◖⁊DataGeneral

Data General Corporation, Westboro, Massachusetts 01580

Installing, Expanding, and Maintaining AViiON® 5500 and 550 Series Computers

014–002250–01

A V i i O N®
P R O D U C T   L I N E

Installing, Expanding, and Maintaining AViiON® 5500 and 550 Series Computers

014–002250–01

Notice

Installing, Expanding, and Maintaining AViiON® 5500 and 550 Series Computers
014–002250–01

Revision History:

Original Release – November, 1993
First Revision   – February, 1994

A vertical bar in the margin of a page indicates substantive technical change from the previous revision.

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference in which case the user will be required to correct the interference at his own expense. Testing was done with shielded cables. Therefore, in order to comply with the FCC regulations, you must use shielded cables with your installation.

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 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.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe (A) prescrites dans la norme sur le matériel brouilleur : "Appareils Numériques", NMB-003 édictée par le ministre des Communications.

この装置は，第一種情報装置（商工業地域において使用されるべき情報装置）
で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制
協議会（ＶＣＣＩ）基準に適合しております。従って，住宅地域またはその隣接した地域で使用すると，ラジオ，テレビジ
ョン受信機等に受信障害を与えることがあります。取扱説明書に従って正しい取り扱いをして下さい。

About this manual

This manual covers a hardware installation sequence that ends with you ready to install your system software; it describes how to unpack, set up, and start a basic AViiON® 550 or AViiON 5500 series computer system. For sites that need to customize their mass–storage configuration, a separate chapter explains how.

This manual also provides detailed information and illustrated instructions for replacing failing parts and for adding internal mass–storage devices, expansion memory, and option boards to an installed system.

IMPORTANT: This manual does *not* describe how to set up or install VMEbus option boards, or the devices that connect to them. If your system includes VMEbus options, refer to S*etting Up and Installing VMEbus Options in AViiON® Systems* (DGC part number 014–001867) for instructions.

We wrote this manual for anyone who sets up and maintains AViiON computer system hardware. Although it addresses readers with some computer hardware experience, you do not need specific knowledge of AViiON or RISC–based computer technology to use this manual.

How this manual is organized

The following gives an overview of what you will find in this manual:

Chapter 1   Provides information you need *before* starting any work. Begins with an overview of base computer system components and options. Includes site preparation and unpacking instructions, an inventory worksheet for cables and cords, and a checklist to complete before you set up your computer system.

Chapter 2   Describes how to connect the system console and computer unit power cord. For the AViiON 550 series, describes how to install the monitor, keyboard, and mouse. Explains how to terminate or connect external cabling for the internal SCSI bus. Also describes cabling for the following optional devices:

- asynchronous or synchronous serial devices such as a modem, printer, or scanner.

- local area network (LAN) transceiver.

- parallel printer.

Chapter 3   Describes how to configure a Small Computer System Interface (SCSI) bus. Includes default and recommended SCSI identification numbers, terminating rules, and cabling restrictions. Also provides worksheets for planning your SCSI configuration, and instructions for connecting external SCSI devices and subsystems to the computer unit.

Chapter 4   Provides general procedures you should follow each time you add or replace an internal system component, and describes how to respond to hardware problems. Further describes how to avoid electrostatic discharge (ESD) damage while working inside the computer unit chassis, and explains how to open and close the chassis covers.

Chapter 5   Each of these six chapters describes how to expand your system by
through   adding a new internal component, or maintain the system by
Chapter 10   replacing a failed Customer Replaceable Unit (CRU). Each refers to Chapter 4 for prerequisite information.

Appendix A   Lists physical, environmental, and electrical specifications for base hardware and optional components.

Appendix B   Provides a list of Customer Replaceable Units (CRUs).

Related Data General manuals

The *Guide to AViiON® and DG/UX™ System Documentation* (069–701085) describes all of the documentation available for your AViiON computer. The *Installation Roadmap* (069-701084) is a pamphlet that outlines the reading path through hardware and software installation documentation.

The following sections describe those hardware and software titles we refer to within this manual:

DG/UX administrator manuals

Installing the DG/UX™ System (093–701087). Describes how to install the DG/UX operating system on AViiON computers.

Customizing the DG/UX™ System (093–701101). Describes how to perform tasks that customize the DG/UX system to your site's needs. Included are descriptions of how to add user home directories, printers, terminals, third–party packages, operating system clients and secondary releases.

Managing the DG/UX™ System (093–70108). Describes how to manage the DG/UX operating system.

Hardware diagnostics manual

Using AViiON® Diagnostics and the AV/Alert℠ Diagnostic Support System (014–002183). Describes diagnostic products available for all AViiON computers. Provides steps for enabling and operating the AV/Alert system, and for using the utilities of the stand-alone AViiON System Diagnostics and online DG/UX Service Manager.

Hardware peripheral manuals

Ethernet/IEEE 802.3 Local Area Network Installation Guide (014–000793). Explains how to install both the coaxial cable plant of an Ethernet LAN and the transceivers that connect the network to a node communication controller.

Installing and Operating the Model 10565 Peripheral Housing Unit (PHU) (014–001810). Describes how to unpack, install, and power up the PHU subsystem. Explains how to replace the power supply, line cord, and fan; and provides general instructions for replacing a drive. Lists electrical and environmental specifications.

Installing and Operating the Model 6690 Stand-Alone CD-ROM Drive (014-002162). Describes how to unpack, install, power up, and maintain the Model 6690 CD-ROM drive.

Installing and Operating the Model 6691 Stand-Alone Cartridge Tape Drive (014-002158). Describes how to install and operate the Model 6691 stand-alone cartridge tape drive.

Installing and Operating Your Model 6590 Series Cartridge Tape Drive (014-001701). Describes how to unpack, install, power up, and maintain the 2.2-gigabyte stand-alone cartridge tape drive.

Installing, Operating, and Expanding the CSS3 Mass–Storage Subsystem (014–002235). Contains step–by–step procedures that explain how to connect the CSS3 to AViiON® series or ECLIPSE® MV/Family systems. Also describes how to power up the CSS3 and how to add or replace customer replaceable units (CRUs).

The CLARiiON™ Series 2000 Disk-Array Storage System with the DG/UX™ Operating System (014-002168). Describes how to install, operate, and maintain the CLARiiON deskside disk-array storage system and how to operate and maintain the rackmount disk-array storage system. Explains how to use the GridMgr (grid manager) and **sysadm** programs to plan, set up, and manage disk configurations. Explains how to generate a new DG/UX kernel to support storage system disks and how to transfer control of disks using DG/UX. Describes how to add and replace customer replaceable units (CRUs).

*The CLARiiON™ Tape-Array Storage System with the DG/UX™
Operating System* (014-002181). Describes how to install, operate,
and maintain the CLARiiON   deskside tape-array storage system,
and how to operate and maintain the rackmount tape-array storage
system. Explains how to make the physical tapes accessible to
DG/UX.

Readers, please note:

Data General manuals use certain symbols and styles of type to
indicate different meanings. The Data General symbol and
typeface conventions used in this manual are defined in the
following list. You should familiarize yourself with these
conventions before reading the manual.

This manual also presumes the following meanings for the terms
"command line," "format line," and "syntax line." A command line is
an example of a command string that you should type verbatim; it
is preceded by a system prompt and is followed by a delimiter such
as the curved arrow symbol for the New Line key. A format line
shows how to structure a command; it shows the variables that
must be supplied and the available options. A syntax line is a
fragment of program code that shows how to use a particular
routine; some syntax lines contain variables.

Convention	Meaning
boldface	In command lines and format lines: Indicates text (including punctuation) that you type verbatim from your keyboard.
	Commands, pathnames, and names of files also use this typeface.
Typewriter	Represents a system response on your screen. Syntax lines also use this font.
$ and %	In command lines and other examples: Represents the system command prompt symbols used for the Bourne and C shells, respectively.
#	In command lines and other examples: Represents the superuser prompt.
↲	In command lines and other examples: Represents the New Line key, the name of the key used to generate a new line. (Note that on some keyboards this key might be called Enter or Return instead of New Line.) Throughout this manual, a space precedes the New Line symbol; this space is used only to improve readability—you can ignore it.

Contacting Data General

Data General wants to assist you in any way it can to help you use its products. Please feel free to contact the company as outlined below.

Manuals

If you require additional manuals, please use the enclosed TIPS order form (United States only) or contact your local Data General sales representative.

Telephone assistance

If you are unable to solve a problem using any manual you received with your system, telephone support is available with your hardware warranty and with Support Plus and Hotline Software Support service contracts. If you are within the United States or Canada, contact the Data General Customer Support Center (CSC) by calling 1–800–DG–HELPS. Lines are open from 8:00 a.m. to 5:00 p.m., your time, Monday through Friday. The center will put you in touch with a member of Data General's telephone assistance staff who can answer your questions.

For telephone assistance outside the United States or Canada, ask your Data General sales representative for the appropriate telephone number.

Joining our users group

NADGUG, the North American Data General Users Group, is a unique network of Data General users who wish to discover more about working computer environments and how to use them. As a professional, user–run organization, NADGUG enables members to make contacts with colleagues, share expertise and perspectives, and influence the companies that provide products and services. The Users Group is your connection to expert users of Data General products, including AViiON® open systems, CLARiiON® advanced storage solutions, PCs, and ECLIPSE® MV/Family systems. Getting just one solution from a fellow member can more than pay for the cost of belonging to NADGUG. To join or for more information, call 1–800–253–3902, extension 1222, or 508–443–3330, extension 1222.

End of Preface

Contents

Chapter 1 – Getting started

Chapter 2 – Setting up the computer unit

Chapter 3 – Setting up and connecting an external SCSI bus

Chapter 4 – Expanding and maintaining computer hardware

Chapter 5 – Adding or replacing internal mass–storage devices

Chapter 6 – Adding or replacing memory modules

Chapter 7 – Adding or replacing system board options

Chapter 8 – Replacing the system board

Chapter 9 – Replacing the fan and speaker/LED

Chapter 10 – Replacing the power supply

Appendix A – Technical specifications

Appendix B – Customer Replaceable Units (CRUs)

Tables

Table

Figures

Figure

Figure

Figure

Figure

1 Getting started

This first part of this chapter provides an overview of AViiON® 5500 and 550 series computer systems and their hardware options.

The latter part of this chapter describes what you should do before you begin to set up your system: how to select a site, unpack and inventory your equipment, and gather the appropriate materials.

About AViiON 5500 and 550 series computers

AViiON 5500 and 550 series computer systems support a variety of configurations. AViiON 5500 series computers function primarily as the basis of multiuser or server systems; AViiON 550 workstations add graphics options to the same basic computer system.

Figure 1–1 illustrates the deskside computer unit common to both models, the AViiON 5500 series system console, and the color graphics monitor, IBM PC AT®-style keyboard, and mouse device that distinguish an AViiON 550 series workstation.
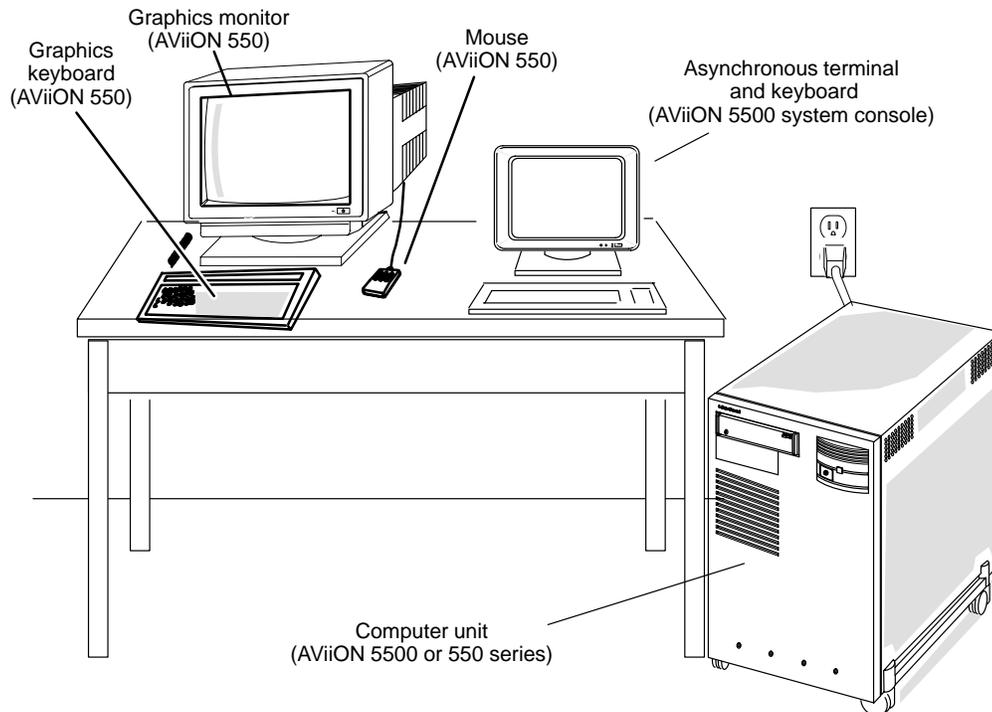
Figure 1–1   AViiON 5500 and 550 series computers

Refer to the following sections of this chapter for an overview of base (standard) and optional system components; refer to Appendix A, "Technical specifications," for more detailed information.

Base system components

All AViiON 5500 and 550 series computer units include the following:

- System board assembly, with:

  One 40-megahertz Motorola 88110 microprocessor, plus an expansion slot for one optional expansion CPU.

  One Motorola 88410 Cache/Memory Management Unit (CMMU) controller with 256-Kbytes cache.

  One integrated SCSI–2 narrow (10-Mbits/second) interface controller.

  One integrated IEEE 802.3 Ethernet local area network (LAN) interface, compatible with thin or thick Ethernet networks (transceiver not included).

  Three asynchronous RS-232-C communications ports.

  One integrated RS-232-C port for synchronous communications.

  One integrated parallel printer port.

- Slots for 4 to 12 ECC (error check/correct) SIMMs (single in–line memory modules) in 32-Mbyte minimum to 256-Mbytes maximum configurations. Base systems include 32-, 64-, or 128-Mbytes.

- 326-watt power subsystem

- Two I/O expansion bus slots for optional SCSI or LAN expansion boards.

- VMEbus standard backplane printed-circuit board.

AViiON 5500 series systems include a modem for the AV/Alert^{SM} service. They require an asynchronous terminal and keyboard to serve as a system console.

AViiON 550 workstations include a 17- or 19-inch color graphics monitor, mouse, keyboard, and an 8-bit or 24-bit high-performance graphics subsystem board.

Internal options

In addition to the basic components listed in the previous section, your system might include some of the following options housed within the computer unit:

System bus options

- A 40-Mhz expansion CPU/CMMU complex board.

- 4-Mbyte, 16-Mbyte, or 32-Mbyte SIMMs, 32-Mbytes minimum to 256-Mbytes system maximum. See Chapter 6 for valid configurations.

- One or two of the following Input/Output (I/O) expansion boards:

  Dual SCSI-2 wide (20-Mbytes/second) two-channel adapter with single-ended or differential controllers

  Ethernet LAN controller .

VMEbus options

The VMEbus backplane printed-circuit board and card cage allows one or two of the following 6U-form communications option boards:

- **VFC** — VMEbus fiber-optic FDDI (fiber-distributed data interface) LAN controller

- **VSC/3i** —Three-line VME synchronous controller (RS232, RS422,X.25)

- **VAC/16** — VME Asynchronous Controller that provides as many as 16 ports for asynchronous devices such as user terminals.

- **VDA/255** — VME Distributed Asynchronous host adapter that supports as many as 255 asynchronous user devices via a network of cluster controllers.

- **VTC** — VME Terminal Controller that supports as many as 255 asynchronous user devices over a standard Ethernet/IEEE 802.3 LAN.

- **VLCi** — VME LAN Controller with a connector for a second Ethernet LAN transceiver. Supplements the Ethernet connection managed by the integrated LAN controller(s) on the system board and optional I/O expansion board.

- **VTRC** — VME Token Ring LAN Controller that enables a system to communicate with other computers over an IEEE 802.5 token ring local area network.

IMPORTANT: Refer to the manual *Setting Up and Installing VMEbus Options in AViiON® Systems* for all information regarding these options.

1-3

Internal mass-storage drives

The internal SCSI-2 bus supports *up to five* of the following mass-storage drives housed internally:

- One 5.25-inch removable-media device:

  320/525-Mbyte quarter-inch cartridge (QIC) SCSI tape drive

  600-Mbyte CD-ROM drive

- One to four 3.5-inch devices (maximum of one removable-media drive):

  1.44-Mbyte diskette drive

  4mm digital audio tape (DAT)

  2-Gbyte (half-height)

  1-Gbyte (half-height)

  520-Mbyte (half-height)

Mounting hardware and cabling for up to five internal drives are part of each computer unit.

A factory-installed label on the computer rear panel identifies the position and SCSI ID of your internal drives.

External mass-storage options

The SCSI bus connector(s) on the computer unit rear panel allow you to connect external SCSI-based mass-storage devices to your computer system. Each SCSI bus in your system can support as many as seven SCSI drives.

Refer to Chapter 3 for information about connecting mass-storage devices using the external SCSI bus connectors on the computer unit rear panel. Refer to Chapter 5 for information about adding or replacing drives using the internal SCSI bus connectors and bays.

Refer to the manual that came with the drive and to the manual that came with the mass-storage housing unit for information about adding a drive. These manuals also contain specific information such as environmental specifications, and operating and maintaining procedures.

Storage systems

The AViiON 5500 and 550 external SCSI bus ports support the following external storage subsystems:

- CLARiiON disk array

- CLARiiON tape array

- Combined Storage Subsystem chassis (CSS2/DC and CSS3/DC)

- Peripheral Housing Unit (PHU)

  Each storage subsystem contains a combination of SCSI-based drives, including the following :

- 332-Mbyte, 520-Mbyte, 662-Mbyte, 1-Gbyte, or 1.4-Gbyte fixed-disk drive

- 590-Mbyte erasable optical disk drive

- 150-Mbyte or multicapacity (320/525-Mbyte) quarter-inch cartridge (QIC) tape drive

- 3.5-inch or 5.25-inch diskette drive

- 600-Mbyte CD-ROM disk drive

- 4-mm digital audio tape (DAT) drive

Stand-alone drives

In addition to drives installed in a storage subsystem, you may also have stand-alone, desktop model drives connected to the external SCSI bus. The following mass-storage devices are available as stand-alone drives:

- Multicapacity (320/525-Mbyte) QIC tape

- 600-Mbyte CD-ROM drive

- 9-track reel-to-reel tape drive

About the system console

The term *system console* refers to a terminal, with a keyboard, that displays powerup diagnostic test messages and from which you bring up your operating system.

AViiON 5500 series (asynchronous terminal)

Any asynchronous terminal with a keyboard, an ASCII character set, and an RS-232-C interface can serve as the system console for AViiON 5500 series computers.

IMPORTANT: You need a terminal that conforms to ANSI standard X3.64 (1977) to support a UNIX screen editor. Those terminals that conform to the standard include Data General terminals with ANSI mode, and any terminal that emulates a VT100 or VT220 terminal.

Refer to Chapter 2 for information about connecting the system console to an AViiON 5500 series rear panel connector.

AViiON 550 series (graphics monitor)

An AViiON 550 series graphics workstation package includes a 17- or 19-inch color graphics monitor. The display has a 70-Hz refresh rate for flicker-free performance.

Figure 1–2 shows monitor controls and switches. Chapter 2 describes how to connect the graphics display to the computer.

Brightness   - + Contrast -

Degauss

Monitor Brightness and Degauss Switch
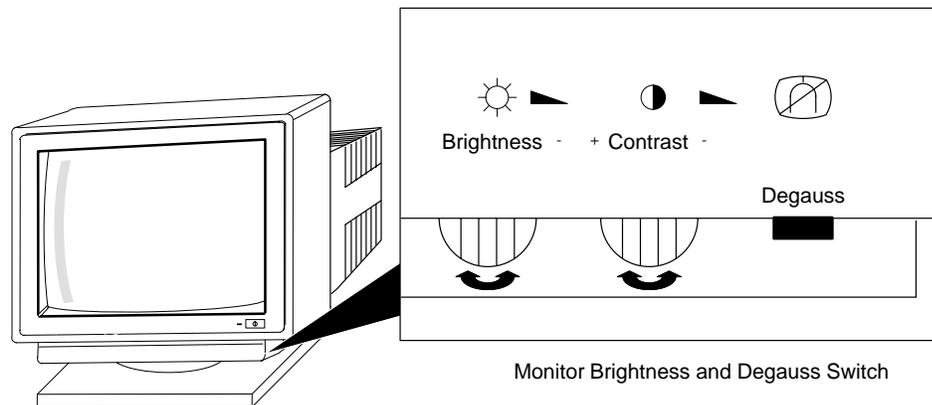
Figure 1–2   Color graphics monitor and controls

IMPORTANT: Over time, the monitor screen becomes magnetized and your screen display may appear distorted; pressing the Degauss switch demagnetizes the monitor screen and clears any associated distortion.

About the keyboard and mouse (AViiON 550 Series)

Your computer system graphics package includes a keyboard and three-button optical/mechanical mouse. The keyboard has an optional extension cable for connection to the computer unit.

The U.S. English keyboard is compatible with the IBM PC AT-101; some international versions contain 102 keys. The Japanese keyboard is AX-compatible.

Refer to Chapter 2 for information about connecting the keyboard and mouse to the desktop computer unit, and to Appendix A for their technical specifications.

Control switches

Table 1–1 describes the control switches on the front and rear panels of the computer unit, illustrated in Figure 1–3.

Table 1–1   AViiON 5500 and 550 series control switches

Switch	Description
Power	Front panel button switch. Turns power on or off.
Reset/Abort	Combined toggle switch. In the *up* position (RESET), restores computer hardware to powerup state without cycling power. In the *down* position (ABORT), sends a CPU interrupt without resetting hardware; the result is software dependent. Consult your system software documentation.
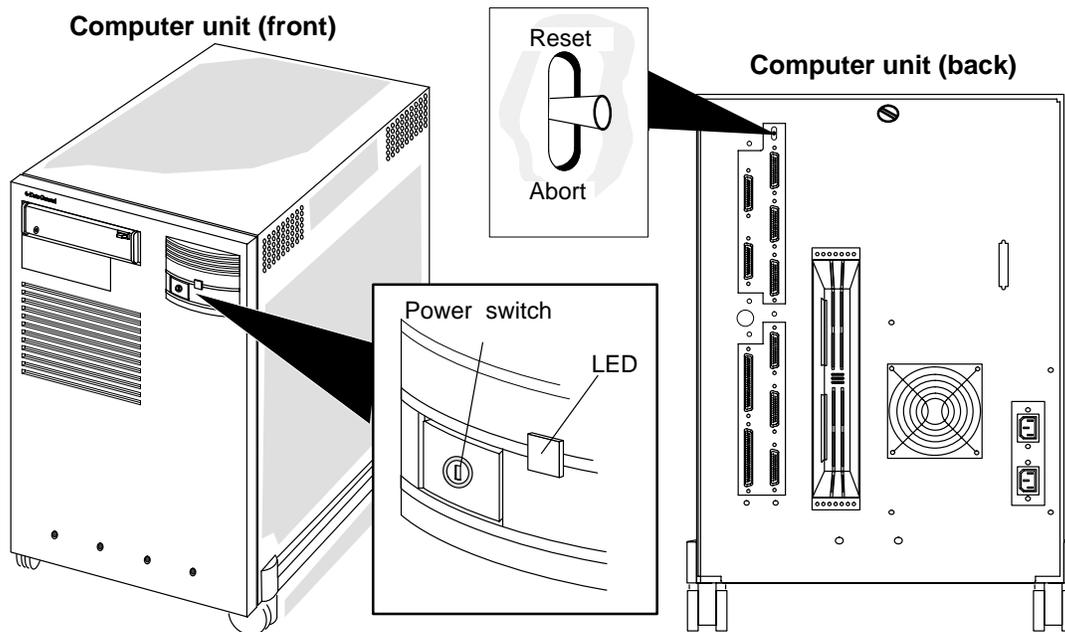
Figure 1–3   AViiON 5500 and 550 control switches

Rear panel connectors

Table 1–2 describes each rear panel peripheral connector that is part of the AViiON 5500/550 computer (or that is integrated on the system board). If your AViiON system includes optional expansion boards, each include additional rear panel SCSI and/or LAN connectors.

The graphics controller in AViiON 550 series systems supplies additional connectors for the monitor, keyboard, and mouse.

Table 1–2   AViiON 5500 and 550 series connectors

Connector	Description
AC output	Couples ac power via cable to the AViiON 550 graphics monitor.
AC input	Receives ac power via power input cable.
OP CON RS 232-A	Couples input/output data via an asynchronous interface for AViiON 5500 system console.
SERVICE RS232-B	Couples input/output data via an asynchronous interface for AV/Alert service modem.
RS232-C	Couples input/output data via an asynchronous interface for a third asynchronous device.
SYNC	Couples input/output data via a synchronous interface.
LAN	Couples input/output data via an Ethernet local area network interface.
Printer	Couples input/output data via a parallel communications interface for a Centronics-compatible parallel printer.
SCSI	Extends the integrated SCSI-2 bus outside the computer chassis via cable.

Figure 1–4 illustrates the rear panel connectors to I/O ports for AViiON 5500 series systems; Figure 1–5 illustrates I/O port connectors for AViiON 550 series systems.

Refer to Chapter 2 for information about installing devices using any of the rear panel connectors.
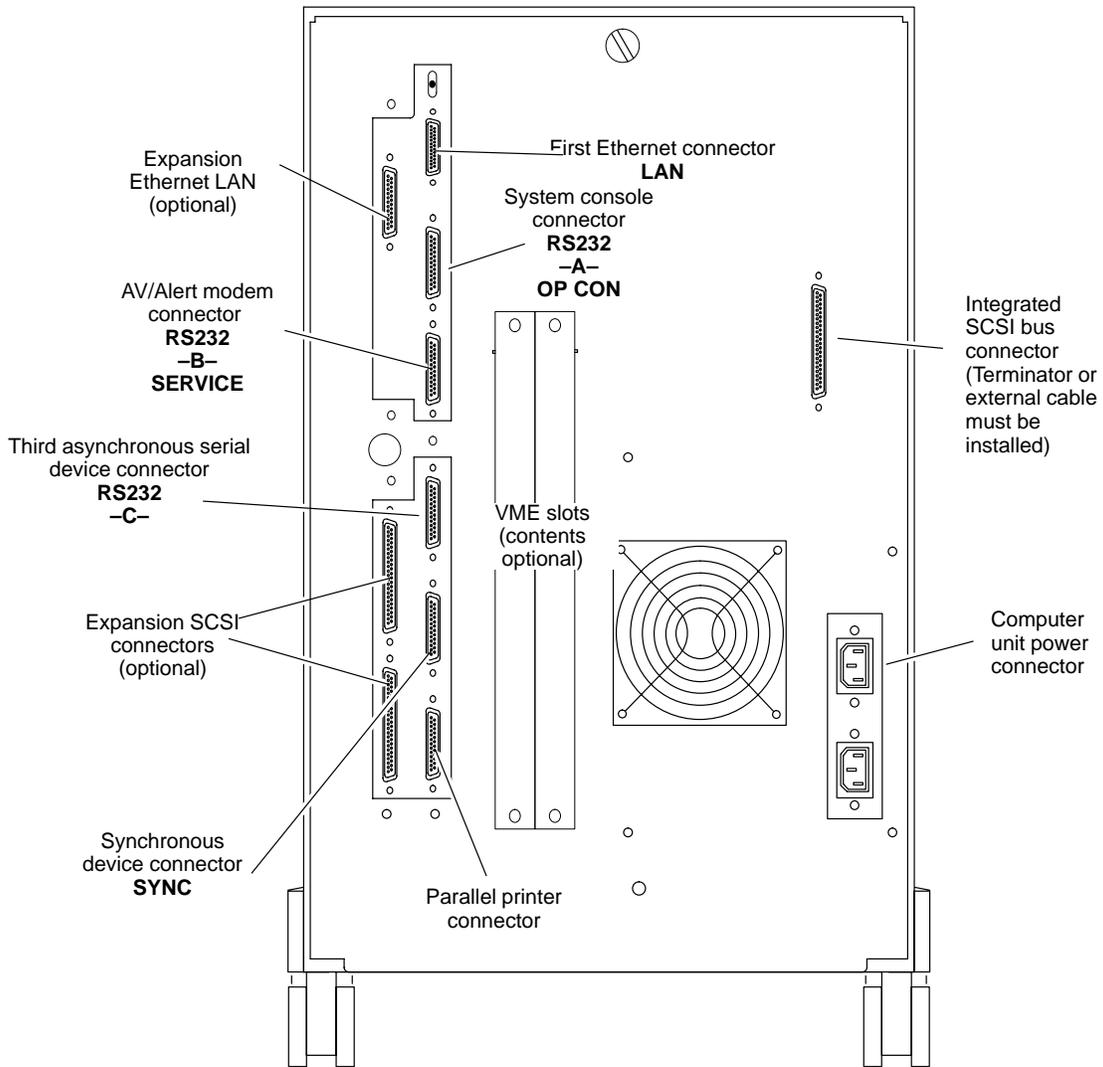
Figure 1–4   AViiON 5500 series rear panel and connectors

IMPORTANT: **For information about connecting devices to VMEbus options, refer to** *Setting Up and Installing VMEbus Options in AViiON® Systems.*

8-bit graphics

Ethernet **LAN** connector (integrated)

Second asynchronous serial device connector (**SERVICE RS-232 –B–**)

First asynchronous serial device connector (**OP CON RS-232 –A–**)

Third asynchronous serial device connector (**RS-232 –C–**)

Graphics monitor connector

Synchronous serial device connector **SYNC**

Graphics keyboard connector

Mouse connector

Audio jacks (NOT SUPPORTED)

VME slots (contents optional)

Integrated SCSI bus connector (Terminator or external cable must be installed.)

Computer unit power cord connector

NOT USED

Parallel printer connector

24-bit graphics

Graphics monitor connector

Graphics keyboard connector

Mouse connector

Audio jacks (NOT SUPPORTED)

Figure 1–5   AViiON 550 series rear panel and connectors

Before you start

Before setting up your system, you need to prepare a site, unpack and inspect your equipment, confirm that the computer unit voltage is correct for your site, and gather the appropriate documentation and materials.

The following sections describe what you need to do before setting up your new computer system. We suggest that you complete the Installation Checklist (Figure 1–6, at the end of this chapter) before proceeding with installation procedures.

Selecting a site

Your first step is to select the final location for setting up and operating your computer system. Try to complete as much of the installation as possible at this final location. Select an area with the following physical requirements:

- Access to at least one ac outlet, plus one ac outlet for each peripheral device (such as system console, storage units and communications devices).

- A reserved telephone line for AV/Alert Service support (AViiON 5500).

- A desk or cleared work surface to position peripherals at a comfortable height for use.

  For the AViiON 550 series computer, the work surface must be large enough to hold the graphics monitor, keyboard, mouse, plus additional peripheral devices.

- Floor area for the deskside computer unit where it is not likely to be jarred.

- Appropriate natural or electrical lighting. Avoid direct sunlight on the equipment.

  Make certain that your site is compatible with the physical, environmental, and electrical requirements listed in Appendix A. If you have peripheral devices, examine the documentation that you received with each device for electrical and environmental requirements.

Inspecting your equipment

Follow the steps in this section to inspect your new computer system. Although it may seem simpler to install items as you unpack them, it is important to verify that your equipment arrived as ordered and undamaged before you start.

1. Remove and set aside the shipping documentation from the outside of each shipping carton. Open the cartons one by one and remove the equipment. As you do so, inspect the equipment carefully for visible damage. Open every carton.

   CAUTION: *Handle your computer equipment carefully; do not drop or jar it. Lift by grasping firm surfaces only.*

2. Compare the items you received with the items listed on the packing slips. Make sure that the model and/or part numbers on the packing slip match those on your equipment. If you think you received the wrong equipment, contact Data General as described in the Preface.

3. Verify that the voltage for the power cords you received is appropriate for your site by examining their model numbers, as seen in Table 1–3.

Table 1–3   Power cord voltage

Power cord	Model number
100/120 V AViiON 5500 or 550 computer unit cord	109-996
100/120 V AViiON 550 graphics monitor cord	109-249
220 V AViiON 5500 or 550 computer unit and monitor cords	109-810, 811, 812, or 815
240 V AViiON 5500 or 550 computer unit and monitor cords	109-809 or 813

4. If you are setting up an AViiON 550 series computer system, examine the model number on the label at the bottom of the keyboard.

   The model number is G6488-*x*, where the *x* suffix indicates your keyboard language. Use Table 1–4 to make sure you received the appropriate keyboard.

Table 1–4 Language suffixes for keyboard part numbers

Suffix	Keyboard G6488-
A	U.S. English
B	U.K. English
C	French
D	German
G	Spanish
I	Italian
N	Swedish/Finnish
S	Katakana AX (AT-compatible). Supports Katakana and Kanji
Y	Swiss

If you think you received the wrong keyboard, contact Data General as described in the Preface.

5. Make sure that you have all of the cables listed on your packing slip; then, create a cable inventory for your system. Cables may be together in one accessories box or packaged separately with the device.

Table 1–5 lists those cables for both AViiON 5500 and 550 series system peripherals. Use this checklist to create a cable inventory.

▶ Refer to *Setting Up and Installing VMEbus Options in AViiON® Systems* to verify the cables for any VMEbus options you received.

▶ Refer to the manual that came with any external mass-storage drives or storage systems to verify cabling for these devices.

If you think you received incomplete or incorrect cabling, contact Data General as described in the Preface.

Table 1–5   AViiON 5500 and 550 series peripheral device cables

☑	Cable Description	Part #	Model #	Illustration
☐	**AViiON 5500 only:** System console EIA RS-232 male to male DB25 to DB25 25 ft.	005-34991	15340E025	
☐	AV/Alert modem EIA RS-232 male to male DB25 to DB25, 10 ft.	005-36256	15369E010	
☐	**AViiON 550 only:** Graphics monitor 6-ft. 13W 3-pin to 3-BNC	118-17552		
☐	Keyboard 6-ft extension cable (DIN)	G6488 118-08469	005-35146	
☐	**Ethernet LAN** DB15 to DB15 female 3-meter flexible drop cable	007-06253	40028A	
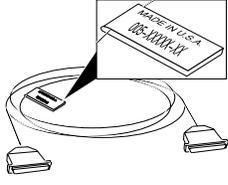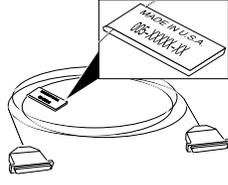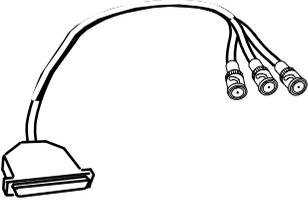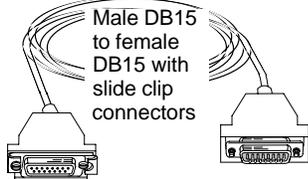
(Continues)

Table 1–5   AViiON 5500 and 550 series peripheral device cables

☑	Cable Description	Part #	Model #	Illustration
☐	**Integrated SCSI bus** 50-pin P&S to CHAMP 5-ft	005-39718	15396E005	
☐	10-ft	005-39719	15396E030	(50-line male CHAMP to 50-pin male P&S)
☐	**Expansion SCSI bus (narrow)** **68-pin to 50-pin adapter** *PLUS:*	**005-39975**		
☐	5-ft	005-39718	15396E005	
☐	10-ft	005-39719	15396E010	
☐	20-ft	005-39720	15396E020	
☐	40-ft	005-39721	15396E040	
☐	**Expansion SCSI bus (wide)** 10-ft	005-40003	15418E010	(68-pin male P&S to 68-pin male P&S)
☐	20-ft	005-40004	15418E020	
☐	40-ft	005-40005	15418E040	
☐	**Asynchronous modem** DB25 male to DB25 male 10-ft EIA RS-232	005-36256	15369E010	
☐	15-ft EIA RS-232	005-36257	15369E015	DB25 male to DB25 male
☐	25-ft EIA RS-232	005-36258	15369E025	
☐	**Asynchronous data terminal device** DB25 male to DB25 male 10-ft EIA RS-232	005-34256	15340E010	
☐	15-ft EIA RS-232	005-34990	15340E015	DB25 male to DB25 male
☐	25-ft EIA RS-232	005-34991	15340E025	
☐	**Synchronous device** DB25 male to DB25 male 6-ft EIA RS-232	005-32917	15290E010	
☐	15-ft EIA RS-232	005-32918	15290E015	DB25 male to DB25 male
☐	25-ft EIA RS-232	005-32919	15290E025	
☐	**Parallel device** DB25 male to CHAMP 5-ft Centronics LPT1	005-23915	10235	 DB25 male to 36-position CHAMP
☐	30-ft Centronics LPT1	005-33762	15293E030	
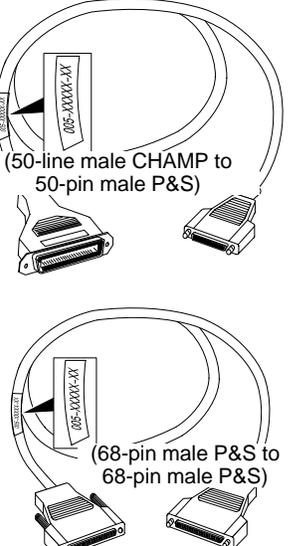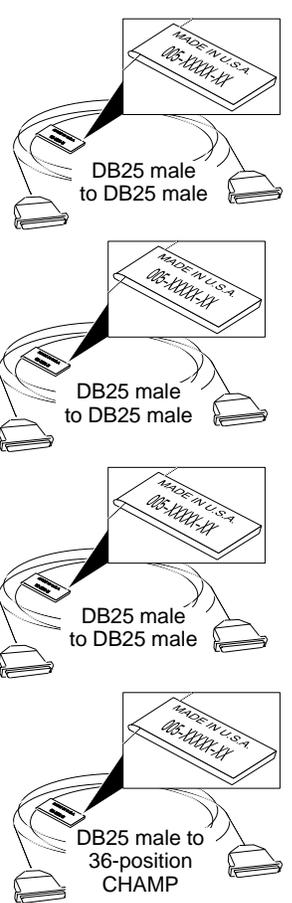
Gathering documentation and media

The *Installation Roadmap* brochure outlines the path we recommend that you follow through the installation documentation. The *Guide to AViiON® and DG/UX™ System Documentation* contains a list and description of all the documentation available for your computer system.

If you ordered a DG/UX™ operating system package, the files you need to install your operating system are already loaded on the disk. Keep the media you received as backup.

You received diagnostic software on separate media. You can use these diagnostics to verify your hardware configuration as an optional part of the installation, or to test your hardware at a later time. Refer to *Using AViiON® Diagnostics and the AV/Alert*[SM] *Diagnostic Support System* for information.

Figure 1–6 itemizes what you need to set up and start your computer system for the first time. Your software Release Notices itemize the documentation and media necessary to complete the installation of software packages.

☑ **Check When Completed:**

☐   Make sure your installation site satisfies the electrical and environmental requirements listed in Appendix A.

☐   Inspect equipment received for damage.

☐   Compare packing slips with equipment received and equipment ordered.

☐   Ensure that all of your equipment and cable model numbers reflect the proper voltage for your site.

☑ **Make Sure You Have These:**

☐   Small flat-blade screwdriver (non-magnetic)

☐   Operating system installation documentation. Use *Installing the DG/UX™ System* to install a basic DG/UX configuration. Most DG/UX installations will also need *Customizing the DG/UX™ System*.

☐   Software Release Notices, plus cartridge tapes if you did not order preloaded software.

☐   Documentation that came with peripherals and other optional components

---

Figure 1–6   Installation checklist

End of Chapter

2 Setting up the computer unit

This chapter describes how to connect the following external components:

- computer system console (AViiON 5500 series)
- graphics monitor, keyboard, and mouse (AViiON 550)
- integrated SCSI bus terminator or external cable
- computer unit power cord

This chapter also describes how to connect cabling for the following system options:

- local–area network (LAN) transceiver
- parallel printer
- asynchronous and synchronous communications devices (serial printers, modems, scanners, plotters).

Proceed with this chapter to begin your system installation. In many cases, this chapter describes all the hardware installation procedures you need in order to set up and install your entire system. Where you need additional information, sections of this chapter refer you to appropriate Data General manuals.

IMPORTANT: If your system includes VMEbus distributed controllers, you will need the manual *Setting Up and Installing VMEbus Options in AViiON® Systems* to complete your installation.

For an overview of the computer system hardware components, refer to Chapter 1.

CAUTION: *Do not apply power to the computer unit while setting up your computer system. Refer to the AViiON 5500 and 550 series operating manual for powerup instructions.*

Connecting the system console (AViiON 5500 series)

This section describes how to connect an asynchronous terminal to the first (–A–) computer unit rear panel RS–232 port (OP CON), for use as the AViiON 5500 series system console.

Your system console is the keyboard and display device that displays powerup diagnostic test messages from the computer and from which you bring up your operating system.

Any asynchronous terminal with an ANSI–standard character set and an RS–232–C interface can serve as the system console for AViiON 5500 series computers. However, for full functionality in a UNIX® environment, **the terminal must emulate a VT100** or VT220 terminal.

IMPORTANT: If you want to use an asynchronous terminal as the system console for an AViiON 550 workstation (instead of the graphics monitor and keyboard), you must disconnect the graphics keyboard from its computer unit connector and connect the terminal as described in this section.

To connect an asynchronous terminal to the system console port of an AViiON 550 or 5500 series system, use the following cable:

	Cable or Cord Type	Part Number	Model Number
☑			
DB25 male to DB25 male ☐	25–ft EIA RS–232 cable	005–34991	15340E025

▶ Complete the following steps to connect the system console. You will need a small, flat–head screwdriver or similar device.

Refer to Figure 2–1 as you perform the first three steps.

1. Place the terminal on top of your work surface. Make sure that the terminal power switch is in the *off* position.

2. Align the pins in the cable to the holes in the connector labeled OP CON (RS-232–A–) on the computer unit rear panel, as seen in Figure 2–1.

3. Secure the cable to the connector by tightening the two cable screws.

Computer Unit Rear Panel
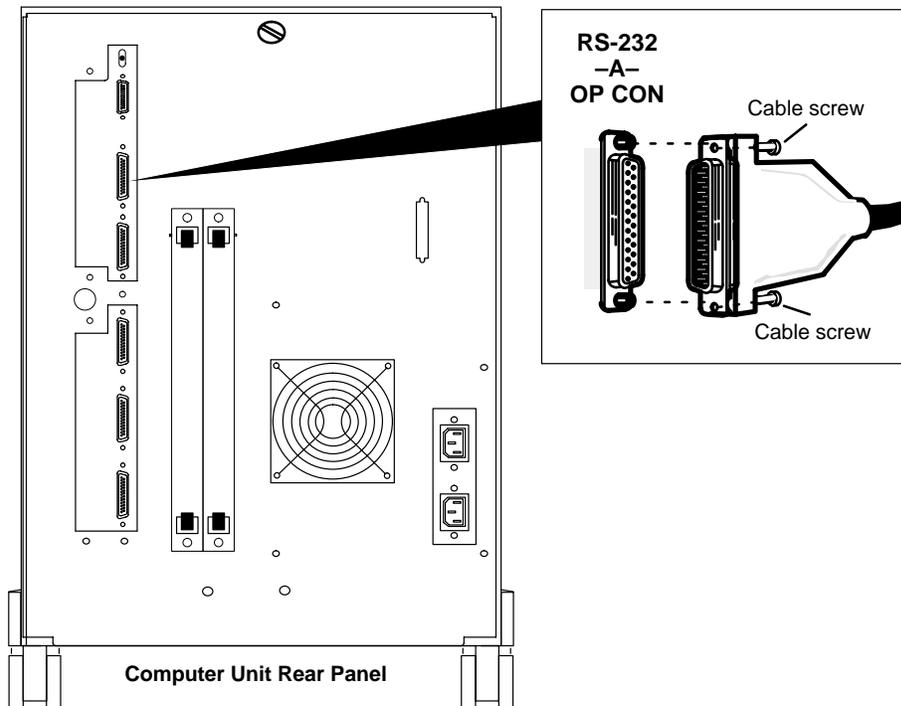
Figure 2–1   Connecting the system console

4. Secure the other end of the terminal cable to the RS–232 connector on the back of the terminal. Often, the terminal connector is labeled HOST.

> IMPORTANT: The AUXILIARY port is reserved for a secondary device that shares the system console, such as a CLARiiON storage system.

5. Connect the terminal power cord as described in the manual that came with the terminal.

6. Initially, both your firmware and the DG/UX operating system require that your system console have the following characteristics:

    9600 baud
    8 data bits, no parity
    ANSI character set

    Set the terminal to select these characteristics. If your terminal offers Terminal Configuration menus, use them to further select Unix mode, VT100 emulation, Echo disabled, and New Line disabled. For information on terminal switches and/or menus, see the manual that came with the terminal.

IMPORTANT: If you have an operating system that supports *different* terminal characteristics, you need to change the default console port characteristics. Refer to the manual *Operating AViiON 5500 and 550 Series Systems* for information about using the SCM to change firmware defaults for the "console port".

Connecting the graphics monitor (AViiON 550)

This section describes how to connect a color graphics monitor to your AViiON 550 series computer unit.

AViiON 550 workstations use the following cabling to connect a monitor to the computer unit:

Ac Power Cord

3-pronged power cord

(See Table 1–3 in Chapter 1 for the model numbers that match your site's voltage.)

Monitor Cable

13We 3-pin DB10 to 3–BNC

□ 118–17552
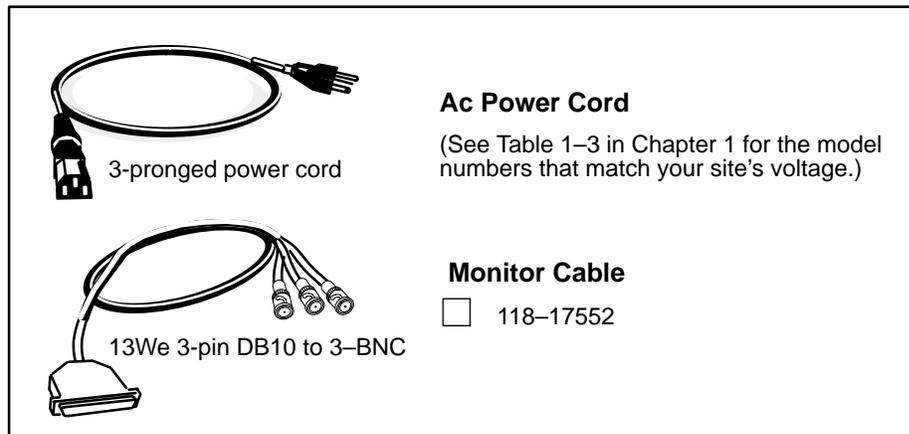
▶ Complete the following steps to connect the graphics monitor.

1. Place the monitor on top of your work surface. Make sure that the monitor power switch is in the *off* position, as shown in Figure 2–2.

   CAUTION: The monitor is heavy (over 60 pounds); you may want a second person to help when moving it.

Power on (I)

Power off (O)
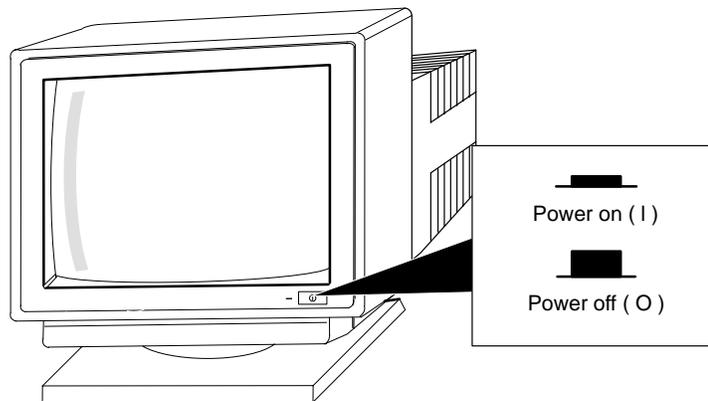
Figure 2–2 Graphics monitor power switch

2. Plug the three monitor BNC cable ends into the RGB connectors on the back of the monitor, as shown in Figure 2–3.

   Each cable end is coded with a red, green, or blue color strip. Connect the red cable to the R monitor connector, the green cable to the G connector, and the blue cable to the B connector.
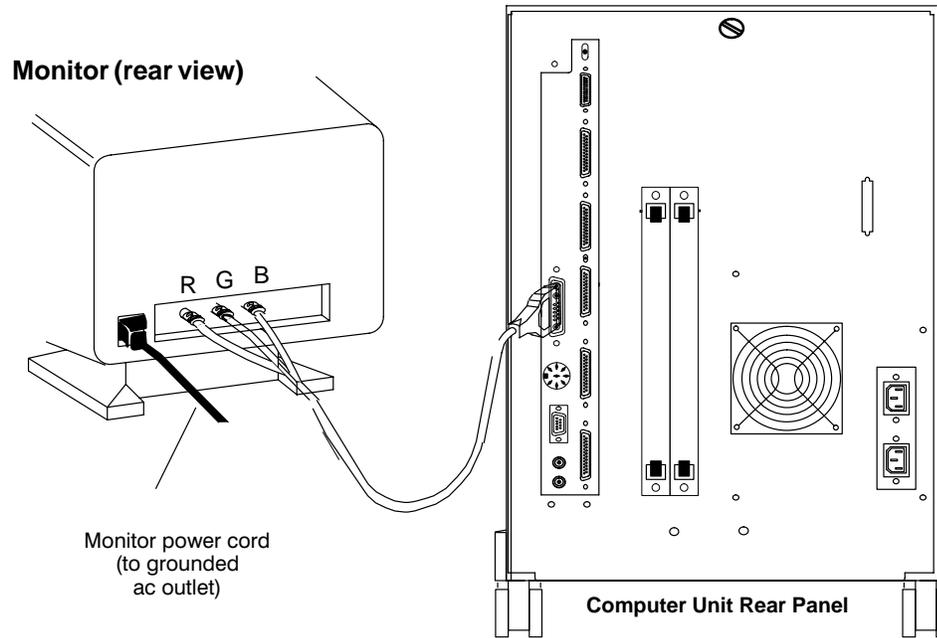
Figure 2–3   Connecting the color monitor

IMPORTANT: Turn the ends of the BNC cables clockwise to lock them in place.

3. Plug the holes in the other end of the monitor cable into the
graphics board connector pins on the back of the computer unit.
Figure 2–3 shows the 8–bit graphics controller (base configuration).

4. Plug the female end of the monitor power cord into the ac connector
at the back of the monitor, as seen in Figure 2–3. Plug the male end
of the monitor power cord into a grounded wall ac outletl.

Connecting the keyboard (AViiON 550)

You receive an extension cable to connect the keyboard to the AViiON 550 series computer unit.

8–pin male to 8–pin female DIN

6–foot extension cable –
DGC part number 005–035146
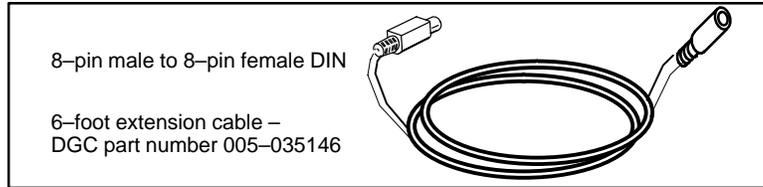
▶ Follow these steps to connect the keyboard to the computer unit. Reverse the order of these instructions to remove a faulty keyboard in order to replace it.

1. Position the computer unit so that you have access to the rear panel connectors.

2. Place the keyboard on the work surface.

3. Attach the female end of the keyboard extension cable to the end of the keyboard cable; then, plug the other end of the extended keyboard cable into the keyboard connector on the rear panel of the computer unit, as shown in Figure 2–4.

Computer Unit Rear Panel
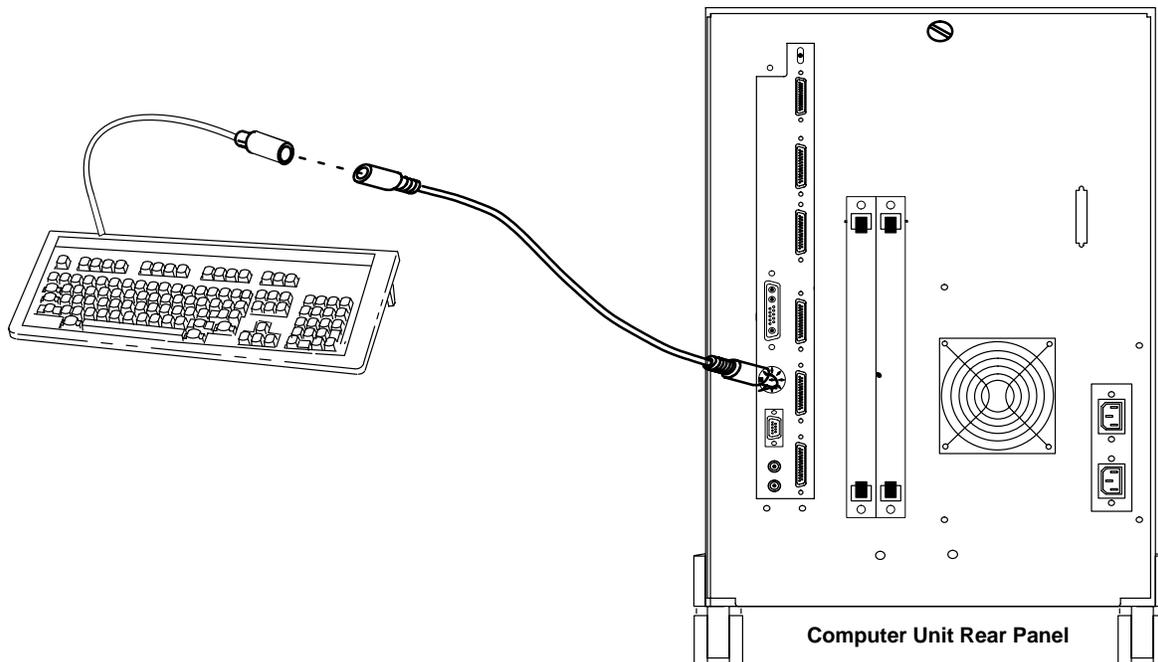
Figure 2–4   Connecting the AViiON 550 keyboard

Connecting the mouse (AViiON 550)

A three–button optical/mechanical mouse is part of the AViiON 550 series workstation.

▶ Follow these steps to connect the mouse to the computer unit. Reverse the order of these instructions to remove a faulty mouse in order to replace it.

1. Position the computer unit so that you have access to the rear panel connectors.

2. Align the holes in the mouse cable connector to the pins in the rear panel 9–pin connector, as shown in Figure 2–5.

Mouse cable
DB9 connector

Extension cable DB9 connector
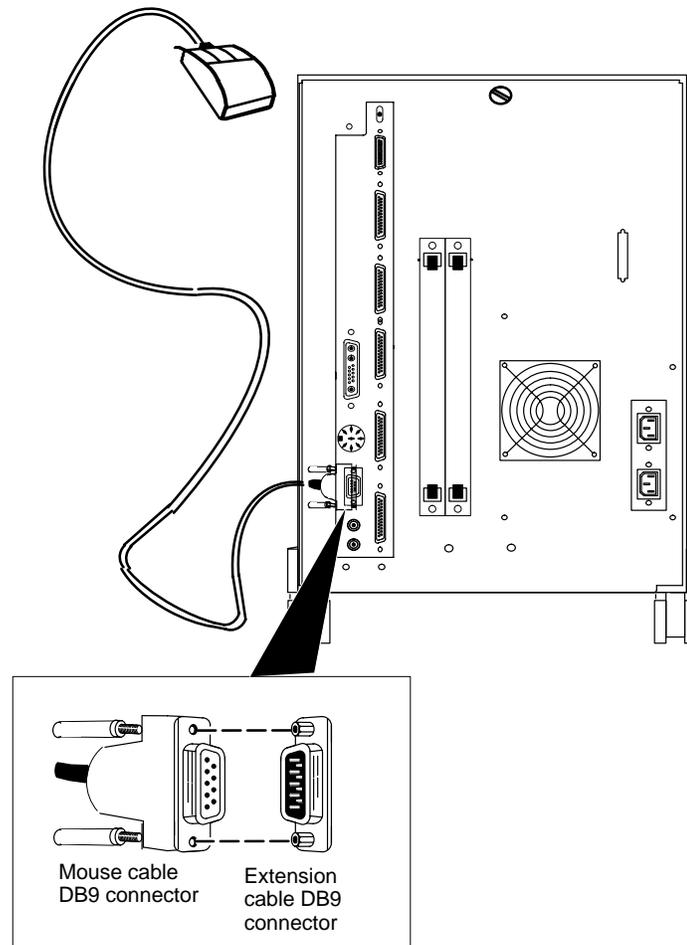
Figure 2–5   Connecting the AViiON 550 mouse

3. Position the mouse on the work surface.

Connecting a local area network cable

If your computer system will be part of an Ethernet local area network (LAN), you must connect the LAN transceiver cable to the integrated computer unit LAN connector.

The steps in this section assume that the LAN drop cable is already installed and the male end of the cable is within reach of your computer unit. Refer to the manual *Ethernet/IEEE 802.3 Local Area Network Installation Guide* for detailed information about installing your Ethernet network.

IMPORTANT: Your AViiON 550 or 5500 series system may include optional VME LAN controllers installed in the rear panel VME card cage. Refer to *Setting Up and Installing VMEbus Options in AViiON® Systems* for information about these installing VMEbus options.

AViiON 550 or 5500 series systems use the following cable to connect an Ethernet LAN to the rear panel connector:

✔	**Cable or Cord Type**	**Part Number**
☐	3–meter flexible drop cable	007–006253
	Male DB15 to female DB15 with slide clip connectors	
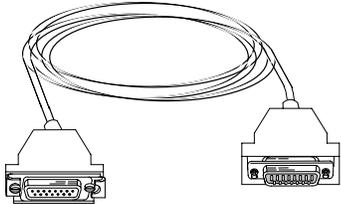
▶ To connect a LAN transceiver cable to the computer unit LAN connector, complete the following steps. Reverse the order of these steps to remove a LAN cable.

1. Align the pins in the transceiver cable with the holes in the computer unit LAN connector, shown in Figure 2–6.

Computer Unit Rear Panel
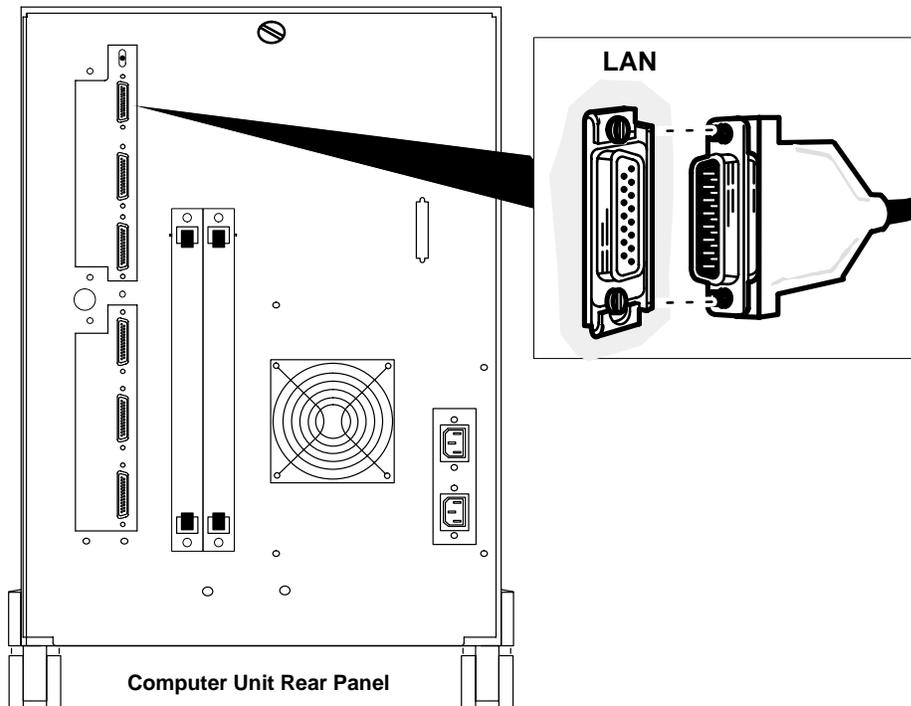
Figure 2–6   Connecting the LAN transceiver cable to the computer unit

2. Unlock the slide clip on the computer unit connector as shown in Figure 2–7(A). Line up the slide clip on the connector so that the clip mounts on the cable can pass through, as seen in Figure 2–7(B). Then, push the cable firmly into the connector.

3. Once the cable and clip mounts are secured to the connector, slide the clip down using a screwdriver or a comparable tool to lock the cable in place, as shown in Figure 2–7(C).
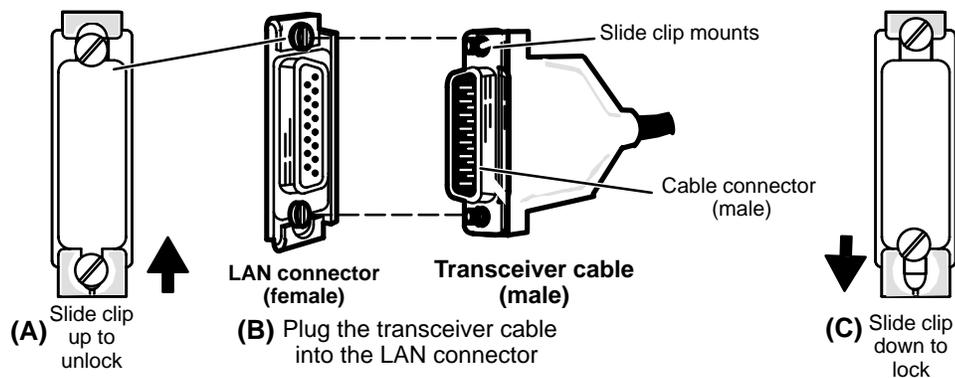
Figure 2–7   Attaching and securing the LAN transceiver cable

Connecting an AV/Alert modem (AViiON 5500) and other asynchronous serial devices

This section describes how to connect an asynchronous device (such as a serial modem, scanner, plotter, or printer) to the second (–B–) and third (–C–) rear panel RS–232 serial port connectors.

AViiON 5500 sites use the RS-232–B– (SERVICE) port for the AV/Alert modem. Connect your AV/Alert modem as described in this section. Refer to the manual *Using AViiON™ Diagnostics and the AV/Alert*sm *Diagnostic Support System* for more information.

IMPORTANT: The second and third asynchronous ports (SERVICE and RS–232–C–) are *not* configured to support a DG/UX™ terminal. On systems running the DG/UX operating system, the system console (OP CON) port (RS-232–A–) is factory–enabled for devices requiring Data Carrier Detect (DCD) signal transmission (all terminals). Refer to the section "Connecting the system console" earlier in this chapter.

You'll use one of the 25–pin (male–male) asynchronous device cable listed below to connect asynchronous devices to the rear panel serial connectors:

Asynchronous Modems

	Cable or Cord Type	Part Number	Model Number
☑			
☐	10–ft EIA RS–232 cable	005–36256	15369E010
☐	15–ft EIA RS–232 cable	005–36257	15369E015
☐	25–ft EIA RS–232 cable	005–36258	15369E025

DB25 male to DB25 male

Asynchronous Data Terminal Devices

	Cable or Cord Type	Part Number	Model Number
☑			
☐	10–ft EIA RS–232 cable	005–34256	15340E010
☐	15–ft EIA RS–232 cable	005–34990	15340E015
☐	25–ft EIA RS–232 cable	005–34991	15340E025

DB25 male to DB25 male
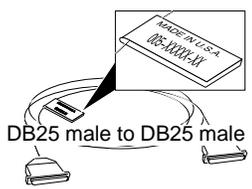
▶ Complete the following steps to connect the AV/Alert modem or other asynchronous device option. Reverse these steps to remove or replace an asynchronous device.

You will need a small, flat–blade screwdriver or similar tool.

1. Align the pins in one end of the asynchronous cable with the holes in either the SERVICE or RS-232–C– female connector on the back of the computer unit, as seen in Figure 2–8.

IMPORTANT: On AViiON 5500 systems, the SERVICE port is reserved for an AV/Alert modem and the OP CON port is reserved for the system console. AViiON 550 workstations may use these ports for any asynchronous device.

2. Secure the device cable to the computer unit connector by aligning and then tightening the two screws on the cable.

Computer Unit Rear Panel
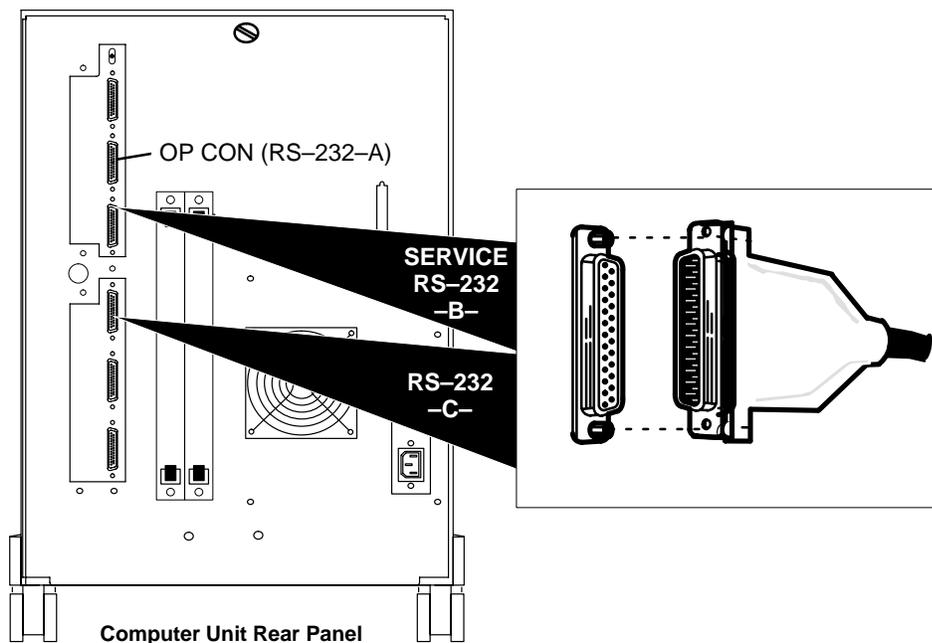
Figure 2–8   Connecting asynchronous devices to the computer unit serial ports

3. Connect the other end of the device cable to the connector on the back of the modem (or other serial device); secure the cable connection.

4. Configure your device to select appropriate operating characteristics, as described in documentation that came with the device.

   Initially, both your firmware and the DG/UX operating system require that the devices connected to the asynchronous ports have the following characteristics (applied to all three asynchronous ports prior to shipment):

   2400 baud
   8 data bits
   No parity

IMPORTANT: If you need to change the default characteristics, refer to the manual *Operating AViiON 5500 and 550 Series Systems* for information about using SCM configuration menus. SCM menus refer to the OP CON port (RS-232–A–) as the "console port" and to the SERVICE port (RS-232–B–)as the "modem port." You cannot configure the third RS–232 port (labeled RS-232–C–) within the SCM; for information on defining characteristics for port RS–232–C–, refer to *Customizing the DG/UX™ Operating System*.

   Do not change the default SERVICE port characteristics for AV/Alert use.

Connecting synchronous devices

This section describes how to connect a synchronous device (such as a modem) to the communications port labeled SYNC.

You'll need one of the following male-to-male 25–pin cables and a small, flat–blade screwdriver or similar tool:

Synchronous Devices

	Cable or Cord Type	Part Number	Model Number
☑	6–ft RS–232 cable	005–32917	15290E006
☐	15–ft RS–232 cable	005–32918	15290E015
☐	25–ft RS–232 cable	005–32919	15290E025

DB25 male to DB25 male

▶ Complete the following steps to connect your device to the computer unit rear panel. Reverse the order of these steps to remove or replace the synchronous device.

1. Plug one end of the synchronous communication cable into the SYNC connector on the back of the computer unit, as shown in Figure 2–9. Attach the cable to the connector by tightening the two screws on the cable.

SYNC

Align and secure with screws

Computer Unit Rear Panel
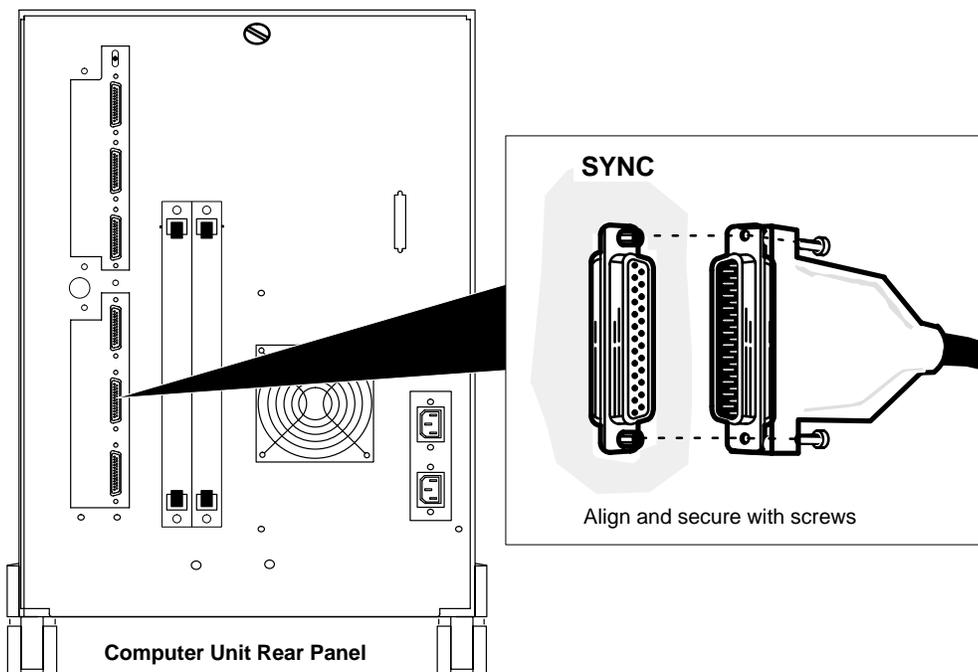
Figure 2–9 Connecting a synchronous device to the computer unit

2. Plug the other end of the cable into the connector on the synchronous device. See the documentation that came with the device for further instructions.

IMPORTANT: To further set up your device to operate under the DG/UX operating system, refer to *Customizing the DG/UX™ System.*

Connecting a parallel printer

This section describes how to connect a parallel printer with a Centronics LPT1 interface.

You'll need one of the following 25–pin to 36–position cables to connect a parallel printer to the rear panel connector, plus a small, flat–blade screwdriver or similar tool. :

Parallel Devices

	Cable or Cord Type	Part Number	Model Number
☑			
☐	5–ft Centronics LPT1	005–023915	10235
☐	30–ft Centronics LPT1	005–033762	15293E030

DB25 male to 36–position CHAMP

▶ Complete these steps to connect a parallel printer. Reverse the order of these steps to remove or replace the printer cable.

1. Plug the 25–pin end of the printer cable into the parallel printer connector on the back of the computer unit as shown in Figure 2–10. Attach the printer cable to the connector by tightening the two screws on the printer cable.

Align and secure with screws

Computer Unit Rear Panel
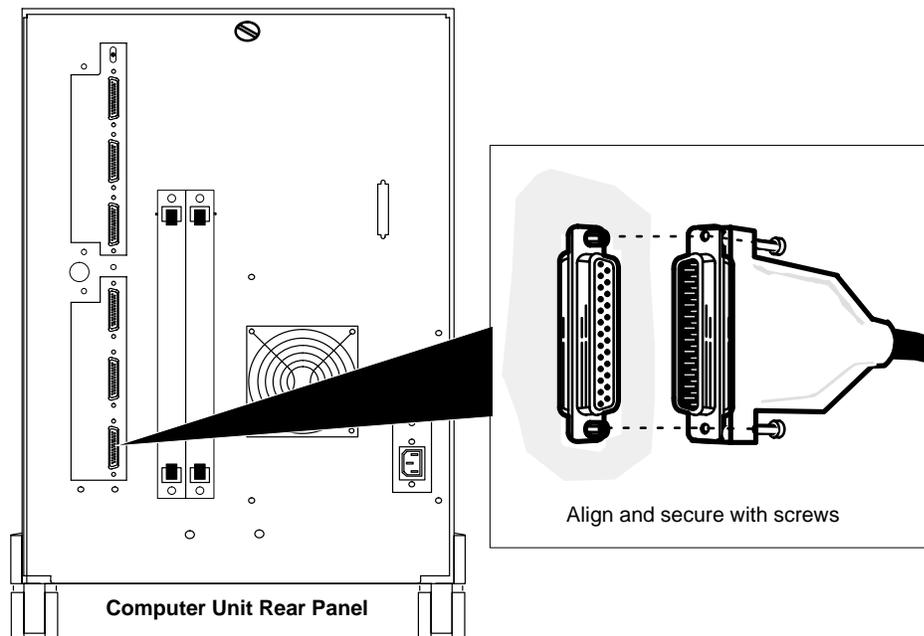
Figure 2–10 Connecting a parallel printer to the computer unit

2. Plug the other (36–position CHAMP) end of the printer cable into the connector on the parallel printer. Secure the connection by closing the connector spring clips over the cable. See the documentation that came with the printer for further instructions.

IMPORTANT: To further set up your printer to operate under the DG/UX operating system, refer to *Customizing the DG/UX™ System.*

Connecting VME devices

Figure 2–11 shows the location of the VMEbus card cage on the computer unit rear panel.

Refer to *Setting UP and Installing VMEbus Options in AViiON® Systems* for information on connecting external devices to your system's VMEbus option boards.
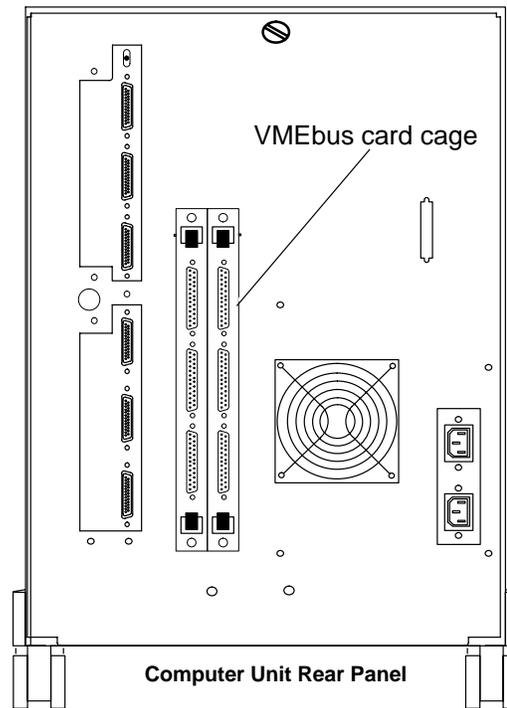
Figure 2–11   VMEbus card cage

After you set up and connect your VMEbus options to the controllers in your AViiON VME card cage, continue with the next section in this chapter.

Terminating or extending the internal SCSI bus

Each base (standard) model AViiON 5500 and 550 series computer includes one SCSI–2 bus controller. This controller supports all internal drives, plus, optionally, a limited number of external SCSI devices. Since the controller is integrated on the system board, we use the phrase *integrated* or *internal SCSI* to refer to this bus.

If your system will include external SCSI devices on the integrated bus (any disk, tape, diskette, CD-ROM, or optical disk drive housed outside the computer unit), complete the steps in the subsection, "Extending the integrated bus."

If your system's integrated SCSI bus *does not include external* storage subsystems or devices, you must terminate the bus at its rear panel connector as described in the following subsection. (Your internal tape and disk drives will not operate correctly unless the bus is properly terminated.)

IMPORTANT: In most cases, your computer is shipped with the internal SCSI bus terminator (DGC part number 111–3468) already installed. If a plug occupies the rear panel connector shown in Figure 2–12 and you have no external SCSI devices to connect to this bus, you can skip this section.

Your system may also include one or two optional SCSI adapter boards (DGC Model 005–39782) installed in expansion slots. Refer to Chapter 3 for information about configuring expansion SCSI buses and connecting devices. *When you finish setting up and installing expansion SCSI buses, return to the last section in this chapter, "Connecting the computer unit power cord."*

Terminating the integrated bus

▶ To terminate the internal SCSI bus, follow these steps.

1. Gently insert the terminator plug in the SCSI connector by aligning the D–shaped connectors, as shown in Figure 2–12.

2. Tighten the thumb screws by rotating clockwise to secure the terminator.

Computer Unit Rear Panel
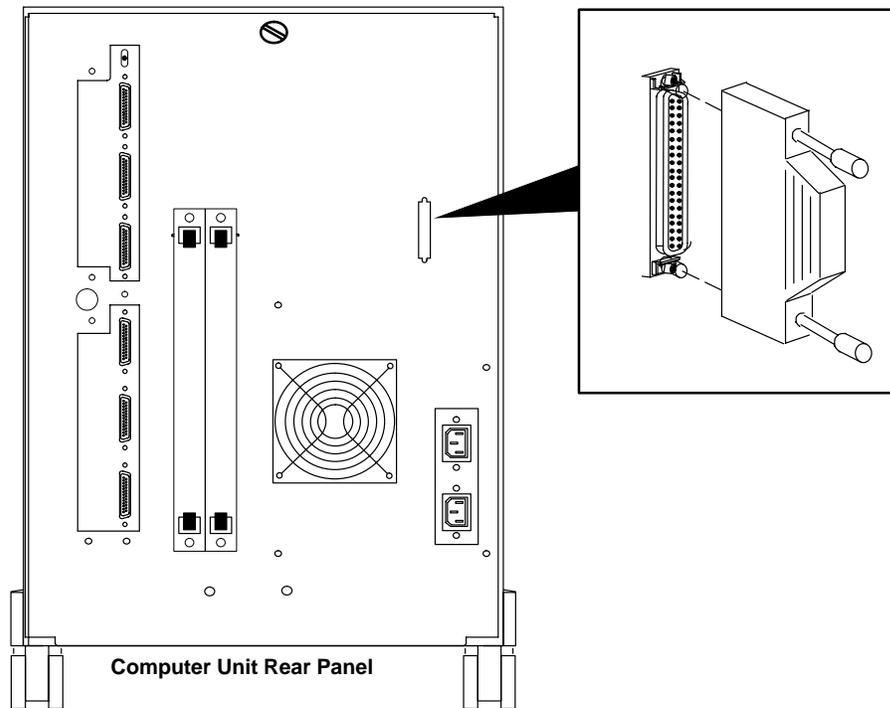
Figure 2–12   Installing the SCSI bus terminator plug

Extending the integrated SCSI bus

This section describes how to connect a cable for external SCSI devices (storage subsystems or stand–alone drives) on the integrated SCSI bus.

IMPORTANT: With external devices installed, the SCSI bus speed must be configured for SLOW operation. For guidelines on setting up and configuring a SCSI bus, or to connect devices to an expansion SCSI bus, refer to Chapter 3.

▶   To connect external SCSI devices to the AViiON 5500 or 550 series internal SCSI bus, complete the following steps.

  1.   Locate the host–to–peripheral device cable.

✔ Cable or Cord Type	Part Number	Model Number
☐ 5–ft cable	005–39718	15396E005
☐ 10–ft cable	005–39719	15396E010

(50–line male CHAMP to 50–pin male P&S)

2. Remove the terminator from the internal SCSI bus connector. To remove a terminator, simply reverse the process illustrated in Figure 2–12. Gently loosen the thumbscrews and pull the terminator out of the rear panel connector.

3. Insert the male end of your P&S–style cable in the rear panel integrated SCSI connector, as seen in Figure 2–13.

Computer Unit Rear Panel
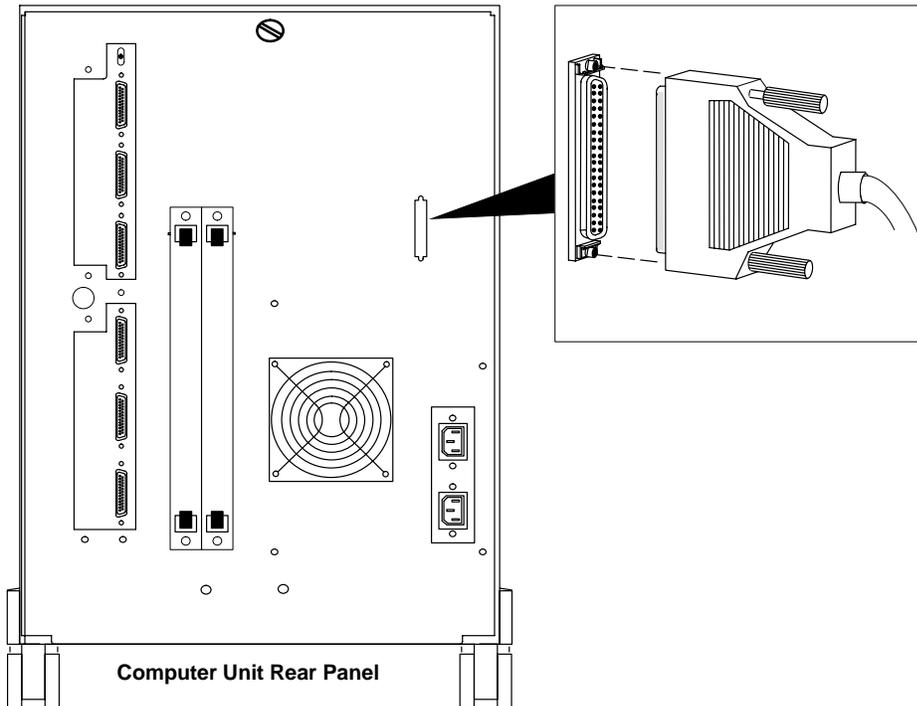
Figure 2–13 Connecting external cabling to the internal SCSI bus connector

4. Secure the cable connectors with the captive thumb screws.

5. Connect the remote end of the cable to the first external device on the bus and terminate the bus as described in the documentation that came with the device.

6. Refer to Chapter 3 if you have more than one device to install, or to install an expansion SCSI bus.

Connecting the computer unit power cord

After you have assembled your computer system, use these steps to connect the computer unit power cord to an ac outlet, completing your set up procedures. Reverse the order of these steps to disconnect the computer unit power cord.

1. Locate the computer unit power cord. It shipped with the computer unit.

   Refer to Table 1–3 in Chapter 1 to be sure you are using a cord with proper voltage for your site.

2. Plug the female end of the computer unit power cord into the upper ac connector, as shown in Figure 2–14.

Computer Unit Rear Panel
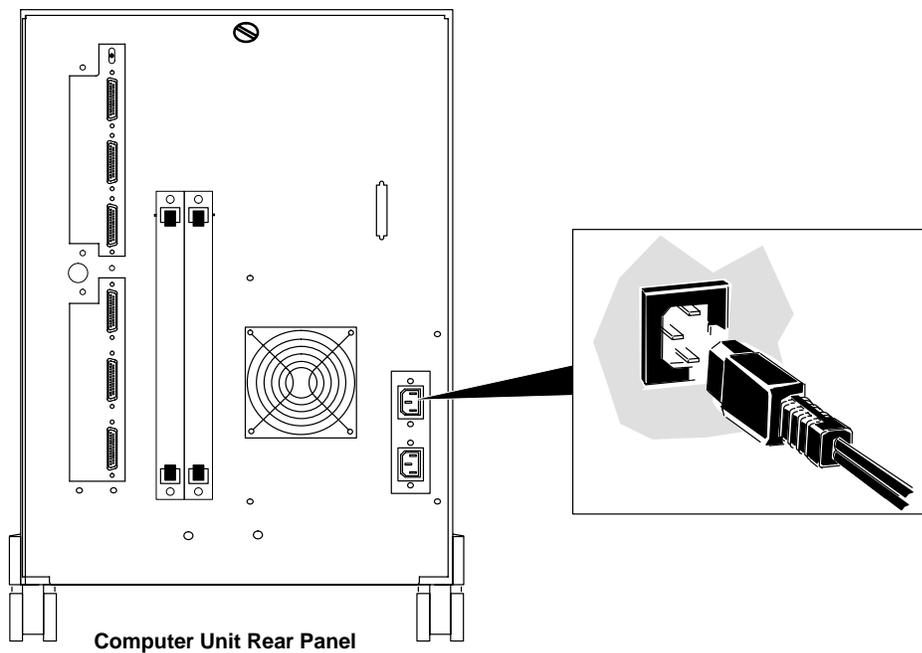
Figure 2–14   Connecting the computer unit power cord

3. Plug the male end of the computer unit power cord into a grounded ac outlet.

Where to go next

Now that you have set up your computer system hardware, you can:

▶ Continue with the manual *Operating AViiON® 5500 and 550 Series Computers* to:

- ensure that your computer system starts properly

- become familiar with powerup procedures

- verify that the computer system hardware passes all powerup diagnostic tests

Or, you can:

▶ Proceed directly with *Installing the DG/UX™ System* to:

- plan your operating system and network configuration

- install your operating system

- set up application software packages

End of Chapter

3 Setting up and configuring a SCSI bus

This chapter describes how to plan and configure a Small Computer System Interface (SCSI) bus for AViiON 5500 and 550 series systems. In addition to instructions for connecting external SCSI–based devices, this chapter includes the following:

- default and recommended SCSI identification numbers

- operating parameters for a SCSI bus and individual drives

- operating parameters for individual drives

- cabling restrictions

- bus terminating rules

- worksheets to help you prepare your SCSI configuration

IMPORTANT: If your system does not include external SCSI storage subsystems or stand–alone SCSI devices, you probably do not need the information in this chapter. However, you do need to terminate the internal SCSI bus at the computer unit, as described in Chapter 2.

To ensure that your system components work together, you should fill out the worksheets in this chapter, and make certain that your SCSI bus adheres to the device identification and cable rules described here. Before adding any new internal or external SCSI devices to your system, read this chapter to plan your SCSI bus configuration.

If your system includes external devices (drives or subsystems housed outside the computer unit), follow the steps in the "Connecting an external SCSI bus to the computer unit rear panel" section of this chapter to connect those devices to your computer unit.

Some notes about terminology.

The AViiON 5500 and 550 SCSI interfaces support both SCSI–2 and SCSI–1 devices. References in this manual to "SCSI" apply to both the SCSI–1 and SCSI–2 specification.

This chapter refers to the microprocessors that manage individual SCSI buses as *controllers.* These controllers, and/or the printed–circuit boards that contain them, are sometimes referred to as SCSI *adapters, adapter boards,* or *controller/adapters;* the distinction should not affect your configuration. The term *channel* is sometimes used when referring to either a SCSI bus, SCSI adapter, or SCSI controller.

About SCSI I/O bus support

The Small Computer System Interface (SCSI) is an ANSI-defined standard for computer and peripheral interconnection.

Every AViiON 5500 and 550 series computer includes a SCSI bus controller on the system board. This bus is set to a single–ended interface by default; it supports internal drives, plus (optionally) a limited number of external drives.

Your system may also include one or two optional SCSI expansion adapter boards installed in the expansion slots shown in Figure 3–1. Each expansion SCSI adapter board provides two additional SCSI buses; qualified personnel can configure each bus to use a single–ended or differential interface. To install a SCSI option board and set singled–ended or differential operation for its channels, refer to Chapter 7.

Figure 3–1 shows the location of all possible SCSI connectors on the rear panel of your computer. All AViiON 5500 and 550 computers include an external connector for the integrated SCSI bus. If your system has an optional SCSI I/O adapter board, the rear panel contains two additional SCSI connectors per board. If you do *not* have SCSI expansion boards, their connector slots remain empty or contain another external I/O option.
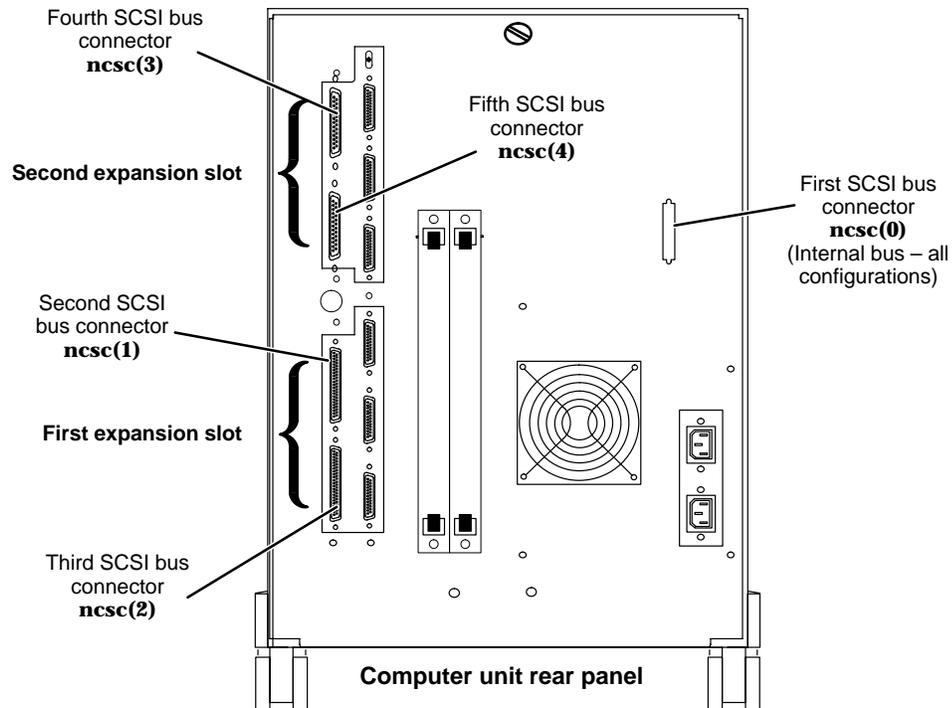
Figure 3–1   Location of SCSI bus connectors

The integrated SCSI controller is factory–specified as Controller 0; system software knows the controller by its device name **ncsc(0)**. The optional SCSI buses are factory–specified as Controller 1 and Controller 2 (first expansion board) and Controller 3 and Controller 4 (second expansion board). Figure 3–1 shows the default device names for each SCSI controller.

Of course, if your system does not include the optional SCSI I/O expansion boards, the slots do not contain SCSI bus connectors.

Each SCSI bus in your system supports up to *seven* devices housed internally, independently, or within a storage subsystem.

Planning a SCSI bus configuration

You should carefully plan your entire SCSI bus configuration *before* you begin setting up the devices. Make sure that your system adheres to the SCSI device identification, cable, and bus termination rules given in this section.

Use the worksheets at the end of this chapter (Figure 3–6 provides a sample) along with the information in the following sections, to plan and/or verify your configuration.

Once you have verified your configuration, continue with the later section, "Connecting external SCSI drives and storage subsystems."

Determining SCSI bus speed

The SCSI bus operates at FAST or SLOW speed. To use single–ended external devices, the default speed of the SCSI bus in your system must be SLOW.

You view or set the SCSI bus speed using an SCM (System Control Monitor) configuration menu. Refer to the manual *Operating AViiON 5500 and 550 Series Computers* for instructions.

Calculating SCSI bus cable lengths

Cabling for a SCSI bus begins at the SCSI controller; it connects all mass–storage drives on the bus in a cabled series of links known as a "daisy–chain" configuration.

Consider the following when you calculate the total length of your SCSI bus cabling:

- A singled–ended bus cannot exceed 6 meters (~19.6 feet).

- A differential bus cannot exceed 25 meters (~82.2 feet).

Integrated SCSI controller

The internal SCSI controller is set by default for singled–ended operation; therefore, the total bus length cannot exceed 6 meters (19.6 feet).

1.25 meters (4.1 feet) of the cable maximum resides within the AViiON 5500 or 550 series computer unit. Thus, the external connector for the integrated SCSI controller supports up to 4.75 meters (15.6 feet) additional bus length.

Optional SCSI adapter board expansion controllers

An optional SCSI I/O expansion board contains two additional SCSI controllers and connectors for external devices. You can configure both controllers for either single–ended or differential operation.

None of the bus length for these controllers resides within the AViiON 5500 or 550 series computer.

External devices

Most stand–alone SCSI drives or storage subsystems consume internal cable, reducing the maximum length of your external cabling. Refer to the manual that came with your subsystem(s) for its internal SCSI bus length.

▶ Use the following formula to calculate the length of your SCSI bus cable.

Length of internal   +   Length of each   =   Total SCSI
SCSI cable for   connecting   bus length
each device   cable

Identifying SCSI drives

Each SCSI controller in your system has a unique identifying number and ID, beginning with Controller 0 for the integrated bus. (The controller ID parameter is used in configurations where a SCSI bus is shared by more than one host, or *dual–initiated*. Refer to your *Operating* manual for information about a dual–initiated SCSI bus.)

Similarly, each drive on each SCSI bus has a unique identification number (referred to as a *SCSI ID* or *device ID*). Since each SCSI controller supports a bus with up to seven devices, SCSI ID values range from 0 through 6.

System software recognizes a device by a combination of its SCSI ID and the controller number for the bus that supports the device; AViiON firmware and the DG/UX operating system use these numbers within device naming syntax. For example, sd(ncsc(1,7),0) identifies the disk at SCSI ID 0 on the second SCSI bus (SCSI controller number 1).

When you receive preinstalled devices, the drives' SCSI ID numbers are already set. Factory–set SCSI IDs are listed on a label attached to your computer rear panel.

Assigning SCSI IDs

Before you connect a SCSI bus cable to your computer unit, make certain each device on the bus has a unique SCSI ID; if you notice a conflict, you will need to reassign device identifications by changing jumpers on the drive(s).

SCSI ID assignments do not need to reflect the physical positioning of devices along the SCSI bus; a drive at the physical end of the bus can have a higher or lower device identification number than another drive closer to the SCSI controller.

The DG/UX operating system allows the configuration of any SCSI device at any unique and valid SCSI device ID number. However, other software (such as device drivers) could limit the use of certain device ID numbers to specific types of devices. Check the drive manual(s), and the documentation for any customized software you plan to run on your system, for further SCSI ID restrictions.

IMPORTANT: The automatic boot sequence for your computer system looks for a disk at SCSI ID 0 on the first controller. Therefore, you should assign SCSI device ID 0, Controller 0, to the system (root) disk. Unless you manually change the automatic boot path, this disk will boot automatically when you power up the computer system.

Default SCSI ID assignments

Components purchased together as a system are preconfigured at the factory to default SCSI ID assignments.

Table 3–1 lists defaults for all possible SCSI devices on the first (integrated) AViiON 5500 and 550 series SCSI controller, as well as defaults for sample devices on expansion buses. (An expansion SCSI bus uses the same recommended device ID assignments as the integrated bus.)

The "Device name" column in Table 3–1 lists the name that the DG/UX operating system and the computer firmware use to identify a device.

Examine the configuration labels on the back of your computer and on each external drive or subsystem in your configuration. Enter the SCSI IDs for each drive on the worksheets provided at the end of this chapter. Figures 3–5 and 3–6 in this chapter provide worksheets with sample configurations. Verify that each drive on a bus has a unique device ID of 0 to 6.

Table 3–1 Recommended SCSI IDs, controller numbers, and default device names

Drive	SCSI ID	Controller #	Device name *
First disk on first SCSI bus (system, or root disk)	0	0	sd(ncsc(0,7),0)
First disk on *second* bus	0	1	sd(ncsc(1,7),0)
Second disk on first bus	1	0	sd(ncsc(0,7),1)
Second disk on *second* bus	1	1	sd(ncsc(1,7),1)
Third disk on first bus	2	0	sd(ncsc(0,7),2)
Third disk on *third* bus	2	2	sd(ncsc(2,7),2)
First CD-ROM (or 4th disk) on first bus	3	0	sd(ncsc(0,7),3)
First CD-ROM (or 4th disk) on *fourth* bus	3	3	sd(ncsc(3,7),3)
First (boot) tape on first bus	4	0	st(ncsc(0,7),4)
First tape on *fifth* bus	4	4	st(ncsc(4,7),4)
Second tape on first bus	5	0	st(ncsc(0,7),5)
Second tape on *second* bus	5	1	st(ncsc(1,7),5)
Third tape (or 2nd CD–ROM, or 5th disk) on first bus	6	0	sd(ncsc(0,7),6)
Third tape (or 2nd CD–ROM, or 5th disk) on *third* bus	6	2	sd(ncsc(2,7),6)

* The default controller ID parameter is 7; you do not need to specify this parameter unless the specified SCSI bus is shared by more than one host (dual–initiated).

Refer to your hardware operating manual, and to DG/UX documentation for more information about device specifications.

Preparing drives

The SCSI devices you received with your system are preconfigured to comply with the operating parameters of the controller and the other drives on the SCSI bus. Before you install an internal or external add-on SCSI device, you need to set its operating parameters as described in this section.

If you add or replace devices anywhere on the SCSI bus, you must set the IDs by positioning drive–select jumpers on the individual device(s).

▶ The following steps outline how to prepare a SCSI drive for installation.

IMPORTANT: For device-specific information about setting the SCSI jumpers/switches and removing the terminator resistors, refer to the list of drive installation manuals in the *Guide to AViiON® and DG/UX™ System Documentation*.

1. Set SCSI ID jumpers according to your SCSI bus plan. Refer to your drive documentation for instructions.

   IMPORTANT: Each SCSI drive or SCSI adapter board located in a storage subsystem must have its own unique SCSI ID number.

2. Make certain the drive's jumper and/or switch settings comply with the following operating parameters:

   • Set all disk drives for sequential drive motor start. With this feature enabled, the drive delays starting up its spindle motor a number of seconds (a multiple of the SCSI ID number) when you power up your system.

   • Set all drives so that the SCSI bus (host system) provides terminator power rather than the drives themselves. Some devices specify this option as "SCSI pin 26 ON," or "power from interface cable pin 26."

   • Set any drive that offers these options to *enable* parity checking and arbitration.

   • Make sure the bus termination is correct on the new drive:

     In an AViiON 5500 or 550 series computer or storage subsystem, *all* drives and SCSI adapter boards must have their SCSI bus terminator resistors removed.

     Most stand–alone drives employ an external terminator plug to terminate the SCSI bus; if your drive does not have an external terminator, and it will be physically positioned as the last drive on the SCSI bus, you must install bus termination resistors.

3. Install each internal drive according to the instructions in Chapter 5 of this manual.

4. Install each external drive according to instructions in the storage subsystem manual.

5. Modify or attach the label that identifies the SCSI ID numbers assigned to the drive(s) to indicate each drive's location in the unit and device name. Document your configuration in the worksheets provided at the end of this chapter. (Figures 3–5 and 3–6 provide samples.)

Installing external SCSI devices

Review the previous sections for guidelines on planning and configuring a SCSI bus.

This section describes how to connect devices to a SCSI bus that is already set up and configured.

Subsections describe how to do the following:

- Connect a SCSI bus cable to the computer unit chassis.

- Connect the SCSI bus cable in a daisy–chain to the external subsystems and stand–alone drives.

- Terminate the SCSI bus.

To complete the steps in this section, you will need the device– and subsystem–specific documentation listed in *Guide to AViiON® and DG/UX™ System Documentation* for each bus component.

Connecting an external SCSI bus cable to the computer unit

Before you begin physically installing your SCSI bus cable and SCSI devices, plan your cabling scheme(s) and assign SCSI ID numbers to each device, according to the rules described in the preceding sections of this chapter.

▶ After you verify the cable lengths and SCSI IDs in your configuration, follow these steps to connect an external SCSI bus to a rear panel SCSI connector:

1. Turn off the power to your computer, storage subsystems, and all peripherals.

2. Locate the appropriate SCSI bus cable.

For the *integrated* bus, use a 50–pin P&S to 50–line CHAMP cable:

	Part Number	Model Number
5-ft cable	005-39718	15396E005
10-ft cable	005-39719	15396E010

(50-line male CHAMP to 50-pin male P&S)
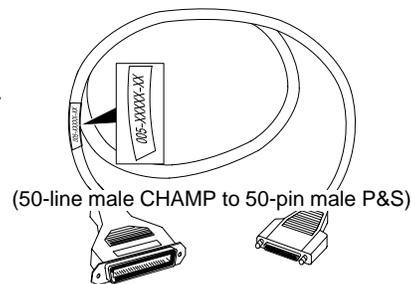
For an *expansion* bus, use a 68–pin P&S cable:

Cables for a single–ended expansion bus:
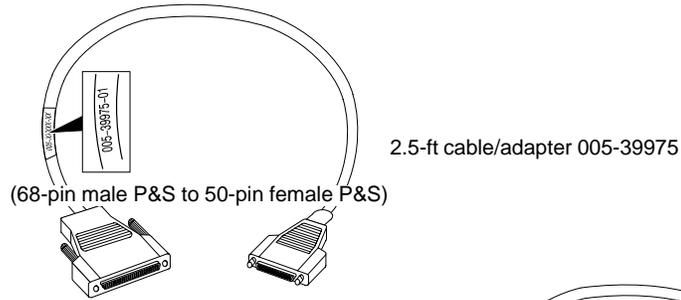
2.5-ft cable/adapter 005-39975

(68-pin male P&S to 50-pin female P&S)

	Part Number	Model Number
5-ft cable	005-39718	15396E005
10-ft cable	005-39719	15396E010

(50-line male CHAMP to 50-pin male P&S)

Cables for a differential expansion bus:
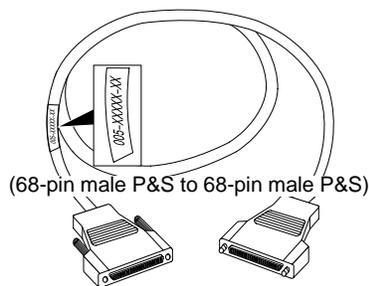
	Part Number	Model Number
10-ft cable	005-40003	15418E010
20-ft cable	005-40004	15418E020
40-ft cable	005-40005	15418E040
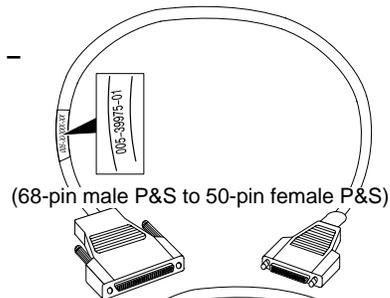
(68-pin male P&S to 68-pin male P&S)

– OR –

2.5-ft cable/adapter 005-39975

(68-pin male P&S to 50-pin female P&S)

	Part Number	Model Number
5-ft cable	005-39718	15396E005
10-ft cable	005-39719	15396E010
20-ft cable	005-39720	15396E020
40-ft cable	005-39721	15396E040

(50-line male CHAMP to 50-pin male P&S)
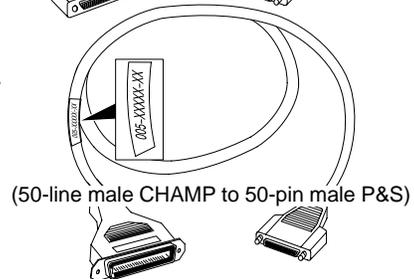
3. Align the cable connector with the computer unit connector. Figure 3–2 shows the connection for the internal SCSI bus; Figure 3–3 shows the connection for an expansion bus.

IMPORTANT: For expansion IOC boards, be sure to use the appropriate cabling
for a single–ended or differential bus interface. *Do not attempt to
use single–ended devices or terminators on a differential bus, or
vice–versa.* Each expansion SCSI controller is labeled Singled Ended
or Differential (inside the machine, on the printed–circuit board).
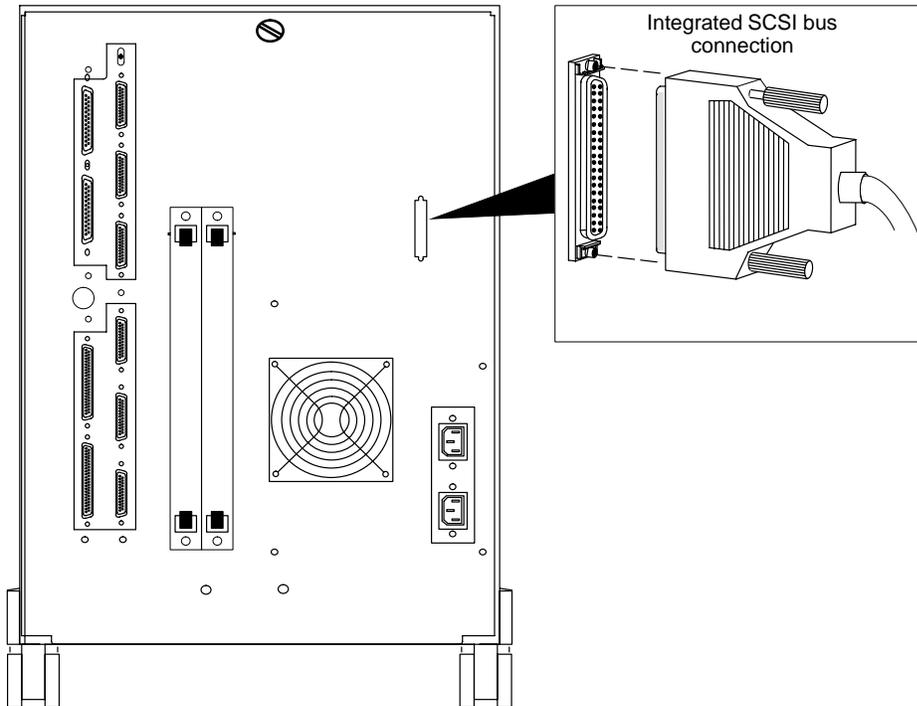
Figure 3–2   Connecting cabling to internal SCSI bus connector
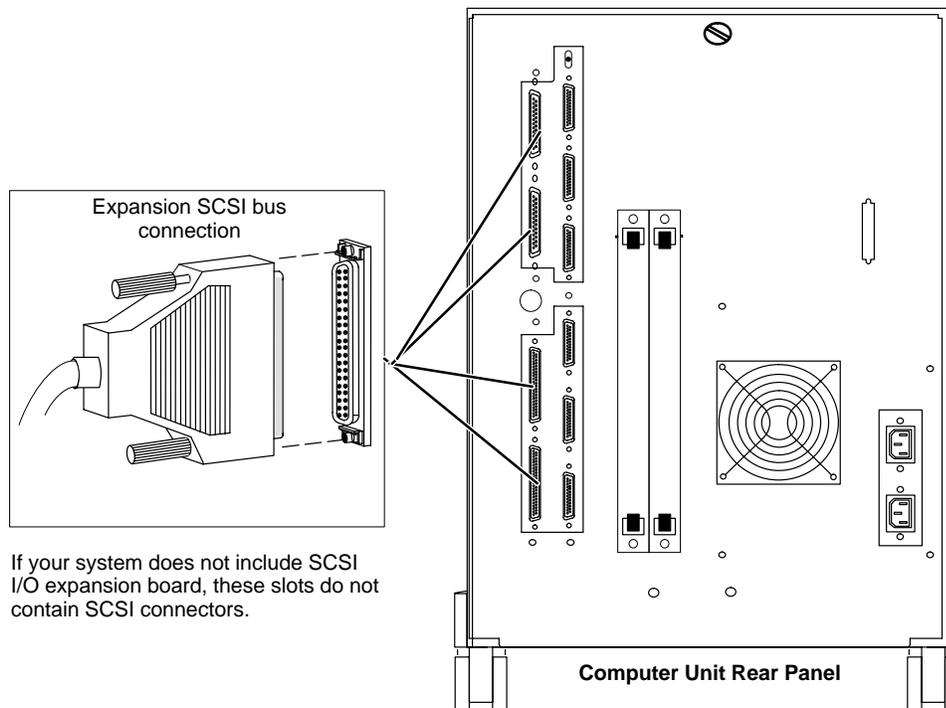
Figure 3–3   Connecting cabling to expansion SCSI bus connectors

4. Tighten the cable screws with your fingers to secure the cable connection.

5. Connect the remote end of the cable to the first external device on the bus as described in the documentation that came with the external device.

    IMPORTANT: You do *not* need to terminate any unused SCSI connectors on expansion IOC board(s).

6. Repeat steps 1 through 5 for each SCSI bus in your system.

Connecting together additional external SCSI devices

Before you begin connecting additional SCSI devices, locate all of your SCSI bus external cables.

Refer to your device–specific documentation for instructions, and then install each device along the bus.

IMPORTANT: When you arrange your SCSI drives along the bus, make certain to avoid strain on any part of the SCSI cable.

Terminating a SCSI bus

If the integrated SCSI bus does not include external storage subsystems or stand–alone devices, you must terminate the bus at its rear panel connector. (Internal tape and disk drives will not operate correctly unless the bus is properly terminated.)

IMPORTANT: In most cases, your computer is shipped with a SCSI bus terminator (DGC part number 111–3468) already installed in the integrated SCSI rear panel connector.

You terminate each expansion SCSI bus with a terminating plug that you install on the unused bulkhead connector on the outside of the last unit. *Do not terminate any of the SCSI devices within an external subsystem.*

IMPORTANT: You do *not* need to terminate any unused SCSI connectors on expansion I/O board(s).

To locate the SCSI bus terminators and connectors for a stand-alone drive or storage subsystem, refer to the device–specific manual for that drive or subsystem.

Recording your SCSI configuration

IMPORTANT: Record your system configuration in the blank *SCSI Configuration Worksheets* provided at the end of this chapter.

In the example worksheets (Figures 3–5 and 3–6), we've recorded the SCSI configuration for a sample AViiON 5500 system. Figure 3–4 illustrates this sample SCSI configuration. Figure 3–5 records the sample configuration for the integrated bus; Figure 3–6 records the expansion bus configuration for the sample configuration.

Internal
CD ROM drive
SCSI ID 3

**AViiON 5500
(front view)**

Internal
DAT drive
SCSI ID 4

Internal
disk drive
SCSI ID 0

**AViiON 5500
(rear view)**

Singled–ended expansion bus < 6 m (19.65 feet)

Disk drive
SCSI ID 1

Tape drive
SCSI ID 4

2.75 ft.

2.75 ft.

5 ft.

5 ft.

Disk drive
SCSI ID 2

Disk drive
SCSI ID 0

CLARiiON disk
array storage
system

Integrated bus < 6 m (19.65 feet)

QIC tape
drive
SCSI ID 5

Disk drive
SCSI ID 1

Differential expansion bus < 25 m (82 feet)

Figure 3–4   Sample SCSI configuration

As seen in Figure 3–4, the integrated SCSI bus contains three internal drives and an external peripheral housing unit (PHU) with two drives installed.

Controller/bus number 0 (integrated controller)

Internal Drives			
Slot (top to bottom)	**Drive description**	**SCSI ID**	**Cable Length**
1. ☒	*600–Mbyte CD–ROM*	**3**	*4.10' internal bus*
2. ☒	*4mm DAT*	**4**	
3. ☒	*520–Mbyte disk*	**0**	
4. ☐			
5. ☐			
External Drives (external connector, integrated bus			*10' cable*
Drive description		**SCSI ID**	
PHU — *1–Gbyte disk*		*1*	*2.75'*
QIC tape		*5*	

Total Cable Length   *16.85 feet*

Figure 3–5   Sample configuration worksheet (integrated bus)

As seen in Figure 3–4, the sample configuration contains one expansion SCSI I/O adapter board; this board provides two expansion SCSI buses. Figure 3–6 records the expansion configuration.

Worksheet: Expansion SCSI bus configuration

Expansion SCSI I/O adapter board: ☒ **first** ☐ **second**

Expansion controller/bus number: ___1___ ☐ **Single–ended bus** ☒ **Differential bus**		
Description (subsystem, drive, external cable)	**SCSI ID**	**Cable Length**
		10' cable
CLARiiON 2000–Series Disk Array		
		See CLARiiON manual for internal bus length and SCSI IDs
	Total Cable Length	*< 82 feet*

SAMPLE SAMPLE SAMPLE

Expansion controller/bus number: ___2___ ☒ **Single–ended bus** ☐ **Differential bus**		
Drive description (subsystem, drive, external cable)	**SCSI ID**	**Cable Length**
First PHU:		*5' cable*
1–Gbyte disk	**0**	*2.75' internal bus*
QIC tape	**4**	
Second PHU:		*5' cable*
1–Gbyte disk	**1**	*2.75' internal bus*
2–Gbyte disk	**2**	

Total Cable Length ___15.5 feet___

Figure 3–6   Sample configuration worksheet (expansion buses)

Record your own system configuration using the blank SCSI Configuration Worksheets that follow. (You may want to make copies of the blanks forms first.)

SCSI Configuration Worksheet: Integrated SCSI Bus

Controller/bus number 0 (integrated controller)

Internal Drives			
Slot (top to bottom)	**Drive description**	**SCSI ID**	**Cable Length**
1. ☐			
2. ☐			
3. ☐			
4. ☐			
5. ☐			
External Drives (external connector, integrated bus)			

Total Cable Length _____

SCSI Configuration Worksheet: Expansion Bus(es)

Expansion SCSI I/O adapter board: ☐ **first**   ☐ **second**

Expansion controller/bus number: _____ ☐ **Single–ended bus** ☐ **Differential bus**		
Description (subsystem, drive, external cable)	**SCSI ID**	**Cable Length**
	Total Cable Length ————	

Expansion controller/bus number: _____ ☐ **Single–ended bus** ☐ **Differential bus**		
Drive description (subsystem, drive, external cable)	**SCSI ID**	**Cable Length**

Total Cable Length _____

End of Chapter

4 Expanding and maintaining computer hardware

This chapter contains procedures you should perform whenever you open your computer chassis.

The first major section in this chapter, "Maintaining your system," outlines what you should do if a problem occurs with your system hardware, and describes periodic maintenance required to keep the system operating properly.

You need to follow the directions in the "Avoiding electrostatic discharge (ESD) damage" section each time you open your computer unit or unpack a new component.

The last sections of this chapter explain how to open and close the computer unit.

IMPORTANT: For information on the periodic maintenance of individual system components such as tape, disk, and diskette drives, refer to the device–specific manual for operating each drive listed in *Guide to AViiON® and DG/UX™ System Documentation*.

Maintaining your system

Occasionally, you need to perform routine maintenance on your computer system. Most often, however, maintenance for your AViiON 550 or 5500 series system involves replacing a component that has failed. We refer to the subassemblies that you can easily remove and install as *customer replaceable units,* or *CRUs*.

If a computer system problem occurs

If you have a problem with your computer system, first refer to the manual *Operating AViiON® 550 and 5500 Series Computers* for a list of problems that could occur during powerup; the manual provides suggestions for resolving these problems.

If you have determined that the problem is in an external storage subsystem, refer to the manual that came with the subsystem (listed in the Preface) for troubleshooting suggestions.

If your computer passes powerup testing but still indicates a hardware problem, you might want to run a diagnostic test on the system or a particular component. Refer to the manual *Using AViiON® Diagnostics and the AV/Alert Diagnostic Support System* for a description of diagnostic utilities available for your system, and instructions on how to run them.

If you cannot resolve the problem yourself, contact Data General as described in the Preface. If the Data General Service Center determines that a CRU needs replacement, they will send the new part.

Replacing CRUs

The cables and devices listed in Chapter 2 are external CRUs. You replace an external CRU by disconnecting and reconnecting one or more cables. Refer to Chapter 2 for the procedures for adding or replacing external CRUs.

Internal CRUs are base components and system options that reside within your computer unit; they include

- mass–storage devices
- the system board,
- the power supply
- the fan assembly,
- memory modules
- an optional expansion CPU complex board
- a graphics controller (AViiON 550 only)
- optional I/O expansion boards.

To add or replace an internal CRU, you must remove the cover of the computer unit.

Chapter 3 describes how to add or replace drives and subsystems connected to the SCSI connectors on the rear of your computer unit.

CAUTION: *Before attempting to replace or add a CRU, read the section in this chapter on "Avoiding Electrostatic Discharge (ESD) Damage" so that you do not damage the replacement or add–on CRU.*

Periodic care

At one–year intervals, you should examine and thoroughly clean the fan/airflow screen located at the bottom of the computer unit chassis, as seen in Figure 4–1.
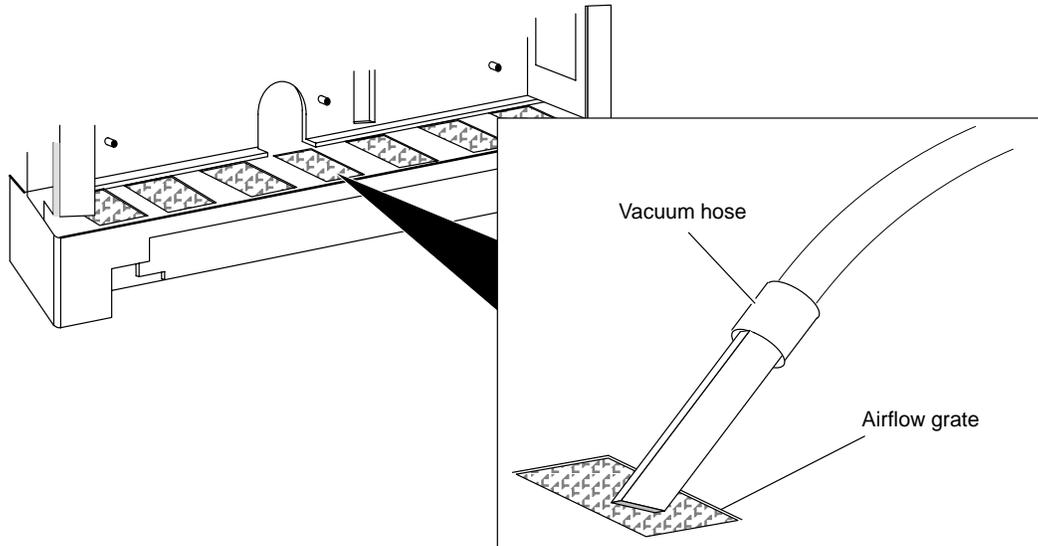
Figure 4–1   Cleaning the grates in the airflow screen

CAUTION: *Be sure to follow the procedures in in the sections "Avoiding Electrostatic Discharge (ESD) Damage" and "Opening and closing the computer unit" before starting periodic maintenance.*

Avoiding electrostatic discharge (ESD) damage

The cover and filler panels installed on your equipment protect the electronic circuits inside the equipment from electrostatic discharge (ESD) damage. However, when you remove these covers and filler panels to replace or install subassemblies, you can inadvertently damage the sensitive electronic circuits in the equipment by simply touching them. Electrostatic charge that has accumulated on your body discharges through the circuits. If the air in the work area is very dry, running a humidifier in the work area will help decrease the risk of ESD damage. You must follow the procedures below to prevent damage to the equipment.

CAUTION: *Read and understand the following instructions before you remove cover(s) or panel(s) from the equipment.*

- Provide enough room to work on the equipment. Clear the work site of any unnecessary materials or materials that naturally build up electrostatic charge, such as foam packaging, foam cups, cellophane wrappers, and similar materials.

- Do not remove replacement or upgrade subassemblies from their antistatic packaging until the exact moment that you are ready to install them.

- Gather the tools, manuals, an ESD kit, and all other materials you will need before you remove covers and panels from the equipment. Procedures for removing subassemblies usually list required materials at the beginning. After you remove a cover or panel, you should avoid moving away from the work site; otherwise, you may build up an electrostatic charge.

- Use an ESD kit when handling circuit boards or when touching the electronic circuits inside the equipment. If you don't have an ESD kit, you can order one from Data General. If an emergency arises and an ESD kit is not available, follow the procedures in the "Emergency Procedures (without an ESD kit)" section.

- Replace the cover(s) or panel(s) on the equipment as soon as possible so that the electronic circuits are protected.

- If the equipment has an opening for an optional device (such as a mass–storage drive), and the device is not installed, make sure a filler panel is installed in the opening before connecting the equipment to the ac power outlet.

Emergency procedures (without an ESD kit)

In an *emergency* when an ESD kit is not available, use the following procedures to reduce the possibility of an electrostatic discharge by ensuring that your body and the subassembly are at the same electrostatic potential.

CAUTION: *These procedures are not a substitute for the use of an ESD kit. Follow them only in the event of an emergency.*

- Before touching any electronic circuits or boards inside the equipment, firmly touch a bare (unpainted) metal surface of the equipment.

- Before removing any replacement or upgrade subassembly from its antistatic bag, place one hand firmly on an unpainted metal surface of the chassis, and at the same time, pick up the replacement or upgrade subassembly while it is still sealed in the antistatic bag. Once you have done this, *do not* move around the room or contact other furnishings, personnel, or surfaces until you have installed and *secured* the subassembly in the equipment.

- Remove the subassembly from the antistatic bag, handling printed circuit boards by the edges. Avoid touching components and circuits on a printed circuit board.

- If you must move around the room or touch other surfaces before securing the subassembly in the equipment, first place the subassembly back in the antistatic bag. When you are ready again to install the subassembly repeat these procedures.

- Order an ESD kit from Data General for the next time you need to add or remove a cover or panel.

Planning a new configuration

This section outlines factors you should consider as you plan and review the type, number, and arrangement of the various hardware and software elements that make up your computer system. We refer to these combined factors as your system *configuration*.

▶ Complete the following before removing or installing any hardware equipment to ensure hardware and software support.

1. Review the options listed in Chapter 1 and in Appendix A to determine whether your system supports the configuration you want. Contact your Data General sales representative if there are any questions, and for up–to–date information about available options.

2. Review your system software manuals, Release Notice(s), Updates, and application documentation. This documentation can provide valuable information you need *before* you install any new system components. A review of your system documentation might, for example, reveal an incompatibility between your current configuration and a proposed hardware addition.

3. Carefully consider hardware or software configuration restraints, such as:

   - worksite or environmental requirements

   - whether your system needs additional drivers for the planned expansion

   - cable and cable–length restrictions

4. If you intend to add or replace a mass–storage device on a system SCSI bus, make certain your new drive complies with the parameters described in Chapter 3.

5. If you intend to add or replace memory, review the configuration rules in Chapter 6.

6. If you intend to add or replace a system expansion board, review the configuration guidelines for CPU, LAN or SCSI options in Chapter 7.

Opening and closing the computer unit

To remove or install a device inside the computer, you must remove the cover from the housing.

CAUTION: *Make sure you have read and understand the "Avoiding Electrostatic Discharge (ESD) Damage" section of this chapter before you open the computer unit.*

You will need a flat–blade screwdriver or similar tool to open the computer unit.
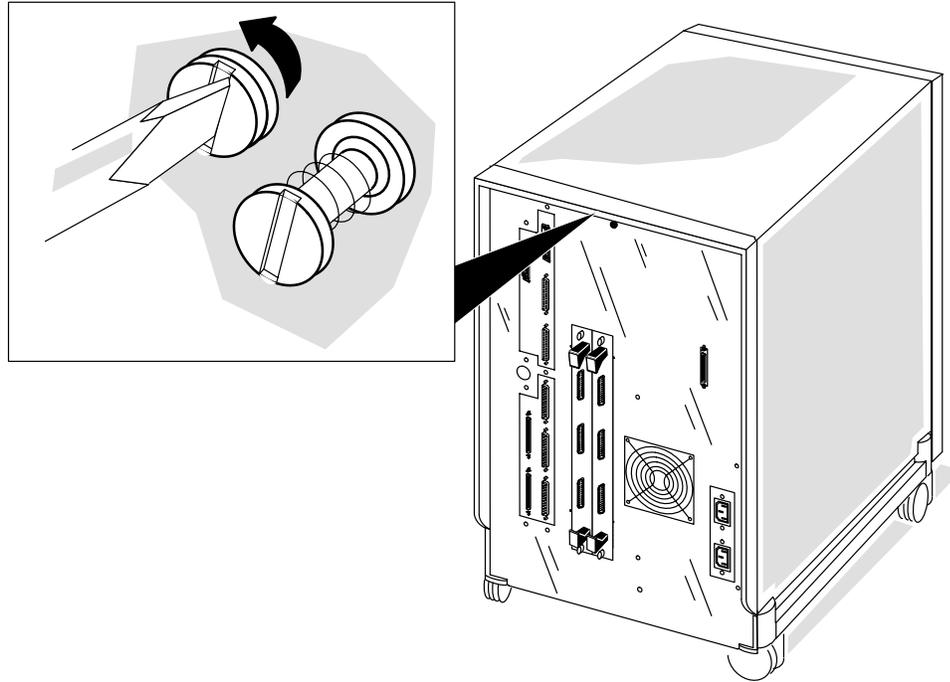
Removing the chassis cover

▶   Complete the following steps to remove the cover from the computer unit's housing.

1. Power down the computer system.

    Refer to the manual *Operating AViiON 550 and 5500 Series Computers* for the proper procedure to power down the computer system.

WARNING: **To avoid electrical shock or equipment damage, always power down the computer unit and unplug the power cord from the ac power outlet and from the receptacle on the back of the computer unit before removing the covers from the computer unit.**

2. Reposition the computer system, if necessary, so you can gain access to the side and rear of the system. As you reposition the computer system, be careful not to strain the cables or jar the computer.

3. Remove all rear panel cabling, as described in Chapter 2.

4. Using a screwdriver, loosen the rear panel fastener by turning one–quarter turn counterclockwise, as shown in Figure 4–2.
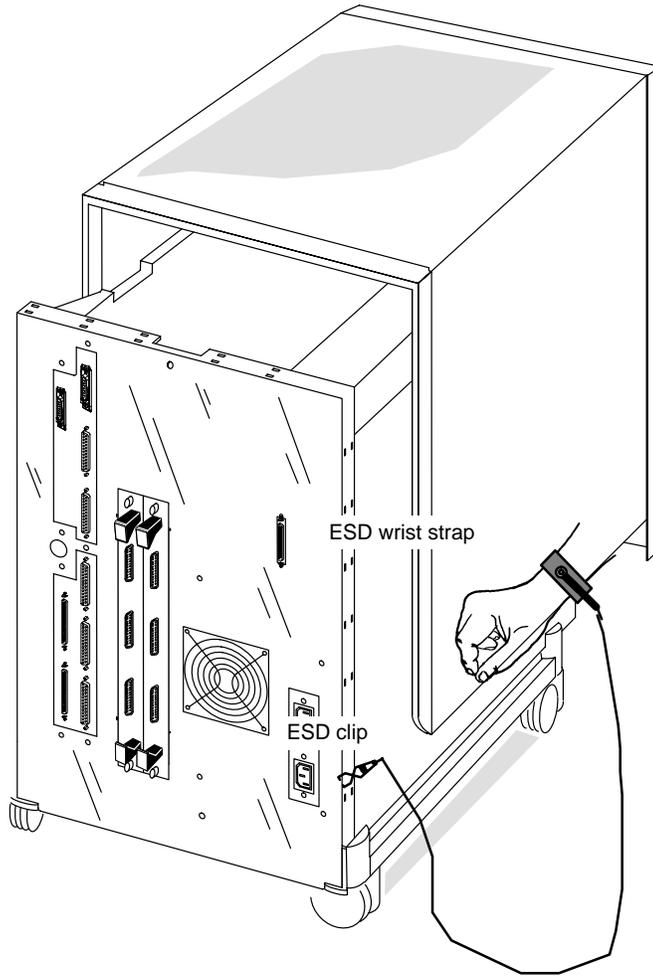
Figure 4–2   Loosening the back cover fastener

5. **Lift the cover away from the computer as shown in Figure 4–3.**
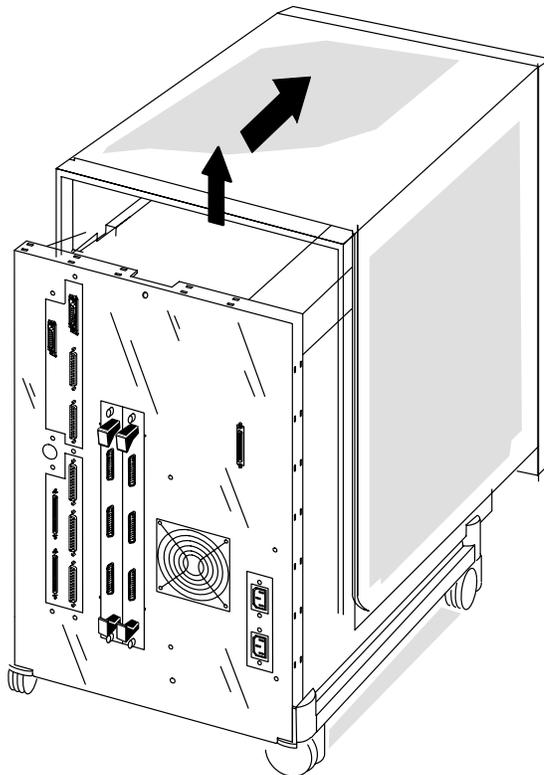
**Figure 4–3**   Removing the chassis cover

4-8

6. Put on the ESD wrist strap and attach the ESD clip to any unpainted metal surface of the chassis as shown in Figure 4–4.



Figure 4–4   Attaching the ESD wrist strap and clip

Installing the chassis cover

▶ Complete these steps to reinstall the computer unit's cover.

1. Remove the ESD clip from the computer unit and take off the ESD wrist strap. Store the wrist strap in a safe place for future use.

2. Place the cover on top of the computer unit.

3. Push the cover toward the rear of the computer unit, as shown in Figure 4–5, until the front edge of the top cover is flush with the rear edge of computer unit.

4. Using a coin or screwdriver, tighten the fastener by turning it one–quarter turn clockwise as shown in Figure 4–5.
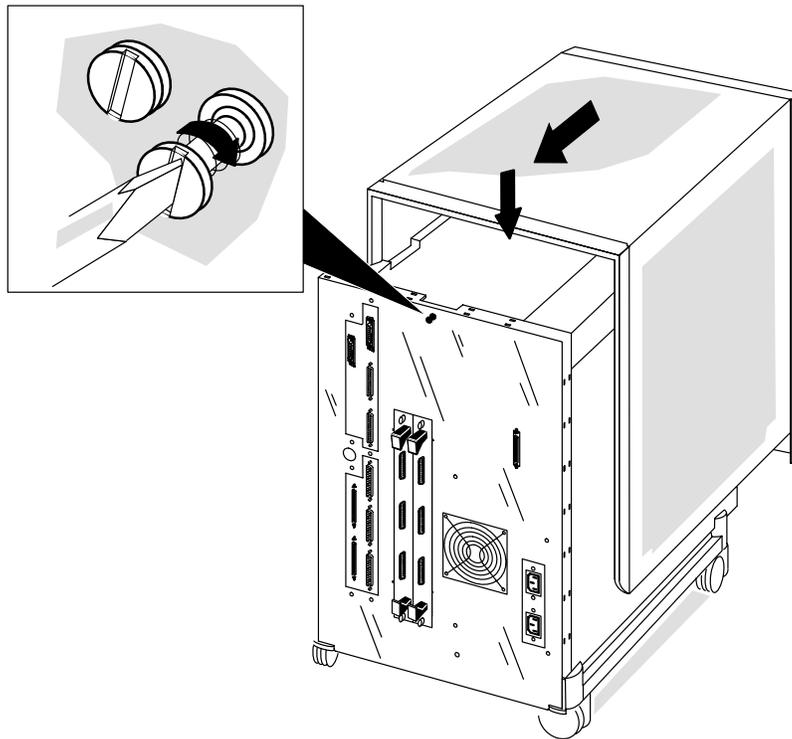
Figure 4–5   Installing the top cover

5. If you moved the computer, return it to its original position being careful not to strain the cables or jar the computer.

6. Attach all peripheral cabling, as described in Chapter 2.

7. Plug the power cord into the receptacle on the back of the computer unit as shown in Figure 4–6.
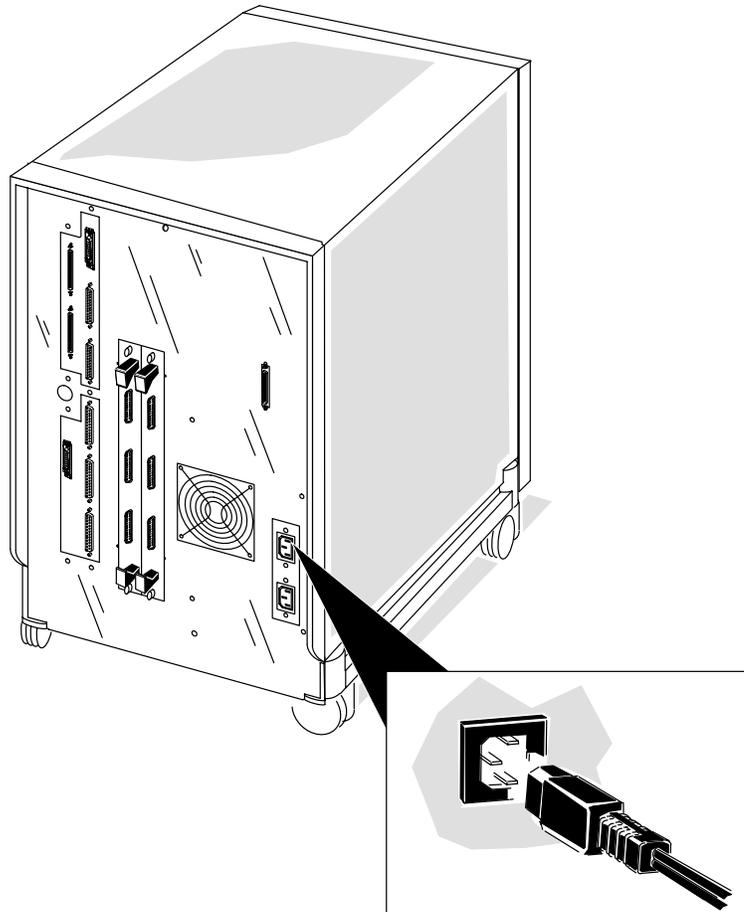
Figure 4–6   Connecting the computer unit's power cord

8. **Plug the other end of the power cord into the installation site's ac power outlet.**

End of Chapter

5 Adding or replacing internal mass–storage devices

This chapter describes how to install new mass–storage drive options such as fixed disks, tape drives, diskette drives, or CD-ROM drives inside your AViiON 550 or 5500 computer unit.

This chapter also provides directions for replacing failed internal mass–storage devices. For information on installing external mass–storage devices, refer to the documentation that accompanied the external subsystem or independent device.

To add or to replace a drive, you will need device–specific information not provided in this manual. Make certain you have the appropriate documentation to set jumpers and operating parameters on each individual drive you need to configure or reconfigure. *Guide to AViiON® and DG/UX™ System Documentation* lists the manuals that support the mass storage devices available inside AViiON 550 and 5500 series systems.

IMPORTANT: Before you add or replace any mass storage device, refer to Chapter 3 to plan or verify your configuration.

Mass–storage device locations

Your computer unit provides five slots for internal SCSI drives, as shown in Figure 5–1. The first (top) slot holds a 5.25–inch drive; the remaining four slots each hold one 3.5–inch, half–height drive.
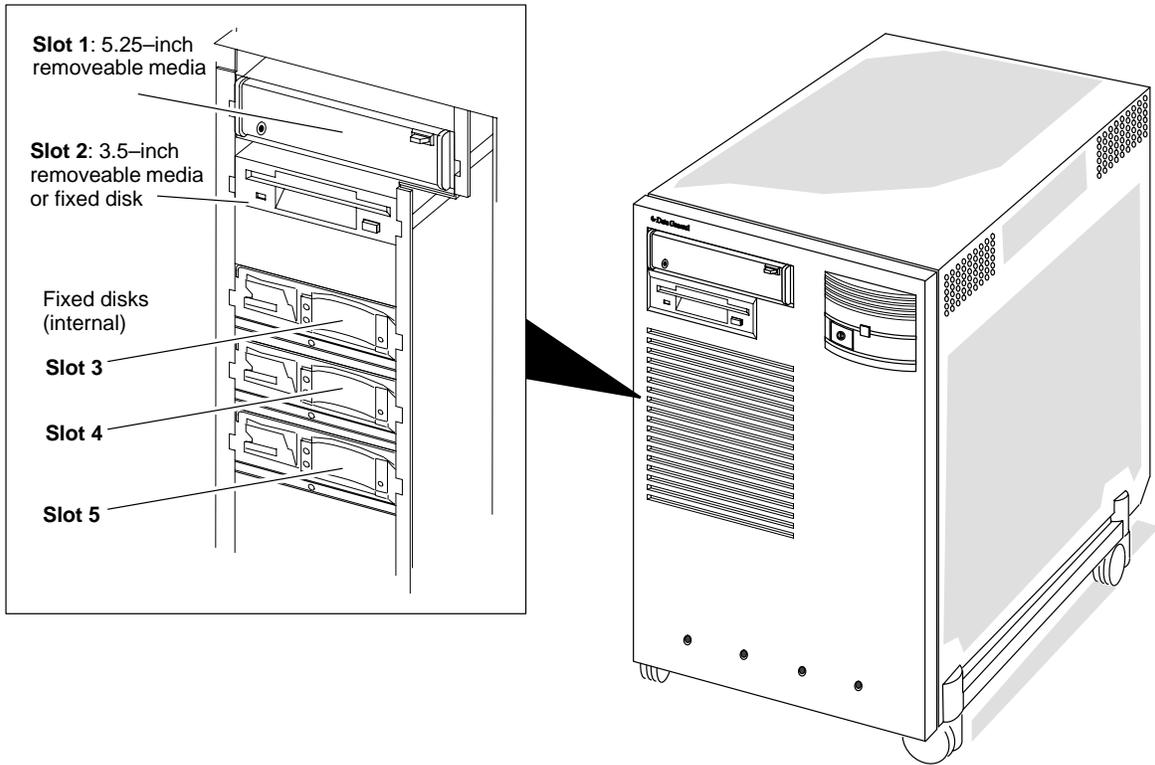
Figure 5–1   Internal drive slots

▶ To add a new internal drive option, you need to perform the following tasks:

1. Select an open slot in which to install the drive.

2. Prepare the new drive by setting the SCSI ID and optional switches or jumpers as described in the drive manual.

3. Attach slide mounts to the new drive (as described in this chapter).

4. Install the drive assembly in the computer unit (as described in this chapter).

5. Attach cables as described in this chapter and in the drive manual.

▶ To replace a failed internal drive, you need to perform the following tasks:

1. Remove the failed drive from the computer unit (as described in this chapter).

2. Remove mounting hardware from the failed drive and set it aside.

3. Prepare the new drive by setting the SCSI ID and optional swtiches or jumpers as described in the drive manual.

4. Attach the slide mounts to the replacement drive (as described in this chapter).

5. Reinstall the drive assembly in the computer unit (as described in this chapter).

Removing a drive assembly

Before you can remove a drive assembly, remove the computer unit cover and attach the ESD wrist strap as described in Chapter 4, "Expanding and Maintaining Your Computer System."

CAUTION: *Unless you are properly grounded, you can discharge static electricity and damage components in the system.*

▶   To remove the drive assembly from the computer unit, follow the steps below. *A drive assembly consists of one half–height drive with mounting brackets and slide mount hardware.*

1. Unplug the drive power and SCSI bus cables from the back of the drive, as seen in Figure 5–2.
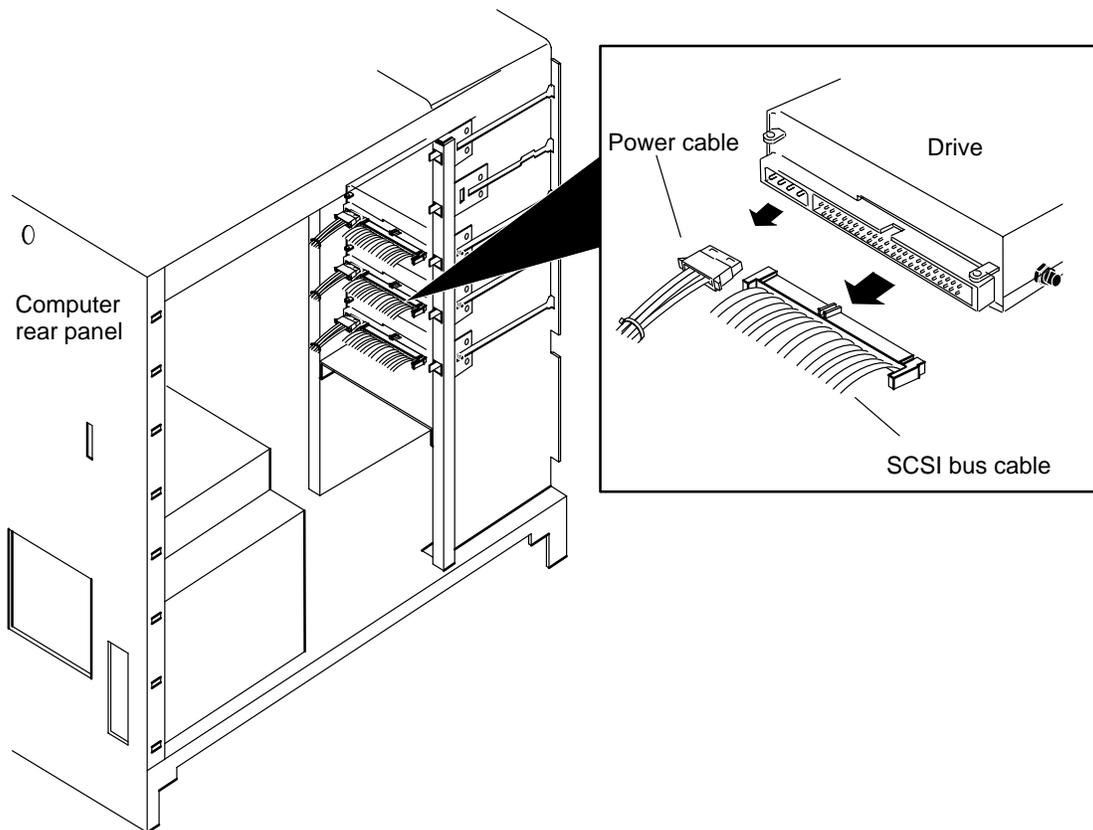
**Figure 5–2**   Removing the drive SCSI bus and power cables

For more information on cable connections, refer to the manual for your drive model, listed in *Guide to AViiON® and DG/UX™ Systems Documentation.*

2. Release the drive's mounting lock by pulling the metal tab to clear the slide mount, as shown in Figure 5–3.
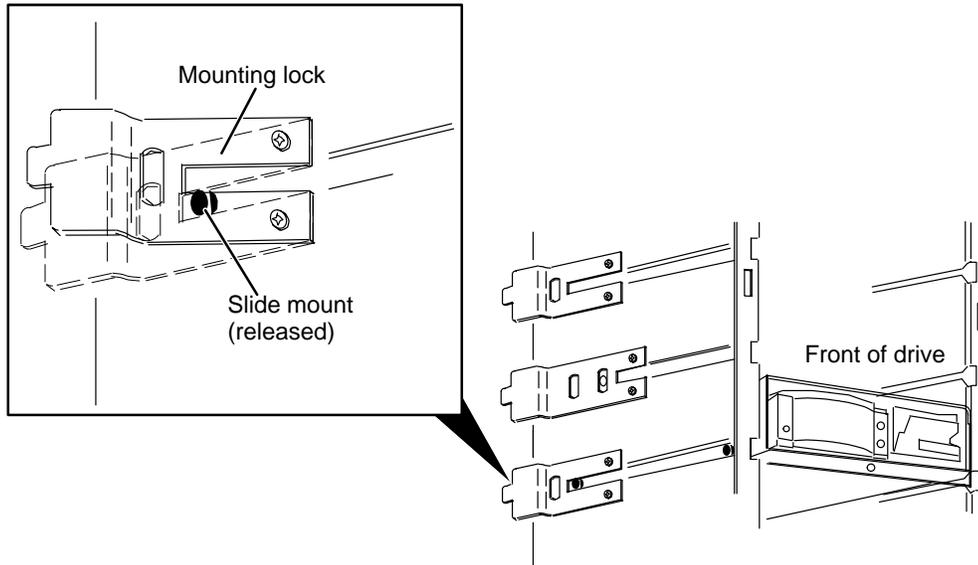
Figure 5–3   Releasing the drive mounting lock

3. Slide the drive assembly toward the front of the computer, as seen in Figure 5–4.
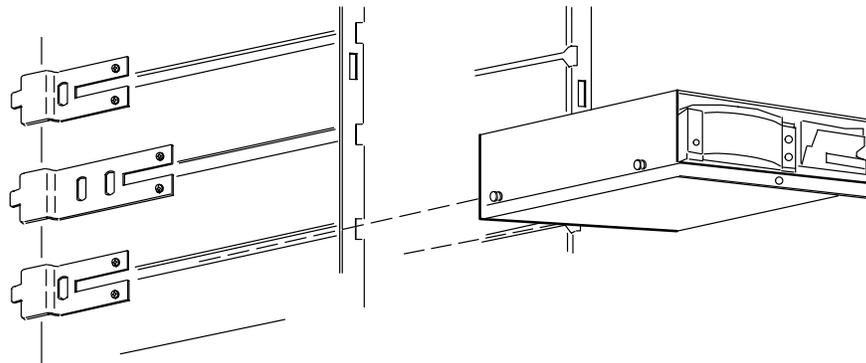
Figure 5–4   Removing a drive assembly from the computer unit

4. Pull straight out; then lift the drive out of the computer unit.

5. Place the drive on a static–free surface or in static–free packaging.

Continue with the next section to install a replacement drive.

Installing a drive assembly

To install a new or replacement drive, prepare the drive, attach mounting hardware, and install the drive as described in the subsections below.

Preparing a new drive

You received with your drive special mounting hardware for AViiON 550 and 5500 series computers. Locate that mounting hardware before proceeding: four metal EMI clips and four slide mount screws.

▶ Complete these steps to prepare a drive before you install it.

IMPORTANT: You will need a 3/8–inch nutdriver or socket wrench.

1. Attach one EMI clip using a slide–mount screw to each of four screw holes on the drive, as seen in Figure 5–5.
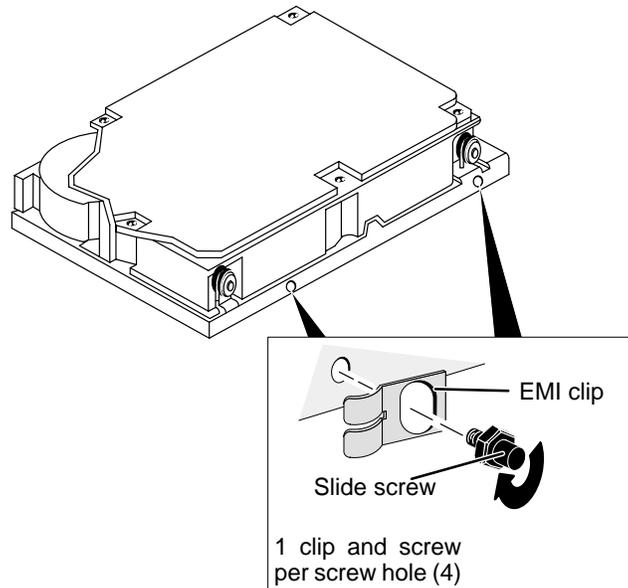
Figure 5–5   Attaching the mounting hardware

If you are installing a fixed–disk drive, proceed with the next section, "Completing the drive assembly installation".

2. If you are installing a drive with removable media (such as tape or CD–ROM), look at the computer unit's front panel. If the slot where you are installing the drive has a plastic filler panel, remove the panel by pulling it away from the computer chassis.

Drive cage opening

Half-height filler panel
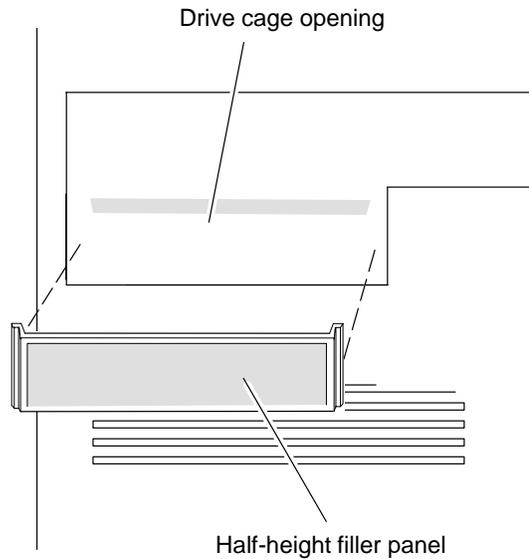
**Figure 5–6**   Removing a filler panel from the computer chassis front drive cage

Completing the drive assembly installation

▶ After you prepare the new or replacement drive, install the assembly into your computer chassis as follows.

1. Position the drive so that its back (the connector end) faces toward the center of the computer unit, as seen in Figure 5–7.
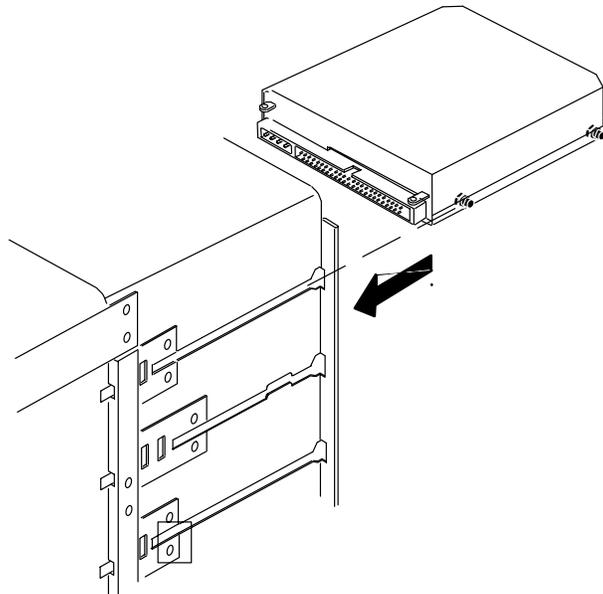
Figure 5–7   Aligning the drive assembly for installation

2. Align the slide mounts on the drive assembly with the holes in the computer unit frame; then, slide the drive into its slot as shown in Figure 5–7.
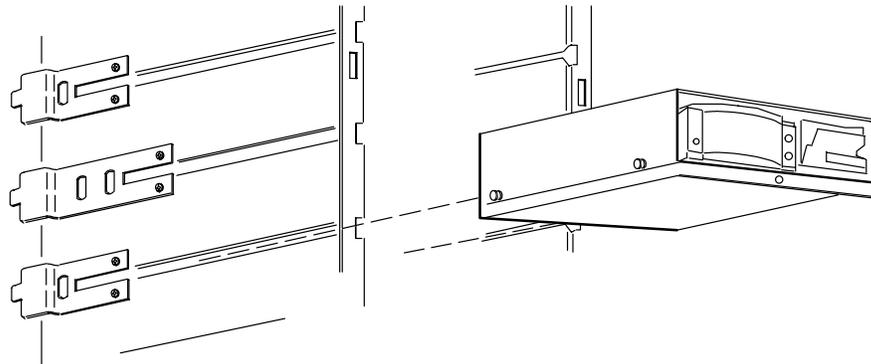
Figure 5–8   Installing a drive assembly in the computer unit

3. Push the drive all the way in. Make sure the drive mounting lock covers the slide mount hole to secure the drive, as seen in Figure 5–9.
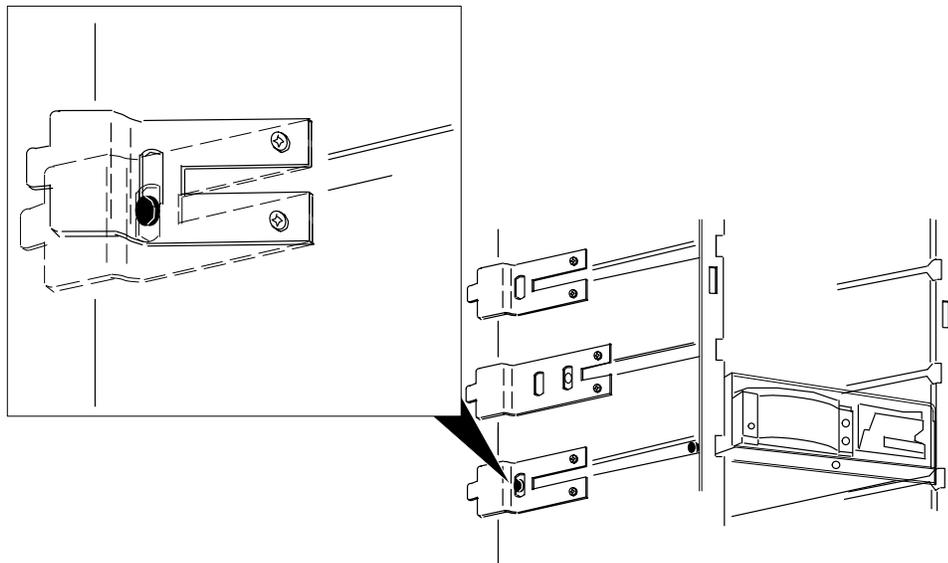
**Figure 5–9**   Securing the drive with the mounting lock

4. Figure 5–10 illustrates the system's drive power cables and internal bus ribbon cable. Locate the power cable and bus connector with the best reach to the new drive's slot. The power cables are numbered (PS4–PS8).
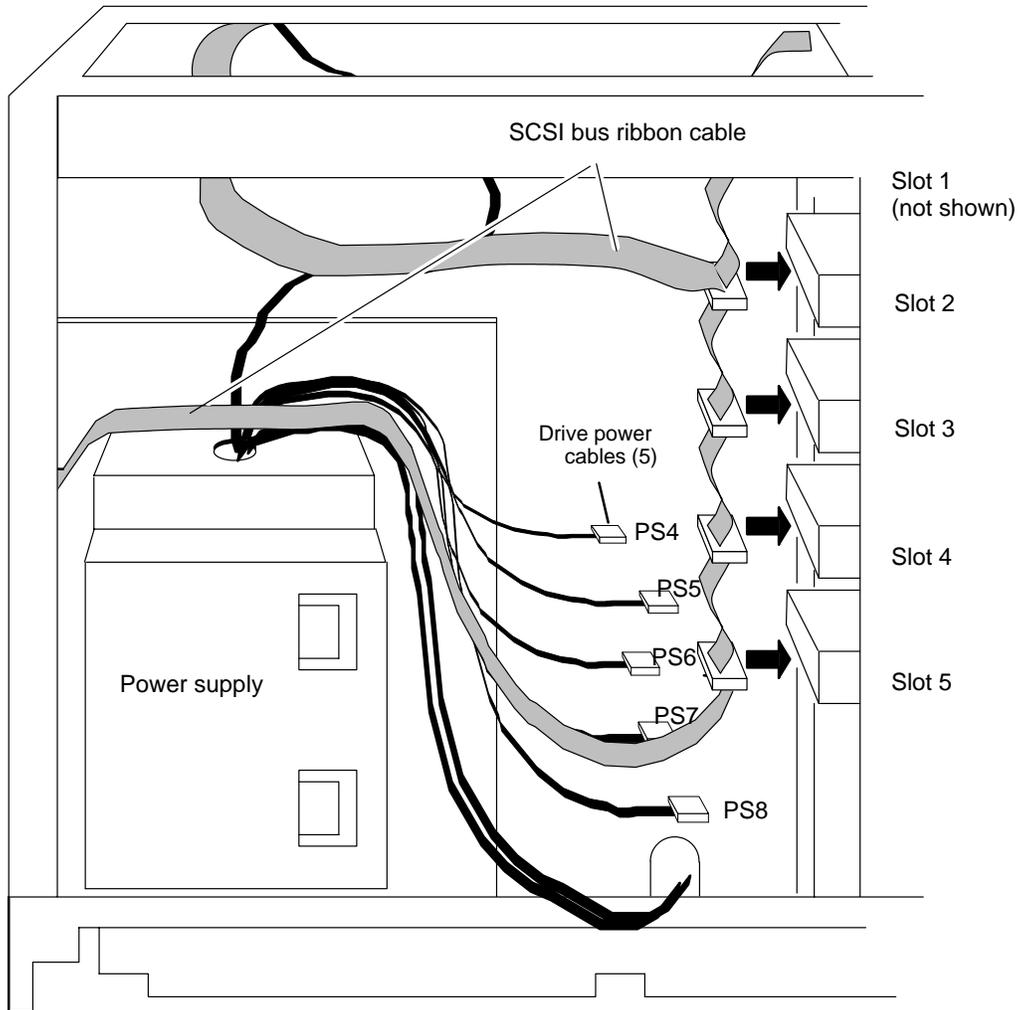
Figure 5–10   SCSI bus internal ribbon cable and drive power cables

5. Plug a drive power cable and SCSI bus cable connector firmly into the power and SCSI bus connectors on the drive, as seen in Figure 5–11. For information on the drive connector locations, refer to the manual for installing the drive.

IMPORTANT: You can plug the cables in only one way: the connector on the power cable has beveled edges to match the power connector on the drive; the connector on the SCSI cable is keyed.
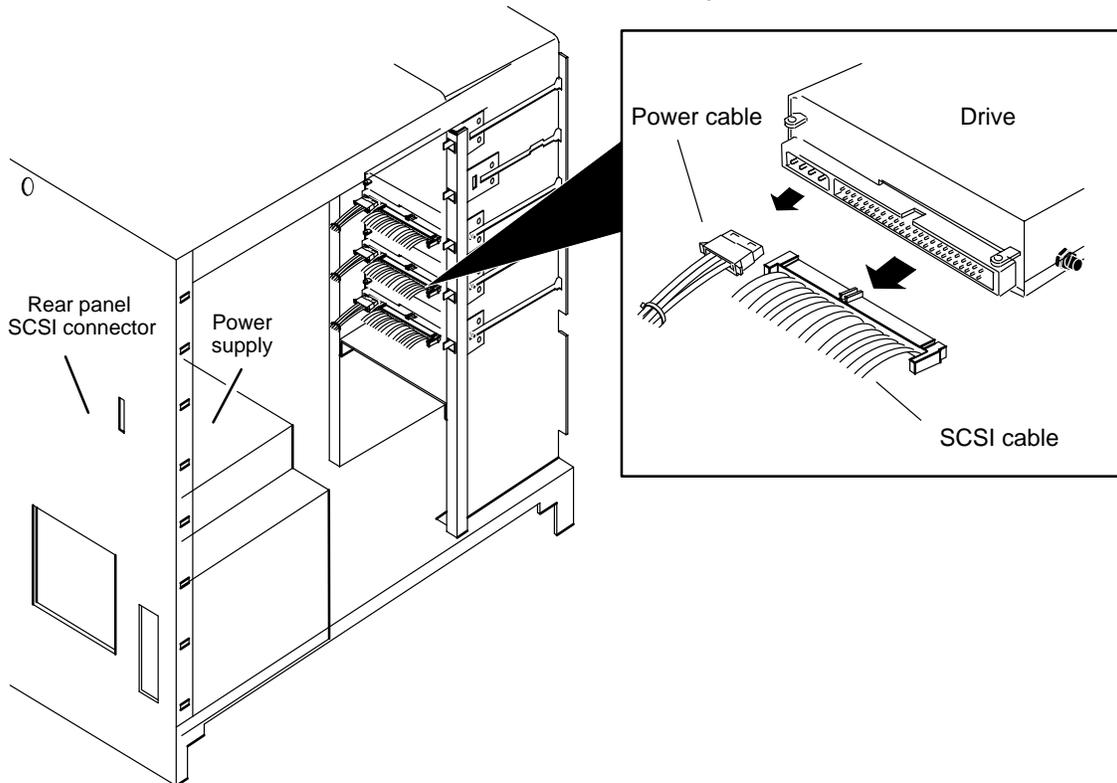
Figure 5–11   Installing the SCSI bus ribbon cable and drive power cable

6. You should now remove the ESD wrist strap, reinstall the cover, and plug in the computer unit's power cord as described in the "Closing the Computer Unit" section of Chapter 4.

After you have closed the computer unit, power up any peripheral housing units and other peripherals, and then the computer, according to the instructions in the hardware operating manual. Then, test your computer system as described in the *Using AViiON® Diagnostics and the AV/Alert*[sm] *Diagnostic Support System* manual.

End of Chapter

6 Adding or replacing memory modules

This chapter gives rules for installing memory modules and explains how to add a new memory module or replace a failed one. You will need to remove memory modules to replace failed memory modules, or to replace a failed system board.

AViiON 5500 and 550 series computer systems contain connectors for four to twelve industry–standard Single In–Line Memory Modules (SIMMs); these connectors support 4–, 16–, or 32–Mbyte SIMMs. All SIMM models support Error Checking and Correction (ECC) rather than byte parity error detection.

Each base system includes a standard configuration of either 32– or 64–Mbytes.

CAUTION: *Attempting to use improper memory modules may cause serious system damage. Make certain you have the correct model and part number SIMMs for your system before installation. Take particular care not to install byte parity memory modules in computers designed for ECC memory modules.*

Table 6–1 shows how to identify (by model and part number) the memory modules used in your system.

Table 6–1   AViiON 5500 and 550 series ECC memory modules

DG model #	Part number	Size per SIMM
7034	116–003453	4–Mbytes
7035	116–005306	16–Mbytes
7043	116–006209	32–Mbytes

Each memory module mounts in a connector on the system board. There are three banks of four modules each, as shown in Figures 6–1 and 6–2.

System board memory module connectors

SIMM modules installed in first bank (Bank 0)
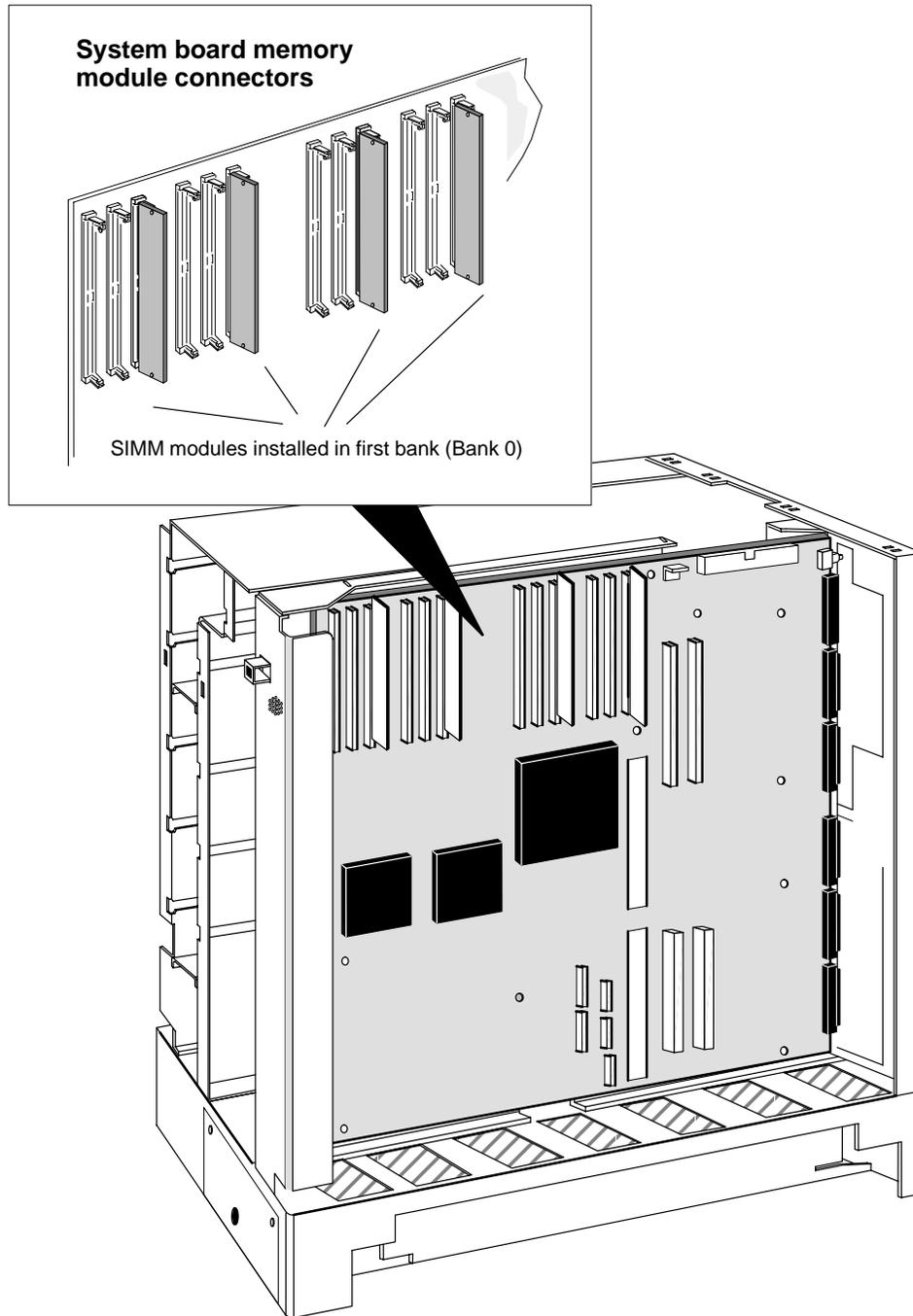
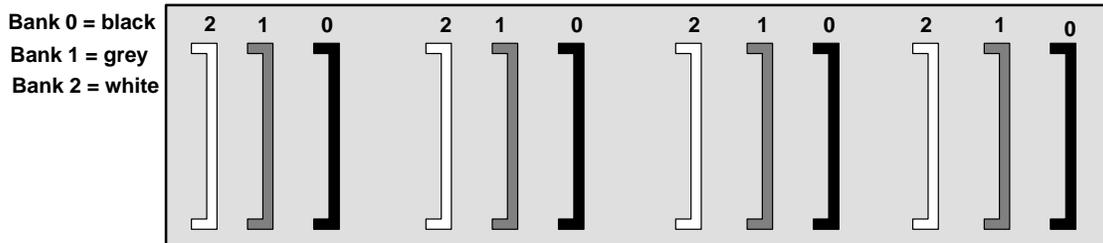**Figure 6–1**   Location of memory module connector banks

Rules for installing memory modules

When you install memory modules, you must follow the configuration and installation rules in this section.

There are three banks of four SIMM connectors. The connectors are grouped in clusters of three (one cluster for each bank). Figure 6–2 shows the numbering scheme and labeling for AViiON 5500 and 550 series memory connectors on the system board.

- You install memory modules in banks of four, starting with the rightmost connector in each 3–connector group (Bank 0). Never leave a connector empty in a four–SIMM bank.

- All four connectors in a bank must be filled with the same SIMM type (4–, 16–, or 32–Mbyte).

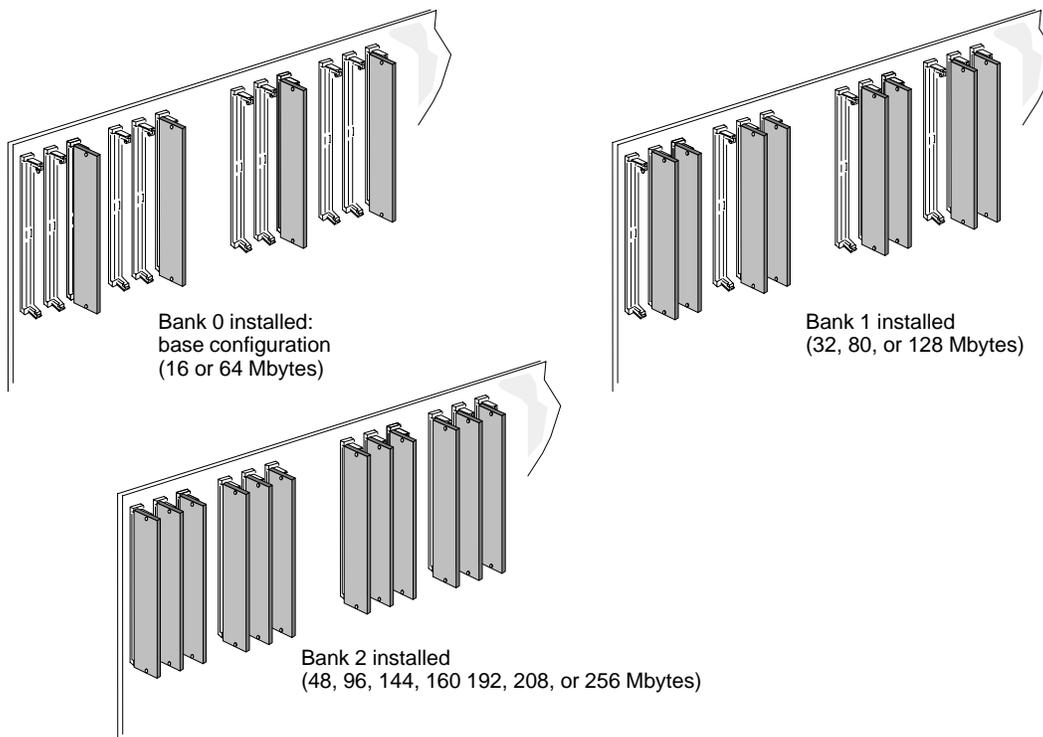- Only the third bank of connectors (Bank 2) can hold 32–Mbyte SIMMs.

Figure 6–2 Numbering scheme for memory module connectors

IMPORTANT: When removing modules in configurations with more than one bank installed, you must temporarily remove the module installed to the left of the one you are replacing. For example, to remove a Bank 0 module, you must remove the Bank 1 module to the left of the one you are replacing.

Table 6–2 lists each valid memory configuration for AViiON 5500 and 550 series systems. Figure 6–3 shows modules installed in each of the three banks.

Table 6–2   Valid configurations of 4–, 16–, and 32–megabyte memory modules

Bank 0				Bank 1				Bank 2				Mbyte Total
SIMM 0	SIMM 1	SIMM 2	SIMM 3	SIMM 0	SIMM 1	SIMM 2	SIMM 3	SIMM 0	SIMM 1	SIMM 2	SIMM 3	
4	4	4	4									16
4	4	4	4	4	4	4	4					32
4	4	4	4	4	4	4	4	4	4	4	4	48
16	16	16	16									64
16	16	16	16	4	4	4	4					80
16	16	16	16	4	4	4	4	4	4	4	4	96
16	16	16	16	16	16	16	16					128
16	16	16	16	16	16	16	16	4	4	4	4	144
16	16	16	16	16	16	16	16	16	16	16	16	192
4	4	4	4	4	4	4	4	32	32	32	32	160
4	4	4	4	16	16	16	16	32	32	32	32	208
16	16	16	16	16	16	16	16	32	32	32	32	256

Bank 0 installed:
base configuration
(16 or 64 Mbytes)

Bank 1 installed
(32, 80, or 128 Mbytes)

Bank 2 installed
(48, 96, 144, 160 192, 208, or 256 Mbytes)

Figure 6–3   SIMM configurations

If you need to remove a memory module, proceed to the next
section. If you are adding a memory module in an empty connector,
go to the section "Installing Memory Modules."

Removing memory modules

Before you can remove any memory modules, you must remove the computer unit cover and attach the ESD wrist strap as described in the "Opening the Computer Unit" section of Chapter 4.

CAUTION: *Unless you are properly grounded, you can discharge static electricity and damage components in the system.*

▶ To remove a memory module, follow the steps below.

IMPORTANT: When removing modules in configurations with more than one bank installed, you must temporarily remove the module installed to the left of the one you are replacing. For example, to remove a Bank 0 module, you must remove the Bank 1 module next to it.

1. To release the memory module from the connector, start with the locking tab at the top of the connector, as seen in Figure 6–4. Using your finger, gently push up on the locking tab. Then, gently push down on the locking tab at the bottom of the connector.

   The memory module will spring up slightly, and to the left.

CAUTION: *When you push on the locking tabs, push gently, using only enough force to release the memory module. If you push too hard, you could break the locking tabs, making it difficult for you to reinstall a memory module securely in the connector.*
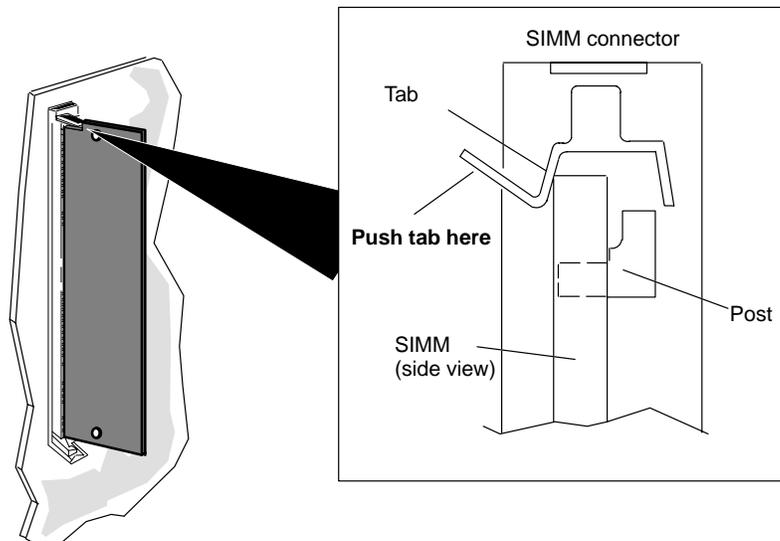
Figure 6–4   Releasing the memory module locking tabs

With the locking tabs released, the memory module sits in the connector at about a 20° to 30° angle, as shown in Figure 6–5.

2. Gently pull the module from its released position in the connector.
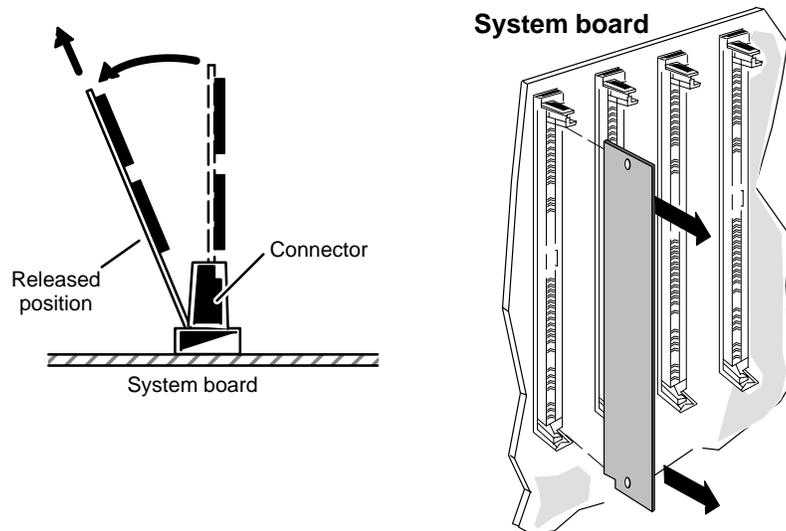
Figure 6–5   Removing a memory module

CAUTION: *If you need to set the memory module down, put it back inside the antistatic shipping bag.*

3. Do one of the following:

    ● If you removed a failed memory module, insert it in an antistatic bag and return it to Data General. Contact the Customer Support Center, as described in the Preface, for information on returning the faulty part.

    ● If you temporarily removed a memory module, insert it in an antistatic bag until you are ready to reinstall it.

    ● If you removed all memory modules to replace another system component, return now to the chapter in this manual that instructed you to remove the memory modules. Otherwise, continue to the next section, "Installing Memory Modules," to install a new memory module.

Installing memory modules

Before you can install any memory modules, you must remove the computer unit cover and attach the ESD wrist strap as described in Chapter 4, "Expanding and maintaining your computer."

When installing add–on memory modules begin by installing the memory module in the lowest numbered open bank. Figure 6–2 (earlier in this chapter) shows the numbering scheme for the memory module connectors. Table 6–2 lists valid configurations.

▶ To install a memory module, use the following steps.

1. Carefully remove the memory module from its package. Save the antistatic shipping bag and packing materials in case you need to return the module.

CAUTION: *If you need to set the memory module down, put it back inside the antistatic shipping bag.*

2. If you are installing a memory modules in Banks 0 or 1, you must first temporarily remove any modules installed to the left (Bank 1 or Bank 2), as described in the previous section.

3. As shown in Figure 6–6, align the memory module so its notch is facing down (towarrd the lower locking tab). Position the module at approximately a 20° to 30° angle; then press the module's connector edges gently into the connector post.

CAUTION: *Never force the memory module into the connector or against the locking tabs.*
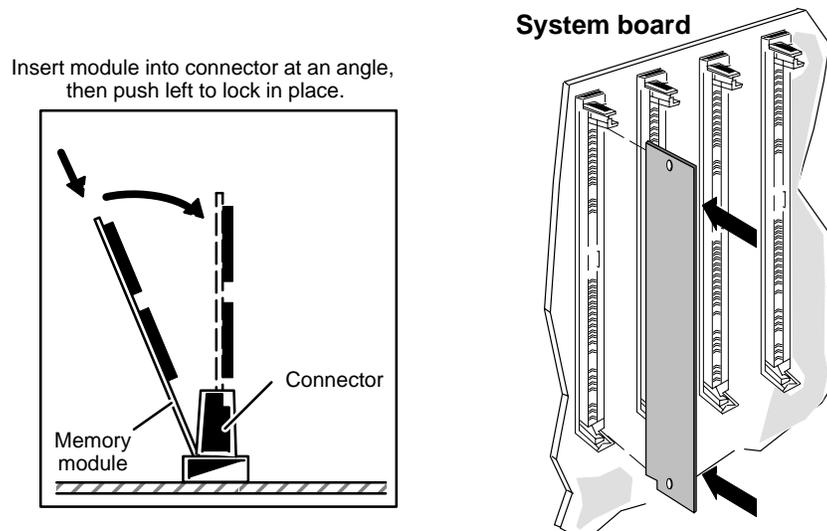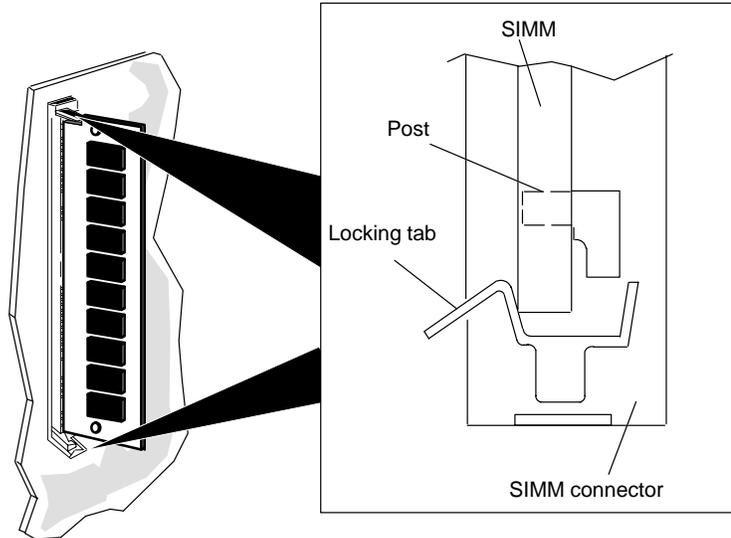

Figure 6–6   Inserting the memory module in the connector

4. Gently push on the module until it is perpendicular to the system board, as shown in Figure 6–6.

You hear and feel a click as each connector tab locks into place.

5. Be sure the locking tabs on both sides of the SIMM connector are securely in place, as seen in Figure 6–7.

Figure 6–7 Securing a memory module in its connector with locking tabs

6. Repeat steps 3 through 5 to install or reinstall any remaining memory module(s).

7. If you are not replacing any other CRUs, reinstall the cover as described in the section,"Closing the computer unit" in Chapter 4.

IMPORTANT: Your system automatically sizes the amount of memory at each powerup. Examine powerup messages if you have increased or reduced system memory configuration.

End of Chapter

7 Adding or replacing system board options

This chapter contains instructions for adding or replacing printed–circuit board options that attach directly to the AViiON 5500 or 550 series system board.

Depending on its configuration, your system might include the following system board options:

- a second CPU complex
- one or two Input/Output (I/O) expansion boards (SCSI and/or LAN)
- one 8– or 24–bit graphics controller board (AViiON 550)

The "Planning a new configuration" section of Chapter 4 describes configuration guidelines.

Adding or replacing a second CPU

This section tells how to add a CPU expansion board to an AViiON 5500 or 550 series computer, and how to replace a failed expansion CPU board.

   NOTE: You will need these instructions to temporarily remove a CPU expansion board if you need to replace a failed system board.

The first AViiON 5500 and 550 series CPU complex (CPU0) is integrated on the system board; to replace this component, you must replace the system board (as described in Chapter 8).

The optional CPU expansion board (CPU1) attaches to an interboard connector on the system board. The expansion CPU board contains an additional Motorola 88110 central processing unit and Motorola 88410 controller, plus eight static random access memory chips (SRAMs). Figure 7–1 shows the add–on CPU complex board used in AViiON 5500 and 550 series systems.
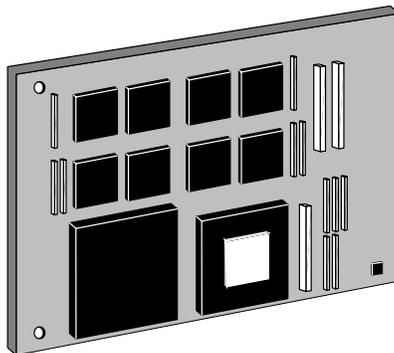
Figure 7–1   AViiON 5500 and 550 series expansion CPU board

If you are replacing a failed CPU expansion or system board, continue with the next section. If you are adding or reinstalling a CPU expansion, skip the next section and continue with the section, "Installing a CPU expansion board."

Removing a CPU expansion board

Before you can remove a CPU expansion board, you must prepare your worksite, remove the computer unit cover, and attach the ESD wrist strap as described in Chapter 4.

CAUTION: *Unless you are properly grounded, you can discharge static electricity and damage components in the system.*

▶ To remove the CPU expansion board, use the following steps. You will need a medium Phillips screwdriver.

1. Remove the three screws, shown in Figure 7–2, that secure the CPU board to the system board.

CPU expansion board
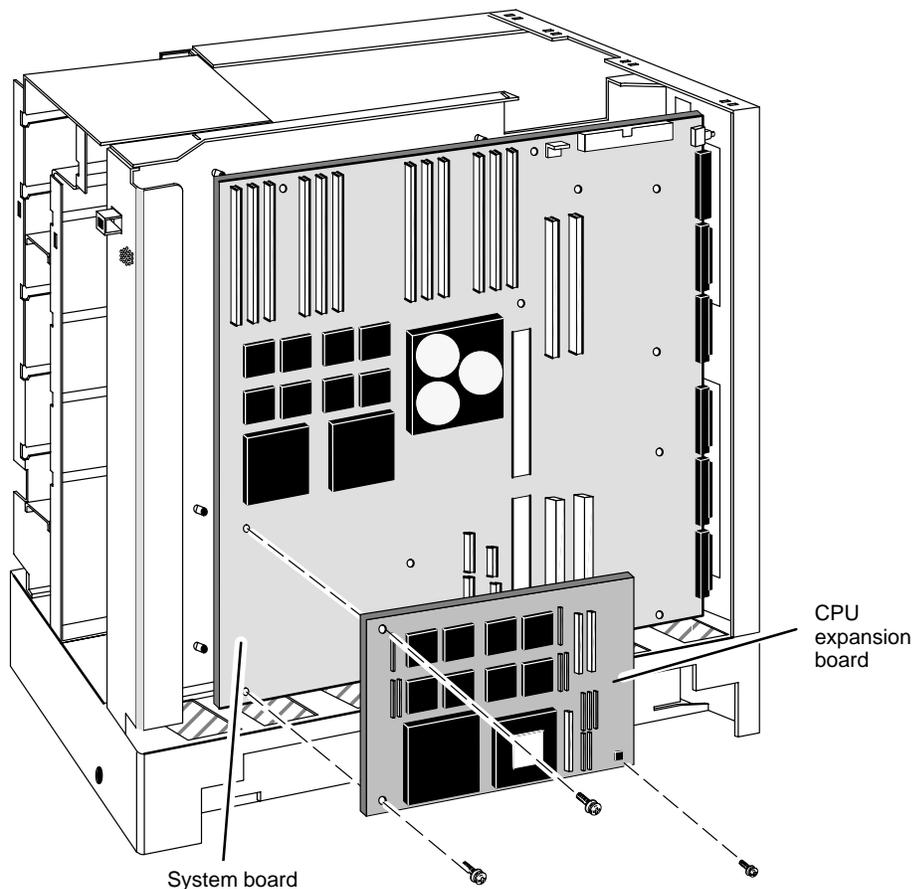
System board

Figure 7–2   Removing the CPU expansion board screws

2. Carefully separate the interboard connector on the back of the CPU expansion board from the interboard connector on the system board.

CAUTION: *Grasp the board at its edges to avoid damaging any components on the board.*

3. Pull the CPU expansion board away and place it in an antistatic bag.

    If you are replacing the CPU expansion board, insert it in an antistatic bag and return it to Data General. Contact the Customer Support Center, as described in the Preface, for information on returning the faulty part.

    If you removed the CPU expansion board temporarily to replace the system board, put the board inside an antistatic bag until you are ready to reinstall it, and go to Chapter 8, "Replacing the system board." Otherwise, continue to the next section, "Installing a CPU expansion board."

Installing a CPU expansion board

Before you can install a CPU expansion board, you must remove the computer unit cover and attach the ESD wrist strap as described in the "Opening the computer unit" section of Chapter 4.

CAUTION: *Unless you are properly grounded, you can discharge static electricity and damage components in the system.*

▶   To install a CPU expansion board, follow these steps.

1. Align the interboard connector on the bottom of CPU expansion board with the interboard connector on the system board it, as shown in Figure 7–3. Align the two screw holes on the CPU expansion board with the system board retaining posts; apply gentle pressure.

    If you cannot press the interboard connectors together, make sure that the connectors are aligned correctly, and then try pressing them together again.

CAUTION: *Grasp the board at its edges to avoid damaging any components on the board.*
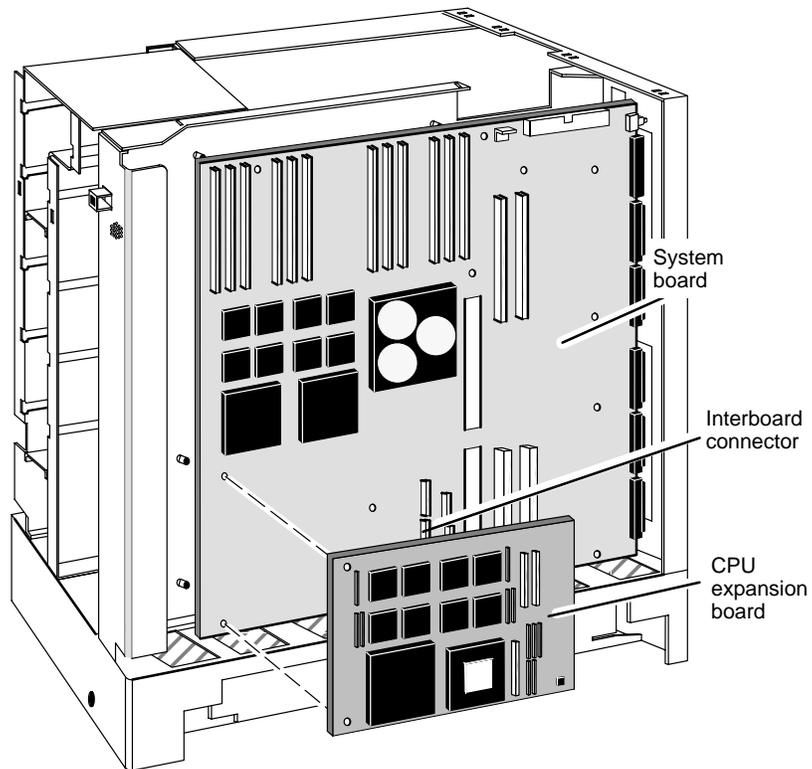
Figure 7–3   Installing a CPU expansion board

2.   **Secure the CPU expansion board to the system board with three screws, as shown in Figure 7–4.**
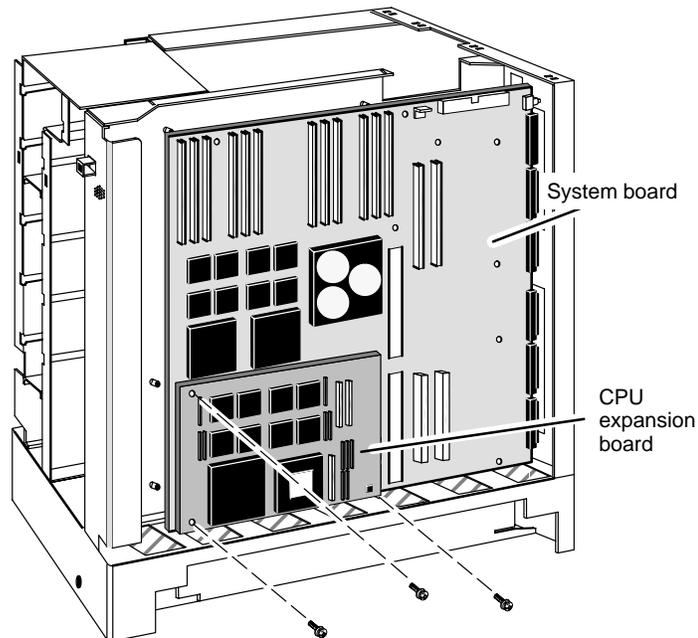
Figure 7–4   Securing CPU expansion boards to the system board

3.   **Reinstall the cover as described in Chapter 4.**

Adding or replacing an I/O expansion board

This section describes how to add or replace I/O expansion boards. Your base system includes one Small Computer System Interface (SCSI) controller and one Ethernet LAN controller integrated on the system board. AViiON 5500 series computers contain slots for one or two I/O option boards that contain additional LAN or SCSI controllers.

NOTE: AViiON 550 workstations with an 8–bit graphics controller (the base configuration) support only one expansion board. AViiON 550 series computers with a 24–bit graphics controller do not support I/O expansion boards.

An I/O expansion board plugs into interboard connectors on the system board; it is secured via system board and computer rear panel screws.

Your configuration can include any combination of two I/O expansion boards: one LAN, one SCSI, one of each, two LAN, or two SCSI boards.

NOTE: Illustrations in this section show a configuration with one LAN and one SCSI expansion I/O board.

Removing an I/O expansion board

If your system includes an I/O expansion board, you will need to remove the board to replace it or to replace a failed system board. Before you can remove any printed–circuit board, you must prepare a worksite, remove the computer unit cover, and attach the ESD wrist strap as described in Chapter 4.

CAUTION: *Unless you are properly grounded, you can discharge static electricity and damage components in the system.*

▶ To remove an I/O expansion board, complete the following steps.
You will need a medium Phillips screwdriver.

1. Disconnect external cables attached to the expansion LAN or SCSI
connectors as described in Chapter 2. Figure 7–5 illustrates the two
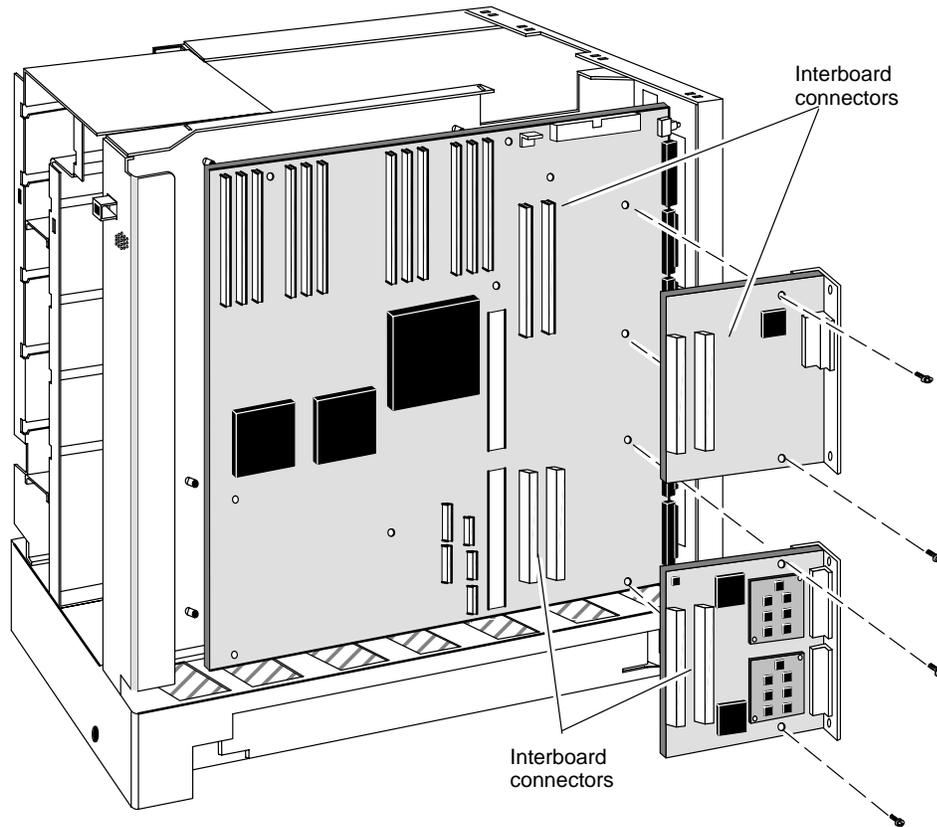option slot locations.
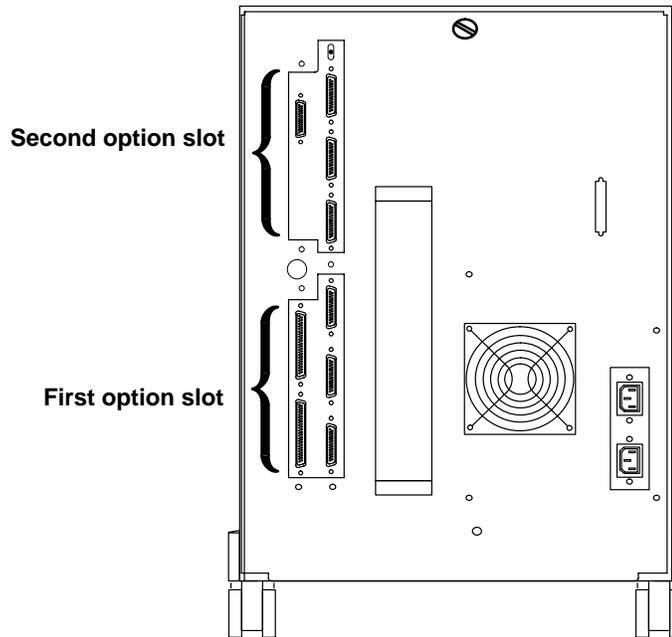
Figure 7–5   Location of external I/O option slots

2. Remove the two screws that secure the I/O expansion board to the
computer unit rear panel bulkhead, as shown in Figure 7–6.
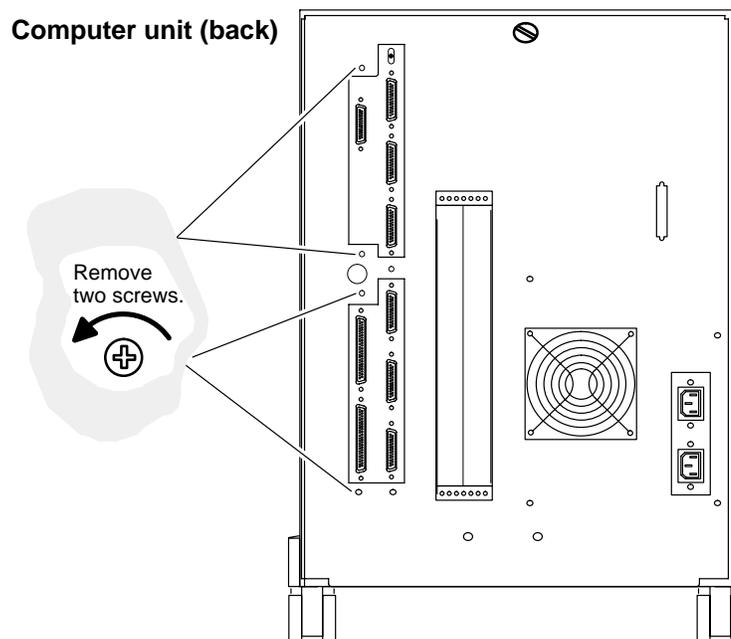
Figure 7–6   Releasing the I/O expansion board from the computer bulkhead

7-6

3. Remove the two screws that secure the I/O expansion board to the system board, as shown in Figure 7–7.

Figure 7–7   Removing an I/O expansion board

4. Separate the interboard connectors on the back of the board from the connectors on the system board, as shown in Figure 7–7.

CAUTION: *Grasp the board at its edges to avoid damaging any components on the board.*

5. Lift the board away from the system board, and place it in an antistatic bag.

6. If you removed the I/O board to replace it with a new board, proceed to the next section, "Installing an I/O expansion board."

   If you removed a failed board, insert it in an antistatic bag and return it to Data General. Contact the Customer Support Center, as described in the Preface, for information on returning the faulty part.

   If you are removing all option boards to replace the system board, remove the next board by following the steps in the appropriate section of this chapter. If you have removed all CPU and option boards, proceed to Chapter 8.

Installing an I/O expansion board

Before you can install an I/O expansion board, you must prepare your worksite, remove the computer unit cover, and attach the ESD wrist strap as described in Chapter 4, "Expanding and maintaining your computer system."

CAUTION: *Unless you are properly grounded, you can discharge static electricity and damage components in the system.*

▶   To install an I/O expansion board, follow the steps in this section. You will need a medium Phillips screwdriver.

Proceed as follows:

- To install a new I/O expansion board in a system that previously had none, start with step 1.

- To install a *replacement* I/O expansion board in your system, start with step 2.

- To reinstall a board you removed temporarily, start with step 7.

1. Remove the filler plates that cover the expansion SCSI or LAN board connector openings on the computer unit bulkhead. Figure 7–8 shows the filler plates for both option board locations.

Computer unit (back)

Remove two screws.
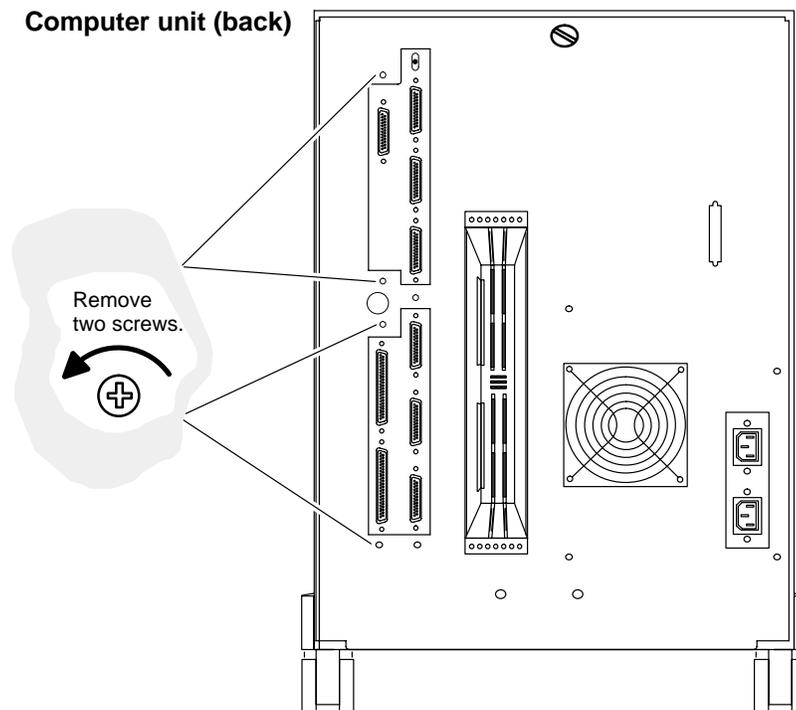
Figure 7–8   Removing expansion SCSI and LAN connector filler plates

7-8

2. Carefully remove the option board from its package. Save the antistatic shipping bag and packing materials to use if you have to return the option board.

   CAUTION: *If you need to set the option board down, put it back inside the antistatic shipping bag.*

3. If you are installing a LAN board, skip to step 7.

   If you are installing a SCSI expansion board, verify that each port on the expansion board matches the configuration you want.

IMPORTANT: By default, each SCSI expansion board supports one singled–ended bus and one differential bus. If you plan to keep this default configuration, proceed with step 7 now. Refer to Chapter 3 before proceeding if you need information about SCSI bus configuration options and requirements.

The orientation of logic boards on the expansion board determines singled–ended or differential bus operation for each port. Labels etched on each logic board identify the two port configurations.

You can configure two single–ended ports, two differential, or keep the default configuration, as seen in Figure 7–9.

When the Singled–Ended (or SE) label appears in the *upper, right corner* of the logic board, the port supports single–ended devices. With the logic board in the reverse position (the Differential or DIFF label in the top, right corner), the port supports differential devices.**Note that the identifying label in the upper right corner of your logic boards may appear upside–down.**
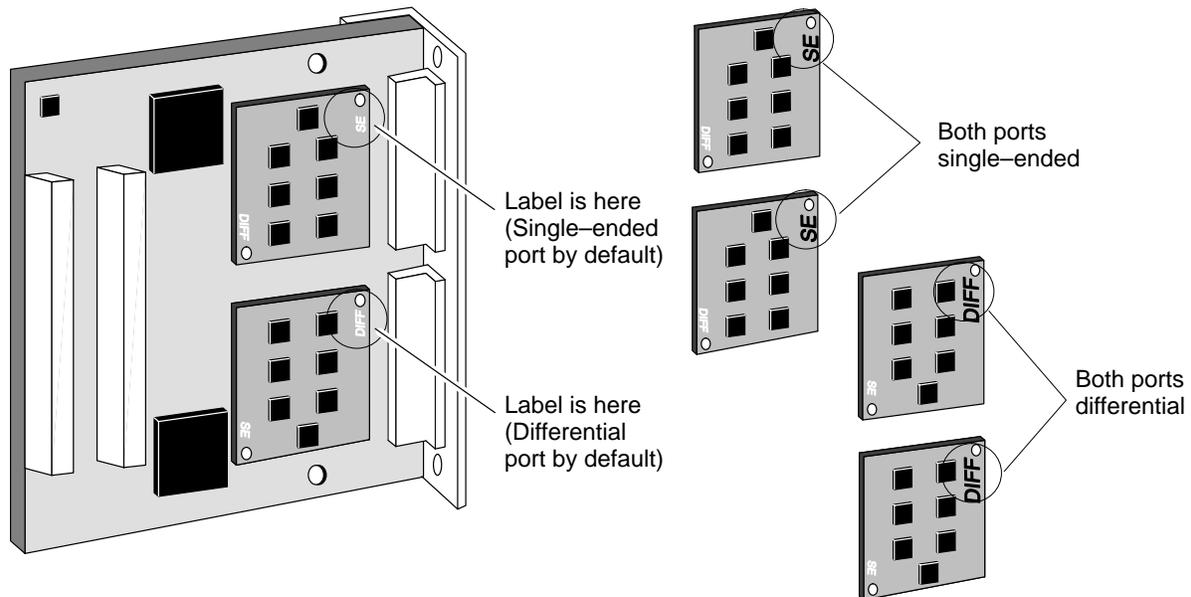
Figure 7–9   Positioning logic boards to determine singled–ended or differential bus configurations on a SCSI expansion controller

Complete steps 4 through 6 to change the default configuration.

4. Remove logic board(s) from the interboard connectors on a SCSI expansion board as follows:

   a. Grasping the logic board as shown in Figure 7–10 (a), pull up on the bottom edge of the logic board and gently rock the board vertically to loosen its connection. Initially, this motion may require firm pressure.

   CAUTION: *Be careful not to move the logic boards in a left-to-right motion (horizontally). Avoid touching other components on the SCSI expansion board.*

   b. With one end of the logic board is loosened from the interboard connectors, gently rock the other side vertically and lift the board away, as shown in Figure 7–10 (b).

a.

b.
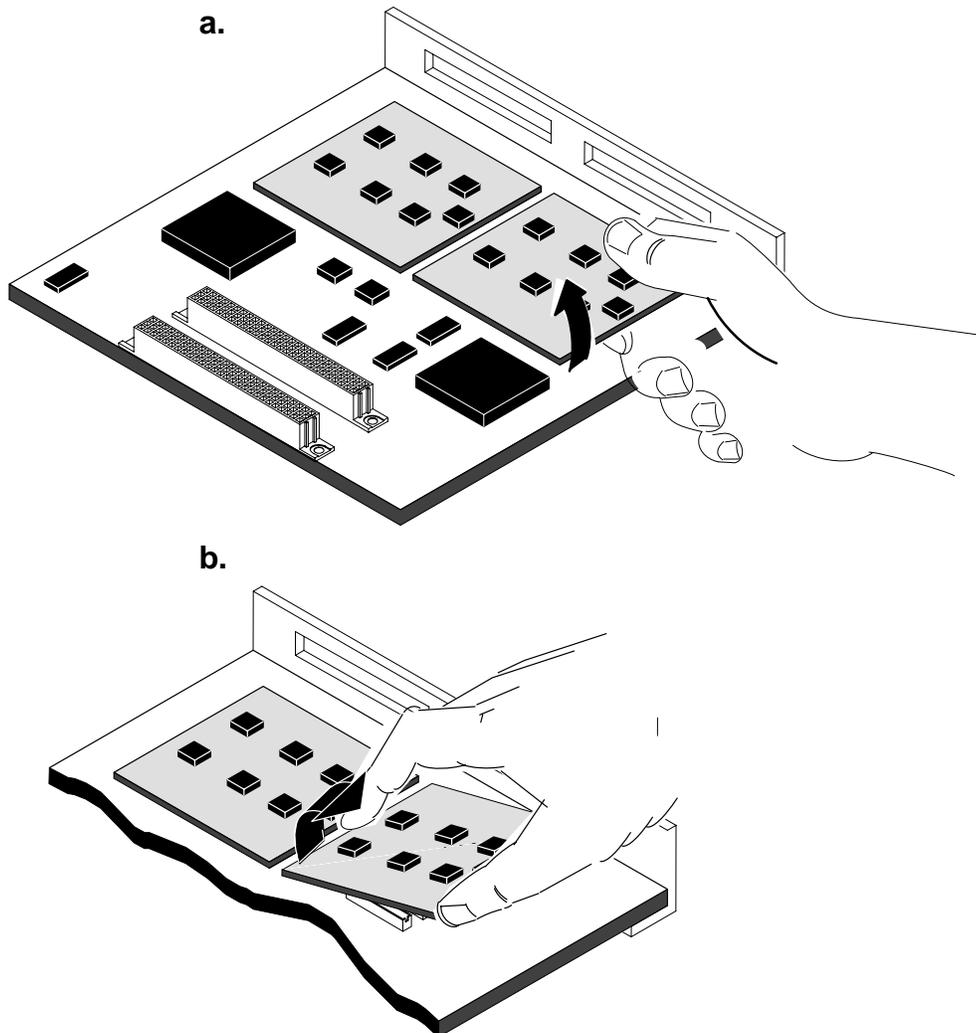
Figure 7–10   Removing a logic board from a SCSI expansion board

5. Reposition the logic board(s) to support single–ended or differential operation. (Use Figure 7–9 to determine appropriate positioning of the SCSI logic boards for your configuration.)

6. Reconnect each logic board onto the set of two sets interboard connectors on the SCSI expansion board. Press the interboard connectors together to create a firm connection.

CAUTION: *If you cannot press the connectors together easily, make sure that the connectors are aligned correctly; then, try pressing them together again.*
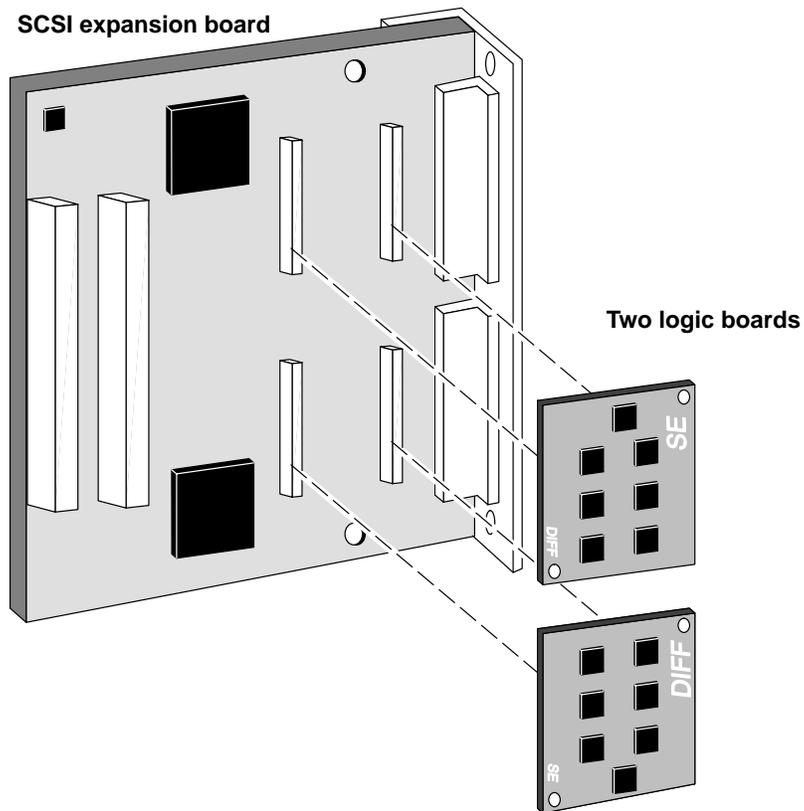
Figure 7–11   Installing logic boards on an expansion SCSI board

7. Position the expansion board so that its external I/O connectors fit inside the opening in the computer unit bulkhead, as seen in Figure 7–12.

External I/O connector

Computer bulkhead opening

Expansion board bracket

External I/O connectors
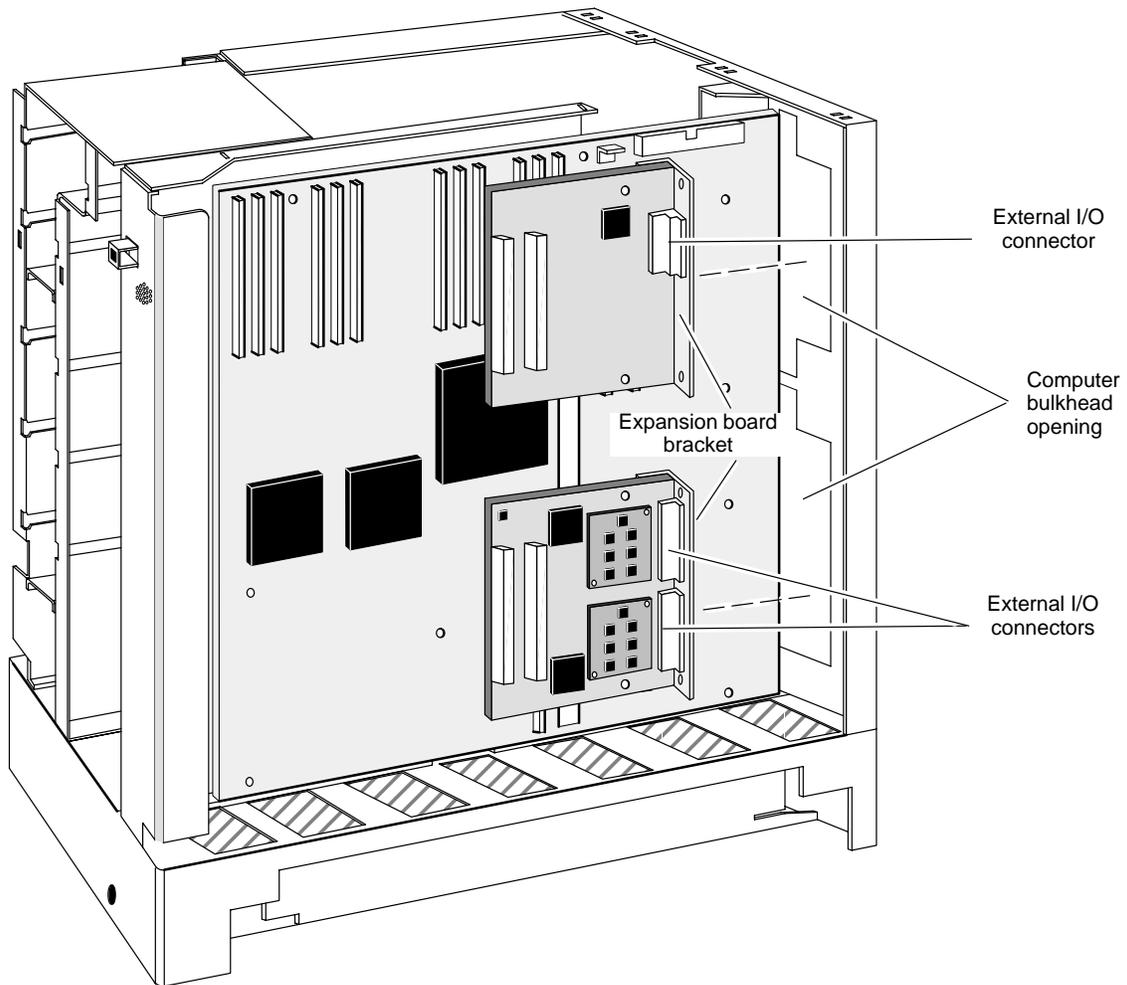
Figure 7–12   Installing an expansion I/O board

8. Align the interboard connectors on the system board and on the expansion board, as seen in Figure 7–13. Press the interboard connectors together to create a firm connection.

   If you cannot press the connectors together easily, make sure that the connectors are aligned correctly; then, try pressing them together again.
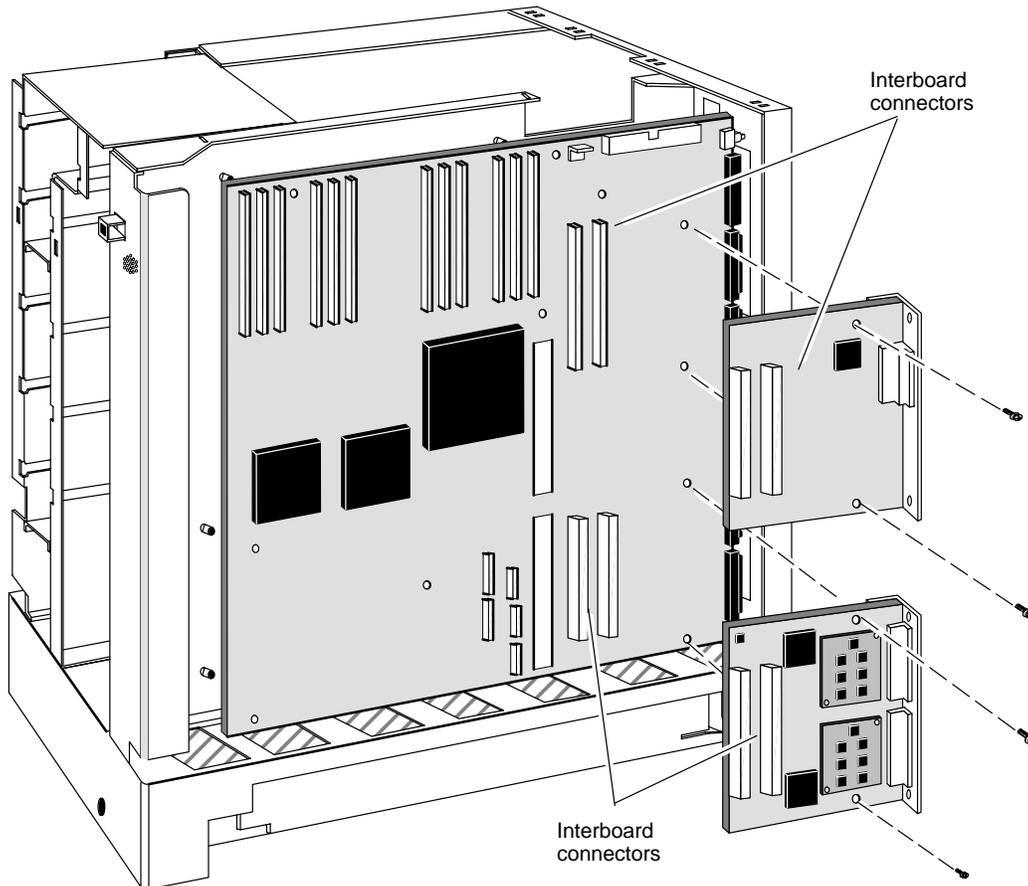
Figure 7–13 Securing an I/O expansion board

9. Install the two screws that secure the I/O expansion board to the system board, as shown in Figure 7–13.

10. Align the expansion board brackets with the holes in the computer unit rear panel bulkhead; then, insert the two screws as shown in Figure 7–14.
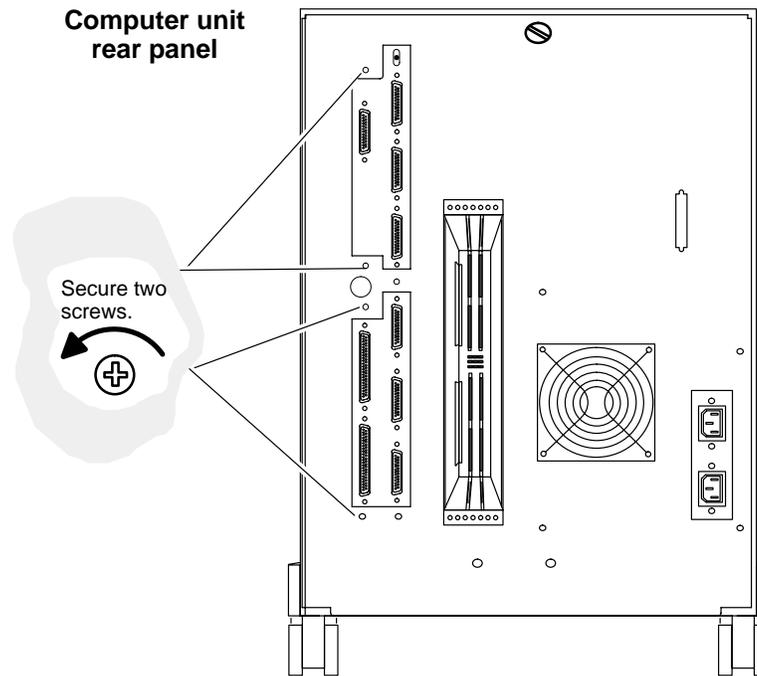
Figure 7–14 Securing the I/O expansion board to the computer unit bulkhead

11. Reinstall the cover as described in Chapter 4.

▶ To connect an Ethernet transceiver cable to a LAN I/O expansion board controller, refer to Chapter 2.

▶ To set up an external SCSI bus, refer to Chapter 3.

To test a new or replacement board, you should run a diagnostics acceptance test after your next powerup. Refer to the manual *Using AViiON® Diagnostics and the AV/Alert*sm *Support System* for instructions on running a hardware acceptance test or other diagnostic utilities.

Adding or replacing a graphics controller (550 series)

This section explains how to add a new or replace a failed graphics board in an AViiON 550 series computer unit. If your computer system has a graphics board, you will need to remove it to replace a failed system board.

The graphics board plugs into interboard connectors on the system board; these same interboard connectors are used for optional expansion I/O boards, as described in the next section.

If your workstation uses an 8–bit graphics controller, one option slot remains for an I/O expansion board; the 8–bit (base unit) controller uses the bottom option slot. If your workstation has 24–bit graphics, you cannot add an I/O expansion board; the 24–bit graphic controller uses both option slots

Figure 7–15 shows the system board locations for the 8– and 24–bit graphics boards.

24–bit graphics board

8–bit graphics board
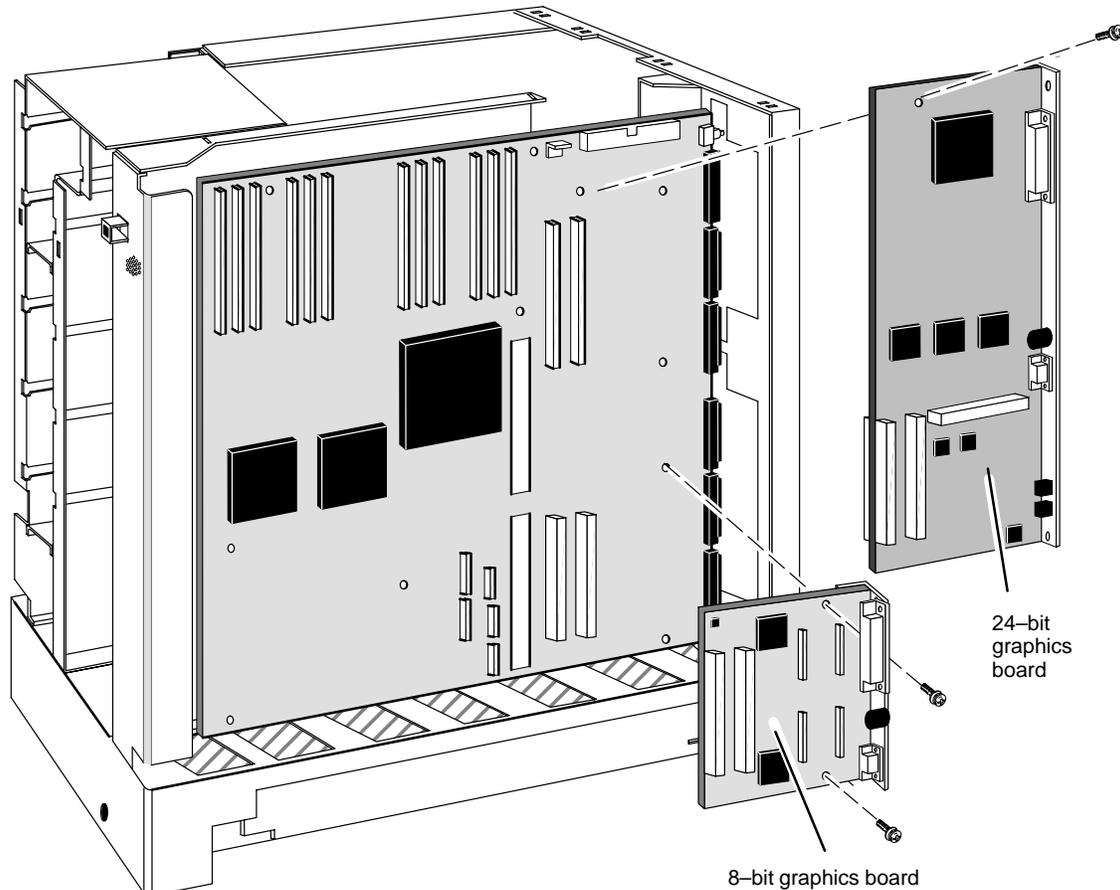
Figure 7–15   Location of the AViiON 550 series graphics board (8–bit or 24–bit)

Removing a graphics controller

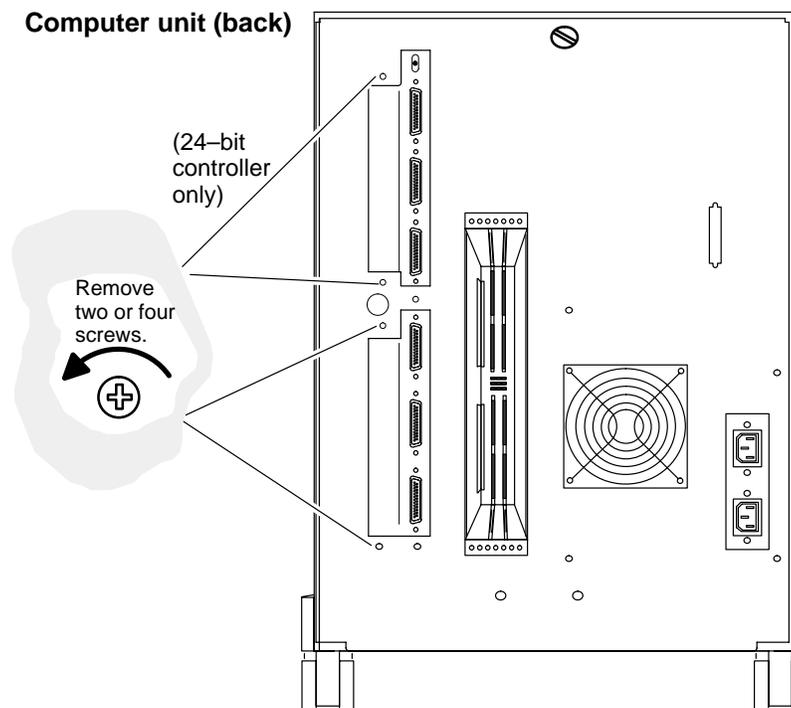You will need to remove the graphics controller to replace a failed system board, or to replace the graphics board. Before you can remove the board, you must prepare a worksite, remove the computer unit cover, and attach the ESD wrist strap as described in Chapter 4.

CAUTION: *Unless you are properly grounded, you can discharge static electricity and damage components in the system.*

▶ To remove an I/O expansion board, complete the following steps. You will need a medium Phillips screwdriver.

1. Disconnect the external monitor and mouse cables attached to the graphics connectors on your computer unit rear panel bulkhead (as described in Chapter 2).

2. Remove the screws that secure the graphics controller to the computer unit rear panel bulkhead, as shown in Figure 7–16.

IMPORTANT: For an 8–bit graphics board, there are two screws; for a 24–bit controller, there are three screws.

Computer unit (back)

(24–bit controller only)

Remove two or three screws.
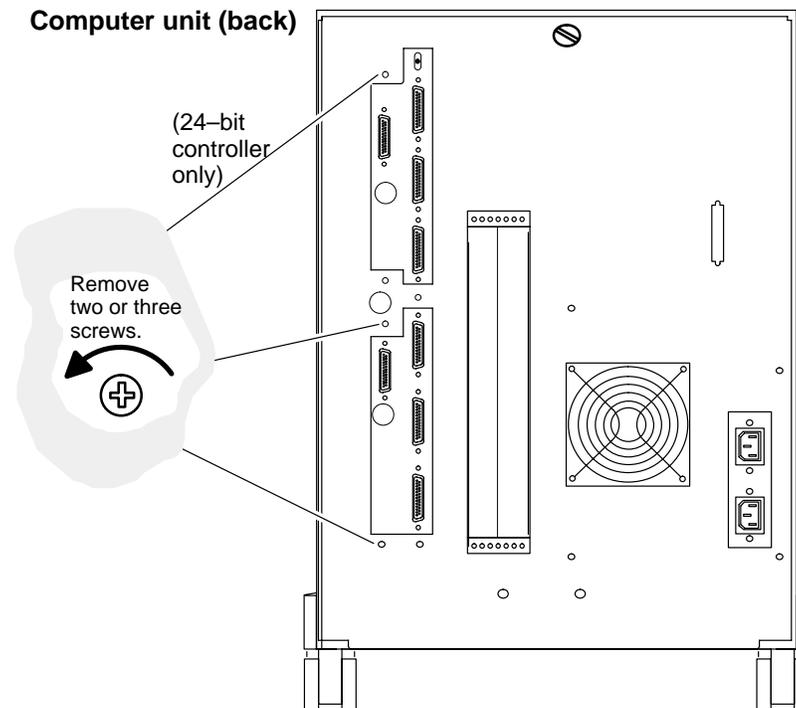
Figure 7–16 Releasing the graphics controller from the computer bulkhead

IMPORTANT: For steps 3 and 4, refer to Figure 7–17 if you have the 8–bit graphics board (standard configuration); refer to Figure 7–18 ilf you have the 24–bit board.

3.   Remove the one screw that secures the graphics board to the system board.

4.   Separate the interboard connectors on the back of the graphics board from the connectors on the system board.

CAUTION: *Grasp the board at its edges to avoid damaging any components on the board.*

8–bit graphics board

Interboard connectors
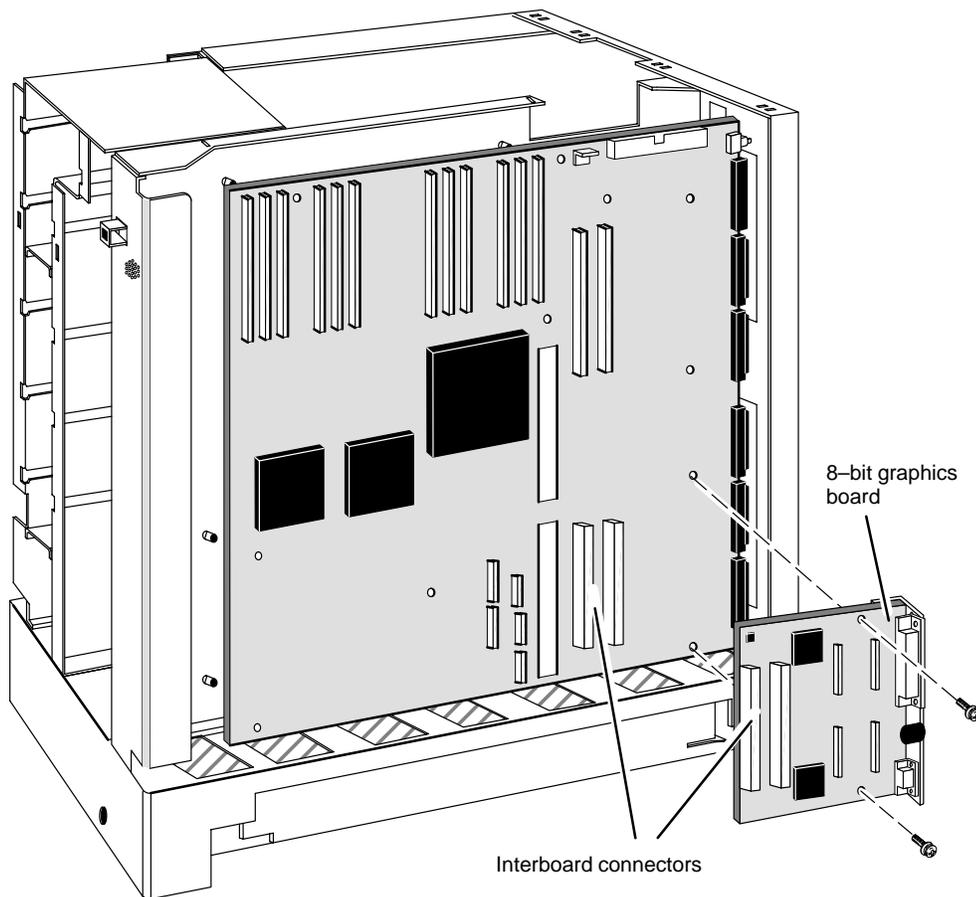
Figure 7–17   Removing the 8–bit graphics controller

7-17

24–bit
graphics
board

Interboard connectors
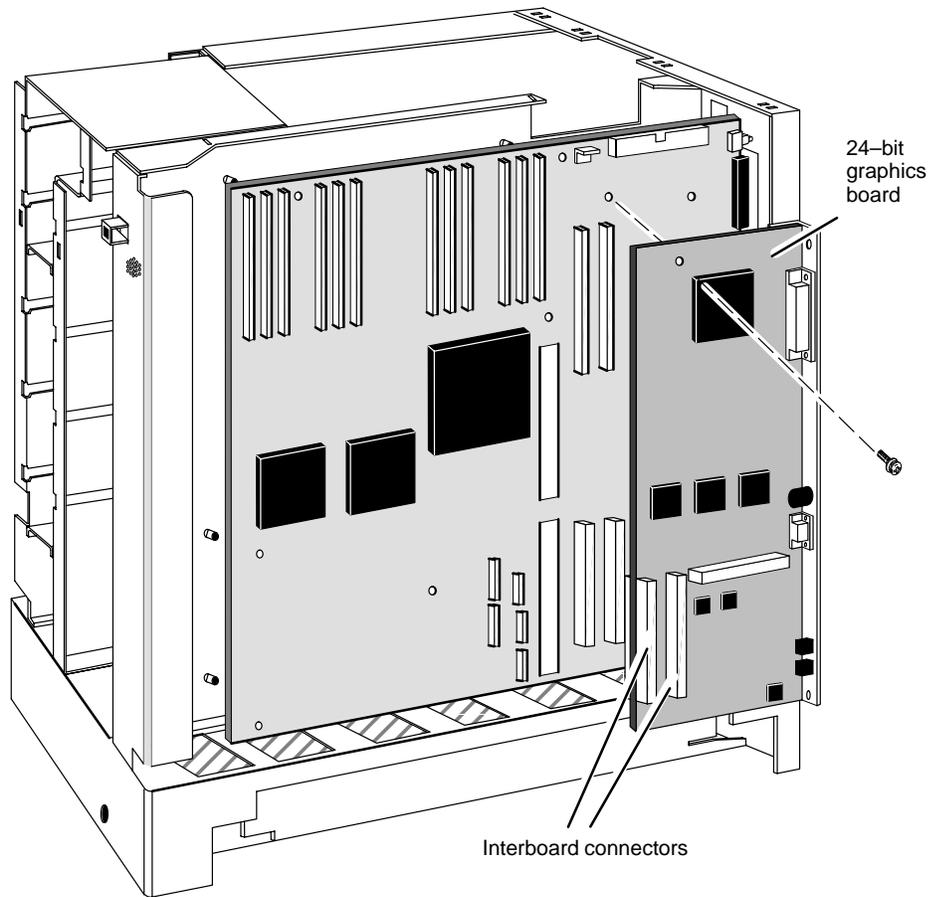
Figure 7–18 Removing the 24–bit graphics controller

5. Lift the board away from the system board, and place it in an antistatic bag.

6. If you removed the I/O board to replace it with a new board, proceed to the next section, "Installing an I/O expansion board."

   If you removed a failed board, insert it in an antistatic bag and return it to Data General. Contact the Customer Support Center, as described in the Preface, for information on returning the faulty part.

   If you are removing all option boards to replace the system board, remove the next board by following the steps in the appropriate section of this chapter. If you have removed all CPU and option boards, proceed to Chapter 8.

Installing a graphics controller

Before you can install a graphics controller, you must prepare your worksite, remove the computer unit cover, and attach the ESD wrist strap as described in Chapter 4.

CAUTION: *Unless you are properly grounded, you can discharge static electricity and damage components in the system.*

▶ To install a graphics controller, follow the steps below. You will need a medium Phillips screwdriver.

Proceed as follows:

- To install a new graphics board in a system that previously had none, start with step 1.

- To install a *replacement* graphics board in your system, start with step 2.

- To reinstall a board you removed temporarily, start with step 7.

1. For an 8–bit controller, remove the bottom filler plate covering the connector openings on the computer unit bulkhead; for a 24–bit controller, remove both filler plates shown in Figure 7–19.

Figure 7–19 Removing graphics controller filler plates

2. Carefully remove the graphics controller from its package. Save the antistatic shipping bag and packing materials to use if you have to return the board.

   CAUTION: *If you need to set the board down, put it back inside the antistatic shipping bag.*

IMPORTANT: For steps 3 through 5: refer to Figure 7–20 if you have an 8–bit controller (the standard configuration); refer to Figure 7–21 if you have a 24–bit controller.

3. Position the graphics board so that its external I/O connectors fit inside the lower slot opening in the computer unit bulkhead.

4. Align the interboard connectors on the system board and on the graphics board. Press the interboard connectors together to create a firm connection.

   If you cannot press the connectors together easily, make sure that the connectors are aligned correctly; then, try pressing them together again.

5. Secure the graphics board to the system board with screws, as shown in Figure 7–20 or Figure 7–21.

Interboard connectors
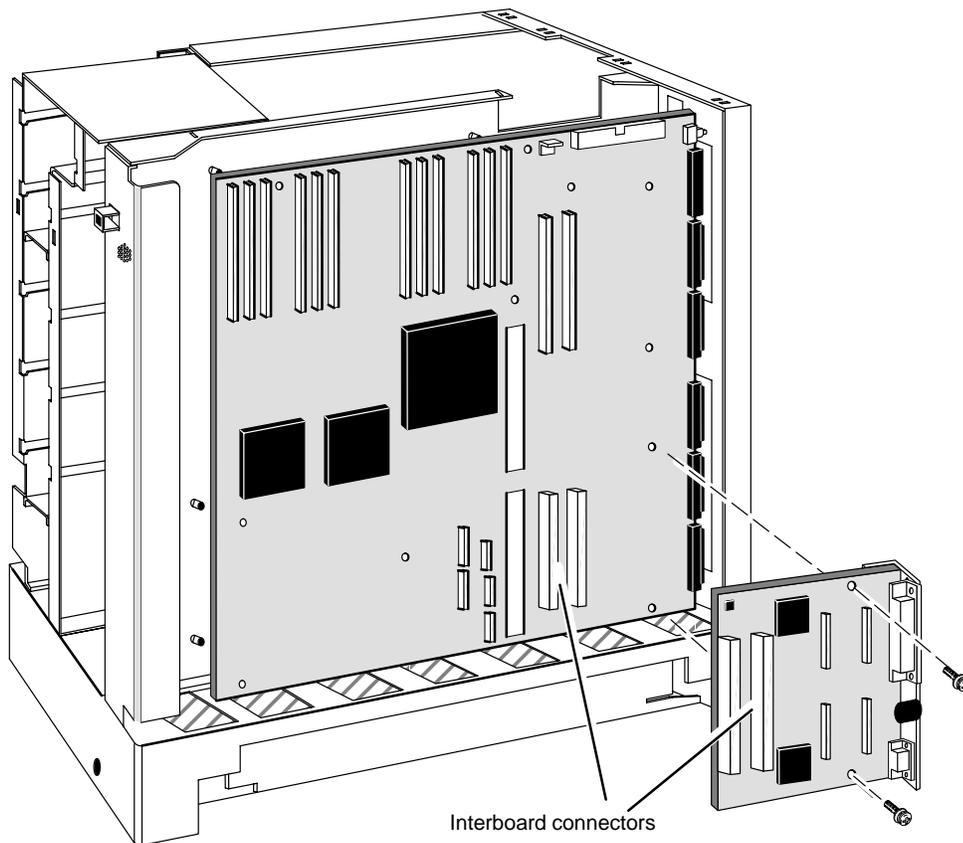
Figure 7–20   Installing the 8–bit graphics controller
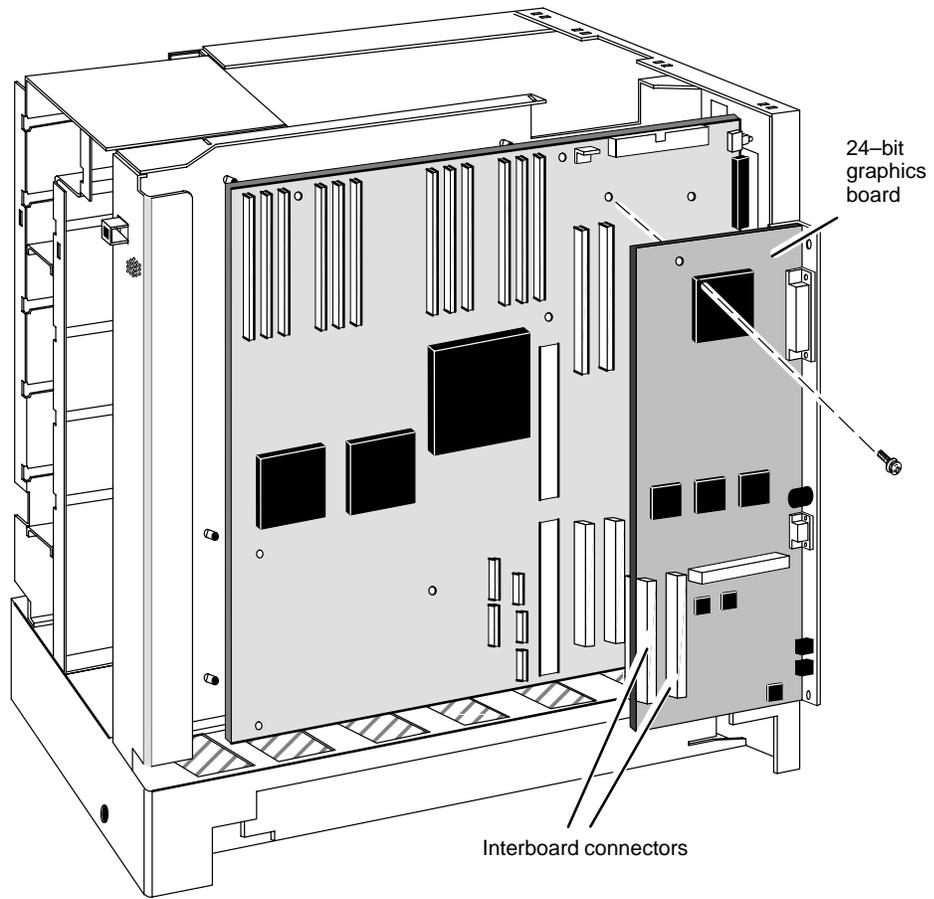
Figure 7–21 Installing the 24–bit graphics controller

6. Align the graphics board bracket screw holes with the holes in the computer unit rear panel bulkhead; then, insert and secure the screws as shown in Figure 7–22. For an 8–bit graphics controller, there are two screws; for a 24–bit controller, there are three screws.
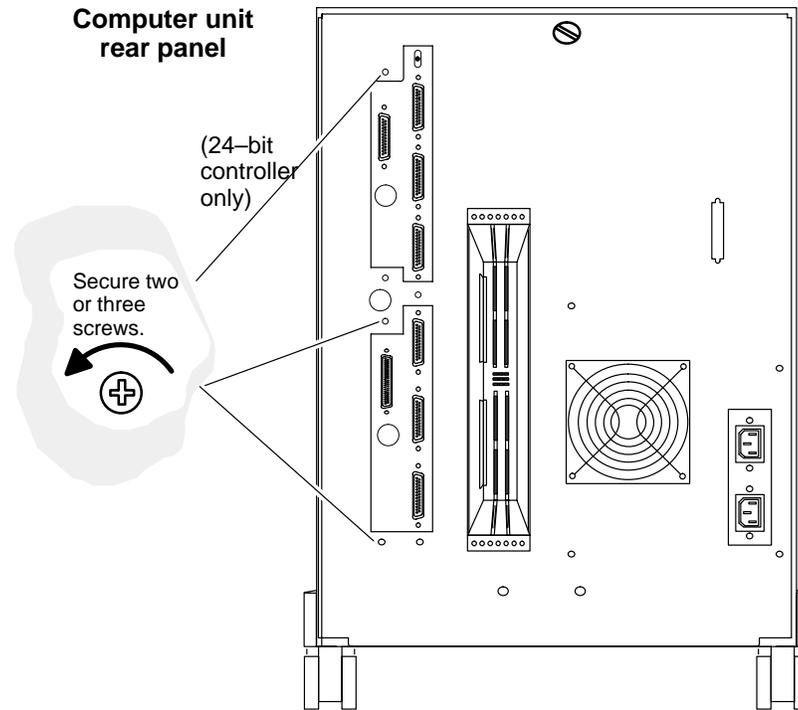
Figure 7–22 Securing the I/O expansion board to the computer unit bulkhead

7. Reinstall the cover as described in Chapter 4, "Expanding and maintaining your computer system."

To connect monitor and mouse cables to a graphics controller, refer to Chapter 2, "Setting up the computer unit."

To test a new or replacement board, you should run a diagnostics acceptance test after your next powerup. Refer to the manual *Using AViiON® Diagnostics and the AV/Alert*sm *Support System* for instructions on running a hardware acceptance test or other diagnostic utilities.

End of Chapter

8 Replacing the system board

This chapter describes how to replace a failed system board. The system board assembly does not include attached system components; to replace a system board assembly, you must remove the following option boards and install them on the replacement system board assembly:

- memory modules
- optional second CPU complex
- graphics controller (AViiON 550)
- optional expansion LAN and/or SCSI boards
- System ID PROM (programmable read–only memory) component

Figure 8–1 shows an exploded view of the system board with some subassemblies installed.
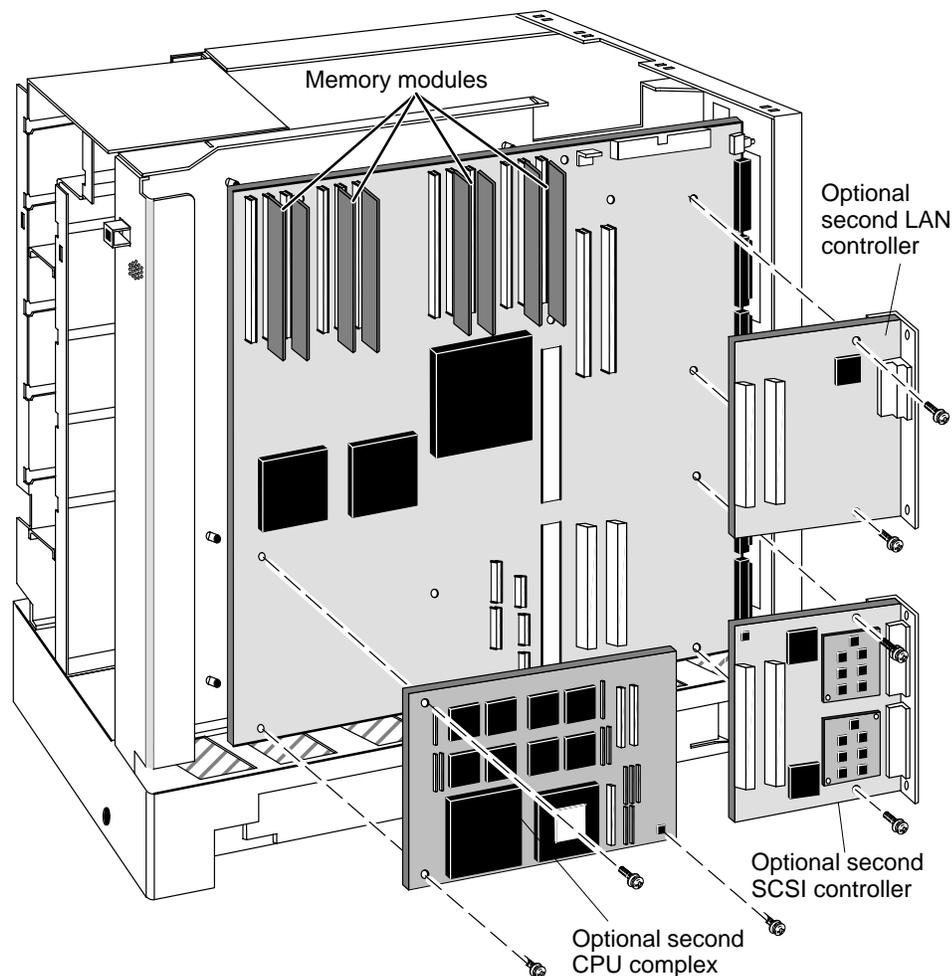
Figure 8–1   AViiON 5500 and 550 series system board and mounted components

Removing the system board

▶ To remove the system board, follow the steps below. You will need a medium Phillips screwdriver, and a small flat–blade screwdriver or comparable tool.

1. Prepare your work site, remove the computer unit cover, and attach the ESD wrist strap, as described in Chapter 4.

2. Remove the system board subassemblies, as follows:

   • Remove each SIMM as described in Chapter 6.

   • Remove the CPU complex board(s) as described in Chapter 7.

   • Remove the graphics controller (AViiON 550) as described in Chapter 7.

   • Remove any expansion I/O and graphics boards as described in Chapter 7.

   IMPORTANT: Temporarily place each component on a static–free surface or in an ESD–protected area while you replace the system board assembly.

3. Unplug the four power supply cables and the SCSI bus ribbon cable from the system board as shown in Figure 8–2.
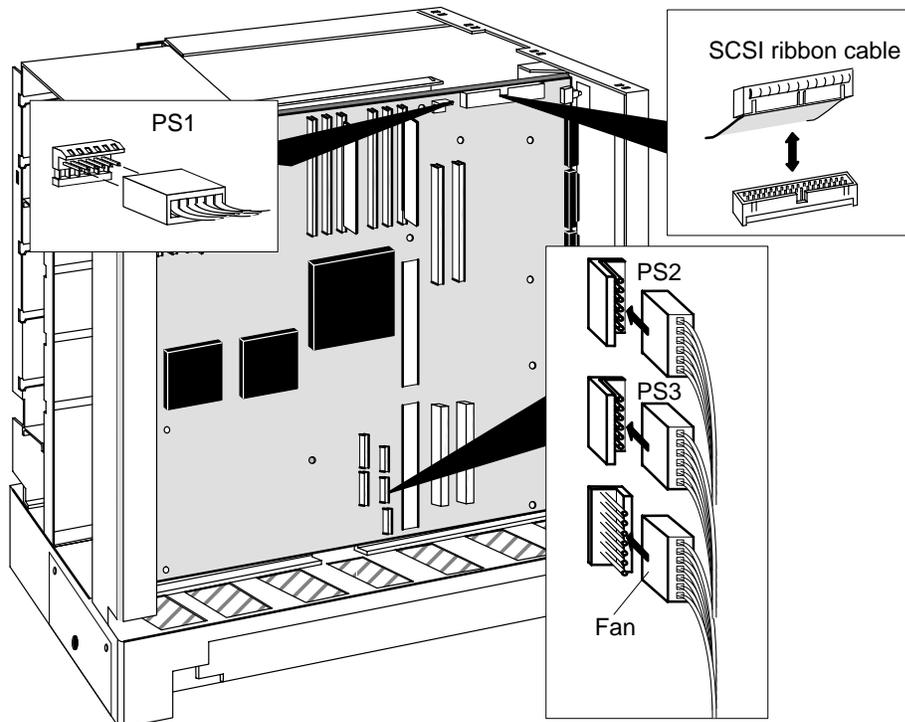
Figure 8–2   Unplugging cables from the system board

4. Using the medium Phillips screwdriver, remove the four screws shown in Figure 8–3.

Remove four screws.
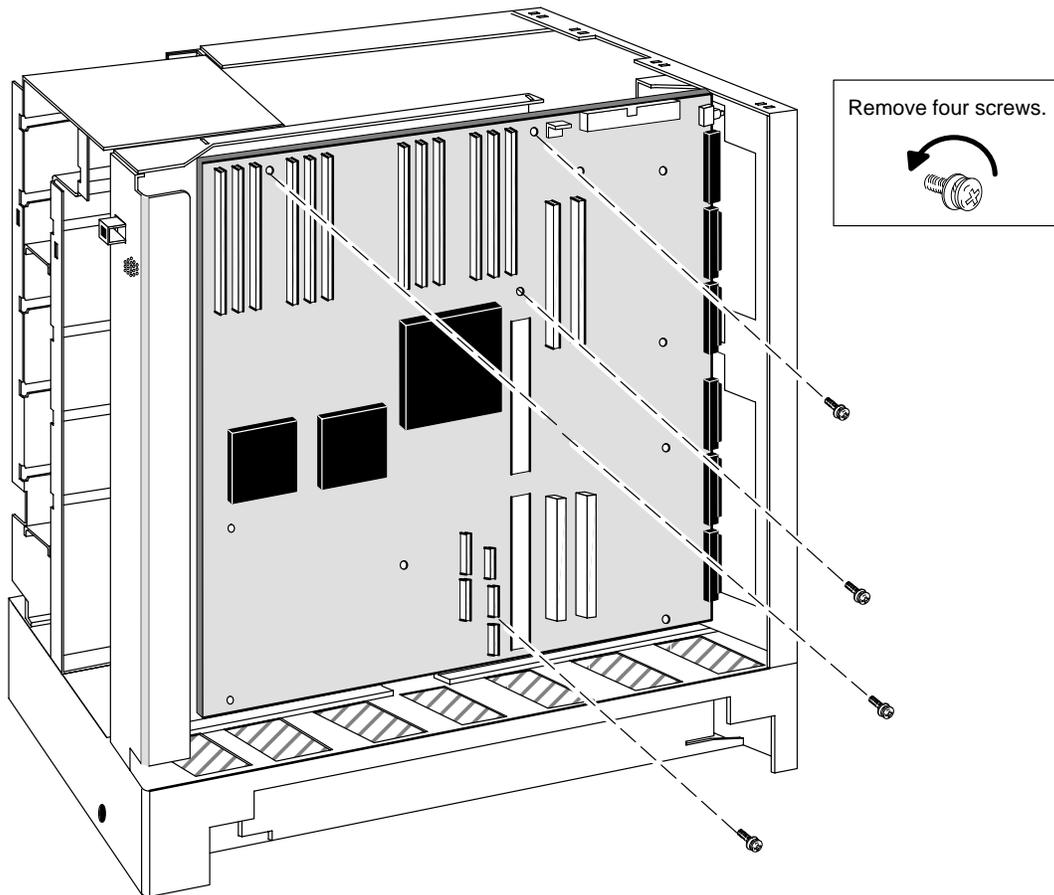
Figure 8–3   Unscrewing the main system board screws

5. If you do not have a second CPU option, remove the two remaining screws, as seen in Figure 8–4. *Skip this step if your configuration includes a CPU option board*.

6. Grasp the the system board at its top and bottom centers, above and below the interboard connectors, as seen in Figure 8–4. Gently pull to dislodge the system board from the computer chassis connector.

Remove two screws
if no 2nd CPU option.
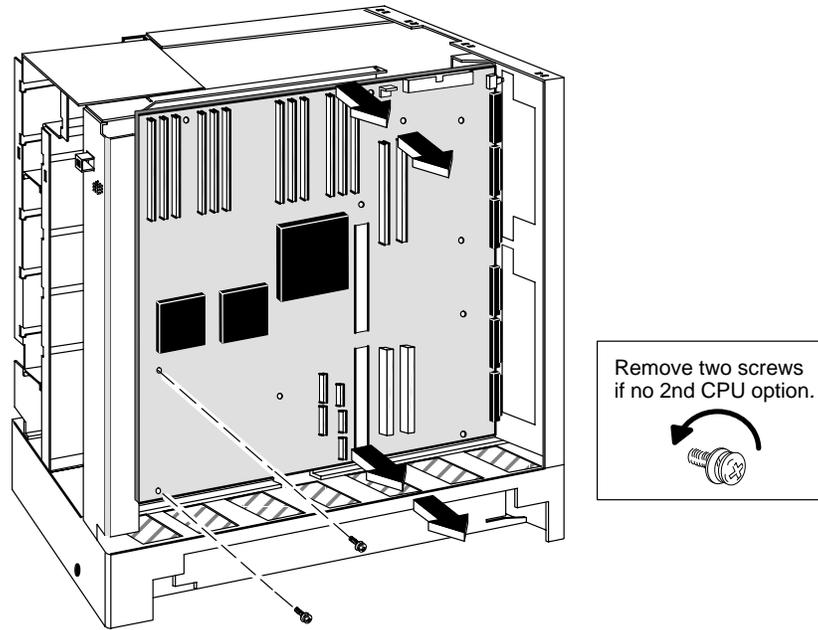
Figure 8–4   Dislodging the system board from the computer chassis

7. **Slide the system board to the left, rear corner of the chassis until the board's connectors can clear the rear panel bulkhead.**

Rear panel
bulkhead

System
board
connectors
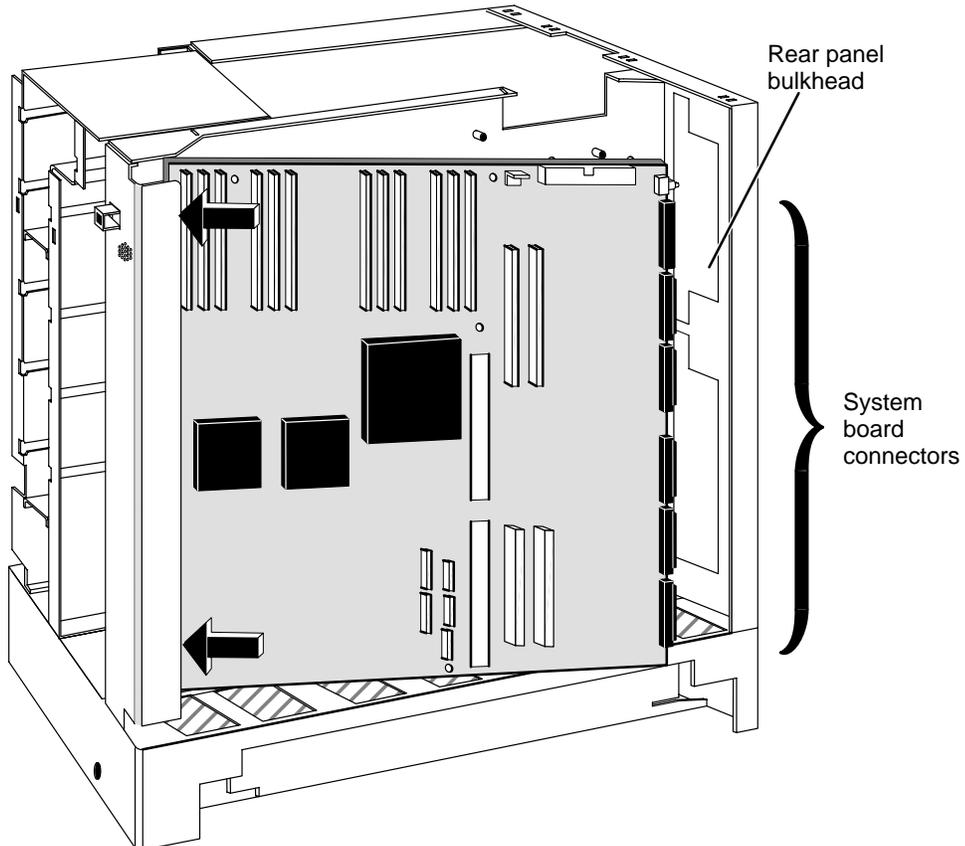
Figure 8–5   Removing the system board

8. Carefully pull the system board away from the computer unit's metal chassis.

CAUTION: *To prevent damage to any components, be sure to grasp the system board by its edges and avoid bowing the board*

9. Place the system board, with the component side facing up, on an ESD–free surface.

10. Using a flat–blade screwdriver, gently pry up one end and then the other end of the System ID PROM component , as shown in Figure 8–6.

System board
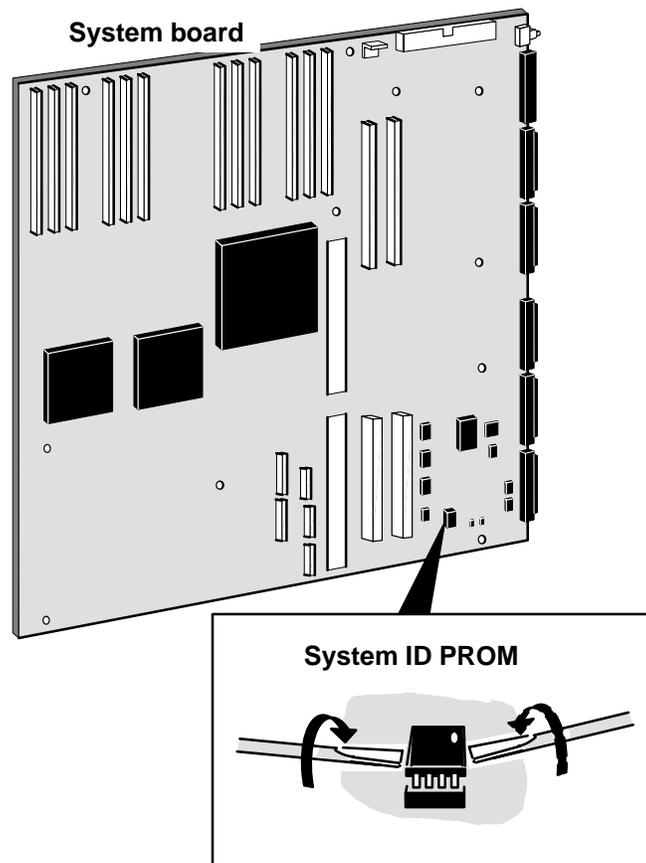
System ID PROM

Figure 8–6   Removing the System ID PROM component

11. Once the PROM component is loose enough to remove by hand, lift it out of its socket. Put the component in an antistatic bag, and set it aside for later installation on the replacement system board.

CAUTION: *You must install this original PROM on the replacement system board to access some applications software.*

12. Insert the failed system board in an antistatic shipping bag.

To install the replacement system board, proceed with the sections that follow.

Preparing a replacement system board

Before you can install the new system board, you need to prepare your work site, remove the computer unit cover, and attach the ESD wrist strap as described in Chapter 4.

Then, prepare the new system board for installation as described in this section.

▶ First, install the original PROM component (the component you removed from the failed system board) on the replacement system board as described below.

CAUTION: *You must install the original PROM on the replacement system board to access some applications software.*

1. Start with step 2 if the replacement system board does not have a PROM component installed.

   If the replacement system board has a PROM component already installed, remove that component from the replacement system board. Using a flat–blade screwdriver, gently pry up one end and then the other end of the component until it is loose enough to remove by hand (as shown in Figure 8–6).

2. Examine the original PROM component to see if its connector pins are straight.

   Straight pins   Angled pin   Spread pins
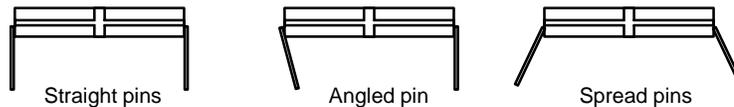
3. If the pins are spread too far apart or angled incorrectly, straighten the pins as follows.

   Lay the PROM component down on one side on an ESD–free table, and carefully roll the component to bend the pins into line as shown in Figure 8–7. Once the pins are in line on one side, repeat this procedure with the other side of the component.
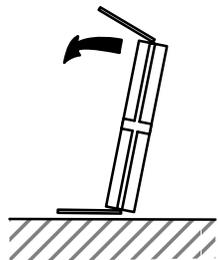
Figure 8–7   Straightening the pins on the PROM component

4. Align the pins of the PROM component with the holes in the system board socket. Insert the PROM component into the socket, as shown in Figure 8–8.
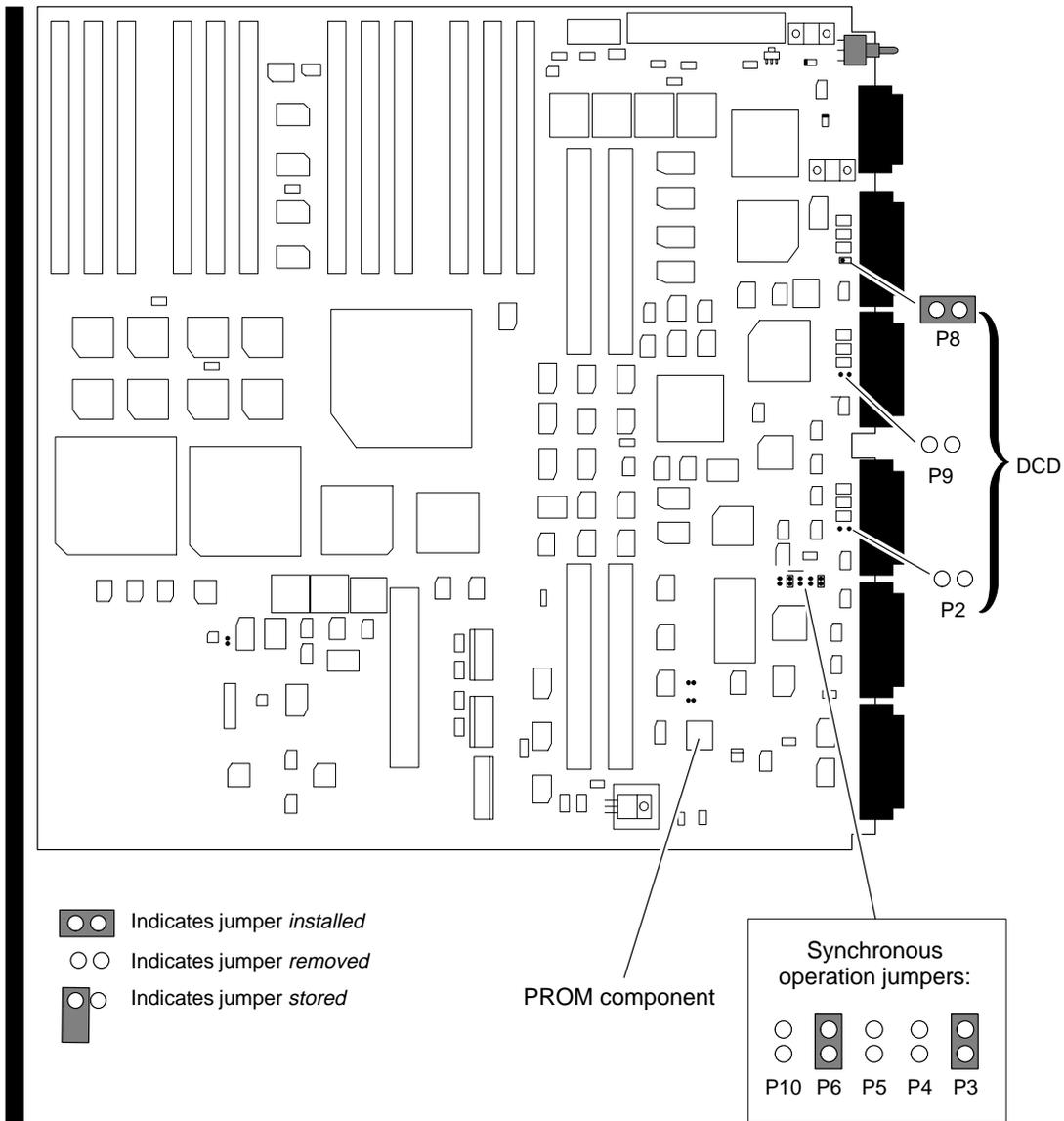
System board
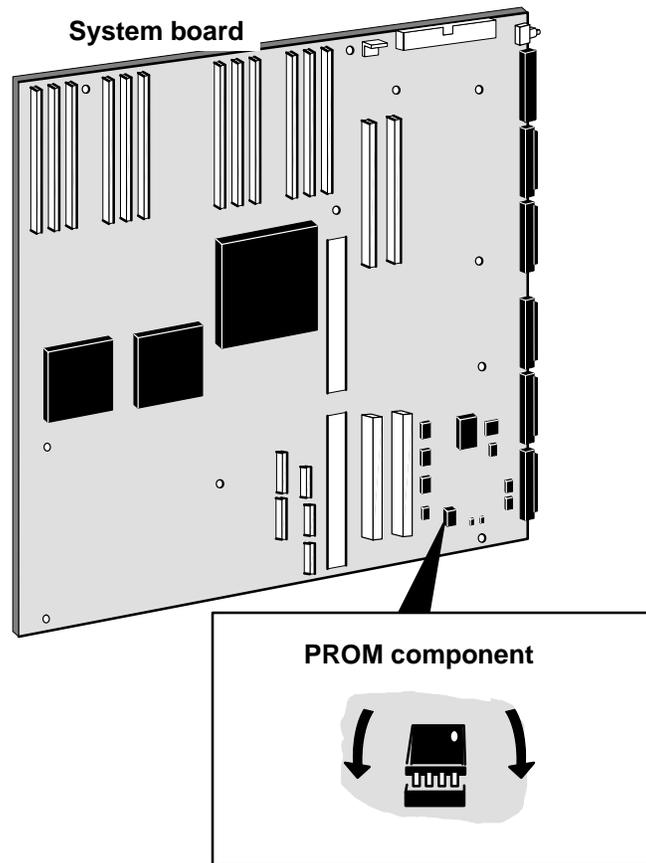
PROM component

Figure 8–8   Installing the System ID PROM component

5. Gently push on one side and then the other side to seat the PROM component in the socket.

▶ Next, verify that configuration jumpers on the system board are positioned correctly for your configuration, as described below.

Figure 8–9 illustrates the system board layout; it indicates both the location and the default configuration of the system board jumpers. Labels identifying each jumper number appear below the jumpers on the system board.

A jumper is *out* −− removed or stored −− when at least one pin is fully exposed. A jumper is *installed* when it covers both pins.

Figure 8–9 Location and default configuration of AViiON 5500 and 550 series system board jumpers

6. Verify the position of Data Carrier Detect (DCD) jumpers for the asynchronous serial ports: P8, P9, and P2. These jumpers enable or disable ASCII terminal operation for the three asynchronous ports.

To use an asynchronous port for ASCII terminal operation with the DG/UX™ operating system, the DCD jumper must be installed. By default, only jumper P8 is installed, enabling the system console port (OPCON), for Data Carrier Detect (DCD).

To configure the third async port (RS232–C) for data terminal operation, install a jumper on P2. The DCD jumper for the AV/Alert service port (RS232–B) is P9.

7. Verify the position of the synchronous serial port jumpers (P3, P4, P5, P6, and P10). These jumpers configure the SYNC port for your release of the DG/UX operating system. Figure 8–10 illustrates configuration options for the synchronous operation jumpers.

IMPORTANT: For synchronous applications to work correctly with DG/UX 5.4 *Release 3.00 or greater*, you must change the default jumper configuration.

By default, jumpers are installed on P3 and P6. To use the synchronous port with DG/UX 5.4 Release 3.00 or greater, install a jumper on pin P5. You may use any stored jumper (one that is attached to only one pin on a jumper location that should be empty).

Contact your Data General representative if an unused jumper is not available.

Before DG/UX 5.4R3.00

P10 P6 P5 P4 P3   **DG/UX 5.4R3.0 or later**

P10 P6 P5 P4 P3
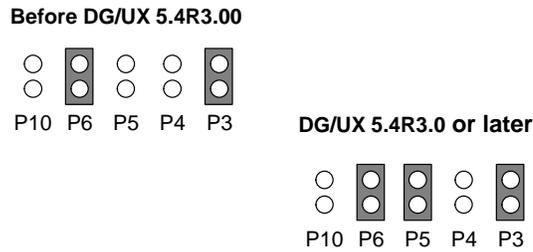
Figure 8–10   Configuring the synchronous operation jumpers

Installing the system board

▶ Complete the following steps to install the system board. You will need a medium Phillips screwdriver.

1. Grasp the the system board at its top and bottom centers, as shown in Figure 8–11. Position your fingers just above and below the interboard connectors.

Align screw holes with retaining posts (12 in all)

Grasp board here

Grasp board here
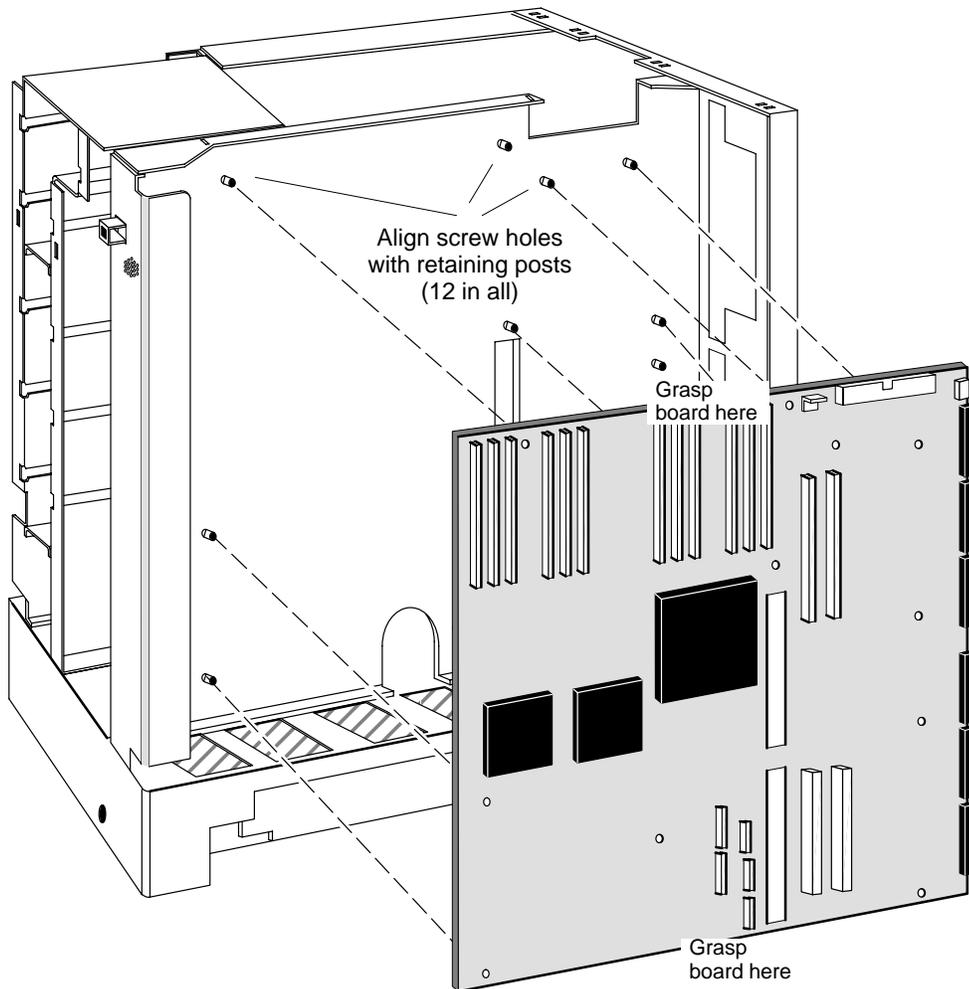
Figure 8–11   Aligning the system board before installing

2. Slide the board toward the left, rear corner of the chassis, as seen in Figure 8–12. Insert the board at an angle until the right side of the board (with connectors) can clear the rear panel bulkhead.

   CAUTION: *There is just enough space to insert the board at a slight angle to clear the metal chassis; do so carefully and slowly to prevent damaging the system board.*
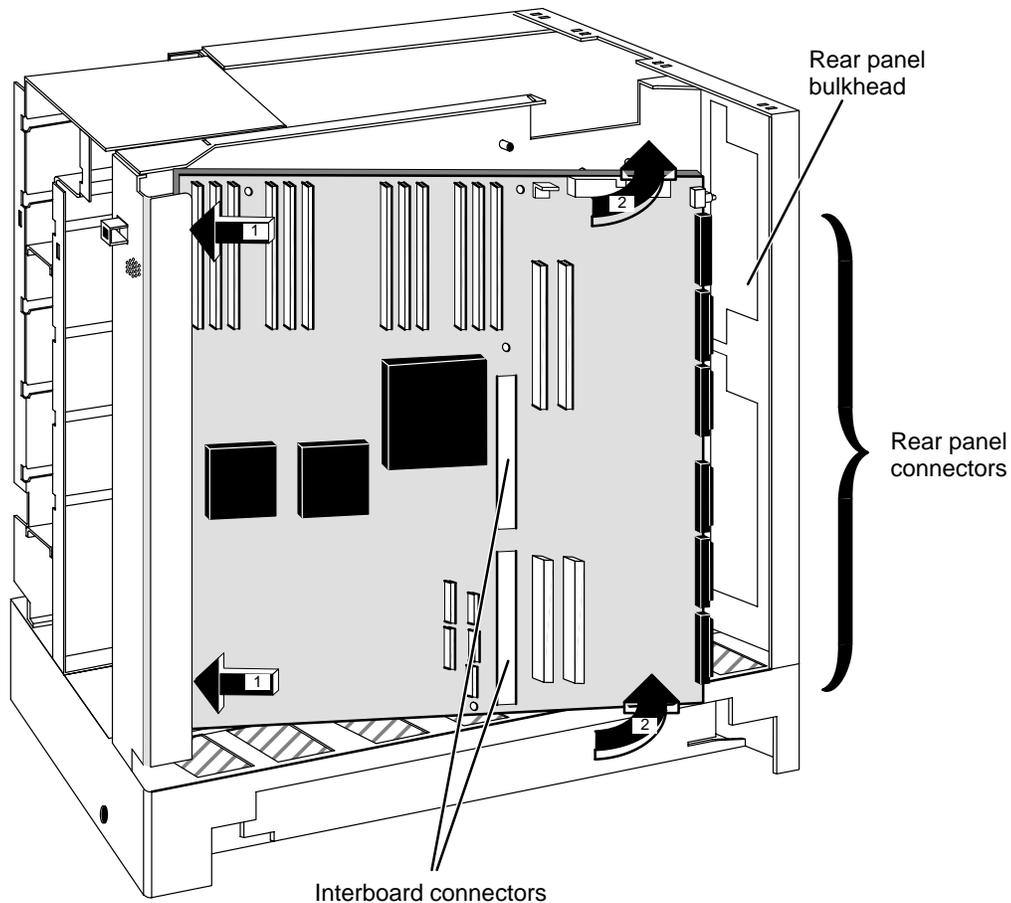
Figure 8–12 Inserting the system board in the computer unit

3. Insert the system board's rear panel connectors into the rear panel bulkhead space to create an exact fit.

4. Align the two interboard pin connectors and the system board screw holes with the connectors on the metal computer unit chassis and the twelve screw retaining posts. Figure 8–12 shows their locations.

5. Once the system board is properly positioned inside the computer unit chassis, press the system board down firmly on the interboard connector pins.

6. Using the medium Phillips screwdriver, secure the system board to the computer unit with the four screws shown in Figure 8–13.

Install four screws.
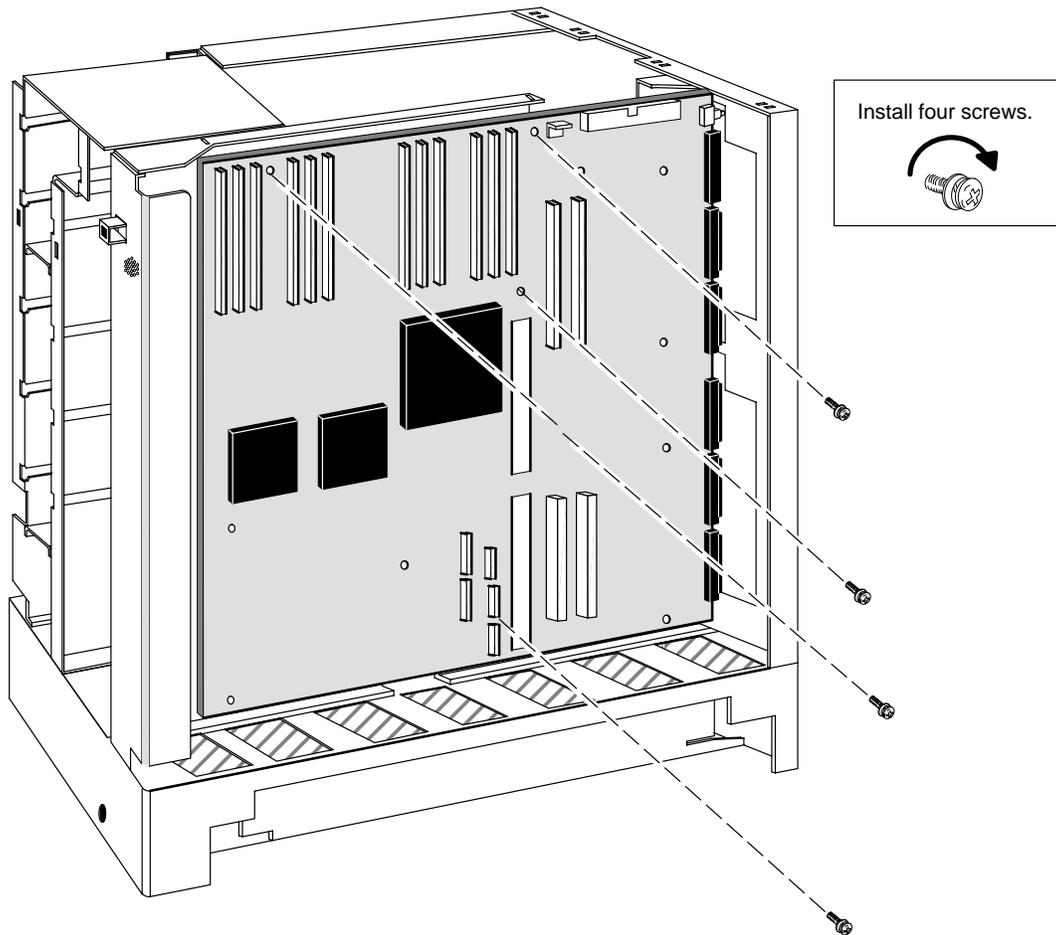
Figure 8–13 Securing the system board to the computer unit

7. If your configuration includes an optional second CPU board, skip to step 8 now.

IMPORTANT: Some of the screws that secure the system board to the chassis also secure CPU complex to the system board. If you do not have a CPU option board, insert the remaining two screws and washers; their locations are shown in Figure 8–14.

Install these two screw*s* if a second CPU option will NOT go here.
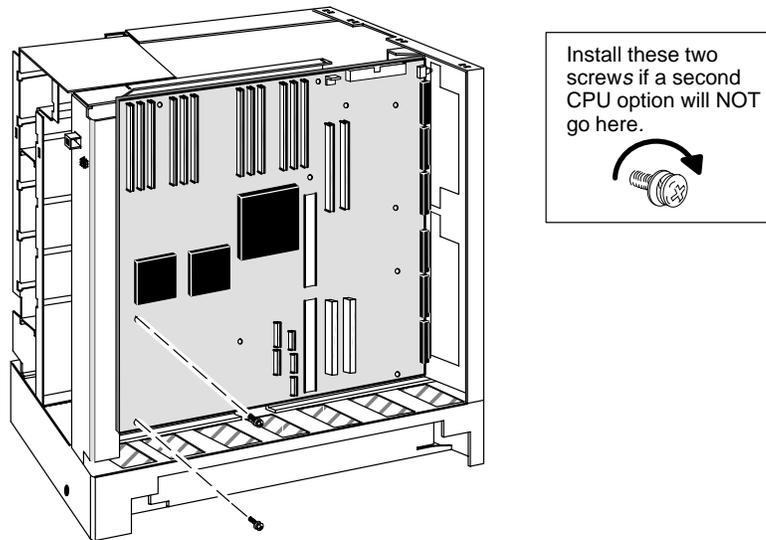
Figure 8–14 Securing additional system board screws

8. Plug the SCSI bus and four power supply cables into the system board as shown in Figure 8–15.

PS1

SCSI bus ribbon cable

System board

PS2

PS3

Fan
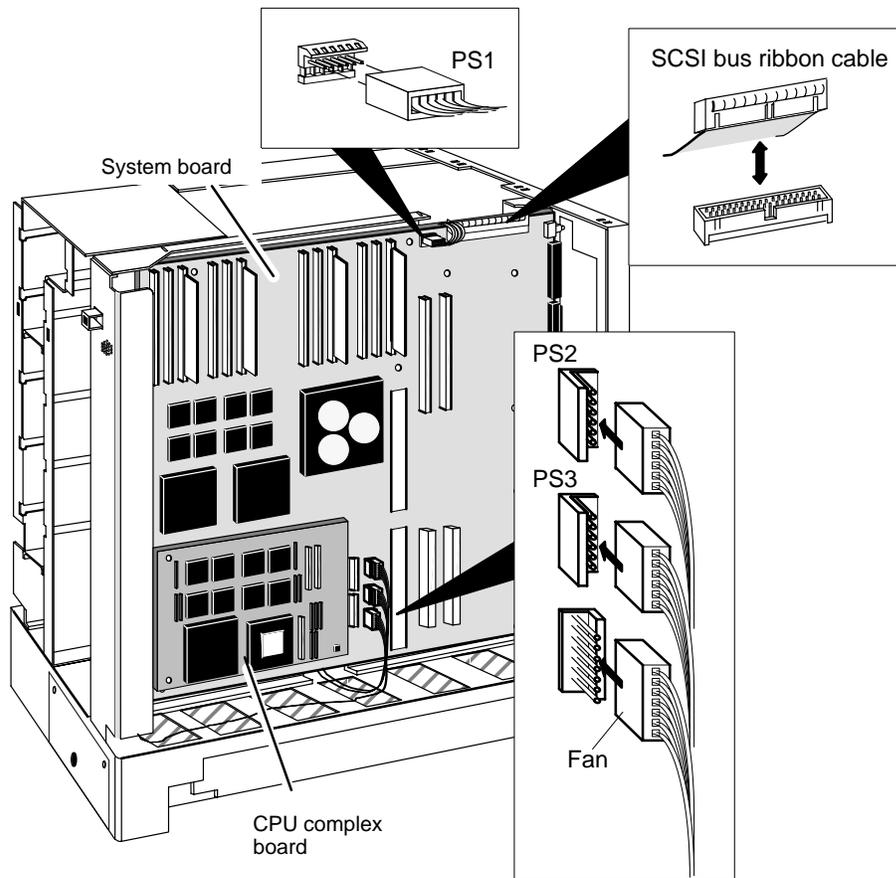
CPU complex board

Figure 8–15 Plugging cables into the system board

9. Reinstall the CPU complex(es), memory modules, and any graphics board, or I/O expansion board that you removed from the failed system board. Refer to Chapters 6 and 7 as appropriate.

10. If you removed the PROM from the replacement system board, you should insert this PROM on the failed system board as described in steps 2 through 5 of this section.

11. Insert the failed system board in an antistatic bag, and return it to Data General. Contact the Customer Support Center, as described in the Preface, for information on returning the faulty part.

12. Dismantle your ESD kit, and reinstall the computer unit cover as described in Chapter 4.

End of Chapter

9 Replacing the fan and the speaker/LED assembly

This chapter explains how to remove and install a failed fan assembly, speaker, power switch/LED, and the power supply cable to these components.

Replacing the fan assembly

Before you can remove a failed fan assembly, you need to power down any peripherals and the computer unit and remove the computer unit cover as described in the "Opening and closing the computer unit" section of Chapter 4.

WARNING: **Always unplug the power cord from the ac power outlet and from the receptacle on the back of the computer unit before removing the housing cover.**

Removing the fan assembly

▶ To remove a fan assembly, complete the following steps. You will need a medium Phillips screwdriver.

1. Unplug the fan assembly power cable from the connector on the computer unit housing, as shown in Figure 9–1.
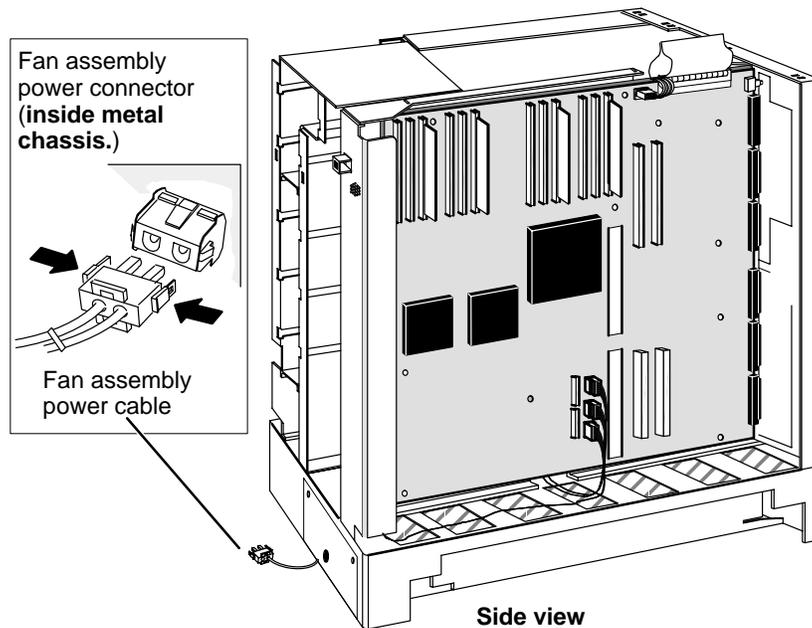
Figure 9–1   Removing the fan assembly power cable

2. Remove the two screws and washers that secure the fan assembly to the computer unit, as shown in Figure 9–2.

Remove two screws.
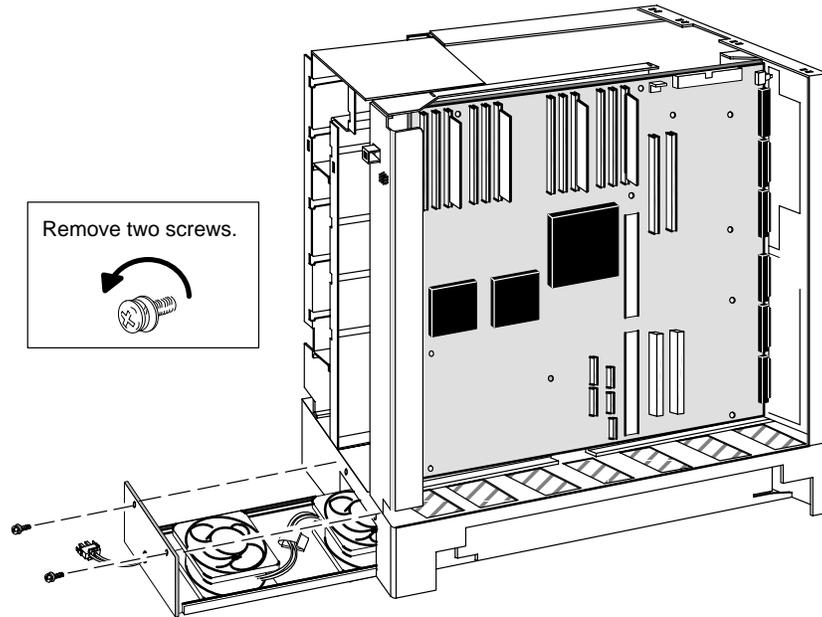
Figure 9–2   Releasing the fan assembly from the computer unit

3. Slide the fan assembly out and down to disengage it from the computer unit.

4. Return the failed fan assembly to Data General. Contact the Customer Support Center, as described in the Preface, for information on returning the faulty part.

   To install a new fan assembly, proceed with the next section, "Installing the fan assembly."

Installing the fan assembly

▶ To install a fan assembly replacement, follow the steps below. You will need a medium Phillips screwdriver.

1. Slide the fan assembly directly under the computer unit, as shown in Figure 9–3.
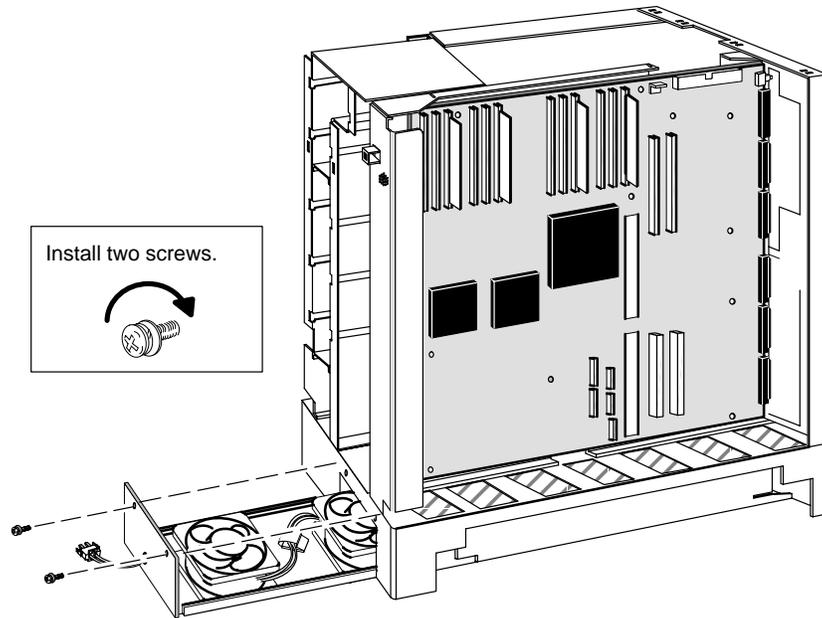
Install two screws.

Figure 9–3   Installing the fan assembly

2. Secure the fan assembly to the computer unit with the two screws and washers shown in Figure 9–3.

3. Plug the fan assembly power cable into the fan's power supply connector, as shown in Figure 9–4.

Fan assembly power connector (**inside metal chassis**.)

Fan assembly power cable
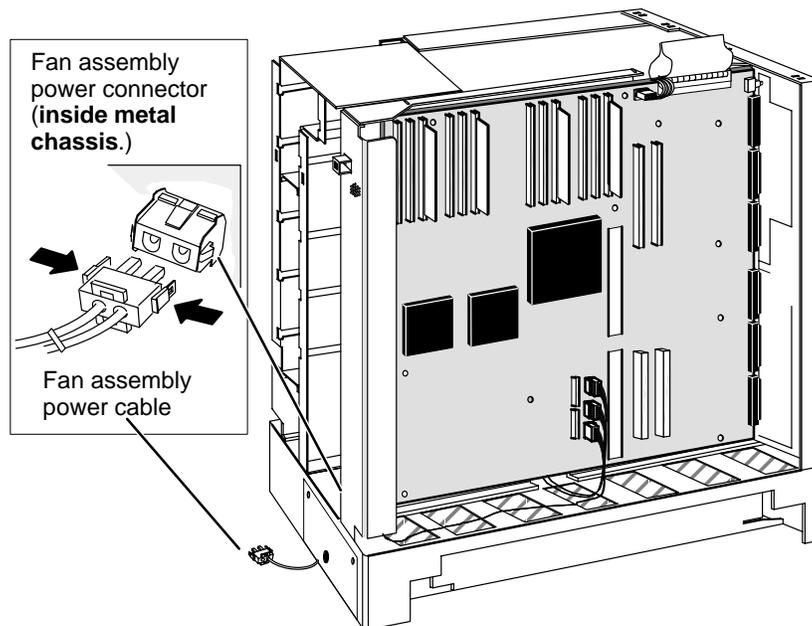
Figure 9–4   Plugging the fan assembly power cable into the power supply

4. Reinstall the cover as described in the section, "Opening and closing the computer unit" in Chapter 4.

   After closing the computer unit, power up any storage subsystems, peripheral housing units, and other peripherals. Then start the computer unit according to the instructions in your hardware operating manual and your operating system software documentation.

   Next, you should test your computer system by running the AViiON System Diagnostics as described in the *Using AViiON® Diagnostics and the AV/Alert*sm *Diagnostic Support System* manual.

Replacing the speaker/LED assembly

The front panel speaker and LED assembly are a combined unit; they share a power supply cable with the fan assembly.

Before you can remove a failed speaker/LED assembly, you need to power down any peripherals and the computer unit and remove the computer unit cover as described in the "Opening and closing the computer unit" section of Chapter 4.

▶ To remove the speaker and front panel LED assembly, follow the steps in this section. Reverse these steps to install a replacement speaker/LED assembly. You will need a nutdriver and flathead screwdriver to complete these steps.

1. To remove the LED, first remove the black plastic frame from the front of the LED, as seen in Figure 9–5.
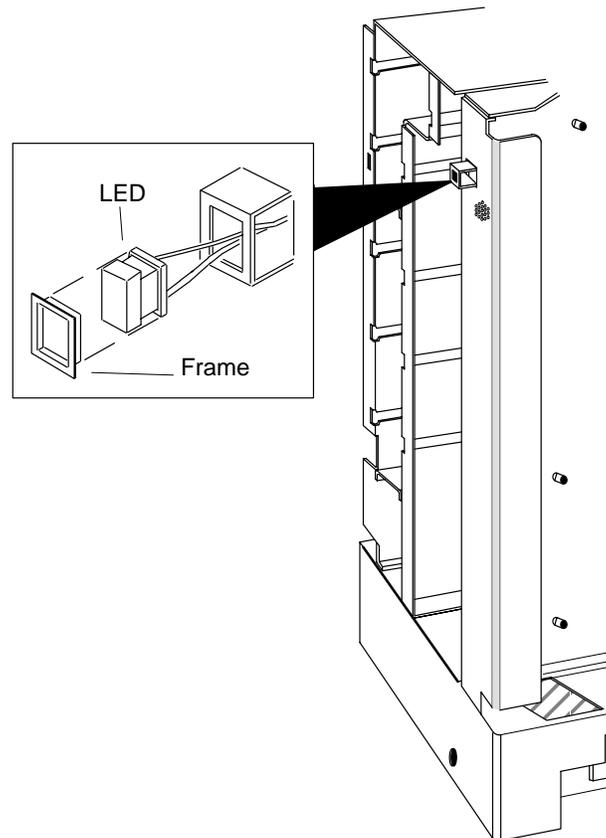
Figure 9–5   Removing the front panel LED

2. Grasping the LED wires from the inside of the chassis, pull the LED back through the hole in the metal chassis.

3. Re–attach the plastic LED cover and let the LED hang freely inside the computer chassis while you remove the rest of the assembly.

4. Remove the nuts that attach the speaker to the computer unit, as seen in Figure 9–6.
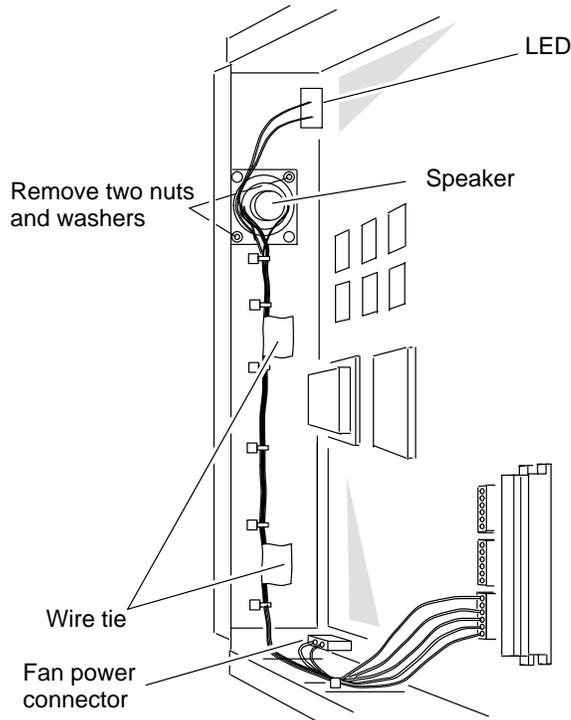
Figure 9–6   Removing the speaker

5. Detach the wiring from the plastic wire ties along the wall of the computer unit chassis (shown in Figure 9–6).

6. Disconnect the fan power cable from its connector as shown in Figure 9–7. (Figure 9–6 shows the connector at a different angle.)
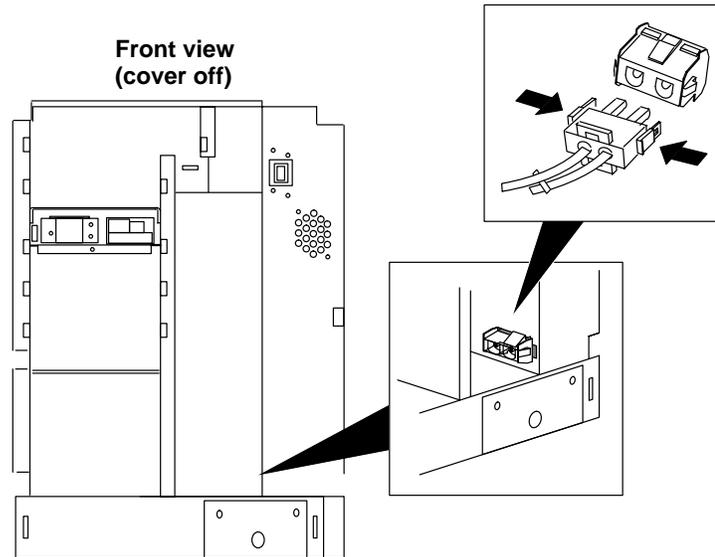
Figure 9–7   Disconnecting the fan assembly power cable

7. Using a flathead screwdriver or comparable tool, press the plastic connector tabs on the fan assembly power connector until the connector fits through the hole in the metal chassis.
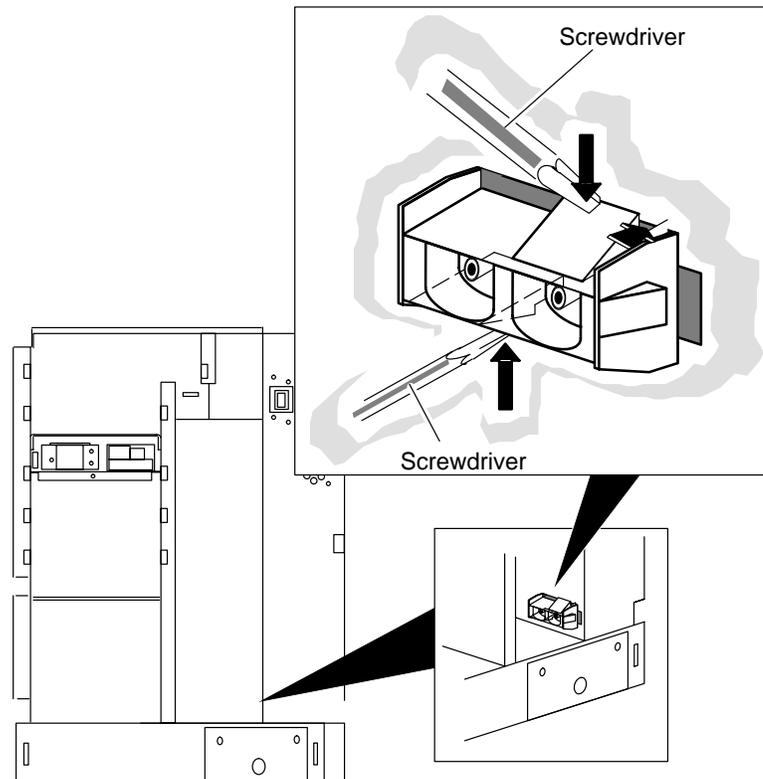
Figure 9–8   Disconnecting the fan assembly power cable and removing the connector

8. Pull the fan power supply connector out of the computer unit chassis, as seen in Figure 9–8.

9. Unplug the power supply cable for the speaker, LED, and fan from the connector on the system board, as shown in Figure 9–9.

PS2

PS3

Power supply cable for the speaker, LED, and fan
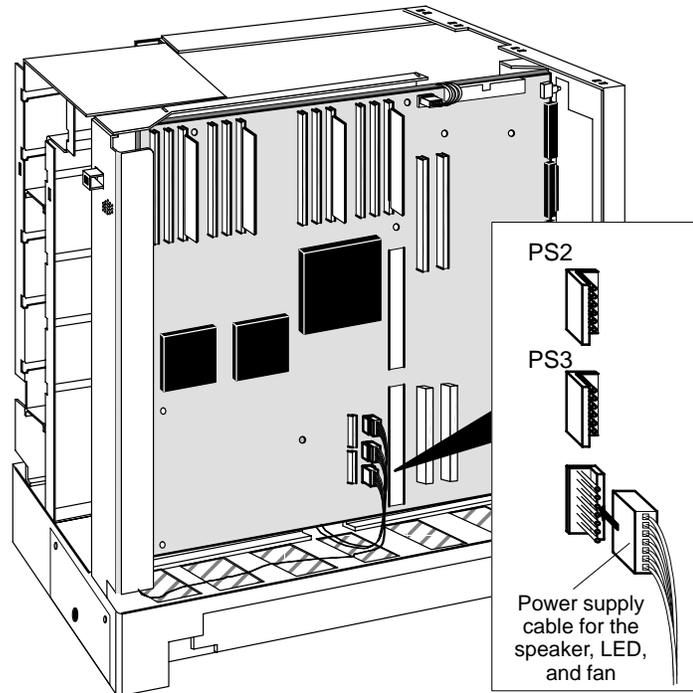
Figure 9–9   Unplugging the speaker/LED/fan power supply cable from the system board

10. Reinstall the cover as described in the section, "Opening and closing the computer unit" in Chapter 4.

After closing the computer unit, power up any storage subsystems, peripheral housing units, and other peripherals. Then start the computer unit according to the instructions in your hardware operating manual and your operating system software documentation.

Next, you should test your computer system by running the AViiON System Diagnostics as described in the *Using AViiON® Diagnostics and the AV/Alert*sm *Diagnostic Support System* manual.

End of Chapter

10 Replacing the power supply

This chapter describes how to replace a failed power supply.

WARNING: **The inside of power supply contains high voltage that can be present even after the supply is disconnected from the ac power source. Never remove the cover of the power supply or attempt to service the power supply.**

Removing the power supply

Before you can remove the power supply, power down the computer unit and remove the computer cover as described in the "Opening and closing the computer unit" section of Chapter 4.

▶ Follow these steps to remove the power supply. You will need a medium Phillips screwdriver.

1. Unplug the system board ac power cables (PS1, PS2, and PS3) from their system board connectors, shown in Figure 10–1.
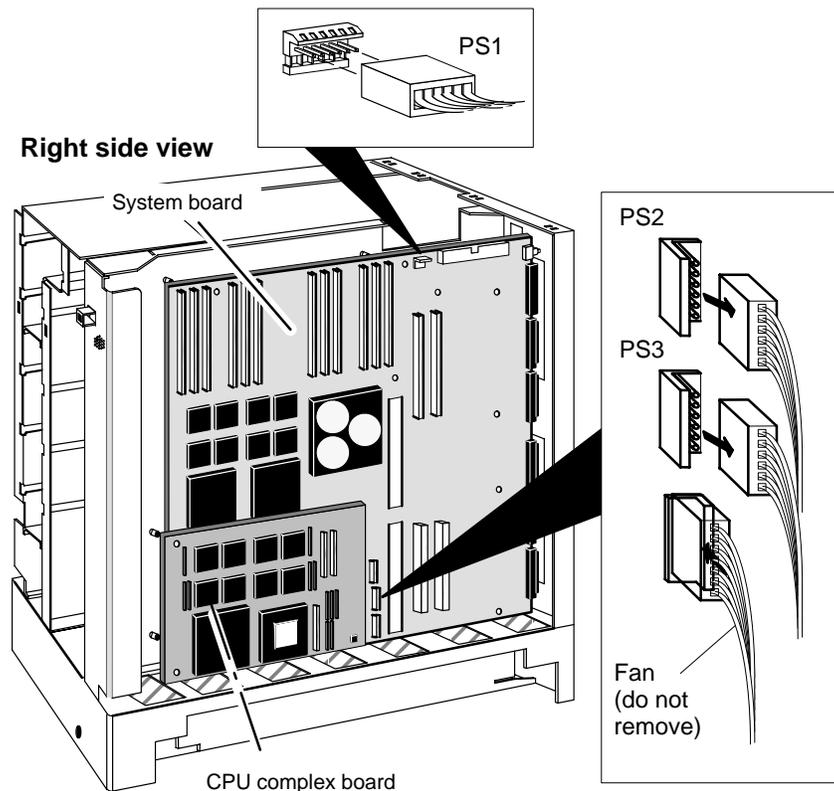
Figure 10–1 Unplugging the system board ac power power cables

CAUTION: *If your system has a CPU complex board installed, be careful not to dislodge the board while removing the power cables.*

2. Remove the power connectors from the rear of each installed disk or tape drive, as seen in Figure 10–2 (cables are numbered PS4–PS8).
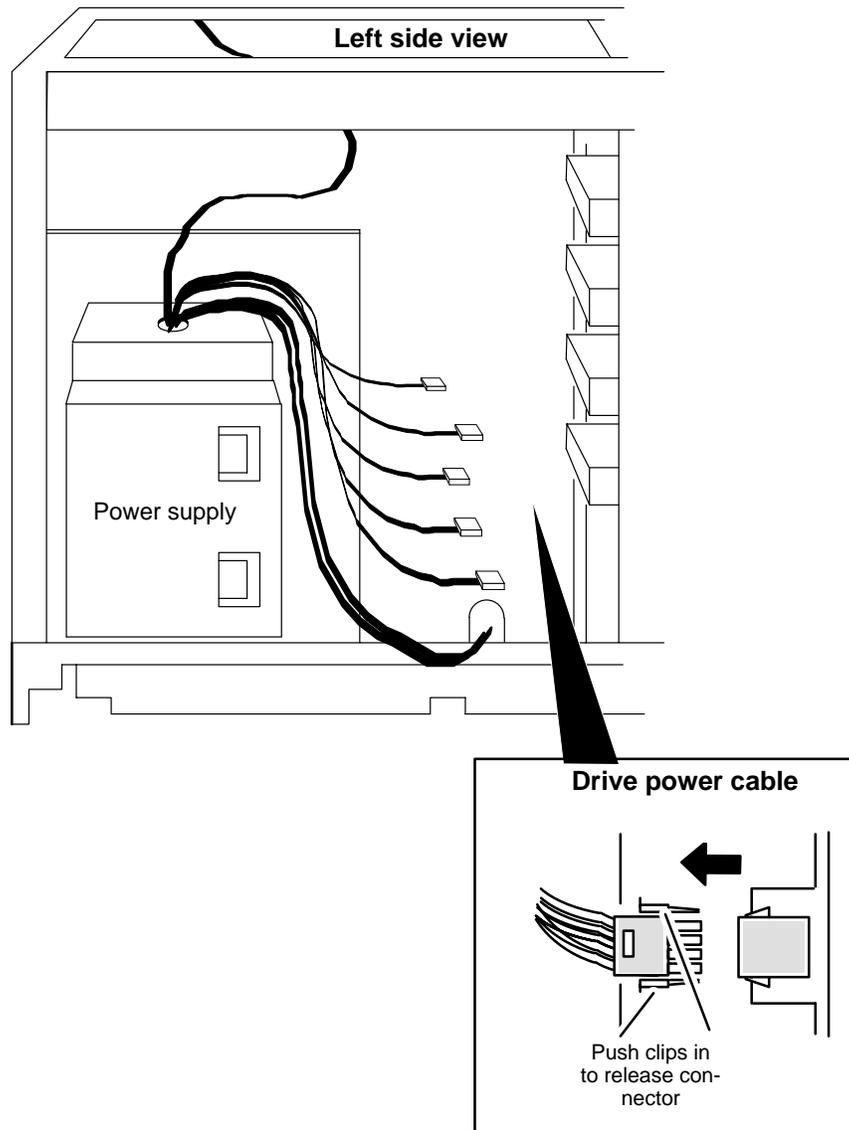
Figure 10–2 Releasing the disk and tape power connectors

3. The front panel power switch assembly is attached by power cord to the power supply. Disconnect the power switch assembly from the front of the computer chassis as follows (see in Figure 10–3):

   a. Release the ground cable.

   b. Remove the two screws that secure the power switch to the front of the computer unit.

   c. Remove the two washers and nuts that secure the safety switch to the front of the computer unit.

   d. Push the power switch assembly through its front panel cutout to free the assembly.
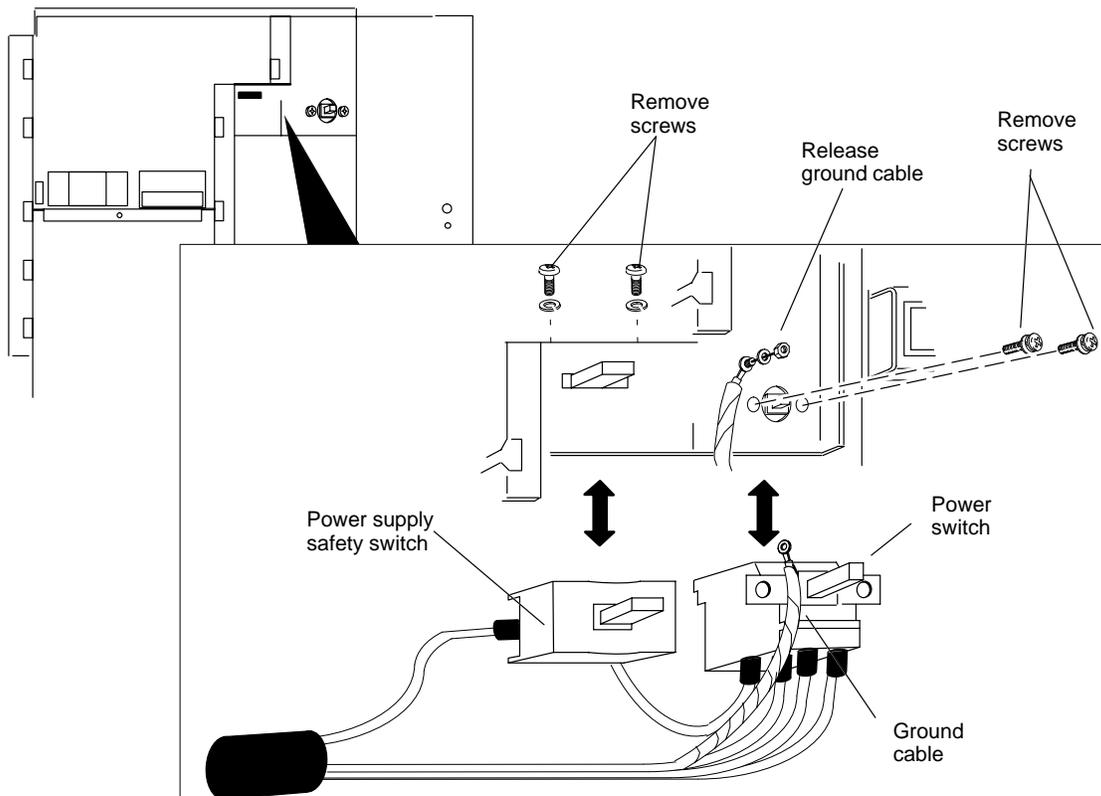
Figure 10–3 Disconnecting the front panel power switch assembly

4. Remove the four screws on the computer unit bulkhead that secure the power supply, as shown in Figure 10–4.
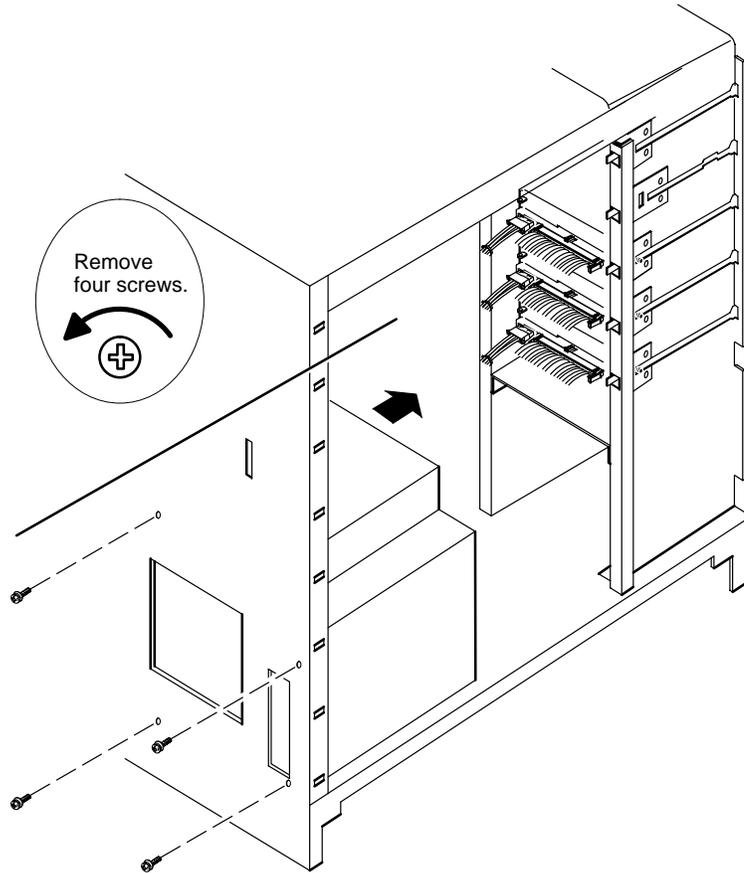
Remove
four screws.

Figure 10–4 Removing the power supply screws from the computer unit rear panel

5. Lift the power supply up and then out of the computer unit. Make sure the power cords come away from the computer unit along with the power supply.

Return the failed power supply to Data General. Contact the Customer Support Center, as described in the Preface, for information on returning the faulty part. To install the new power supply, continue to the next section, "Installing the power supply."

Installing the power supply

The steps below assume that you are working in an ESD–protected environment, and that you have removed the computer unit cover as described in Chapter 4.

▶ To install a power supply, follow these steps.

1. Carefully remove the power supply from its package. Save the packing materials to use if you have to return the power supply.

2. Insert the power supply through the left side of the computer (the side opposite the system PCB board). Position the power supply at the base of the computer unit, with its four screwholes facing the rear panel bulkhead.

3. Secure the power supply to the computer unit with its four rear panel screws, as seen in Figure 10–5.
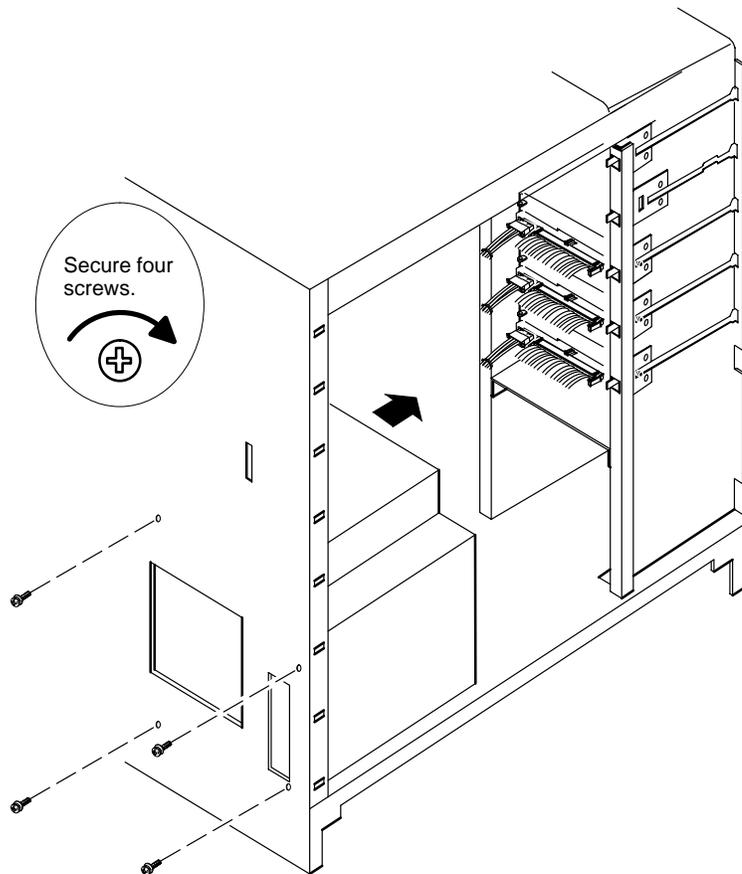
Figure 10–5 Securing the power supply to the computer unit

4. Plug in the tape/disk power cables for each installed drive, as shown in Figure 10–6.

Left side view

Power supply

Drive power cable

Push clips in to release connector
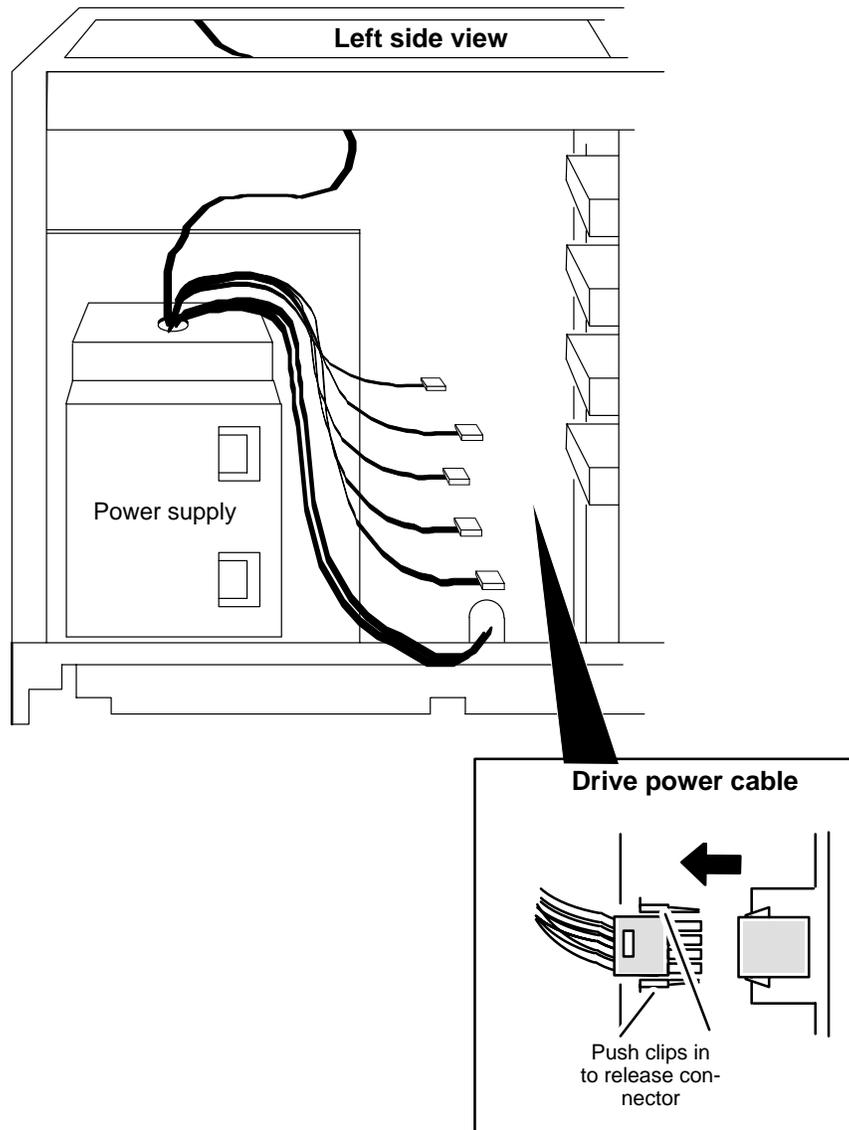
Figure 10–6 Connecting the disk and tape power connectors

5. Plug in the system board ac power cables (PS1, PS2, and PS3) to the power supply as shown in Figure 10–7.
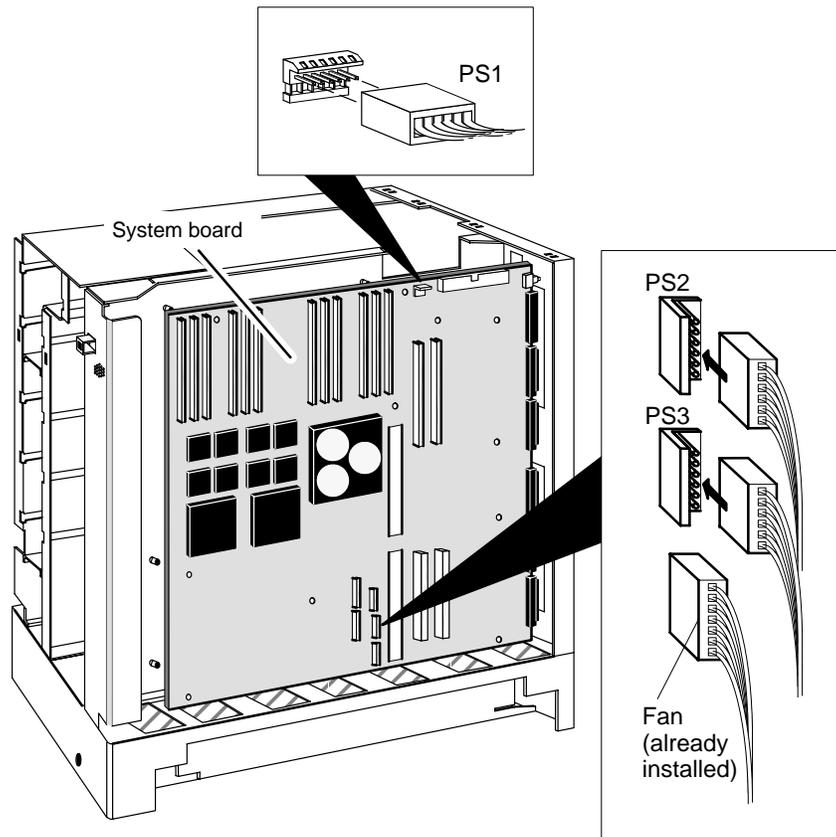
Figure 10–7   Connecting the system board ac power cables

6. Install the front panel power switch assembly as follows (see in Figure 10–8):

   a. Insert the front panel switch into its front panel cutouts.

   b. Secure the power switch by inserting two screws from the front of the computer unit and securing the screws inside the computer chassis.

   c. Install the safety switch by inserting two screws from the top of the metal chassis and securing them.

   d. Attach the ground wire.
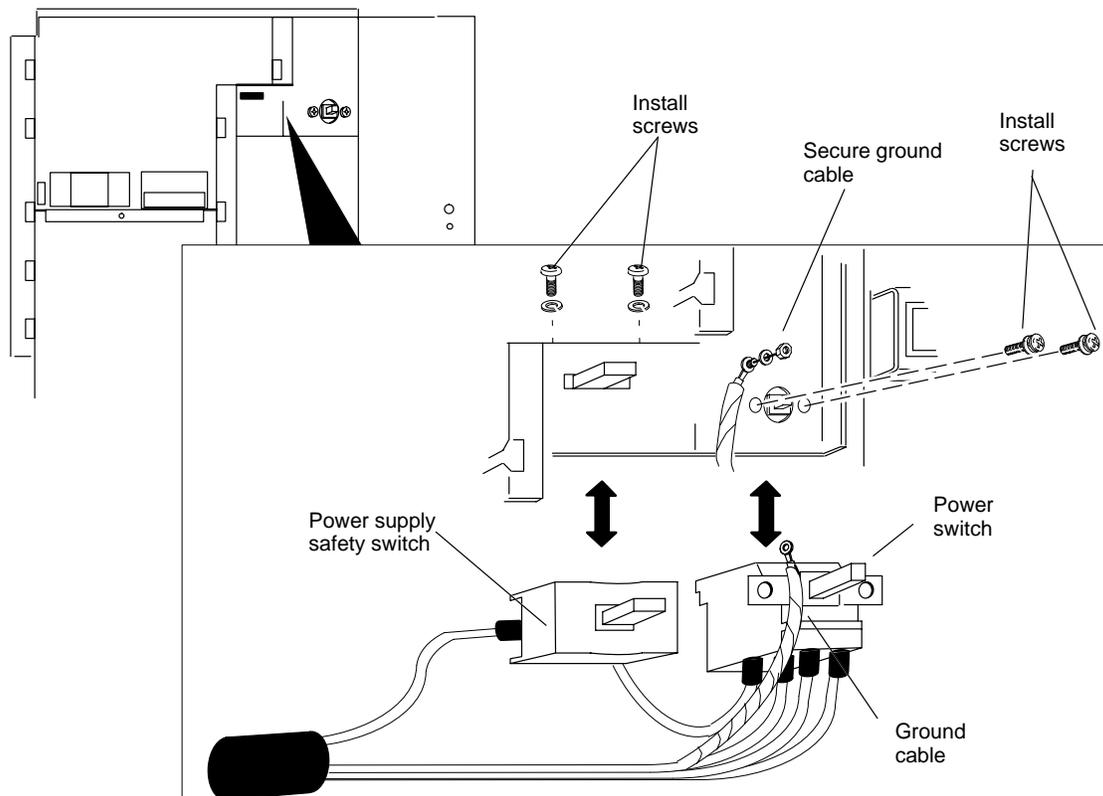
Figure 10–8 Connecting the front panel power switch assembly

7. Reinstall the side cover as described in the section, "Opening and closing the computer unit" in Chapter 4.

   After closing the computer unit, power up any storage subsystems, peripheral housing units, and other peripherals. Then start the computer unit according to the instructions in your hardware operator's manual and operating system software documentation. Next, you should test your computer system as described in the *Using AViiON® Diagnostics* manual.

End of Chapter

A Technical specifications

This appendix contains technical specifications for AViiON 5500 and 550 series computer system hardware components. The base system for either computer model consists of a deskside chassis that contains:

- System board with integrated CPU, SCSI, and LAN, components, plus integrated asynchronous, syncchronous, and parallel communications ports

- 32–256 megabytes ECC memory, in 1-3 banks of four SIMMs.

- One 326–watt power supply

- One optional CPU expansion board slot

- Two high–performance expansion bus slots

- A two–slot backpanel printed circuit board with VMEbus

AViiON 550 only

- One 8–bit (or optional 24–bit) color graphics controller.

- IBM PC AT–style keyboard

- Mouse

- 17- or 19-inch color graphics display monitor

Sections of this appendix describe the AViiON 5500 and 550 series base and optional components.

IMPORTANT: The configuration parameters included in this appendix apply to individual components; they do not consider all system variables.

System board and system bus options

This section describes the contents of the AViiON 5500 and 550 series system board and those *integrated* components that attach to the system bus on option boards.

Refer to the next section in this appendix for information about your computer system's integrated I/O ports and computer unit connectors.

System board

Printed–circuit board with side panel mounting, contains:

- One Motorola 88110 microprocessor

- One Motorola 88410 cache and memory management unit (CMMU) with 256 kilobytes cache RAM.

- One NCR single–ended SCSI controller

- One AMD 802.3 Ethernet LAN controller

- Three asynchronous serial peripheral ports (RS-232-C)

- One synchronous serial peripheral ports (RS-232-C; full-duplex)

- One parallel printer port; Centronics LPT1 compatible

Main memory

- Socket connectors for three banks of four Single In–Line Memory Modules (SIMMs) –– (4–, 16–, or 32–megabyte)

- ECC with single– and double–bit error detection, single–bit error correction

  Minimum: 32 megabytes
  Maximum: 256 megabytes

SCSI bus

Maximum of five buses per system: one integrated on system board; up to four on optional expansion I/O boards

- Each controller supports seven devices maximum (internal or external)

- Asynchronous operation mode support (5 Mbytes/s maximum)

- Synchronous operation mode support (5.5 Mbytes/s maximum)

- Integrated NCR 53C710 Small Computer System Interface (SCSI) controller

  - Single–ended interface by default

  - Maximum of five internal devices (four 3.5–inch half–height device bays and one 5.25–inch half–height bay)

- One or two optional expansion I/O boards, each adapter board contains two controllers

  - Configurable single–ended or differential SCSI interface

  - Maximum of seven external devices per bus

Expansion CPU complex board (optional)

- One 40–megahertz Motorola 88110 32–bit RISC microprocessor with integral floating–point unit
- One Motorola 88410 CMMU
- Stacked on system board with one 200–pin impedance–controlled connector

Expansion input/output board (optional)

Maximum of two (AViiON 5500 series) or one (AViiON 550 series) of the following option boards stacked on system board with two 96–pin DIN connectors

- NCR SCSI adapter board with two integrated controllers
- AMD 802.3 Ethernet LAN controller

Graphics controller board (AViiON 550 series)

One 8– or 24–bit/pixel color graphics subsystem board provides high resolution display. The following summarizes some features of both controllers:

- 32–bit wide address/data bus
- 70 Hz refresh
- 1280 x 1024 displayable resolution
- 3–color hardware cursor
- 4 Mbit video DRAMs (256K x 16)
- Stacks on system board with two 96–pin DIN connectors
- KMA (keyboard/mouse/audio) controller supports standard AT keyboard and serial mouse. NOTE: Audio input/output is NOT SUPPORTED.

8–bit controller (base system)

- 8 bits/pixel
- Bt459 RAMDAC
- 256 active colors from palette of 16.7 million
- Two overlay planes
- 3–color hardware cursor

24–bit controller

- 24 bits/pixel
- Bt463 RAMDAC
- True color display from a 16.7–million color palette
- Dynamic, per–pixel allocation of planes and visual modes
- 2–color hardware cursor

VMEbus backplane and options

This section describes the AViiON 5500 and 550 series VMEbus backplane and lists the optional devices it currently supports.

- Electrically compliant with Motorola VME specification, Revision C.1

- Sustained nonblock (single word) mode VMEbus transfer rate

  Supports maximum of two of the following 6U form factor controller or adapter boards (maximum subject to configuration–dependent power constraints).

  - VMEbus Asynchronous Controller (VAC/16)

  - VMEbus Distributed Asynchronous Host Adapter (VDA/255)

  - VMEbus Synchronous Controller (VSC/3i)

  - VMEbus Terminal Controller (VTC)

  - VMEbus Ethernet LAN Controller (VLCi)

  - VMEbus Token Ring Controller (VTRC)

  - VMEbus Fiber–Optic FDDI Controller (VFC) –– maximum one

CAUTION: *The VME card cage supplies 15 amps maximum current; your configuration must not exceed this limit. Refer to the documentation that came with your VME controllers for specifications and restrictions.*

Integrated I/O connectors and signals

This section lists the I/O connectors and signals available on the AViiON 550 and 5500 computer system and system bus option boards. For a description of VMEbus connectors and pin assignments, refer to *Setting Up and Installing VMEbus Options in AViiON® Systems.*

Asynchronous serial port connectors

Your system console, AV/Alert modem, Uninterruptible Power Supply (UPS) and other asynchronous serial devices connect to the Input /Output Controller(s) (IOC) through RS–232–C, 25–pin female DB25 connectors. These Data Communications Equipment (DCE) connectors are located at the rear of the computer unit.

Table A–1 specifies the signals for each pin in these connectors.

Table A–1   Asynchronous port signals

Pin	Signal	Direction
1	Chassis Ground (CG)	n/a
2	Transmit Data (TxD)	Out
3	Receive Data (RCD)	In
4	Request to Send (RTS)	Out
5	Clear to Send (CTS)	In
6	Data Set Ready (DSR)	In
7	Signal Ground (SG)	Both
9–19	Not used	n/a
8	Data Carrier Detect (DCD) *	Out
20 **	Data Terminal Ready (DTR)	Out
22 **	Ring Indicator (RI)	In
23–25	Not used	n/a

*   Proper terminal operation while running the DG/UX operating system requires the DCD signal pulled up (enabled) by the presence of an IOC board jumper. By default, DCD is *not* enabled to the SERVICE or RS232 B connectors.

**   not used by OP CON or RS232 A connectors

Figure A–1 illustrates pin numbers and shows the signal routing in the DB25–to–DB25 cables used to connect asynchronous devices to the AViiON 5500 and 550 series computer bulkhead.
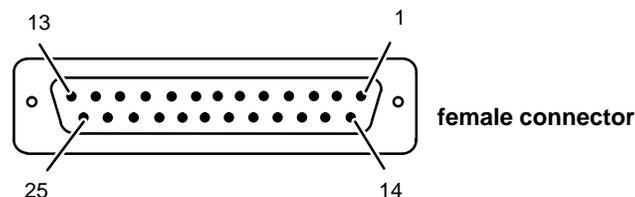
Figure A–1   Asynchronous serial connector pin numbering and cable signal routing

Synchronous serial port connector

Synchronous devices connect through the 25-pin female D–connector (DB25) located on the back of the computer unit, labeled SYNC.

Figure A–2 shows the pin numbers for the synchronous communications connector; Table A–2 lists the signals.

female connector
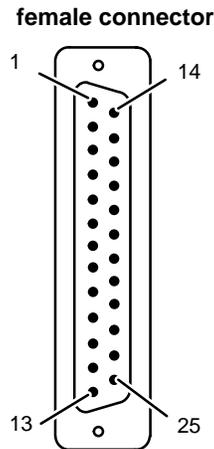
Figure A–2   Synchronous serial port connector signals

Table A–2   Synchronous (SYNC) port signals

Pin	Signal	Direction
1	Chassis Ground	n/a
2	Transmit Data (TxD)	Out
3	Receive Data (RCD)	In
4	Request to Send (RTS)	Out
5	Clear to Send (CTS)	In
6	Data Set Ready (DSR)	In
7	Signal Ground (SG)	Both
8	Data Carrier Detect (DCD)	In
15	Transmit Timing (Tx Clock)	In
17	Receive Timing (RCV Clock)	In
20	Data Terminal Ready (DTR)	Out
22	Ring Indicator (RI)	In
24	Terminal Signal Timing (SC)	Out

Parallel port connector

The I/O cable from a parallel printer connects to the system board port through a 25–pin, female D–connector (DB25) located on the back of the computer system.

Table A–3 lists the signals and pin numbers for the parallel printer connector; Figure A–3 illustrates the pin numbering and shows the 25– to 36–pin conversion accomplished by the parallel printer cable.

female connector

Parallel Printer Cable Signal Pins					
DB25 Connector	**to**	**CHAMP-36 Connector**	**DB25 Connector**	**to**	**CHAMP-36 Connector**
1 1			9 9		
2 2			10 10		
3 3			11 11		
4 4			12 12		
5 5			13 13		
6 6			15 32		
7 7			16 31		
8 8					
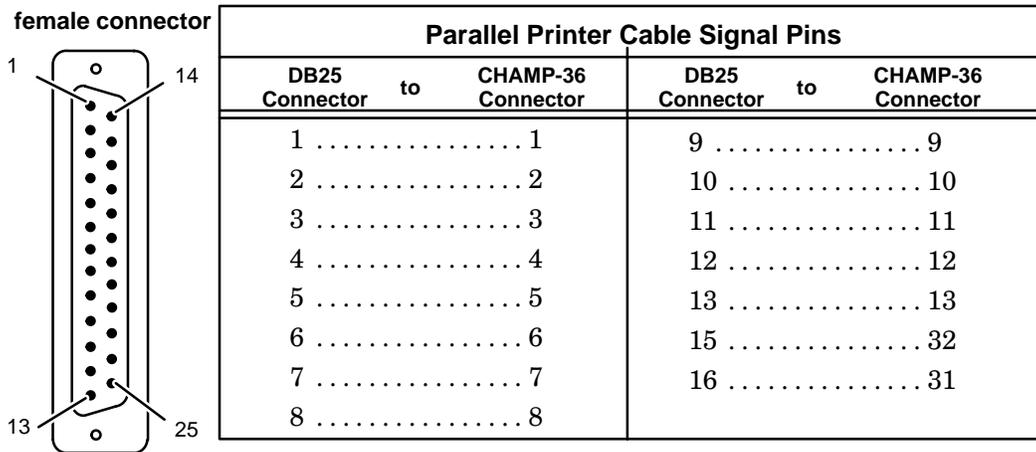
Figure A–3   Printer connector pin numbering and cable signal routing

Table A–3   Parallel printer connector pin signals

Pin	Signal
1	– Strobe
2	+ Data 0
3	+ Data 1
4	+ Data 2
5	+ Data 3
6	+ Data 4
7	+ Data 5
8	+ Data 6
9	+ Data 7
10	– Acknowledge
11	+ Busy
12	+ Paper End (out of paper)
13	+ Select (on line)

Continued

Table A–3 Parallel printer connector pin signals

Pin	Signal
14	Unused
15	– Fault (error)
16	– Reset
17	Unused
18–25	Ground

LAN connector

The rear panel of every AViiON 5500 and 550 series computer contains an external connector for the integrated Ethernet LAN. Some systems include one or two expansion LAN controller boards with a rear panel bus connector.

An attachment unit interface (AUI) cable connects the computer to an external medium attachment unit (MAU). The MAU contains the Ethernet transceiver and the medium–dependent interface (MDI) for connection to the physical network. The MAU provides electrical isolation between the AUI cable and the physical network.

You can attach the Ethernet interface via AUI cable to any one of the following types of external 10 MHz MAUs:

- 10BASE5 (Ethernet)
- 10BASE2 (Cheapernet or Thin Ethernet)
- 10BROAD36 (Ethernet over CATV)
- 10BASET (Ethernet over twisted pair)
- any 10–MHz, AUI–compatible MAU or MAU–like device that does not require the Control Out signal specified in the AUI definition.

The computer's rear panel LAN ports (integrated and expansion) contain a 15–pin, female D–connector. Figure A–4 illustrates the pin numbers for the connector.
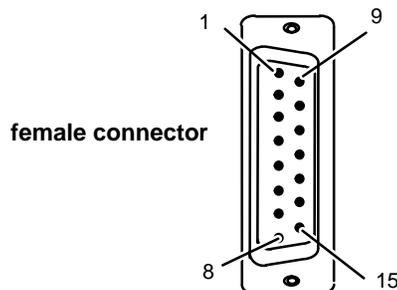
Figure A–4 LAN connector pin numbering

Table A–4 specifies the signals for the LAN connector.

Table A–4   LAN connector signals

Pin	Signal	Circuit
1	Ground	CI–S (control in shield)
2	Collision +	CI–A (control in A)
3	Transmit +	DO–A (data out A)
4	Ground	DI–S (data in shield)
5	Receive +	DI–A (data in A)
6	Ground	VC (voltage common)
7	No Connection	CO–A (control out A)
8	Ground	CO–S (control out shield)
9	Collision –	CI–B (control in B)
10	Transmit –	DO–B (data in B)
11	Ground	DO–S (data out shield)
12	Receive –	DI–B (data in B)
13	+12 V	VP (voltage plus)
14	Ground	VS (voltage shield)
15	No Connection	CO–B (control out B)
Shell	Ground	PG (protective ground)

Integrated SCSI–2 bus connector

An external connector for the integrated SCSI bus is located on the rear panel of every AViiON 5500 and 550 series computer. Some systems may include as many as four expansion SCSI buses; see the next section for information about a SCSI expansion bus connector.

The integrated SCSI–2 bus port contains a 50–position, male P&S–style connector. Figure A–5 shows the position numbering for the connector.
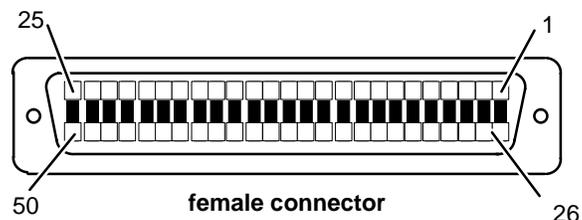
Figure A–5   SCSI connector position numbers

The SCSI bus standard describes two types of pin assignments: one for devices that use *single–ended* drivers and another for devices that use *differential* drivers. The integrated SCSI bus is configured for single–ended devices by default.

Table A–5 lists the signals for the integrated bus.

Table A–5   Integrated SCSI bus connector signals

Connector contact number	Signal
1 – 11	Ground
12	Reserved
13	TERMPWR (Termination Power)
14	Reserved
15–25	Ground
26	Data Bus 0 –DB(0)
27	Data Bus 1 –DB(1)
28	Data Bus 2 –DB(2)
29	Data Bus 3 –DB(3)
30	Data Bus 4 –DB(4)
31	Data Bus 5 –DB(5)
32	Data Bus 6 –DB(6)
33	Data Bus 7 –DB(7)
34	Data Bus P –DB(P)
35	Ground
36	Ground
37	Reserved
38	TERMPWR (Termination Power)
39	Reserved
40	Ground
41	–ATN (Attention)
42	Ground
43	–BSY (Busy)
44	–ACK (Acknowledge)
45	–RST (Reset)
46	–MSG (Message)
47	–SEL (Select)
48	–C/D (Control/Data)
49	–REQ (Request)
50	–I/O (Input/Output)

SCSI–2 expansion bus connectors

Each expansion SCSI controller contains two rear panel bus connectors. Systems may include one to four expansion SCSI buses.

The rear panel expansion SCSI–2 bus ports contain 68–position, male P&S–style connectors. Figure A–5 shows the position numbering for the SCSI expansion connectors.
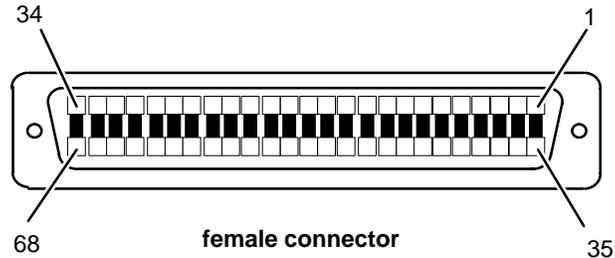
Figure A–6   SCSI expansion bus connector position numbers

The SCSI bus standard describes two types of pin assignments: one for devices that use *single–ended* drivers and another for devices that use *differential* drivers. Your expansion buses may be configured for either singled–ended or differential operation.

Table A–6 lists both the single–ended and differential connector signals for AViiON 5500 and 550 series expansion buses.

Table A–6   Expansion SCSI bus connector signals

Contact number	Signal (Single–ended)	Signal (Differential)
1	Ground	+DB(12)
2	Ground	+DB(13)
3	Ground	+DB(14)
4	Ground	+DB(15)
5	Ground	+DB(P1)
6	Ground	GROUND
7	Ground	+DB(0)
8	Ground	+DB(1)
9	Ground	+DB(2)
10	Ground	+DB(3)
11	Ground	+DB(4)
12	Ground	+DB(5)
13	Ground	+DB(6)
14	Ground	+DB(7)

Continued

Table A–6   Expansion SCSI bus connector signals

Contact number	Signal (Single–ended)	Signal (Differential)
15	Ground	+DB(P)
16	Ground	DIFFSENS
17	TERMPWR	TERMPWR
18	TERMPWR	TERMPWR
19	Ground	RESERVED
20	Ground	+ATN
21	Ground	Ground
22	Ground	+BSY (high Busy)
23	Ground	+ACK (high Acknowledge)
24	Ground	+RST (high Reset)
25	Ground	+MSG (high Message)
26	Ground	+SEL (high Select)
27	Ground	+C/D (high Control/Data)
28	Ground	+REQ (high Request)
29	Ground	+I/O (high Input/Output)
30	Ground	GROUND
31	Ground	+DB(8)
32	Ground	+DB(9)
33	Ground	+DB(10)
34	Ground	+DB(11)
35	–DB(12)	–DB(12)
36	–DB(13)	–DB(13)
37	–DB(14)	–DB(14)
38	–DB(15)	–DB(15)
39	–DB(P1)	–DB(P1)
40	–DB(0)	GROUND
41	–DB(1)	–DB(0)
42	–DB(2)	–DB(1)
43	–DB(3)	–DB(2)
44	–DB(4)	–DB(3)
45	–DB(5)	–DB(4)
46	–DB(6)	–DB(5)
47	–DB(7)	–DB(6)
48	–DB(P)	–DB(7)
49	GROUND	–DB(P)
50	GROUND	GROUND

Continued

A-12

Table A–6   Expansion SCSI bus connector signals

Contact number	Signal (Single–ended)	Signal (Differential)
51	TERMPWR	TERMPWR
52	TERMPWR	TERMPWR
53	RESERVED	RESERVED
54	GROUND	–ATN
55	–ATN	GROUND
56	GROUND	–BSY
57	–BSY	–ACK
58	–ACK	–RST
59	–RST	–MSG
60	–MSG	–SEL
61	–SEL	–C/D
62	–C/D	–REQ
63	–REQ	–I/O
64	–I/0	GROUND
65	–DB(8)	–DB(8)
66	–DB(9)	–DB(9)
67	–DB(10)	–DB(10)
68	–DB(11)	–DB(11)

Workstation peripherals specifications (AViiON 550 series)

This section provides specifications for the display monitor, keyboard, and mouse included with AViiON 550 workstations.

For specifications of the internal graphics controllers boards in AViiON 550 workstations, refer to the "System board and system bus options" section earlier in this appendix.

Keyboard

101/102–key IBM PC AT style

Available versions: Danish, French, French/Canadian, German, Italian, Japanese, Norwegian, Spanish, Swedish/Finnish, Swiss, United Kingdom, and United States.

The keyboard cable includes a 5–pin DIN connector that plugs into the AViiON 550 series computer system through an 8–pin DIN connector located on the rear of the computer unit.

Both the 8– and 24–bit graphics controller contain an 8–pin female DIN connector that extends to the computer unit rear panel bulkhead.

Table A–7 lists the signals for the keyboard connector, and Figure A–7 shows the pin numbers for the keyboard and connector.

Table A–7   Keyboard connector signals

Pin	Signal
1	Clock
2	Data
3	Unused
4	Ground
5	+5 V
6	Unused
7	Unused
8	Unused
Shell	Ground
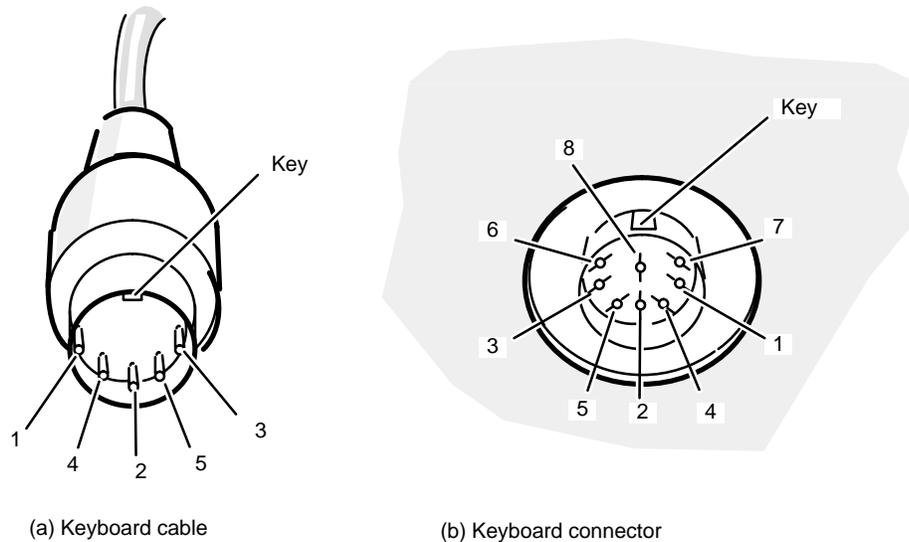
Figure A–7   Keyboard connector and cable pin numbering

Mouse

- 3.75 x 2.5 inches (9.5 x 5 cm)

- Three momentary switches with tactile and audible feedback

- Compatible with EIA RS-232-C interface;
  1200–baud asynchronous serial

- Uses power from RS-232-C interface

- Maximum current 15 milliamps
  Maximum voltage +/–13.2 volts ac

- 1000 miles (621.4 km)

Both the 8– and 24–bit graphics controller contain a 9–pin male DSUB connector that extends to the AViiON 550 series computer unit rear panel bulkhead.

Table A–8 lists the signals for the mouse connector, and Figure A–8 shows the pin numbers for the connector.
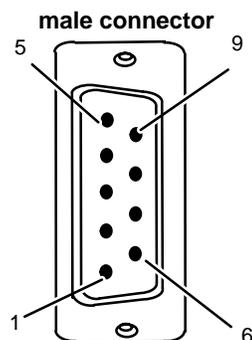
Figure A–8   Mouse DB9 connector and cable pin numbering

A-15

Table A–8   Mouse connector signals

Pin	Signal
1	Unused
2	Data In
3	Data Out
4	+12 V
5	Ground
6	Unused
7	Ground
8	Unused
9	Unused

Graphics I/O connector

Both the 8– and 24–bit graphics controller contain a single–piece 13W3 DB10/3 COAX female video connector to the computer unit rear panel bulkhead.

Table A–9 lists the RGB pin signals. Figure A–9 illlustrates the connector pins.

Table A–9   Graphics display connector signals

Pin	Signal
A1	Red
A2	Green
A3	Blue

female connector
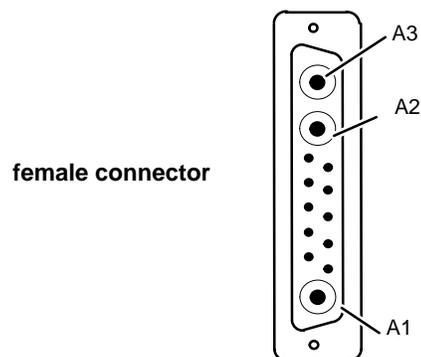
Figure A–9   Graphics controller connector

17–inch color monitor

Dimensions:	42.5 cm high (16.8 inches)
	41.3 cm wide (16.3 inches)
	43.5 cm deep (17.1 inches)
Weight	18.5 kg (40.8 pounds), including swivel base
CRT	43 cm (17 inches) diagonal measure
	Invar shadow mask, .28 mm dot pitch maximum
	90 degree, in–line gun
	Silica–coated anti–reflective/anti–static treated
Screen refresh	70 hertz, flicker–free

Display resolution	*Horizontal*	1280 pixels (dots)
	Vertical	1024 pixels (lines)

Input signal	RS–343 compatible composite
	R, G, B analog; sync on green
	75 ohms, 15pf for R and B signal
	75 ohms, 20pf for G signal

Signal timing	*Pixel*	Frequency	125 megahertz
		Clock	8 nS
	Horizontal	Frequency	75.12 kilohertz
		Line	13.312 uS (1664 dot)
		Front Porch	0.512 uS (64 dots)
		Sync Width	1.024 uS (128 dots)
		Back Porch	1.536 uS (192 dots)
		Active Time	10.240 uS (1280 dot)
	Vertical	Frequency	70.14 hertz
		Frame	14.257 ms (1071 hz)
		Front Porch	0.013 ms (1 hz)
		Sync Width	0.053 ms (4 hz)
		Back Porch	0.559 ms (42 hz)
		Active Time	13.631 ms (1024 hz)

Power	90 – 264 volts ac input	50/60 hertz
	2.3 A maximum input current	
	120 watts maximum consumption	

Connectors	Approved IEC connector CEE23.	
	Signal input	3 BNC (R, G, B)
	Power input	3–pin, CEE–22

19–inch color monitor

Dimensions:	45.3 cm high (17.8 inches)		
	47.1 cm wide (18.5 inches)		
	49.4 cm deep (19.4 inches)		

Weight	55 pounds, (25 kg)

CRT	50 cm (20 inches) diagonal measure
	90 degree, MPF–DAF gun
	Invar shadow mask, .28mm dot pitch maximum.
	Silica–coated anti–glare, anti–reflective, anti–static

Screen refresh rate	70 hertz, flicker–free

Display resolution	*Horizontal*	1280 pixels (dots)
	Vertical	1024 pixels (lines)

Input signal	Analog video (RS343–A) 0.7Vpp
	R, G, B analog; sync on green

Signal timing	*Pixel*	Frequency	125 megahertz
	Horizontal	Frequency	75.12 kilohertz
		Period	13.312 uS (1664 cl)
		Front Porch	0.512 uS (64 cl)
		Sync Width	1.024 uS (128 cl)
		Back Porch	1.536 uS (192 cl)
		Blanking Time	3.072 uS (384 cl)
		Display Time	10.240 uS (1280 cl)
	Vertical	Frequency	70.14 kilohertz
		Period	14.257 ms (1071 hz)
		Front Porch	0.013 ms (1 hertz)
		Sync Width	0.053 ms (4 hertz)
		Back Porch	0.559 ms (42 hertz)
		Blanking Time	0.626 ms (47 hertz)
		Display Time	13.631 ms (1024 hz)

Power	90 – 264 volts ac input	50/60 hertz
	3.0 A maximum input current	
	150 watts maximum consumption	

Connectors	Signal input	3 BNC (R, G, B)
	Power input	3–pin, CEE–22

Physical and environmental specifications

This section contains physical specifications and environmental requirements for the operation and storage of AViiON 5500 and 550 series deskside computer systems.

These models satisfy FCC Class A, VCCI Class 1, UL 1950, CSA 950 and IEC 950/EN 60950, CISPR 22/EN55022 Class A, UDE Class A, and TUV standards.

Temperature

Operating: 50° through 100.4° F; 10° through 38° C

Storage: −40° through +149° F; −40° through +65° C

Heat dissipation

2080 BTU/hour, maximum

Relative humidity

Operating: 20–80%, noncondensing

Storage: 10–90%, noncondensing

Altitude

Operating: 0–8000 feet; 0–2438 meters

Storage: 0–25000 feet; 0–7620 meters

Ambient noise

Operating: 50 decibels

Idle: 0–40 decibels (Quiet Office rating)

Power subsystem specifications

This section contains specifications for the power subsystem.

Ac input line

Frequency:	47 through 63 hertz, single phase	
Voltage options:	120 volts ac, +15 percent, −15 percent	
	220/240 volts ac, +10 percent, −15 percent	
Maximum current:	110/120 Vac	6.5 amperes
	220/240 Vac	3.25 amperes

Ac output line

Maximum current:	110/120 Vac	2 amperes
	220/240 Vac	1 ampere

Dc power output

Output power 396 watts

45 amperes +5V dc maximum
13 amperes +12V dc maximum
 1 ampere −12V dc maximum
 .5 ampere −5V dc maximum

End of Appendix

B Customer Replaceable Units (CRUs)

Your AViiON 5500 or 550 series computer contains several components called *customer replaceable units* (CRUs). CRUs are subassemblies that you can remove and install.

Table B–1 lists CRUs you can order from Data General.

CAUTION: *Before attempting to replace or add an internal CRU, always read the "Avoiding electrostatic discharge (ESD) damage" section in Chapter 4 so that you do not damage the CRU.*

Table B–1   AViiON 5500 and 550 CRUs

Customer Replaceable Unit	DGC Part Number
CPU expansion option (2nd CPU board)	005–039613
Drives, internal (half–height)	
520–Mbyte disk	118–15462
1-Gbyte disk	118–16263
2-Gbyte disk	118–15789
1.44-Mbyte diskette	118–16580
2-Gbyte DAT	118–10958
Ethernet LAN expansion option board	005–039489
Front panel LED/speaker assembly	005–040101
Fan assembly	005–040111
Graphics board (AViiON 550)	
8-bit controller (standard configuration)	005–040397
24–bit controller	005–039611
Keyboard (AViiON 550)	
French	007–004706
German	007–004707
Italian	007–004831
Japanese	007–005201
Spanish	007–004833
Swedish/Finnish	007–004708
Swiss	007–004830
United Kingdom	007–004709
United States	007–003578
Memory modules	
4-megabyte SIMM	116–003453
16-megabyte SIMM	116–005306
32-megabyte SIMM	116–006209

Continued

Table B–1   AViiON 5500 and 550 CRUs

Customer Replaceable Unit	DGC Part Number
Monitor, color (AViiON 550)	
17-inch color	118–014491
19-inch color	118–016094
BNC cable	118–017552
Mouse, 3–button (AViiON 550)	118–015965
Power cord (computer unit and monitor)	
U.S./Canada/Japan (120 V ac) computer unit	109–000996
U.S./Canada/Japan (120 V ac) monitor	109–000249
Australia (240 V ac)	109–000809
Denmark (220 V ac)	109–000815
Europe [1] (220 V ac)	109–000812
Italy (220 V ac)	109–000811
Switzerland (220 V ac)	109–000810
United Kingdom [2] (240 V ac)	109–000813
Power supply assembly	118–014768
SCSI–2 bus cable, internal	005–040100
SCSI–2 bus terminator	111–003468
SCSI expansion board	005–039782
Speaker/LED assembly	005–040101
System board assembly	005–039489
VME backplane	005–034272

End of Appendix

Index

Within the index, a range of page numbers indicates that the reference spans those pages.

R

rear panel connectors
    AViiON 550, 1-10
    AViiON 5500, 1-9

related manuals, vi

removing
    cover from computer unit, 4-7–4-9
    CPU expansion board, 6-2–6-3
    drive assembly, 5-3–5-4
    fan assembly, 9-1–9-2
    LAN expansion controller, 6-5–6-7
    memory modules, 6-5–6-6
    power supply, 10-1–10-4
    PROM component from system board, 8-5
    SCSI controller (external), 6-5–6-7
    system board, 8-2–8-5

replacing
    cartridge tape drives, 5-1–5-9
    CD-ROM drives, 5-1–5-9
    CPU expansion board, 6-1–6-4
    disk drives, 5-1–5-9
    diskette drives, 5-1–5-9
    fan assembly, 9-1–9-4
    graphics board, (AViiON 550), 6-15–6-22
    I/O expansion board, 6-5–6-22
    LAN expansion controller, 6-5–6-7
    memory modules, 6-1–6-8
    power supply, 10-1–10-4
    SCSI controller, 6-5–6-7
    speaker/LED assembly, 9-5–9-8

requirements
    documentation and media, 1-16
    electrical, A-20
    environmental, A-19

RGB, pin signals, A-16

routine maintenence, 4-3

RS-232, cable and connector
    specifications
    asynchronous, A-5
    synchronous, A-6

RS–232, connectors, 2-11

S

SCSI bus
    cable
        connecting to expansion bus, 3-12
        connecting to integrated bus, 3-11
        connecting to the computer unit, 2-17
    cable lengths, 3-4–3-5
    configuration rules, 3-5
    configuration worksheet
        blank, 3-17–3-18
        sample expansion buses, 3-16
        sample integrated bus, 3-15
    device identification, 3-5
    differential, configuring controller, 6-10
    dual initiated, 3-5, 3-7
    expansion
        external cable, 3-9–3-13
        installing, 3-9–3-13
    external, connecting devices, 3-9–3-13
    integrated, connecting devices, 2-16–2-18
    planning, 3-4–3-8
    rear panel connectors, 1-7–1-10
    sample configuration, 3-14
    single–ended, configuring controller, 6-10
    speed, 3-4
    terminology, 3-2
SCSI bus connector
    pin numbers
        expansion bus, A-11–A-14
        integrated bus, A-9–A-10
    signals
        differential, A-11
        expansion bus, A-11–A-14
        integrated bus, A-9–A-10
        single–ended, A-11
SCSI expansion board
    configuring, 6-10
    installing, 6-8–6-22
    removing, 6-5–6-7
serial ports
    pin numbers, A-5
    rear panel connectors, 1-7–1-10
        CONSOLE, 2-3
        RS-232-C, 2-10–2-12
        SERVICE, 2-10–2-12
        SYNC, 2-13
    RS-232 signals, A-5, A-6
    signals
        asynchronous, A-5
        synchronous, A-6

TIPS ORDERING PROCEDURES

TO ORDER

1. An order for documentation can be placed with the Technical Information and Publications Services (TIPS) in three ways:

   a. Mail Order – Use the order form on the opposite page and fill in all requested information. Be sure to include shipping charges and local sales tax. If applicable, write in your tax exempt number in the space provided on the order form. Send your order form with payment to:

   > Data General Corporation
   > ATTN: Educational Services/TIPS A131
   > 4400 Computer Drive
   > Westboro, MA 01581–9973

   b. Telephone – Call TIPS at 1–800–343–8842, Option #4, for all orders that will be charged by credit card or paid for by purchase orders over $50.00. Training representatives are available from 8:30 AM to 5:00 PM EST.

   c. Fax – You can fax your order to (508) 898–4244 for quick, convenient service.

METHOD OF PAYMENT

2. As a customer, you have several payment options:

   a. Purchase Order – Minimum of $50. If ordering by mail, a hard copy of the purchase order must accompany order.

   b. Check or Money Order – Make payable to Data General Corporation.

   c. Credit Card – A minimum order of $20 is required for MasterCard or Visa orders.

SHIPPING

3. To determine the charge for UPS shipping and handling, check the total quantity of units in your order and refer to the following chart:

Total Quantity	Shipping & Handling Charge	
	UPS	Airborne (Overnight)
1–5 Items	$5.00	$15.00
6–10 Items	$10.00	$25.00
11–40 Items	$15.00	$35.00
41–100 Items	$50.00	$70.00
Over 100 Items	$100.00	Call for price

VOLUME DISCOUNTS

4. The TIPS discount schedule is based upon the total value of the order. This schedule does not apply to Maintenance Service Guides and Maintenance Documentation Packages (MDPs).

Order Amount	Discount
$500–$999.99	10%
Over $1000.00	20%

TERMS AND CONDITIONS

5. Read the TIPS terms and conditions on the reverse side of the order form carefully. These must be adhered to at all times.

DELIVERY

6. Allow at least two weeks for delivery.

RETURNS

7. Items ordered through the TIPS catalog may not be returned for credit.

8. Order discrepancies must be reported within 15 days of shipment date. Contact your TIPS Administrator at 1–800–343–8842, Option #4, to notify the TIPS department of any problems.

INTERNATIONAL ORDERS

9. Customers outside of the United States must obtain documentation from their local Data General Subsidiary or Representative. Any TIPS orders received by Data General U.S. Headquarters will be forwarded to the appropriate DG Subsidiary or Representative for processing. Canadian customers should call 1–800–565–3583.

TIPS ORDER FORM

Mail To: Data General Corporation
                Attn: Educational Services/TIPS A131
                4400 Computer Drive
                Westboro, MA 01581 - 9973

BILL TO:	SHIP TO: (No P.O. Boxes - Complete Only If Different Address)
COMPANY NAME_____	COMPANY NAME_____
ATTN:_____	ATTN:_____
ADDRESS_____	ADDRESS (NO PO BOXES)_____
CITY_____	CITY_____
STATE_____ ZIP_____	STATE_____ ZIP_____

Priority Code _____ (See label on back of catalog)

_____   _____   _____   _____   _____
Authorized Signature of Buyer   Title   Date   Phone (Area Code)   Ext.
(Agrees to terms & conditions on reverse side)

ORDER #	QTY	DESCRIPTION	UNIT PRICE	TOTAL PRICE

A	SHIPPING & HANDLING

Check Shipping Method   ☐ UPS   ☐ Airborne (Overnight)

# of ITEMS	ADD	ADD
1–5 Items	$5.00	$15.00
6–10 Items	$10.00	$25.00
11–40 Items	$15.00	$35.00
41–100 Items	$50.00	$70.00
100+ Items	$100.00	*Call for Charges

These rates apply to 48 contiguous states.

B	VOLUME DISCOUNTS*

Order Amount	Save
$500.00–$999.99	10%
Over $1000.00	20%

Tax Exempt # or Sales Tax
(if applicable)

_____

ORDER TOTAL	
Less Discount See B	–
SUBTOTAL	
Your local** sales tax	+
Shipping and handling – See A	+
TOTAL – See C	

C	PAYMENT METHOD

☐ Purchase Order Attached ($50 minimum)
     P.O. number is_____. (Include hardcopy P.O.)
☐ Check or Money Order Enclosed
☐ Visa   ☐ MasterCard   ($20 minimum on credit cards)

Account Number   Expiration Date

_____
Authorized Signature
(Credit card orders without signature and expiration date cannot be processed.)

THANK YOU FOR YOUR ORDER

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.
PLEASE ALLOW 2 WEEKS FOR DELIVERY.
NO REFUNDS NO RETURNS.

*   Does not apply to maintenance documentation.

**   Data General is required by law to collect applicable sales or use tax on all purchases shipped to states where DG maintains a place of business, which covers all 50 states. Please include your local taxes when determining the total value of your order. If you are uncertain about the correct tax amount, please call 1–800–343–8842.

DATA GENERAL CORPORATION
TECHNICAL INFORMATION AND PUBLICATIONS SERVICE

TERMS AND CONDITIONS

Data General Corporation ("DGC") provides its Technical Information and Publications Service (TIPS) solely in accordance with the following terms and conditions and more specifically to the Customer signing the Educational Services TIPS Order Form. These terms and conditions apply to all orders, telephone, telex, or mail. By accepting these products the Customer accepts and agrees to be bound by these terms and conditions.

1. CUSTOMER CERTIFICATION
Customer hereby certifies that it is the owner or lessee of the DGC equipment and/or licensee/sub–licensee of the software which is the subject matter of the publication(s) ordered hereunder.

2. TAXES
Customer shall be responsible for all taxes, including taxes paid or payable by DGC for products or services supplied under this Agreement, exclusive of taxes based on DGC's net income, unless Customer provides written proof of exemption.

3. DATA AND PROPRIETARY RIGHTS
Portions of the publications and materials supplied under this Agreement are proprietary and will be so marked. Customer shall abide by such markings. DGC retains for itself exclusively all proprietary rights (including manufacturing rights) in and to all designs, engineering details and other data pertaining to the products described in such publication. Licensed software materials are provided pursuant to the terms and conditions of the Program License Agreement (PLA) between the Customer and DGC and such PLA is made a part of and incorporated into this Agreement by reference. A copyright notice on any data by itself does not constitute or evidence a publication or public disclosure.

4. LIMITED MEDIA WARRANTY
DGC warrants the CLI Macros media, provided by DGC to the Customer under this Agreement, against physical defects for a period of ninety (90) days from the date of shipment by DGC. DGC will replace defective media at no charge to you, provided it is returned postage prepaid to DGC within the ninety (90) day warranty period. This shall be your exclusive remedy and DGC's sole obligation and liability for defective media. This limited media warranty does not apply if the media has been damaged by accident, abuse or misuse.

5. DISCLAIMER OF WARRANTY
EXCEPT FOR THE LIMITED MEDIA WARRANTY NOTED ABOVE, DGC MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ON ANY OF THE PUBLICATIONS, CLI MACROS OR MATERIALS SUPPLIED HEREUNDER.

6. LIMITATION OF LIABILITY
A. CUSTOMER AGREES THAT DGC'S LIABILITY, IF ANY, FOR DAMAGES, INCLUDING BUT NOT LIMITED TO LIABILITY ARISING OUT OF CONTRACT, NEGLIGENCE, STRICT LIABILITY IN TORT OR WARRANTY SHALL NOT EXCEED THE CHARGES PAID BY CUSTOMER FOR THE PARTICULAR PUBLICATION OR CLI MACRO INVOLVED. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO CLAIMS FOR PERSONAL INJURY CAUSED SOLELY BY DGC'S NEGLIGENCE. OTHER THAN THE CHARGES REFERENCED HEREIN, IN NO EVENT SHALL DGC BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS AND DAMAGES RESULTING FROM LOSS OF USE, OR LOST DATA, OR DELIVERY DELAYS, EVEN IF DGC HAS BEEN ADVISED, KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY THEREOF; OR FOR ANY CLAIM BY ANY THIRD PARTY.

B. ANY ACTION AGAINST DGC MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE CAUSE OF ACTION ACCRUES.

7. GENERAL
A valid contract binding upon DGC will come into being only at the time of DGC's acceptance of the referenced Educational Services Order Form. Such contract is governed by the laws of the Commonwealth of Massachusetts, excluding its conflict of law rules. Such contract is not assignable. These terms and conditions constitute the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior oral or written communications, agreements and understandings. These terms and conditions shall prevail notwithstanding any different, conflicting or additional terms and conditions which may appear on any order submitted by Customer. DGC hereby rejects all such different, conflicting, or additional terms.

8. IMPORTANT NOTICE REGARDING AOS/VS INTERNALS SERIES (ORDER #1865 & #1875)
Customer understands that information and material presented in the AOS/VS Internals Series documents may be specific to a particular revision of the product. Consequently user programs or systems based on this information and material may be revision–locked and may not function properly with prior or future revisions of the product. Therefore, Data General makes no representations as to the utility of this information and material beyond the current revision level which is the subject of the manual. Any use thereof by you or your company is at your own risk. Data General disclaims any liability arising from any such use and I and my company (Customer) hold Data General completely harmless therefrom.

Installing,
Expanding, and
Maintaining AViiON®
5500 and 550 Series
Computers

014–002250–01

Cut here and insert in binder spine pocket