Installation and Hardware Guide

AAA-130SA Series

Ultra Wide SCSI RAID Cards

Adaptec, Inc.
691 South Milpitas Boulevard
Milpitas, CA 95035

Printed in Singapore
STOCK NO.: 512059-00, Rev. A RQ 6/98

▼▼▼▼ AAA-130SA Series

Ultra Wide SCSI RAID Cards
for Small-Business, Workgroup,
and Departmental Servers

Installation and Hardware Guide

adaptec®

Federal Communications Commission Radio Frequency Interference Statement

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.

Adaptec, Inc.	AAA-131b, AAA-132b, AAA-133b
FC	Tested To Comply With FCC Standards
FOR HOME OR OFFICE USE	

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 matérial brouilleur du Canada.

▼▼▼▼ Contents

4 Installing Software on a Windows NT Server

5 Installing Software on a Novell NetWare Server

6 Installing Software on a Remote Client

A Configuring the AAA-13xSA RAID Card with SCSI*Select*

1

Introduction

The Adaptec® AAA™-130SA Series of Ultra Wide SCSI RAID cards provide powerful disk array support in servers that have a PCI bus. The AAA-130SA Series of RAID cards (collectively referred to as "AAA-13xSA RAID card" in this manual) includes these three models:

- **AAA-131SA** - single-channel, half-size PCI RAID card, with 50-pin and 68-pin internal connectors and a 68-pin external connector
- **AAA-132SA** - two-channel, full-size PCI RAID card with 68-pin internal connectors for Channel A and B, 68-pin external connector for Channel A, and 50-pin internal connector for Channel B. (OEM only)
- **AAA-133SA** - three-channel, full-size PCI RAID card with 68-pin internal connectors for Channel A, B, and C; 68-pin external connector for Channel A; and 50-pin internal connector for Channel B

This *Installation and Hardware Guide* explains how to install the AAA-13xSA RAID card, create the first array, and then install the supporting software. The *Adaptec CI/O Management Software User's Guide*, which is also included with your RAID card, explains how to use the software to create and manage additional arrays.

Note: If you are installing and using the AAA-13xSA RAID card in a desktop computer system, you should interpret *server* or *server console* to mean *desktop system* wherever the term is used in this document.

System Requirements

The minimum system requirements for the AAA-13xSA RAID card are

- PCI-based 90-MHz Pentium or equivalent motherboard with PCI-to-PCI bridge support
- An available half-length (for AAA-131SA) or full-length (for AAA-132SA/133SA), unobstructed PCI slot that supports Bus Mastering
- A minimum of one SCSI hard disk drive
- 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-13xSA RAID card 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™ 3.51 or 4.0 Server; or Novell NetWare 3.12 or 4.11
- A 3.5-inch 1.44-MByte primary (boot) floppy disk drive
- 64 MBytes system memory for NetWare; more than 64 MBytes memory recommended for Windows NT
- A CD-ROM drive for installation of Adaptec CI/O™ Management Software

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 server system.

Installation Overview

- Install the AAA-13xSA RAID card in the server. (Chapter 2)
- Connect SCSI peripherals to the AAA-13xSA RAID card. (Chapter 2)
- Create the first bootable array using the Array*Config*SA™ utility. (Chapter 3)
- Install the Array1000SA driver for your operating system. (Chapter 4 and Chapter 5)
- Install the Adaptec CI/O Management Software on your server. (Chapter 4 and Chapter 5)
- Install the Adaptec CI/O Management Software on your networked Windows-based client (optional). (Chapter 6)

Note: Before proceeding with installation, review the *readme* file on the *\winnt\disk1* directory of the Adaptec CI/O Management Software CD-ROM.

❒

2

Installing the AAA-13xSA RAID Card and Connecting SCSI Peripherals

This chapter explains how to install the hardware. To install the AAA-13xSA RAID card and peripherals, you will need to

- Verify presence of DIMM memory
- Back up any existing data
- Install the AAA-13xSA RAID card in your server
- Connect SCSI peripherals

Note: If you need to configure the SCSI options (e.g., ID, Parity Checking, and Termination) of your system after the AAA-13xSA RAID card is installed, see Appendix A, *Configuring the AAA-13xSA RAID Card with SCSISelect*.

AAA-13xSA RAID Card Layout

Figure 2-1 identifies the major components on the AAA-131SA, and Figure 2-2 the components on the AAA-132SA/133SA. You may find it helpful to refer to these figures while installing your adapter.

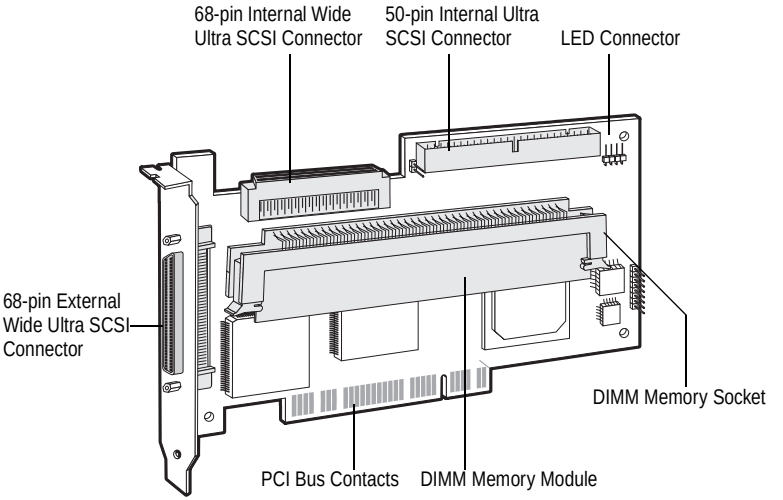

Figure 2-1. AAA-131SA Major Components

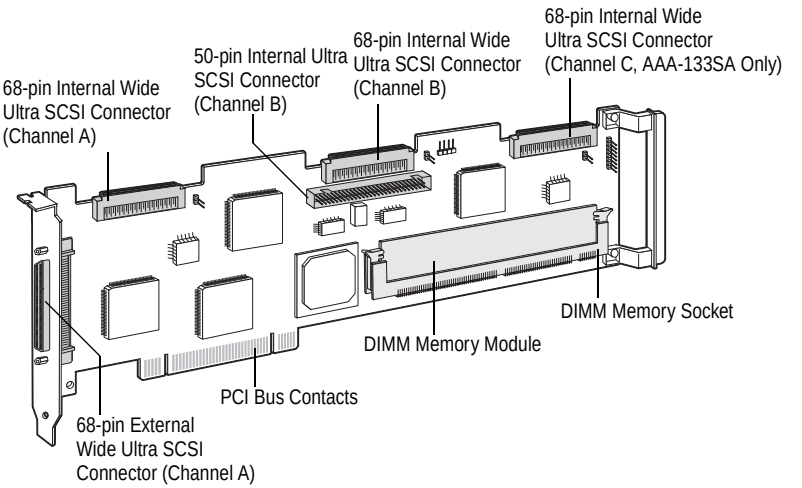

Figure 2-2. AAA-132SA/133SA Major Components

Verifying Presence of DIMM Memory

Before you can use the AAA-13xSA RAID card, the DIMM memory socket must be populated with a DIMM, as shown in Figure 2-3. In most cases, the AAA-13xSA RAID card comes pre-installed with a DIMM. Nevertheless, a 168-pin EDO 3.3v 60ns or faster DIMM can be used. Visit the Adaptec Web Site at *http://www.adaptec.com/raid* for a list of approved DIMMs and vendors.

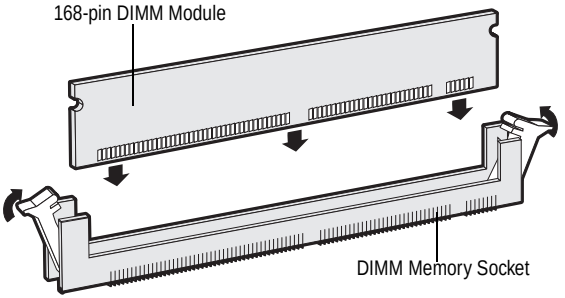

Figure 2-3. Installing DIMM in the DIMM Memory Socket

Installing the AAA-13xSA RAID Card

Follow these steps to install the AAA-13xSA RAID card:

Note: If you are installing the AAA-13xSA RAID card 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.
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-13xSA RAID card 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-131SA card.)

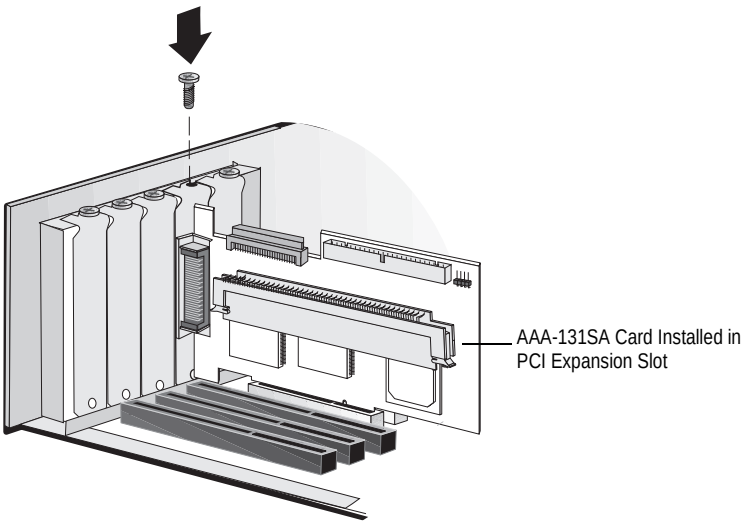

Figure 2-4. Installing an AAA-131SA in PCI Expansion Slot

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-13xSA RAID card instead, you must disconnect the LED cable from the motherboard and connect it to the LED connector on the AAA-13xSA RAID card. If the LED has a two-position cable, connect the cable to pins 1 and 2 of the LED connector. (Figure 2-5 shows the connection on an AAA-133SA 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-13xSA RAID card.

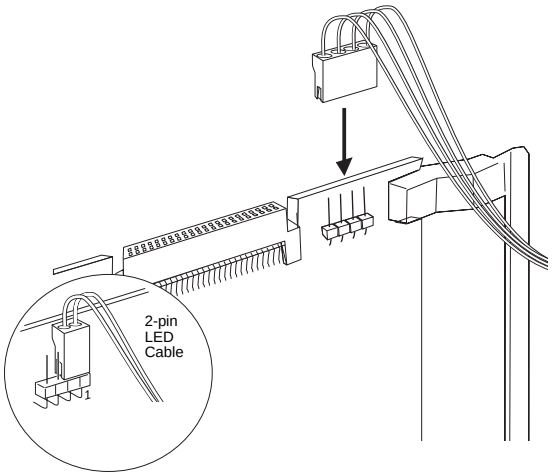

Figure 2-5. Connecting the LED Activity Indicator

Setting Up SCSI Peripherals

Setting up SCSI peripherals before attaching them to the AAA-13xSA RAID card typically involves setting SCSI IDs and termination, mounting internal peripherals inside your computer or external array enclosure, and connecting power cables to each peripheral. Since setup can vary from peripheral to peripheral, always refer to the peripheral's documentation for specific instructions. Below are some guidelines for setting SCSI IDs and termination on your peripherals. Additional installation hints are also provided to help you install your peripherals.

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

Check the SCSI IDs

Each peripheral attached to a SCSI channel on the AAA-13xSA RAID card, 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 peripheral 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 peripherals, 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 peripherals, refer to the peripheral's documentation.)
- If you wish to use a single SCSI disk drive (instead of an array) as your boot peripheral, we recommend that you set the SCSI ID for the peripheral to zero. Most SCSI hard disks come from the factory preset to ID 0.
- The IDs for internal peripherals are usually set with jumpers; external peripherals are usually set with a switch on the back of the peripheral.

Terminate the Ends

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

Terminating SCSI Channels on the AAA-13xSA RAID Card

Termination on the AAA-13xSA RAID card itself is controlled via the SCSI*Select*™ utility. We recommend that you leave each channel on the AAA-13xSA RAID card 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-13xSA RAID card termination setting, see Chapter A, *Configuring the AAA-13xSA RAID Card with SCSISelect*.

Terminating SCSI Peripherals

On most internal SCSI peripherals 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 peripherals, termination is controlled by installing or removing a terminating plug (see Figures 2-14 and 2-15). Read the peripheral's documentation to determine how to enable or disable termination on your particular peripheral.

The internal SCSI cables supplied in Adaptec AAA-13xSA RAID card kits have attached terminators, so you should disable termination on all internal SCSI peripherals connected to the cable. In general, we recommend that you terminate the internal cable instead of terminating the SCSI peripherals. 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 peripherals. If you follow these recommendations, SCSI bus termination will not be affected when you remove or replace SCSI peripherals.

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

Additional Hints for Connecting SCSI Peripherals

All SCSI Peripherals

- If you are booting your server from a single SCSI hard disk drive or bootable array, the boot order (or *virtual device order*) of the disk or array must be set to 0. (See *Making the Array Bootable* on page 3-5.)
- Enable termination power on all SCSI peripherals in the server so that if you remove a drive that is supplying termination power other peripherals 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 E, *Obtaining SCSI Cables and Converters* for additional information.)

Cable Lengths

- The total length of cabling (internal and external) on each SCSI channel should not exceed the following:
  - Three m (9.8 ft) if you are using Fast SCSI data transfer rates (10 MBytes/sec).
  - Three m (9.8 ft) if you are using Ultra SCSI data transfer rates (20 MBytes/sec for 8-bit peripherals, and 40 MBytes/sec for 16-bit peripherals) and have four or less peripherals (including the Array controller).
  - One and one-half m (4.9 ft) if you are using Ultra SCSI data transfer rates and have between four and eight peripherals (including the Array controller).

Note: Ultra SCSI data transfer rates do not currently support more than eight peripherals per channel.

  - Six m (19.7 ft) if you are using 5-MByte/sec asynchronous or synchronous data transfer rates.
- When calculating the total length of the bus, be sure to include the cabling inside any array enclosure.

Connecting SCSI Peripherals

The AAA-13xSA RAID card supports both internal and external SCSI peripherals. Up to 15 SCSI peripherals can be supported on each SCSI channel—either 16-bit peripherals alone or a combination of 16-bit and up to seven 8-bit peripherals. Before connecting peripherals to the AAA-13xSA RAID card, be sure to also review *Setting Up SCSI Peripherals* on page 2-6.

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

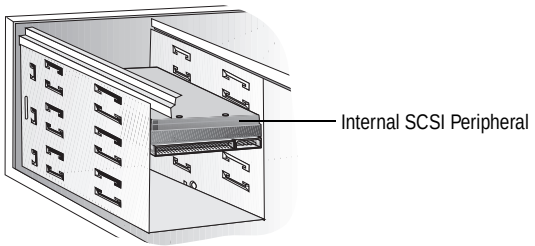

Figure 2-6. Internal SCSI Peripheral Mounted in Drive Bay Inside Your Computer

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

Internal Wide Ultra SCSI Connector (68-pin)

Use the internal Wide Ultra SCSI connector to connect internal Fast/Wide Ultra SCSI peripherals that have 68-pin connectors. Follow these steps to connect your internal Fast/Wide Ultra peripherals:

Note: To connect internal Fast/Wide Ultra SCSI peripherals, a 68-pin internal Ultra SCSI cable, similar to the one shown in Figure 2-7, is required. (One 68-pin internal Ultra SCSI cable is included in Adaptec AAA-13xSA RAID card kits. The cable allows up to four internal Fast/Wide Ultra SCSI peripherals and has a built-in terminator at the end.)

1 Locate the 68-pin internal Ultra SCSI cable.

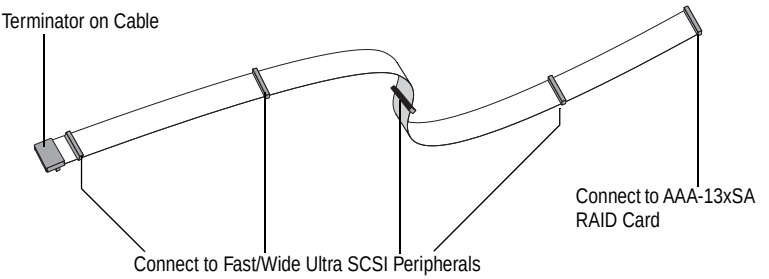

Figure 2-7. 68-pin Internal Ultra SCSI Cable

2 Plug the long end of the cable to the 68-pin internal Wide Ultra SCSI connector.

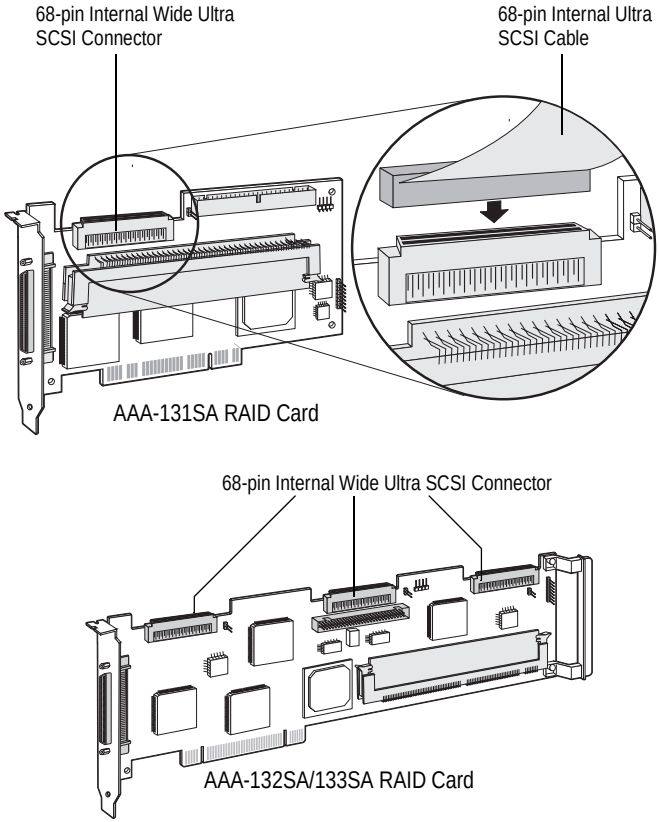

Figure 2-8. Connecting Cable to 68-pin Internal Wide Ultra SCSI Connector

3 Plug the remaining connectors to your Fast/Wide Ultra SCSI peripherals.

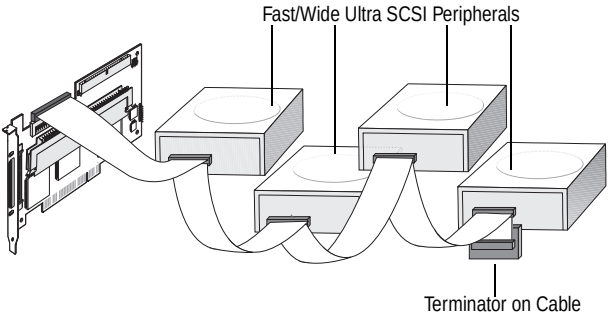

Figure 2-9. Connecting Fast/Wide Ultra SCSI Peripherals

Note: If your 68-pin internal Ultra SCSI cable has a built-in terminator at the end of the cable (such as the cable provided in Adaptec AAA-13xSA RAID card kits), disable termination on all peripherals connected to the cable. If there is no built-in terminator, terminate the peripheral connected to the end of the cable only and disable termination on all remaining peripherals connected to the cable.

Internal Ultra SCSI Connector (50-pin)

Use the internal Ultra SCSI connector to connect internal Fast/Ultra Narrow SCSI peripherals that have standard 50-pin connectors.

Note: To connect internal Fast/Ultra Narrow SCSI peripherals, a standard 50-pin internal SCSI cable, similar to the one shown in Figure 2-10, is required. (One 50-pin internal SCSI cable is included in Adaptec AAA-13xSA RAID card kits. The cable allows up to four internal Fast/Ultra Narrow SCSI peripherals and has a built-in terminator at the end.)

Follow these steps to connect your standard internal Fast/Ultra Narrow peripherals:

1 Locate the 50-pin internal Ultra SCSI cable.

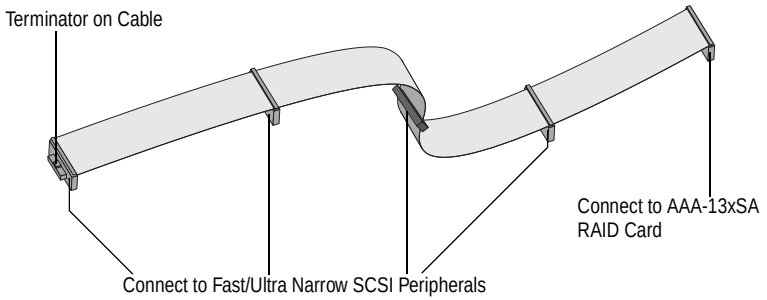

Figure 2-10. Connecting Fast/Wide Ultra SCSI Peripherals

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

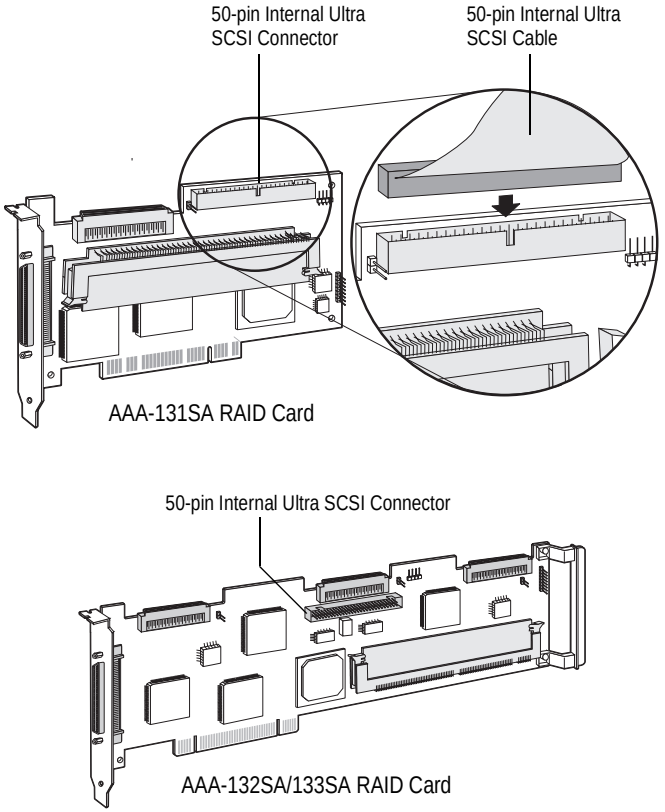

Figure 2-11. Connecting Cable to 50-pin Ultra SCSI Connector

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

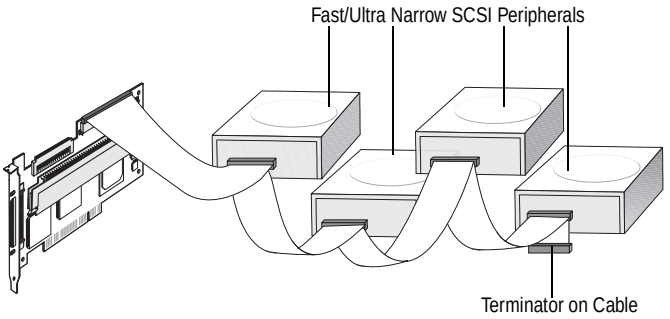

Figure 2-12. Connecting Fast/Ultra Narrow SCSI Peripherals

Note: If your 50-pin internal Ultra SCSI cable has a built-in terminator at the end of the cable (such as the cable provided in Adaptec AAA-13xSA RAID card kits), disable termination on all peripherals connected to the cable. If there is no built-in terminator, terminate the peripheral connected to the end of the cable only and disable termination on all remaining peripherals connected to the cable.

External Wide Ultra SCSI Connector (68-pin)

Use the external Ultra SCSI connector to connect your external SCSI peripherals. For each external peripheral, you will need to obtain an external SCSI cable. Follow these steps to connect your external peripherals:

1 Connect one end of the external SCSI cable to the external SCSI connector on the AAA-13xSA RAID card.

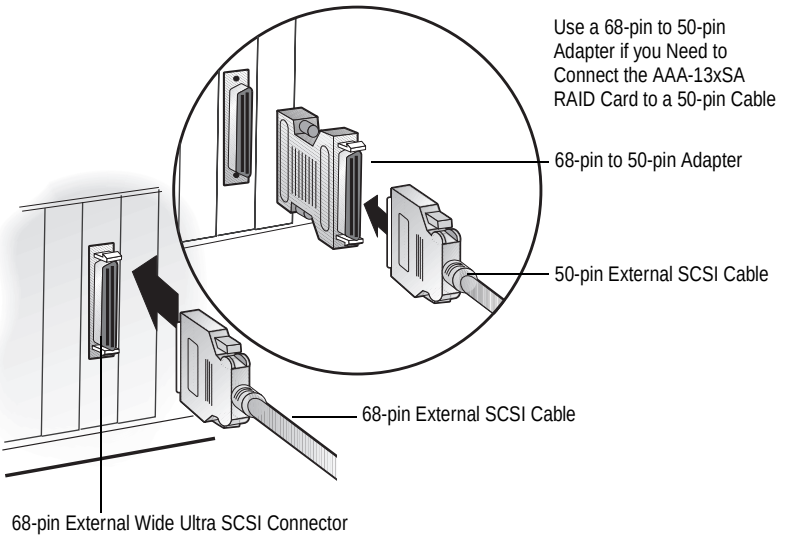

Figure 2-13. Attaching an External Cable to the External SCSI Connector

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

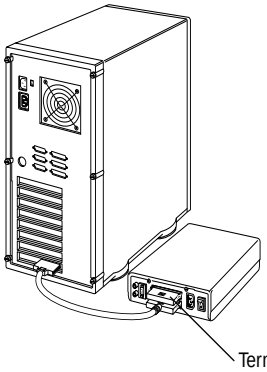

Figure 2-14. Attaching a Single External Peripheral

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

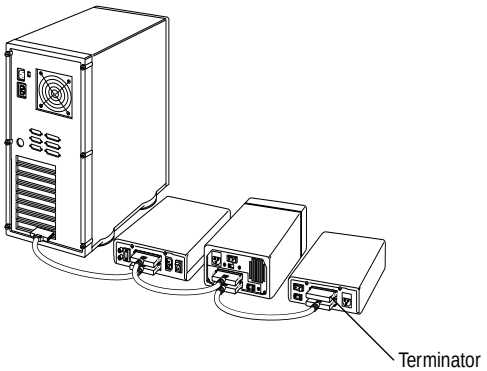

Figure 2-15. Attaching Multiple External Peripherals

4 Connect all power cables to the external peripherals.

Connecting 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 server. To install your SCSI peripherals in these enclosures, refer to the enclosure's documentation. The following information is provided to help you properly connect your enclosure to the server: (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 peripherals 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.

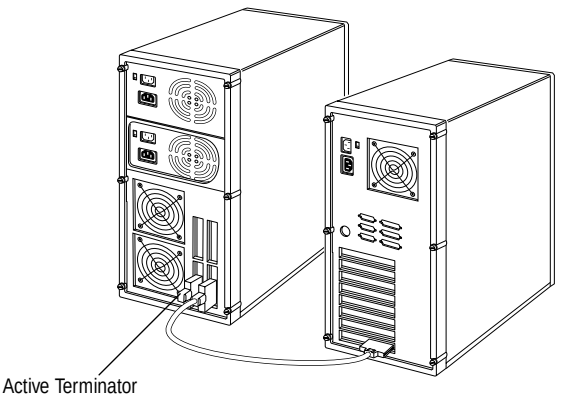

Figure 2-16. A Typical Array Enclosure Setup

Completing the Installation

Reinstall the computer cover and connect all power cables. To verify that the SCSI peripherals work properly, turn on the external SCSI peripherals first, then turn on the computer. When the computer boots, the adapter BIOS sign-on message should appear on the screen, and each peripheral connected to the adapter should be listed. If the BIOS message does not appear, see Appendix B, *Troubleshooting*.

❒

3

Creating the First Array With the Array*Config*SA Utility

This chapter explains how to use the Array*Config*SA Utility to create the first bootable or non-bootable array on your server. Once the first array is created using Array*Config*SA, use Adaptec CI/O Management Software to create additional arrays. Adaptec CI/O Management Software provides a convenient user interface for efficient creation of non-bootable arrays and array management over the network. Refer to the *Adaptec CI/O Management Software User's Guide* for more information.

Before creating the array, make sure the disks for the array are connected and installed in your server (or array enclosure).

Note: Array*Config*SA runs from a self-booting diskette. If you are changing the configuration of a server 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 Array*Config*SA.

Caution: It is strongly recommended that you consistently and regularly backup your array to tape so you may recover your data due to failure events other than disk drive failure.

Creating an Array

Follow these instructions to create the first array with Array*Config*SA:

1. Insert the Array*Config*SA diskette in the server's drive *A* and reboot the server. Array*Config*SA starts automatically.
2. Select **Disk Array Operations** from the Main Menu.
3. Select **Create New Array** from the Disk Array Operations menu.
4. 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.
5. 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.

6 Select the number of drives you want in the array and press **Enter**. This number should not include *spares* (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.

7 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 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 the array.

When you have selected the number of drives you specified in step 6, 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.

8 Select spares. If you do not want a spare, type n and continue with Step 10. 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.

9 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 disk drives.

10 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 network server environments.

11 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.

12 Create additional arrays. You may use Array*Config*SA to create additional arrays (if disks are available), however we recommend using Adaptec CI/O Management Software to create additional arrays and for array management. See the *Adaptec CI/O Management Software User's Guide* for more information.

13 When all arrays are created, exit Array*Config*SA, remove the Array*Config*SA diskette, and reboot the server. After you reboot you can write data to the arrays. At this point, you can make your initial array bootable as described in the next section.

Making the Array Bootable

You can make the array bootable so that the server 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. We recommend that you make your initial array bootable. Follow these steps if you want the server to boot from the newly created array:

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

1 Insert the Array*Config*SA diskette in the server's floppy disk drive *A*.

2 Reboot the server from the diskette. Array*Config*SA starts automatically.

3 Select **Display Boot Order** from the Main Menu. The Boot Order for Singles and Arrays window appears.

4 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**.

5 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.

6 Press **Esc** to return to the Main Menu.

7 Exit Array*Config*SA, remove the diskette from drive *A*, and reboot the server.

8 Prepare the array as you normally would prepare a boot disk drive for your operating system. See either Chapter 4, *Installing Software on a Windows NT Server* or Chapter 5, *Installing Software on a Novell NetWare Server*.

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.)

❒

4

Installing Software on a Windows NT Server

This chapter explains how to install the software required to use the AAA-13xSA RAID card in a system using Windows NT 4.0 or 3.51 Server.

Before installing the software, make sure the AAA-13xSA RAID card is already installed. If you plan to boot from an array, make sure the array is already created. To install all of the software, you must complete the following in the order presented:

- Install the *cda1000.sys* driver for Windows NT
- Install Adaptec CI/O Management Software for Windows NT

Once all software is installed, refer to the *Adaptec CI/O Management Software User's Guide* for instructions on adding, deleting, and managing your arrays.

Note: If your server has an additional Adaptec AIC™-78xx device (for example, AHA®-2940 or AHA-3940 host adapter) installed, the NT driver for these adapters must be from the Adaptec 7800 Family Manager Set 2.10 or higher. Ultra2 SCSI host adapters require v3.00 or higher of the Family Manager Set.

Installing the Array1000SA Driver for Windows NT

This section explains how to install the Adaptec Array1000SA™ Miniport Driver (*cda1000.sys*) for Windows NT. To begin driver installation, see either *Installing the Driver When Installing Windows NT* below, 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 an array 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: If you have multiple arrays, we recommend temporarily powering off all peripherals except for the boot array before installing Windows NT; otherwise, Windows NT limits the size of the partitions you can create to 1 GByte. When Windows NT installation is complete, power on all peripherals and reboot the system.

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

Note: To install Windows NT from a bootable CD-ROM, make sure BIOS Support for Bootable CD-ROM is *enabled* in SCSI*Select*.

2 *Windows NT Boot diskette installation*: When prompted, insert diskette #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 peripheral.

5 Press **Enter** to select **Others**; insert the Adaptec Array1000SA Family Manager Set driver diskette in your floppy disk drive and press **Enter**.

6 The screen displays the adapter drivers supported on the diskette. Select the Adaptec Array1000SA Family Adapter driver and press **Enter**.

7 If you want to add drivers (other than for the AAA-13xSA RAID card), press **S** and repeat Step 5 for each additional adapter and inserting 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.

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 Array1000SA Family Manager Set driver diskette in your floppy disk drive and press **Enter.** Enter the following path to the installation files and then click **OK**.

   a:\winnt

   The Adaptec Array1000SA Family Adapter driver is highlighted by default.
8. In the Install Driver window, Click **OK**.
9. Click the **New** button when asked if you want to use the currently installed driver(s) or install new one(s).
10. Type a:\winnt again, and click **Continue**. The driver is now installed.
11. You must restart your computer for the changes to take effect. Click **Yes** to restart your computer.

Windows NT Installation and Configuration Notes

If Windows NT Setup Hangs

During Windows NT installation, the system may hang while the Windows NT Setup floppy 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. Array*Config*SA

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

- Disconnect all peripherals other than members of the boot array, so that only one peripheral is present in the Windows NT installation. Reconnect all other peripherals after Windows NT is successfully installed.
- Configure the boot array in the Array*Config*SA 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 nonbootable installation CD and installation diskettes which do not ask for third-party driver diskettes (Manufacturer-supplied hardware support disks). To have the installation program prompt you for the third party driver diskettes, do the following:

1. Copy the *winnt.sif* file from the *I386* directory on the BackOffice Small Business Server CD to Disk 2 of the Windows NT boot diskettes (overwrite existing file).
2. Reboot the system using the Windows NT boot diskettes. After Disk 2 is inserted, the installation program prompts you for the manufacturer-supplied hardware support disks.

Installing Adaptec CI/O Management Software for Windows NT Server

Note: The Adaptec CI/O Management Software installation process automatically installs both CI/O server and client components on your Windows NT Server. Before you start the Adaptec CI/O Management Software, be sure that communication with the server via the network is already established. (See the documentation provided with your TCP/IP software for instructions on establishing communications, and also *Hints for Establishing Communications With Your Server* on page 6-3.)

Follow these steps to install the Adaptec CI/O Management Software for Windows NT:

1. Start Windows NT.
2. Insert the Adaptec CI/O Management Software CD-ROM in your CD-ROM drive.
3. Select **Start** and then **Run**, type the following and press **Enter**:

   x:\win_nt\disk1\setup.exe

   where *x* is the CD-ROM drive letter.
4. Follow the directions that appear on the screen.
5. When installation is complete, reboot the system. The following NT Services start automatically in the background:

   CIO Array Management Service
   CIOArrayManager RPC Command
   CIOArrayManager RPC EventP
   CIOArrayManager RPC Event
   NobleNet Portmapper

Note: These NT Services are configured to start automatically at boot time. After installation you can start or stop these services through the Services icon in the Windows NT Control Panel.

6 Double-click the **Adaptec CI/O Management Software** icon to start the program.

See the *Adaptec CI/O Management Software User's Guide* for information on using the Adaptec CI/O Management Software to add, delete, or manage your arrays. If you are experiencing problems starting the software, see *Problems Running Adaptec CI/O Management Software On Your Windows NT Server* on page B-3.

Note: You must have the proper level of Adaptec CI/O Management Software password authorization if you want to add and delete arrays and spares from a networked client. The default password is "adaptec." See the *Adaptec CI/O Management Software User's Guide* for information on setting security options.

❒

5

Installing Software on a Novell NetWare Server

This chapter explains how to install the software required to use the AAA-13xSA RAID card in a Novell NetWare (NetWare 3.12 and 4.11) server.

Before installing the software, make sure the AAA-13xSA RAID card is already installed. If you plan to boot from an array, make sure the array is already created. To install all of the software, you must complete the following in the order presented:

- Install the *cda1000.dsk* driver for Novell NetWare
- Install the TIRPC Communications Module
- Install the Adaptec CI/O Management Software for Novell NetWare

Once all software is installed, refer to the *Adaptec CI/O Management Software User's Guide* for instructions on adding, deleting, and managing your arrays from the server console.

Note: If your server has an additional Adaptec AIC™-78xx device (for example, AHA®-2940 or AHA-3940 host adapter) installed, the NetWare driver for these adapters must be from the Adaptec 7800 Family Manager Set 2.10 or higher. Ultra2 SCSI host adapters require v3.01 or higher of the Family Manager Set.

Installing the Array1000SA Driver for Novell NetWare

This section explains how to install the Adaptec Array1000SA driver (*cda1000.dsk*) for NetWare. To begin driver installation, see either *Installing the Driver When Installing NetWare* below, or *Installing the Driver When NetWare is Already Installed* on page 5-6.

Note: We recommend that you install your Novell NetWare operating system on an array to take advantage of the redundancy and performance features of the array.

Installing the Driver When Installing NetWare

To install the *cda1000.dsk* driver when you are installing NetWare, follow the instructions below for the version of NetWare you are installing.

NetWare 4.11

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

1. Follow the procedures in your NetWare documentation for installing a new server. (For information on using a CD-ROM drive on a NetWare server, see Appendix C, *Using a CD-ROM Drive* in this installation guide.)
2. When a screen appears that asks you to select a disk driver, press **Enter**.
3. Press **Insert** to install an unlisted driver.
4. Insert the appropriate Adaptec Array1000SA Family Manager Set driver diskette (Disk A or Disk B) into your floppy disk drive.
5. Press **F3** and specify the path to the *cda1000.dsk* driver. For NetWare 4.1, the driver is located in *\netware\v4_1x* on the diskette.
6. Select ***cda1000.dsk*** and press **Enter**.

7. When prompted to save the current version of *aspitran.dsk,* select **Yes** or **No**.
8. When prompted to save the current version of *nwpaload.nlm,* select **Yes** or **No**.
9. When the message File "A:\netware\v4_1x\nwpaload.nlm was not found…" appears, ignore the message and press **Enter** to continue.
10. Select **Continue copying the next file**.
11. Select **Yes** to install an additional disk driver.
12. Select ***aspicd.dsk*** and press **Enter**.
13. When prompted to so save current version of *aspicd.dsk,* select **No**.
14. When prompted to so save current version of *aspicd.ddi,* select **No**.
15. Select **No** when prompted to install an additional disk driver.
16. Select **Continue Installation**.
17. Press **Enter** to continue.
18. Down and exit the server. At the DOS prompt, copy the *nwpa.nlm, nbi.nlm,* and *nwpaload.nlm* files (located on the Novell Installation CD-ROM) to the server's startup directory (usually *c:\nwserver*).

Note: To load the driver automatically at server bootup, make sure the *startup.ncf* file includes the load command line for the *cda1000.dsk* driver. (If you also have an Adaptec host adapter that uses the Adaptec *aic78xx.dsk* driver, make sure the driver loads after the *cda1000.dsk* driver.)

Note: Older versions of the *aic78xx.dsk* driver (before v1.30) are compatible with *cda1000.dsk* as long as the AAA-13xSA RAID card's 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-13xSA RAID card's slot number. If loaded without command line parameters, NetWare list valid slot numbers. The AAA-13xSA RAID card will be listed in the parameter list; however, *do not* select it.

NetWare 3.12

Follow these instruction only if you are installing NetWare 3.12 for the first time:

1. Follow the procedures in your NetWare documentation for installing a new server. (For information on using a CD-ROM drive on a NetWare server, see Appendix C, *Using a CD-ROM Drive*.)

2. When you see the NetWare colon prompt (:), use the load command to install the driver from the Adaptec Array1000SA Family Manager Set driver diskette.

   The correct syntax to load the *cda1000.dsk* driver is

   :load [*pathname*]cda1000

   (For example, :load a:\netware\v3_1x\cda1000)

Note: To load the drivers automatically at server bootup, copy the *aspitran.dsk* and *cda1000.dsk* drivers to the server's startup directory and modify the *startup.ncf* so that the proper path to the driver is specified.

The *aspitran.dsk* driver must reside in the same path as *cda1000.dsk,* because NetWare attempts to load this file automatically. If you also have an Adaptec host adapter that uses the Adaptec *aic78xx.dsk* driver, make sure the driver loads after the *cda1000.dsk* driver.

Note: Older versions of the *aic78xx.dsk* driver (before v1.30) are compatible with *cda1000.dsk* as long as the AAA-13xSA RAID card's 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-13xSA RAID card's slot number. If loaded without command line parameters, NetWare list valid slot numbers. The AAA-13xSA RAID card will be listed in the parameter list; however, *do not* select it.

3 Load the NetWare *install* program from the NetWare colon prompt (:load install). Follow the instructions in the NetWare documentation to complete the installation (e.g., creating disk partitions, system volumes, etc.) of your server.

Installing the Driver When NetWare is Already Installed

To update or install the *cda1000.dsk* driver if NetWare is already installed, follow the instructions in this section. The procedures are similar for all versions of NetWare. Procedures that are specific to a NetWare version are noted when necessary.

1. Copy the *cda1000.dsk* and *aspitran.dsk* files from the Adaptec Array1000SA Family Manager Set driver diskette into the server's startup directory (e.g., *c:\nwserver*, *c:\server.312*) on your hard disk drive.

Note: For NetWare 3.12, the *cda1000.dsk* and *aspitran.dsk* files are located in the *\netware\v3_1x* subdirectory on the diskette; for NetWare 4.11, the files are in *\netware\v4_xx*.

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 *cda1000.dsk* driver is

```
load [pathname]cda1000
```

Note: If you unload *cda1000.dsk* driver, you must also unload *cioams.nlm*. When you load *cda1000.dsk* driver again, you must also load *cioams.nlm*. If *cioams.nlm* is not unloaded when you unload *cda1000.dsk*, your system may work erratically.

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 to continue installation. Ignore this error message.

Unloading *cda1000.dsk*

When running Adaptec CI/O Management Software, do not unload *cda1000.dsk* while *iomgr.nlm* is still loaded. Unstable behavior may result.

Configuring a Windows Client to Manage Netware Servers

To run the WinRPC for SPX system, the Windows NetWare environment should be patched to the latest level from Novell. The patches should be at the "DOSUP9" and "WINUP9" level, or greater. Novell patches are available on CompuServe and the Novell FTP and web site on the internet.

The following table lists the NetWare client components that have been successfully tested. *Do not* use versions older than the version listed below:

NetWare Component	Version
lsl.com	9/10/93, 2.05
ipxodi.com	10/7/93, 2.12
netx.exe	11/17/93, 3.32
netware.drv	10/27/92, 2.00
vnetware.386	11/19/93, 1.04
vipx.386	1/19/94, 1.13
nwcalls.dll	11/2/93, 4.04
nwipxspx.dll	11/2/93, 4.04

Installing the TIRPC Communications Module

The TIRPC communications module must be installed before you install the Adaptec CI/O Management Software. The module allows communications between the server and remote clients. Follow the instructions below for the version of NetWare installed.

NetWare 3.12

1. Insert the Adaptec CI/O Management Software CD-ROM in your CD-ROM drive.
2. From the NetWare colon prompt (:), type the following and press **Enter**:

   ```
   load install
   ```

3. Select **Product Options** from the Installation Options Menu.
4. Press the **<Ins>** key.
5. Enter the path to the CD-ROM (do not include the backslash).
6. Select **NetWare 3.x TIRPC Runtime and Configuration Files**. (TIRPC must be installed in the *sys:system* directory only.)

NetWare 4.11

1. Insert the Adaptec CI/O Management Software CD-ROM in your CD-ROM drive.
2. From the NetWare colon prompt (:), type the following and press **Enter**:

   ```
   load install
   ```

3. Select **Product Options** from the Installation Options Menu.
4. Select **Install a Product Not Listed**.
5. Press **<F3>** key.
6. Enter the path to the CD-ROM (include the backslash).
7. Select **NetWare 4.0 TIRPC Runtime and Configuration Files**. (TIRPC must be installed in the *sys:system* directory only.)

Installing the Adaptec CI/O Management Software for Novell NetWare

The Adaptec CI/O Management Software for Novell NetWare does not support NetWare installations from CD-ROM peripherals mounted as a NetWare volume. Additionally, the Adaptec CI/O Management Software for Novell NetWare only supports installations from CD-ROM DOS drive *x*:, where *x* is the CD_ROM drive letter. (For information on using a CD-ROM drive on a NetWare server, see Appendix C, *Using a CD-ROM Drive*.)

Note: Before you start the Adaptec CI/O Management Software, be sure that communication with the server via the network is already established. (See the documentation provided with your TCP/IP software for instructions on establishing communications, and also *Hints for Establishing Communications With Your Server* on page 6-3.)

Follow these steps to install the Adaptec CI/O Management Software for Novell NetWare:

1. Insert the Adaptec CI/O Management Software CD-ROM in your CD-ROM drive.
2. The CD-ROM drive must be added to the search path. From the NetWare colon prompt (:), type the following and press **Enter**:

   search add *x*:\netware\disk2

   where *x* is the CD-ROM drive letter.
3. From the NetWare colon prompt (:), type the following and press **Enter**:

   load *x*:\netware\disk2\nwsetup

   where *x* is the CD-ROM drive letter.

4 From the NWSETUP Installation menu, select **Default Installation** or **Custom Installation** (press **F1** for help).

Note: When installing Adaptec CI/O Management Software on an array 2 GBytes or larger, the install program erroneously reports the following message "Low Disk Space–Installation May Not Complete–Press Escape to Continue." Ignore this message and continue with installation.

5 At the end of the installation process, select **Yes** when you are prompted to update the *autoexec.ncf* file. (This adds the appropriate NLM command lines to the file so that all software is automatically loaded when the server starts.)

See the *Adaptec CI/O Management Software User's Guide* for information on using the Adaptec CI/O Management Software to add, delete, or manage your arrays from your server console.

Adaptec CI/O Management Software Installation Hints

- For communications supported over TCP/IP, the *tcpip.nlm* must be loaded and the IP protocol must be bound to a valid IP address. The IP protocol generally needs to be bound to an ethernet frame type, ETHERNET_II, which must be specified when loading the LAN driver. A LAN driver can be loaded multiple times for different ethernet frame types.
- Command lines similar to the following are automatically added to the *autoexec.ncf* file when you run the *nwsetup* utility:

```
#
# NWSETUP LAST UPDATE XX-XX-XX
#
RPCSTART
IOMGR.NCF
IOMGRRPC.NCF
```

❒

6

Installing Software on a Remote Client

This chapter explains how to install the Adaptec CI/O Management Software on a remote network client running under Windows (Windows® 95, and Windows NT). If you want the capability to manage your arrays on the server from a remote networked client, continue with the remainder of this chapter. Once installed, refer to the *Adaptec CI/O Management Software User's Guide* for instructions on using the software.

Installing Adaptec CI/O Management Software

Follow these steps to install the software:

Note: Before you start the Adaptec CI/O Management Software, be sure that communication with the server via the network is already established. As long as communication is established, it is not a requirement to log-on to the server to install the software and to monitor the server via the network. (See the documentation provided with your TCP/IP or SPX/IPX software for instructions on establishing communications, and also *Hints for Establishing Communications With Your Server* on page 6-3.)

1. Start Windows on the client.
2. Insert the Adaptec CI/O Management Software CD-ROM in your CD-ROM drive.
3. Select **Run** from the File menu (Windows 95 and NT users select **Start**, and then **Run**), type the following and press **Enter**.

   x:\win_client\disk1\setup.exe

   where *x* is the CD-ROM drive letter.
4. Follow the directions that appear on the screen.

   During installation you will be prompted to enter the host name of the client PC. If you do not know the host name, you can add the information later by inserting a line in the *autoexec.bat* file. Instructions for this step appear on the screen during installation.

See the *Adaptec CI/O Management Software User's Guide* for information on using the Adaptec CI/O Management Software to add, delete, or manage your arrays from the remote client.

Note: You must have the proper level of Adaptec CI/O Management Software password authorization if you want to add and delete arrays and spares from a networked client. The default password is "adaptec." See the *Adaptec CI/O Management Software User's Guide* for information on setting security options.

Hints for Establishing Communications With Your Server

Communication with the server via the network must be established prior to installing the Adaptec CI/O Management Software on a networked client. The following information is provided to help you set up proper communication:

TCP/IP Networks

- When installing your TCP/IP software (not provided by Adaptec), follow the installation instructions provided with your TCP/IP software. You will be asked to enter information such as IP address, host name, host file, etc.
- The TCP/IP stack uses the *host name* from TCP/IP setup.

SPX/IPX Networks

- On an SPX/IPX network, make sure to install the NetWare Client Software for Windows (provided by Microsoft). During installation, certain DLLs required by the Adaptec CI/O Management Software are installed.
- The *host name* is identified through the SET RPCHOST= environment variable. You can enter this variable through the setup process, or you can manually add it to the *autoexec.bat* file.

Note: Under dual stack situations, we recommend using the same *host name* for both TCP/IP and SPX/IPX to minimize any naming confusion.

❒

A

Configuring the AAA-13xSA RAID Card with SCSI*Select*

The AAA-13xSA RAID card has the onboard SCSI*Select* configuration utility, which allows you to change adapter settings without opening the computer or handling the adapter. This chapter describes the default settings, explains when you should change them, and gives instructions for doing so.

SCSI*Select* also includes SCSI disk utilities to list the SCSI IDs of devices on the AAA-13xSA RAID card, format SCSI disk drives, and check them for defects. Instructions for using these utilities are included.

Default AAA-13xSA RAID Card Settings

The default SCSI*Select* settings, shown in the table below, are appropriate for most systems. For situations where you might want or need to change the settings, see the descriptions of each setting beginning on page A-5. To change any setting, or if you would like to run the SCSI*Select* utilities, see *Starting the SCSISelect Utility* on page A-3.

SCSI Bus Interface Definitions	**Default**
Host Adapter SCSI ID	7
SCSI Parity Checking	Enabled
Host Adapter SCSI Termination	Auto Mode
Host Adapter UltraSCSI	Disabled
Additional Options (SCSI Device Configuration)	**Default**
Initiate Sync Negotiation	Yes (Enabled)
Maximum Synchronous Transfer Rate	20.0 MBytes/sec.[1]
Enable Disconnection	Yes (Enabled)
Initiate Wide Negotiation	Yes (Enabled)
Send Start Unit Command	No (Disabled)
Include In BIOS Scan	Yes (Enabled)
Additional Options	**Default**
Array1000SA BIOS	Enabled
BIOS Support for Bootable CD-ROM	Disabled

[1] This is 10 MBytes/sec if Wide Negotiation is not enabled.

Starting the SCSI*Select* Utility

To start SCSI*Select*, press the **F6** key when the following prompt appears when you turn on or reboot your computer:

```
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.

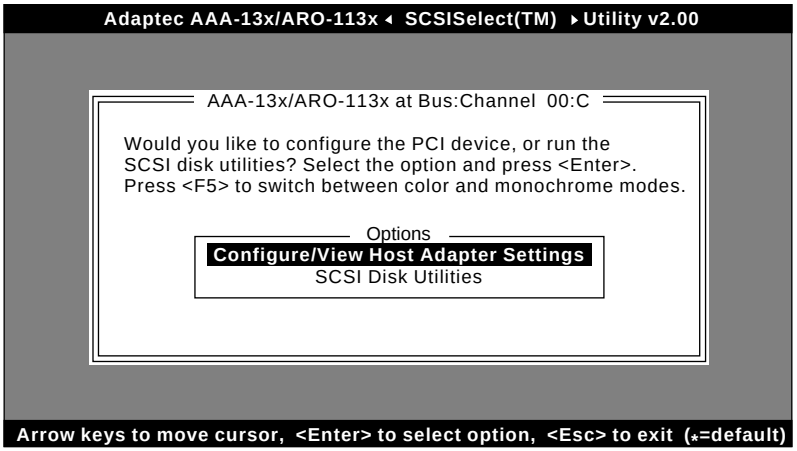

Figure A-1. SCSI*Select* Menu

Using SCSI*Select* Menus

To select a SCSI*Select* 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 SCSI*Select* default values, press **F6** from the main SCSI*Select* screen. To toggle the display between color and monochrome modes, press **F5** from the main SCSI*Select* screen (this feature may not work on all monitors).

Exiting SCSI*Select*

To exit SCSI*Select*, 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 computer. Any changes you made in SCSI*Select* take effect after the computer 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 SCSI*Select*. Once the option is selected, SCSI*Select* 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 drive. Each hard disk drive 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 drive for defects. If the utility finds bad blocks on the media, it prompts you to reassign them; if you select *yes*, those blocks are longer used. You can press **Esc** at any time to abort the utility.

SCSI*Select* Settings

SCSI Bus Interface Definitions

The following settings are the SCSI*Select* settings most likely to require any modification:

- **Array Adapter SCSI ID**— This option sets the RAID card's SCSI ID. The default setting is SCSI ID *7*, which gives the card the highest priority on the SCSI bus. We recommend that you leave the AAA-13xSA RAID card set to SCSI ID 7.
- **SCSI Parity Checking**—This option determines whether the AAA-13xSA RAID card verifies the accuracy of data transfer on the SCSI bus. The default setting is *Enabled*. You should disable SCSI Parity Checking on the card and all SCSI devices if any SCSI device connected to the card does not support SCSI parity; otherwise, leave it enabled. Most SCSI devices do support SCSI parity. If you are not sure whether a device supports SCSI parity, consult the documentation for the device.
- **Host Adapter SCSI Termination**—This option sets termination on the AAA-13xSA RAID card. The default setting is *Auto Mode*. This means the card will detect whether internal or external SCSI devices are connected to it and whether they are Wide or Narrow SCSI devices. The adapter will then adjust its termination accordingly. Under normal operation, you should never need to change this setting.
- **Host Adapter UltraSCSI**—This option determines whether the adapter supports Ultra SCSI devices. The default setting is *Disabled*. If you have any installed Ultra SCSI devices installed, you should enable this setting. When this setting is enabled, the card negotiates for data transfer speeds of up to 20 MBytes/sec. (or 40 MBytes/sec. for Wide SCSI devices).

Note: If you use Ultra SCSI data transfer speeds, be sure to use high-quality cables to connect the disk drives to the adapter. The quality of the cable is much more critical when you use higher-speed data transfer. See *Additional Hints for Connecting SCSI Peripherals* on page 2-8 for information on cabling SCSI peripherals.

Additional Options (SCSI Device Configuration)

The SCSI device settings allow you to configure certain parameters for each device on the SCSI bus. To configure settings for a specific device, you must know the SCSI ID assigned to that device. If you are not sure of the SCSI ID, see *Using the SCSI Disk Utilities* on page A-4.

- **Initiate Sync Negotiation**—This option determines whether synchronous data transfer negotiation (Sync Negotiation) between the device and AAA-13xSA RAID card is initiated by the RAID card. Normally, you should leave the Initiate Sync Negotiation setting enabled, because most SCSI devices support synchronous negotiation and because it allows for faster data transfer. The default setting is *Yes*.
- **Maximum Sync Transfer Rate**—This option determines the maximum synchronous data transfer rate that the AAA-13xSA RAID card supports. The default setting is 20.0 MBytes/sec. (The effective data transfer rate is doubled when Initiate Wide Negotiation is set to *Yes*. For example, a transfer rate of 10 MBytes/sec becomes 20 MBytes/sec.)
- **Enable Disconnection**—This option determines whether the AAA-13xSA RAID card allows the SCSI device to disconnect from the SCSI bus (sometimes called Disconnect/Reconnect). The default setting is *Yes*.

  You should leave Enable Disconnection set to *Yes* if two or more SCSI devices are connected to the adapter. If only one SCSI device is connected to the RAID card, you can set Enable Disconnection to *No* to achieve slightly better performance.
- **Initiate Wide Negotiation**—This option determines whether the AAA-13xSA RAID card attempts 16-bit data transfer instead of 8-bit data transfer. The default setting Yes. (The effective data transfer rate is doubled when 16-bit data transfer is used. For example, a transfer rate of 10 MBytes/sec becomes 20 MBytes/sec.)
- **Send Start Unit Command**—This option determines whether the Start Unit Command is sent to the SCSI device at bootup (most devices do not require this). The default setting is *No*.

- **Include in BIOS Scan**—This option determines whether the AAA-13xSA RAID card BIOS controls hard disk drives connected to the RAID card. When set to *Yes*, the BIOS controls the hard disk drive. When set to *No,* the BIOS does not control the hard disk drive, and device driver software is needed to control the device. The default setting is *Yes*. You should leave the setting at the default for all drives that are part of an array.

Additional Options

Array1000SA BIOS

This option determines whether the AAA-13xSA RAID card BIOS is installed at boot time. When set to *Enabled*, the AAA-13xSA RAID card BIOS is installed, and all Int13 devices are supported. When set to *Disabled*, the AAA-13xSA RAID card BIOS is not installed. The default setting is *Enabled*.

BIOS Support for Bootable CD-ROM

This option determines whether the AAA-13xSA RAID card BIOS supports booting from a CD-ROM drive. When set to *Enabled*, the AAA-13xSA RAID card BIOS allows booting from a CD-ROM drive.

❒

B

Troubleshooting

Troubleshooting Checklist

Check the following if you have problems installing or running the AAA-13xSA RAID card adapter and SCSI peripherals:

- Does the AAA-13xSA RAID card BIOS sign-on message appear during bootup? If not, check the following items:
  - Is the AAA-13xSA RAID card adapter 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.
  - Does the motherboard chipset meet the minimum requirements listed on *System Requirements* on page 1-2 (especially PCI-to-PCI bridge support)? If not, contact your vendor for a motherboard firmware upgrade.
- Is the SCSI bus terminated properly, and are all SCSI peripherals turned on?
- Are all SCSI bus cables and power cables connected?
- Does each channel and each peripheral 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.

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. Re-boot the server using the Array*Config*SA diskette.
2. Run the Array*Config*SA 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 floppies 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 Array1000SA 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 Array1000SA driver diskette and the installation should continue as normal.

"Partition size too large"
When installing Windows NT, this message appears if attempting to create a partition larger than 4 GBytes. Windows NT has a maximum primary 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.

Problems Running Adaptec CI/O Management Software On Your Windows NT Server

If the Adaptec CI/O Management Software does not start when you double-click the program icon and you see a warning box with Unable to Initialize IOMAPI, try the following:

- Verify that the following NT services have a status of *Started* (double-click the **Services** icon in Control Panel). If they do not, select each service and press the **Start** button:

  CIO Array Management Service
  CIOArrayManager RPC Command
  CIOArrayManager RPC EventP
  CIOArrayManager RPC Event
  NobleNet Portmapper

- Make sure you have the proper security access rights to the Windows NT Services. The Windows NT Services can be started, stopped, paused, etc., by different users (administrators, power users, local users, etc.) according to the NT service security rules defined by Microsoft (refer to the Windows NT documentation for more details).

- Verify that the Registry was updated correctly during installation. If the values do not match the values listed below, try reinstalling the Adaptec CI/O Management Software:
  - The correct entries for *HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CIOArrayManagement* are:

    DisplayName: REG_SZ: CIO Array Management Service (v x.xx)
    ErrorControl: REG_DWORD: 0x01
    ImagePath: REG_SZ: [*Pathname specified during installation*]iomgr.exe
    ObjectName: REG_SZ: LocalSystem
    Start: REG_DWORD: 0x02
    Type: REG_DWORD: 0x110
    SharedMemName: REG_SZ: iomgr.shm

  - The correct entries for *HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\EventLog\System\CIOArrayManagement* are:

    EventMessageFile: REG_SZ: [*pathname to system32 directory*]\system32\iomgrmsg.dll
    TypesSupported: REG_DWORD: 0x7

  - The correct entries for *HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\NobleNetPortmapper* are:

    DisplayName: REG_SZ: NobleNet Portmapper
    ErrorConrol: REG_DWORD: 0x1
    ImagePath: REG_EXPAND_SZ: Absolute Path of "portserv.exe"
    ObjectName: REG_SZ : LocalSystem
    Start: REG_DWORD : 0x02
    Type: REG_DWORD : 0x10

  - The correct entries for *HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CIOArrayManager RPC Command* are:

    DependOnService: REG_MULTI_SZ: NobleNet Portmapper CIOArrayManagement
    DisplayName: REG_SZ: CIOArrayManager RPC Command

ErrorControl: REG_DWORD: 0x1
ImagePath: REG_EXPAND_SZ: Absolute Path of "iomrpccm.exe"
ObjectName: REG_SZ : LocalSystem
Start: REG_DWORD : 0x02
Type: REG_DWORD : 0x10

– The correct entries for *HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CIOArrayManager RPC Event* are:

DependOnService: REG_MULTI_SZ: CIOArrayManagement CIOArrayManager RPC Command
DisplayName:REG_SZ: CIOArrayManager RPC Event
ErrorControl: REG_DWORD: 0x1
ImagePath: REG_EXPAND_SZ: Absolute Path of "iomrpcev.exe"
ObjectName: REG_SZ : LocalSystem
Start: REG_DWORD : 0x02
Type: REG_DWORD : 0x10

Problems Running SNMP Agent on Your Windows NT Server

If you have problems running SNMP agent, try the following:

- Make sure you configure Windows NT base SNMP support, including the appropriate trap community name and trap destinations. The SNMP configuration is accessed via Control Panel/Network/SNMP Service. If the SNMP service does not appear as a configurable item, then SNMP support must be installed from the Windows NT distribution media.
- Verify that the values in the Registry match the values listed below:
  – Make sure *HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\SNMP\Parameter\ExtensionAgents* includes an entry like this:

    3 REG_SZ SOFTWARE\Adaptec\CIOSNMP\CurrentVersion

    (where 3 should be replaced by the next unused number)

– Make sure *HKEY_LOCAL_MACHINE\SOFTWARE\Adpatec\CIOSNMP\CurrentVersion* includes a value like this:

  Pathname: REG_SZ: [installationpath]\ciosnmp.dll

  For example, if the recommended *c:\ciodata* path is used for the installation directory, then the Pathname value would look like:

  Pathname: REG_SZ: c:\ciodata\ciosnmp.dll

– Make sure *HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\SNMP* includes an entry like this:

  DependOnService: REG_MULTI_SZ: CIOArrayManagement

❒

C

Using a CD-ROM Drive

Should you need to install a CD-ROM, the Array1000SA Family Manager Set drivers diskette included with the AAA-13xSA RAID card contains the DOS and NetWare driver software you need in order to use a CD-ROM controlled by the AAA-13xSA RAID card. 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-13xSA RAID card under DOS, you need

- The SCSI driver, *aspi8dos.sys* (version 1.32 or later)
- The CD-ROM driver, *aspicd.sys*
- The Microsoft CD-ROM extensions, *mscdex.exe*

The *aspi8dos.sys* and *aspicd.sys* files must be copied from the *\dos* directory on the Adaptec Array1000SA Family Manager Set driver diskette to a directory (e.g., *c:\scsi*) on your hard disk drive. 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 CompuServe forum.

To complete the driver installation, edit the *config.sys* file to include command lines for *aspi8dos.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\aspi8dos.sys /d
device=c:\scsi\aspicd.sys /d:aspicd0
```

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

```
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.)

The following tables describe the *aspi8dos* and *aspicd* 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.

Command Line Options for *aspi8dos.sys*

Option	Example	Use
/ccbs<*count*>	/ccbs8	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.
/d	/d	Displays information about the AAA-13xSA RAID card and attached SCSI devices when the computer boots.
/L	/L	Enables *aspi8dos* to recognize all eight possible LUNs associated with each SCSI ID. If the option is not used, *aspi8dos* can recognize only LUN 0 for each SCSI ID.
/m*n*	/m1	Causes *aspi8dos* to scan the PCI bus. The method used to scan the bus is determined by the value of *n*: /mb = scan PCI bus using PCI BIOS calls /m1 = scan PCI bus using Mechanism #1 /m2 = scan PCI bus using Mechanism #2 *aspi8dos* 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 /mb, /m1, and /m2 options only if you want to override the *aspi8dos* internal scanning mechanism. Usually *aspi8dos* 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.
/norst	/norst	Prevents *aspi8dos* from resetting the SCSI bus when you boot your computer. By default, *aspi8dos* resets the SCSI bus when you boot the computer if the host adapter BIOS is not present. You can use /norst to prevent this from happening.
/pause	/pause	Pauses the system after loading *aspi8dos* at bootup, so you can read the message on the screen. After you read the message, press any key to resume booting.
/rst	/rst	Forces *aspi8dos* to reset the SCSI bus when you boot your computer. By default, *aspi8dos* does not reset the SCSI bus when you boot your computer if the host adapter BIOS is present.
/s<*slot number*>	/s1 /s3	Indicates the slot number(s) where you want *aspi8dos* to look for host adapters. Valid slot numbers = 1 to 15. If you do not use this option, *aspi8dos* scans all slots for host adapters, beginning at slot 1.

Command Line Options for *aspicd.sys*

Option	Example	Use
/d:*<name>*	/d:aspicd0	Required in the *config.sys* command line. Assigns a name to the CD-ROM drive so that *mscdex* can assign the CD-ROM a logical drive letter. The name must exactly match the CD-ROM drive name in the *mscdex* command line in *autoexec.bat*. Use any eight-character name.
/id=*{…}*	/id=2+4 / id=3+5+1:4	Specifies CD-ROM drives controlled by *aspicd*. By default, *aspicd* controls all drives. In the first example, which is for a computer with one host adapter, *aspicd* controls the devices with SCSI IDs 2 and 4. In the second example, for a computer with two host adapters, *aspicd* 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, *aspicd* assumes it is 0).
/L	/L	Enables *aspicd* to recognize all eight possible LUNs associated with each SCSI ID. If the option is not used, *aspicd* can recognize only LUN 0 for each SCSI ID. Add the /L 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 /L option. The *aspicd* device driver automatically scans multiple LUNs if it detects one of these devices on the SCSI bus.
/norst	/norst	Prevents *aspicd* 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.
/pause	/pause	Makes your system pause after loading *aspicd* at bootup, so you can read the message on the screen. Press any key to resume booting.
/type:*<drive vendor>*	/type:sony	Allows *aspicd* 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 /type:*<drive vendor>* option, *aspicd* 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.

Using a CD-ROM Drive with NetWare

To operate a CD-ROM drive connected to the AAA-13xSA RAID card under NetWare, you need the *aspicd.dsk* driver. The driver must be copied from the *netware\v3_1x* or *netware\v4_1x* directory on the Array1000SA Family Manager Set driver diskette to a directory on your hard disk drive.

Follow these steps to set up the CD-ROM drive under NetWare:

1. At the server prompt, enter

   load install

2. From the Installation Options menu, select **Available System Options** and then **Edit STARTUP.NCF**.

3. Insert the following lines:

   load *[pathname]*aspicd.dsk
   load cdrom.nlm

4. Press the **Esc** key, save the changes, and exit *install.nlm*.

5. Down the server normally and restart.

Note: To access your CD-ROM without restarting your server, simply enter each of the command lines listed in Step 3 at the server prompt (:); then proceed to Step 6.

6. At the server prompt, enter

   cd device list

   A list of CD-ROM drives appears.

7. Write down the device number and volume name of the CD-ROM.

8. At the server prompt, enter

   cd mount <*x*> <*name*>

   where <*x*> is the device number and <*name*> is the volume name you wrote down in step 5.

❒

▼▼▼▼ D

Using the SNMP Agent

This appendix provides information on using the SNMP agent for NetWare and Windows NT. A section describing how to load MIBs in the MIB database is also provided.

NetWare

1. Modify the *traptarg.cfg* file which specifies SNMP trap destinations.

   a. Open the *traptarg.cfg (sys:\etc\traptarg.cfg)* file using any editor.

   b. Scroll down to the Protocol IPX section of the file.

   c. For each client PC which is to receive traps using the IPX network protocol, add a line to the file that includes the IPX network number (8 digits) and the MAC address (12 digits) of the client PC. Include a tab character before the IPX Network Number. For example:

      ```
      (Tab)00000002:008DAD088E24
      ```

      When all of the appropriate entries are added, the Protocol IPX section should look something like the following:

      ```
      Protocol IPX
      00000002:008DAD088E24
      00000002:0080AD0761EC
      ```

2. Similar to instructions for the Protocol IPX section, edit the *traptarg.cfg* file to specify IP addresses mapped to MAC addresses for each client PC which is to receive traps using the TCP/IP network protocol.

3. Start the SNMP agent

   a. Load the SNMP agent by entering the following command:

      load cio20 [c<string>] [v]

   b. The optional parameters are

      c<string>

      Load the agent using the SNMP community name contained in <string>. The default SNMP community name is "public".

      v

      Load the agent in verbose mode, which will cause debugging information to be sent to the console.

Note: The I/O Manager must be loaded prior to loading the SNMP agent.

Windows NT

The SNMP agent is automatically installed when you install Adaptec CI/O Management Software.

There are no command line options for the CI/O SNMP agent; however, if a file named *ciosnmp.vb* is placed in the I/O Manager installation directory, the CI/O SNMP agent will write a debugging trail to a file named *ciosnmp.log* in the same directory. It does not matter what the contents of the *ciosnmp.vb* file are. The log file will be overwritten each time the NT SNMP agent is restarted. If you have problems running the SNMP agent, refer to *Problems Running SNMP Agent on Your Windows NT Server* on page B-5.

Note: The I/O Manager must be loaded prior to loading the SNMP agent.

Loading MIBs in the MIB Database

Follow the procedure below to load MIBs in the MIB database while running HP OpenView. For more complete information refer to the *Managing MIB Data* section of the HP OpenView Manual.

1. Select the **Options:Load/Upload MIBs:SNMP** menu item, the MIB Load/Upload MIBs:SNMP dialog box appears, listing the MIBs currently loaded.
2. Click the **Load** button. The Load MIB from File dialog box appears, listing the files in the default directory.
3. Browse the CI/O Setup Diskette and double-click the MIB file you want to load. The MIB is automatically loaded and the MIB Load/Unload MIBs dialog box reappears, showing the list of currently loaded MIBs.
4. The MIB name is now included in the Loaded MIBs scrollable list.

   If a MIB does not load properly, you will receive an error message. The problem could be one of the following:

   – A syntax error in the MIB. The MIB loader error message contains the MIB where the error is occurring.

   – The vendor's MIB. For example, the vendor's MIB might not match the version for the device that is on the network.
5. Click **Close** to exit this operation.

❒

E

Obtaining SCSI Cables and Converters

High-quality cables are required in high-performance SCSI Array (RAID) systems to ensure data integrity. Adaptec provides the highest quality SCSI cables designed specifically for use with Adaptec AAA-13xSA RAID card PCI Array adapters. For purchasing information, contact Adaptec:

Adaptec, Inc.
691 S. Milpitas Boulevard
Milpitas, CA 95035
USA
Tel: (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 a list of SCSI cables and converters available directly from Adaptec.

External Cables

Part Number	Description	Length
ACK-W2W-E	High-Density 68-pin to High-Density 68-pin Cable	1 m
ACK-H2H CBL KT(97)	High-Density 50-pin to High-Density 50-pin Cable	1 m
ACK-H2L CBL KT(97)	High-Density 50-pin to Centronics 50-pin Cable	1 m

External Connector Diagrams

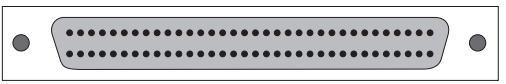

Figure E-1. High-Density 68-pin

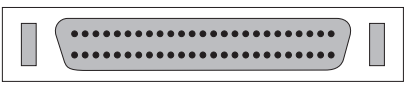

Figure E-2. High-Density 50-pin

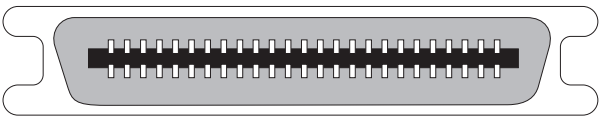

Figure E-3. Centronics 50-pin

Internal Ribbon Cables

Part Number	Description	Length
ACK-F2F-5IT[1]	5 position (4 devices + SCSI Card), Standard 50-pin female connectors, terminated	1.3 m
ACK-W2W-5IT[1]	5 position (4 devices + SCSI Card), High-density 68-pin male connectors, terminated	1.3 m

[1] 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

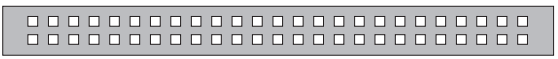

Figure E-4. Low-Density 50-pin

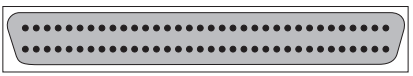

Figure E-5. High-Density 68-pin

Converters

Part Number	Description	Connectors
ACK-GCH2L	External Converter	High-density 50-pin female to Standard 50-pin female
ACK-68P-50P-E	External Converter	High-density 68-pin female to High-Density 50-pin male
ACK-68I-68E	Internal to External Converter	Internal High-density 68-pin male to External High-density 68-pin female
ACK-501-50E	Internal to External Converter	Internal Standard 50-pin female to External High-density 50-pin female

Maximum Cable Lengths

The total length of cabling connected to each SCSI channel may not exceed the maximum lengths listed in the following table.

Maximum Cable Length	Data Transfer Rate	Maximum Peripherals Supported[1]
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, 20 MBytes/sec for 8-bit)	4
1.5 m (4.9 ft)	Ultra SCSI (40 MBytes/sec for 16-bit, 20 MBytes/sec for 8-bit)	5-8[2]

[1] Not including the AAA-13xSA RAID card.

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

❒

▼▼▼▼ Index

H

I

L

M

N

P

R

S

T

W

❒