

INSTALLATION AND HARDWARE GUIDE

AAA-130U2 SERIES
ULTRA2 SCSI RAID CARD



Adaptec, Inc.
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▼▼▼▼ **AAA-130U2 Series**
Ultra2 SCSI RAID Card

Installation and Hardware Guide



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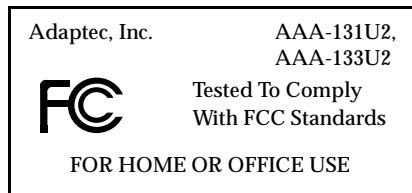
WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has 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 instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. However, if this equipment does cause interference to radio or television equipment 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 equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Use a shielded and properly grounded I/O cable and power cable to ensure compliance of this unit to the specified limits of the rules.

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.



Canadian Compliance Statement

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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Introduction

In this Chapter

- *System Requirements* 1-2
- *Installation Overview* 1-3

The Adaptec® AAA™ -131U2 and AAA-133U2 Ultra2 SCSI RAID cards provide powerful disk array support in systems that have a PCI bus. The AAA-131U2 and AAA-133U2 are collectively referred to as “AAA-131U2/133U2” in this document. Here is a summary of the two models:

- The **AAA-131U2** is a single-channel, half-size PCI RAID card, with 50-pin standard and 68-pin Ultra2 internal connectors and a 68-pin external Ultra2 connector.
- The **AAA-133U2** is a three-channel, full-size PCI RAID card with 68-pin internal Ultra2 connectors for Channel A, B, and C; 68-pin external Ultra2 connector for Channel A; and 50-pin internal connector for Channel A.

This *Installation and Hardware Guide* explains how to install the AAA-131U2/133U2, connect SCSI devices to it, run the **ARRAYCONFIG™ U2** Utility to create the first array for a bootable array configuration, and then install the software driver for your operating system.

Use the Adaptec CI/O Management Software™, which is included with the AAA-131U2/133U2, to create additional arrays (CI/O is required for array management in order to provide the proper level of fault tolerance and event notification). Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.

System Requirements

The minimum system requirements for the AAA-131U2/133U2 are

- PCI-based 90-MHz Pentium or equivalent motherboard with PCI-to-PCI bridge support
- An available half-length (for AAA-131U2) or full-length (for AAA-133U2), unobstructed PCI slot that supports Bus Mastering
- A minimum of one SCSI hard disk
- A standard 168-pin EDO 3.3v, 60ns or faster DIMM installed on the adapter. (A DIMM is typically pre-installed.) See the Adaptec Web Site at <http://www.adaptec.com/raid> for a list of approved DIMMs and vendors
- Five MBytes of free hard disk space for the AAA-131U2/133U2 software (five MBytes of free hard disk space on the Windows system disk are also required for the temporary files created during installation of the software)
- Windows NT™ 4.0 Server, Windows NT 4.0 Workstation, Novell NetWare 4.11, 4.2, or 5.0, or UnixWare 7.0.
- A 3.5-inch 1.44-MByte primary (boot) floppy disk drive
- 64 MBytes or more of system memory.



Caution: An Uninterruptable Power Supply (UPS) is a key feature for system fault tolerance. It is possible to lose data due to power failure or power brown outs. In order to prevent errors or data loss due to power failure, Adaptec strongly recommends that a UPS be installed to support your system.

Installation Overview

To install AAA-131U2/133U2 hardware and software, follow these steps:

- Install the AAA-131U2/133U2 in the system. (Chapter 2)
- Connect SCSI devices to the AAA-131U2/133U2. (Chapter 2)
- Create the first bootable array using the **ARRAYCONFIG U2** utility. (Chapter 3)
- Install the appropriate Array1000U2 software driver for your operating system. (Chapter 4, Chapter 5, and Chapter 6)
- Install the Adaptec CI/O Management Software. (*Adaptec CI/O Management Software User's Guide*)



Note: Before proceeding with installation, review the *readcio.txt* file found in the Adaptec CI/O Management Software CD-ROM and the *relnote.txt* file found in the root directory of the Array1000U2 driver diskette.



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Installing the Hardware

In this Chapter

- *AAA-131U2/133U2 RAID Card Layout* 2-2
- *Installing DIMM Memory* 2-3
- *Installing the AAA-131U2/133U2* 2-4
- *Setting Up SCSI Devices* 2-6
- *Connecting SCSI Devices* 2-9
- *Configuring the AAA-131U2/133U2* 2-19

This chapter explains how to install the AAA-131U2/133U2 and connect SCSI devices to it.



WARNING: Before handling the AAA-131U2/133U2 and any other electronic component, ground yourself by touching an unpainted metal surface on your computer chassis.

AAA-131U2/133U2 RAID Card Layout

Figure 2-1 identifies the major components on the AAA-131U2, and Figure 2-2 the components on the AAA-133U2. You may find it helpful to refer to these figures while installing the AAA-131U2/133U2 and attaching SCSI devices to it.

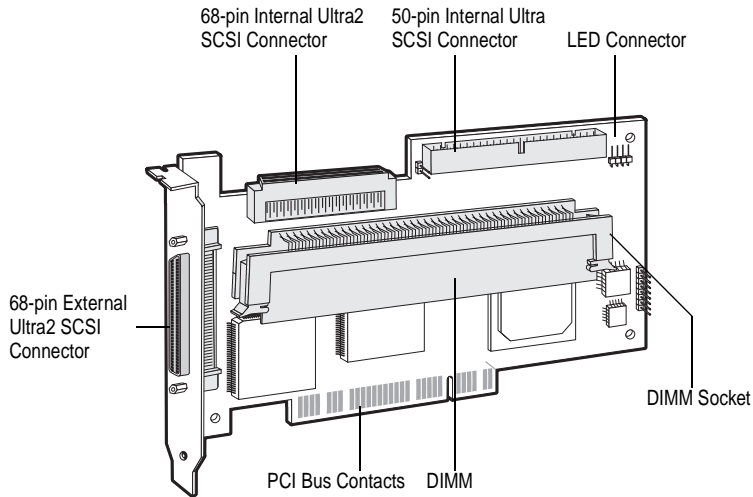


Figure 2-1. AAA-131U2 Major Components

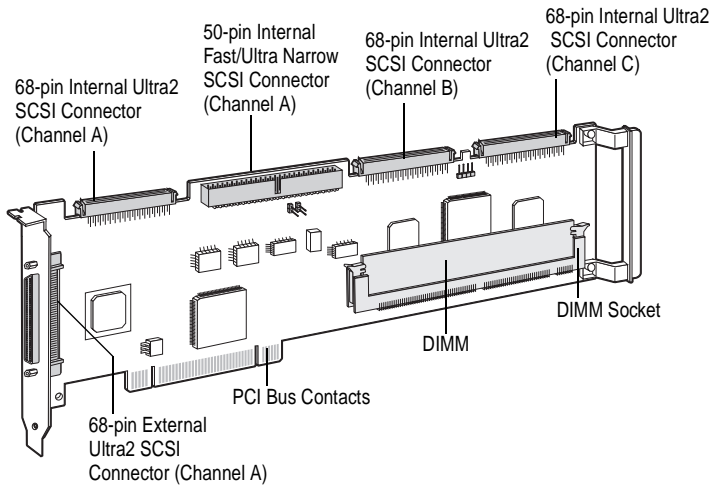


Figure 2-2. AAA-133U2 Major Components

Installing DIMM Memory

Before you can use the AAA-131U2/133U2, the DIMM memory socket must be populated with a DIMM, as shown in Figure 2-3. In most cases, the AAA-131U2/133U2 comes pre-installed with a DIMM. If a DIMM is not pre-installed, a 168-pin EDO 3.3v 60ns or faster DIMM can be used. (See the Adaptec Web Site at <http://www.adaptec.com/raid> for a list of approved DIMMs and vendors.)

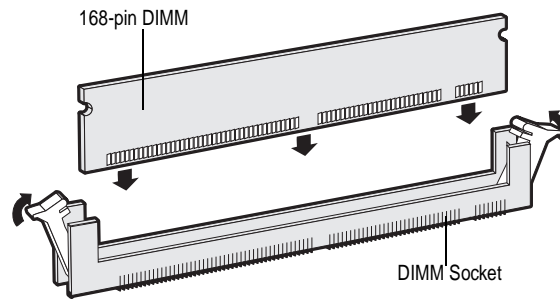


Figure 2-3. Installing DIMM in the DIMM Memory Socket

Installing the AAA-131U2/133U2

Follow these steps to install the AAA-131U2/133U2:



Note: If you are installing the AAA-131U2/133U2 in an existing system, back up all data before continuing with installation.

- 1 Turn OFF power to the computer and disconnect the power cord.
- 2 Remove the cover from the computer case.
- 3 Locate an unused, unobstructed, PCI expansion slot and remove the expansion slot cover. (The expansion slot must be Rev. 2.1 or higher compliant and support bus mastering.) Save the slot cover screw for use in Step 4.
- 4 Insert the AAA-131U2/133U2 in the PCI expansion slot; press down firmly until it clicks into place, then replace the slot cover screw. (Figure 2-4 shows the installation of an AAA-131U2 card.)

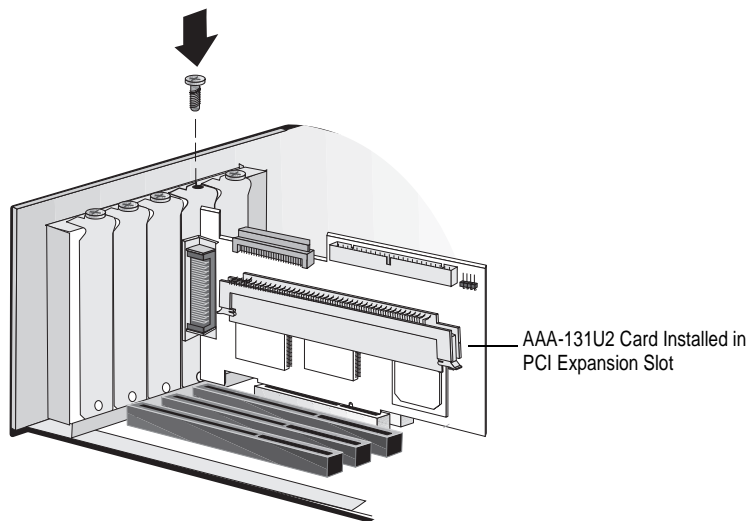


Figure 2-4. Installing an AAA-131U2 in PCI Expansion Slot

Connecting the LED Activity Indicator

(Optional) An LED on the front panel of most computers lights to indicate non-SCSI hard disk activity. If you want the LED to light whenever there is activity on the AAA-131U2/133U2 instead, you must disconnect the LED cable from the motherboard and connect it to the LED connector on the AAA-131U2/133U2. If the LED has a 2-pin cable, connect the cable to pins 1 and 2 of the LED connector. (Figure 2-5 shows the connection on an AAA-133U2 card.)



Note: If you are using non-SCSI disk drives (e.g., IDE), the LED will no longer indicate activity on these drives when you connect the LED cable to the AAA-131U2/133U2.

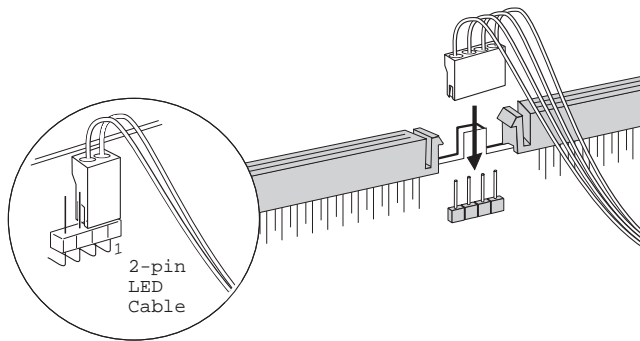


Figure 2-5. Connecting the LED Activity Indicator

Setting Up SCSI Devices

Setting up SCSI devices before attaching them to the AAA-131U2/133U2 typically involves setting SCSI IDs and termination, mounting internal devices inside your computer or external array enclosure, and connecting power cables to each device. Since setup can vary from device to device, always refer to the device's documentation for specific instructions. Below are some guidelines for setting SCSI IDs and termination on your devices. Additional installation hints are also provided to help you install your devices.



Note: If you refer to the device's documentation for installation instructions, be sure to return to this document to continue with installation of the software included in the package.

Check the SCSI IDs

Each device attached to a SCSI channel on the AAA-131U2/133U2, as well as the SCSI channel itself, must be assigned a unique SCSI ID number from 0 to 15—no duplicate IDs are permitted on a channel. ID numbers don't have to be sequential, as long as the channel and each device has a different number.

- We recommend that you leave each RAID card channel set to its default setting of SCSI ID 7.
- SCSI ID 7 has the highest priority on the channel. The priority of the remaining IDs, in descending order, is 6 to 0, then 15 to 8.
- If you have 8-bit SCSI devices, they must use SCSI IDs 0, 1, 2, 3, 4, 5, or 6. (To change the SCSI ID on your hard disk and other SCSI devices, refer to the device's documentation.)
- If you wish to use a single SCSI disk drive (instead of an array) as your boot device, we recommend that you set the SCSI ID for the device to zero. Most SCSI hard disks come from the factory preset to ID 0.
- The IDs for internal devices are usually set with jumpers; external devices are usually set with a switch on the back of the device.

Terminate the Ends

To ensure reliable communication on the SCSI bus, *terminators* must be installed (or enabled) on the devices at the physical ends of each SCSI channel. The devices between the physical ends of each SCSI channel must have the terminator removed (or disabled).

Terminating SCSI Channels on the AAA-131U2/133U2 RAID Card

Termination on the AAA-131U2/133U2 itself is controlled via the *SCSISelect*[™] utility. We recommend that you leave each channel on the AAA-131U2/133U2 set to its default setting of *Auto Mode* (the terminators are enabled or disabled according to the SCSI connectors in use). If you want to manually disable the AAA-131U2/133U2 termination setting, see Chapter A, *Using SCSISelect and Disk Utilities*.

Terminating SCSI Devices

On most internal SCSI devices the termination setting is controlled by setting a jumper or a switch, or by physically removing or installing a resistor module(s). On most external SCSI devices, termination is controlled by installing or removing a terminating plug (see Figures 2-14 and 2-15 on page 2-17). Read the device's documentation to determine how to enable or disable termination on your particular device.

The internal SCSI cables supplied in an Adaptec AAA-131U2/133U2 kit have a terminator attached. If you have this type of cable, disable termination on all internal SCSI devices connected to the cable. In general, we recommend that you terminate the internal cable instead of terminating the SCSI devices. If you are using an external array enclosure, we recommend that you terminate the SCSI backplane or install an active terminator on the second SCSI connector on the rear panel instead of terminating the individual SCSI devices. If you follow these recommendations, SCSI bus termination will not be affected when you remove or replace SCSI devices.



Note: We recommend that you enable termination power on all SCSI devices in the system so that termination power will still be supplied if you replace one or more drives on the SCSI bus.

Additional Hints for Connecting SCSI Devices

All SCSI Devices

- If you are booting your system from a single SCSI hard disk or bootable array, the boot order (or *virtual device order*) of the hard disk or array must be set to 0. (See *Making the Array Bootable* on page 3-8.)
- Enable termination power on all SCSI devices in the system so that if you remove a drive that is supplying termination power other devices will still provide it.
- Symptoms of SCSI cabling-related problems are drives not being recognized, drives locking up, or drives that deactivate.
- Use good-quality SCSI cabling, and minimize the stub lengths. Good-quality cables should not be limp when you pick them up. (See Appendix D, *Obtaining SCSI Cables* for additional information.)

Cable Lengths

- The total length of cabling (internal and external) on each SCSI channel may not exceed the maximum lengths listed in the following table:

Maximum Cable Lengths for each SCSI Channel

Maximum Cable Length	Data Transfer Rate	Maximum Devices Supported
12 m (29.4 ft)	Ultra2 (80 MBytes/sec) ¹	15
3 m (9.8 ft)	Fast SCSI (10 MBytes/sec)	7
3 m (9.8 ft)	Wide SCSI (20 MBytes/sec)	15
3 m (9.8 ft)	Ultra SCSI (40 MBytes/sec for 16-bit (Wide), 20 MBytes/sec for 8-bit)	4
1.5 m (4.9 ft)	Ultra SCSI (40 MBytes/sec for 16-bit (Wide), 20 MBytes/sec for 8-bit)	5-8 ²

¹ Mixing Fast/Ultra devices with Ultra2 devices on the same channel causes the channel to default to Ultra SCSI speeds and cable requirements.

² Ultra SCSI data transfer rates do not currently support more than eight devices.

Connecting SCSI Devices

The AAA-131U2/133U2 supports both internal and external SCSI devices. Each channel supports up to 15 SCSI devices—Ultra2 SCSI devices alone or a combination of Ultra2 and Ultra SCSI devices. Using Adaptec SpeedFlex™ technology, the 50-pin narrow connector on Channel A supports up to seven Fast/Narrow SCSI devices without affecting the performance of Ultra2 devices connected to Channel A internal and external Ultra2 connectors. Before connecting devices to the AAA-131U2/133U2, be sure to also review *Setting Up SCSI Devices* on page 2-6.



Note: We recommend keeping Ultra2 devices on separate channels from non-Ultra2 devices. Peak transfer rates on Ultra2 channels are 80 MBytes/sec. Connecting a non-Ultra2 device to an Ultra2 SCSI channel limits the entire channel to lower performance levels (up to 40 MBytes/sec).

If you have internal SCSI devices, mount each device in an available drive bay inside your computer, as shown in Figure 2-6. Refer to your computer and device documentation for instructions on installing devices inside your computer.

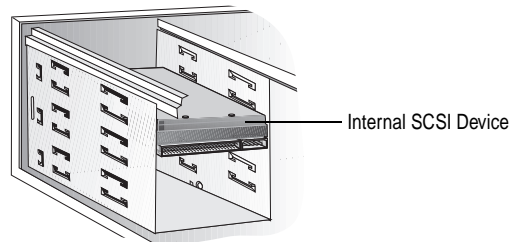


Figure 2-6. Internal SCSI Device Mounted in Drive Bay Inside Your Computer



Note: If you are installing your SCSI devices inside an external array enclosure, see *External SCSI Array Enclosures (Storage Subsystems)* on page 2-18.

Internal Ultra2 SCSI Connector (68-pin)

Use the internal Ultra2 SCSI connector to connect internal Ultra2 and Ultra SCSI devices. The AAA-131U2 has one internal Ultra2 SCSI connector (Channel A); and the AAA-133U2 has three (Channels A, B, and C).



Note: We recommend keeping Ultra2 devices on separate channels from non-Ultra2 devices. Peak transfer rates on Ultra2 channels are 80 MBytes/sec. Connecting a non-Ultra2 device to an Ultra2 SCSI channel limits the entire channel to lower performance levels (up to 40 MBytes/sec).

To connect internal Ultra2 SCSI devices, a 68-pin internal Ultra2 SCSI cable, similar to the one shown in Figure 2-7, is required. Follow these steps to connect your internal Ultra2 devices:

- 1 Locate the 68-pin internal Ultra2 SCSI cable.

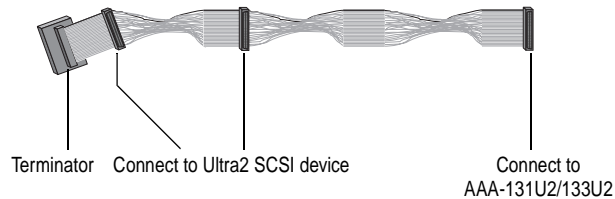


Figure 2-7. 68-pin Internal Ultra2 SCSI Cable

Installing the Hardware

- 2 Plug the long end of the cable to the Ultra2 SCSI connector (Channel A, B, or C) on the AAA-131U2/133U2.

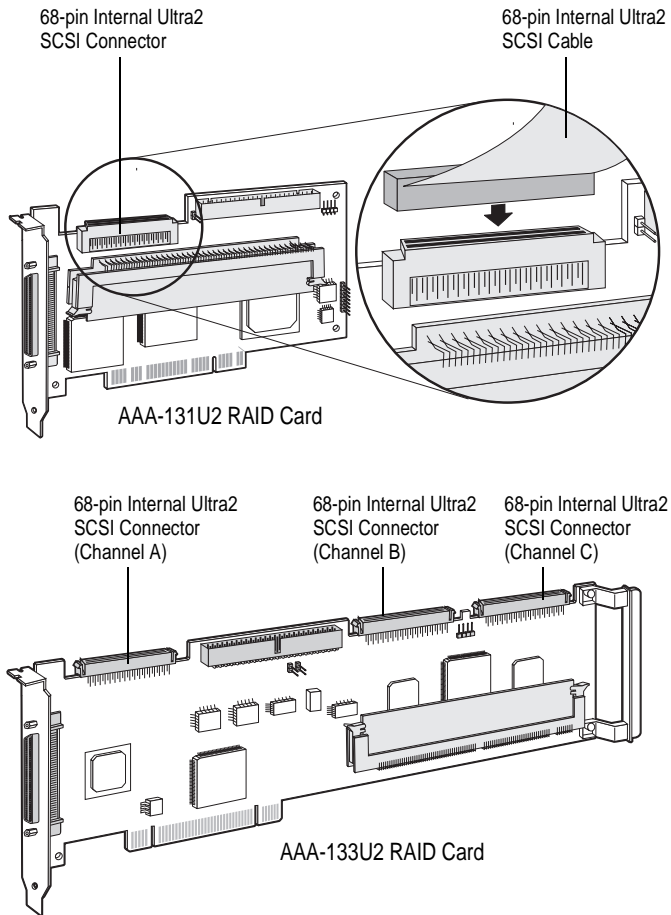


Figure 2-8. Connecting Cable to Internal Ultra2 SCSI Connector

- 3 Plug the remaining connectors on the cable to your internal devices.

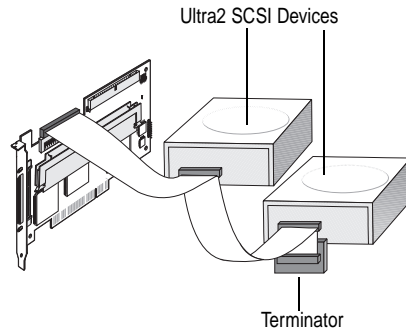


Figure 2-9. Connecting Ultra2 SCSI Devices



Note: If your 68-pin internal Ultra2 SCSI cable has a built-in terminator at the end of the cable (such as the cable provided in Adaptec AAA-131U2/133U2 kits), disable termination on all devices connected to the cable. If there is no built-in terminator, terminate the device connected to the end of the cable only and disable termination on all remaining devices connected to the cable.

Internal Ultra SCSI Connector (50-pin)

Use the internal Ultra SCSI connector on Channel A of the AAA-131U2/133U2 to connect internal Fast/Ultra Narrow SCSI devices that have a standard 50-pin connector.

To connect internal Fast/Ultra Narrow SCSI devices, a standard 50-pin internal SCSI cable, similar to the one shown in Figure 2-10, is required. Follow these steps to connect your standard internal Fast/Ultra Narrow devices:

- 1 Locate the 50-pin internal Ultra SCSI cable.

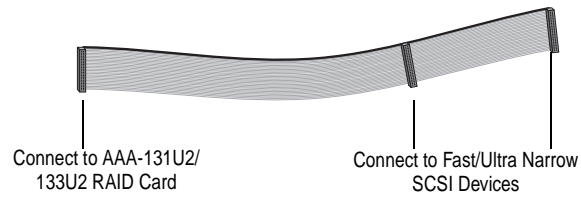


Figure 2-10. Connecting Fast/Wide Ultra SCSI Devices

- 2 Plug the long end of the cable to the 50-pin internal Ultra SCSI connector.

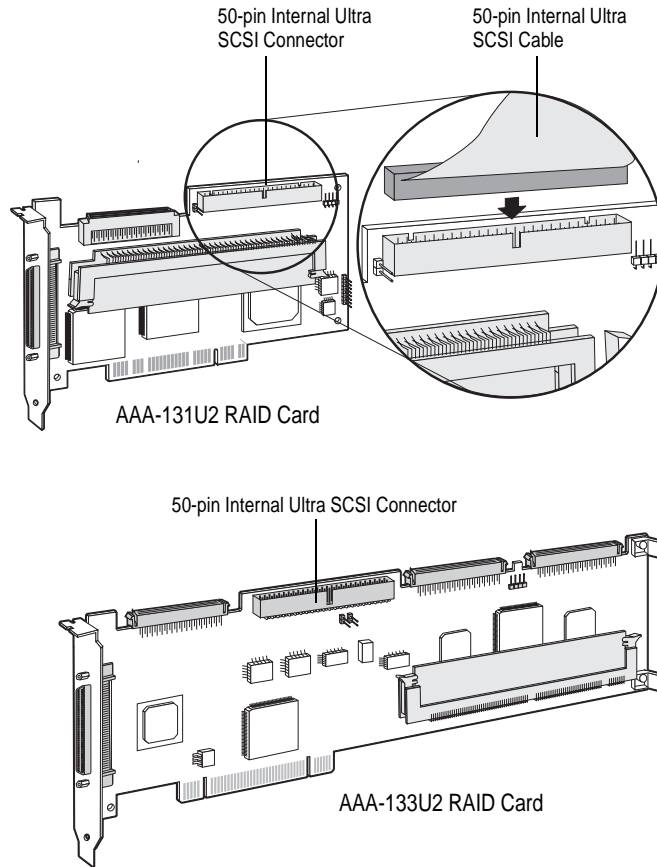


Figure 2-11. Connecting Cable to 50-pin Ultra SCSI Connector

Installing the Hardware

- 3 Plug the remaining connectors to your Fast/Ultra Narrow SCSI devices.

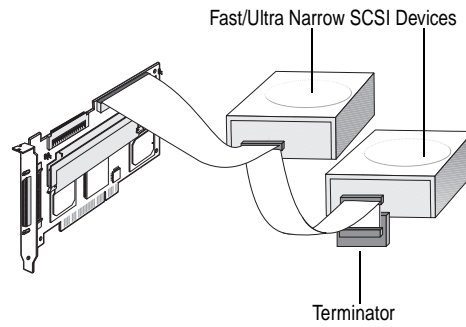


Figure 2-12. Connecting Fast/Ultra Narrow SCSI Devices



Note: If your 50-pin internal Ultra SCSI cable has a built-in terminator at the end of the cable, disable termination on all devices connected to the cable. If there is no built-in terminator, terminate the device connected to the end of the cable only and disable termination on all remaining devices connected to the cable.

External Ultra2 SCSI Connector (68-pin)

Use the external Ultra2 SCSI connector on Channel A of the AAA-131U2/133U2 to connect your external Ultra2 and Ultra SCSI devices. For each external device, you will need to obtain a 68-pin external SCSI cable. Follow these steps to connect your external devices:



Note: We recommend keeping Ultra2 devices on separate channels from non-Ultra2 devices. Peak transfer rates on Ultra2 channels are 80 MBytes/sec. Connecting a non-Ultra2 device to an Ultra2 SCSI channel limits the entire channel to lower performance levels (up to 40 MBytes/sec).

- 1 Connect one end of the external SCSI cable to the external Ultra2 connector on the AAA-131U2/133U2.

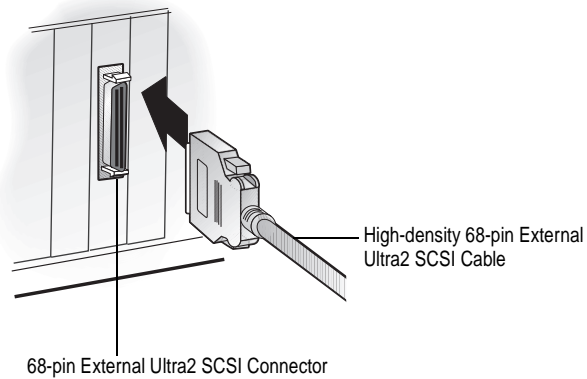


Figure 2-13. Attaching an External Cable to the External Ultra2 Connector

Installing the Hardware

- 2 Connect the other end of the external SCSI cable to a SCSI connector on the back of an external SCSI device. If you are installing only one external device, terminate the device and skip to Step 4.

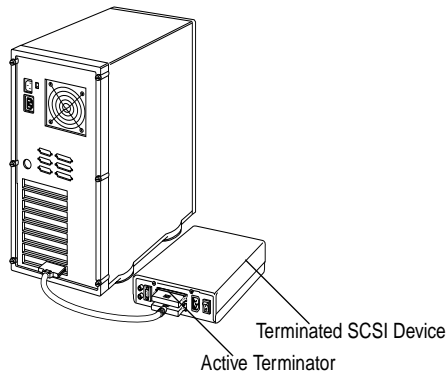


Figure 2-14. Attaching a Single External Device

- 3 Connect other external devices by connecting each device to the previous one until all devices are connected. The device at the end of the chain must be the only external device terminated.

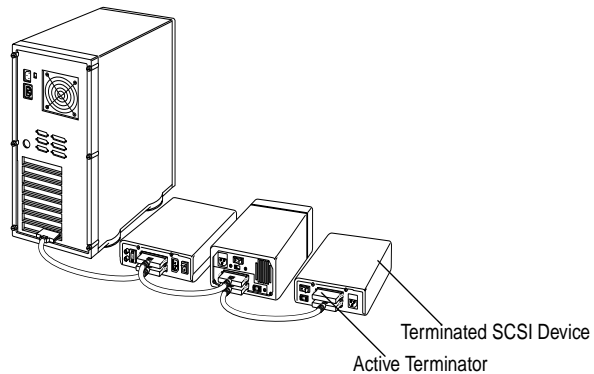


Figure 2-15. Attaching Multiple External Devices

- 4 Connect all power cables to the external devices.

External SCSI Array Enclosures (Storage Subsystems)

To help you conveniently manage your SCSI storage subsystems, a variety of external array enclosures are available from different manufacturers. Figure 2-16 shows a typical setup between the array enclosure and the system. To install your SCSI devices in these enclosures, refer to the enclosure's documentation. The following information is provided to help you properly connect your enclosure to the system: (See the Adaptec Web site at <http://www.adaptec.com/raid> for a list of popular array storage enclosures and disk drive manufacturers.)

- All rules for SCSI ID and termination must be followed when installing SCSI device in an array enclosure.
- Ideally, the array enclosure itself should provide termination capability, either on the SCSI backplane or with an attachable active terminator, as shown in Figure 2-16, and you should disable termination on all the drives in the enclosure. If you terminate the SCSI bus by enabling termination on a drive, you may run into problems if you have to replace that drive and you then forget to terminate the replacement drive.
- If the enclosure you are using for the array drives is not specifically designed as a array enclosure (such as a standard *tower* unit), be sure it has adequate cooling and ventilation.

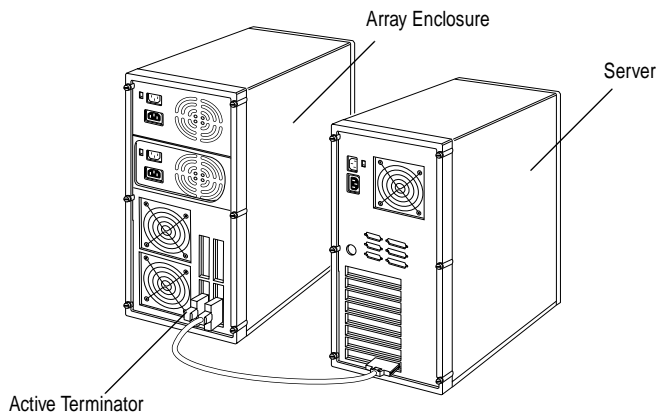


Figure 2-16. A Typical Array Enclosure Setup

Configuring the AAA-131U2/133U2

After connecting all devices, reinstall the computer cover and connect all power cables. Turn on the external SCSI devices first, and then turn on the computer. During BIOS initialization, the AAA-131U2/133U2 BIOS banner should appear on the screen, and each device connected to the adapter should be listed. If the BIOS banner does not appear, see Appendix B, *Troubleshooting*.

Before installing the drivers and software for the AAA-131U2/133U2 RAID card, you may want to configure SCSI options (e.g., ID, Parity Checking, and Termination) for the card and the SCSI devices connected to it by running the onboard *SCSISelect* utility. To do this press **F6** when the following prompt appears during BIOS initialization:

Press <F6> for SCSISelect (TM) Utility!

In most cases, it is not necessary to run the *SCSISelect* utility. Should you need to configure SCSI options, see Appendix A, *Using SCSISelect and Disk Utilities* for additional information.



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Creating an Array With the ARRAYCONFIG U2 Utility

In this Chapter

- *Creating an Array* 3-2
- *Making the Array Bootable* 3-8

This chapter explains how to use the **ARRAYCONFIG U2** Utility to create a bootable or non-bootable array on your system. If you want a bootable array on your system, you must use the **ARRAYCONFIG U2** utility to create the bootable array.



Note: **ARRAYCONFIG U2** runs from a self-booting diskette. If you are changing the configuration of a system that is already in use on a network, log all users off the system and shut it down in an orderly manner before you start **ARRAYCONFIG U2**.

Once the array is created, use Adaptec CI/O Management Software, which is included with the AAA-131U2/133U2, to create additional arrays (CI/O is required for array management in order to provide the proper level of fault tolerance and event notification). Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.



Caution: It is strongly recommended that you consistently and regularly backup your data to a backup media such as tape so you may recover your data due to failure events not protected by a fault tolerant array.

Creating an Array

Before creating the array, make sure the disks for the array are connected and installed in your system (or array enclosure). You can use **ARRAYCONFIG U2** in two ways:

- Select **Express Setup** if you want to create an array quickly and easily. **ARRAYCONFIG U2** asks you a few simple questions and uses your answers to create the kind of array that best meets your needs.
- Select **Custom Setup** if you want to perform advanced operations, such as creating an array with specified disks or adding spare disks to an array being created.

Creating an Array with Express Setup

Follow these steps to create an array with Express Setup. (You can probably complete the Express Setup process simply by following the instructions that appear on the screen.)



Note: To select **ARRAYCONFIG U2** menu options, type the *hot key*—the letter that appears in a different color. (The hot key letters are underlined in the following instructions). You can also press the **↑** and **↓** keys until the option is highlighted and then press **Enter**.

- 1 Insert the **ARRAYCONFIG U2** diskette in drive **A** and reboot the system. Wait for **ARRAYCONFIG U2** to start automatically.
- 2 Read the text that appears on the initial screens. Press any key to view the next screen, or press **Esc** to return to the previous screen.
- 3 Select **Express Setup** from the Setup Type Selection menu.

- 4 When the next screen appears, select the type of array you want to create:
 - Select **Optimized for Performance (RAID 0)** if you want the fastest possible data input and output from the new array. This kind of array does not have special data protection features, however. When prompted, type the number of disks you want in this array.
 - Select **Optimized for Data Protection (RAID 1)** if your main concern is to protect the files on the array from disk failure. This kind of array safeguards files in the array even if one of the array disks fails. (This kind of array has two disks by definition, so you will *not* be prompted to enter the number of disks you want in the array.)
 - Select **Performance and Data Protection with Parity (RAID 5)** if you want fast performance and data protection, and you have three or more disks available for the array. This kind of array contains redundant (parity) data distributed across all disks in the array. If any one disk fails, data can be reconstructed from the parity information. If a second disk fails before the array has been reconstructed, all data is lost. The actual usable data capacity of the array is equal to one less than the total number of disks. (One disk's worth of capacity is needed to hold the parity information.)
 - Select **Performance and Data Protection with Mirroring (RAID 0/1)** if you want fast performance and data protection, and have an even number of disks available for the array. This kind of array stripes and mirrors data on two or more pairs of disks. If one disk in a pair fails, data is available. The actual data capacity of the array equals half the total available disk space.
- 5 When the next menu appears, select the type of applications that you will run on your system. (Select **Others** if you are not sure what type of applications you will use.) **ARRAYCONFIG U2** will use your answer to create the best array configuration for your applications.

- 6 When the next menu appears, select a boot order for the new array.
 - Select **Disk Array will be Boot Drive** if you want your system to boot from the new array. If you selected **Optimized for Data Protection** in Step 4, booting from an array safeguards the information on your boot drive. (To boot from an array, you must also install the operating system software on the array, as described in later chapters.)
 - Select **Disk Array will not be a Boot Drive** if you do not want your system to boot from the new array.
- 7 When you have finished all these menu selections, wait while **ARRAYCONFIG U2** creates the array. This may take a long time, especially if the drives are large in capacity.

A message appears when the array has been created. An error message appears if fewer than two drives are available or if **ARRAYCONFIG U2** encounters some other problem. If this happens, install more drives or run **ARRAYCONFIG U2** again and use the **Custom Setup** option.
- 8 When the array is created, exit **ARRAYCONFIG U2**, remove the **ARRAYCONFIG U2** diskette, and reboot the system. After you reboot you can write data to the array.

Creating an Array with Custom Setup

Follow these instructions to create an array with **ARRAYCONFIG U2**:

- 1 Insert the **ARRAYCONFIG U2** diskette in drive A and reboot the system. Wait for **ARRAYCONFIG U2** to start automatically.
- 2 Read the text that appears on the initial screens. Press any key to view the next screen, or press **ESC** to return to the previous screen.
- 3 Select **Custom Setup** from the Setup Type Selection Menu.
- 4 Select **Disk Array Operations** from the Main Menu.
- 5 Select **Create New Array** from the Disk Array Operations menu.

- 6 Type an array name and press **Enter**. The name can be up to 15 characters long and can include spaces and any other printable characters.
- 7 Select an array type. Your options are
 - **RAID 0:** Data is striped across the disks in a RAID 0 array, allowing for faster I/O performance than a single disk. RAID 0 arrays do not store redundant data; if any disk in the array fails, all data is lost.
 - **RAID 1:** Data is mirrored on one pair of disks. If one disk fails, data is available. The actual data capacity of the array equals half the available disk space.
 - **RAID 5:** The array contains redundant (parity) data distributed across all disks in the array. If any one disk fails, data can be reconstructed from the parity information. If a second disk fails before the array has been reconstructed, all data is lost. The actual usable data capacity of the array is equal to one less than the total number of disks. (One disk's worth of capacity is needed to hold the parity information.)
 - **RAID 0/1:** Data is striped and mirrored on two or more pairs of disks. If one disk in a pair fails, data is available. The actual data capacity of the array equals half the total available disk space.

See the *Adaptec CI/O Management Software User's Guide* for more information on selecting a RAID level.

- 8 Select the number of drives you want in the array and press **Enter**. This number should not include *sparcs* (drives that automatically replace failed array drives). The number of drives available for assignment is listed on the screen.



Note: This step does not apply to RAID 1 arrays, which have two drives by definition.

- 9 Select array members. When the next screen appears, press **Tab** to highlight a channel (if more than one SCSI channel is available). Select drives for the array by pressing the **↑** and **↓** keys until the drive name is highlighted, and then press **Ins** or **Enter**. The names of selected drives appear in the Adaptec Array # box.

To select drives on a different channel press **Tab** to select another channel and then select the drives from the SCSI IDs on the Channel menu. To deselect the drive you most recently added, press **Del**.



Caution: A warning appears if you select a disk that has partitions. *Do not* select a partitioned disk if it contains data you want to keep, because any existing data will be erased when the disk becomes part of an array.

When you have selected the number of drives you specified in Step 8, the next screen appears automatically. If you are creating a RAID 1, RAID 0/1, or RAID 5 array, and if there are any unassigned drives, the screen prompts you to define dedicated spare drives for the array. (We recommend that you use a *spare pool* instead of dedicated spares.)



Note: A spare must have at least the capacity of the smallest drive in the array.

- 10 Select spares. If you do not want a spare, type **n** and continue with Step 12. If you want to select dedicated spares, follow these steps:
 - a At the prompt, type **y**.
 - b At the next prompt, type **1** or **2**.
 - c Select one or two spares, using the same method you used to select disks for the array.

- 11 Initialize array. When the Initialize Mode menu appears, select **Initialize Array to Zero**. A graph on the screen shows the progress of this operation.



Caution: If the drives contain data, all the data is lost when you initialize the array.

Select **Low-Level Format** only if the drives were previously formatted on another computer or if you think they may have surface defects. Low-level formatting takes a long time for large capacity disk drives.

- 12 Select array block size. When the menu of block sizes appears, select a block size. (This menu does not appear if the array is a mirrored array with only two drives.)

The allowable block sizes are 8, 16, 32, 64 (the default), and 128 KBytes. The default block size gives the best overall performance in most environments.

- 13 Wait for initialization to complete. When you see the message Initialization of [array name] is complete, press any key to return to the Disk Array Operations menu.
- 14 Create additional arrays. You may use **ARRAYCONFIG U2** to create additional arrays (if disks are available), however we recommend using Adaptec CI/O Management Software to create additional arrays. (CI/O is required for array management in order to provide the proper level of fault tolerance and event notification.) See the *Adaptec CI/O Management Software User's Guide* for more information.
- 15 When all arrays are created, exit **ARRAYCONFIG U2**, remove the **ARRAYCONFIG U2** diskette, and reboot the system. After you reboot you can write data to the arrays. At this point, you can make the array bootable as described in the next section.

Making the Array Bootable

You can make the array bootable so that the system boots from the array instead of from a stand-alone (single) disk.

To make the array bootable, the array must be set to #0 in the boot order. Follow these steps if you want the system to boot from the newly created array:



Note: The system will always attempt to boot from any installed non-SCSI hard disks (for example, any IDE hard disk at drive C). You must disable or remove all non-SCSI hard disks if you want the system to boot from a SCSI hard disk or array.

- 1 Insert the **ARRAYCONFIG U2** disk in drive A and reboot the system. Wait for **ARRAYCONFIG U2** to start automatically.
- 2 Read the text that appears on the initial screens. Press any key to view the next screen, or press **ESC** to return to the previous screen.
- 3 Select **Custom Setup** from the Setup Type Selection Menu.
- 4 Select **Display Boot Order** from the Main Menu. The Boot Order for Singles and Arrays window appears.
- 5 If the newly created array is at the top of the list, preceded by the words Unit 0, no changes are necessary; if it has some other unit number, highlight the array name and press **Enter**.
- 6 Use the arrow keys to move the selected array to the top of the list. Then press **Enter**. If you want to change the boot order of another array, select it, move it with the arrow keys, and press **Enter** again.
- 7 Press **Esc** to return to the Main Menu.
- 8 Exit **ARRAYCONFIG U2**, remove the disk from drive A, and reboot the system.

- 9 Prepare the array as you normally would prepare a boot disk drive for your operating system. See either Chapter 4, *Installing the Software Driver for Windows NT*, Chapter 5, *Installing the Software Driver for Novell NetWare*, or Chapter 6, *Installing the Software Driver for SCO UnixWare*.



Note: You cannot use this procedure to change the boot order of a SCSI disk drive that is not part of an array. If you want to do this, create a one-disk RAID 0 array from the disk. (Data is not actually striped on a one-disk array.)



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Installing the Software Driver for Windows NT

In this Chapter

- ▶ *Installing the Array1000U2 Driver for Windows NT* 4-2
- ▶ *Windows NT Installation and Configuration Notes* 4-5

This chapter explains how to install the AAA-131U2/133U2 software driver (*cda1000.sys*) for Windows NT (Windows NT 4.0 Server and Workstation). Before installing the driver, make sure you have completed the following:

- Installed the AAA-131U2/133U2 in your system. (See Chapter 2)
- Created the first array using the **ARRAYCONFIG U2** utility, if you plan to boot from an array. (See Chapter 3)

Once Windows NT and the driver are installed, install Adaptec CI/O Management Software and use it to add, delete, and manage arrays from the server console (CI/O is required for array management in order to provide the proper level of fault tolerance and event notification). Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.

Installing the Array1000U2 Driver for Windows NT

To begin driver installation, see either *Installing the Driver When Installing Windows NT* on page 4-2, or *Installing the Driver When Windows NT is Already Installed* on page 4-4.



Note: We recommend that you install your Windows NT operating system on a fault-tolerant array (RAID 5, 1, or 0/1) to take advantage of the redundancy and performance features of the array.

Installing the Driver When Installing Windows NT

To install the *cda1000.sys* driver when you are installing Windows NT, follow these steps:



Note: During Windows NT installation, if your system configuration has multiple arrays and/or single drives, Windows NT limits the size of the system partition you can create to 1 GByte. To work around this 1 GByte limitation, see *Windows NT 1 GByte Partition Limitation* on page 4-5.

- 1 Start your system with the Windows NT Boot disk in the floppy disk drive or the Windows NT Boot CD-ROM in the CD-ROM drive.



Note: When using a SCSI CD-ROM drive to install Windows NT from the bootable CD-ROM, make sure BIOS Support for Bootable CD-ROM is *enabled* in *SCSISelect*.

Installing the Software Driver for Windows NT

- 2** *Windows NT Boot disk installation:* When prompted, insert disk #2 in your floppy drive. After a few moments you will see a blue screen. To setup Windows NT now, press **Enter** and continue with Step 3 below.

Windows NT Boot CD-ROM installation: When the following message appears onscreen, press the **F6** key and skip to Step 4 below.

Setup is inspecting your computer system's hardware...

- 3** Press **S** to skip autodetection of your SCSI host adapter.
- 4** Press **S** again to specify an additional device.
- 5** Press **Enter** to select **Others**; insert the Adaptec Array1000U2 Family Manager Set driver disk in your floppy disk drive and press **Enter**.
- 6** The screen displays the adapter drivers supported on the disk. Select the **Adaptec Array1000U2 Family Adapter** driver and press **Enter**.
- 7** If you want to add drivers (other than for the AAA-131U2/133U2), press **S** and repeat Step 5 for each additional adapter and insert the appropriate disk provided by the hardware manufacturer.
- 8** Press **Enter** to continue with the Windows NT operating system setup. Follow the instructions onscreen and in the Windows NT documentation to complete the installation.
- 9** When Windows NT installation is complete, install Adaptec CI/O Management Software. Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.

Installing the Driver When Windows NT is Already Installed

To update or install the *cda1000.sys* driver if Windows NT is already installed, follow these steps:

- 1 Start Windows NT.
- 2 Click the **Start** button on the Windows NT task bar, and then point to Settings.
- 3 Click the **Control Panel**.
- 4 Double-click the **SCSI Adapters** icon.
- 5 Click the **Drivers** tab, and then click the **Add** button.
- 6 In the Install Driver window, click the **Have Disk** button.
- 7 Insert the Adaptec Array1000U2 Family Manager Set driver disk in your floppy disk drive and press **Enter**. Enter the following path to the installation files and then click **OK**.

a:\winnt

The Adaptec Array1000U2 Family Adapter driver is highlighted by default.
- 8 In the Install Driver window, Click **OK**.
- 9 You must restart your computer for the changes to take effect. Click **Yes** to restart your computer.
- 10 When driver installation is complete, install Adaptec CI/O Management Software. Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.

Windows NT Installation and Configuration Notes

Windows NT 1 GByte Partition Limitation

During Windows NT installation, if your system configuration has multiple arrays and/or single drives, Windows NT limits the size of the system partition you can create to 1 GByte. To work around this 1 GByte limitation, try the following:

- During Windows NT installation, create the 1 GByte partition (do not finish setup); reboot the system and then delete the partition. This allows Windows NT Setup to create a system partition larger than 1 GByte, but limited to 4 GBytes or 1024 cylinders of data, whichever is less.

or

- Using MS-DOS, create a partition using fdisk. During Windows NT installation, delete the partition created with MS-DOS. This allows Windows NT Setup to create a system partition larger than 1 GByte, but limited to 4 GBytes or 1024 cylinders of data, whichever is less.

If Windows NT Setup Hangs

During Windows NT installation, the system may hang while the Windows NT Setup floppy disk is being used to copy the SCSI disk device driver. A workaround is to boot from a DOS boot disk, create a DOS partition on the array using fdisk, and then install Windows NT on the array.

Windows NT Disk Administrator

When creating a new array on a system running under Windows NT, the array is not listed as “usable” in the NT Disk Administrator until it is initialized. This is normal Windows NT functionality.

Boot Order In Windows NT vs. ARRAYCONFIG U2

During Windows NT installation, Windows NT does not show the devices in the boot order. Instead, it shows the arrays with the lower SCSI ID (on lower channel) first. To minimize confusion during Windows NT installation, try one of the following:

- Disconnect all devices other than members of the boot array, so that only one logical device is present in the Windows NT installation. Reconnect all other devices after Windows NT is successfully installed.
- Configure the boot array in the **ARRAYCONFIG U2** utility so that the lowest SCSI ID on the lowest channel is a member of the boot array.

Microsoft BackOffice Small Business Server

Microsoft BackOffice Small Business Server features a non-bootable installation CD and setup boot disks which do not ask for a third-party driver disk. (Manufacturer-supplied hardware support disks.) To have the installation program prompt you for the third-party driver disk, do the following:

- 1 Copy the *winnt.sif* file from the *1386* directory on the BackOffice Small Business Server CD to Disk 2 of the setup boot disks (overwrite existing file).
- 2 Boot the system using the setup boot disks. Press <F6> while the message "Setup is inspecting your computer system's hardware..." is displayed.
- 3 You will be prompted for the driver disk during the installation process.



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Installing the Software Driver for Novell NetWare

In this Chapter

- ▶ *Installing the Array1000U2 Driver for Novell NetWare* 5-2
- ▶ *Netware Installation and Configuration Notes* 5-8

This chapter explains how to install the AAA-131U2/133U2 software driver (*cda1000h.ham*) for Novell NetWare (NetWare 4.11, 4.2, and 5.0). Before installing the driver, make sure you have completed the following:

- Installed the AAA-131U2/133U2 in your system (See Chapter 2)
- Created the first array using the **ARRAYCONFIG U2** utility, if you plan to boot from an array. (See Chapter 3)

Once NetWare and the driver are installed, install Adaptec CI/O Management Software from the server console (CI/O is required for array management in order to provide the proper level of fault tolerance and event notification). Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.

Installing the Array1000U2 Driver for Novell NetWare

To begin driver installation, see either *Installing the Driver When Installing NetWare* on page 5-2, or *Installing the Driver When NetWare is Already Installed* on page 5-7.



Note: We recommend that you install your Novell NetWare operating system on a fault-tolerant array (RAID 5, 1, or 0/1) to take advantage of the redundancy and performance features of the array.

Installing the Driver When Installing NetWare

To install the *cda1000h.ham* driver when you are installing NetWare, follow the instructions below for the version of NetWare you are installing.



Note: The instructions below assume your CD-ROM is connected to the AAA-131U2/133U2. If your CD-ROM is not connected to the AAA-131U2/133U2 (for example, connected to an IDE controller), you will need to include command lines in the *config.sys* and *autoexec.bat* files similar to those described below. Refer to the documentation for the adapter the CD-ROM is connected for the appropriate command lines.

NetWare 4.11 and 4.2

Follow these instructions only if you are installing NetWare 4.11 or 4.2 for the first time:

- 1 Create a DOS partition and install DOS on your system.
- 2 Copy the *aspi8u2.sys* and *aspicd.sys* files from the `\dos` directory on the Adaptec Array1000U2 Family Manager Set driver disk to a directory (e.g., `c:\scsi`) on your hard disk.

Installing the Software Driver for Novell NetWare

- 3 Edit the *config.sys* file to include command lines for *aspi8u2.sys* and *aspicd.sys*. The following sample command lines for the *config.sys* file are appropriate for most systems:

```
device=c:\scsi\aspi8u2.sys /d
device=c:\scsi\aspicd.sys /d:aspicd0
```



Note: For non-Ultra2 systems, use *aspi8dos.sys* instead of *aspi8u2.sys* in the command line (for example, `device=c:\scsi\aspi8dos.sys /d`).

- 4 Edit the *autoexec.bat* file to include a command line for *mscdex.exe* (the *mscdex.exe* file is included with MS-DOS 6.x and above). The following sample command lines for the *autoexec.bat* file are appropriate for most systems:

```
c:\dos\mscdex.exe /d:aspicd0 /M:12
```

(This assigns the CD-ROM the next available drive letter, typically *D* if there is only one DOS drive.)
- 5 Reboot the system to the DOS partition.
- 6 Insert the NetWare CD in your CD-ROM drive.
- 7 Go to the CD-ROM drive.
- 8 Type **Install** and press **Enter**.
- 9 Follow the procedures in your NetWare documentation for installing a new server.
- 10 If prompted to load an SMP Module, select **No**. (The SMP Module can be installed once NetWare is up and running.)
- 11 When a screen appears that asks you to select a disk driver, press **Enter**.
- 12 Press **Insert** to install an unlisted driver.
- 13 Insert the Adaptec Array1000U2 Family Manager Set driver disk into your floppy disk drive.
- 14 Press **F3** and specify the path to the *cda1000h.ham* driver. For NetWare 4.1, the driver is located in `\netware\lv4_1x` on the disk. For NetWare 4.2, the driver is located in `\netware`.

- 15 Select *cda1000h.ham* and press **Enter**.
- 16 When prompted to save existing file *c:\nwserver\nbi.nlm*, select **No**.
- 17 When prompted to save existing file *c:\nwserver\nwpaoload.nlm*, select **No**.
- 18 When prompted to save existing file *c:\nwserver\nwpa.nlm*, select **No**.
- 19 When prompted, select **Select/Modify driver parameters**.
- 20 Enter a valid slot number, then press **Enter** to save field data.
- 21 Press **F10** to save parameter settings.
- 22 When prompted, select **Save parameters and continue**.
- 23 Select **No** when prompted to select an additional disk driver.
- 24 Select **Continue Installation**.
- 25 When NetWare installation is complete, install Adaptec CI/O Management Software from the server console. Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.



Note: To load the driver automatically at server bootup, make sure the *startup.ncf* file includes the load command line for the *cda1000h.ham* driver. (If you also have an Adaptec host adapter that uses the Adaptec *aic78xx.dsk* driver, make sure the driver loads after the *cda1000h.ham* driver.)



Note: Older versions of the *aic78xx.dsk* driver (before v1.30) are compatible with *cda1000h.ham* as long as the AAA-131U2/133U2 PCI slot is not specified on the command line (e.g., load *aic7870.dsk slot=z*). If there is an AIC-78xx based card (e.g., AHA™-2940) in the system, *z* must point to that card's slot number and not to the AAA-131U2/133U2 slot number. If loaded without command line parameters, NetWare lists valid slot numbers. The AAA-131U2/133U2 will be listed in the parameter list; however, *do not* select it.

NetWare 5.0

Follow these instructions only if you are installing NetWare 5.0 for the first time:

- 1 Create a DOS partition and install DOS on your.
- 2 Copy the *aspi8u2.sys* and *aspicd.sys* files from the *\dos* directory on the Adaptec Array1000U2 Family Manager Set driver disk to a directory (e.g., *c:\scsi*) on your hard disk.
- 3 When using a SCSI CD-ROM, edit the *config.sys* file to include command lines for *aspi8u2.sys* and *aspicd.sys*. The following sample command lines for the *config.sys* file are appropriate for most systems:

```
device=c:\scsi\aspi8u2.sys /d
device=c:\scsi\aspicd.sys /d:aspicd0
```



Note: For non-Ultra2 systems, use *aspi8dos.sys* instead of *aspi8u2.sys* in the command line (for example, *device=c:\scsi\aspi8dos.sys /d*).

- 4 Edit the *autoexec.bat* file to include a command line for *mscdex.exe* (the *mscdex.exe* file is included with MS-DOS 6.x and above). The following sample command lines for the *autoexec.bat* file are appropriate for most systems:

```
c:\dos\mscdex.exe /d:aspicd0 /M:12
```

(This assigns the CD-ROM the next available drive letter, typically *D* if there is only one DOS drive.)

- 5 Reboot the system to the DOS partition.
- 6 Insert the NetWare 5.0 CD in your CD-ROM drive.
- 7 Go to the CD-ROM drive.
- 8 Type **Install** and press **Enter**.
- 9 Follow the procedures in your NetWare documentation for installing a new server.
- 10 From the Welcome to the NetWare server installation screen, press **F2** for Advanced Settings; change Load server at reboot: from Yes to No and continue with the installation.
- 11 When NetWare detects device drivers for the server, you are prompted to Add, Change, or Delete drivers as needed:
 - Delete any Multiple Processor Support module that is detected (for example, MPS14).
 - Delete the Storage Adapters drivers for adapters that are not present in your system.
- 12 Insert the Adaptec Array1000U2 Family Manager Set driver disk in your floppy disk drive.
- 13 Select **Storage Adapters** and press **Enter**.
- 14 To add Storage Adapter driver, press **Insert**.
- 15 Press **Insert** again to add an unlisted driver.
- 16 Press **F3** to specify a different path. Enter the following path:

```
a:\netware
```
- 17 Select **Return to Driver Summary** and press **Enter**. CDA1000 is listed as your storage adapter.

Installing the Software Driver for Novell NetWare

- 18 Remove the disk from your floppy disk drive.
- 19 Select **Continue**.
- 20 Follow the procedures in your NetWare documentation to complete the installation.
- 21 When installation is complete, restart the system.
- 22 At the DOS prompt (c:\), change to the *c:\nwserver* directory and enter
server
- 23 At this point, install Adaptec CI/O Management Software from the server console. Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.

Installing the Driver When NetWare is Already Installed

To update or install the *cda1000h.ham* driver if NetWare is already installed, follow the instructions below for the version of NetWare you have installed.

NetWare 4.11 and 4.2

- 1 Copy the *cda1000h.ham* file from the Adaptec Array1000U2 Family Manager Set driver disk into the server's startup directory (e.g., *c:\nwserver*) on your hard disk.



Note: For NetWare 4.11, the *cda1000h.ham* file is in *a:\netware\lv4_1x*. For NetWare 4.2, the *cda1000h.ham* file is in *a:\netware*.

- 2 If necessary, modify the load command line in the *startup.ncf* so that the proper path to the driver is specified. The correct syntax to load the *cda1000h.ham* driver is

```
load [pathname]cda1000
```

NetWare 5.0

- 1 Copy the *cda1000h.ham* file from the Adaptec Array1000U2 Family Manager Set driver disk into the server's startup directory (e.g., *c:\nwserver*) on your hard disk.



Note: For NetWare 5.0, the *cda1000h.ham* file is in *a:\netware*.

- 2 If necessary, modify the load command line in the *startup.ncf* so that the proper path to the driver is specified. The correct syntax to load the *cda1000h.ham* driver is

```
load [pathname]cda1000
```

Netware Installation and Configuration Notes

Larger Than 4 GByte Arrays

When installing NetWare on an array 4 GBytes or larger, the Install program erroneously reports that the DOS partition is too small. It, however, does allow you to continue installation. Ignore this error message.

Unloading *cda1000h.ham*

When running Adaptec CI/O Management Software, do not unload *cda1000h.ham* while *iomgr.nlm* is still loaded. Unstable behavior may result.



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Installing the Software Driver for SCO UnixWare

In this Chapter

- *Installing the Array1000U2 Driver for UnixWare* 6-2

This chapter explains how to install the AAA-131U2/133U2 software driver (*cda1000*) for SCO UnixWare 7.0. Before installing the driver, make sure you have completed the following:

- Installed the AAA-131U2/133U2 in your system. (See Chapter 2)
- Created the first array using the **ARRAYCONFIG U2** utility, if you plan to boot from an array. (See Chapter 3)

Once UnixWare and the driver are installed, install Adaptec CI/O Management Software from the server's X Window (CI/O is required for array management in order to provide the proper level of fault tolerance and event notification). Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.

Installing the Array1000U2 Driver for UnixWare

To begin driver installation, see either *Installing the Driver When Installing SCO UnixWare* below, or *Installing the Driver When SCO UnixWare is Already Installed* on page 6-3.

Installing the Driver When Installing SCO UnixWare

To install the *cda1000* driver at the same time you install SCO UnixWare, follow the instructions below:

- 1 Insert the SCO UnixWare Installation disk in the floppy boot drive. Reboot your computer.
Wait for the first SCO UnixWare installation screen and prompt to appear, then follow the onscreen instructions.
- 2 When prompted to Install HBA Diskette, first remove the Installation disk, then insert the Adaptec Array1000U2 Family Manager Set driver disk for SCO UnixWare into your floppy disk drive.
- 3 Select **Install HBA Diskette** and press **F10**.
- 4 If you have additional HBA disks, insert the next HBA disk, select **Install HBA Diskette** and press **F10**.
If all of your HBA disks have been installed, select **Proceed With Installation** and press **F10**. (Do not reinstall the *cda1000* HBA disk.)
- 5 If necessary, enter the DCU (Device Configuration Utility) to view/change the SCO UnixWare device driver configuration data; otherwise select **Continue With Installation**.
- 6 When prompted, reinsert the HBA disk (Adaptec Array1000U2 Family Manager Set driver disk for SCO UnixWare) that you inserted in Step 3 above, and press **Enter**.
- 7 Follow the onscreen instructions to complete the installation.



Note: If your installation fails, do not attempt to use the update installation `pkgadd` procedure to fix the installation. Follow the instructions in the SCO UnixWare documentation and in this document to retry the installation.

Installing the Software Driver for SCO UnixWare

- 8 When SCO UnixWare installation is complete, install Adaptec CI/O Management Software. Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.

Installing the Driver When SCO UnixWare is Already Installed

To update or install the *cda1000* driver on a system where SCO UnixWare is already installed, follow the instructions below:

- 1 At the system prompt, type the following and press **Enter**:

```
pkgadd -d diskette1
```
- 2 Follow the instructions onscreen to insert the HBA disk (the Adaptec Array1000U2 Family Manager Set driver disk for SCO UnixWare) into your floppy disk drive and press **Enter**.
- 3 When prompted to select packages, select all packages (press **Return**). The package is loaded into your SCO UnixWare operating system.
- 4 When the package has loaded, you may be prompted to install the disk again. Do not reinsert the HBA disk (Adaptec Array1000U2 Family Manager Set driver disk for SCO UnixWare). Instead, type q (quit) and press **Enter**.
- 5 Shutdown or reboot the system.
- 6 When prompted to rebuild the kernel, select **go**.
- 7 When driver installation is complete, install Adaptec CI/O Management Software. Refer to the *Adaptec CI/O Management Software User's Guide* for instructions on installing and using the software.



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Using *SCSISelect* and Disk Utilities

In this Appendix

- *SCSISelect Default Settings* A-2
- *Starting the SCSISelect Utility* A-3
- *Using the SCSI Disk Utilities* A-3
- *SCSISelect Settings* A-5

The AAA-131U2/133U2 has the onboard *SCSISelect* configuration utility, which allows you to change SCSI options (e.g., ID, Parity Checking, and Termination) without opening the computer chassis or handling the card. This appendix describes the default settings, explains when you should change them, and gives instructions for doing so.

SCSISelect also includes SCSI disk utilities to list the SCSI IDs of devices connected to the AAA-131U2/133U2, format SCSI disk drives, and check SCSI disk drives for defects. Instructions for using these utilities are included.

SCSISelect Default Settings

The SCSISelect default settings for the AAA-131U2/133U2, listed in the table below, are appropriate for most systems. If you want to view and/or change the current settings, or if you would like to format or verify a disk, see *Starting the SCSISelect Utility* on page A-3. Detailed descriptions of each setting begin on page A-5.

SCSISelect Option	Available Settings	Default Settings
SCSI Bus Interface Definitions		
Host Adapter SCSI ID	0-15	7
SCSI Parity Checking	Enabled/Disabled	Enabled
Host Adapter SCSI Termination		
Channel A:		
ULTRA2-LVD/SE Connector	Auto/Enable/Disable	Auto
Fast/Ultra-SE Connector	Enable/Disable	Enable
Channels B & C: (AAA-133U2 only)	Enable/Disable	Enable
SCSI Device Configuration		
Initiate Sync Negotiation	Yes/No	Yes (Enabled)
Maximum Synchronous Transfer Rate	80.0 ¹ , 53.3 ¹ , 40.0, 32.0, 26.6, 20.0, 16.0, 13.4, 10.0	80.0 ²
Enable Disconnection	Yes/No	Yes (Enabled)
Initiate Wide Negotiation	Yes/No	Yes (Enabled)
Send Start Unit Command	Yes/No	Yes (Enabled)
Include In BIOS Scan	Yes/No	Yes (Enabled)
Additional Options		
Array1000U2 BIOS	Enabled/Disabled	Enabled
BIOS Support for Bootable CD-ROM	Enabled/Disabled	Enabled

¹ If Initiate Wide Negotiation is set to No, this setting is not available.

² If Initiate Wide Negotiation is set to No, the default setting is 40.0.

Starting the SCSISelect Utility

To start SCSISelect, press the **F6** key when the following prompt appears when you turn on or reboot your system:

Press <F6> for SCSISelect (TM) Utility!

The menu that appears displays the options Configure/View Host Adapter Settings and SCSI Disk Utilities, as shown in Figure A-1.

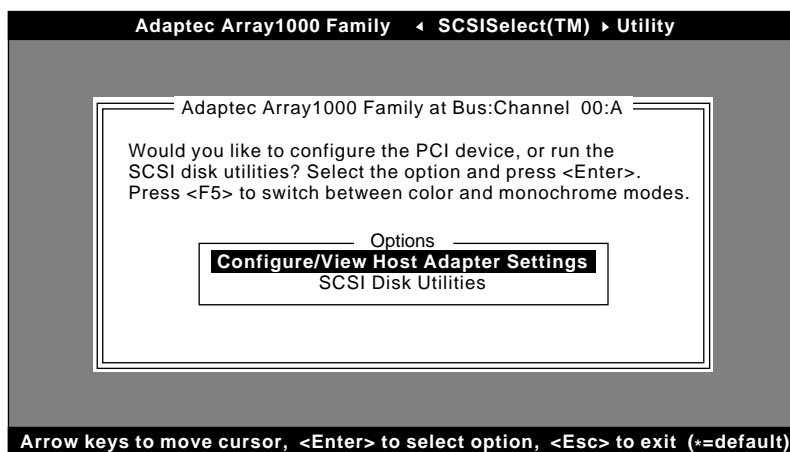


Figure A-1. SCSISelect Menu

Using SCSISelect Menus

To select a SCSISelect menu option, move the cursor to the option with the **↑** and **↓** keys, then press **Enter**. In some cases, selecting an option displays another menu. You can return to the previous menu at any time by pressing **Esc**.

To restore the original SCSISelect default values, press **F6** from the Configure/View Host Adapter Settings screen. To toggle the display between color and monochrome modes, press **F5** from the main SCSISelect screen (this feature does not work on some monitors).

Exiting SCSISelect

To exit SCSISelect, press **Esc** until a message prompts you to exit (if you changed any host adapter settings, you are prompted to save the changes before you exit). Select **Yes** to exit, then press any key to reboot the system. Any changes you made in SCSISelect take effect after the system boots.

Using the SCSI Disk Utilities

To access the SCSI disk utilities, select the **SCSI Disk Utilities** option from the menu that appears after starting *SCSISelect*. Once the option is selected, *SCSISelect* immediately scans the SCSI bus (to determine the devices installed) and displays a list of all SCSI IDs and the devices assigned to each ID.

When you select a specific ID and device, a small menu appears, displaying the options **Format Disk** and **Verify Disk Media**.

- **Format Disk**—This utility allows you to perform a low-level format on a hard disk. Each hard disk must be low-level formatted before you can use your operating system's partitioning and file preparation utilities, such as MS-DOS Fdisk and Format.

Most SCSI disk devices are preformatted at the factory and do not need to be formatted again. The Adaptec Format Disk utility is compatible with the vast majority of SCSI disk drives.



Caution: A low-level format destroys all data on the drive. Be sure to back up your data before performing this operation. You *cannot* abort a low-level format once it is started.

- **Verify Disk Media**—This utility allows you to scan the media of a hard disk for defects. If the utility finds bad blocks on the media, it prompts you to reassign them; if you select *yes*, those blocks are reassigned to new blocks and will be available for use. You can press **Esc** at any time to abort the utility.

SCSISelect Settings

SCSI Bus Interface Definitions

The following settings are the SCSISelect settings most likely to require any modification:

- **Host Adapter SCSI ID**— Sets the SCSI ID for the AAA-131U2/133U2. The AAA-131U2/133U2 is set to SCSI ID 7, which gives it the highest priority on the SCSI bus. We recommend you do not change this setting.
- **SCSI Parity Checking**—When set to Enabled, verifies the accuracy of data transfer on the SCSI bus. Leave this setting Enabled unless any SCSI device connected to the AAA-131U2/133U2 does not support SCSI parity.
- **Host Adapter SCSI Termination**—Sets the termination setting for each SCSI channel. We recommend that you leave the ULTRA2-LVD/SE connector setting for Channel A at Auto. For the remaining termination settings, leave them set to Enable unless the AAA-131U2/133U2 does not form one of the physical endpoints of the channel (the AAA-131U2/133U2 is not connected at the end of the internal cable).

SCSI Device Configuration

To configure settings for a specific SCSI device, you must know the SCSI ID assigned to that device (see *Using the SCSI Disk Utilities* on page A-4.)

- **Initiate Sync Negotiation**—When set to Yes, synchronous data transfer negotiation (Sync Negotiation) between the device and SCSI channel is initiated by the SCSI channel. Leave this setting set to Yes unless any SCSI device connected to the channel does not support Sync Negotiation.
- **Maximum Sync Transfer Rate**—Determines the maximum synchronous data transfer rate that the SCSI channel supports. For most SCSI devices, use the maximum rate supported.

- **Enable Disconnection**—When set to Yes, allows the SCSI device to disconnect from the SCSI bus (sometimes called Disconnect/Reconnect). Leave the setting at Yes if two or more SCSI devices are connected to the AAA-131U2/133U2. If only one SCSI device is connected, changing the setting to No results in slightly better performance.
- **Initiate Wide Negotiation**—When set to Yes, the AAA-131U2/133U2 attempts 16-bit data transfer (wide negotiation). When set to No, the AAA-131U2/133U2 uses 8-bit data transfer unless the SCSI device requests wide negotiation. For Ultra2 SCSI devices, make sure this option is set to Yes.



Note: Set Initiate Wide Negotiation to **No** if you have an 8-bit SCSI device that hangs or exhibits other performance problems.

- **Send Start Unit Command**—When set to Yes, sends the Start Unit Command to the SCSI device at bootup.
- **Include in BIOS Scan**—When set to Yes, the AAA-131U2/133U2 BIOS includes the device as part of its BIOS scan at bootup. Leave this setting at Yes for all hard disks that are part of an array.

Additional Options

- **Array1000U2 BIOS**—When set to Enabled, the AAA-131U2/133U2 BIOS is installed and all Int13 (except bootable CD-ROM) devices are supported at boot time. When set to Disabled, the AAA-131U2/133U2 BIOS is not installed.
- **BIOS Support for Bootable CD-ROM**—When set to Enabled, the AAA-131U2/133U2 BIOS allows booting from a CD-ROM drive.



...B

Troubleshooting

In this Appendix

- *Troubleshooting Checklist* B-1
- *Windows NT Troubleshooting* B-2

Troubleshooting Checklist

Check the following if you have problems installing or running the AAA-131U2/133U2 and SCSI devices:

- Does the AAA-131U2/133U2 BIOS sign-on message appear during bootup? If not, check the following items:
 - Is the AAA-131U2/133U2 properly seated in a PCI expansion slot? Refer to your computer documentation for the slot location.
 - Does your computer CMOS setup require you to enable PCI bus parameters (see your computer documentation)? If so, run the CMOS Setup program and assign the parameters—usually IRQ, Enable PCI Slot, and Enable Master.
- Is the SCSI bus terminated properly, and are all SCSI devices turned on?
- Are all SCSI bus cables and power cables connected?

- Does each channel and each device on the channel have a unique SCSI ID?
- If you are having trouble booting from a SCSI disk drive or array, make sure your computer's CMOS setup is set to **No Drives Installed** (the required setting for SCSI drives). Also, verify that the drive or array has been selected as the boot-first (boot) device and that the boot partition is active.
- If you receive the Drive not ready message, make sure the Send Start Unit command in *SCSISelect* is set to **Yes** for the suspect drive.

Windows NT Troubleshooting

Error Messages While Setting Up Windows NT

"Setup is unable to locate the hard drive partition prepared by the MS-DOS portion of setup"

or

"xxxx MB disk y at Id z on bus 0 on cda1000.sys does not contain a partition suitable for starting Window NT"

If these messages appear during Windows NT setup, do the following:

- 1 Reboot the system using the **ARRAYCONFIG U2** disk.
- 2 Run the **ARRAYCONFIG U2** utility to ensure that the boot array includes the drive with the lowest SCSI target ID.

"Boot: Couldn't find NTLDR"

If this message appears when attempting to boot from the Windows NT installation CD, boot from the Windows NT installation floppy disks instead, and proceed to load Windows NT from the CD-ROM.

"No Accessible Boot Device"

When attempting to boot from the Windows NT installation CD, this message indicates that the NT CD-ROM does not contain Array1000U2 drivers. To avoid this failure, try the following:

- 1 Reboot the Windows NT installation CD.
- 2 When the prompt "Setup is inspecting your computer system's hardware" appears, press the **F6** key repeatedly.

- 3 Windows NT will later prompt you for the Array1000U2 driver disk and the installation should continue as normal.

“Partition Size Too Large”

When installing Windows NT, this message appears if attempting to create a system partition larger than 4 GBytes. Windows NT has a maximum system partition size of 4096 MBytes. Create a partition that is smaller than 4 GBytes and continue the Windows NT installation. When Windows NT is completely installed, use the Windows NT Disk Administrator to partition the remaining available space of the array.



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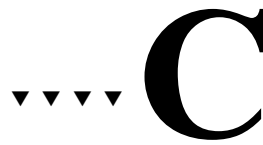
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Using a CD-ROM Drive

In this Appendix

► *Using a CD-ROM Drive with DOS*

C-1

Should you need to install a SCSI CD-ROM to the AAA-131U2/133U2, the Array1000U2 Family Manager Set drivers disk included with the AAA-131U2/133U2 contains the necessary DOS driver software for the CD-ROM. This appendix explains how to set up your CD-ROM drive so that you can initially install your software.

Using a CD-ROM Drive with DOS

To operate a CD-ROM drive supported by the AAA-131U2/133U2 under DOS, you need

- The SCSI driver, *aspi8u2.sys* (for Ultra2 systems) or *aspi8dos.sys* (for non-Ultra2 systems)
- The CD-ROM driver, *aspicd.sys*
- The Microsoft CD-ROM extensions, *mcdex.exe*

The *aspi8u2.sys* (or *aspi8dos.sys*) and *aspicd.sys* files must be copied from the *ldos* directory on the Adaptec Array1000U2 Family Manager Set driver disk to a directory (e.g., *c:\scsi*) on your hard disk. The *mscdex.exe* file is included with MS-DOS 6.x and above (see your MS-DOS documentation for details).



Note: If you use MS-DOS 5 and do not have *mscdex.exe*, we recommend that you upgrade to MS-DOS 6 or above. You can also obtain *mscdex.exe* from Microsoft's Web site, online bulletin board, or the CompuServe forum.

To complete the driver installation, edit the *config.sys* file to include command lines for *aspi8u2.sys* and *aspicd.sys*, and edit the *autoexec.bat* file to include a command line for *mscdex.exe*. The following examples illustrate the command line format and the command options appropriate for most systems:

- Sample command lines for *config.sys* file:

```
device=c:\scsi\aspi8u2.sys /d
device=c:\scsi\aspicd.sys /d:aspicd0
```



Note: For non-Ultra2 systems, use *aspi8dos.sys* instead of *aspi8u2.sys* in the command line (for example, *device=c:\scsi\aspi8dos.sys /d*).

- Sample command line for *autoexec.bat* file:

```
c:\dos\mscdex.exe /d:aspicd0
```

(This assigns the CD-ROM the next available drive letter, typically *D* if there is only one DOS drive.)

The following tables describe the *aspi8u2.sys* (or *aspi8dos.sys*) and *aspicd.sys* command line options. For a description of *mscdex* command line options, see your Microsoft DOS documentation. You can type command line options in uppercase or lowercase letters. Leave a blank space between options.

Using a CD-ROM Drive

Command Line Options for *spi8dos.sys* (or *aspi8u2.sys*)

Option	Example	Use
<i>/ccbs<count></i>	<i>/ccbs8</i>	Specifies the maximum number of concurrent ASPI commands that can be supported. The valid range is 1 through 16. The default is 4. If you increase this value, the size of the ASPI manager also increases. Use this option only if you want to run an ASPI program that specifies a higher number of concurrent commands.
<i>/d</i>	<i>/d</i>	Displays information about the AAA-131U2/133U2 and attached SCSI devices when the computer boots.
<i>/L</i>	<i>/L</i>	Enables <i>aspi8dos</i> to recognize all eight possible LUNs associated with each SCSI ID. If the option is not used, <i>aspi8dos</i> can recognize only LUN 0 for each SCSI ID.
<i>/mn</i>	<i>/m1</i>	Causes <i>aspi8dos</i> to scan the PCI bus. The method used to scan the bus is determined by the value of <i>n</i> : <i>/mb</i> = scan PCI bus using PCI BIOS calls <i>/m1</i> = scan PCI bus using Mechanism #1 <i>/m2</i> = scan PCI bus using Mechanism #2 <i>aspi8dos</i> automatically scans the PCI bus for SCSI devices. It tries to determine which scanning method will work best for the given system configuration. Use the <i>/mb</i> , <i>/m1</i> , and <i>/m2</i> options only if you want to override the <i>aspi8dos</i> internal scanning mechanism. Usually <i>aspi8dos</i> can determine which scanning method is optimal for your system. (PCI BIOS calls are described in the PCI BIOS spec; scanning mechanisms #1 and #2 are described in the PCI spec.
<i>/norst</i>	<i>/norst</i>	Prevents <i>aspi8dos</i> from resetting the SCSI bus when you boot your computer. By default, <i>aspi8dos</i> resets the SCSI bus when you boot the computer if the host adapter BIOS is not present. You can use <i>/norst</i> to prevent this from happening.
<i>/pause</i>	<i>/pause</i>	Pauses the system after loading <i>aspi8dos</i> at bootup, so you can read the message on the screen. After you read the message, press any key to resume booting.
<i>/rst</i>	<i>/rst</i>	Forces <i>aspi8dos</i> to reset the SCSI bus when you boot your computer. By default, <i>aspi8dos</i> does not reset the SCSI bus when you boot your computer if the host adapter BIOS is present.
<i>/s<slot number></i>	<i>/s1 /s3</i>	Indicates the slot number(s) where you want <i>aspi8dos</i> to look for host adapters. Valid slot numbers = 1 to 15. If you do not use this option, <i>aspi8dos</i> scans all slots for host adapters, beginning at slot 1.

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Command Line Options for *aspicd.sys*

Option	Example	Use
<code>/d:<name></code>	<code>/d:aspicd0</code>	Required in the <i>config.sys</i> command line. Assigns a name to the CD-ROM drive so that <i>mscdex</i> can assign the CD-ROM a logical drive letter. The name must exactly match the CD-ROM drive name in the <i>mscdex</i> command line in <i>autoexec.bat</i> . Use any eight-character name.
<code>/id={...}</code>	<code>/id=2+4</code> <code>/id=3+5+1:4</code>	Specifies CD-ROM drives controlled by <i>aspicd</i> . By default, <i>aspicd</i> controls all drives. In the first example, which is for a computer with one host adapter, <i>aspicd</i> controls the devices with SCSI IDs 2 and 4. In the second example, for a computer with two host adapters, <i>aspicd</i> controls the devices with SCSI IDs 3 and 5 on host adapter 0 and SCSI ID 4 on host adapter 1 (if you do not specify the host adapter number, <i>aspicd</i> assumes it is 0).
<code>/L</code>	<code>/L</code>	Enables <i>aspicd</i> to recognize all eight possible LUNs associated with each SCSI ID. If the option is not used, <i>aspicd</i> can recognize only LUN 0 for each SCSI ID. Add the <code>/L</code> option to the command line if you have a CD-ROM drive that can access multiple discs. If your computer system includes a Pioneer DRM-600 or DRM-604x multiple-disc CD-ROM drive, you do not need to add the <code>/L</code> option. The <i>aspicd</i> device driver automatically scans multiple LUNs if it detects one of these devices on the SCSI bus.
<code>/norst</code>	<code>/norst</code>	Prevents <i>aspicd</i> from issuing a SCSI Bus Reset message at system start-up. The default is to issue it. The SCSI Bus Reset message (supported by Toshiba, Hitachi, and NEC drives) resets drives that are playing audio CDs when the computer reboots.
<code>/pause</code>	<code>/pause</code>	Makes your system pause after loading <i>aspicd</i> at bootup, so you can read the message on the screen. Press any key to resume booting.
<code>/type:<drive vendor></code>	<code>/type:sony</code>	Allows <i>aspicd</i> to support audio play mode for CD-ROM drives that are compatible with a supported drive type but are not included on the list of supported drives. If you use the <code>/type:<drive vendor></code> option, <i>aspicd</i> assumes that all CD-ROM drives on the SCSI bus are made by this vendor—you cannot combine different brands of CD-ROM drives on the bus. The valid entries for this option are chinon, denon, hitachi, lms, nec, panasonic, sony, texel, and toshiba.





Obtaining SCSI Cables

In this Appendix

- *External Cables* D-2
- *Internal Ribbon Cables* D-2

High-quality cables are required in high-performance SCSI RAID systems to ensure data integrity. Adaptec provides the highest quality SCSI cables designed specifically for use with Adaptec RAID cards. For purchasing information, contact Adaptec:

Adaptec, Inc.
691 S. Milpitas Boulevard
Milpitas, CA 95035
USA
Tel: 1-800-442-7274

Adaptec Europe - Belgium
Tel: (32) 2-352-34-11
Fax: (32) 2-352-34-00

Adaptec Japan - Tokyo
Tel: (81) 3-5365-6700
Fax: (81) 3-5365-6950

Adaptec Singapore
Tel: (65) 278-7300
Fax: (65) 273-0163

See the following pages for SCSI cables available directly from Adaptec.

External Cables

Description	Part Number
High-density 68-pin Wide Ultra2 (1 m)	ACK-U2W-1M
High-density 68-pin Wide Ultra2 (3 m)	ACK-U2W-3M
High-density 68-pin to High-Density 68-pin Cable (1m)	ACK-W2W-E

External Connector Diagrams

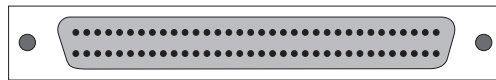


Figure D-1. Ultra2 and High-density 68-pin

Internal Ribbon Cables

Description	Part Number
5 position (4 devices + SCSI card), high-density 68-pin internal Ultra2 SCSI, terminated (1.25 m)	ACK-68I-U2W ¹
5 position (4 devices + SCSI card), standard 50-pin female connectors, terminated (1.3 m)	ACK-F2F-5IT ¹
5 position (4 devices + SCSI card), high-density 68-pin connectors, terminated (1.3 m)	ACK-W2W-5IT ¹

¹ ACK-68I-U2W, ACK-F2F-5IT, and ACK-W2W-5IT have built-in active terminators which eliminate the need to terminate any internal SCSI devices

Internal Connector Diagrams

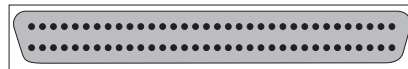


Figure D-2. Ultra2 and High-density 68-pin



Figure D-3. Low-density 50-pin



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