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	45	-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
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

Signal Name		Connector		Signal Name
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)

Note:

- 8-bit SE devices that connect to the P-cable should tie the following signals inactive high: –DB(8), –DB(9), –DB(10), –DB(11), –DB(12), –DB(13), –DB(14), –DB(15), –DB(P1), and float the same signal lines.
- 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.
- All other signals shall be connected as defined.

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