INSTALLATION AND HARDWARE GUIDE

ARO-1130CA2
RAID OPTION CARD

▼▼▼▼ ARO-1130CA2

**RAID Option Card
for PC Workstations
with RAID*port* II or III**

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.	ARO-1130CA-C
FC	Tested To Comply With FCC Standards
FOR HOME OR OFFICE USE	
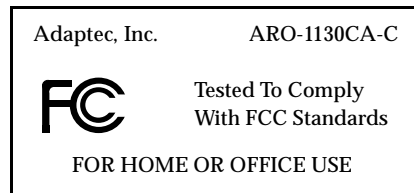
Canadian Compliance Statement

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 matériel brouilleur du Canada.

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Introduction

The Adaptec® ARO™-1130CA2 RAID Option card provides power-ful disk array support in personal workstations with a PCI/RAID-*port* II or III expansion slot on the system motherboard.

This *Installation and Hardware Guide* explains how to install the ARO-1130CA2, run the Array1000 BIOS & Driver Selection Utility, create the first array with the Array*Config*CA2 program, and then install the supporting software. The *Adaptec Array1000CA2 Family Array Management Guide*, which is included with the ARO-1130CA2, explains how to use the software to create and manage additional arrays.

System Requirements

The minimum system requirements for the ARO-1130CA2 are

- A RAID*port* II or III equipped system with an available PCI/RAID*port* II or III slot. See the Adaptec Web Site at *http://www.adaptec.com/raid* for a compatibility list of systems.

- A minimum of one SCSI hard disk drive

- A standard 168-pin, EDO 3.3v, 60ns or faster DIMM installed on the card. (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 ARO-1130CA2 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™ Workstation 4.0

- A 3.5-inch 1.44-MByte primary (boot) floppy disk drive

- 64 MBytes of system memory

- CD-ROM drive for installation of Adaptec CI/O™ Workstation Array Management Software

> **Note:** 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 workstation.

Installation Overview

To install ARO-1130CA2 hardware and software, follow these steps:

1 Locate the PCI /RAID*port* II or III slot on the PC workstation motherboard. (Chapter 2)

2 Install the ARO-1130CA2 into the PCI/RAID*port* II or III slot in the PC workstation. (Chapter 2)

3 Connect any additional SCSI devices to the RAID ready SCSI connectors on the motherboard.

4 Run the Array1000 BIOS & Driver Selection Utility. (Chapter 3)

> **Note:** If you plan to install ARO-1130CA2 in a system containing another Adaptec product, and the Array1000 BIOS & Driver Selection Utility determines you require Disk B of the manager set driver diskettes, see Appendix B, *Using the ARO-1130CA2 with Other Adaptec Products*, before continuing with installation.

5 Run the Array*Config*CA2 ™ program. (Chapter 4)

6 Install the Array1000CA driver for Windows NT. (Chapter 5)

7 Install the Adaptec CI/O™ Workstation Array Management Software on your workstation. (Chapter 5)

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

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Installing the ARO-1130CA2

This chapter explains how to install the ARO-1130CA2 in your
workstation. To install the ARO-1130CA2, you must

- Verify installation of DIMM memory

- Install the ARO-1130CA2 in your workstation

> **Note:** If the Array1000 BIOS & Driver Selection Utility
> (Chapter 3) determines you require driver Disk B of the
> manager set driver diskettes, see Appendix B, *Using the
> ARO-1130CA2 with Other Adaptec Products.*

ARO-1130CA2 Layout

Figure 2-1 identifies the major ARO-1130CA2 components. You may find it helpful to refer to this information while installing the ARO-1130CA2.

DIMM Memory Socket
Must be populated with a
168-pin EDO 3.3v DIMM

LED Connector
Connects to the computer's LED cable to
display activity on the SCSI bus

Bus Contacts
Inserted into the PCI/RAID*port*
expansion slot

Expansion Slot Bracket
Secures the ARO-1130CA2
card inside your computer

BIOS EPROM
Provides booting
capabilities from a SCSI
hard disk or array
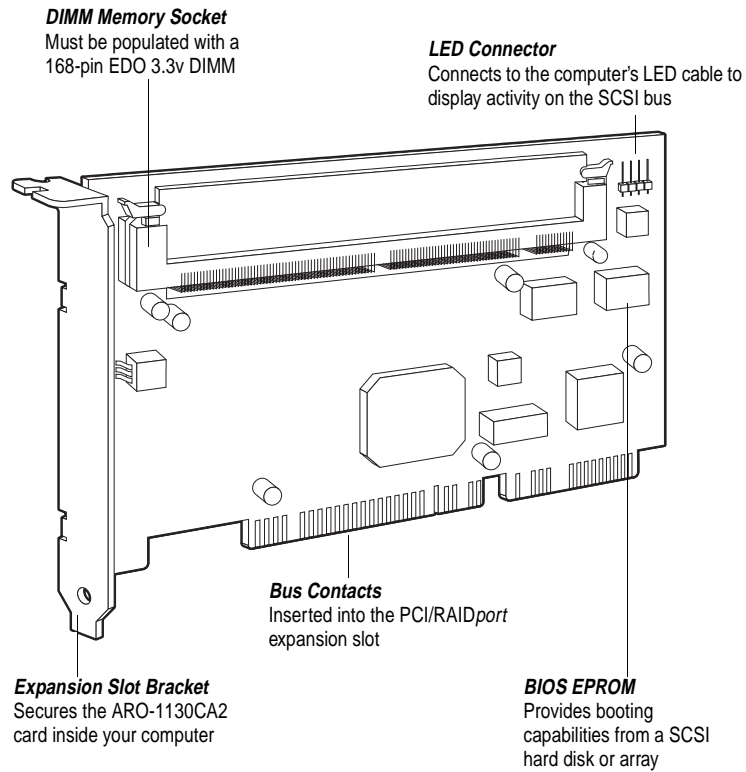
Figure 2-1. ARO-1130CA2 Major Components

Verifying Installation of DIMM Memory

Before you can use the ARO-1130CA2, the DIMM memory socket must be populated with a DIMM, as shown in Figure 2-2. 1 In most cases, the ARO-1130CA2 comes pre-installed with a DIMM. Nevertheless, 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.)

168-pin DIMM
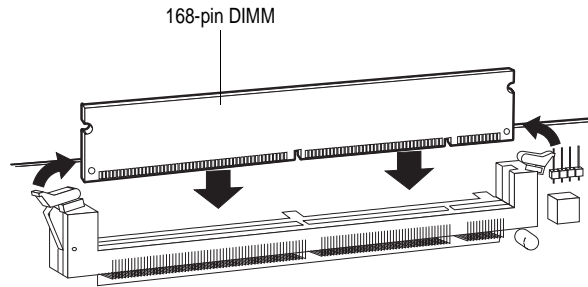
Figure 2-2. Installing a DIMM in the ARO-1130CA2 DIMM Memory Socket

Installing the ARO-1130CA2

Follow these steps to install the ARO-1130CA2:

> **Note:** If you are installing the ARO-1130CA2 in an existing workstation that already has data, back up all data before continuing with installation.

1 Turn OFF power to the workstation, and disconnect the power cord.

2 Remove the cover from the workstation. (If necessary, refer to the instructions in your computer documentation.)

3 Locate the PCI/RAID*port* II or III expansion slot and remove the expansion slot cover. Save the slot cover screw for use in Step 4.

4 Insert the ARO-1130CA2 in the PCI expansion slot; press down firmly until it clicks into place, then replace the slot cover screw.
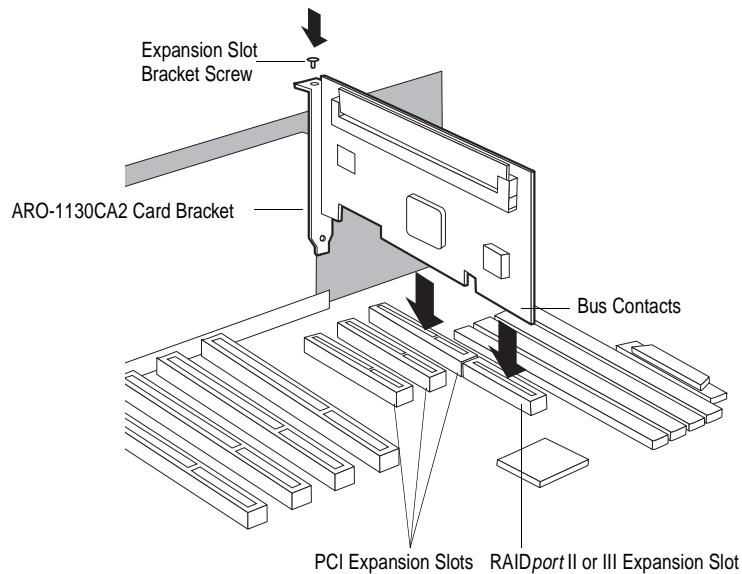
Figure 2-3. Installing the ARO-1130CA2 in a Typical PCI/RAID*port* II or III Expansion Slot

Connecting the LED Cable to the ARO-1130CA2

(*Optional feature*) An LED on the front panel of most computers lights to indicate non-SCSI hard disk activity. If you want that LED to light whenever there is activity on SCSI Channel A (controlled by the ARO-1130CA2), disconnect the LED cable from the motherboard and connect it to the LED connector on the ARO-1130CA2. If the LED has a two-position cable, connect the cable to pins 1 and 2 of the LED connector, as shown in Figure 2-4.

If the ARO-1130CA2 supports multiple SCSI channels, and you want the LED to light whenever there is activity on any of those channels, refer to your motherboard documentation for instructions on setting the appropriate motherboard jumpers.

> **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 ARO-1130CA2.
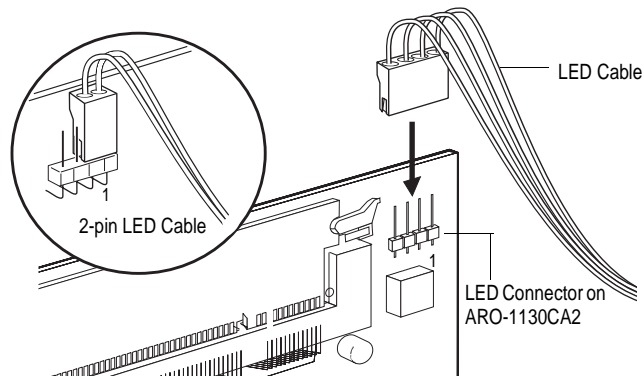
Figure 2-4. Connecting the LED Activity Indicator Cable

Completing the Installation

Once the ARO-1130CA2 is installed in your workstation, refer to the documentation that came with your computer and SCSI device for specific instructions on setting up your SCSI devices and connecting them to the SCSI connectors on the motherboard.

Note: If you refer to the computer's documentation for installation instructions, be sure to return to this document for instructions on running the Array1000 BIOS & Driver Selection Utility and installing the software included in the package.

The SCSI*Select*® utility, described in Appendix A, *Configuring ARO-1130CA2 with the SCSISelect Utility*, allows you to configure the SCSI options (e.g., ID, Parity Checking, and Termination) available for the SCSI channels supported by the ARO-1130CA2. If you need to configure SCSI options see Appendix A. In most cases, it is not necessary to run the SCSI*Select* utility.

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Using the Array1000 BIOS & Driver Selection Utility

Whenever you install a new ARO-1130CA2 in your workstation and before you run the Adaptec Array*Config*CA2 program to create the first array in your workstation, always run the Array1000 BIOS & Driver Selection Utility.

> ⚠ **Caution:** We highly recommend that you back up the data on your array(s) before you use the Array1000 BIOS & Driver Selection Utility. This will ensure that your data is completely protected.

The Array1000 BIOS & Driver Selection Utility installs the ARO-1130CA2 BIOS by automatically updating (flashing) the correct BIOS. The utility also determines which of the two Manager Set driver diskettes (Disk A or Disk B) is required when you install the Windows NT Driver, as explained in *Installing the Array1000CA Driver for Windows NT* on page 5-2.

Running the Array1000 BIOS & Driver Selection Utility

The Array1000 BIOS & Driver Selection Utility is provided on a bootable floppy disk and runs under DOS as a stand-alone utility. A simple-to-use interface prompts you through the process. Follow these steps to run the Array1000 BIOS & Driver Selection Utility:

1   Insert the Array1000 BIOS & Driver Selection Utility diskette in drive *A* and reboot your workstation. The utility starts automatically and the initial Array1000 BIOS & Driver Selection Utility screen appears.

> **Note:** The initial Array1000 BIOS & Driver Selection Utility screen identifies which of the two Manager Set driver diskettes (Disk A or Disk B) is required when you install the Windows NT Driver, as explained in Chapter 5. Make a note of which diskette to use, and continue with Step 2.

2   Select either **Express** or **Advanced** setup.

> **Note:** If you receive an "Unsupported Hardware Configuration," message during setup, contact the system manufacturer. The ARO-1130CA2 is not supported by the system.

- **Express** setup automatically updates the ARO-1130CA2 BIOS. Simply select **Express** setup and the utility will do the rest. When prompted, remove the floppy disk and press any key to reboot the workstation. *Do not* continue with the remaining steps.

- **Advanced** setup also allows you to update the ARO-1130CA2 BIOS. In addition, Advanced setup allows you to select other options such as:

  - **Display Current BIOS Checksum**. Determines current version of the ARO-1130CA2 BIOS.

  - **Display New BIOS Checksum**. Determines version of the BIOS available on the floppy.

  - **Save Current BIOS to a File**. Saves the current ARO-1130CA2 BIOS to a file.

  - **Erase Current BIOS**. Erases the current ARO-1130CA2 BIOS.

  To access these options, select **Advanced** setup and continue with Step 3.

3 From the Main Menu, select the array adapter card you want to upgrade (only available array adapters can be selected). The Utility Menu appears.

4 Make a selection from the Utility Menu.

5 Follow the simple instructions on the screen.

6 When prompted, remove the Array1000 BIOS & Driver Selection Utility diskette from drive *A* and reboot your workstation.

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Creating the First Array With the Array*Config*CA2 Program

This chapter explains how to use the Adaptec Array*Config*CA2 program to create the first bootable or nonbootable array on your workstation. Once the first array is created using Array*Config*CA2, use Adaptec CI/O Workstation Array Management Software to create additional arrays.

Before creating the array, make sure the disks for the array are connected and installed in your workstation (or array enclosure), and that you have run the Array1000 BIOS & Driver Selection Utility, as described in Chapter 3. You can use Array*Config*CA2 in two ways:

■ Select **Express Setup** if you want to create an array quickly and easily. Array*Config*CA2 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 more than two disks or adding spare disks to an array.

Array*Config*CA2 runs from a convenient, self-booting diskette. All Array*Config*CA2 functions, except creating bootable arrays, can also be performed with Adaptec CI/O Workstation Array Management Software, which runs under Windows NT. Refer to the *Adaptec Array1000CA2 Family Array Management Guide* for additional information.

Creating an Array with Express Setup

Array*Config*CA2's Express Setup option allows you to quickly create an array by answering some basic questions about what kind of array you want. This process is similar to the wizards used in many Windows® programs. When you use the Express Setup option you do not need to know the technical details of how arrays are configured.

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 Array*Config*CA2 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 Array*Config*CA2 diskette in drive *A* and reboot your workstation. Wait until Array*Config*CA2 starts automatically.

2 Read the text that appears on the initial Array*Config*CA2 screens. Press any key to view the next screen, or press **Esc** to return to the previous screen.

3 When you see the Setup Type Selection Menu, select **Express Setup.**

4 When the next screen appears, select the type of array you want to create:

– Select **Optimized for Performance** 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** 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.)

5 When the next menu appears, select the type of application that you will run on your workstation. (Select **Others** if you are not sure what type of application you will use.) Array*Config*CA2 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 workstation 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 Chapter 5, *Installing Software on Windows NT Workstation.*)

– Select **Disk Array will not be a Boot Drive** if you do not want your workstation to boot from the new array.

7 When you have finished all these menu selections, wait while Array*Config*CA2 creates the array. This may take a long time, especially if the disk drives are large in capacity.

A message appears when the array has been created. An error message appears if fewer than two disks are available or if Array*Config*CA2 encounters some other problem. If this happens, install more disk drives or run Array*Config*CA2 again and use the **Custom Setup** option.

Creating an Array with Custom Setup

Array*Config*CA2's Custom Setup option allows advanced users to create arrays with customized configuration and to manage arrays that are already created. Use Custom Setup if you want to

- delete an array

- initialize an array

- add or delete spare disks

- make an existing array the boot array

Follow these instructions to create an array with Custom Setup.

1 Insert the Array*Config*CA2 diskette in drive *A* and reboot your workstation. Wait until Array*Config*CA2 starts automatically.

2 Read the text that appears on the initial Array*Config*CA2 screens. Press any key to view the next screen, or press **Esc** to return to the previous screen.

3 When you see the Setup Type Selection Menu, select **Custom Setup.** Then wait while Array*Config*CA2 scans your workstation for information about your host adapter and SCSI devices.

4 When the Main Menu appears, select **Disk Array Operations**.

5 Select **Create New Array** from the Disk Array Operations menu.

6 Type a name for the array 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 from the following options:

- **RAID 0**: Data is striped across the disks in a RAID 0 array, allowing for faster data input and output than a single disk. RAID 0 arrays do not store redundant data; if any disk in the array fails, all data is lost. (This is the type of array that is created if you select **Optimized for Performance** under Express Setup.)

> **Note:** Array*Config*CA2 allows creation of a single disk RAID 0 Array. This option does not stripe data, but does allow two powerful features: Caching of a single disk, and booting of the cached single disk.

– **RAID 1**: Data is mirrored on one pair of disks. If one disk fails, data is still safe. The actual data capacity of the array equals half the available disk space. (This is the type of array that is created if you select **Optimized for Data Protection** under Express Setup.)

See the *Adaptec Array1000CA2 Family Array Management Guide* for more information on selecting a RAID level.

8 Type the number of drives you want in the array and press **Enter**. The number of drives available for assignment is listed on the screen.

> **Note:** This step only applies if you are creating RAID 0 arrays; RAID 1 arrays have two drives by definition.

9 When the next screen appears, press **Tab** to highlight a channel (if your Adaptec array card uses more than one SCSI channel). 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 box on the right side of the screen.

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 disks with partitions if they contain 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 8, the next screen appears automatically. If you are creating a RAID 1 array, and if there are any unassigned drives, the screen prompts you to define spare drives for the array.

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

10 If you do not want a spare, type n and continue with Step 11. 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 When the Initialize Mode Menu appears, select **Initialize Array to Zero**. This operation begins immediately. 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 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 default block size (64 KBytes) gives the best overall performance. The allowable block sizes are 8, 16, 32, 64, and 128 KBytes.

13 When you see the message Initialization of [*array name*] is complete, press any key to return to the Disk Array Operations Menu.

14 You may use Array*Config*CA2 to create additional arrays (if disks are available); however, we recommend using Adaptec CI/O Workstation Array Management Software to create additional arrays and for array management. See the *Adaptec Array1000CA2 Family Array Management Guide* for more information.

15 When the array is created, exit from Array*Config*CA2, remove the Array*Config*CA2 diskette, and reboot the workstation. After you reboot you can write data to the array.

At this point, you can make your initial array bootable as described in the next section.

For information on other Custom Setup options, or information on using Array*Config*CA2 to create, delete, and manage arrays and spares, refer to the *Adaptec Array1000CA2 Family Array Management Guide.*

Making the Array Bootable

You can make the array bootable so that the workstation boots from a cached one-disk RAID 0 array or multiple-disk RAID 0 or RAID 1 array instead of from an unconfigured 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 workstation to boot from the newly created array:

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

1 Insert the Array*Config*CA2 diskette in the workstation's floppy disk drive *A*.

2 Reboot the workstation from the diskette. Array*Config*CA2 starts automatically.

3 Select **Custom Setup**.

4 Select **Display Boot Order** from the Main Menu. The Boot Order for Singles (an unconfigured stand-alone SCSI device) and Arrays (one-disk RAID 0 array or multiple drive RAID 0 or RAID 1 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 Array*Config*CA2, remove the diskette from drive *A*, and reboot the workstation.

9 Prepare the array as you normally would prepare a boot disk drive for your operating system. See Chapter 5, *Installing Software on Windows NT Workstation*.

Note: You cannot use this procedure to change the boot order of a stand-alone SCSI disk drive. If you want to do this, configure a one-disk RAID 0 array from the stand-alone disk drive and then designate it with a boot order of Unit 0.

Installing Software on Windows NT Workstation

This chapter explains how to install the software required to use the ARO-1130CA2 in a workstation using Windows NT Workstation 4.0.

Before installing the software, make sure the ARO-1130CA2 is already installed. If you plan to boot from an array, make sure the array is already created and has a boot order of Unit 0. If you have not already done so, run the Array1000 BIOS & Driver Selection Utility to determine which of the two Manager Set driver diskettes (Disk A or Disk B) is required to install the Windows NT Driver.

To install all of the software, you must complete the following in the order presented:

- Install the Array1000CA driver for Windows NT
- Install the Adaptec CI/O Workstation Array Management Software for Windows NT

Once all software is installed, refer to the *Adaptec Array1000CA2 Family Array Management Guide* for instructions on adding, deleting, and managing your arrays.

Note: If your workstation has an additional Adaptec AIC™-78xx adapter (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 Array1000CA Driver for Windows NT

This section explains how to install the Array1000CA 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 5-4.

> **Note:** We recommend that you install your Windows NT operating system on an array to take advantage of the performance or redundancy features of the array.

> **Note:** If your system is: 1) a RAID*port* equipped workstation; AND 2) has an Adaptec AHA®-294x, AHA-3940, or other AIC-78xx based host adapter installed; AND 3) requires driver Disk B (as determined by the Array1000 BIOS & Driver Selection Utility), see *Using the ARO-1130CA2 with an AHA-294x, AHA-3940, or Other AIC-78xx Based Host Adapter and Driver Disk B* on page B-2 for instructions on installing the Array1000CA Miniport Driver.

Installing the Driver When Installing Windows NT

To install the *cda1000.sys* driver when you are installing Windows NT 4.0, follow these steps:

> **Note:** If you have other arrays or a stand-alone single disk, we recommend temporarily powering off all devices 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 devices and reboot the workstation.

1 Start your workstation with the Windows NT Boot Diskette in the floppy disk drive <u>or</u> the Windows NT Boot CD-ROM in the CD-ROM drive.

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's hardware configuration…

Note: For Windows NT Boot CD-ROM installation, BIOS support for Bootable CD-ROM must be enabled in SCSI*Select*. See Appendix A, *Configuring ARO-1130CA2 with the SCSISelect Utility*.

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; when prompted for the Manufacturer-supplied hardware support disk, insert the appropriate Adaptec Array1000CA Family Manager Set drivers diskette (Disk A or Disk B) in your floppy disk drive. (See *Running the Array1000 BIOS & Driver Selection Utility* on page 3-2 to determine the appropriate drivers diskette.)

6   Press **Enter**; the screen displays the adapter drivers supported on the diskette. Select the Adaptec Array1000CA Family Adapter and press **Enter**.

7   If you want to add drivers for other devices (other than the ARO-1130CA2), do so at this time by pressing **S** and repeating 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 onscreen instructions to complete the installation.

Installing the Driver When Windows NT is Already Installed

To install the *cda1000.sys* driver when Windows NT 4.0 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 appropriate Adaptec Array1000CA Family Manager Set drivers diskette (Disk A or Disk B) in drive *A*; enter the following path to the installation files and then click **OK**. (See *Running the Array1000 BIOS & Driver Selection Utility* on page 3-2 to determine the appropriate drivers diskette.)

    a:\winnt

The Adaptec Array1000CA Family Adapter is highlighted by default.

8 In the Install Driver window, Click **OK**.

9 Click the **New** button if you are asked 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 workstation for the changes to take effect. Click **Yes** to restart your workstation.

Installing Adaptec CI/O Workstation Array Management Software for Windows NT

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

1   Start Windows NT.

2   Insert the Adaptec CI/O Workstation Array Management Software CD-ROM in your CD-ROM drive. If you are installing the software from diskettes, insert Disk 1 of the Adaptec CI/O Workstation Array Management Software for Windows NT in the floppy disk drive.

3   Select **Run** from the File menu, 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 workstation. The following NT Services start automatically in the background:

   CIO Array Management Service

   Note: This NT Service is configured to start automatically at boot time. After installation you can start or stop this service through the Services icon in the Windows NT Control Panel.

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

See the *Adaptec Array1000CA2 Family Array Management Guide* for information on using the Adaptec CI/O Workstation Array Management Software to add, delete, or manage your arrays. If you are experiencing problems starting the software, see *Problems Running the Software On Your Windows NT Workstation* on page C-3.
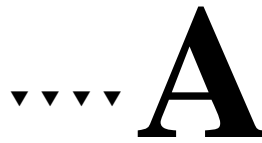
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Configuring ARO-1130CA2 with the SCSI*Select* Utility

The SCSI*Select* configuration utility allows you to change SCSI settings without opening the workstation or handling the RAID card. SCSI*Select* also contains utilities that allow you to low-level format or verify the disk media of your SCSI hard disk drives.

The SCSI*Select* settings are listed in the table below. 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-2. Detailed descriptions of each setting begin on page A-4.

SCSI Bus Interface Definitions
Host Adapter SCSI ID
SCSI Parity Checking
Host Adapter SCSI Termination
Host Adapter Ultra SCSI[1]
SCSI Device Configuration
Initiate Sync Negotiation
Maximum Transfer Rate
Enable Disconnection
Initiate Wide Negotiation[2]
Send Start Unit Command
Include in BIOS Scan
Additional Options
Array1000xA BIOS
BIOS Support for Bootable CD-ROM

[1] Option is available in a RAID*port* II system only.
[2] Option is available only if Wide SCSI is supported on the motherboard.

Starting the SCSI*Select* Utility

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

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.
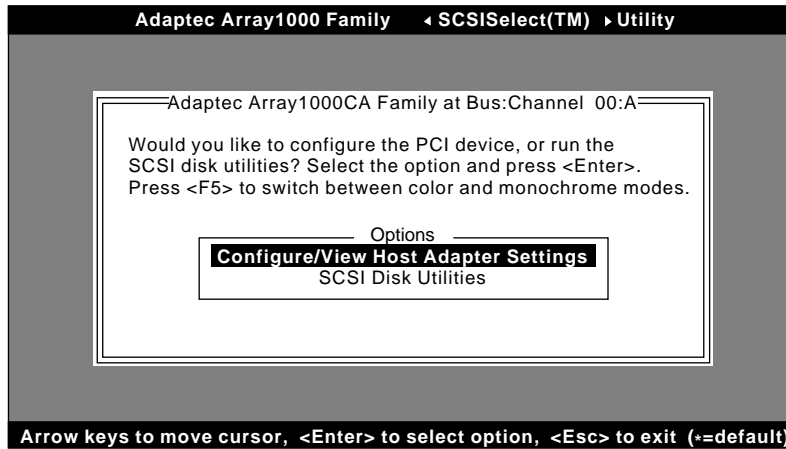
```
┌──────────────────────────────────────────────────────────────┐
│     Adaptec Array1000 Family     ◄ SCSISelect(TM) ► Utility    │
└──────────────────────────────────────────────────────────────┘


        ┌════Adaptec Array1000CA Family at Bus:Channel 00:A════┐
        │                                                      │
        │   Would you like to configure the PCI device, or run the │
        │   SCSI disk utilities? Select the option and press <Enter>. │
        │   Press <F5> to switch between color and monochrome modes. │
        │                                                      │
        │              ─────── Options ───────                 │
        │          ▐ Configure/View Host Adapter Settings ▌    │
        │                  SCSI Disk Utilities                 │
        │                                                      │
        └──────────────────────────────────────────────────────┘


  Arrow keys to move cursor,  <Enter> to select option,  <Esc> to exit  (∗=default)
```

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 does not work on some 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 workstation. Any changes you made in SCSI*Select* take effect after the workstation 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 no 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.

- **Host Adapter SCSI ID**— This option sets the ARO-1130CA2's SCSI ID. We recommend that you leave the ARO-1130CA2 set to SCSI ID 7, which gives the ARO-1130CA2 the highest priority on the SCSI bus.

- **SCSI Parity Checking**—This option determines whether the ARO-1130CA2 verifies the accuracy of data transfer on the SCSI bus. You should disable SCSI Parity Checking on the ARO-1130CA2 and all SCSI devices if any SCSI device supported by the ARO-1130CA2 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 is used in conjunction with your motherboard termination settings. Refer to your motherboard documentation for instructions on properly setting termination.

- **Host Adapter Ultra SCSI**—This option determines whether the ARO-1130CA2 supports Ultra SCSI data transfer speeds. If you have any Ultra SCSI devices installed, you should enable this setting. When this setting is enabled, the ARO-1130CA2 negotiates for data transfer speeds of up to 20 MBytes/sec (40 MBytes/sec for Wide SCSI devices). This option is available on RAID*port* II systems only.

  Note: If you use Ultra SCSI data transfer speeds, be sure to use high-quality cables to connect the disk drives supported by the ARO-1130CA2. The quality of the cable is much more critical when you use higher-speed data transfer.

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-3.

- **Initiate Sync Negotiation**—This option determines whether synchronous data transfer negotiation (Sync Negotiation) between the device and SCSI channel is initiated by the SCSI channel. Normally, you should leave Initiate Sync Negotiation set to *Enabled*, because most SCSI devices support synchronous negotiation and because it allows for faster data transfer.

- **Maximum Transfer Rate**—This option determines the maximum data transfer rate that the SCSI channel supports. The effective data transfer rate is doubled when Initiate Wide Negotiation is set to *Yes*. For example, a transfer rate of 20 MBytes/sec becomes 40 MBytes/sec.

- **Enable Disconnection**—This option determines whether the SCSI channel allows the SCSI device to disconnect from the SCSI bus (sometimes called Disconnect/Reconnect). This option should be enabled for maximum performance.

- **Initiate Wide Negotiation**—This option determines whether the SCSI channel attempts 16-bit data transfer instead of 8-bit data transfer. 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. If you have a Wide SCSI device, make sure this option is enabled.

- **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).

- **Include in BIOS Scan**—This option determines whether the ARO-1130CA2 BIOS supports hard disk drives attached to the SCSI channel. When set to *Yes*, the ARO-1130CA2 BIOS controls the hard disk drive. When set to *No,* the ARO-1130CA2 BIOS does not control the hard disk drive.

Additional Options

Array1000xA BIOS
This option determines whether the ARO-1130CA2 BIOS is installed at boot time. When set to *Enabled*, the ARO-1130CA2 BIOS is installed and all Int13 (except bootable CD-ROM) devices are supported. When set to *Disabled*, the ARO-1130CA2 BIOS is not installed. The default setting is *Enabled*.

BIOS Support for Bootable CD-ROM
This option determines whether the ARO-1130CA2 BIOS supports booting from a CD-ROM drive. When set to *Enabled*, the ARO-1130CA2 allows booting from a CD-ROM drive.

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Using the ARO-1130CA2 with Other Adaptec Products

You cannot install more than one ARO-1130CA2 card in the same system; however, you can install an ARO-1130CA2 in workstations that have other PCI-, ISA-, or EISA-based host adapters installed. When installing multiple adapters, consider the following:

■ Adaptec AAA-130 Series adapters cannot coexist with an ARO-1130CA2 inside a RAID*port* II or III equipped system.

■ All drives in a single array must be connected to the same host adapter. A single array cannot be created with drives from two or more host adapters.

■ If you are booting from a SCSI disk drive or array supported by the ARO-1130CA2, then the ARO-1130CA2 must be the card that the workstation scans first. Some computers boot from the device with the lowest PCI device number; others boot from the device with the highest number. (See also *Making the Array Bootable* on page 4-7.) You can disable the BIOS on cards that are scanned before the desired boot card.

■ In systems with EISA- and ISA-based host adapters, the boot host adapter must have the lowest BIOS base address.   The system BIOS automatically controls the ARO-1130CA2 base address (the user has no control over the assigned address).

Using Driver Disk B

If the Array1000 BIOS & Driver Selection Utility determines you require Disk A of the manager set driver diskettes, the rest of this appendix does not apply. If Disk B is required, then note the following for these Adaptec products:

- **AHA-294x, AHA-3940, or other AIC-78xx based host adapters**: These host adapters can coexist with an ARO-1130CA2 inside a RAID*port* II system; however, it is necessary to make some modification to your Windows NT configuration. See *Using the ARO-1130CA2 with an AHA-294x, AHA-3940, or Other AIC-78xx Based Host Adapter and Driver Disk B* below.

- **AHA-3940AU/3940AUW**: Due to a PCI ID conflict with the hardware on the motherboard that requires driver Disk B, these host adapters *cannot* coexist with an ARO-1130CA2 inside a RAID*port* II system.

Using the ARO-1130CA2 with an AHA-294x, AHA-3940, or Other AIC-78xx Based Host Adapter and Driver Disk B

This section offers two scenarios for using the ARO-1130CA2 in a system also containing any of the above host adapters. If the Array1000 BIOS & Driver Selection Utility (see Chapter 3) determines you require Disk B of the manager set driver diskettes, follow the scenario below that matches your situation. You will need to install drivers and make changes to the Windows NT Registry.

If the Array1000 BIOS & Driver Selection Utility determines you require Disk A, this section does not apply. To install the driver, follow the instructions in *Installing the Array1000CA Driver for Windows NT* on page 5-2.

> **Caution:** We recommend that you do *not* attempt to change the Windows NT Registry unless you are an experienced computer user.

Scenario #1: Adding an ARO-1130CA2 to a RAID*port* II System with an AHA-294x, AHA-3940, or Other AIC-78xx Based Host Adapter

These instructions assume that Windows NT is *already installed* on the workstation and that the boot drive is currently connected to the AHA-294x, AHA-3940, or other AIC-78xx based host adapter. If the ARO-1130CA2 is already installed, shut down the workstation, remove the ARO-1130CA2 from the expansion slot, and restart the workstation.

Installing the ARO-1130CA2 Driver

1 Start the Windows NT Control Panel and double click the **SCSI Adapters** icon.

2 Click the **Drivers** tab and click **Add**.

3 Click **Have Disk …**, and insert Disk B of the Array1000CA Family Manager Set diskettes in the floppy disk drive. (This diskette is included with your ARO-1130CA2 adapter.)

4 When the Install from Disk dialog box appears, type a:\winnt on the command line and click **OK**.

5 Select **Adaptec Array1000CA Family Adapter** and click **OK**.

6 When a message appears asking you if you want to restart Windows NT, click **No**.

7 Exit from Control Panel.

Changing Registry Settings

1 Back up the NT Registry, using one of the techniques described in *Backing up the Windows NT Registry* on page B-10

> ⚠️ **Caution:** It is very important to back up the NT Registry before you make any changes to it. This allows you to restore the original NT Registry settings if there is a problem with the new configuration.

2 Run the Registry Editor (*regedit.exe*).

3 When the Registry Editor window appears, expand the tree on the left until you can see the nodes under *\HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services*.

4 Select **cda1000** on the left part of the screen. Write down the cda1000 Tag value that appears on the right part of the screen.

The Tag value is a hex number followed by an equivalent decimal equivalent in brackets: for example, 0x00000002 [2].

5 Select **aic78xx** on the left part of the screen. Write down the aic78xx Tag value that appears on the right part of the screen.

6 Expand the tree on the left until you can see the nodes under *\HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\GroupOrderList*.

7 Select **GroupOrderList**.

8 Click the right mouse button on **SCSI Miniport** on the right side of the window and select **Modify** from the popup menu. A table appears with columns of two- and four-number groups, something like this:

```
0005 02 00 00 00 03 00 00 00
0010 01 00 00 00 01 01 00 00
0015 04 00 00 00 05 00 00 00
0020 06 00 00 00 07 00 00 00
etc.
```

This table of hexadecimal numbers indicates the Tag-value sequence in which the SCSI Miniport drivers are loaded when you start Windows NT.

9 Determine what the Tag value loading sequence is. Here is how you do this:

a Ignore the four-digit groups on the left of each row.

b Going from left to right, and starting on the first row, divide the two-digit numbers into groups of eight. In this example, the groups are

02 00 00 00
03 00 00 00
01 00 00 00
01 01 00 00
etc.

You need to write down *all* the number groups from all rows in the table.

c In each group of eight numbers, reverse the sequence of the two-digit pairs, like this:

00 00 00 02
00 00 00 03
00 00 00 01
00 00 01 01
etc.

d Write down the series of resulting numbers, without all the extra zeroes. In this example, it is 2, 3, 1, 101, etc. This is the Tag value loading sequence for SCSI Miniport drivers. In other words, when Windows NT loads these miniport drivers, the one with Tag value 2 is loaded first, then the one with Tag value 3, and so on.

10 Compare the Tag value loading sequence to the actual tag values of cda1000 and aic78xx that you determined in steps 4 and 5. If cda1000 is loading before aic78xx, skip to step 16. If aic78xx is loading first, continue with the next step.

11 Expand the tree on the left until you can see the nodes under \HKEY_LOCAL_MACHINE\System\CurrentControlSet \Services.

12 Select **cda1000** on the left part of the screen. Click the right mouse button on **Tag Value** on the right part of the screen and select **Modify** from the popup menu.

13 Type the tag value of the aic78xx miniport driver in the space provided and click **OK**.

14 Select **aic78xx** on the left part of the screen. Click the right mouse button on **Tag Value** on the right part of the screen and select **Modify** from the popup menu.

15 Type the tag value of the cda1000 miniport driver in the space provided and click **OK**. You have now reversed the tag values for the two miniport drivers, and the cda1000 driver will load first.

16 Exit from the Registry Editor and from Windows NT. Then shut down the workstation.

17 Physically install the ARO-1130CA2 in the PCI/RAID*port* expansion slot.

18 Attach your boot drive to one of the SCSI channels controlled by the ARO-1130CA2 and boot the workstation.

Scenario #2: Adding an AHA-294x, AHA-3940, or Other AIC--78xx Based Host Adapter to a RAID*port* II System with an ARO-1130CA2

These instructions assume that Windows NT is *already installed* on the workstation and that the boot drive is connected to the SCSI channel controlled by the ARO-1130CA2. If the AHA-294x host adapter is already installed, shut down the workstation, remove the adapter from the slot, and restart the system.

Installing the AHA-294x, AHA-3940, or AIC-78xx Family Driver

1 Start the Windows NT Control Panel and double click the **SCSI Adapters** icon.

2 Click the **Drivers** tab and click **Add**.

3 Click **Have Disk …**, and insert AIC-78xx Family Manager Set diskette in the floppy disk drive. (This diskette was included with your 2940 Family adapter.)

4 When the Install from Disk dialog box appears, type a:\winnt on the command line and click **OK**.

5 Select **Adaptec AHA290x/291x/294x/394x/4944/AIC78xx PCI SCSI Controller (NT 4.0)** and click **OK**.

6 When a message appears asking if you want to restart Windows NT, click **No**.

7 Exit from Control Panel.

Changing Registry Settings

1 Back up the NT Registry, using one of the techniques described in *Backing up the Windows NT Registry* on page B-10

> ⚠ **Caution:** It is very important to back up the NT Registry before you make any changes to it. This allows you to restore the original NT Registry settings if there is a problem with the new configuration.

2 Run the Registry Editor (*regedit.exe*).

3 When the Registry Editor window appears, expand the tree on the left until you can see the nodes under *\HKEY_LOCAL_MACHINE\System\CurrentControlSet \Services*.

4 Select **cda1000** on the left part of the screen. Write down the cda1000 Tag value that appears on the right part of the screen.

The Tag value is a hex number followed by an equivalent decimal equivalent in brackets: for example, 0x00000002 [2].

5 Select **aic78xx** on the left part of the screen. Write down the aic78xx Tag value that appears on the right part of the screen.

6 Expand the tree on the left until you can see the nodes under *\HKEY_LOCAL_MACHINE\System\CurrentControlSet \Control\GroupOrderList*.

7 Select **GroupOrderList**.

8 Click the right mouse button on **SCSI Miniport** on the right side of the window and select **Modify** from the popup menu. A table appears with columns of two- and four-number groups, something like this:

```
0005 02 00 00 00 03 00 00 00
0010 01 00 00 00 01 01 00 00
0015 04 00 00 00 05 00 00 00
0020 06 00 00 00 07 00 00 00
etc.
```

This table of hexadecimal numbers indicates the Tag-value sequence in which the SCSI Miniport drivers are loaded when you start Windows NT.

9 Determine what the Tag value loading sequence is. Here is how you do this:

a Ignore the four-digit groups on the left of each row.

b Going from left to right, and starting on the first row, divide the two-digit numbers into groups of eight. In this example, the groups are

```
02 00 00 00
03 00 00 00
01 00 00 00
01 01 00 00
etc.
```

You need to write down *all* the number groups in all rows of the table.

c In each group of eight numbers, reverse the sequence of the two-digit pairs, like this:

```
00 00 00 02
00 00 00 03
00 00 00 01
00 00 01 01
etc.
```

d Write down the series of resulting numbers, without all the extra zeroes. In this example, it is 2, 3, 1, 101, etc. This is the Tag value loading sequence for SCSI Miniport drivers. In other words, when Windows NT loads these miniport drivers, the one with Tag value 2 is loaded first, then the one with Tag value 3, and so on.

10 Compare the Tag value loading sequence to the actual tag values of cda1000 and aic78xx that you determined in steps 4 and 5. If cda1000 is loading before aic78xx, skip to step 16. If aic78xx is loading first, continue with the next step.

11 Expand the tree on the left until you can see the nodes under *\HKEY_LOCAL_MACHINE\System\CurrentControlSet \Services*.

12 Select **cda1000** on the left part of the screen. Click the right mouse button on **Tag Value** on the right part of the screen and select **Modify** from the popup menu.

13 Type the tag value of the aic78xx miniport driver in the space provided and click **OK**.

14 Select **aic78xx** on the left part of the screen. Click the right mouse button on **Tag Value** on the right part of the screen and select **Modify** from the popup menu.

15 Type the tag value of the cda1000 miniport driver in the space provided and click **OK**. You have now reversed the tag values for the two miniport drivers, and the cda1000 driver will load first.

16 Exit from the Registry Editor and from Windows NT. Then shut down the workstation.

17 Physically install the AHA-2940 Family adapter in the expansion slot.

18 Boot the workstation.

Backing up the Windows NT Registry

It is very important to back up the Windows NT Registry before making any changes to it. This will allow you to recover if the changes make your system unusable. Here are two ways to back up the Windows NT Registry. The backup utilities described here are included with NT Workstation:

- Use the *ntbackup* utility to create a tape copy of all data files and Registry information. Be sure to select the **Backup Local Registry** option when performing the backup.

- Run the *rdisk* utility with the /s option to create a copy of the Registry on a hard disk. (A typical backup file is 5 MBytes to 10 MBytes in size.) Then use *xcopy* or some other command to copy the information to removable media. You must have the three NT boot floppy disks to restore an RDISK-saved registry to your workstation.

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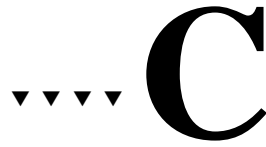
Troubleshooting

Troubleshooting Checklist

Check the following if you have problems installing or running the
ARO-1130CA2 and SCSI devices:

- Does the ARO-1130CA2 BIOS sign-on message appear during
  bootup? If not, check the following items:

  - Is the ARO-1130CA2 properly seated in a PCI/RAID*port* II
    or III expansion slot? Refer to your computer documenta-
    tion 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 parame-
    ters—usually IRQ, Enable PCI Slot, and Enable Master.

  - Have you run the Array1000 BIOS & Driver Selection Utility?

- 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.

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 server using the Array*Config*CA2 diskette.

2 Run the Array*Config*CA2 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 Array1000CA 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 allow you to select the Array1000CA driver 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 the Software On Your Windows NT Workstation

If the Adaptec CI/O Workstation Array 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 service has a status of *Started* (double-click the **Services** icon in Control Panel). If it does not, select the service and press the **Start** button:

   CIO Array Management Service

■ Make sure you have the proper security access rights to the Windows NT services. The Windows NT services can be started, stopped, paused, 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 Workstation Array 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

■ Verify that the following DLLs are located in your *system32* directory. If they are not present, try reinstalling the Adaptec CI/O Workstation Array Management Software:

> *ctl3dnt.dll*
> *xnmhb420.dll*
> *xnmhn420.dll*
> *xnmte420.dll*
> *msvcrt20.dll*
> *mtld.dll*
> *xnmba420.dll*
> *iomgrmsg.dll*

■ Verify that the following files are located in the directory where you installed the Adaptec CI/O Workstation Array Management Software. If they are not present try reinstalling the software:

> *iomgr.ems*
> *cioams.hlp*
> *cioams.exe*
> *readme.txt*
> *iomgr.exe*
> *iomgr.ini*
> *iomgr.msg*

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