



Data General Corporation, Westboro, Massachusetts 01580

---

Customer Documentation

**Installing, Starting,  
Expanding, and Maintaining  
AViiON<sup>®</sup> Computer Systems:  
410, 412, 4100, and 4300 Series**

014-002083-02

**A V i i O N<sup>®</sup>**  
P R O D U C T L I N E



**Installing, Starting, Expanding,  
and Maintaining  
AViiON<sup>®</sup> Computer Systems:  
410, 412, 4100, and 4300 Series**

014-002083-02

Ordering No. 014-002083  
Copyright ©Data General Corporation, 1991, 1992  
All Rights Reserved  
Printed in the United States of America  
Rev. 02, May 1992

# Notice

DATA GENERAL CORPORATION (DGC) HAS PREPARED THIS DOCUMENT FOR USE BY DGC PERSONNEL, CUSTOMERS, AND PROSPECTIVE CUSTOMERS. THE INFORMATION CONTAINED HEREIN SHALL NOT BE REPRODUCED IN WHOLE OR IN PART WITHOUT DGC'S PRIOR WRITTEN APPROVAL.

DGC reserves the right to make changes in specifications and other information contained in this document without prior notice, and the reader should in all cases consult DGC to determine whether any such changes have been made.

THE TERMS AND CONDITIONS GOVERNING THE SALE OF DGC HARDWARE PRODUCTS AND THE LICENSING OF DGC SOFTWARE CONSIST SOLELY OF THOSE SET FORTH IN THE WRITTEN CONTRACTS BETWEEN DGC AND ITS CUSTOMERS. NO REPRESENTATION OR OTHER AFFIRMATION OF FACT CONTAINED IN THIS DOCUMENT INCLUDING BUT NOT LIMITED TO STATEMENTS REGARDING CAPACITY, RESPONSE-TIME PERFORMANCE, SUITABILITY FOR USE OR PERFORMANCE OF PRODUCTS DESCRIBED HEREIN SHALL BE DEEMED TO BE A WARRANTY BY DGC FOR ANY PURPOSE, OR GIVE RISE TO ANY LIABILITY OF DGC WHATSOEVER.

IN NO EVENT SHALL DGC BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES WHATSOEVER (INCLUDING BUT NOT LIMITED TO LOST PROFITS) ARISING OUT OF OR RELATED TO THIS DOCUMENT OR THE INFORMATION CONTAINED IN IT, EVEN IF DGC HAS BEEN ADVISED, KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES.

**AViiON, CEO, DASHER, DATAPREP, DESKTOP GENERATION, ECLIPSE, ECLIPSE MV/4000, ECLIPSE MV/6000, ECLIPSE MV/8000, GENAP, INFOS, microNOVA, NOVA, PRESENT, PROXI, SWAT, and TRENDVIEW** are U.S. registered trademarks of Data General Corporation; and **AOSMAGIC, AOS/VSMAGIC, AROSE/PC, ArrayPlus, AV Object Office, AV Office, BaseLink, BusiGEN, BusiPEN, BusiTEXT, CEO Connection, CEO Connection/LAN, CEO Drawing Board, CEO DXA, CEO Light, CEO MAILI, CEO Object Office, CEO PXA, CEO Wordview, CEOwrite, COBOL/SMART, COMPUCALC, CSMAGIC, DASHER/One, DASHER/286, DASHER/286-12c, DASHER/286-12j, DASHER/386, DASHER/386-16c, DASHER/386-25, DASHER/386-25k, DASHER/386SX, DASHER/386SX-16, DASHER/386SX-20, DASHER/486-25, DASHER II/486-33TE, DASHER/LN, DATA GENERAL/One, DESKTOP/UX, DG/500, DG/AROSE, DGConnect, DG/DBUS, DG/Fontstyles, DG/GATE, DG/GEO, DG/HEO, DG/L, DG/LIBRARY, DG/UX, DG/XAP, ECLIPSE MV/1000, ECLIPSE MV/1400, ECLIPSE MV/2000, ECLIPSE MV/2500, ECLIPSE MV/3500, ECLIPSE MV/5000, ECLIPSE MV/5500, ECLIPSE MV/5600, ECLIPSE MV/7800, ECLIPSE MV/9300, ECLIPSE MV/9500, ECLIPSE MV/9600, ECLIPSE MV/10000, ECLIPSE MV/15000, ECLIPSE MV/18000, ECLIPSE MV/20000, ECLIPSE MV/30000, ECLIPSE MV/35000, ECLIPSE MV/40000, ECLIPSE MV/60000, FORMA-TEXT, GATEKEEPER, GDC/1000, GDC/2400, Intellibook, microECLIPSE, microMV, MV/UX, PC Liaison, RASS, REV-UP, SLATE, SPARE MAIL, SUPPORT MANAGER, TEO, TEO/3D, TEO/Electronics, TURBO/4, UNITE, WALKABOUT, and XODIAC** are trademarks of Data General Corporation.

**UNIX** is a U.S. registered trademark of Unix System Laboratories, Inc

**MS-DOS** is a U.S. registered trademark of Microsoft Corporation.

**IBM PC AT** is a U.S. registered trademark of International Business Machines Corporation.

**Teflon** is a U.S. registered trademark of E.I. DuPont de Nemours and Company.

Installing, Starting, Expanding, and Maintaining AViiON® Computer Systems:

410, 412, 4100, and 4300 Series

014-002083-02

## Revision History:

Original Release - July 1991

First Revision - October 1991

Second Revision - May 1992

A vertical bar in the margin of a page indicates substantive technical change from the previous revision. (The exception is Appendix D, which contains entirely new material.)

## 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 set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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）で高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。」



# Preface

This manual is written for the person or persons responsible for setting up and maintaining AViiON® 410, 412, 4100, and 4300 series computer system hardware. Although it addresses readers with some computer hardware experience, you do not need knowledge of AViiON or RISC-based computer technology to use this manual.

The first three chapters of this manual describe how to unpack, set up, and start a new computer system to the point at which you are ready to install your system software. Chapter 3 also describes how to respond to any problems you encounter during powerup. Subsequent chapters explain how to set up and connect external mass-storage units, and how to customize operating parameters for devices connected directly to the system board. The final six chapters in this manual describe how to replace failing parts and add mass-storage devices, expansion memory, and option boards after the computer system is installed.

**NOTE:** 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 *Setting Up and Installing VMEbus Options in AViiON® Systems (014-NNNN)* for instructions.

## How This Manual is Organized

The information in this manual is organized as follows:

### **Chapter 1 Getting Started**

Provides information you need *before* starting any work. The chapter begins with an overview of base computer system components and options. It also 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 Setting Up Your Computer System**

Describes how to connect the system console and computer unit power cord. For the AViiON 410 and 412 series, describes how to install the monitor, keyboard, and mouse. Also describes cabling for the following optional devices:

- asynchronous devices such as a modem, serial printer, or plotter.
- local area network (LAN) transceiver.
- parallel printer.

For systems without external mass-storage devices, explains how to terminate an internal SCSI bus.

### **Chapter 3 Starting and Stopping Your Computer System**

Explains how to correctly power the computer system up and down and describes routine firmware power-up testing.

**NOTE:** Chapter 3 describes a first powerup sequence to the point at which you should install your operating system software. It then provides references to the appropriate documentation for your next step.

### **Chapter 4 Setting Up and Installing a SCSI Bus**

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

### **Chapter 5 Expanding and Maintaining Your Computer System**

Provides general procedures you should follow each time you add or replace an internal system component, and describes how to respond to hardware problems. Explains how to review system configuration parameters, and provides instructions and worksheets for calculating the power requirements of proposed configurations.

Also 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 6 through 11 Adding and or Replacing ...**

Each of these six chapters describes how to expand your system by adding a new internal component, or maintain the system by replacing a failed Customer Replaceable Unit (CRU). Each refers to Chapter 6 for prerequisite information that applies to all CRUs.

### **Appendix A Solving Powerup Problems**

Provides suggestions for resolving powerup problems such as a blank screen display or unreadable text messages.

### **Appendix B Understanding the System Control Monitor**

Explains how to reach the system firmware and use basic SCM commands to boot, program, and debug your system. Describes menus you can use to view or change configuration parameters for devices connected to the system board. Also describes changing the system automatic boot path from the default DG/UX installation path.

### **Appendix C Technical Specifications**

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

### **Appendix D Starting Your Computer System (any release prior to DG/UX 5.4)**

Explains how to correctly power the computer system up and describes routine firmware power-up testing for systems running any DG/UX release prior to 5.4.



## Reading Paths

The following reading paths explain which chapters and sections you should read and in what order, depending on the task you need to do.

### Reading Path for Setting Up a New Computer System

Review site requirements, and then unpack and inventory your system, as described in Chapter 1. Then read Chapter 2, following those subsections with instructions that apply to your configuration. Read the first section in Chapter 3, “Starting and Stopping Your Computer System,” before you power up your new computer system.

- If your system includes external SCSI devices or subsystems, set them up as described in Chapter 4 before continuing with the instructions in Chapter 3 to start your system.
- If your system includes devices connected to the system board whose operating parameters are required for the first powerup but conflict with the defaults listed in Chapter 2, read the appropriate instructions in Chapter 5 before continuing with the instructions in Chapter 3 to start your system.

### Reading Path for Powerup Procedures or Problems

Refer to the first part of Chapter 3, “Starting and Stopping Your Computer System,” for a description of the normal powerup sequence. Refer to Appendix A, “Solving Powerup Problems” for troubleshooting suggestions. For steps to properly shut down the computer system, refer to the last section of Chapter 3, “Shutting Down the Computer System.”

### Reading Path for Expanding the Computer System

**NOTE:** To add VMEbus options to your system, first verify your proposed system configuration as described in Chapter 5, then refer to *Setting Up and Installing VMEbus Options in AViiON® Systems*.

#### Internal CRUs

An internal CRU is any component you can install *inside* the computer unit chassis. To add an internal part, follow the instructions in Chapter 5 to verify your proposed configuration and open your system; then proceed to the appropriate chapter.

#### Adding Mass–Storage Devices

To add a drive to a mass–storage housing unit, verify your proposed SCSI configuration as described in Chapter 4, then refer to the manual that came with the drive and to the manual that came with the housing unit for instructions.

To connect a stand–alone mass–storage drive or housing unit, refer to Chapter 4 and the manual that came with the unit.

To add an internal drive, refer first to Chapter 4 to verify your proposed bus configuration, and then refer to Chapter 5 to verify your proposed system configuration. Follow the instructions in Chapter 5 before adding the drive as described in Chapter 6.

### **Adding an External Option**

If you are adding an option (such as a LAN transceiver, modem, or other externally connected peripheral), follow the steps in the appropriate section of Chapter 2 to configure the device and connect the cabling. Refer to the manual that came with the option for additional information and instructions.

## **Reading Path for Replacing Parts**

**NOTE:** To replace VMEbus options in or connected to your system, refer to the *Setting Up and Installing VMEbus Options in AViiON® Systems* manual.

### **Internal CRUs**

An internal CRU is any component you can replace that is housed *inside* the computer unit chassis. To replace an internal part, follow the instructions in Chapter 5 to open your system; then proceed to the appropriate chapter in this manual.

### **Replacing Mass-Storage Devices**

To replace a drive in a housing unit, refer to the manual that came with the drive and to the manual that came with the housing unit for instructions. Refer to Chapter 4 for operating parameters.

To replace a stand-alone mass-storage drive or housing unit, refer to Chapter 4 and the manual that came with the unit.

To replace an internal drive, follow the instructions in Chapter 5 to open your system before removing and reinstalling the drive as described in Chapter 6.

### **Replacing an External Option**

To replace an external option (such as a LAN transceiver, modem, or other externally connected peripheral), follow the steps in the appropriate section of Chapter 2 to configure the replacement device, disconnect the old part, and then reconnect the new part. Refer to the manual that came with the option for additional information and instructions.

## Related Documents

You received a comprehensive documentation package with your AViiON 410, 412, 4100, or 4300 computer system. Only those documents specifically mentioned within the text of this manual appear below. The manuals in this section are a small subset of manuals available for your computer system. Refer to the document *Guide to AViiON® and DG/UX™ Systems Documentation* (069–701085) or to the document *Read This First* (069–000519) for a complete list of related documentation.

### Hardware Manuals

*Using AViiON® System Diagnostics* (014–001863)

Describes how to use menu-based utilities to verify system hardware and test the graphics monitor, keyboard, and mouse or asynchronous terminal. Also describes how to check for faults in LAN connections, and maintain cartridge tape and diskette media.

*AViiON® Series Systems Automatic Reporting and Remote Assistance User's Guide* (015–000356)

Available with a Remote Assistance contract only. Provides details about remote and machine initiated calling features. Explains how to set up your system and how to make a remote connection, and describes user menus.

*Setting Up and Installing VMEbus Options in AViiON® Systems* (014–001867)

Supplies instructions for connecting external devices to the controller boards. Describes how to jumper VMEbus controllers to operate in an AViiON environment. Explains how to install and remove the controller boards in the system's VMEbus card cage, and how to jumper the VMEbus printed circuit backplane (backpanel) when necessary.

### DG/UX Manual

*Installing the DG/UX™ System* (093–701087)

Shows how to install the DG/UX operating system on AViiON computers. Instructions address first-time installations on new hardware, installations on existing systems, and upgrades to a newer release of the software.

### Local Area Network Manual

*Ethernet/IEEE 802.3 Local Area Network Installation Guide* (014–000793)

Explains how to install both the coaxial cable plant of an Ethernet local area network (LAN) and the transceivers that connect the network to a communication controller.

## Peripheral Manuals

### *Installing and Operating the Model 10565 Peripheral Housing Unit (014–001810)*


Describes how to unpack, inspect, install, and power up the unit. Explains how to replace the power supply, line cord, and fan, and provides general instructions for replacing a drive. Lists physical, electrical, and environmental specifications of the peripheral housing unit.

### *Installing CSS2 and CSS2/DC Storage Subsystem Components (014–002032)*

Describes how to unpack, inspect, install, and power up the unit. Explains how to replace the power supply, line cord, and fan, and provides general instructions for replacing a drive. Lists physical, electrical, and environmental specifications of the subsystem.


## Reader, Please Note

We use the following conventions in this manual:

Within text, “press New Line” means that you should press the New Line key on the Data General DASHER® keyboard. If you are using a keyboard compatible with the industry--standard IBM PC AT® keyboard, the equivalent key is usually marked Enter, Return, or with a symbol such as .

The term *system console* refers to the keyboard and display device that receives powerup diagnostic test messages and from which you bring up your operating system. The system console communicates directly with the AViON computer’s system board. A workstation’s system console consists of the graphics monitor and keyboard. A computer’s system console consists of an asynchronous terminal .

Within text, we use the following symbols:

Symbol	Means
	Press the New Line, Carriage Return (CR), Return, or Enter key on your system console keyboard.
SCM>	The default System Control Monitor (SCM) prompt.
#	The default DG/UX Superuser shell prompt.

In examples we use

**This typeface to show your keyboard entry.**

This typeface to show system queries and responses.

## 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, free telephone assistance is available with your hardware warranty and with most Data General software service options. 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

Please consider joining the largest independent organization of Data General users, the North American Data General Users Group (NADGUG). In addition to making valuable contacts, members receive *FOCUS* monthly magazine, a conference discount, access to the Software Library and Electronic Bulletin Board, an annual Member Directory, Regional and Special Interest Groups, and much more. For more information about membership in the North American Data General Users Group, call 1-800-253-3902 or 1-508-443-3330.

End of Preface



# Contents

## Chapter 1 – Getting Started

AViiON 410, 412, 4100, and 4300 Series Computers .....	1-1
Basic System and Options .....	1-2
Internal Options .....	1-3
External Options .....	1-4
About the System Console (AViiON 4100 and 4300 Series) .....	1-7
About the Graphics Monitor (AViiON 410 and 412 Series) .....	1-8
About the Keyboard and Mouse (AViiON 410 and 412 Series) .....	1-8
About VME Options .....	1-9
About Mass–Storage Drives .....	1-10
Before You Start .....	1-11
Selecting a Site .....	1-11
Unpacking and Inspecting Your Equipment .....	1-11
Gathering Documentation and Media .....	1-18

## Chapter 2 – Setting Up Your Computer System

Connecting the System Console to AViiON 4100 Series .....	2-1
Connecting the System Console to AViiON 4300 Series .....	2-3
Connecting the Graphics Monitor to AViiON 410 and 412 Series .....	2-6
Connecting the Keyboard to AViiON 410 and 412 Series .....	2-9
Connecting the Mouse to AViiON 410 and 412 Series .....	2-10
Connecting a Cluster Controller Cable to a VDA Adapter (AViiON 4300 Series) .....	2-11
Connecting a Local Area Network Cable .....	2-12
Connecting Asynchronous Devices .....	2-14
Connecting Asynchronous Devices to AViiON 410, 412, or 4100 Series Systems .....	2-14
Connecting Asynchronous Devices to AViiON 4300 Series Systems .....	2-17
Connecting a Parallel Printer .....	2-19
Terminating an Internal SCSI Bus .....	2-20
Connecting the Computer Unit Power Cord .....	2-22

## **Chapter 3 – Starting and Stopping Your Computer System**

Starting the Computer System .....	3-1
Powering Up .....	3-1
Your Next Step .....	3-6
Shutting Down Your Computer System .....	3-7
Powering Down .....	3-7
Resetting the Computer System .....	3-8
Restarting Your System .....	3-9

## **Chapter 4 – Setting Up and Installing a SCSI Bus**

Planning a SCSI Bus Configuration .....	4-2
Identifying SCSI Drives .....	4-3
SCSI Bus Cabling Rules .....	4-5
Configuring Drive Operating Parameters .....	4-6
Terminating the External SCSI Bus .....	4-6
Installing a SCSI Bus and SCSI Drives .....	4-9
Installing Configuration Jumpers .....	4-10
Connecting the SCSI Bus to SCSI drives .....	4-11
Connecting the External SCSI Bus to the Computer Unit Rear Panel .....	4-11

## **Chapter 5 – Expanding and Maintaining Your Computer System**

Maintaining Your System .....	5-1
If a Computer System Problem Occurs .....	5-2
Reviewing System Specifications .....	5-2
Verifying Support for Your Configuration .....	5-3
Calculating Power Requirements .....	5-3
Avoiding Electrostatic Discharge (ESD) Damage .....	5-7
Emergency Procedures (Without an ESD Kit) .....	5-7
Installing Board Jumpers and Setting Switches .....	5-8
Installing Jumpers .....	5-8
Setting Switches .....	5-9
Opening the Computer Unit .....	5-10
Removing the Side Covers .....	5-10
Removing the Top Cover .....	5-12
Closing the Computer Unit .....	5-13
Installing the Top Cover .....	5-13
Installing the Side Covers .....	5-14



## **Chapter 6 – Adding or Replacing Internal Mass–Storage Drives**

Supported Mass–Storage Drives .....	6-1
Mass–Storage Drive Locations .....	6-2
Removing a Drive Assembly .....	6-3
Removing Brackets from a Drive .....	6-6
Configuring New or Replacement Drives .....	6-7
Installing a Drive Assembly .....	6-9
Attaching Brackets to a Drive .....	6-9
Completing the Drive Assembly Installation .....	6-10
Adding or Replacing the SCSI Adapter Board .....	6-14
Removing the SCSI Adapter Board .....	6-14
Installing the SCSI Adapter Board .....	6-16
Replacing the Terminator Plug .....	6-17

## **Chapter 7 – Adding or Replacing Memory Modules**

Rules for Installing Memory Modules in AViiON 4300 Series Systems .....	7-3
Rules for Installing Memory Modules in AViiON 410, 412, and 4100 Series Systems .....	7-4
Removing Memory Modules .....	7-7
Installing Memory Modules .....	7-9

## **Chapter 8 – Adding or Replacing CPU and Graphics Boards**

Adding or Replacing a CPU Option Board .....	8-2
Removing a CPU Option Board .....	8-2
Installing a CPU Option Board .....	8-4
Adding or Replacing a Graphics or Z–buffer Board (AViiON 410 and 412 Series) .....	8-6
Removing the Graphics or Z–Buffer Board .....	8-6
Installing the Graphics or Z–Buffer Board .....	8-9

## **Chapter 9 – Replacing the System Board**

Removing the System Board .....	9-1
Installing the System Board .....	9-5

## **Chapter 10 – Replacing the Fan Assembly**

Removing the Fan Assembly .....	10-1
Installing the Fan Assembly .....	10-3

## **Chapter 11 – Replacing the Power Supply and Fuses**

Removing the Power Supply .....	11-1
Installing the Power Supply .....	11-3
Replacing the Tape/Disk Fuse .....	11-6

## Appendix A – Solving Powerup Problems

Blank Monitor Screen at Powerup (AViiON 410 and 412 Series) .....	A-5
Blank Terminal Screen at Powerup (AViiON 4100, and 4300 Series) .....	A-6
Unclear Monitor Display (AViiON 410 and 412 Series) .....	A-7
Testing With an Asynchronous Terminal .....	A-8
Unclear Terminal Display .....	A-9
Error Codes and Messages .....	A-9
Screen Display .....	A-10
LED Signals .....	A-11
Speaker Signals .....	A-11

## Appendix B – Using the System Control Monitor

Using the SCM Configuration Menus .....	B-1
Summary of Menus and Menu Conventions .....	B-2
Changing the Default Boot Path .....	B-4
Changing Console Parameters .....	B-9
Changing Modem Port Parameters .....	B-16
Changing the Mouse Baud Rate .....	B-18
Viewing the Memory Configuration .....	B-19
Getting to the SCM .....	B-19
Using SCM Commands .....	B-22
Summary of Commands .....	B-24

## Appendix C – Technical Specifications

Physical and Environmental Specifications .....	C-1
System Board and System Bus Options .....	C-2
VMEbus Backplane and Options .....	C-3
Mass Storage Options .....	C-5
Power Subsystem Specifications .....	C-6
Peripherals Specifications (AViiON 410 and 412 Series) .....	C-8
Display Monitor .....	C-8
Keyboard .....	C-9
Mouse .....	C-9
Integrated I/O Connections and Signals .....	C-11
Asynchronous Serial Port Connectors (AViiON 4300) .....	C-11
Asynchronous Serial Port Connectors (AViiON 410, 412, and 4100 Series) .....	C-12
Parallel Port Connector .....	C-13
SCSI Bus Connector .....	C-14
LAN Connector .....	C-15
Keyboard Connector (AViiON 410 and 412 Series) .....	C-16
Mouse Connector (AViiON 410 and 412 Series) .....	C-17

**Appendix D – Starting Your Computer System  
(any preloaded DG/UX system with a release  
prior to 5.4)**

Starting the Computer System .....	D-1
Powering Up .....	D-1

# Tables

## Table

1-1	Voltage Suffixes .....	1-15
1-2	Cable/Cord Inventory Worksheet .....	1-17
1-3	Language Suffixes for Keyboard Part Numbers .....	1-18
4-1	Default SCSI Device ID Numbers .....	4-3
6-1	AViON 410, 412, 4100, and 4300 Series Internal Mass-Storage Drives .	6-2
6-2	SCSI Device Identification Numbers .....	6-8
7-1	Valid Memory Configurations for AViON 4300 Systems .....	7-4
7-2	Valid Memory Configurations for AViON 410, 412, and 4100 Series Systems .....	7-6
A-1	Reading Path for Power-Up Testing Hangs .....	A-1
A-2	Quick Reference for Powerup Problems (Graphics Console) .....	A-3
A-3	Quick Reference for Powerup Problems (Nongraphics Console) .....	A-4
A-4	Beep Codes .....	A-11
B-1	Boot Specifications for Disk and Tape Drives .....	B-6
B-2	Specifications for LAN Devices .....	B-7
B-3	Alternate Keyboard Codes .....	B-16
B-4	SCM Line Editing Features and Keyboard Control Sequences .....	B-23
B-5	Summary of SCM Commands and Command Functions .....	B-24
B-6	Mnemonics and Parameters for Bootable Devices .....	B-27
B-7	Controller (cntrl) Parameter Values .....	B-28
B-8	Default SCSI Device ID and LUN Numbers .....	B-29
C-1	Internal Component Current Requirements for AViON 410, 412, 4100, and 4300 Series Systems .....	C-7

# Figures

## Figure

1-2	AViiON 410 and 412 Series Rear Panel and Connectors .....	1-5
1-3	AViiON 4100 Series Rear Panel and Connectors .....	1-6
1-4	AViiON 4300 Series Rear Panel and Connectors .....	1-7
1-5	Color Graphics Monitor and Controls .....	1-8
1-1	Removing the Shipping Cover .....	1-12
1-2	Removing the Shipping Tray and Packing .....	1-13
1-3	Removing the Computer from the Packing Tray .....	1-14
1-6	Voltage Setting Label .....	1-15
1-7	Installation Checklist .....	1-19
2-1	Connecting the System Console to an AViiON 4100 Series System .....	2-2
2-2	Connecting the System Console to an AViiON 4300 System .....	2-4
2-3	Placing the Graphics Monitor .....	2-6
2-4	Connecting the Color Monitor Power Cord .....	2-7
2-5	Plugging the Cables and Power Cord into the Monitor and Computer Unit .....	2-8
2-6	Connecting the Keyboard .....	2-9
2-7	Connecting the Mouse .....	2-10
2-8	VDA/255 Connector .....	2-11
2-9	Attaching a BNC Host Connector to a VDA/255 Receptacle .....	2-12
2-10	Connecting the LAN Transceiver Cable to the Computer Unit .....	2-13
2-11	Attaching and Securing the LAN Transceiver Cable .....	2-14
2-12	Connecting Devices to the Computer Unit Serial Ports (AViiON 410, 412, and 4100 Series) .....	2-15
2-13	Connecting Devices to the Computer Unit Serial Ports (AViiON 4300) .....	2-18
2-14	Connecting a Parallel Printer to the Computer Unit .....	2-19
2-15	AViiON 410, 412, 4100, and 4300 Series SCSI Bus Connector .....	2-20
2-16	Installing the SCSI Bus Terminator Plug .....	2-21
2-17	Securing a SCSI Bus Terminator .....	2-21
2-18	Connecting the Computer Unit Power Cord .....	2-23
3-1	Monitor Power Switch .....	3-2
3-2	Peripheral Housing Unit (PHU) and Combined Storage Subsystem Deskside Chassis (CSS2/DC) Power Switch .....	3-2
3-3	Computer Unit Power Switch and LED Power-On Indicator .....	3-3
3-4	Computer Unit Reset and Power Switches .....	3-8
4-1	AViiON 410, 412, 41000, and 4300 Series SCSI Bus Connector .....	4-2
4-2	Sample SCSI Device Identification Configuration .....	4-4
4-3	Typical Daisy Chain and SCSI Bus Cable Lengths .....	4-5
4-4	SCSI Bus Configuration Worksheet .....	4-7
4-5	Sample Configuration Worksheet .....	4-8

## Figure

4-6	SCSI Cable Rules and Sample Device IDs .....	4-9
4-7	AViiON 41000 and 4300 Series External SCSI Connectors .....	4-12
4-8	Removing the SCSI Bus Terminator Plug .....	4-13
4-9	Plugging Together SCSI Bus Connectors .....	4-13
4-10	Securing a SCSI Cable Connection .....	4-14
5-1	Sample Current and Power Calculation Form for AViiON 410, 412, 4100, and 4300 Series Systems .....	5-5
5-2	Current and Power Calculation Form .....	5-6
5-3	Removing or Installing Jumper Plugs .....	5-9
5-4	DIP Switches on Printed Circuit Boards .....	5-10
5-5	Loosening the Side Cover Fasteners .....	5-11
5-6	Removing the Side Covers .....	5-11
5-7	Attaching the ESD Wrist Strap and Clip .....	5-12
5-8	Removing the Top Cover .....	5-13
5-9	Installing the Top Cover .....	5-14
5-10	Inserting the Cover Tabs into the Computer Unit Slots .....	5-15
5-11	Installing the Side Covers .....	5-15
5-12	Tightening the Side Cover Fasteners .....	5-16
5-13	Connecting the Computer Unit's Power Cord .....	5-17
6-1	Internal Drive Slots .....	6-2
6-2	SCSI Bus Ribbon Cable and Drive Power Connectors .....	6-4
6-3	Unplugging the I/O Bus Cable from a Diskette Drive .....	6-4
6-4	Unplugging the Power Adapter Cable from a Diskette Drive .....	6-5
6-5	Removing a Drive Assembly from the Computer Unit .....	6-5
6-6	Removing Brackets from Drives .....	6-6
6-7	Example of Recommended SCSI ID Settings .....	6-8
6-8	Bracket Mounting Holes for Drives .....	6-9
6-9	Attaching Brackets to Drives .....	6-10
6-10	Removing or Replacing a Filler Panel .....	6-11
6-11	Installing a Drive Assembly in the Computer Unit .....	6-12
6-12	Plugging the Power Adapter Cable into a Diskette Drive .....	6-13
6-13	Plugging the I/O Bus Cable into a Diskette Drive .....	6-13
6-14	Unplugging the SCSI Bus and I/O Bus Cables from the SCSI Adapter Board .....	6-14
6-15	Unplugging the Power Adapter Cable from the SCSI Adapter Board ....	6-15
6-16	Removing or Installing the Screws that Attach the SCSI Adapter Board to the Computer Unit .....	6-15
6-17	Plugging the Power Adapter Cable into the SCSI Adapter Board .....	6-16
6-18	Plugging the SCSI Bus and I/O Bus Cables into the SCSI Adapter Board	6-17
6-19	Unplugging and Plugging in the SCSI Bus Terminator Plug .....	6-18
7-1	AViiON 4300 Series ECC Memory Modules .....	7-1
7-2	AViiON 410, 412, and 4100 Series Byte-Parity Memory Modules .....	7-2
7-3	Location of Memory Modules and Connectors .....	7-2
7-4	Numbering Scheme for Memory Module Connectors .....	7-3
7-5	Releasing the Memory Module Locking Tabs .....	7-8
7-6	Removing a Memory Module .....	7-9

## Figure

7-7	Installing the Memory Module in the Connector .....	7-10
8-1	AViiON 410, 412, 4100, and 4300 Series System Board and CPU and Graphics Option Boards .....	8-1
8-2	AViiON 410, 412, 4100, and 4300 Series CPU Option Board .....	8-2
8-3	Removing the CPU Option Board Screws .....	8-3
8-4	Separating the Interboard Connectors .....	8-3
8-5	Joining the Interboard Connectors .....	8-4
8-6	Securing CPU Option Board to the System Board .....	8-5
8-7	Location of the Graphics and Z-Buffer Boards on the AViiON 410 and 412 Series System Board .....	8-6
8-8	Releasing the BNC Connectors from the Computer Bulkhead .....	8-7
8-9	Removing the Board-Retaining Screws .....	8-8
8-10	Separating the Interboard Connectors .....	8-9
8-11	Removing the BNC Connector Filler Plugs .....	8-10
8-12	Joining the Interboard Connectors .....	8-11
8-13	Replacing the Board-Retaining Screws .....	8-12
8-14	Securing BNC Connectors to the Computer Bulkhead .....	8-13
9-1	AViiON 410, 412, 4100, and 4300 Series System Board and Mounted Components .....	9-1
9-2	Releasing the System Board Bracket from the Back of the Computer Unit .....	9-2
9-3	Unplugging Cables from the System Board .....	9-3
9-4	Unscrewing the System Board from the Computer Unit .....	9-3
9-5	Releasing the System Board from the VME Backplane .....	9-4
9-6	Removing the System Board .....	9-4
9-7	Removing the PROM Component .....	9-5
9-8	Straightening the Pins on the PROM Component .....	9-6
9-9	Installing the PROM Component .....	9-6
9-10	AViiON 4300 Series System Board .....	9-7
9-11	Inserting the System Board into the Computer Unit .....	9-8
9-12	Securing the System Board to the Computer Unit .....	9-8
9-13	Securing the System Board Bracket to the Back of the Computer Unit ..	9-9
9-14	Plugging Cables into the System Board .....	9-9
10-1	Unplugging the Fan Assembly Power Cable from the Power Supply .....	10-1
10-2	Releasing the Fan Assembly from the Back of the Computer Unit .....	10-2
10-3	Removing the Fan Assembly from the Computer Unit .....	10-2
10-4	Positioning the Fan Assembly Under the Computer Unit .....	10-3
10-5	Installing the Fan Assembly in the Computer Unit .....	10-4
10-6	Securing the Fan Assembly to the Back of the Computer Unit .....	10-4
10-7	Plugging the Fan Assembly Power Cable into the Power Supply .....	10-5
11-1	Unplugging the Ac Power and Fan Assembly Power Cables .....	11-1
11-2	Unplugging the Tape/Disk Power and Logic Power Cables .....	11-2
11-3	Releasing the Power Supply from the Computer Unit .....	11-2
11-4	Removing the Power Supply .....	11-3
11-5	Setting the Voltage Selection Switch .....	11-4
11-6	Inserting the Power Supply into the Computer Unit .....	11-4

**Figure**

11-7	Securing the Power Supply to the Computer Unit .....	11-5
11-8	Connecting the Tape/Disk Power and Logic Power Cables .....	11-5
11-9	Connecting the Fan Assembly Power and the ac Power Cables .....	11-6
11-10	Replacing the Tape/Disk Fuse .....	11-7
A-1	Monitor Brightness and Degauss Switch .....	A-7
B-1	SCM Menus .....	B-3
B-2	Full Boot Path Format .....	B-5
C-1	Asynchronous Serial Port (RS232 A-C) Connector Signals for AViiON 4300 Systems .....	C-11
C-2	Asynchronous Cable Signal Routing .....	C-12
C-3	Asynchronous Serial Port (RS232 A-C) Connector Signals for AViiON 410, 412, and 4100 Series .....	C-12
C-4	Printer Connector (25-Pin) .....	C-13
C-5	SCSI Connector (50-Pin) .....	C-14
C-6	LAN Connector (15-Pin) .....	C-15
C-7	Keyboard Connector and Cable Pin Numbering .....	C-16
C-8	Mouse DIN Connector and Cable Pin Numbering .....	C-17
D-1	Monitor Power Switch .....	D-2
D-2	Peripheral Housing Unit (PHU) and Combined Storage Subsystem Deskside Chassis (CSS2/DC) Power Switch .....	D-2
D-3	Computer Unit Power Switch and LED Power-On Indicator, .....	D-3



# Chapter 1

## Getting Started

This chapter provides an overview of the basic AViiON® 410, 412, 4100 and 4300 series computer systems and their hardware options. It also 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 appropriate documentation.

### AViiON® 410, 412, 4100, and 4300 Series Computers

AViiON 410, 412, 4100, and 4300 series systems support a variety of configurations. AViiON 4100, and 4300 series computers function primarily as server systems; AViiON 410 and 412 computers add graphics options to the same basic system to work as graphics computer systems. Figure 1-1 illustrates the deskside computer unit that the three models hold in common, with the color graphics monitor, IBM PC AT®-style keyboard, and a mouse device that distinguish an AViiON 410 and 412 series computer systems.

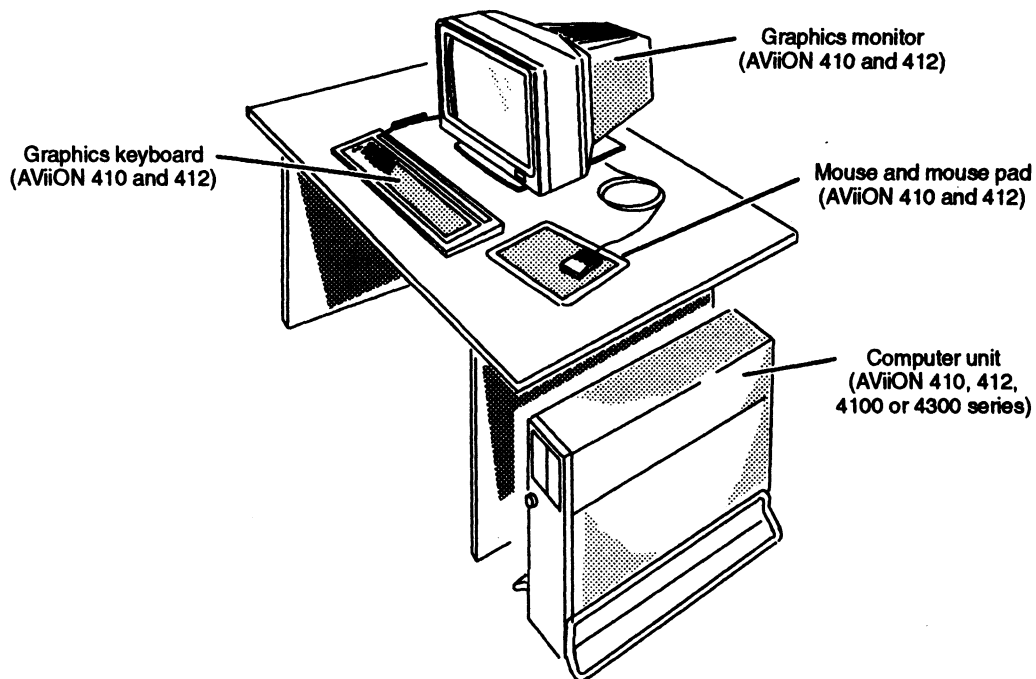


Figure 1-1 AViiON 410 and 412 Series Computer

## Basic System and Options

All AViiON 410, 412, 4100 and 4300 series computer units include the following:

- One system processor (system) board containing
  - Minimum 8 megabytes, byte–parity memory (AViiON 410, 412, or 4100 series, except 4300).
  - Minimum 8 megabytes, ECC memory (AViiON 4300 series).
  - Two asynchronous RS–232–C ports for a modem or data terminal devices.
  - One parallel printer port, compatible with a Centronics LPT1 interface.
  - One integrated AMD Ethernet local area network (LAN) interface, compatible with thin or thick Ethernet networks (transceiver not included).
  - One integrated NCR small computer system interface (SCSI) controller for internal (maximum of four) and external (bus maximum of seven) SCSI mass–storage drives (external support for AViiON 410, 412, 4100 and 4300 series).
  - One integrated VDA/255 (AViiON 4300).
  - One 16.67 or 20 megahertz Motorola 88000 processor, or one 25 megahertz Motorola 88100 processor.
  - Two Motorola 88200 Cache/Memory Management Units (CMMUs).
- One 2–slot backpanel printed circuit board with VMEbus (supplies VMEbus to a maximum of two options).
- A 326–watt power supply.

AViiON 410 and 412 series systems further include the following:

- One 8–bit or one 24–bit color graphics controller (internal).
- IBM PC AT®–style keyboard.
- Mouse.
- Color graphics display monitor.

**NOTE:** AViiON 4100 and 4300 series systems require an asynchronous terminal to serve as a system console.

## 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

- One additional CPU option board.
- 4-Mbyte or 16-Mbyte, byte-parity single in-line memory modules (AViiON 410, 412, and 4100 series, except 4300).
  - AViiON 410, 412, and 4100: 128-Mbytes maximum.
- 4-Mbyte or 16-Mbyte ECC single in-line memory modules (AViiON 4300 series).
  - Maximum of three additional pairs (four pairs total per system) – 128-Mbytes system maximum.
- One integrated NCR SCSI controller supporting a maximum of seven external SCSI mass-storage drives.
- One integrated AMD Ethernet LAN controller .
- One 24-bit, Z-buffer board for enhanced graphics performance (AViiON 410 and 412 series).

### Mass-Storage Drives

Maximum of four (total) of the following:

- Removable media drives (maximum of two):
  - 1/4-inch cartridge (QIC) SCSI cartridge tape drives.
  - 1.2-Mbyte and 1.44-Mbyte diskette drives.
  - 600-Mbyte CD ROM.
  - Digital audio tape (DAT) drive.
- Winchester hard disk drives (maximum of three half-height or one full-height):
  - 1.4-Gbyte (full-height).
  - 1-Gbyte (full-height).
  - 662-Mbyte (full-height).
  - 1.65-Gbyte (full-height).
  - 332-Mbyte (full-height).
  - 520-Mbyte (full-height).

### VMEbus Option Boards

Maximum of two (total) of the following:

- One or two VSC/3 VME Synchronous Controllers.
- One or two VAC/16 VME Asynchronous Controllers.
- One or two VLC VME Ethernet LAN Controllers.
- One or two VTRC VME Token Ring LAN Controllers.
- One VDA/255 VME Distributed Asynchronous host adapter.
- • One or two VTC VME Terminal Controllers.

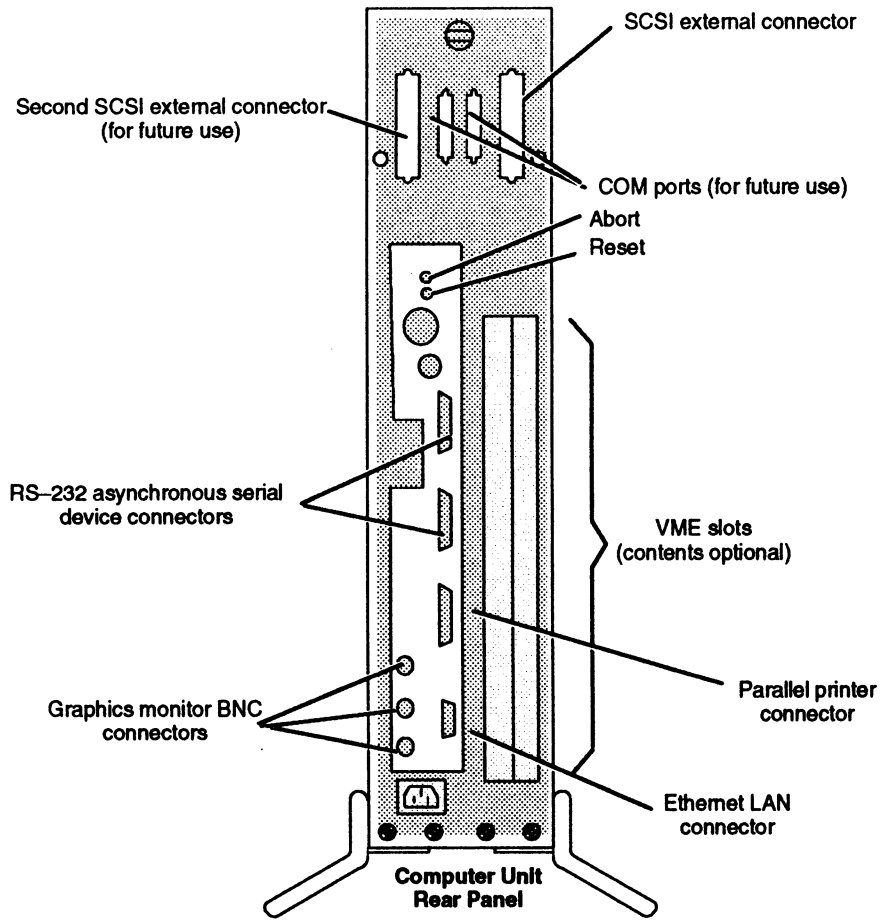
## External Options

AViiON 410, 412, 4100, and 4300 series systems also support the following external devices connected to the rear panel of the deskside computer unit.

- Model 10565 Peripheral Housing Unit (PHU) mass-storage subsystems:
  - Three half-height (1.75-inch) 5.25-inch SCSI drives per PHU
  - One full-height (3.25-inch) 5.25-inch SCSI drive per PHU
  - Combination of one full-height and one half-height drive per PHU.
- CSS2/DC mass-storage subsystems:
  - Seven half-height, five full-height, or combination of seven drives.
  - 5.25-inch SCSI drives per CSS2/DC.
- Model 6586/6587, Model 6588/6589 reel-to-reel SCSI tape drives.
- 3 synchronous devices per VSC/3 controller.
- 16 asynchronous devices per VAC/16 controller.
- 255 asynchronous devices per VDA/255 adapter.
  - Controlled by VDC/8P or VDC/16 downloadable cluster controller boxes.
- • 255 asynchronous devices per VTC controller.

Refer to the following sections of this chapter and Appendix C for more detailed information about base and optional system components. Figure 1-2 illustrates the rear panel and connectors to I/O ports for AViiON 410 and 412 series systems. Figure 1-3 illustrates the rear panel and connectors to I/O ports for AViiON 4100 series systems. Figure 1-4 illustrates the rear panel and connectors to I/O ports for AViiON 4300 series systems. Refer to Chapter 2 for information about installing devices in any of the connectors.

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



*Figure 1-2 AViiON 410 and 412 Series Rear Panel and Connectors*

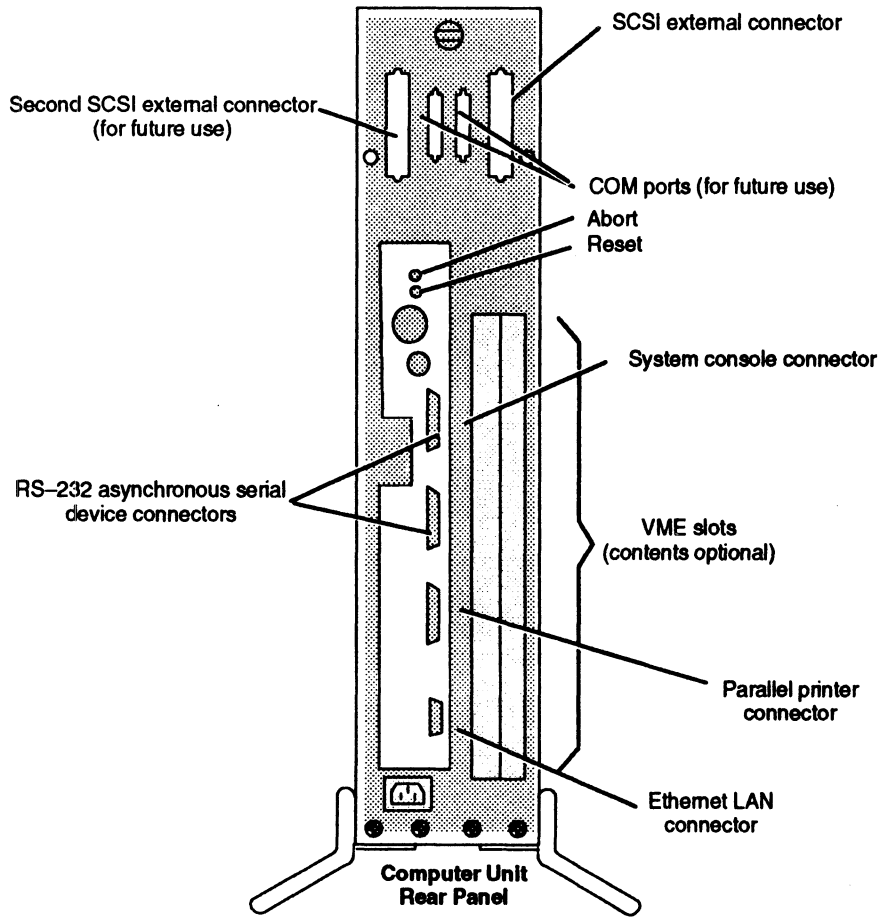


Figure 1-3 AViiON 4100 Series Rear Panel and Connectors

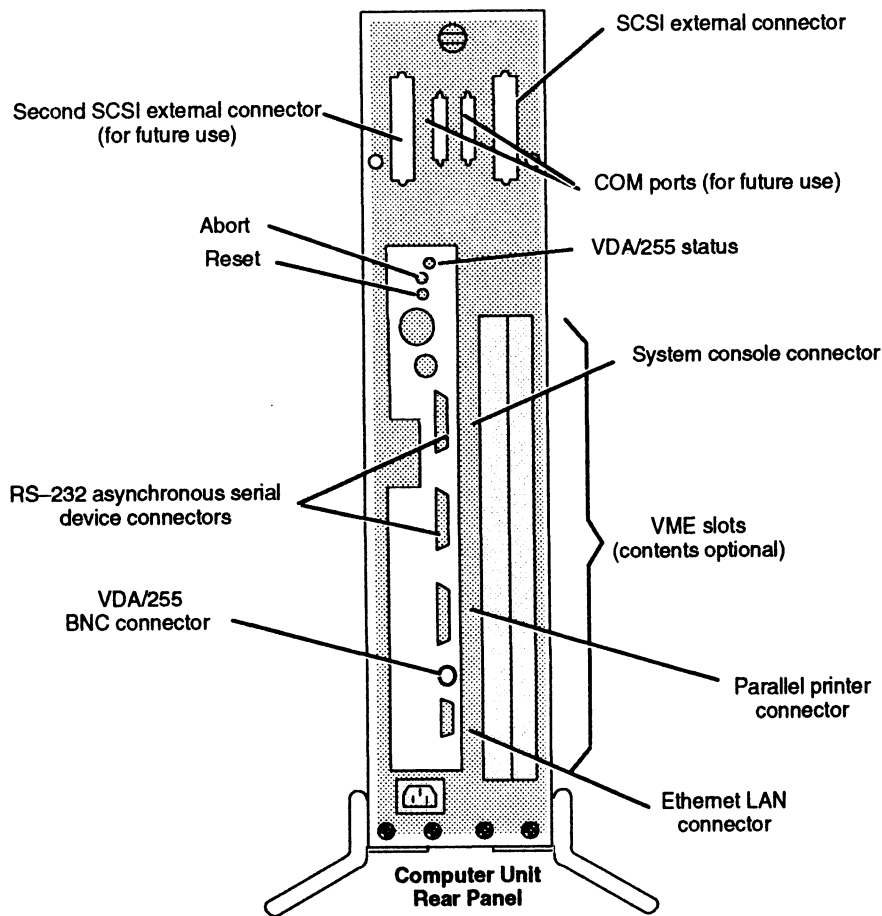


Figure 1-4 AViiON 4300 Series Rear Panel and Connectors

## About the System Console (AViiON 4100 and 4300 Series)

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

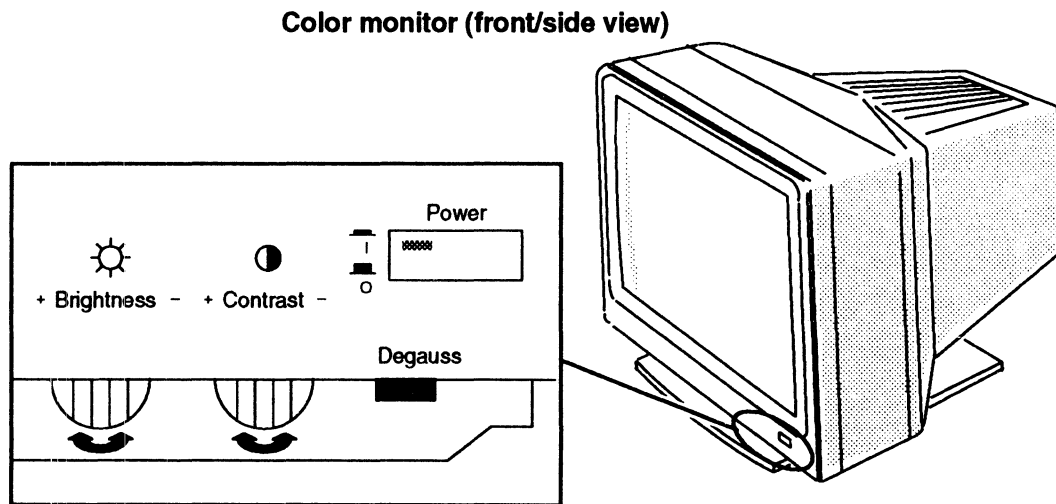
Any asynchronous terminal and keyboard with an ASCII character set and an RS-232-C interface can serve as the system console for AViiON 4100 and 4300 series computers. However, you need a terminal that conforms to ANSI standard X3.64 (1977) to support a UNIX screen editor. Those terminals that conform 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 4100 or 4300 series rear panel connector.

## About the Graphics Monitor (AViiON 410 and 412 Series)

An AViiON 410 or 412 series computer system package includes a color graphics monitor, Model G6487. Figure 1-5 illustrates its dials and switches. Refer to Chapter 2 for information about connecting your graphics monitor to the computer unit.

A “C” suffix in your series number (AViiON 410C, for example) indicates that the computer system contains a color graphics controller and uses the 19-inch color monitor illustrated in Figure 1-5.



**NOTE:** Rotate Brightness and Contrast controls left and right to activate. Press Power and Degauss switches in to activate. The Power switch LED illuminates when monitor power is on.

*Figure 1-5 Color Graphics Monitor and Controls*

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.

If you did not order Data General's Model G6487 graphics monitor, you can use another color graphics monitor with the correct video parameters. Refer to ■ Appendix C for required hardware specifications for the monitor.

## About the Keyboard and Mouse (AViiON 410 and 412 Series)

Your computer system graphics packages includes (in addition to the graphics monitor) a keyboard and a three-button optical mouse with pad. Both have optional extension cables 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 PC AX-compatible. Refer to Chapter 2 for information about ■ connecting the keyboard and mouse to the desktop computer unit, and to Appendix C for their technical specifications.



## About VME Options

The VME bus backplane printed-circuit board and card cage in an AViiON 410, 412, 4100 or 4300 series computer unit can support one or more of the following communications options:

- **VAC/16** — VME Asynchronous Controller that provides as many as 16 ports for asynchronous devices such as user terminals.
- **VSC/3** — VME Synchronous Controller that provides as many as three synchronous communications ports.
- **VDA/255** — VME Distributed Asynchronous host adapter that supports as many as 255 asynchronous user devices via a network of cluster controllers.

**NOTE:** Not an option for AViiON 4300 computer systems.

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

## About Mass-Storage Drives

The Small Computer System Interface (SCSI) is an ANSI-defined standard for computer and peripheral interconnection. The SCSI bus connector(s) on the computer unit allow you to connect SCSI-based mass-storage drives to your computer system. Each SCSI controller in your system can support as many as seven SCSI drives, including standalone drives or drives residing in mass-storage housing units.

Refer to Chapter 4 for information about connecting mass-storage drives using the external SCSI bus connectors on the computer unit rear panel.

Each PHU or CSS2/DC in your system contains a combination of the following 5.25-inch, full-height (3.25-inch) SCSI-based drives:

- 662-megabyte, 1-gigabyte, or 1.4-gigabyte Winchester disk drive (Full-Height)
- 332- or 520-megabyte Winchester disk drive (Full-Height; – both drives include adapter brackets to convert from 3.5- to 5.25-inch width )
- 590-megabyte erasable optical disk drive (Full-Height)
- 2-gigabyte cartridge tape backup (Full-Height)
- 150-megabyte quarter-inch cartridge (QIC) tape drive (Half-Height)
- Multicapacity (320/525-megabyte) QIC tape drive (Half-Height)
- 3.5- or 5.25-inch diskette drive (Half-Height)
- 600-megabyte CD-ROM disk drive (Half-Height)

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.

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 1-11, at the end of this chapter) before proceeding with any of these installation procedures.

## 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 required documentation and materials.

### 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 outlet for each external peripheral (such as storage units and printers). AViiON 410 and 412 series systems also require an outlet for the graphics monitor.
- A desk or cleared work surface to position the external peripherals at a comfortable height for use.

For the AViiON 410 and 412 series computer, a desk or cleared work surface to hold the computer unit, graphics monitor, keyboard, mouse with pad, and external peripherals at a comfortable height for use.

- Floor area for the deskside computer unit where it is not likely to be jarred.
- Appropriate natural or electrical lighting.

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

### Unpacking and Inspecting Your Equipment

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

1. Remove and set aside the packing slip 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.

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

2. Refer to Figures 1–6 through 1–9 to unpack the computer unit.

**NOTE:** The computer unit can weigh over 70 pounds. Unpacking the unit involves a vertical lift of approximately six inches, and requires control of the entire unit while it balances at angles approaching forty degrees. While the instructions in Figures 1–6 through 1–9 should enable you to unpack the unit alone, you might want the help of another person.

enable you to unpack the unit alone, you might want the help of another person.

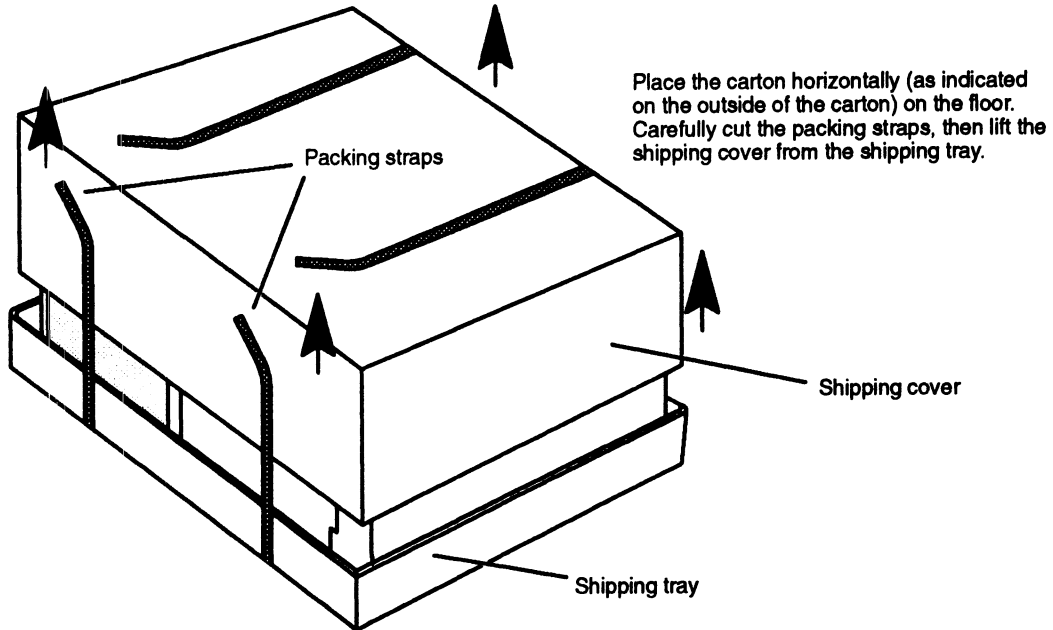


Figure 1-6 Removing the Shipping Cover

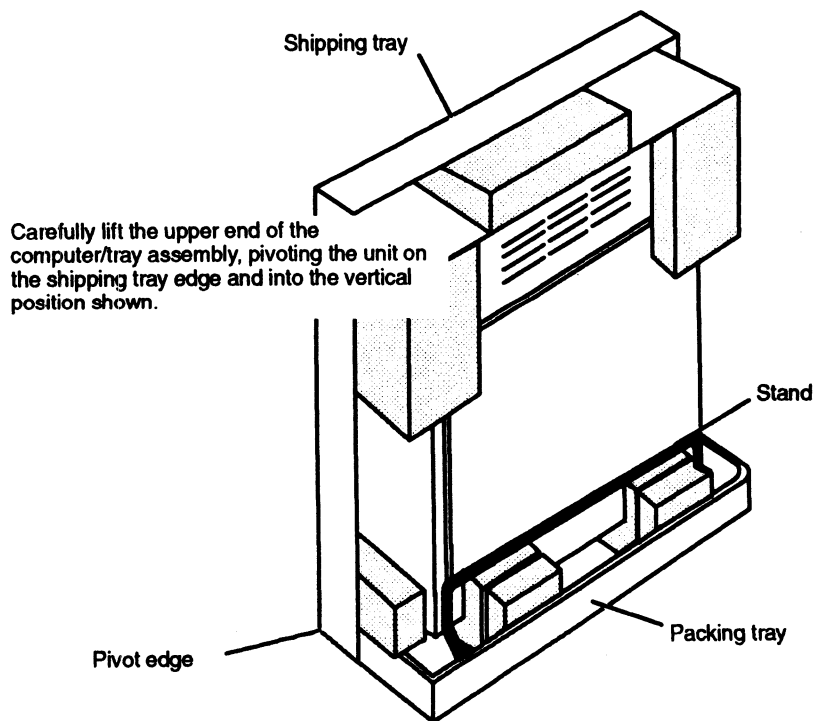


Figure 1-7 Positioning the Computer Unit Upright

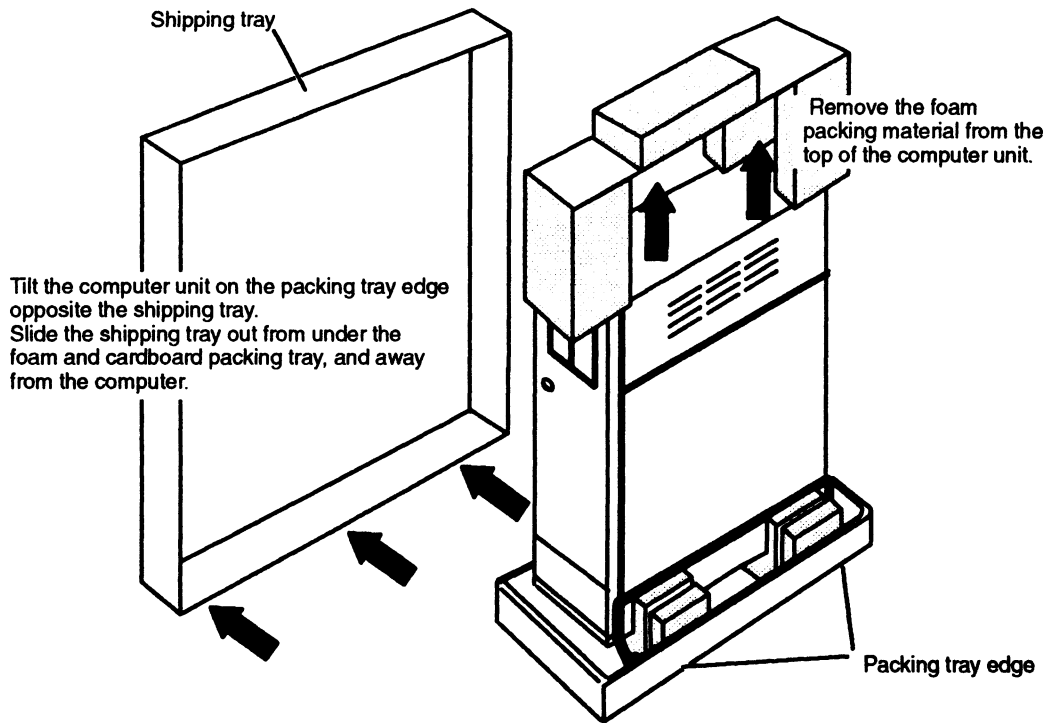
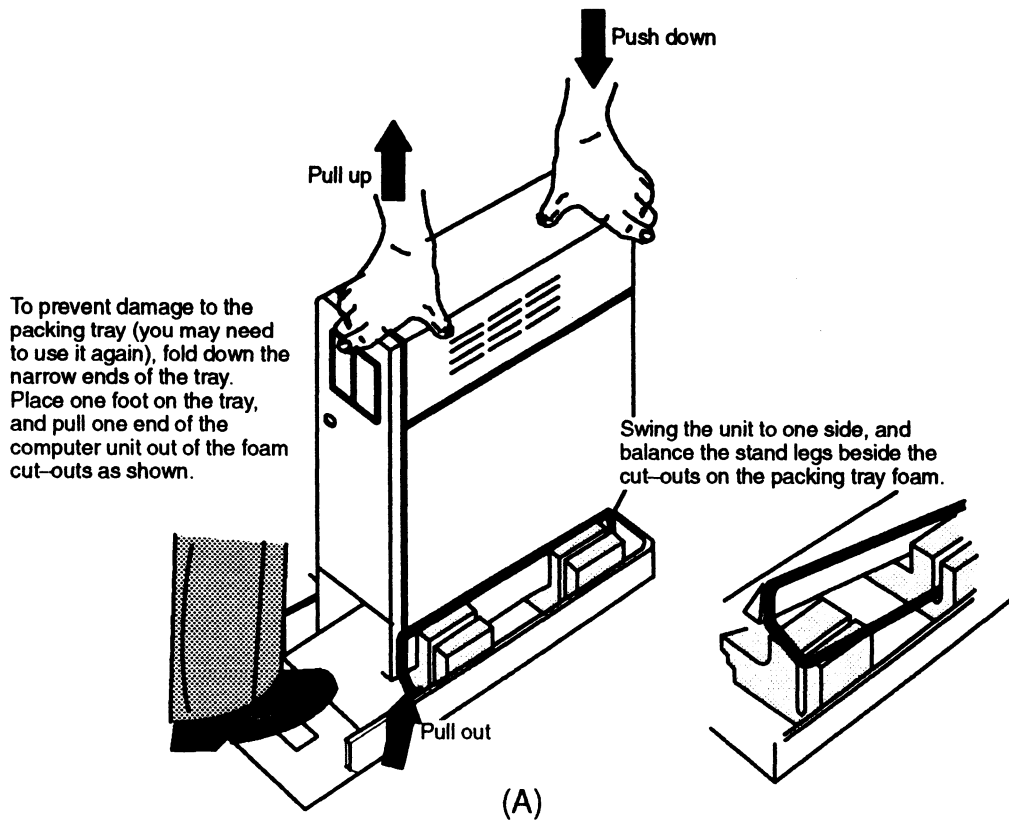


Figure 1-8 Removing the Shipping Tray and Packing Material



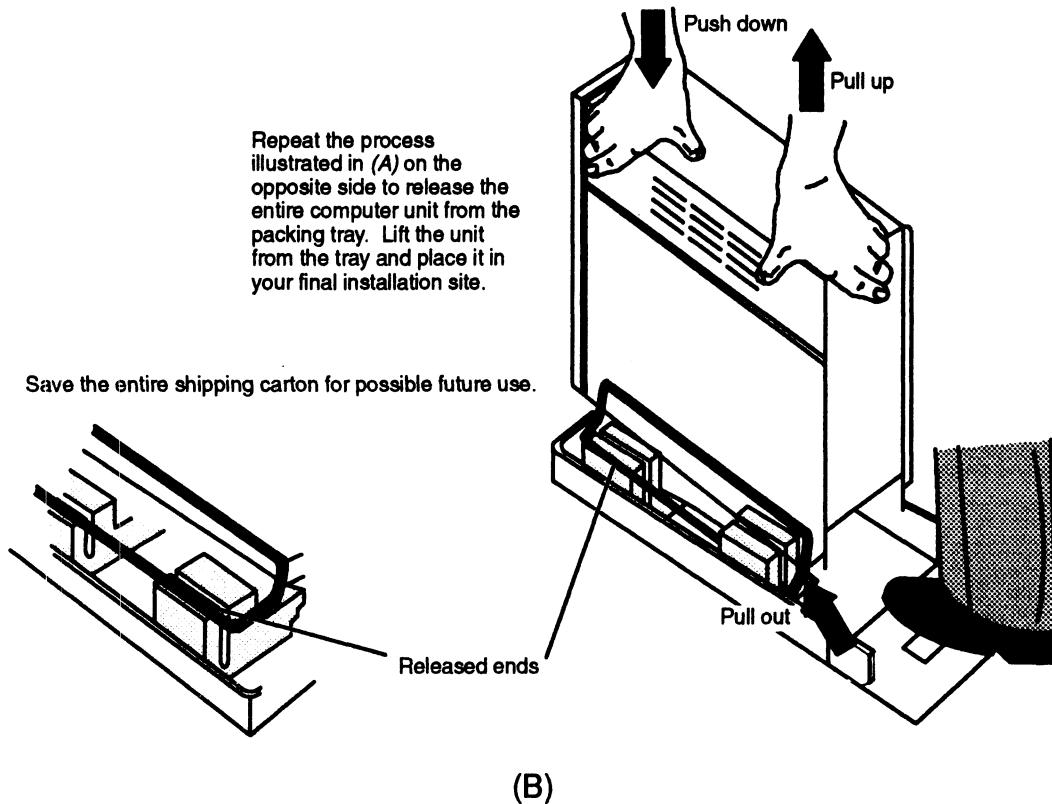


Figure 1-9 Removing the Computer from the Packing Tray

3. 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. Open every carton. If you think you received the wrong equipment, contact Data General as described in the Preface.
4. Make sure that you received equipment with the proper voltage and frequency for your site.

You can determine the voltage rating for your power cords (and monitor, for AViiON 410 and 412 series computer systems) by examining their model number suffixes. Table 1-1 lists voltage suffixes (by country) for your computer unit power cord and for the model G6487 graphics monitor power cord. Verify that the voltage for both is appropriate for your site.

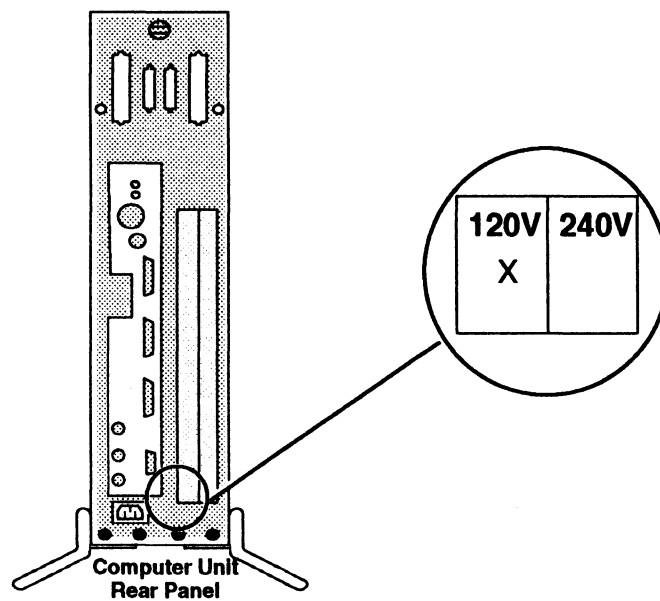
**Table 1-1 Voltage Suffixes**

Country	Voltage	Model Number Suffix
U.S./Canada	120	None
U.S./Canada	100	-1
United Kingdom <sup>1</sup>	240	-5
Australia	240	-6
Europe <sup>2</sup>	220	-7
Italy	220	-8
Denmark	220	-9
Switzerland	220	-0

<sup>1</sup> Used in Bangladesh, Bermuda, Hong Kong, Nigeria, Pakistan, Singapore, Sri Lanka, and the United Arab Republics.

<sup>2</sup> Excluding Switzerland, Italy, the United Kingdom, and Denmark.

Verify that the voltage setting for your computer unit power supply is correct for your site. The label shown in Figure 1-10 specifies whether the power supply is set for 100-120 or 200-240 volt operation.



*Figure 1-10 Voltage Setting Label*

5. Make sure that you have all of the cables listed on your packing slip; the cables may be together in one box or packaged separately with the device. Use Table 1–2 to record the cables you received for integrated system components. (With the exception of the asynchronous adapter cables, you receive only those cables listed in Table 1–2 that were ordered with your computer system.) Refer to *Setting Up and Installing VMEbus Options in AViiON® Systems* to verify the cables for any VMEbus options you received.



Table 1-2 Cable/Cord Inventory Worksheet

<input checked="" type="checkbox"/>	Cable or Cord Type	Part Number	Model Number
	<b>Mouse and Keyboard (AViiON 400 series only)</b>		
<input type="checkbox"/>	5-ft (1.52 m) mouse extension cable	005-008468	15357E005
<input type="checkbox"/>	6-ft (1.83 m) keyboard extension cable	005-008469	15358E006
	<b>Graphics Monitor (AViiON 400 series only)</b>		
<input type="checkbox"/>	Color monitor triple-BNC cable	005-034408	N/A
<input type="checkbox"/>	120-V monitor power cord		109-001253
<input type="checkbox"/>	240-V monitor power cord		109-001544
	<b>Ethernet LAN</b>		
<input type="checkbox"/>	16.4-ft (5 m) IEEE 802.3 plenum	005-033791	1326
<input type="checkbox"/>	65.6-ft (20 m) IEEE 802.3 plenum	005-033787	1326A
<input type="checkbox"/>	16.4-ft (5 m) IEEE 802.3 PVC	005-033766	15274E005
<input type="checkbox"/>	65.6-ft (20 m) IEEE 802.3 PVC	005-031694	15274E020
	<b>External SCSI Mass-Storage</b>		
<input type="checkbox"/>	1.3-ft cable	005-037722	15378E001
<input type="checkbox"/>	3-ft cable	005-037725	15378E003
<input type="checkbox"/>	5-ft (1.52 m) cable	005-037723	15378E005
<input type="checkbox"/>	10-ft (3.05 m) cable	005-037722	15378E010
<input type="checkbox"/>	15-ft (4.6 m) cable	005-036625	15378E015
<input type="checkbox"/>	<b>Asynchronous 9- to 25-pin Adapter Cables</b>	005-038420	N/A
	<b>Synchronous Devices</b>		
<input type="checkbox"/>	6-ft ( m) EIA RS-232 cable	005-032917	15290E006
<input type="checkbox"/>	15-ft (4.6 m) EIA RS-232 cable	005-032918	15290E015
<input type="checkbox"/>	25-ft (7.6 m) EIA RS-232 cable	005-032919	15290E025
	<b>Asynchronous Terminals</b>		
<input type="checkbox"/>	10-ft (3.05 m) EIA RS-232 cable	005-034256	15340E010
<input type="checkbox"/>	15-ft (4.6 m) EIA RS-232 cable	005-034990	15340E015
<input type="checkbox"/>	25-ft (7.6 m) EIA RS-232 cable	005-034991	15340E025
	<b>Asynchronous Modems</b>		
<input type="checkbox"/>	10-ft (3.05 m) EIA RS-232 cable	005-036256	15369E010
<input type="checkbox"/>	15-ft (4.6 m) EIA RS-232 cable	005-036257	15369E015
<input type="checkbox"/>	25-ft (7.6 m) EIA RS-232 cable	005-036258	15369E025
	<b>Parallel Printer</b>		
<input type="checkbox"/>	5-ft (1.5 m) Centronics cable	005-023915	10235
<input type="checkbox"/>	30-ft (9.1 m) Centronics cable	005-033762	15293E030

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

If you are setting up an AViiON 410 and 412 series computer system, examine the model number and suffix (the letter following the model number) on the label at the bottom of the keyboard (G6488-x, where x is the the suffix for your keyboard language) to make sure you received the appropriate keyboard.

Table 1-3 lists the language suffixes for available keyboards.

**Table 1-3 Language Suffixes for Keyboard Part Numbers**

Suffix	Keyboard	Suffix	Keyboard
A	U.S. English	I	Italian
B	U.K. English	M	French/Canadian
C	French	N	Swedish/Finnish
D	German	O	Norwegian
G	Spanish	S	Katakana(AX) <sup>1</sup>
H	Danish	Y	Swiss

<sup>1</sup> Japan's AT-compatible keyboard. Supports Katakana and Kanji.

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

## Gathering Documentation and Media

The *Guide to AViiON® and DG/UX™ System Documentation* contains a list and description of all the documentation available for your computer system. The *Installation Roadmap* outlines the path we recommend that you follow through the hardware installation documentation. The Installation Checklist on the following page summarizes the hardware and software installation manuals you may need to set up the computer system and begin software installation.

If you ordered a DG/UX™ operating system package, the files you need to install your operating system are already on disk, along with AViiON System Diagnostics. Keep the cartridge tapes you received as backup copies of your system software.

Whether or not you ordered the DG/UX operating system, you received AViiON System Diagnostics software on a cartridge tape. You can use these diagnostics to verify your hardware configuration as an optional part of the installation, or use them to test your hardware at a later time. Refer to *Using AViiON® System Diagnostics* for information about using the 15-minute hardware acceptance test and the other diagnostic utilities provided.

Figure 1-11 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.

<input checked="" type="checkbox"/>	<b>Check When Completed:</b>
<input type="checkbox"/>	Make sure your installation site satisfies the electrical and environmental requirements listed in Appendix C.
<input type="checkbox"/>	Inspect equipment received for damage.
<input type="checkbox"/>	Compare packing slips with equipment received and equipment ordered.
<input type="checkbox"/>	Determine the ac line current for your site:
	<input type="checkbox"/> 100/120 volts
	<input type="checkbox"/> 220/240 volts
<input type="checkbox"/>	Ensure that all of your equipment and cable model numbers reflect the proper site voltage for your site.
<input checked="" type="checkbox"/>	<b>Make Sure You Have These:</b>
<input type="checkbox"/>	Small flat-blade screwdriver (non-magnetic).
<input type="checkbox"/>	Operating system installation documentation. Use <i>Installing the DG/UX™ System</i> to install a basic DG/UX configuration. Most DG/UX installations will also need <i>Customizing the DG/UX™ System</i> .
<input type="checkbox"/>	Software Release Notices, plus cartridge tapes if you did not order preloaded software.
	<b>You May Need These:</b>
<input type="checkbox"/>	<i>Installing and Operating the Model 10565 Peripheral Housing Unit, Installing and Maintaining the CSS2/DC, or Installing the Model 6586/6587 Magnetic Tape Steamer Unit</i> for information about using any of these peripheral options.
<input type="checkbox"/>	<i>Ethernet/IEEE 802.3 Local Area Network Installation Guide</i> for information about installing your integrated LAN(s).
<input type="checkbox"/>	<i>DG/Token Ring Local Area Network Installation Guide</i> for information about installing token-ring network hardware.
<input type="checkbox"/>	<i>Using AViiON® System Diagnostics</i> for information about using the hardware acceptance test or other diagnostic utilities before installing your operating system.
<input type="checkbox"/>	<i>Setting Up and Installing VMEbus Options in AViiON® Systems</i> for information on connecting devices to the VMEbus.
<input type="checkbox"/>	<i>AViiON® Series Systems Automatic Reporting and Remote Assistance User's Guide</i> if your maintenance contract includes this option.

Figure 1-11 Installation Checklist

End of Chapter



# Chapter 2

## Setting Up Your Computer System

This chapter describes how to connect the computer system console (an asynchronous terminal or a graphics monitor with keyboard and mouse), SCSI bus terminator, and computer unit power cord. It also describes how to connect system options such as a local-area network (LAN) transceiver, a parallel printer, and asynchronous devices (serial printers, scanners, plotters, or modems).

**NOTE:** 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.

Proceed with this chapter to begin your system installation. In many cases, it will describe all the hardware installation procedures you need to set up and install your entire system. If your system includes external SCSI-based mass-storage devices, you will need the information in Chapter 4, "Setting Up and Installing a SCSI Bus." For an overview of the computer system hardware components, refer to Chapter 1.

**CAUTION:** Do not apply power to the computer unit while setting it up. Refer to Chapter 3 for powerup instructions.

### Connecting the System Console to AViiON 4100 Series

Your system console is the keyboard and display device that receives powerup diagnostic test messages from the computer and from which you bring up your operating system. This section describes how to connect an asynchronous terminal to the computer unit rear panel to use as a system console.

An asynchronous terminal with an ANSI-standard character set and an RS-232-C interface serves as the system console for AViiON 4100 series computers. However, for full functionality in a UNIX® environment, the terminal has to support the display of the ASCII BS (backspace) character by moving the cursor left one column. Furthermore, you need a terminal that conforms to ANSI standard X3.64 (1977) to support a UNIX-based 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.

To connect an asynchronous terminal to the system console port of an AViiON 4100 series system use one of the following cables:

Device	Cable part number	length (ft.)
System console	005-013325	5
	005-033703	15
	005-033788	25
	005-033776	50

To connect a terminal to the system console connector on the computer unit, complete the following steps.

**NOTE:** You will need a small flat-head screwdriver to complete these steps.

As you perform the first two steps refer to Figure 2-1.

1. Align the pins of the cable to the holes in the connector labeled "RS232 A" on the computer unit rear panel.

**NOTE:** Do not use serial Port B for the system console.

2. Secure the cable to the connector by tightening the two cable screws with a small flat-head screwdriver.

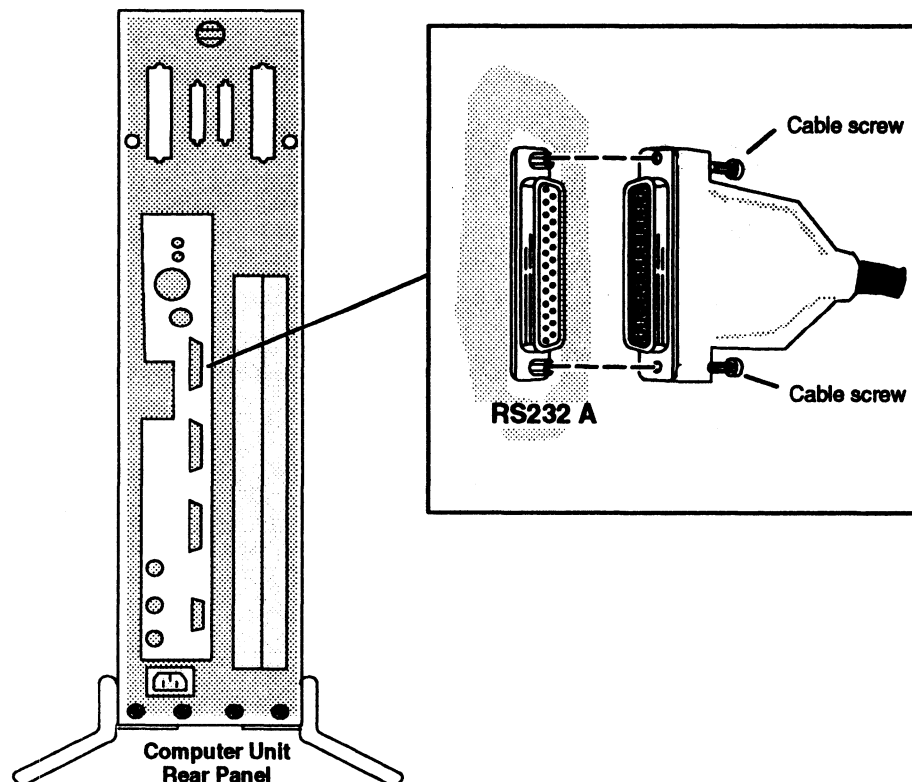


Figure 2-1 Connecting the System Console to an AViiON 4100 Series System

3. Secure the other end of the terminal cable to the RS232 C connector on the back of the terminal. Often, the terminal connector is labeled HOST.
4. 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  
 Enabled flow control

Set the terminal to select these characteristics. For information on terminal switches, see the manual that came with the terminal.

If you have an operating system that supports different terminal characteristics, refer to Chapter 5 for information about changing the console port parameters after your first powerup.

**NOTE:** SCM menus refer to port RS232 A as the “console port” and to port RS232 B as the “modem port.”

## Connecting the System Console to AViiON 4300 Series

Your system console is the keyboard and display device that receives power-up diagnostic test messages from the computer and from which you bring up your operating system. This section describes how to connect an asynchronous terminal to the computer unit rear panel to use as a system console.

Any asynchronous terminal with an ANSI-standard character set and an RS-232-C interface can serve as the system console for AViiON 4300 series computers. However, for full functionality in a UNIX® environment, the terminal has to support the display of the ASCII BS (backspace) character by moving the cursor left one column. Furthermore, you need a terminal that conforms to ANSI standard X3.64 (1977) to support a UNIX-based 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.

To connect an asynchronous terminal to the system console port of an AViiON 4300, use the 9 pin-to-25 pin asynchronous adapter cable (female to female), part number 005-38420, and one of the following cables:

Device	Cable part number	Cable model number	length (ft.)
System console	005-34256	15340E010	10
	005-34990	15340E015	15
	005-34991	15340E025	25

To connect a terminal to the system console connector on the computer unit, complete the following steps.

**NOTE:** You will need a small flat-head screwdriver to complete these steps.

As you perform the first two steps refer to Figure 2-2.

1. Align the holes in the 9-pin end of the asynchronous adapter cable to the pins in the connector labeled "RS232 A" on the computer unit rear panel.

**NOTE:** Do not use serial ports B for the system console.

2. Secure the cable to the connector by tightening the two cable screws with a small flat-head screwdriver.

Secure the other (25-pin) end of the adapter cable into one end of the terminal cable.

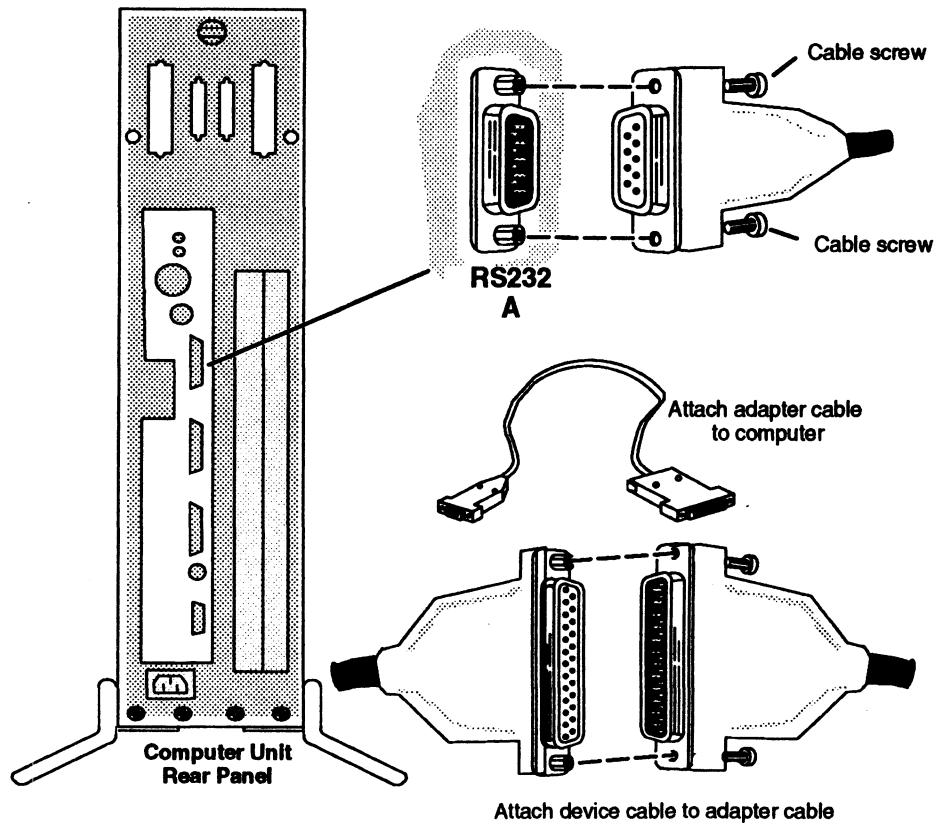


Figure 2-2 Connecting the System Console to an AViiON 4300 System

3. Secure the other end of the terminal cable to the RS-232-C connector on the back of the terminal. Often, the terminal connector is labeled HOST.



4. 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

Enabled flow control

Set the terminal to select these characteristics. For information on terminal switches, see the manual that came with the terminal.

If you have an operating system that supports different terminal characteristics, refer to Appendix B for information about changing the console port parameters after your first powerup. ■

**NOTE:** SCM menus refer to port RS232 A as the “console port” and to port RS232 B as the “modem port.”

## Connecting the Graphics Monitor (AViiON 410 and 412 Series)

This section describes how to connect a color graphics monitor to your AViiON 410 and 412 series computer unit.

AViiON 410 and 412 series systems use the following cables to connect a monitor to the computer unit and to an ac power outlet:

Device	Cable part number	Cable model number
Color monitor (triple BNC)	005-034408	NA
120 volt power cord		109-001253
240 volt power cord		109-001544

1. Place the monitor on top of the work surface. Make sure that the power switches for both the computer unit and the monitor are off, as shown in Figure 2-3.

**CAUTION:** *The monitor is heavy (approximately 60 pounds); be careful when moving it.*

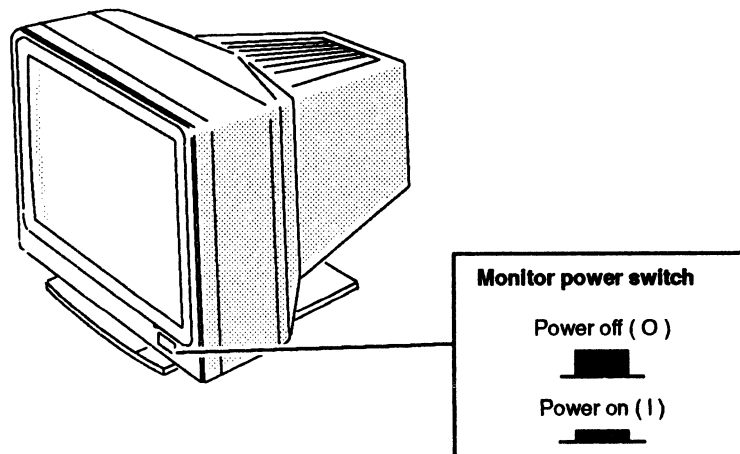
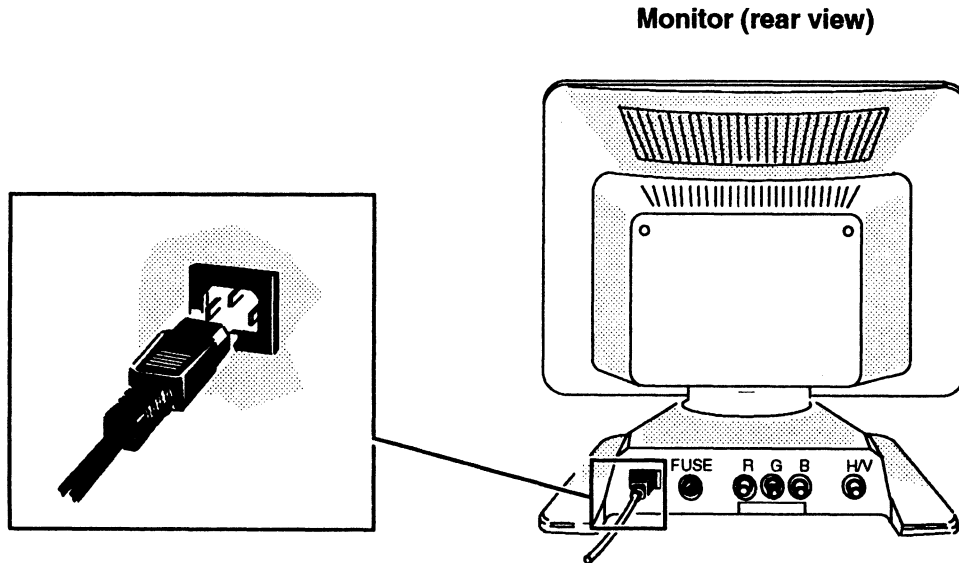


Figure 2-3 Placing the Graphics Monitor

2. Plug the female end of the monitor power cord into the ac connector at the back of the monitor. Plug the male end of the monitor power cord into an ac outlet. Figure 2-4 illustrates how to connect the monitor cord.



*Figure 2-4 Connecting the Color Monitor Power Cord*

3. Plug one end of the monitor BNC cable into the connectors on the back of the monitor. The cable is coded with red, green, and blue color strips near the connector ends. Connect the red cable to the R monitor connector, the green cable to the G/MONO connector, and the blue cable to the B connector, as shown in Figure 2-5. Turn the ends of the cables clockwise to lock them in place.

**NOTE:** If you are cabling the computer unit for gray-scale operation, plug only the *green* BNC cable into the G/MONO connector.

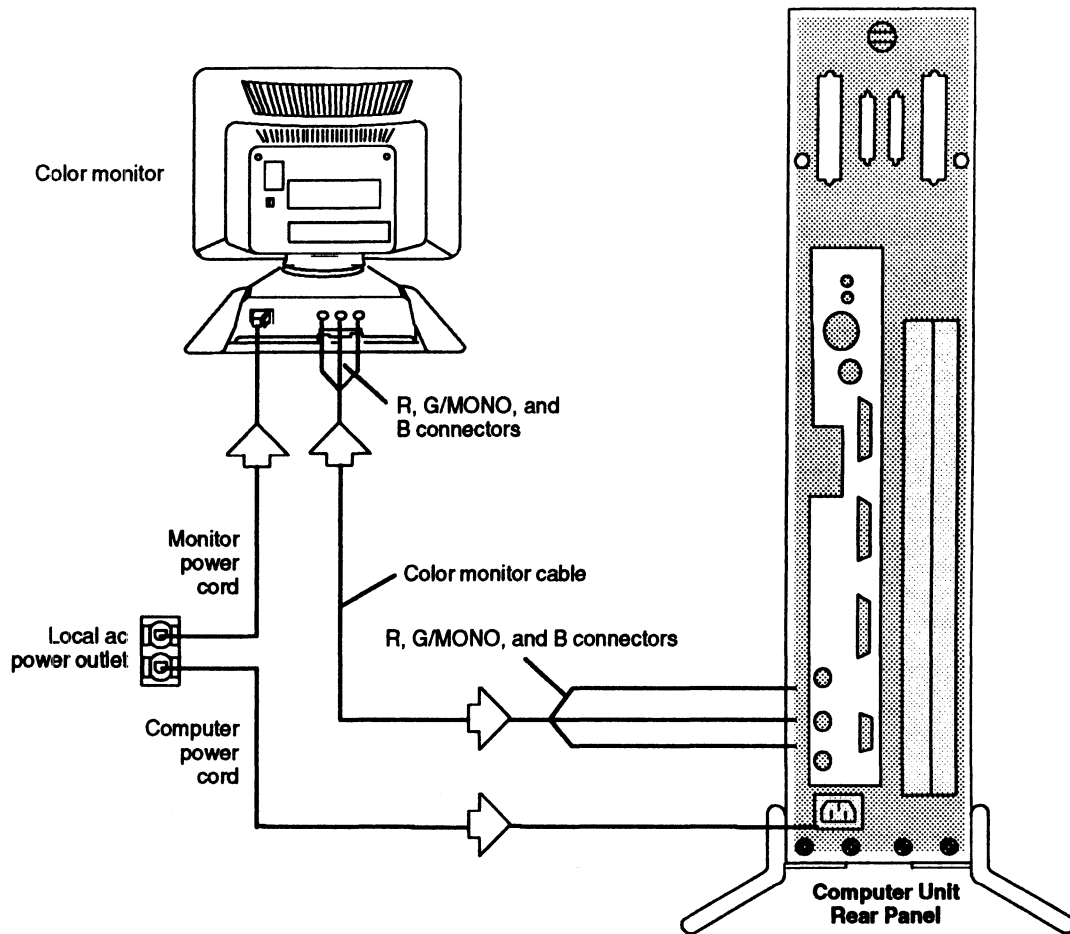


Figure 2-5 Plugging the Cables and Power Cord into the Monitor and Computer Unit

4. Plug the other end of the monitor cable into the connectors on the back of the computer unit. The color monitor cable has color-coded ends which plug into the appropriate R, G/MONO, and B connectors on the back of the computer unit, as shown in Figure 2-5. Turn the ends of the cables clockwise to lock them in place.

**NOTE:** If you are cabling the computer unit for gray-scale operation, plug only the *green* BNC cable into the G/MONO connector.

## Connecting the Keyboard (AViiON 410 and 412 Series)

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.

**CAUTION:** Do not remove or replace your keyboard while the computer power is on.

AViiON 400 series systems use the following extension cable to connect the keyboard cable to the computer unit:

Cable	part number	model number	length (ft.)
Keyboard (extension)	005-08469	1538E006	6

1. Position the computer unit so that you have access to the rear panel connectors.
2. Place the keyboard on the work surface.
3. Plug the female end of the keyboard extension cable into 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 2-6.

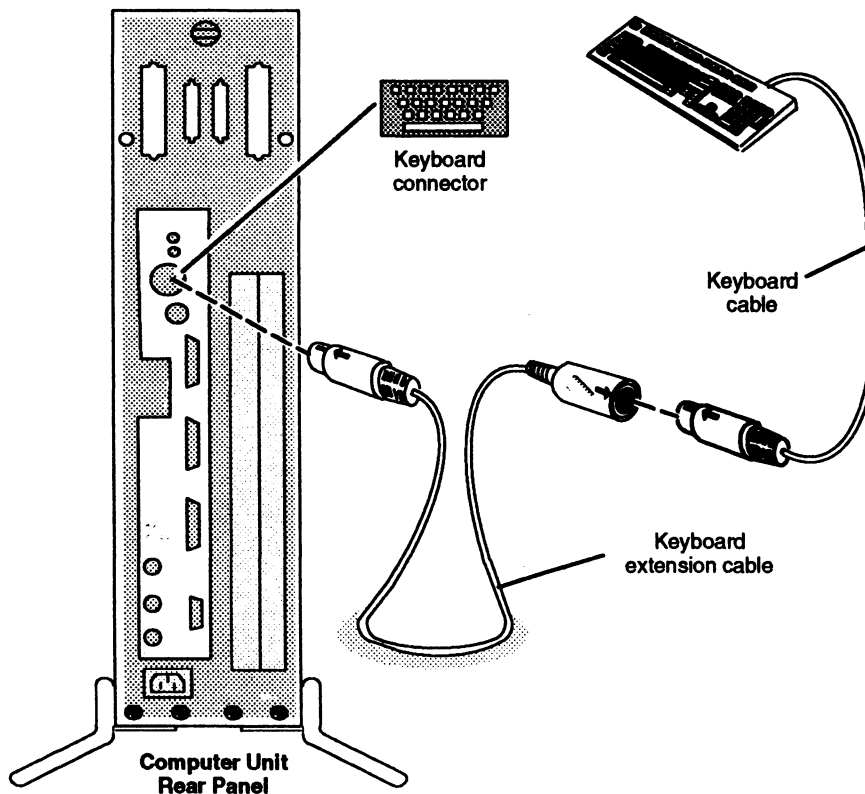


Figure 2-6 Connecting the Keyboard

## Connecting the Mouse (AViON 410 and 412 Series)

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

**CAUTION:** *Do not remove or replace your mouse while computer power is on.*

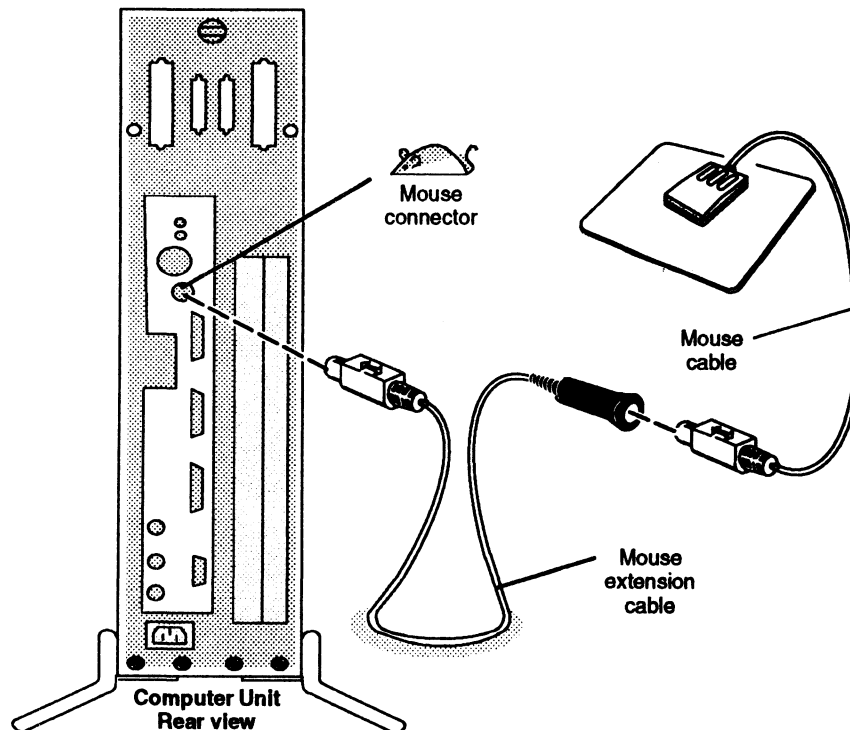
AViON 410 and 412 series systems use the following extension cable to connect the mouse cable to the computer unit:

Cable	part number	model number	length (ft.)
Mouse (extension)	005-08468	1537E005	5

1. Position the computer unit so that you have access to the rear panel connectors.
2. Place the mouse and pad on the work surface with the shiny side facing up. Position the mouse pad so that its longer side aligns with the edge of the work surface and place the mouse on the mouse pad.

**NOTE:** For right-handed use, position the mouse pad just to the right of the keyboard; place it to the left for left-handed use.

3. Plug the female end of the mouse extension cable into the end of the mouse cable; then, plug the other end of the extended mouse cable into the mouse connector on the rear panel of the computer unit, as shown in Figure 2-7.



*Figure 2-7 Connecting the Mouse*

**NOTE:** The mouse is initially set at 1200 baud. Refer to Appendix B for information about changing the mouse baud rate setting.

## Connecting a Cluster Controller Cable to a VDA Adapter (AViON 4300 Series)

To attach a controller cluster to a VDA/255 adapter, you need a BNC host connector, which connects to the BNC connector on your AViON 4300 computer system. Figure 2-8 shows the host connector and the location of the VDA port.

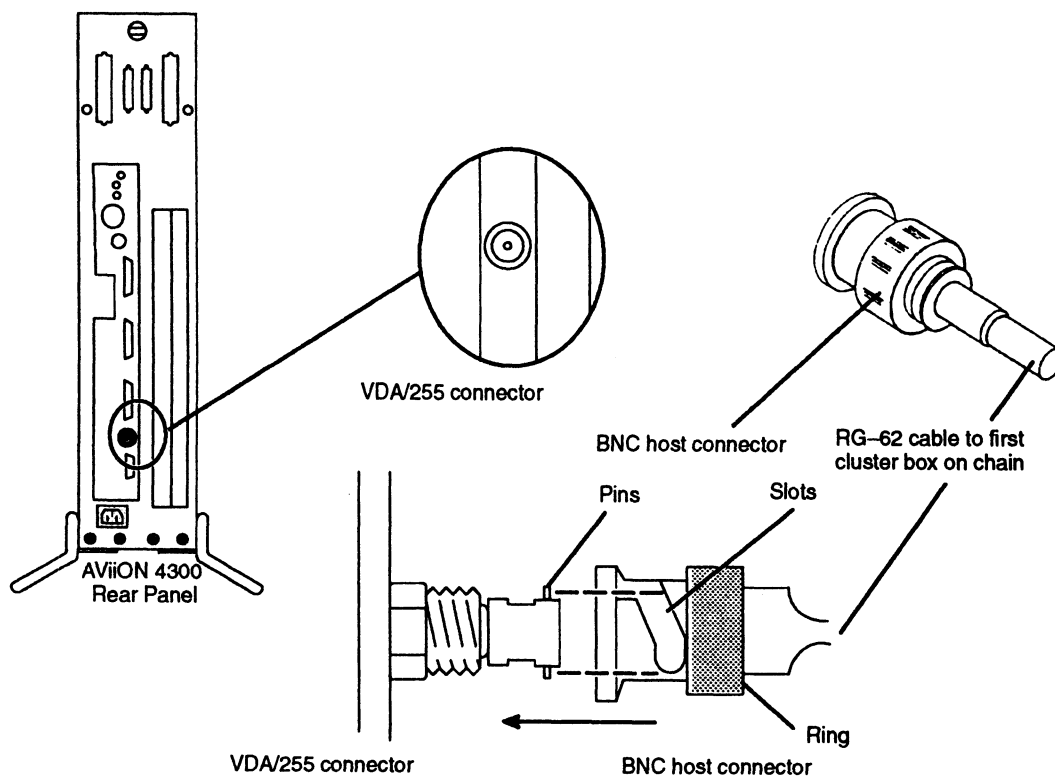


Figure 2-8 VDA/255 Connector

**NOTE:** You must connect the cluster line cable to your computer with a host connector rather than a T-fitting. T-fittings connect the cluster boxes to the cable chain. For information on how to install the cluster boxes, refer to the *Setting Up and Installing VMEbus Options in AViON® Systems* manual.

To connect a host connector to the receptacle on the adapter board, simply push the host connector firmly onto the receptacle, making sure that the pins on the receiving fitting slide completely into the slots on the host connector. See Figure 2-9. Then turn the knurled ring on the connector clockwise until the pins on the receiving connector snap into place.

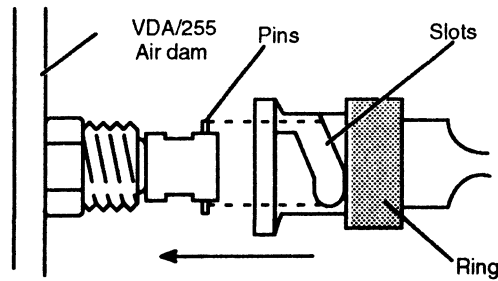


Figure 2-9 Attaching a BNC Host Connector to a VDA/255 Receptacle

## Connecting a Local Area Network Cable

If your computer system will be part of a local area network (LAN), you must connect the LAN transceiver cable to the 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* (listed in the Preface) for detailed information about installing your Ethernet network.

**NOTE:** Your AViiON 410, 412, 4100 or 4300 series system may include optional VLC, VTC, or VTRC controllers installed in the rear panel VME card cage. Refer to *Setting Up and Installing VMEbus Options in AViiON® Systems* for information about installing VMEbus options.

AViiON 410, 412, 4100, or 4300 series systems use the following cables to connect an Ethernet LAN to the rear panel connector(s):

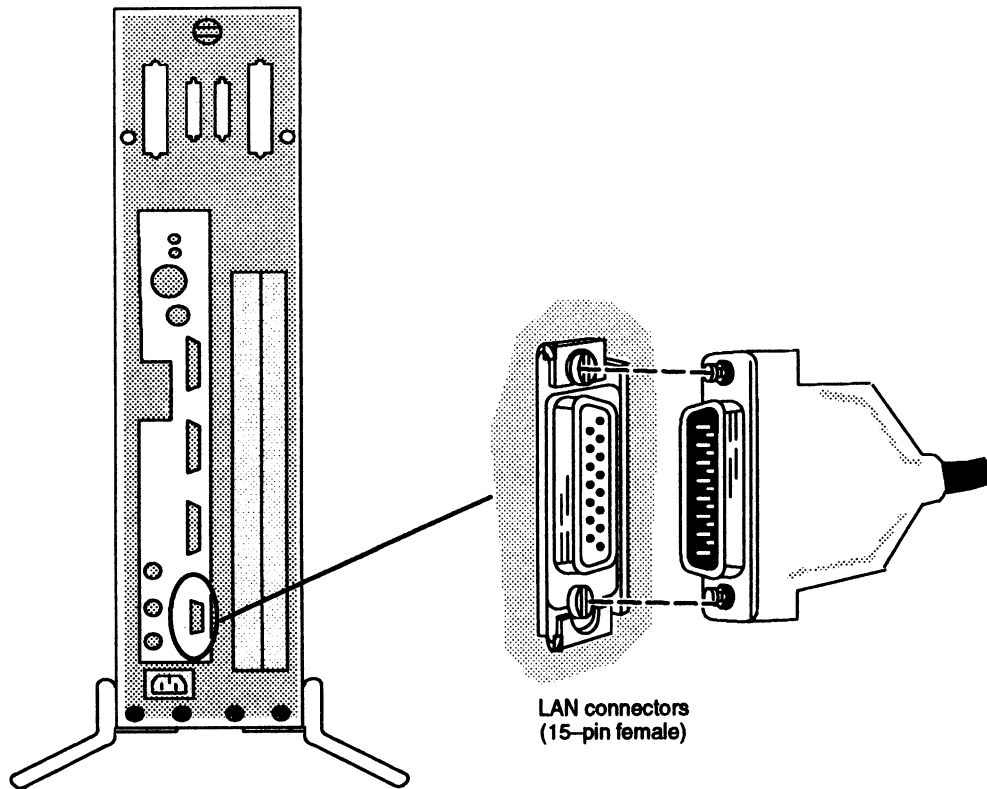
Cable type	Cable part number	Cable model number	length (ft.)
Teflon ® (plenum)	005-33791	1326	16.4
	005-33787	1326A	65.6
PVC	005-33766	15274E005	16.4
	005-31694	15274E020	65.6

To connect a LAN transceiver cable to the computer unit LAN connector, complete the following steps. You will need a flat-blade screwdriver or comparable tool to complete these steps. Reverse the order of these steps to remove a faulty LAN cable in order to replace it.

**NOTE:** An optional screw converter kit (part number 005-37438) enables you to remove the sliding lock assembly described in these steps and use screw mounts to secure your LAN cable. If you received this option, refer to the instructions that came with the screw converter kit.



3. Align the holes in the transceiver cable with the pins in the computer unit LAN connector, shown in Figure 2-10.



*Figure 2-10 Connecting the LAN Transceiver Cable to the Computer Unit*

4. As shown in Figure 2-11(a) and 2-11(b), line up the slide clip on the computer unit connector so that the slide clip mounts on the cable can pass through; then push the cable firmly into the connector.

5. Once the cable and clip mounts are secured to the connector, slide the clip using your screwdriver or a comparable tool to lock the cable in place, as shown in Figure 2-11(c).

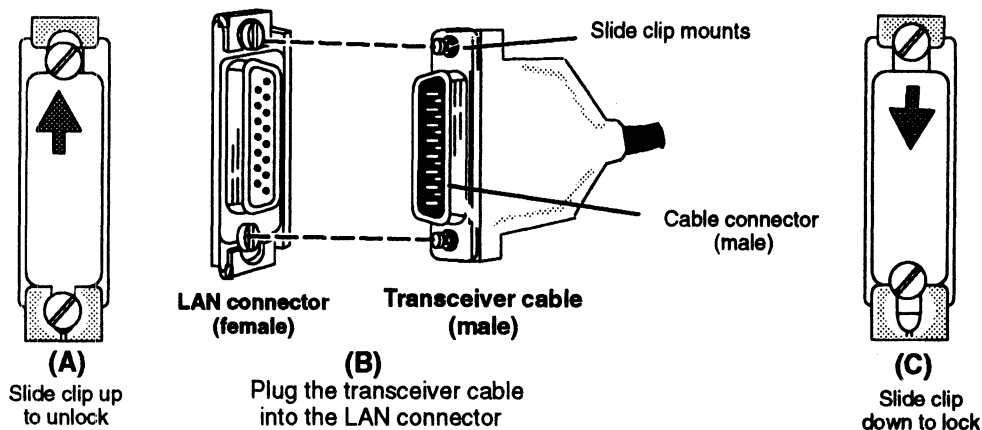


Figure 2-11 Attaching and Securing the LAN Transceiver Cable

## Connecting Asynchronous Devices

This section describes how to connect an asynchronous device such as a display terminal, modem, scanner, plotter, or printer to any of the three serial port connectors on the computer unit rear panel.

### Connecting Asynchronous Devices to AViiON 410, 412, or 4100 Series Systems

AViiON 410, 412, or 4100 series systems use the following cables to connect asynchronous serial devices to the rear panel connectors:

Device	Cable part number	length (ft.)
Terminal, modem, or system console	005-013325	5
	005-033703	15
	005-033788	25
	005-033776	50

Complete the following steps to connect an asynchronous device to your computer system. Reverse these steps to remove or replace an asynchronous device. You will need a nonmagnetic, small flat-blade screwdriver or similar tool to complete these steps. Refer to Figure 2-12 as you perform the first three steps.

1. Align the pins of the cable to one of the two connectors on the two male connectors on the back of the computer unit. The connectors are labeled RS232 A and RS232 B. Use the A port for the first device you connect.

**NOTE:** If an asynchronous terminal will serve as a workstation system console instead of a graphics monitor and keyboard, you must connect the terminal to Port A and disconnect the keyboard from its computer unit connector.

Devices requiring Data Carrier Detect (DCD) signal transmission further require installation of a DCD enabling jumper on the system board. On systems running the DG/UX operating system, such devices include all terminals. DCD to the system console serial port connector marked RS232 A is factory-enabled; to operate another terminal connected to Port B, you must install an enabling jumper as shown in Figure 9-10.

2. Secure the cable to the connector by tightening the two cable screws with a small flat-head screwdriver.

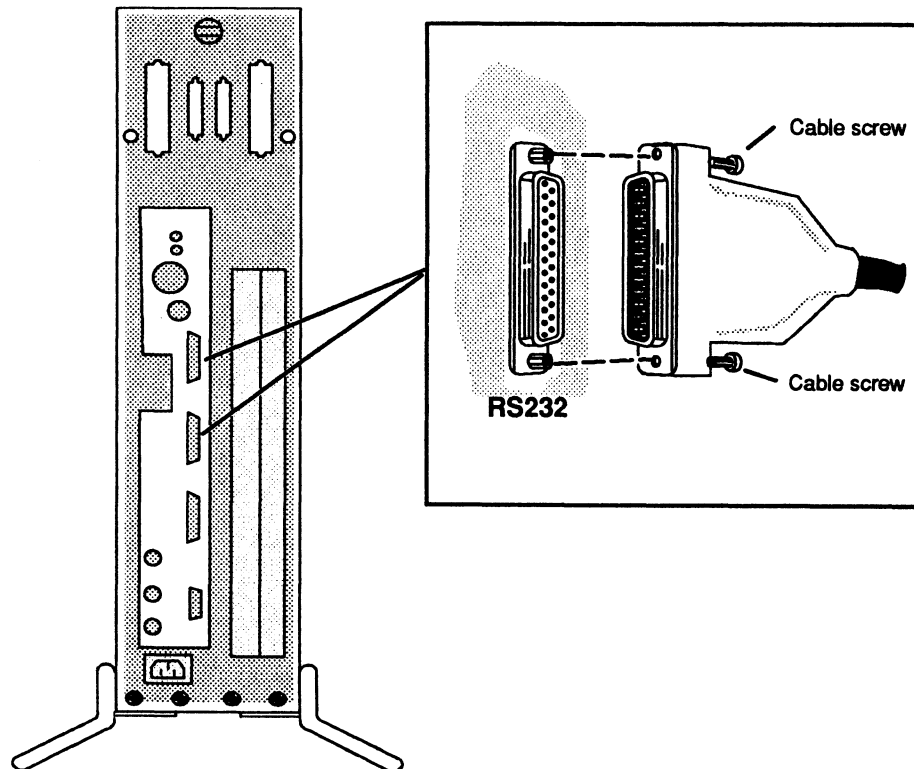


Figure 2-12 Connecting Devices to the Computer Unit Serial Ports (AViiON 410, 412, and 4100 Series)

3. Connect the device cable to the RS232 C connector on the back of the terminal, modem, or printer and secure the cable connection.
4. Set the switches or configuration menu on the terminal, modem, or printer to select the appropriate characteristics. Initially, both your firmware and the DG/UX operating system require that the device connected to port "RS232 A" have the following characteristics:  
  
9600 baud      8 data bits  
No parity      ANSI character set  
Enabled flow control

**NOTE:** These default settings are applied to both asynchronous ports prior to shipment.

Set the switches or configuration menu to select these characteristics. For information on device switches or configuration menus, see the manual that came with the device.

If you need to change these default characteristics, refer to Appendix B for information about changing the configuration parameters after your first powerup. SCM menus refer to serial Port A as the "console port" and to Port B as the "modem port."

## Connecting Asynchronous Devices to AViiON 4300 Series Systems

AViiON 4300 use the following cables to connect asynchronous serial devices to the rear panel connectors:

part number 00538420

9- to 25-pin (female-female)  
asynchronous adapter cable

and one of the following:

Device	Cable part number	Cable model number	length (ft.)
Terminal or system console	005-34256	15340E010	10
	005-34990	15340E015	15
	005-34991	15340E025	25
Modem	005-36256	15369E010	10
	005-36257	15369E015	15
	005-36258	15369E025	25

Complete the following steps to connect an asynchronous device to your computer system. Reverse these steps to remove or replace an asynchronous device. You will need a nonmagnetic, small flat-blade screwdriver or similar tool to complete these steps. Refer to Figure 2-13 as you perform the first three steps.

1. Plug the 9-pin female end of the asynchronous adapter cable into one of the two male connectors on the back of the computer unit. The connectors are labeled RS232 A and RS232 B. Use the A port for the first device you connect.

**NOTE:** If an asynchronous terminal will serve as a workstation system console instead of a graphics monitor, you must connect the terminal to the Port A and disconnect the graphics keyboard from its computer unit connector.

2. Secure the adapter cable to the connector by aligning and then tightening the two screws on the cable.

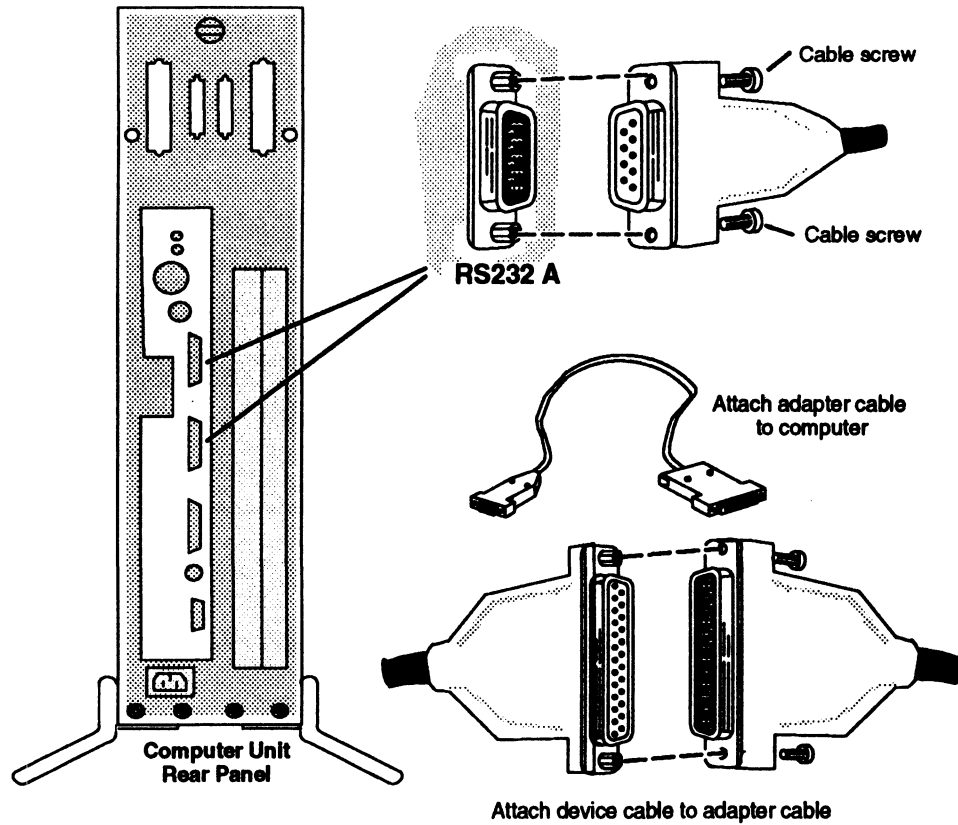


Figure 2-13 Connecting Devices to the Computer Unit Serial Ports (AViON 4300)

3. Connect the device cable to the RS232 C connector on the back of the terminal, modem, or printer and secure the cable connection.
4. Set the switches or configuration menu on the terminal, modem, or printer to select the appropriate characteristics. Initially, both your firmware and the DG/UX operating system require that the devices connected to port "RS232 A" have the following characteristics:

9600 baud      8 data bits  
No parity      ANSI character set  
Enabled flow control

NOTE: These default settings are applied to both asynchronous ports A and B prior to shipment.

Set the switches or configuration menu to select these characteristics. For information on device switches, see the manual that came with the device.

If you need to change these default characteristics, refer to Appendix B for information about changing the configuration parameters after your first powerup. SCM menus refer to serial Port A as the "console port" and to Port B as the "modem port."

## Connecting a Parallel Printer

This section describes how to connect a parallel printer with a Centronics LPT1 interface. Reverse the order of these steps to remove or replace your parallel printer cable.

AViON 410, 412, 4100, and 4300 series systems use the following 25-pin CHAMP cables to connect a parallel printer to the rear panel connector:

Device	Cable part number	Cable model number	length (ft.)
Parallel printer	005-023915	10235	5
(Centronics LPT1 interface)	005-033762	15293E030	30

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 2-14. Attach the printer cable to the connector by tightening the two screws on the printer cable.

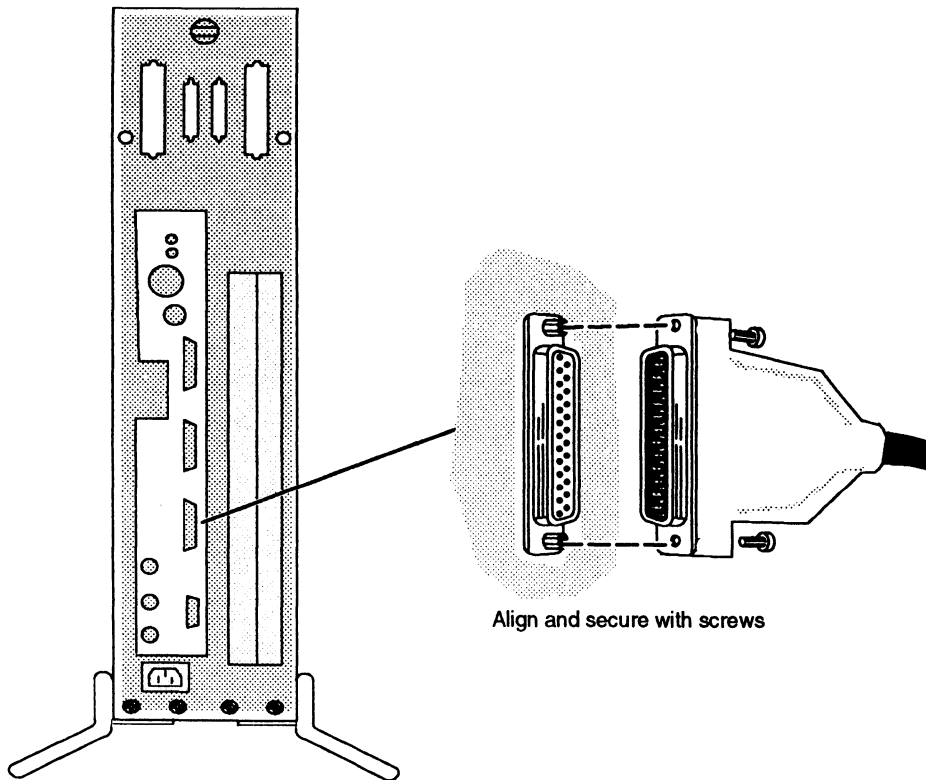


Figure 2-14 Connecting a Parallel Printer to the Computer Unit

2. Plug the other (36-position CHAMP) end of the printer cable into the connector on the parallel printer. See the documentation that came with the printer for further instructions.

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

## Terminating an Internal SCSI Bus

If your system does not include any *external* mass-storage subsystems or drives, you must terminate the bus that links the Small Computer System Interface (SCSI) controller, your internal SCSI drives, and the SCSI A rear panel connector. Your tape and disk drives will not operate correctly until the SCSI A bus is properly terminated.

**NOTE:** In most cases, your computer unit is shipped with the SCSI bus terminator(s) already installed. If a large black plug occupies the rear panel connector(s) labeled SCSI, and you have no external SCSI devices, you can skip this section and continue with the next section, “Connecting the Computer Unit Power Cord.”

If your system *includes* external SCSI drives (any disk, tape, diskette, CD-ROM, or optical disk drive housed outside the computer unit), skip this section and refer to Chapter 4, “Setting Up and Installing a SCSI Bus.” When you finish setting up and installing your external SCSI bus, return to the last section in this chapter, “Connecting the Computer Unit Power Cord.”

To terminate an internal SCSI bus, follow these steps.

5. Locate the CHAMP terminator plug, Data General number 005-033334, and the SCSI rear panel connector shown in Figure 2-15.

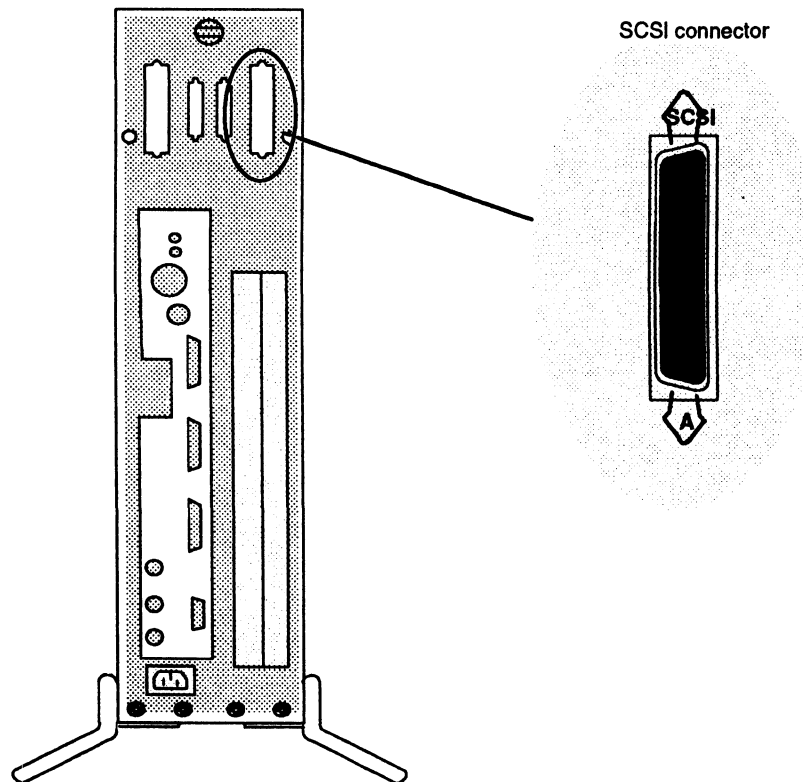


Figure 2-15 AViiON 410, 412, 4100, and 4300 Series SCSI Bus Connector



- Align the connector pin numbers and the D-shaped connector bevels before gently inserting the plug in the SCSI connector, as shown in Figure 2-16.

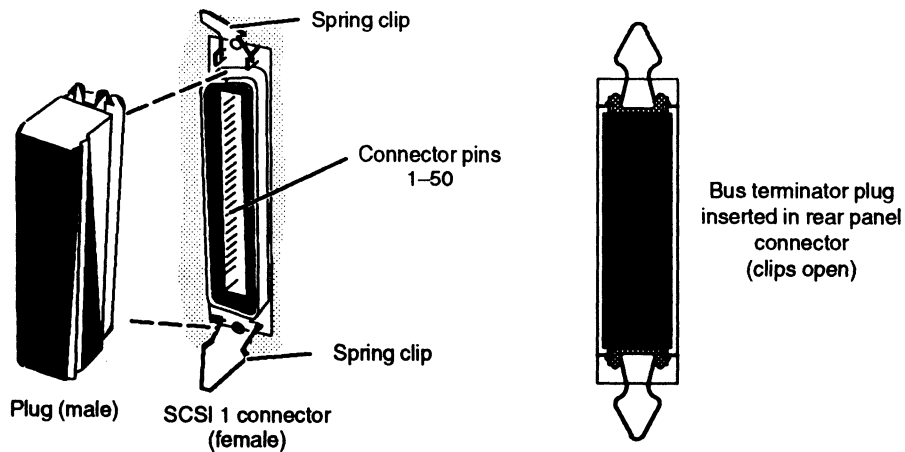


Figure 2-16 Installing the SCSI Bus Terminator Plug

- Push the spring clips attached to the SCSI 1 connector straight down or straight up into the brackets on the terminator plug, as shown in Figure 2-17. Your vertical pressure will push the clips into place; do not squeeze or pull the clips out of shape.

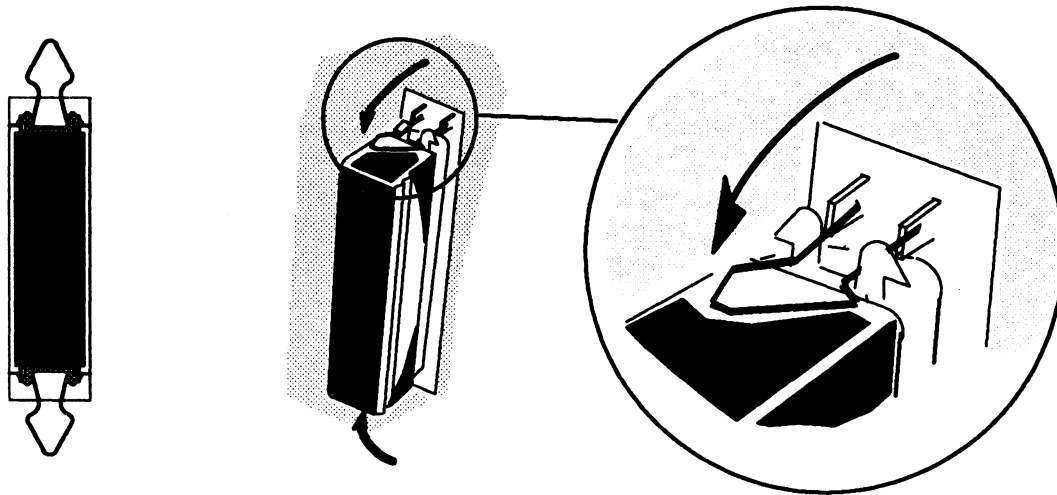


Figure 2-17 Securing a SCSI Bus Terminator

**NOTE:** To remove a terminator, simply reverse the process illustrated above; pull the clips vertically and gently pull the terminator out of the rear panel connector.

## Connecting the Computer Unit Power Cord

After you have assembled your computer system, including any devices connected to VME-based option boards, use these steps to connect the computer unit power cord to an ac outlet and complete your set-up procedures. Reverse the order of these steps to disconnect the computer unit power cord.

**CAUTION:** *Make sure that the computer unit power switch is off before connecting the power cord.*

1. Locate the computer unit power cord. The correct power cord part number ensures that you are using a proper cord for your site's voltage. AViiON 410, 412, 4100, and 4300 series computers use the following power cords:

Cord	part number	model number	Country
120 volt	109-996		US
100 volt	109-996	-1	US/Canada
240 volt	109-813	-5	UK <sup>1</sup>
240 volt	109-809	-6	Australia
220 volt	109-812	-7	Europe <sup>2</sup>
220 volt	109-811	-8	Italy
220 volt	109-815	-9	Denmark
220 volt	109-810	-0	Switzerland

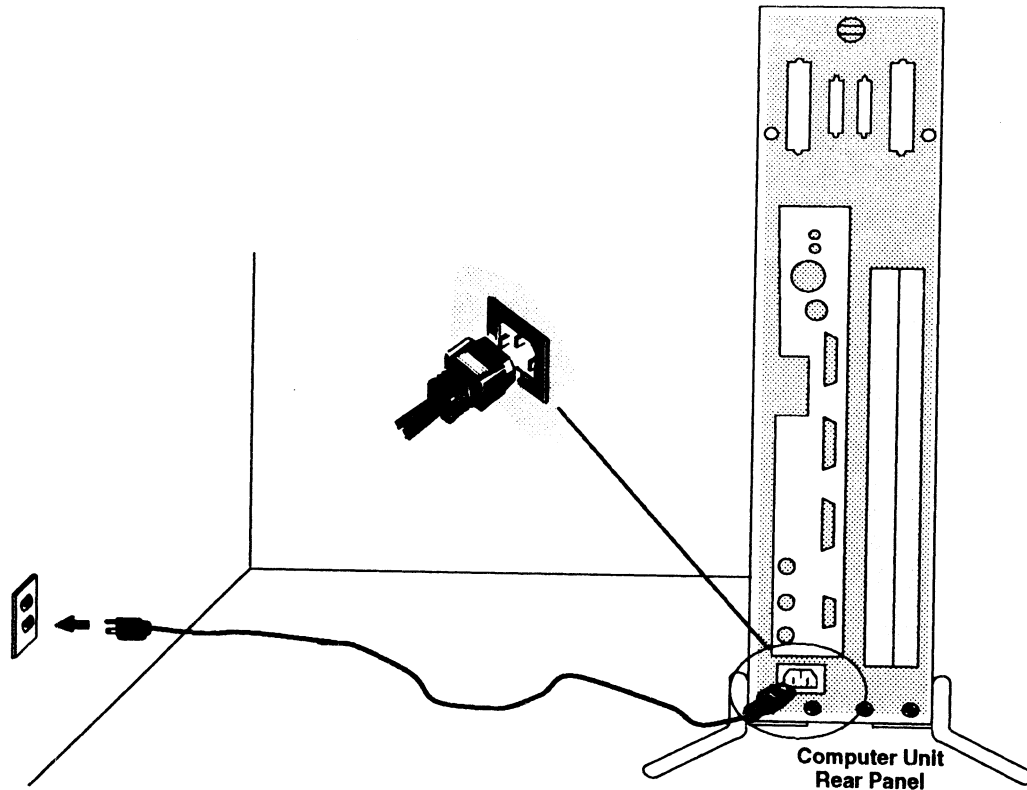
<sup>1</sup> Used in Bangladesh, Bermuda, Hong Kong, Nigeria, Pakistan, Singapore, Sri Lanka, and the United Arab Republics.

<sup>2</sup> Excluding Italy, Switzerland, the United Kingdom, and Denmark.

2. The computer unit is shipped with a yellow and black warning label covering the rear panel ac connector. Examine the computer unit's device rating label to be sure your computer unit's voltage is properly set for your site. If the label indicates proper voltage, remove the warning label and plug the female end of the computer unit power cord into the ac connector as shown in Figure 2-18.

**WARNING:** **Do not attempt to connect or power up your machine if it is not compatible with your ac power source. If the warning label does not indicate the proper voltage selection for your site, contact Data General before continuing.**

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



*Figure 2-18 Connecting the Computer Unit Power Cord*

Now that you have set up the computer system hardware, continue with the steps in Chapter 3 to ensure that the computer system starts properly, to become familiar with power-up procedures, and to verify that the computer system hardware passes all power-up diagnostic tests. When you complete the procedures described in Chapter 3, you can install your operating system and application software.

End of Chapter



# Chapter 3

## Starting and Stopping Your Computer System

The first section of this chapter describes a normal powerup sequence. After you install your computer system hardware (for the first time, as described in Chapter 2, or after hardware maintenance, as described in Chapter 5), follow the steps in the “Powering Up” section of this chapter to start the computer and boot your operating system. The last section of this chapter explains how to properly power down, reset and restart the computer system.

### Starting the Computer System

Each time you apply ac power to your computer system, a series of diagnostic tests in the firmware verify that the hardware is functioning well enough to run your operating system and its applications. Appendix A, “Solving Powerup Problems,” describes what you can do if your computer system fails to successfully complete power-up diagnostic tests. The following sections describe how to power up your system, and describe what you should do the first time you start up your AViON 410, 412, 4100, or 4300 series computer.

Once you install and customize your operating system, the sequence of events and displays you see after powerup testing will change; refer to your operating system documentation for information on booting software.

**CAUTION:** *Verify that the computer unit, monitor, peripherals, and all power cords have appropriate ac power voltage for your site as described in Chapter 2, before turning on power to your computer system.*

### Powering Up

This section describes how to power up your computer system. It is important that you turn power on to the computer unit and peripherals in the proper sequence, and that your computer system complete the powerup testing properly.

1. Turn on power to the system console. For graphics workstations, turn on power to the display monitor, as shown in Figure 3-1.

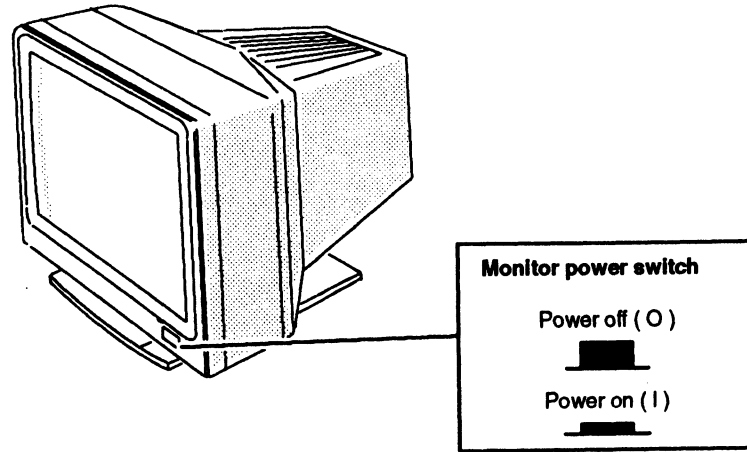


Figure 3-1 Monitor Power Switch

2. If you have a Peripheral Housing Unit (PHU), a combined storage subsystem (CSS2/DC), or another external peripheral unit connected to your computer system, turn on power to that device. Figure 3-2 shows how to turn on power to a PHU or CSS/DC.

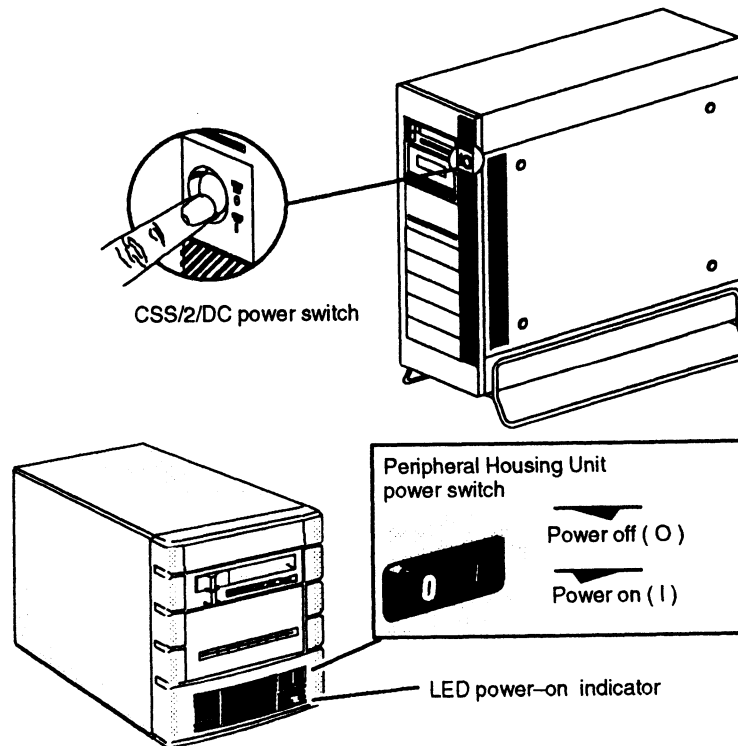
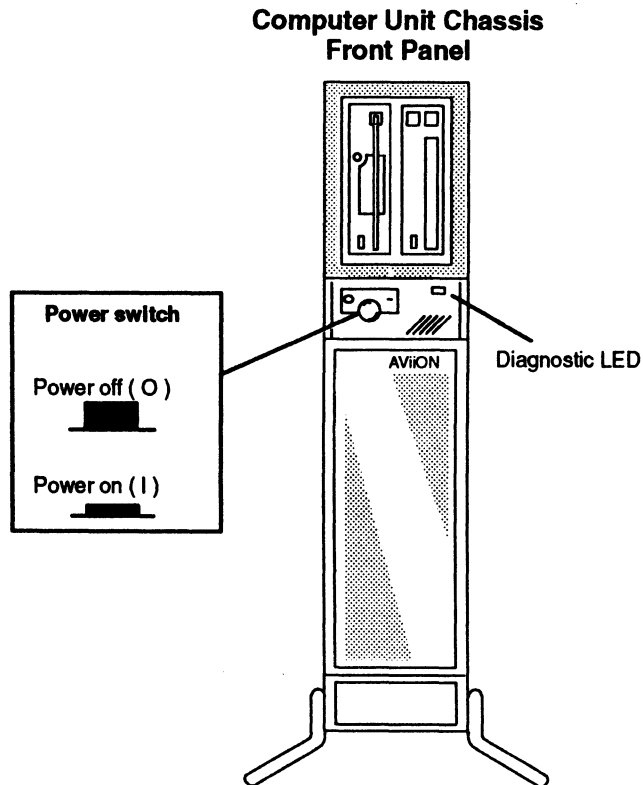


Figure 3-2 Peripheral Housing Unit (PHU) and Combined Storage Subsystem Deskside Chassis (CSS2/DC) Power Switch

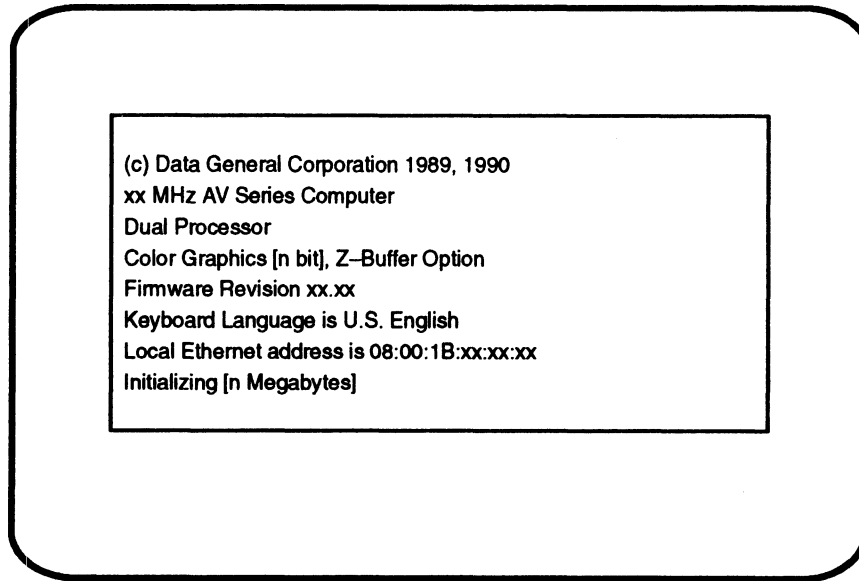
3. If you have a printer or other devices connected to your computer system, including those connected to VME-based controllers, turn on power and make sure that each is *on line*. For specific information, see the documentation that came with the devices.
4. Turn on power to the computer unit by pressing the computer unit's power switch as shown in Figure 3-3.



*Figure 3-3 Computer Unit Power Switch and LED Power-On Indicator*

5. Watch the system console (or graphics display monitor on an AViiON 410 or 412 series system) carefully. You will hear beep tones from the computer unit speaker. After approximately 10 seconds, the screen displays a power-up window in the center of the screen with a black cursor in its top left corner, followed by initialization messages after another several seconds. Continue with the next step when you see text messages in the powerup window. If the console does not behave in this manner, refer to Appendix A, "Solving Powerup Problems."

Your AViiON 410 or 412 series system should display initialization text similar to the following example:



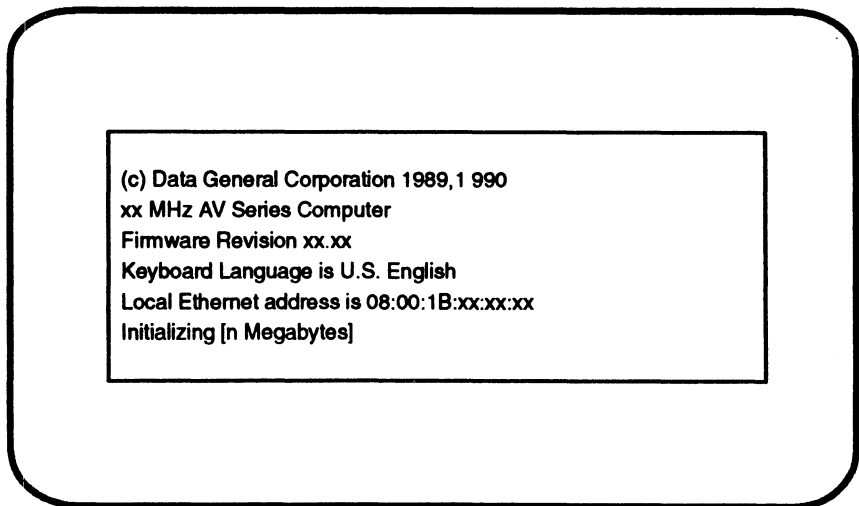
**Where**

xx MHz  
Dual Processor  
Single Processor  
n bit  
Z-Buffer Option  
n Megabytes

**Indicates**

Computer system clock speed, in megahertz  
Second CPU installed  
Second CPU option not installed  
Type of graphics board installed  
Enhanced graphics board installed  
Amount of memory installed

Your AViiON 4100 or 4300 series system should display initialization text similar to the following example:



**Where**

xx MHz  
n Megabytes

**Indicates**

Computer system clock speed, in megahertz  
Amount of memory installed



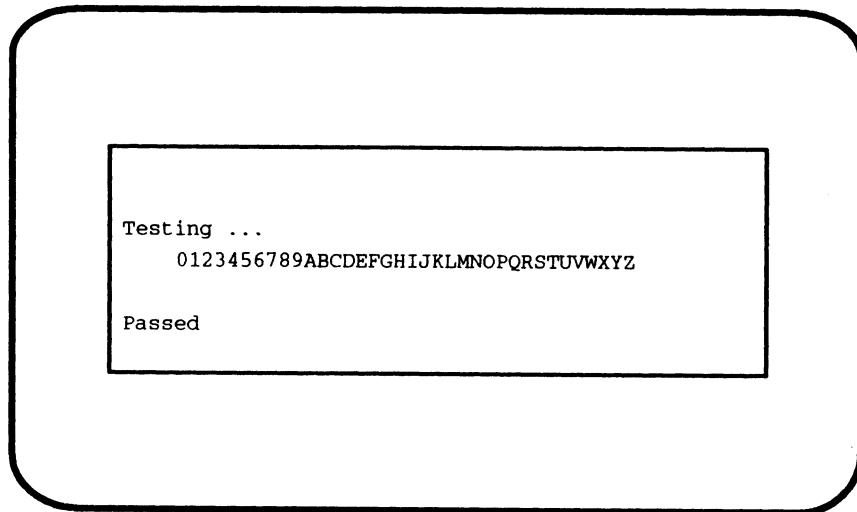
If your display does not appear as described, turn power off to the computer unit, to the graphics or nongraphics console, and to all connected peripherals; wait approximately one minute, and then repeat steps 1 through 4. If the trouble persists, refer to Appendix A, "Solving Powerup Problems."

- 6. Examine the initialization information in your powerup display carefully. Once you have verified that the information is correct, continue with the next step.

**NOTE:** Write down the computer system Ethernet address for future use. If any of the initialization messages report inaccurate information, or if your system does not find components that you ordered, contact Data General immediately.

- 7. After the computer system hardware is initialized, powerup tests begin. As testing progresses, each character in the alphanumeric sequence 0123...ABC...Z appears on the screen, indicating that the hardware has passed.

Make sure that powerup tests complete. Once the system displays the message Passed, continue to the next step. Your console screen appears as follows:



If the test messages are incomplete or include an error message, refer to Appendix A, "Solving Powerup Problems."

**NOTE:** If you installed add-on memory modules, the testing may halt when the "2" is displayed. Simply press the space bar to continue the self test.

- 8. After power-up testing is completed, your computer system tries to automatically boot the operating system. If your systems has a preloaded disk, your screen displays the name of the disk and file that your computer system is attempting to boot, as follows:

```
Loading image. . . . .
DG/UX System Release 5.4, Version Installer
```

If your system does not have a preloaded disk, the SCM> prompt will be displayed on your system console screen.

What happens next depends on whether or not you ordered a preloaded DG/UX operating system package.

## Your Next Step

If you ordered the DG/UX operating system preloaded on disk, the system automatically boots the DG/UX installer kernel.

If you did *not* order DG/UX preloaded on disk or if you intend to run a different operating system, see the appropriate operating system installation manuals now. Refer to the following instructions depending on whether or not you ordered DG/UX preloaded on your system.

## Preloaded DG/UX Systems

Once your firmware has successfully booted the DG/UX bootstrap, the hardware powerup is complete and the booted operating system takes over. The DG/UX bootstrap program displays initialization and sizing messages, and then enters the DG/UX installer kernel. Your screen display stops for your input and asks:

```
Do you want to configure any nonstandard devices? [no]
```

You will reach this point each time you power up, until you build a DG/UX kernel, as described in the manual *Customizing the DG/UX™ System*.

**NOTE:** If you ordered a preloaded DG/UX operating system package, but the installer kernel fails to boot automatically, first refer to Appendix A, “Solving Powerup Problems,” to verify that the trouble is not caused by the way you set up your hardware. Then try to boot DG/UX manually by typing the following command line at the SCM prompt:

```
SCM> b sd(insc(),0)root:/dgux.installer -i}
```

If the DG/UX installer kernel fails to boot again, contact Data General as described in the Preface.

## Systems Without Preloaded DG/UX

If you did *not* order preloaded DG/UX with your computer unit or if you intend to run a different operating system, the automatic boot process will fail.

When the automatic boot sequence fails to boot the DG/UX installer kernel, you’ll see this message from the System Control Monitor (SCM):

```
Unable to load bootfile sd(insc(),0)root:/dgux...
```

You have *not* failed the firmware powerup; your system has simply failed to boot the DG/UX installer kernel from disk. Proceed now to your operating system documentation for installation instructions.

For information about the SCM configuration menus, refer to Appendix B. You can use these menus to change asynchronous port B, display console, mouse, or keyboard

configuration parameters. Once your operating system is installed, you can use an SCM menu to change the default boot path to that of your configured operating system; it will then come up automatically in subsequent powerups.

To run a diagnostics acceptance test, refer to the instructions in the manual *Using AViiON® System Diagnostics*. When you finish running diagnostics, proceed to your operating system documentation for installation instructions.

## Shutting Down Your Computer System

Each time you turn off the computer system, you must complete a software sequence of shutdown procedures to ensure that data is not lost and that you leave the hardware in the proper state. It is important to bring down your software and turn power off to your computer and peripherals in the correct order.

This section describes the various ways you can shut down your computer system. If your AViiON computer system provides resources for other computers, you probably won't shut it down very often. If you use your computer system as a stand-alone system or as a client to a server system, however, you are likely to start it at the beginning of each work day and shut it down at the close of the day. Once you become familiar with powerdown, reset, and restart procedures, you won't need to follow the steps in this section to shut down or reset your computer system.

### Powering Down

Follow these steps when shutting down the computer system entirely; for instance, when the computer system won't be used for a long period, or when you plan any kind of hardware maintenance tasks. You may also want to powerdown if your computer system is experiencing intermittent errors; often the process of restoring hardware components to the powerup state resolves temporary problems, or identifies problems that are not temporary.

**CAUTION:** *Never turn off power to your computer system before properly shutting down your operating system software. Resetting or cycling power to your computer while the operating system is running may result in lost data.*

1. Shut down your applications and operating system software according to the procedures in your operating system documentation. For a DG/UX system, the sequence to *immediately* shut down the operating system is as follows:

```
# cd / ↵
# shutdown -g0 -y ↵
# halt -q ↵
```

2. Once you see the SCM prompt displayed on the system console, turn off power. Make sure you turn off power to each device.
3. Turn off power to the computer unit by pressing the computer unit's power switch

4. If you have a Peripheral Housing Unit (PHU), Combined Storage Subsystem Deskside Chassis (CSS/DC) or another external storage device connected to your computer system, turn off power to the external unit.
5. Turn off power to the monitor or system console.
6. Wait at least a minute before attempting to restart your computer system. Listen for the computer unit fan; do not turn power back on until you hear that the fan has stopped spinning.

## Resetting the Computer System

As long as your computer system has completed powerup testing, you can reset the hardware at any time by pressing the reset switch on the computer unit rear panel. Figure 3-4 shows the location of the computer unit power and reset switches.

**CAUTION:** *Never press the reset switch during powerup testing. If you want to interrupt a powerup sequence, wait until you see the message Passed. Also, remember that resetting or cycling power to your computer while your operating system is running may result in lost data. Always try to shut down your operating system before resetting your computer system.*

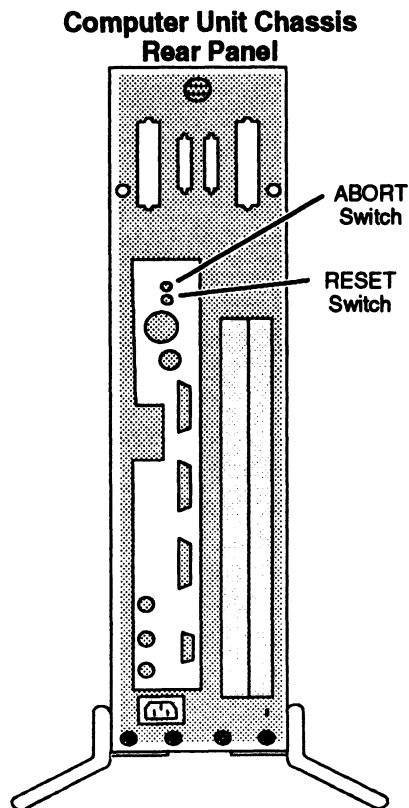


Figure 3-4 Computer Unit Reset and Power Switches

**NOTE:** Pressing the Reset/Abort switch down (to ABORT) sends an interrupt to the CPU without resetting the system. The effect of this interrupt depends on what operating system or stand-alone software is running at the time of the interrupt; refer to your software documentation to determine the abort switch's use on your system. If, for example, your system includes the DG/UX kernel debugging software, pressing the abort switch brings you to the kernel debugger prompt, described in the manual *Using the DG/UX™ Kernel Debugger*.

You may want to reset the computer system if it seems to be experiencing intermittent errors; often the process of restoring hardware components to the powerup state resolves temporary problems.

Resetting the hardware without cycling power is called a *warm reset*; turning power off, and then on again is a *cold reset*. With a cold reset, your system goes through power-up testing and its automatic boot sequence, as described in the “Powering Up” section at the beginning of this chapter. With a warm reset, your computer system restores system board components to their powerup state and displays the System Control Monitor (SCM) prompt, but does not proceed through power-up tests or automatically boot your operating system.

You can perform a warm reset while at the SCM prompt without pressing the reset switch by using the SCM RESET command, as follows:

```
SCM> r ) (or, SCM> reset ) )
```

## Restarting Your System

Each time you turn power on, your system goes through power-up testing and its automatic boot sequence, as described in the “Powering Up” section at the beginning of this chapter. It is not necessary to power down completely in order to restart your operating system, however.

If you shut down your operating system to the SCM prompt or press the reset switch (as described in the previous sections), you can restart your operating system by entering the BOOT command at the SCM prompt, as follows:

```
SCM> b ) (or, SCM> boot ) )
```

When you use the BOOT command without an argument, the computer system uses its default boot path and boots the same file it uses at every powerup. If there is no default boot path, it looks for a bootable file on the first SCSI disk and then tries to boot over the LAN if it cannot boot from disk. Refer to Appendix B for additional information about the SCM BOOT command, the default boot path, and the automatic boot sequence.

End of Chapter



# Chapter 4

## Setting Up and Installing a SCSI Bus

This chapter describes how to plan and configure a Small Computer System Interface (SCSI) bus for AViiON 410, 412, 4100, and 4300 series systems. It includes default and recommended SCSI identification numbers, operating parameters for the individual mass-storage drives on the bus, terminating rules, cabling restrictions that apply to your system, and worksheets to help you prepare your SCSI configuration. This chapter also provides instructions for connecting SCSI drives and subsystems to your computer unit.

**NOTE:** Factory-set SCSI IDs for the internal drives in your system are listed on a label attached to your computer unit's rear panel, above the SCSI connector(s). In most cases, the IDs for factory-installed subsystem drives are listed on a label attached to your PHU or CSS2/DC. Table 4-1 lists the default identification settings and DG/UX device names for AViiON 410, 412, 4100, and 4300 series SCSI drives; components purchased together as a system are factory-preconfigured to these defaults.

If your system includes *external* drives or subsystems (housed outside the computer unit), you will need the information in the "Connecting an External SCSI Bus to the Computer Unit Rear Panel" section of this chapter to connect those drives to your computer unit. To ensure that your system components work together, you should also fill out the worksheets and make certain that your SCSI bus adheres to the device identification and cable rules described in this chapter. *Before* adding any new internal or external SCSI drives to your system, you should read this chapter to plan your SCSI bus configuration.

**NOTE:** If your system does *not* include any external SCSI mass-storage subsystems or stand-alone SCSI drives (such as reel-to-reel tape drives), you probably do not need the information in this chapter unless you plan to add more drives. However, you do need to terminate the SCSI bus at the computer unit, as described in Chapter 2.

## Planning a SCSI Bus Configuration

You should carefully plan your entire SCSI bus configuration *before* you begin setting up the drives. As you set up your SCSI drives, make sure that your system adheres to the following SCSI device identification, bus cable, and bus termination rules. Use the worksheets in Figure 4-4 along with the information in the following sections to plan and/or verify your configuration.

Your computer unit includes one single-ended SCSI bus controller that supports your internal disk, tape, diskette, and CD-ROM drives. This controller is factory-specified as Controller 0 and the bus it supports extends to the external connector labeled SCSI A on your computer's rear panel. The SCSI bus in your system can support a total of seven drives housed internally, independently, or within a mass-storage subsystem.

Figure 4-1 shows the location of the SCSI connector on the rear panel of your computer.

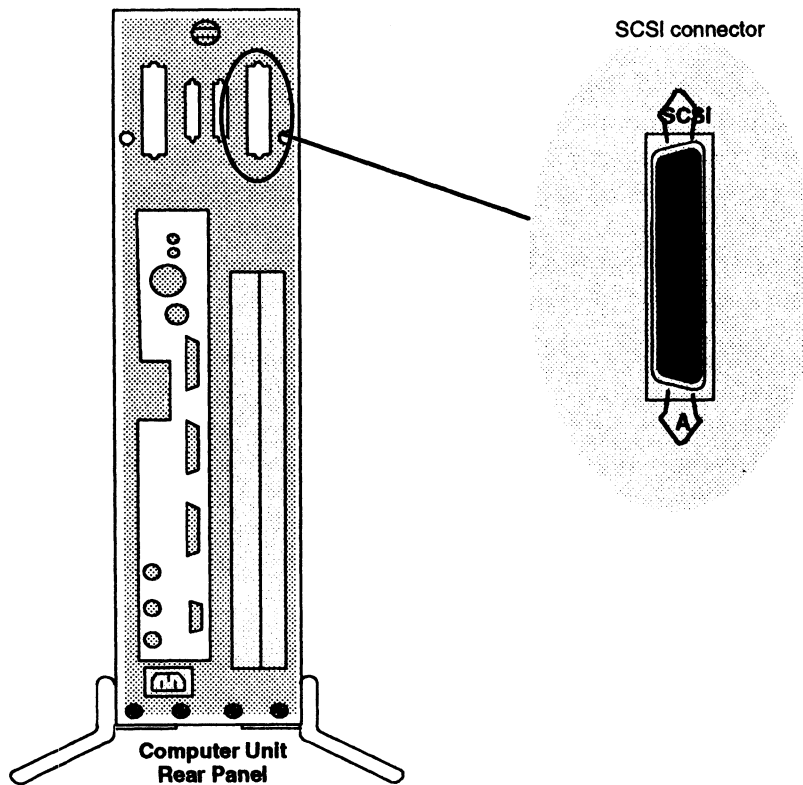


Figure 4-1 AViiON 410, 412, 4100, and 4300 Series SCSI Bus Connector



## Identifying SCSI Drives

The SCSI controller in your computer unit can support a total of seven SCSI drives, *including* internal drives. For example, if your computer includes one tape drive and one SCSI disk on the bus, you can connect five additional drives to that (controller 0, SCSI A) bus. If your computer unit includes three internal drives, you can connect only four external drives to the SCSI A bus; the maximum of four internal drives reduces the maximum number of external drives the bus could support to three. When a single mass-storage subsystem contains multiple drives, each individual drive applies to the seven-drive maximum.

Each individual drive on a SCSI bus must have a unique SCSI identification number (also referred to as a *SCSI ID*, *device ID*, or *DID*) with a value from 0 through 6. When you receive preinstalled drives mounted either inside the computer unit or mounted inside a mass-storage housing unit, the SCSI ID numbers are already set. If you add or replace drives anywhere on the SCSI bus, you must set the IDs by positioning drive-select jumpers on the individual drive(s).

Table 4-1 lists the default (factory-installed) SCSI device ID numbers for hard disk, diskette, and tape drives. The “DG/UX Device Name” column lists the mnemonic name that the DG/UX operating system and the computer system firmware use to identify a drive on the first (controller 0) bus in your system; the mnemonic name includes the SCSI ID of the drive.

**Table 4-1 Default SCSI Device ID Numbers**

Drives	ID Number	DG/UX Device Name
<b>Disk<sup>1</sup></b>		
First	0	<b>sd(iscs())</b>
Second	1	<b>sd(iscs(),1)</b>
Third	2	<b>sd(iscs(),2)</b>
Fourth	3	<b>sd(iscs(),3)</b>
<b>Diskette</b>		
First (Diskette LUN 0) <sup>2</sup>	1, 2, or 3; determined as next sequential disk (x)	<b>sd(iscs(),x)0</b>
Second (Diskette LUN 1)		<b>sd(iscs(),x)1</b>
<b>Cartridge Tape<sup>3</sup></b>		
First	4	<b>st(iscs(),4)</b>
Second	5	<b>st(iscs(),5)</b>
Third	6	<b>st(iscs(),6)</b>

<sup>1</sup> Includes diskette, optical disk, and CD-ROM drives.

<sup>2</sup> The SCSI ID of a diskette drive is set on a SCSI adapter board, not on the drive. If you have more than one diskette drive managed by the same SCSI adapter board, the drives have the same SCSI ID number. The LUN (Logical Unit Number) differentiates drives managed by the same SCSI adapter.

<sup>3</sup> Includes digital audio tape drives.

Refer to your DG/UX documentation or Appendix C for more information about drive specifications.

**NOTE:** ID assignments do not need to reflect the physical positioning of drives 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 in the computer unit.

The DG/UX operating system allows the configuration of any SCSI drive 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 drives. Check the drive manual(s), and the documentation for any customized software you plan to run on your system, for further SCSI ID restrictions.

The automatic boot sequence for your computer system looks for a disk at device ID 0 on the first SCSI 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. You also use the SCSI ID of a drive when booting it directly (using the **SCM BOOT** command) or to change the automatic boot path, as described in Appendix B.

Figure 4-2 shows an example of a valid SCSI ID configuration that follows the pattern of recommended ID assignments.

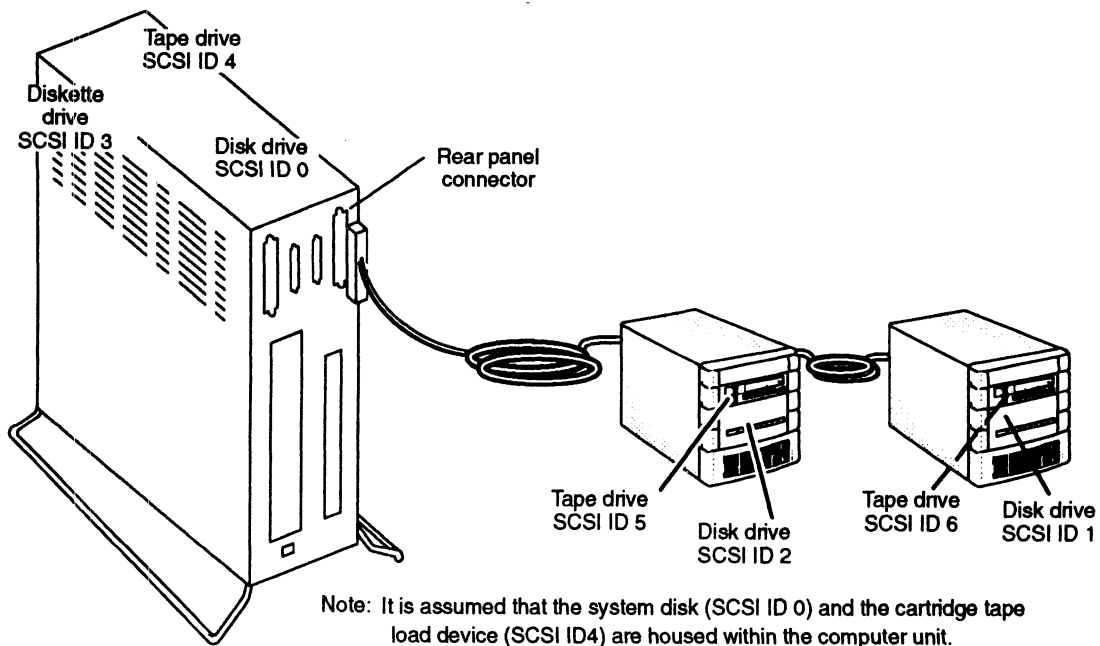


Figure 4-2 Sample SCSI Device Identification Configuration

Labels on the back of your computer unit and subsystem display the the device IDs assigned to your mass-storage drives. Before you connect the SCSI bus cable to your computer unit, make certain each drive on the bus has a *unique* SCSI ID; if you notice a conflict, you will need to reassign SCSI identifications by changing jumpers on the drive(s).

Examine the configuration labels on the back of your drives or subsystems, and enter the SCSI IDs for each drive on the worksheet in Figure 4-4. Verify that each drive on a bus has a unique device ID of 0 to 6. If your device ID configuration appears valid, make certain the SCSI bus you plan to install meets the cabling restrictions described in the next section, “SCSI Bus Cabling Rules.”

## SCSI Bus Cabling Rules

The cabling for a SCSI bus begins inside the computer unit at the SCSI controller and connects the mass-storage drives on the bus in a cabled daisy chain. The maximum length of combined internal and external SCSI bus cabling cannot exceed 19.6 feet.

When you calculate the length of your SCSI bus cabling, consider the following:

- Your system’s connector (SCSI A) supports an external SCSI bus with a cable maximum of 14.85 feet. Of the 19.6-foot cable maximum, 4.75 feet resides within the AViiON 410, 412, 4100 or 4300 series computer unit.
- Some peripheral SCSI drives consume internal cable, further reducing the maximum length of your cable configuration. For example:

The Model 10565 PHU uses 2.75 feet of internal SCSI cable.

The CSS2/DC uses 4.83 feet of internal SCSI cable.

The G6587 reel tape drive uses 0.5 feet of internal SCSI cable.

The G6589–A and G6589–TA reel tape drives each use 0.34 feet of internal SCSI cable.

Figure 4-3 illustrates the SCSI bus cable requirements.

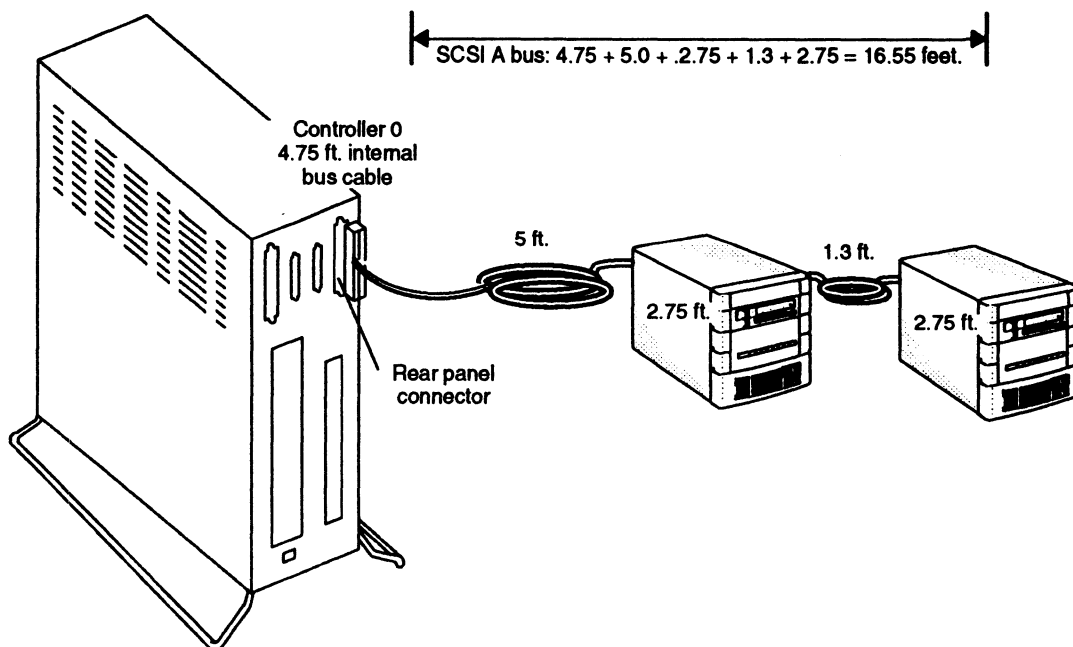


Figure 4-3 Typical Daisy Chain and SCSI Bus Cable Lengths

## Configuring Drive Operating Parameters

The SCSI drives 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 drive on your SCSI bus, you need to set its operating parameters as described in this section. Configure all new or replacement drives as follows:

- Set all disk drives for sequential drive motor start. The drive will then delay 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 drives 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 410, 412, 4100, or 4300 series computer or mass-storage subsystem, *all* drives and SCSI adapter boards for drives 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 will be physically positioned as the last drive on the SCSI bus, you must install bus termination resistors. Refer to the next section, “Terminating the External SCSI Bus.”

**NOTE:** For 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*.

## Terminating the External SCSI Bus

You must terminate the SCSI bus at the last drive or mass storage subsystem on the SCSI bus. Depending on the physical placement and type of SCSI peripherals included in your system, you terminate your bus with one of the following:

- A terminating plug that you install on the unused bulkhead connector on the outside of the unit. On such housings (for example, the Model 10565 Mass Storage Subsystem), *do not terminate any of the SCSI drives within the unit*.
- A terminating resistor pack that you install on an individual drive’s printed-circuit board. Note that devices terminated in this manner must also connect at the physical *end* of any daisy-chain configuration.

To locate the SCSI bus terminators and connectors for each SCSI drive and drive housing in your system, refer to the manual for the drive or mass storage subsystem.

Internal Drives			
Slot	Drive Type	SCSI ID	Cable Length
Front <input type="checkbox"/> half-height left <input type="checkbox"/> half-height right <input type="checkbox"/> full-height			} 4.75 feet
Back <input type="checkbox"/> half-height left <input type="checkbox"/> half-height right <input type="checkbox"/> full-height			
<input type="checkbox"/> SCSI Adapter Board			
External Mass-Storage Drives (external connector port A)			
Device	Drive Type	SCSI ID	

**Total Cable Length (19.6 feet maximum)** \_\_\_\_\_

Figure 4-4 SCSI Bus Configuration Worksheet

Internal Drives			
Slot	Drive Type	SCSI ID	Cable Length
Front	<input checked="" type="checkbox"/> half-height left	3.5" diskette	(LUN 0)
	<input checked="" type="checkbox"/> half-height right	525-Mbyte QIC tape	4
	<input type="checkbox"/> full-height		
Back	<input type="checkbox"/> half-height left		
	<input type="checkbox"/> half-height right		
	<input checked="" type="checkbox"/> full-height	662-Mbyte disk	0
<input type="checkbox"/> SCSI Adapter Board	for diskette	3	
<b>External Mass-Storage Drives</b> (external connector port A)			
Device	Drive Type	SCSI ID	Cable Length
PHU	1-Gbyte disk	1	5' cable
	525-Mbyte QIC tape	5	2.75'
			5' cable
	Reel tape 6587	6	.5'
<b>Total Cable Length (19.6 feet maximum)</b>			<u>18 feet</u>

Figure 4-5 Sample Configuration Worksheet

## Installing a SCSI Bus and SCSI Drives

This section outlines the following steps to physically install a SCSI bus on your system:

- Installing configuration jumpers on each external SCSI tape and/or disk drive
- Connecting the SCSI bus cable in a daisy-chain to the subsystems and stand-alone drives
- Terminating a SCSI bus

To perform each step, you will need the drive- and subsystem-specific documentation listed in *Guide to AViiON® and DG/UX™ System Documentation* for each bus component.

The next section in this chapter describes how to connect an external SCSI bus to your computer unit.

Before you begin physically installing your SCSI bus and SCSI drives, plan your cabling scheme(s) and assign SCSI ID numbers to each drive according to the rules described in the preceding sections of this chapter. Make certain to assign ID numbers compatible with any application software requirements planned for your system. Figure 4-6 shows a sample AViiON 4100, and 4300 series SCSI layout that adheres to SCSI bus cable and device identification rules.

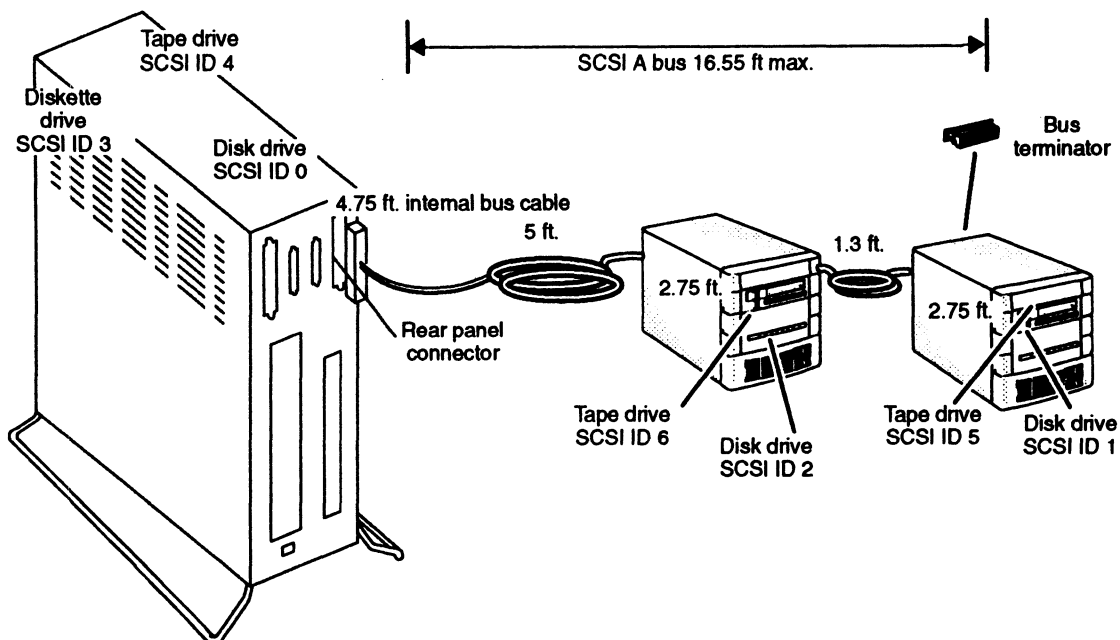


Figure 4-6 SCSI Cable Rules and Sample Device IDs

## Installing Configuration Jumpers

The following steps outline how to assign device identifications and operating parameters to your SCSI-based drives. Refer to Chapter 6 in this manual for guidelines on how to handle drives and insert or remove jumpers.

1. Refer to your drive documentation for any stand-alone tape and/or disk drives on your SCSI bus for instructions, and then set the SCSI ID jumpers according to your SCSI bus plan. Make certain the drive's jumper and/or switch settings comply with the operating parameters listed in the previous section, "Configuring Drive Operating Parameters."

2. Refer to Chapter 6 in this manual, or the unit manual for any peripheral housing units (such as the Model 10565 Mass Storage Subsystem), for instructions on how to remove any drive whose device ID conflicts with your SCSI bus plan.

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

3. Refer to the drive-specific documentation for each drive in the subsystem for instructions, and then set the SCSI ID jumpers according to your SCSI bus plan.
4. Before you replace a drive in your computer unit or subsystem, make certain its jumper and/or switch settings comply with the operating parameters listed in the preceding section, "Configuring Drive Operating Parameters."

5. Replace each drive according to Chapter 6, or the peripheral housing unit manual.

6. Modify or attach a label that identifies the SCSI ID numbers assigned to the drive(s) on the outside of the computer unit and each stand-alone drive or subsystem. For mass-storage subsystems, indicate each drive's location in the unit. Document your configuration in the worksheet provided in Figure 4-4.

**NOTE:** Step 6 is important for those who will operate and maintain your system. Your AViiON system software refers to SCSI drives by identification number and SCSI controller number.



## Connecting the SCSI Bus to SCSI drives

Before you begin connecting your SCSI drives together, locate all of your SCSI bus external cables. Your SCSI bus connects to the computer unit and between drives and subsystems with one of the following 50-pin CHAMP to 50-pin CHAMP cables:

Device	Cable part number	Cable model number	Length (ft.)
SCSI to	005-33003	15325E001	1.3
SCSI	005-33004	15325E005	5
	005-33005	15325E010	10

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

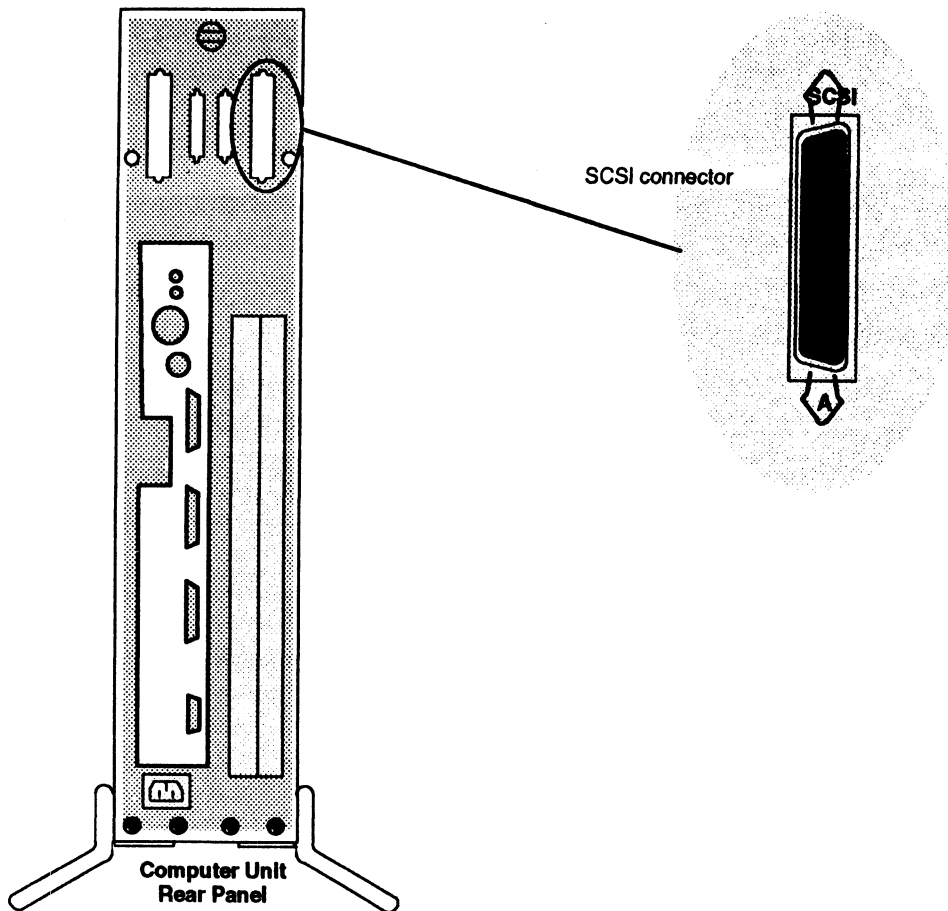
Refer to your drive-specific documentation for instructions, and then install each drive along the bus.

Make certain to properly terminate each SCSI bus on your system at the last drive or subsystem on the bus. If you need to terminate an external SCSI bus, refer to the previous sections "Configuring Drive Operating Parameters" and "Terminating an External SCSI Bus." Chapter 2 describes how to terminate a bus that does not extend outside the computer unit chassis.

Once you have verified your configuration, configured your SCSI drives, connected the drives together, and terminated the last drive on the SCSI bus, continue with the directions in the next section, "Connecting an External SCSI Bus to the Computer Unit Rear Panel."

## Connecting the External SCSI Bus to the Computer Unit Rear Panel

Figure 4-7 shows the location of the SCSI connector on the rear panel of your computer.



*Figure 4-7 AViiON 4100 and 4300 Series External SCSI Connectors*

After you verify that the cable lengths and SCSI IDs in your configuration adhere to the rules listed earlier in this chapter, follow these steps to connect an external SCSI bus to the rear panel of your computer:

1. Make certain power to your computer, subsystems, and peripherals is OFF before connecting the SCSI bus.
2. If present, remove the SCSI bus terminator plug from the rear panel connector as shown in Figure 4-8. Simply open the spring clips by pushing them vertically, and then pull the plug off.

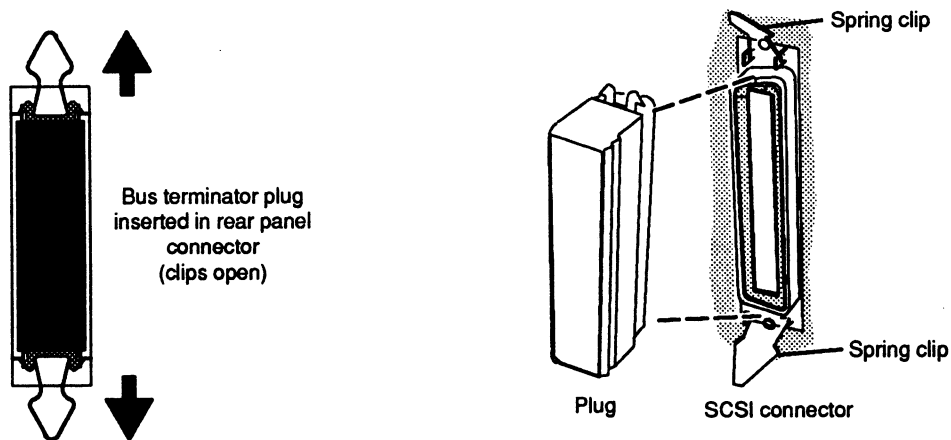


Figure 4-8 Removing the SCSI Bus Terminator Plug

3. Align the connector pin numbers and the D-shaped connector bevels before gently inserting the cable connector in the rear panel connector as shown in Figure 4-9.

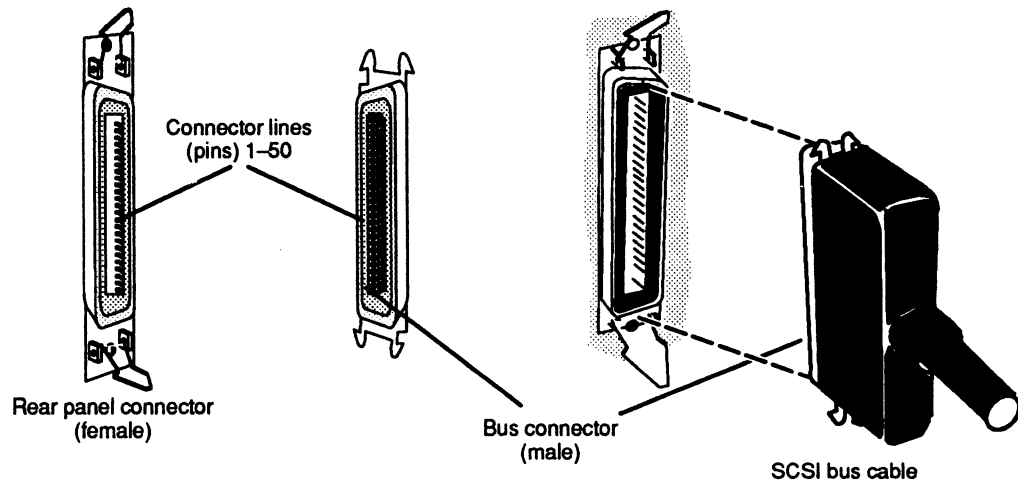
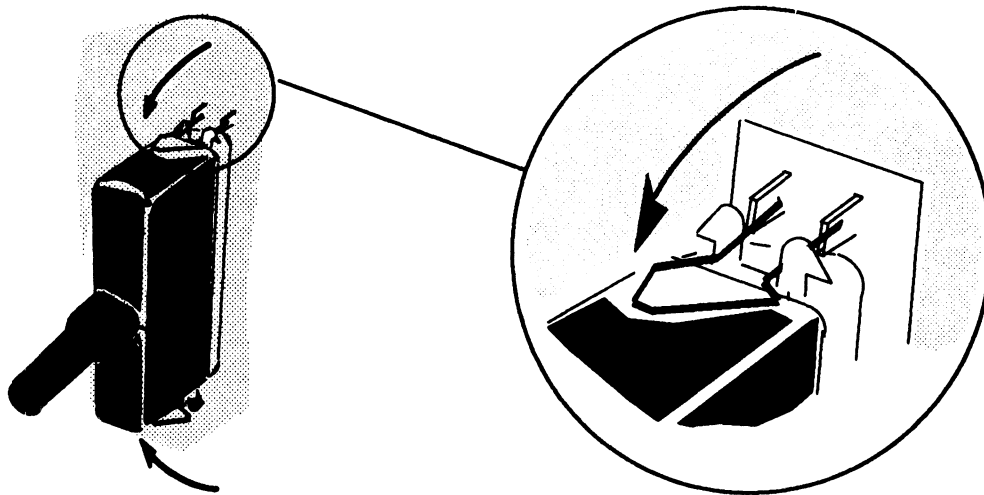


Figure 4-9 Plugging Together SCSI Bus Connectors

4. Push the spring clips attached to the rear panel connector straight down or straight up into the brackets on the cable connector as shown in Figure 4-10. Your vertical pressure will push the clips into place; do not squeeze or pull the clips out of shape.



*Figure 4-10 Securing a SCSI Cable Connection*

If you haven't already connected the remote end of the cable to your first SCSI external drive, do so now (refer to the drive-specific documentation, if necessary). If you have more than one drive or subsystem, connect them with the appropriate SCSI cables. Then terminate the SCSI bus on the last drive or subsystem connected to the SCSI bus.

If you have just connected your external SCSI bus for the first time, return to Chapter 2, "Setting Up Your Computer System," to complete your installation and connect the ac power cord. Then continue with Chapter 3, "Starting and Stopping Your Computer System," for instructions on powering up a system with external peripherals.

If you just re-connected your cable(s) after adding or replacing a SCSI drive, we recommend that you test the drive after your next powerup to ensure that the drive is operating correctly within your system configuration. Refer to *Using AViON® System Diagnostics* for instructions on running a diagnostic acceptance test and tests on individual drives.

**End of Chapter**

# Chapter 5

## Expanding and Maintaining Your Computer System

This chapter contains procedures you should perform each time you replace a failed system component or add new components to your system. It also describes some procedures you might need to perform, such as installing configuration jumpers or calculating power requirements, in the course of installing a new or replacement drive.

The first major section in this chapter, “Maintaining Your System,” outlines what you should do if a problem occurs with your system hardware. The second major section, “Reviewing System Specifications,” contains important instructions and worksheets to help you plan the addition of any new system components. You need to follow the directions in the third major section of this chapter, “Avoiding Electrostatic Discharge (ESD) Damage,” each time you open your computer unit or unpack a new component. Since installing a new or replacement drive often requires that you set configuration jumpers and switches on the drive, the section “Installing Board Jumpers and Setting Switches” provides basic instructions for this procedure. The last sections of this chapter explain how to open and close the computer unit.

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

### Maintaining Your System

In general, you maintain your AViiON 410, 412, 4100, or 4300 series system by simply replacing any component that has failed. We refer to the subassemblies that you can easily remove and install as *customer replaceable units*, or simply *CRUs*.

The graphics and nongraphics consoles, cables, and other devices listed in Chapter 2, “Setting Up Your Computer System,” are *external* CRUs. You replace an external CRU by simply disconnecting and reconnecting one or more cables. Refer to Chapter 2 for the procedures for adding or replacing external CRUs.

Internal CRUs reside within your computer unit and include mass-storage drives, the power supply, the fan assembly, memory modules, a CPU option board, a Z-buffer board, graphics boards, and the system board. To add or replace an internal CRU, you must remove the cover of the computer unit.

Chapter 4 “Setting Up and Installing a SCSI Bus” describes how to add or replace drives and subsystems connected to the SCSI A connector on the rear of your computer unit.

## If a Computer System Problem Occurs

If you have a problem with your computer system, first read Appendix A, “Solving Powerup Problems.” It lists problems that could occur during powerup and provides suggestions that you can use to solve these problems.

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 *Using AViiON® System Diagnostics* for a description of the diagnostics 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, after calling the Data General Service Center, you determine that a CRU needs replacement, refer to Chapter 2 if the CRU is external. Follow the procedures for removing and installing an internal CRU in subsequent chapters of this manual *after* you have reviewed the appropriate sections of this chapter. Refer to Chapter 4 if the CRU is an external SCSI drive.

**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.*

**NOTE:** If you have determined that the problem is in the peripheral housing unit (PHU), refer also to the manual *Installing and Operating the Model 10565 Peripheral Housing Unit*. If you have determined that the problem is in the combined storage subsystem deskside chassis (CSS2/DC), you will need the manual *Maintaining the CSS2 or Installing and Maintaining the CSS2/DC*.

## Reviewing System Specifications

This section contains information you should know before removing or installing any hardware equipment in your computer system. It specifically covers the following procedures you should perform before unpacking or installing a new internal option:

- Review your system specifications to ensure hardware and software support for any planned additions to your computer system.
- Calculate your system’s power requirements to ensure that the configuration you plan doesn’t exceed the limits of your power supply.

## Verifying Support for Your 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*.

- Review the options listed in Chapter 1 and Appendix C to determine whether your system supports the configuration you want.
- Review your system software documentation, Release Notice(s), Updates, and application documentation. These books can provide valuable information you should know *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.
- Carefully consider site requirements, whether or not your system needs additional drivers for the planned expansion, cable and cable-length restrictions, and any other hardware or software configuration restraints.
- If you intend to add or replace a mass-storage drive on a system SCSI bus, make certain your new drive complies with the parameters described Chapter 4 “Setting Up and Installing a SCSI Bus.”

If your proposed expansion appears acceptable, continue with the next section to ensure that the power supply for your computer system can support the entire new configuration.

## Calculating Power Requirements

The combination of boards, drives, and other devices powered by your computer unit cannot consume more electrical power than the computer’s power supply can provide. Before you begin installing options, you should calculate the electric current and power requirements of the proposed configuration, and then compare those totals with your power supply’s maximum output. If the new configuration exceeds system power limits you will need to eliminate some part of the proposed system.

This section explains how to calculate and compare the necessary power information; it also contains a calculation form and completed sample form. The procedures may appear complicated; they actually require only that you perform some simple addition, and then compare the results.

To calculate the current totals and total wattage of the planned configuration, follow the steps below. Use the Current and Power Calculation Form in Figure 5–2 and the example of Figure 5–1 as you proceed; you might want to copy these forms for future use.

1. Refer to Table C–1 in Appendix C of this manual for the current requirements of every device in your planned configuration that will draw power from your computer power supply. Enter each value on your calculation form.

**NOTE:** Be certain to include all devices that draw current power from the computer unit's power supply, but not those that draw power from another source. For example, your calculations must include graphics keyboards and mouse devices, but monitors, most keyboards, and mass-storage subsystems do not draw current from the system power supply. Do *not* list the fan assembly, which has exclusive use of the +9-volt power supply output.

If your configuration includes devices not listed in this manual or *Setting Up and Installing VMEbus Options in AViiON® Systems*, refer to the device-specific technical manuals to determine *current draw* (the amount of electric current the device draws from your power supply).

Enter each memory module at the "average" current draw listed in Table C-1. This incorporates "active," "peak," and "passive" current draws into a single calculated value.

2. Calculate the total amount of current needed by your system devices by adding the values in each column. Enter the totals on your calculation form in the "Calculated Totals" column of the Power Supply/Amperage section.

3. Compare the current limits with your current totals from step 2.

*If any current draw total exceeds the limit for that power source, your proposed configuration will not work; recalculate your current requirements and/or plan another system configuration.*

If the current draws are within the maximum provided by each power source, continue verifying your power requirements by calculating the wattage total for the planned system.

4. Multiply the number of volts from each power source (5, 12, and 12) by the corresponding amperage totals you calculated in step 2. Enter the results on your calculation form in the "Calculated Totals" column of the Power Supply/Wattage section.
5. Add the wattage values for each voltage source and enter the total in the lower right corner of your form as "Total wattage."
6. Compare the maximum wattage supplied by your power supply with the total wattage of all sources from step 5.

*If the total wattage consumed by the devices in your proposed configuration exceeds the capabilities of your computer unit's power supply, the configuration will not work; recalculate your current requirements and/or plan another system configuration.*

Figure 5-1 shows a completed calculation form for a possible AViiON 410, 412, 4100, or 4300 series computer.



Device	Current (Amperes)		
	+5 V dc	+12 V dc	-12 V dc
0 SYSTEM BOARD	14.4	0.7	0.1
1 Keyboard (with graphics console only)			
2 Mouse (with graphics console only)			
3 Mbyte Memories: 1 active:	3.1	NA	NA
4 3 inactive (idle) drawing 0.24 (5V), ea	0.72	NA	NA
5 320-Mbyte hard disk	2.0	3.3	NA
6 179-Mbyte hard disk	1.1	1.4	NA
7 QIC-150 tape drive	1.5	1.5	NA
8 VME options:			
9 slot 1 - VSC/3 sync controller	3.4	0.07	0.07
10 slot 2 - VAC/16 async controller	4.5	0.25	0.25
11			
12			
Total Amperes Used	<u>30.72</u>	<u>7.22</u>	<u>0.42</u>

<b>Power Supply</b>	
<b>Maximum Amperes Available</b>	<b>Total Amperes Used (from Table above)</b>
+ 5 V Total = 37.0 amps	<u>30.72 A</u>
+12 V Total = 10.0 amps	<u>7.22 A</u>
-12 V Total = 1.0 amps	<u>0.42 A</u>
<b>Maximum Wattage (volts x amperes) Available</b>	<b>Watts Used</b>
+5 V wattage total (5 V x 30.72 A)	= 152.36
+12 V wattage total (12 V x 7.22 A)	= 86.64
wattage total (12 V x 0.42 A)	= 5.04
Maximum Power Supply Output = 330 Watts	Total Watts Used = <u>244.04</u>

Figure 5-1 Sample Current and Power Calculation Form for AViiON 410, 412, 4100, and 4300 Series Systems

Device	Current (Amperes)		
	+5 V dc	+12 V dc	-12 V dc
0 SYSTEM BOARD	_____	_____	_____
1 <i>Keyboard (with graphics console only)</i>	_____	_____	_____
2 <i>Mouse (with graphics console only)</i>	_____	_____	_____
3 <i>Memory</i>	_____	_____	_____
4 <i>tape drive</i>	_____	_____	_____
5 <i>hard disk</i>	_____	_____	_____
6 <i>hard disk</i>	_____	_____	_____
7 _____	_____	_____	_____
8 <b>VME options:</b>	_____	_____	_____
9 <i>slot 1 -</i>	_____	_____	_____
10 <i>slot 2 -</i>	_____	_____	_____
11 _____	_____	_____	_____
12 _____	_____	_____	_____
Total Amperes Used	=====	=====	=====
<b>Power Supply</b>			
<b>Maximum Amperes Available</b>		<b>Total Amperes Used (from Table above)</b>	
+ 5 V Total = _____ amps		_____ A	
+12 V Total = _____ amps		_____ A	
-12 V Total = _____ amps			_____ A
<b>Wattage (volts x amperes) Available</b>			<b>Watts Used</b>
+5 V wattage total	(5 V x _____ A)		= _____
+12 V wattage total		(12 V x _____ A)	= _____
-12 V wattage total			(12 V x _____ A) = _____
Maximum Power Supply Output = _____ Watts		Total Watts Used	= _____

Figure 5-2 Current and Power Calculation Form

If your proposed new configuration meets all the power requirements described in this section, you can install the new system component(s). Continue with the next section before opening your computer unit.

## Avoiding Electrostatic Discharge (ESD) Damage

When your computer unit top and side panels are installed, they protect the electronic circuits inside the computer unit from electrostatic discharge (ESD) damage. However, when you remove the panels from the computer unit to install a subassembly, you can inadvertently damage the electronic circuits in the computer unit by simply touching them and discharging any electrostatic charge that has accumulated on your body. This section contains procedures that you must follow to prevent ESD damage to the computer unit.

- Provide enough room to work on the equipment. Clear the work site of any unnecessary materials or materials that naturally build up electrostatic charge. These include plastic foam packaging materials and cups, cellophane wrappers, and similar materials.
- Do not remove a subassembly from its antistatic packaging until the exact moment that you are ready to install it.
- Gather all the tools, manuals, an ESD kit (an ESD wrist strap shipped with your computer system), and other materials you will need before you remove covers and panels from the equipment. The chapters on adding or replacing a subassembly list required tools and materials at the beginning of the procedures. After you remove the 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 a subassembly or when touching the electronic circuits inside the equipment. (The section on “Opening the Computer Unit” in this chapter tells you how to attach this wrist strap.) If you lose your ESD strap, you can order an ESD kit from Data General. If an emergency arises and an ESD kit is not available, follow the procedures in the section “Emergency Procedures (without an ESD kit).”
- Replace the cover(s) or panels(s) on the equipment as soon as possible so that the electronic circuits are protected.

### 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 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 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 for the next time you need to add or remove a cover or panel. You can order an ESD kit from Data General.

## Installing Board Jumpers and Setting Switches

When you install new or replacement drives or boards in your system, you often need to specify configuration parameters by setting jumpers and/or switches on the individual drives or boards. This section explains how to physically change the jumper and switch settings on boards and drives. These guidelines apply to SCSI device configuration as described in Chapters 4 and 6, and at various points throughout the succeeding chapters of this manual.

Before you begin configuring a board or drive, you will need the following:

- A thorough understanding of the section “Avoiding Electrostatic Discharge (ESD) Damage” in this chapter
- The board or drive-specific technical manual for your option that shows the location of the jumpers and switches
- Nonmagnetic needlenose pliers
- Nonmagnetic jeweler’s screwdriver or another small-pointed device (such as a ball point pen or paper clip end) to push DIP switches

### Installing Jumpers

*Jumpers*, or jumper plugs, are small removable plastic posts that contain wire circuit connectors. *Jumper pins* are rows of small metal posts sticking out from the board surface. Figure 5-3 shows a row of jumpered and unjumpered jumper pins.

**CAUTION:** *You can ruin the entire device by bending or breaking these delicate pins; exercise extreme care when installing or removing jumper plugs.*

To install or remove jumpers from a device, follow these steps after setting up an ESD kit:

1. Remove the board or drive from its antistatic bag and place it, component-side up, on a static-free surface. Do not touch the electronic components on the boards; handle printed-circuit boards by the edges only.
2. Refer to your board or drive-specific technical manual to determine the location of the jumper(s) you need to change.
3. Use needlenose pliers to carefully pull the proper jumper(s) *straight up* and off the pin. Do not pull the plug from side to side, twist it, or otherwise risk bending or breaking the pins.

Use needlenose pliers to carefully align and start pushing jumpers *straight* onto the proper pins; then push the jumper completely onto the pins with your finger, if necessary. You should not need to force a jumper into place if you install the proper jumper in the right location.

Figure 5-3 shows how to install and remove jumpers from a typical row of pins.

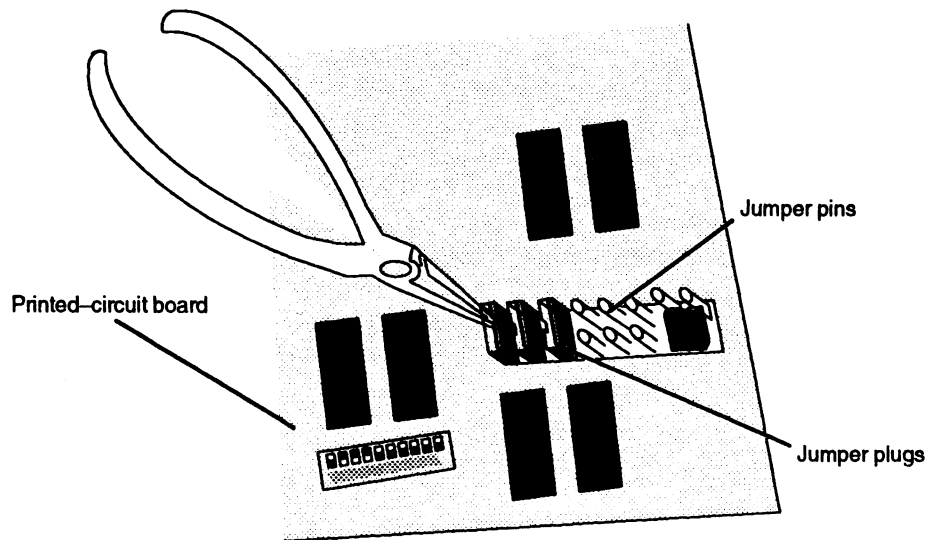


Figure 5-3 Removing or Installing Jumper Plugs

## Setting Switches

Some boards use DIP switches to determine certain settings. To alter switch settings on a printed-circuit board, follow these steps *after* setting up an ESD kit:

1. Remove the board or drive from its antistatic bag and place it, component-side up, on a static-free surface. Do not touch the electrical components on the board; handle printed circuit boards by the edges only.
2. Refer to your board or drive-specific technical manual to determine the location and in/out position of the switches you need to change.

3. Use a nonmagnetic pointed device to carefully push the proper switch(es) to the in or out position, as required. Figure 5–4 shows a typical row of DIP switches.

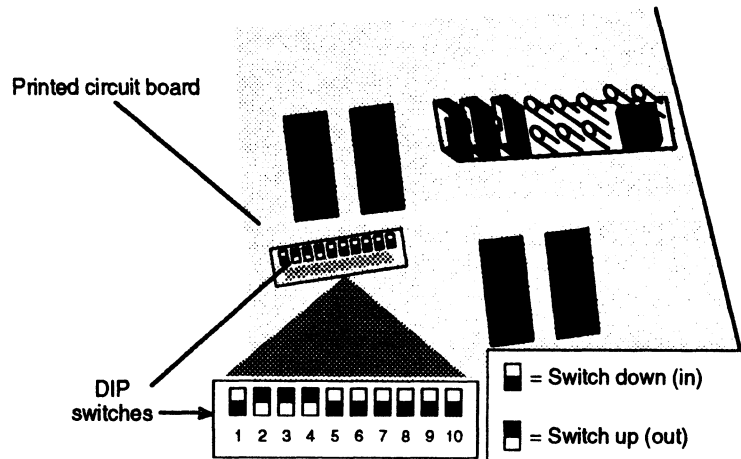


Figure 5–4 DIP Switches on Printed-Circuit Boards

## Opening the Computer Unit

To remove or install a board, drive, or power supply inside the computer, you must remove the top and or side cover(s) from the housing. 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 coin or large flat-blade screwdriver to open the computer unit.

The following steps tell you how to remove the side and top covers from the computer unit’s housing.

### Removing the Side Covers

1. Power down the computer system. Refer to the “Shutting Down Your Computer System” section of Chapter 3 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 left or right side. As you reposition the computer system, be careful not to strain the cables or jar the computer system.
3. Using a coin or screwdriver, loosen each fastener by turning it one-quarter turn counterclockwise as shown in Figure 5–5.

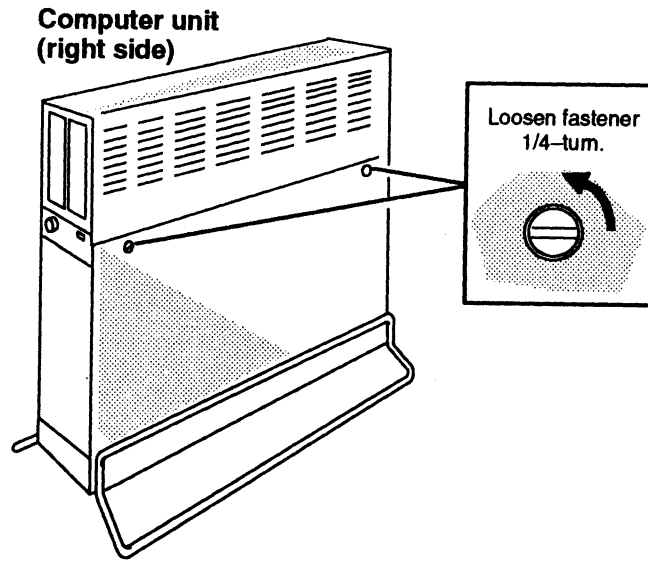


Figure 5-5 Loosening the Side Cover Fasteners

4. While supporting the side cover, lift it up and away from the computer unit as shown in Figure 5-6.

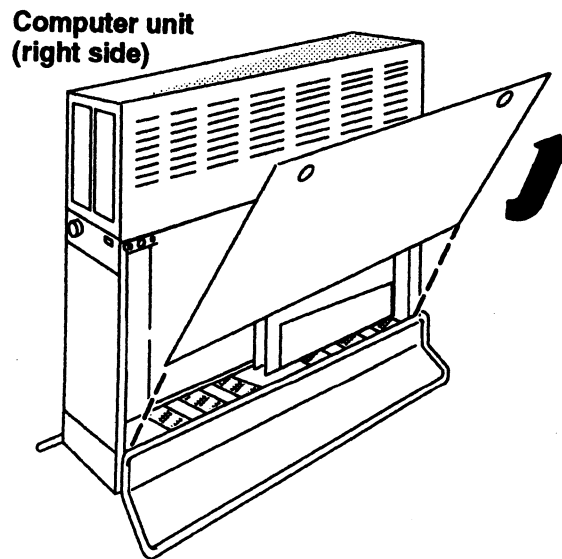


Figure 5-6 Removing the Side Covers

5. Put on the ESD wrist strap and attach the ESD clip to any unpainted metal surface of the chassis as shown in Figure 5-7.

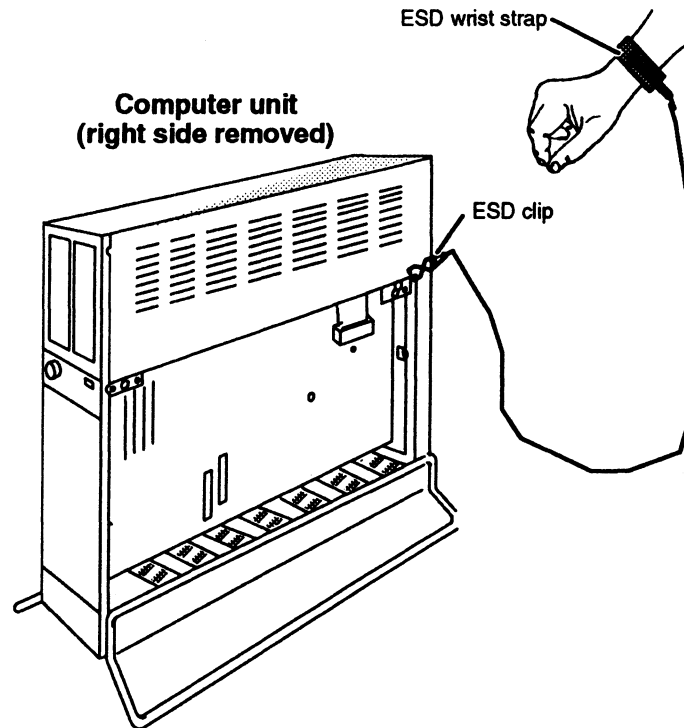


Figure 5-7 Attaching the ESD Wrist Strap and Clip

## Removing the Top Cover

1. Power down the computer system. Refer to the “Shutting Down Your Computer System” section of Chapter 3 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. Using a coin or screwdriver, loosen the fastener by turning it one-quarter turn counterclockwise as shown in Figure 5-8.



3. Push the top cover toward the back of the computer unit and remove the cover as shown in Figure 5-8.

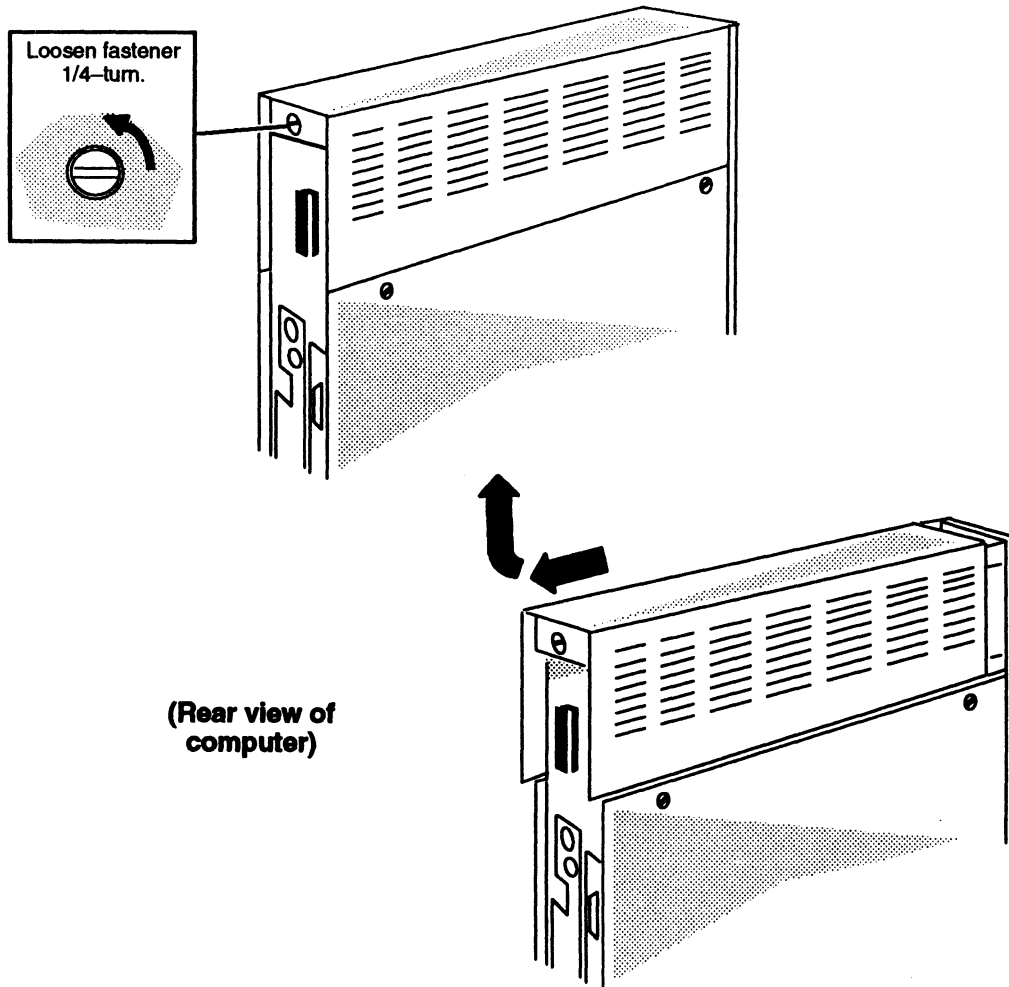


Figure 5-8 Removing the Top Cover

## Closing the Computer Unit

This section tells how to reinstall the computer unit's top and side covers. You must install the top cover before you install the side covers.

### Installing the Top Cover

To reinstall the top cover, follow the steps below. You will need a coin or a large flat-blade screwdriver.

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 top cover on top of the computer unit.

3. Push the top cover toward the front of the computer unit, as shown in Figure 5-9 until the front edge of the top cover is flush with the front edge of computer unit.
4. Using a coin or screwdriver, tighten the fastener by turning it one-quarter turn clockwise as shown in Figure 5-9.

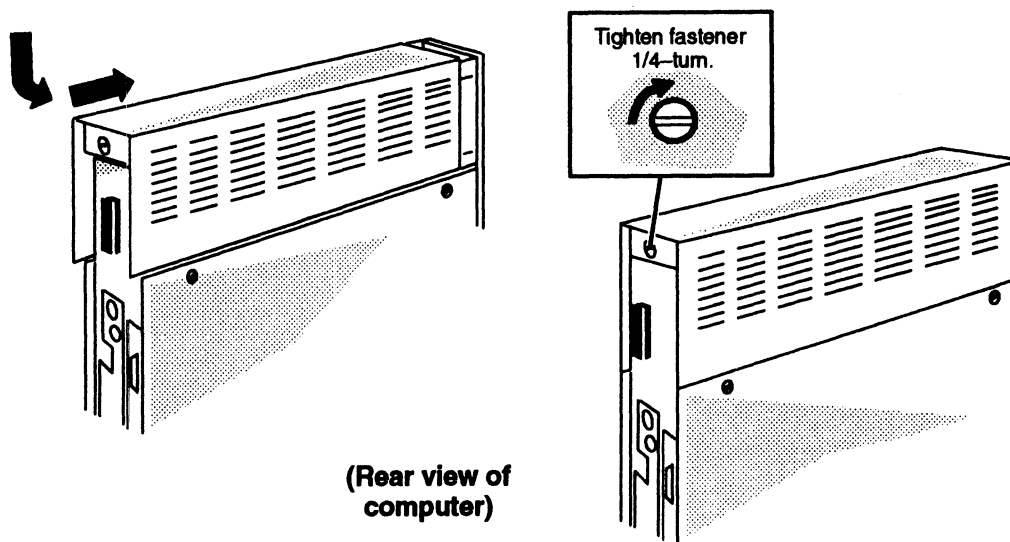
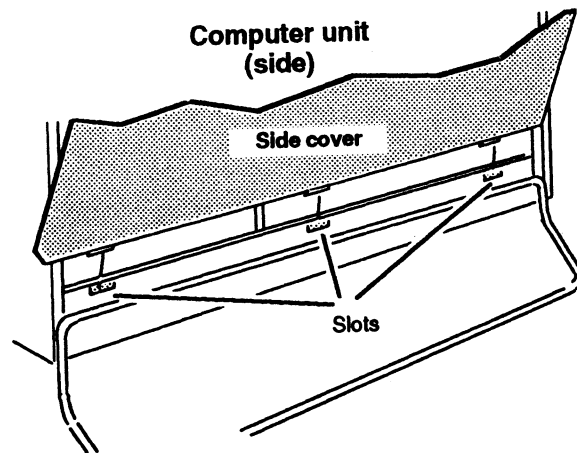


Figure 5-9 Installing the Top Cover

## Installing the Side Covers

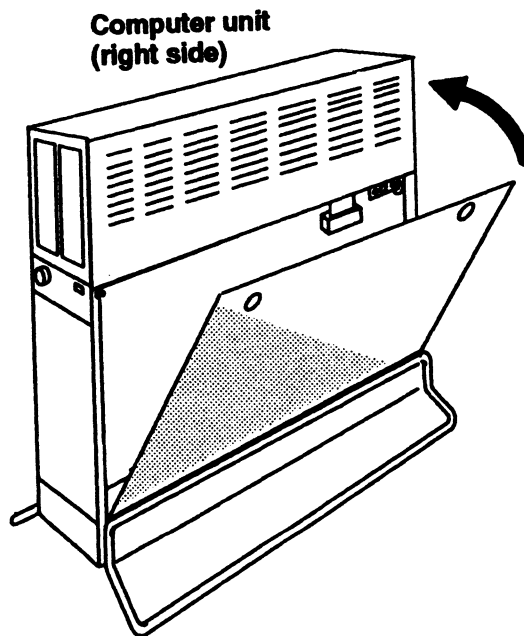
After installing the top cover, follow the steps below to reinstall one or both side covers. You will need a coin or a large flat-blade screwdriver.

1. If you have not done so already, 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. Insert the three tabs on the cover's bottom edge into the slots at the base of the computer unit as shown in Figure 5-10.



*Figure 5-10 Inserting the Cover Tabs into the Computer Unit Slots*

3. Rotate the cover as shown in Figure 5-11 so that it is against the side of the computer unit.



*Figure 5-11 Installing the Side Covers*

4. Using a coin or screwdriver, turn the two fasteners one-quarter turn clockwise as shown in Figure 5-12 to lock the cover in place.

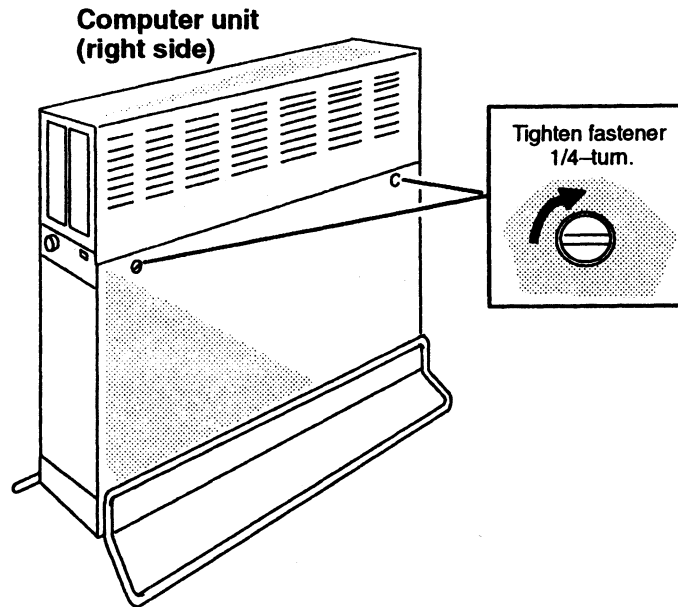


Figure 5-12 Tightening the Side Cover Fasteners

5. If you moved the computer, return it to its original position being careful not to strain the cables or jar the computer.
6. Plug the power cord into the receptacle on the back of the computer unit as shown in Figure 5-13.

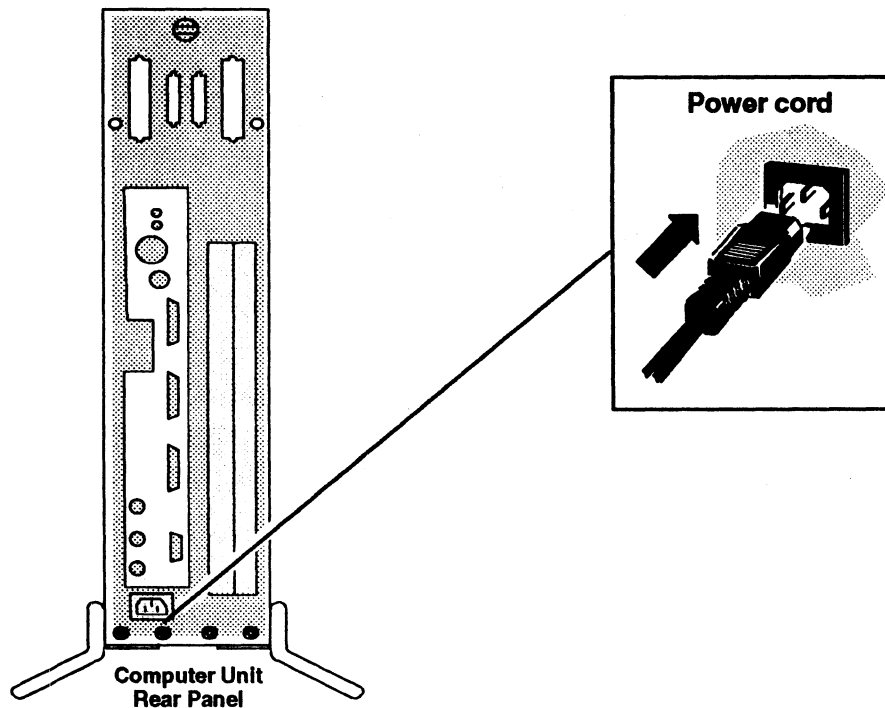


Figure 5-13 Connecting the Computer Unit's Power Cord

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

**End of Chapter**



# Chapter 6

## Adding or Replacing Internal Mass–Storage Drives

This chapter describes how to install new mass–storage drive options such as Winchester disks, tape drives, diskette drives, or CD–ROM drives inside your AViiON 410, 412, 4100, or 4300 series computer unit. It also provides directions for replacing failed internal mass–storage drives. For information on installing external drives to your system, refer to the documentation that accompanied the external subsystem or independent drive.

To install or replace a drive, you will need drive–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. The *Guide to AViiON® and DG/UX™ System Documentation* lists the manuals that support the mass storage drives available in AViiON 410, 412, 4100, and 4300 series systems.

**NOTE:** *Before* you add or replace any mass storage drive, refer to Chapter 4, “Setting Up and Installing a SCSI Bus,” and Chapter 5, “Expanding and Maintaining Your Computer System,” to plan or verify your configuration.

### Supported Mass–Storage Drives

An integrated Small Computer Systems Interface (SCSI) bus controller supports all the mass–storage drives housed inside your computer unit. The SCSI controller in your system can support up to seven drives or adapters, but a maximum of four drives will fit inside an AViiON 410, 412, 4100, and 4300 series computer unit chassis. Since tape, diskette, and CD–ROM drives require access from the front, only two of the internal drives can use removable media. Disk drives can occupy all four internal mass–storage spaces.

Table 6–1 lists the internal mass–storage drives supported by AViiON 410, 412, 4100, and 4300 series systems.

**Table 6-1 AVIION 410, 412, 4100, and 4300 Series Internal Mass-Storage Drives**

Drives	Model	Size
<b>Disks</b>		
332-Mbyte Winchester	6662	Full-height <sup>1</sup>
520-Mbyte Winchester	6796	Full-height <sup>2</sup>
662-Mbyte Winchester	6554	Full-height
1-Gbyte Winchester	6685	Full-height
1.4-Gbyte Winchester	6716	Full-height
<b>Removable Media</b>		
2-Gbyte tape	6590	Full-height
Digital audio tape	6762	Full-height
525-Mbyte QIC tape	6677	Half-height
150-Mbyte QIC tape	6577	Half-height
1.44-Mbyte diskette	6563	Half-height
1.2-Mbyte diskette	6562	Half-height
CD-ROM	6629	Half-height
Digital audio tape	6762	Half-height

<sup>1</sup> Some versions include 3 1/2- to 5 1/4-inch conversion brackets

<sup>2</sup> Includes 3 1/2- to 5 1/4-inch conversion brackets

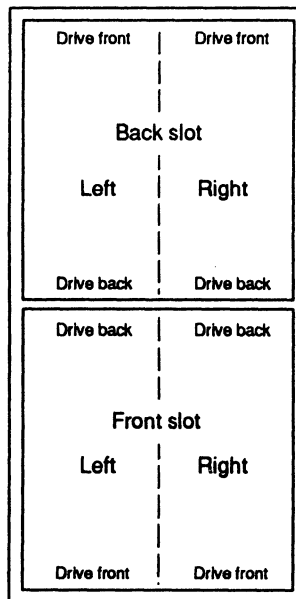
## Mass-Storage Drive Locations

Your computer unit has the two slots for internal SCSI drives as shown in Figure 6-1. Each slot can hold one drive assembly that contains two brackets and either one full-height drive or two half-height drives.

**NOTE:** Drives are mounted vertically in the computer unit. A full-height drive mounted vertically is 3.25 inches wide, and a half-height drive mounted vertically is 1.75 inches wide.



**Computer unit  
(view from top looking down)**



*Figure 6-1 Internal Drive Slots*

Either drive slot can hold one drive assembly containing either one full-height drive or one or two half-height drives.

- If you are adding a removable media drive you must assign it to an available space in the front slot.
- If you are adding a disk drive, assign it to an available space in the back slot. If there is no available space in the back slot, then assign it to a space in the front slot.

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

1. Identify where to install the drive.
2. If you are adding the drive to an existing drive assembly (drive and two brackets), remove the drive assembly from the computer unit.
3. Configure the new drive.
4. Attach the brackets to the new drive.
5. (Re)install the drive assembly in the computer unit.

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

1. Remove the drive assembly containing the failed drive from the computer unit.
2. Remove the brackets from the failed drive.
3. Configure the replacement drive.
4. Attach the brackets to the replacement drive.
5. Reinstall the drive assembly in the computer unit.

## Removing a Drive Assembly

Before you can remove a drive assembly, you should remove the computer unit's top and side covers and attach the ESD wrist strap as described in Chapter 5, "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 two drive brackets and one or two drives. You will need a medium (#2) Phillips screwdriver.

1. Unplug the power and SCSI bus cables from the drive. If the drive assembly contains two half-height drives, unplug the cables from each drive. Figure 6-2 shows the internal drive ribbon cable and power connectors.
2. If you are removing a diskette drive, unplug the I/O bus cable from the diskette drive you are removing as shown in Figure 6-3.
3. Next unplug the power adapter cable from the diskette drive you are removing as shown in Figure 6-4.

For more information on cable connections, refer to the manual for installing the drive listed in *Guide to AViiON and DG/UX System Documentation*.

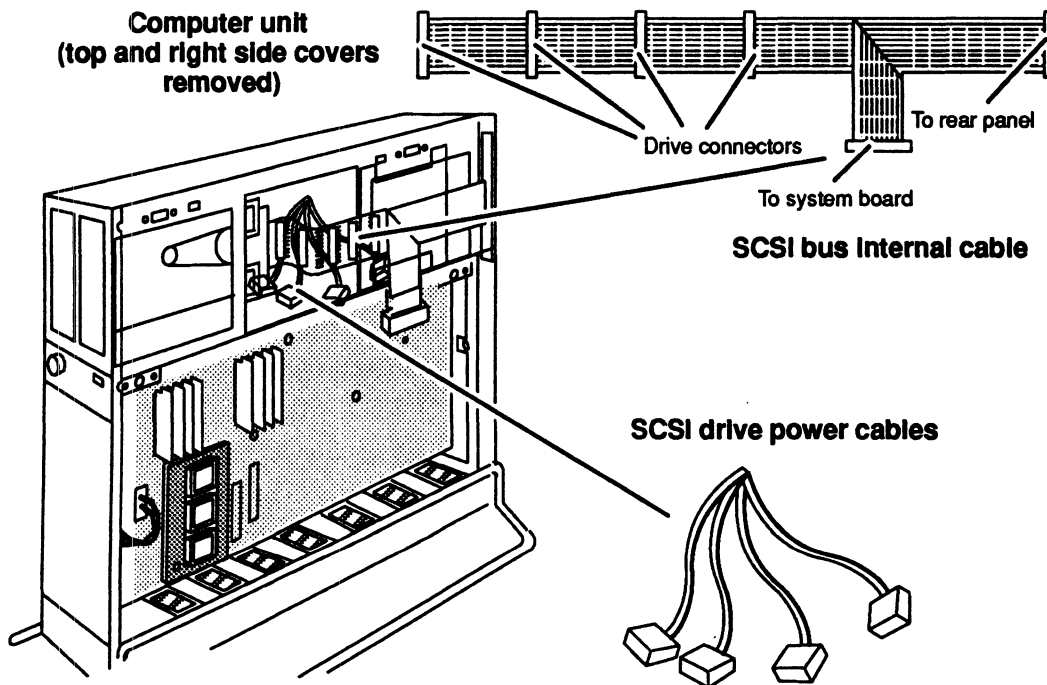


Figure 6-2 SCSI Bus Ribbon Cable and Drive Power Connectors

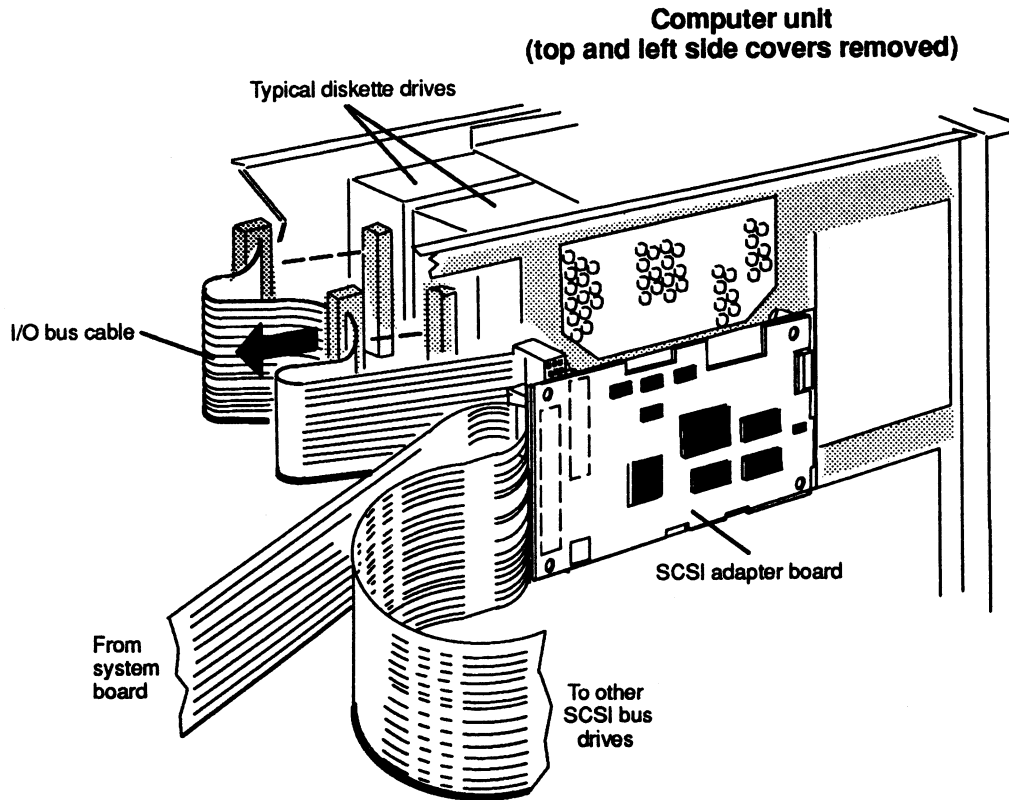


Figure 6-3 Unplugging the I/O Bus Cable from a Diskette Drive

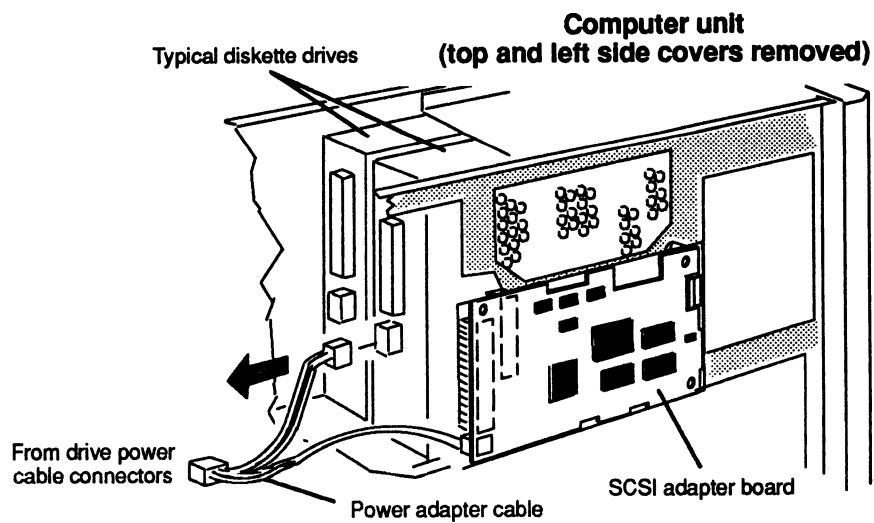
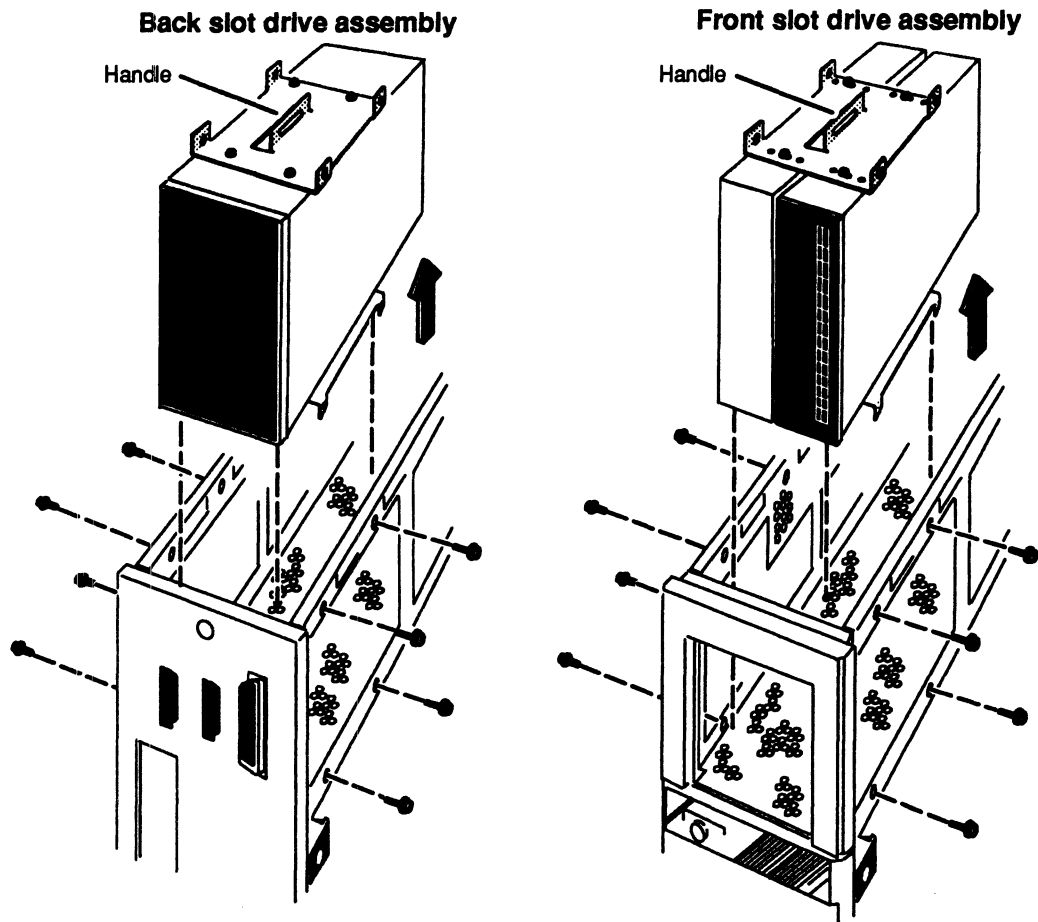


Figure 6-4 Unplugging the Power Adapter Cable from a Diskette Drive

4. Remove the eight screws and washers securing the drive assembly to the computer unit as shown in Figure 6-5.



6-5 Removing a Drive Assembly from the Computer Unit

5. Use the handle on the drive assembly to lift the drive assembly out of the computer unit. If you are removing a drive assembly from the front slot, slide the assembly toward the center of the computer unit first; then lift it out of the computer unit.

If you are removing a drive from the drive assembly, go to the next section. If you are adding a drive to the drive assembly, go to the “Configuring New or Replacement Drives” section.

## Removing Brackets from a Drive

To remove the brackets from the drive you are replacing, follow the steps below. You will need a medium (#2) Phillips screwdriver.

1. Remove the eight screws and washers (four for each bracket) that secure the drive to the brackets.

If the drive assembly contains two half-height drives and you want to detach just one half-height drive from the brackets, remove only the four screws and washers that attach that drive to the brackets. There is no need to detach the other half-height drive from the brackets. Figure 6-6 shows how to remove the brackets from full-height and half-height drives.

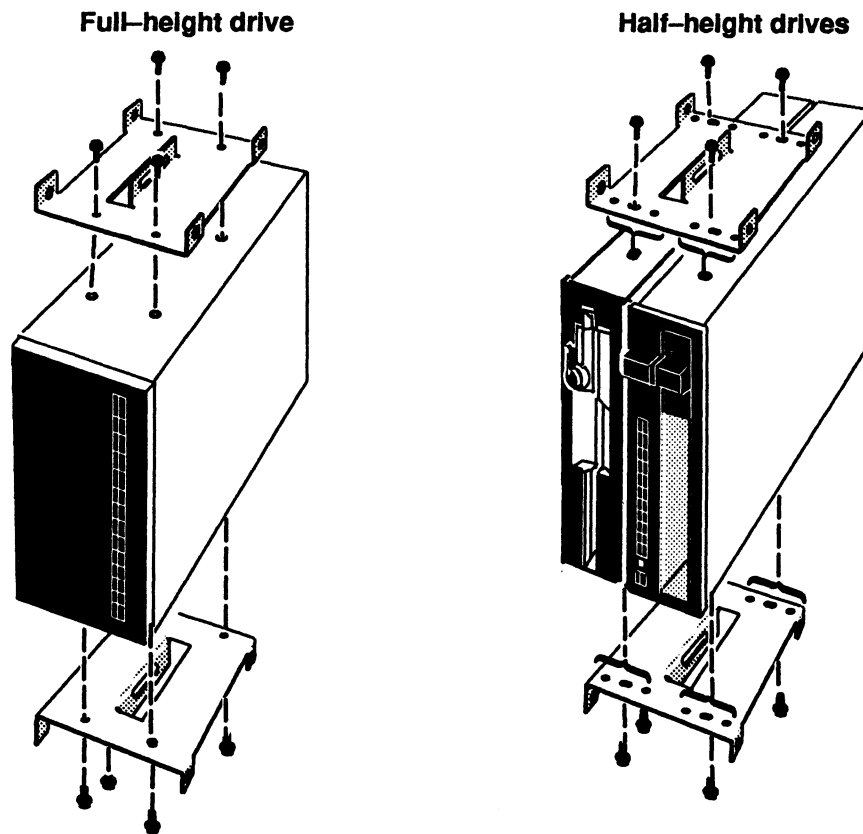


Figure 6-6 Removing Brackets from Drives

2. Grasping the drive by its edges, gently place the drive and brackets on a work surface.

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

To install a replacement drive, go to the next section, “Configuring New or Replacement Drives ”

## Configuring New or Replacement Drives

Before you install a new or replacement drive in your system, you must *configure* the drive to cooperate with your other system components. In particular, you need to set the operating parameters for your SCSI drives to function properly with other drives on the SCSI bus. Once you have confirmed (after referring to Chapters 6 and 4 in this manual) that your new drive adheres to the SCSI and power rules for your entire system, you must set the appropriate jumpers and/or switches on the new or replacement as described in this section.

**NOTE:** For information on how to access the SCSI jumpers/switches and the terminator resistors, refer to the manual on installing the drive listed in *Guide to AViON® and DG/UX™ Systems Documentation*.

Configure the new or replacement drive as follows:

- On the disks, set the spindle control option jumpers or switches for sequential drive motor start. The drive will then delay starting up its spindle motor a number of seconds (a multiple of the SCSI ID number) when you power up your system.
- On all drives, set the appropriate jumpers or switches for the SCSI bus (host system) to provide terminator power rather than the drive itself. Some drives specify this option as “SCSI pin 26 ON,” or “power from interface cable pin 26.”
- Set the jumpers or switches to *enable* parity checking and arbitration if the drive offers these options.
- Make sure the bus termination is correct on the new drive. In an AViiON 410, 412 4100, or 4300 series computer, *all* the internal drives and SCSI adapter boards must have their SCSI bus terminator resistors *removed*.
- Set the SCSI ID jumpers or switches on the new drive or SCSI adapter board to the device ID you assigned it when you planned your SCSI bus. Table 6–2 reviews the device identification sequence we recommended; Figure 6–7 shows an example of a valid SCSI bus configuration.

**NOTE:** You should review or complete the SCSI Bus Configuration Worksheet in Chapter 4 to see if any external SCSI drive or SCSI adapter board on the bus has the same SCSI ID as the internal drive or SCSI adapter board you intend to add. If any external drive on the bus has the same SCSI ID as an internal drive or SCSI adapter board, you must reassign your SCSI IDs for one of the drives.

**Table 6–2 SCSI Device Identification Numbers**

Drives <sup>1</sup>	ID Number	LUN
<b>Disk Drives</b>		
First drive	0	
Second drive	1	
Third drive	2	
<b>Diskette Drives</b>		
Adapter board	3 <sup>2</sup>	
First drive		0
Second drive		1
<b>Tape Drives</b>		
First drive	4	
Second drive	5	
Third drive	6	

- 1 A CD-ROM drive can have any SCSI ID except 0 or 4.
- 2 Or as the next “disk” in sequence.

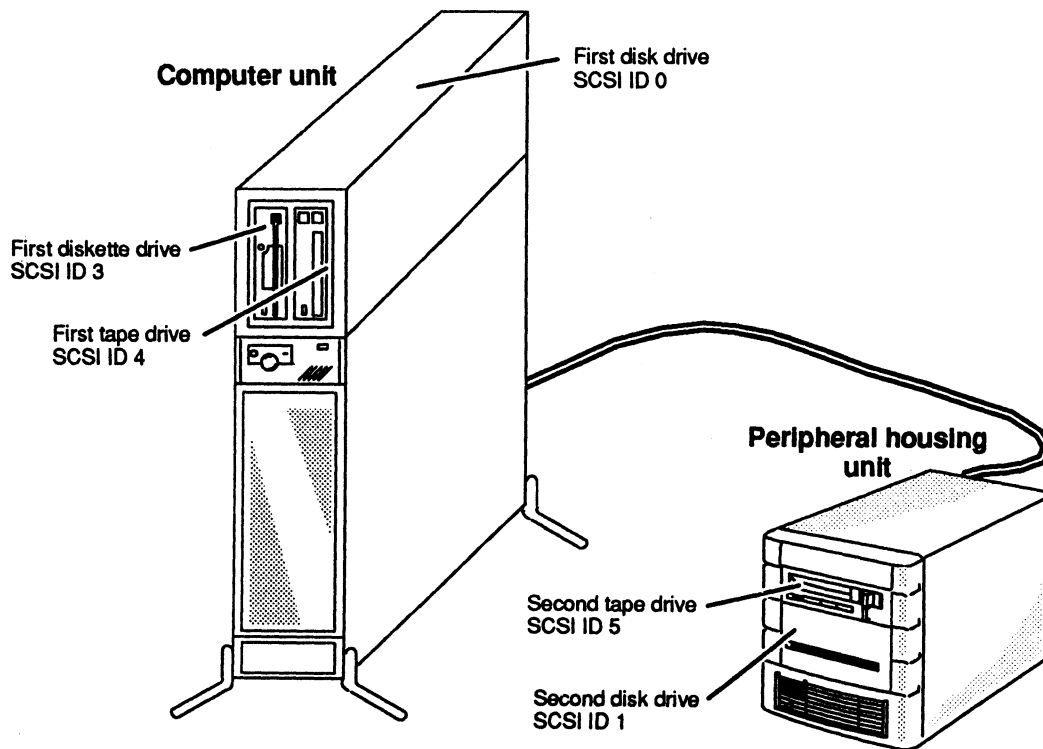


Figure 6-7 Example of Recommended SCSI ID Settings

Continue with the next section to install your properly configured drive in the computer chassis.

## Installing a Drive Assembly

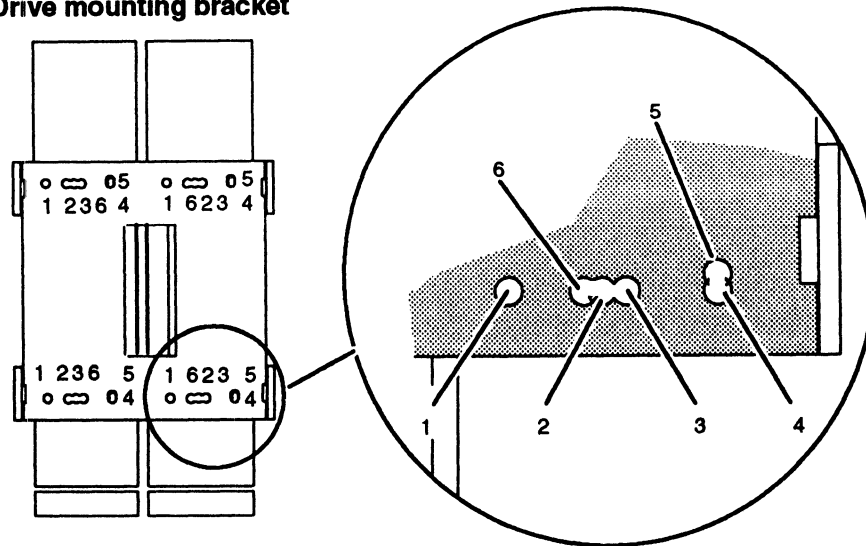
After you configure your new or replacement drive, you can attach the brackets to form a drive assembly, and then (re)install the assembly into your computer chassis.

### Attaching Brackets to a Drive

To attach the brackets to the new drive, follow the steps below. You will need a medium (#2) Phillips screwdriver.

3. Grasping the new drive by its edges, align the appropriate mounting holes in the bracket with the holes in the side of the drive. A half-height drive fills half of the bracket. Figure 6-8 shows the mounting holes for each type of drive.

**Drive mounting bracket**



Half-Height Drives	Mounting Hole Numbers
600-Mbyte CD ROM	2
150-Mbyte QIC cartridge tape	1
525-Mbyte QIC cartridge tape	5
1.2-Mbyte diskette	2
1.44-Mbyte diskette	4
Digital audio tape	4
Full-height Drives	Mounting Hole Numbers
332-Mbyte disk	2 or 4 <sup>1</sup>
520-Mbyte disk	4 <sup>1</sup>
2-Gbyte tape	6
1-Gbyte disk	6
1.4-Gbyte disk	6
662-Mbyte disk	6

1 Mounts to 3 1/2- to 5 1/4-inch conversion brackets

*Figure 6-8 Bracket Mounting Holes for Drives*

- Attach the two brackets to the new drive with the eight mounting screws and washers (four for each bracket) as shown in Figure 6-9. If you are adding only one half-height drive to the brackets, you need to use only four screws and washers (two for each bracket).



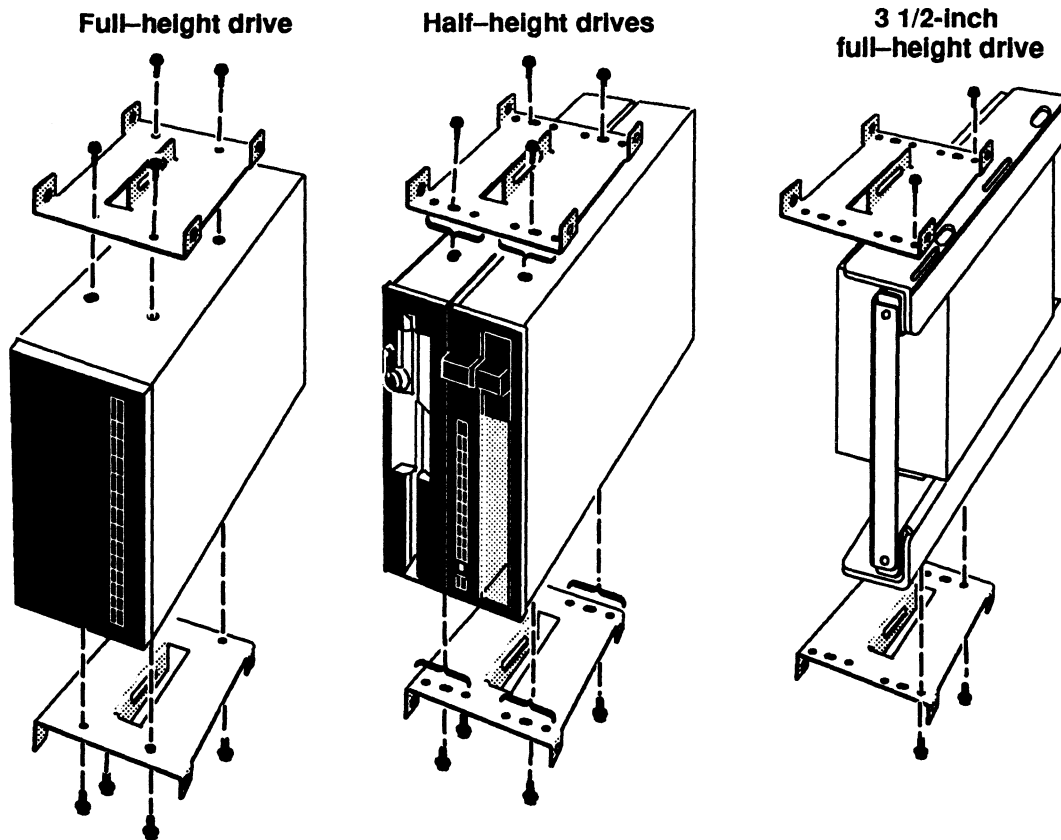


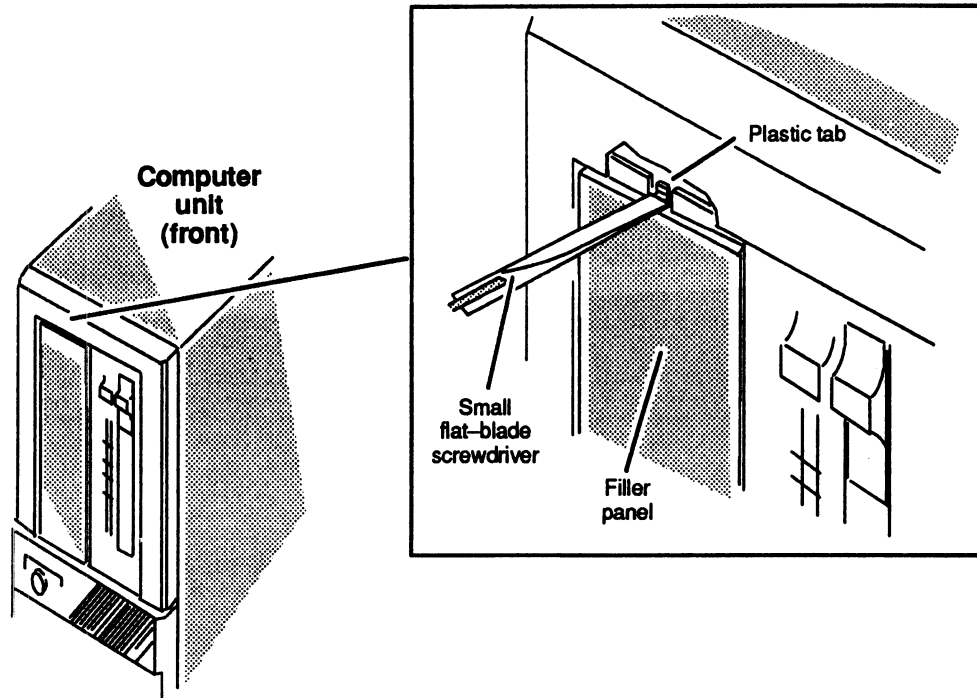
Figure 6-9 Attaching Brackets to Drives

Now go to the next section, “Completing the Drive Assembly Installation” to complete the installation of the drive.

## Completing the Drive Assembly Installation

To complete the installation of the drive, follow the steps below. You will need a medium (#2) Phillips screwdriver, and in some cases, a small flat-blade screwdriver. If you are installing a removable media drive, start with Step 1; otherwise, start with Step 2.

1. If you are installing a removable media drive, look at the computer unit’s front panel. If the slot where you are installing the drive has a plastic filler panel, you must remove the panel as described below. Figure 6-10 shows a filler panel covering the right front slot.



*Figure 6-10 Removing or Replacing a Filler Panel*

While supporting the filler panel, insert the tip of a flat-blade screwdriver about 1/8-inch into the recessed slot and gently twist the screwdriver to release the plastic tab on the filler panel. Once you do this the filler panel will pop out.

2. Position the drive in the slot so that its back (connector end) faces toward the center of the computer unit. If you are installing a drive assembly in a front slot, slide the drive into the front panel opening.
3. Align the holes on the drive assembly's brackets with the holes in the computer unit frame, and attach the drive assembly to the computer unit with the eight screws and washers as shown in Figure 6-11.

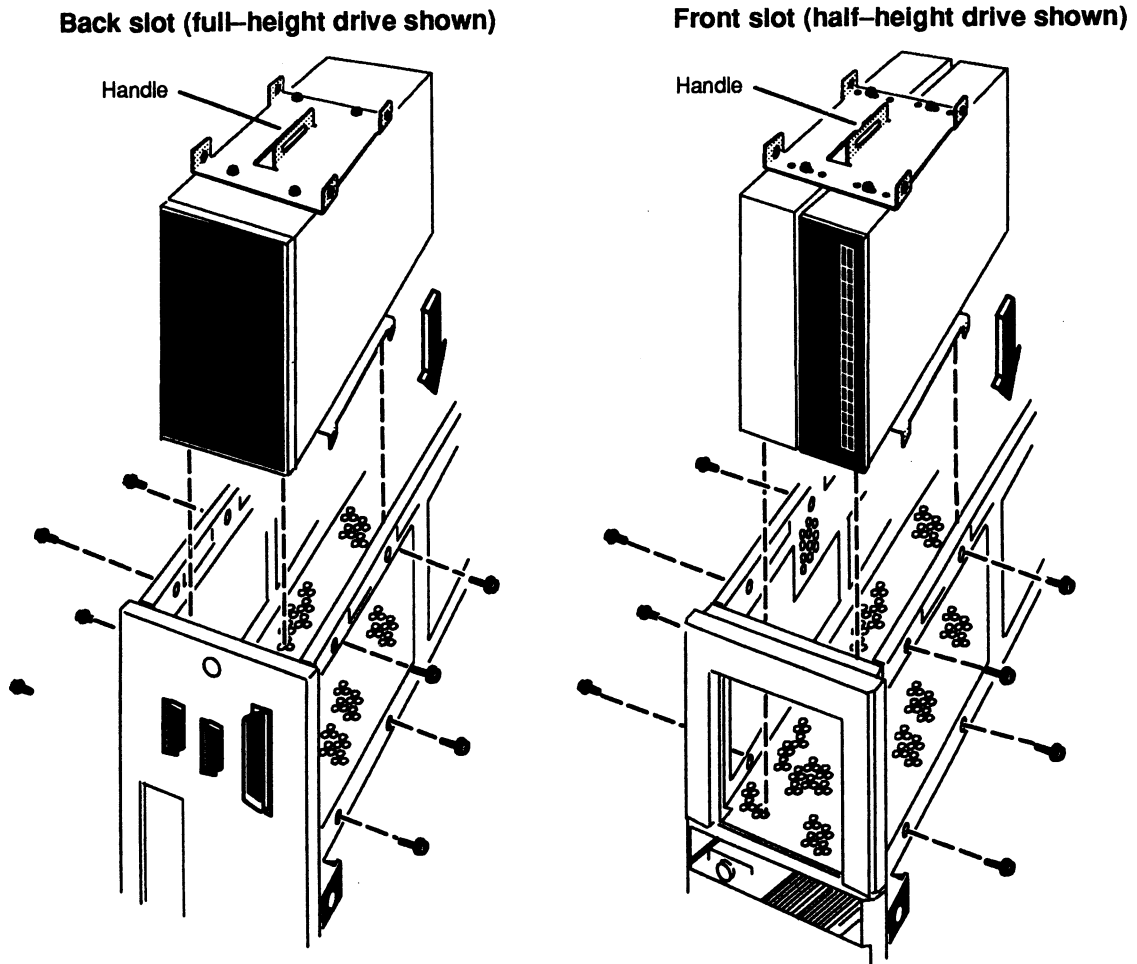


Figure 6-11 Installing a Drive Assembly in the Computer Unit

4. Plug a power cable and the nearest SCSI bus cable connector firmly into the power and SCSI bus connectors on each drive in the drive assembly. For information on the connector locations, refer to the manual for installing the drive.

**NOTE:** You can plug the cable 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.

If you are installing a diskette drive, plug the power adapter cable into the diskette drive you are installing as shown in Figure 6-12.

Next, plug the I/O bus cable into the diskette drive you are installing as shown in Figure 6-13. Be sure to plug in the cable so that the red line is on the bottom.

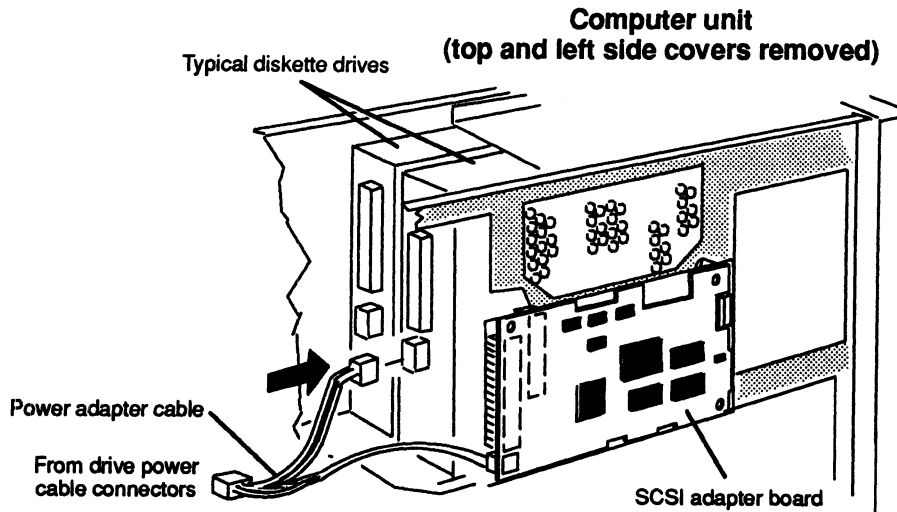


Figure 6-12 Plugging the Power Adapter Cable into a Diskette Drive

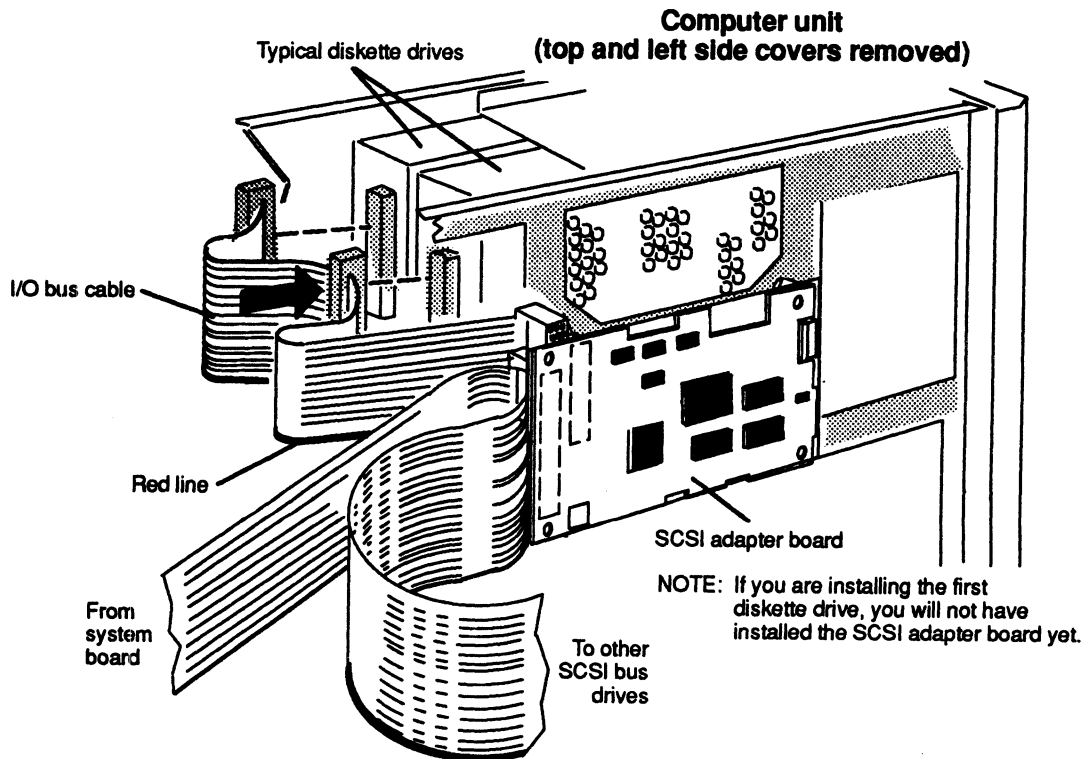


Figure 6-13 Plugging the I/O Bus Cable into a Diskette Drive

If you installed the *first* diskette drive in your computer chassis, go to the “Adding or Replacing the SCSI Adapter Board” section of this chapter to install the SCSI adapter board. If you are installing a drive other than the first diskette drive, you have now completed the procedure for installing a drive. You should remove the ESD wrist strap, reinstall the top and side covers, and plug in the computer unit’s power cord as described in the “Closing the Computer Unit” section of Chapter 5.

After you have closed the computer unit, you should power up any peripheral housing units and other peripherals, and then the computer, according to the instructions in the “Powering Up” section of Chapter 3. Then test your computer system by running the AViON System Diagnostics as described in the *Using AViON® System Diagnostics* manual.

## Adding or Replacing the SCSI Adapter Board

The diskette drives supported in AViON 410, 412, 4100 and 4300 series systems require a printed-circuit board that adapts the SA450-interface diskette drive to the system’s SCSI bus. One of these *SCSI adapter boards* can support two diskette drives.

If you are adding the SCSI adapter board, go to the section, “Installing the SCSI Adapter Board.” If you are replacing the SCSI adapter board, continue to the next section, “Removing the SCSI Adapter Board.”

### Removing the SCSI Adapter Board

Before you can remove the SCSI adapter board, you should remove the computer unit’s top and side covers and attach the ESD wrist strap as described in Chapter 5, “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 SCSI adapter board from the computer unit, use the following steps.

1. Unplug the SCSI bus and I/O bus cables from the SCSI adapter board as shown in Figure 6-14.

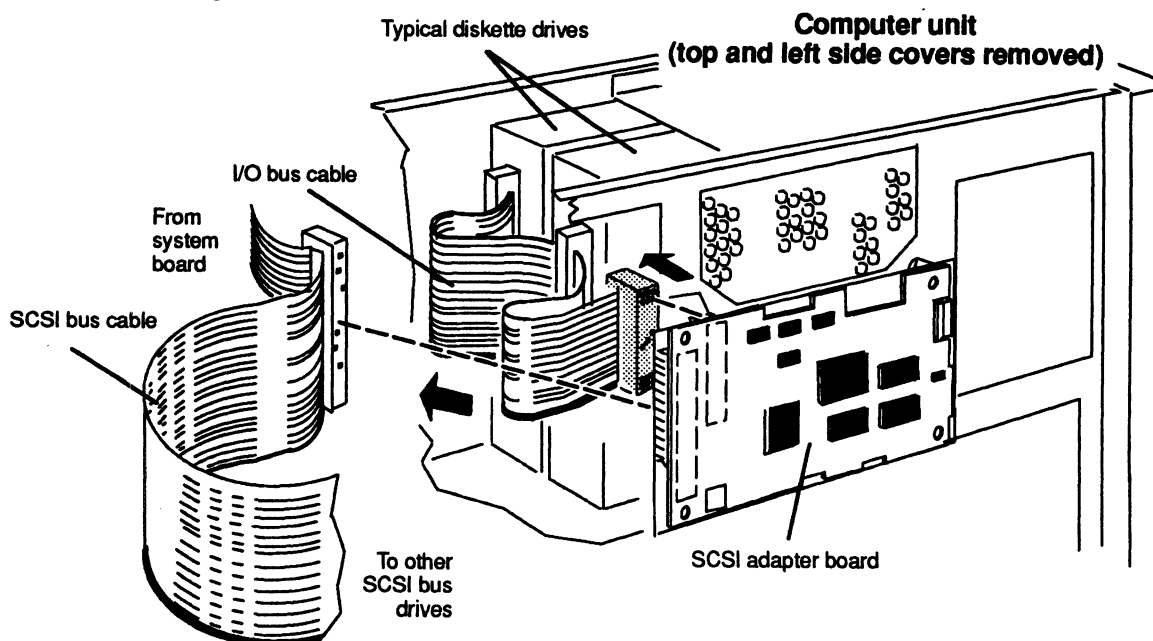


Figure 6-14 Unplugging the SCSI Bus and I/O Bus Cables from the SCSI Adapter Board

2. Unplug the power adapter cable from the SCSI adapter board as shown in Figure 6-15.

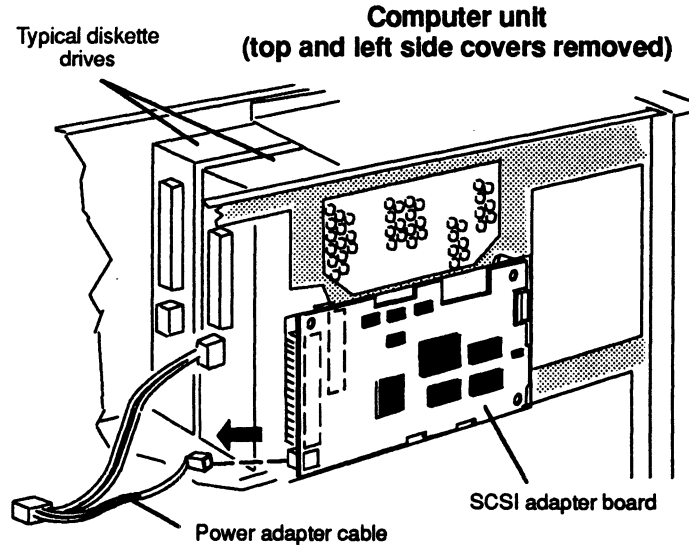


Figure 6-15 Unplugging the Power Adapter Cable from the SCSI Adapter Board

3. Remove the two screws securing the SCSI adapter board to the front of the left side of the computer unit as shown in Figure 6-16.

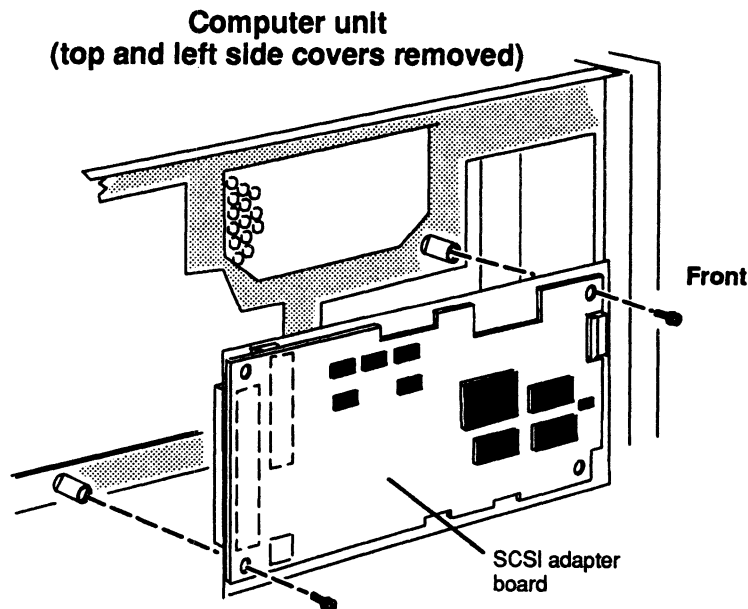


Figure 6-16 Removing or Installing the Screws that Attach the SCSI Adapter Board to the Computer Unit

If you removed a failed SCSI adapter 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.

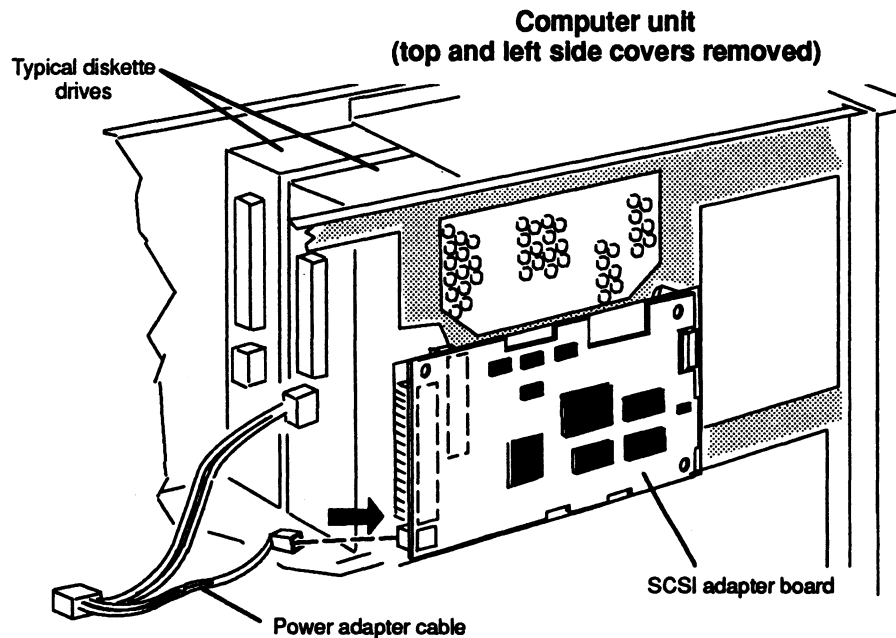
## Installing the SCSI Adapter Board

Before you can install a new SCSI adapter board, you should remove the computer unit's top and side covers and attach the ESD wrist strap as described in the "Opening the Computer Unit" section of Chapter 5. You also need to prepare the SCSI adapter board as described in the device-specific manual(s) for board and drives.

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

To install the SCSI adapter board in the computer unit, follow the steps below.

1. Prepare the board by setting the SCSI ID jumpers to specify drive 3.
2. Attach the SCSI adapter board to the computer unit with the two screws. Refer to Figure 6-16.
3. Plug the power adapter cable into the SCSI adapter board as shown in Figure 6-17.



**Figure 6-17** *Plugging the Power Adapter Cable into the SCSI Adapter Board*

4. Plug the SCSI bus and the I/O bus cables into the SCSI adapter board as shown in Figure 6-18. Be sure to plug in each cable so that the red line is on the bottom.

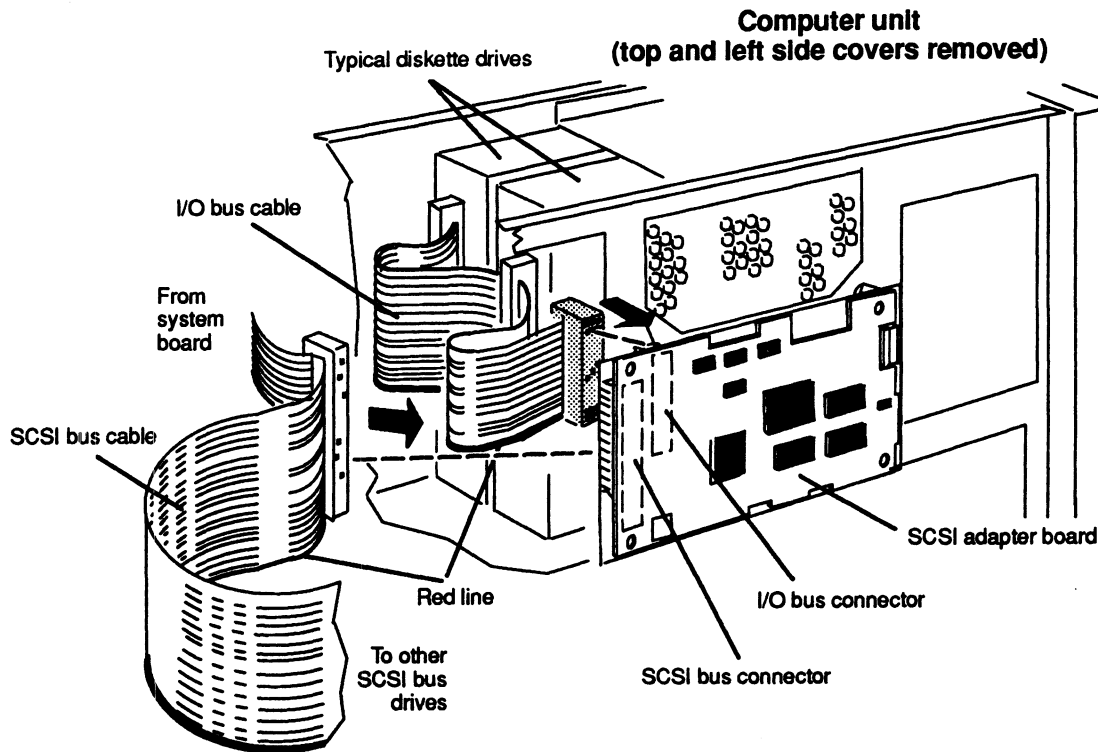


Figure 6-18 Plugging the SCSI Bus and I/O Bus Cables into the SCSI Adapter Board

5. Reinstall the top and side covers as described in the section, "Closing the Computer Unit" in Chapter 5.

## Replacing the Terminator Plug

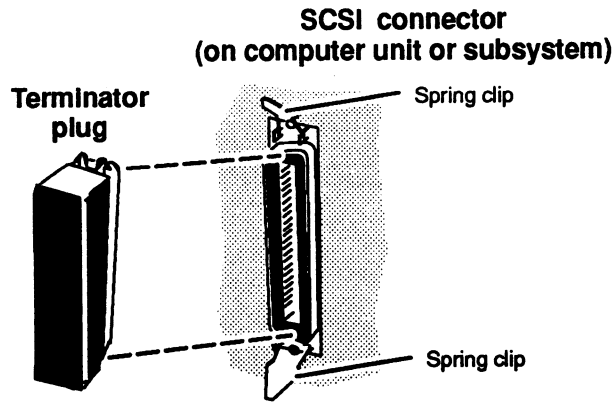
The computer uses a SCSI bus terminator plug that ships installed in the external SCSI connector on the rear panel. If you have any external mass-storage drives, you must install the terminator plug on the *last* subsystem or independent drive on the SCSI bus in your system. Refer to Chapter 4, "Setting Up and Installing a SCSI Bus," for a description of SCSI bus configuration and termination rules.

To replace the terminator plug, follow the steps below.

1. If the computer subsystem is running, power it down. Refer to Chapter 3, "Starting and Stopping Your Computer System," and your operating system software, for proper powerdown procedures.



2. Release the spring clips on each side of the terminator plug as shown in Figure 6-19, and unplug the terminator plug from the SCSI bus connector.



*Figure 6-19 Unplugging and Plugging in the SCSI Bus Terminator Plug*

3. Plug the new terminator plug into the same connector, and push the two spring clips down onto the new terminator plug to hold it in place.

End of Chapter



# Chapter 7

## Adding or Replacing Memory Modules

This chapter gives the 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 410, 412, and 4100 series computer systems support up to eight Single In-Line Memory Modules (SIMMs). The AViiON 4300 supports one to four pairs of SIMMs. Models 7000 and 7018 memory modules contain 4 megabytes of memory on each SIMM; Models 7014 and 7019 modules provide 16 megabytes. AViiON 410, 412, and 4100 series computer systems support byte parity error detection. The AViiON 4300 supports Error Checking and Correction (ECC). Figure 7-1 shows how to identify the memory modules supported by your system.

**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.*

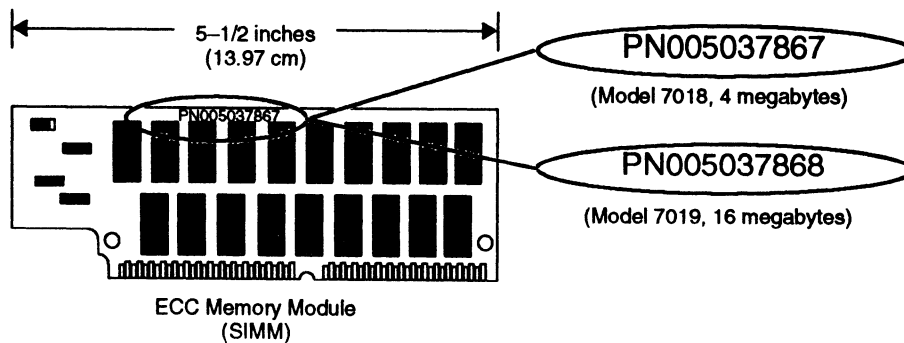


Figure 7-1 AViiON 4300 Series ECC Memory Modules

Adding or Replacing Memory Modules

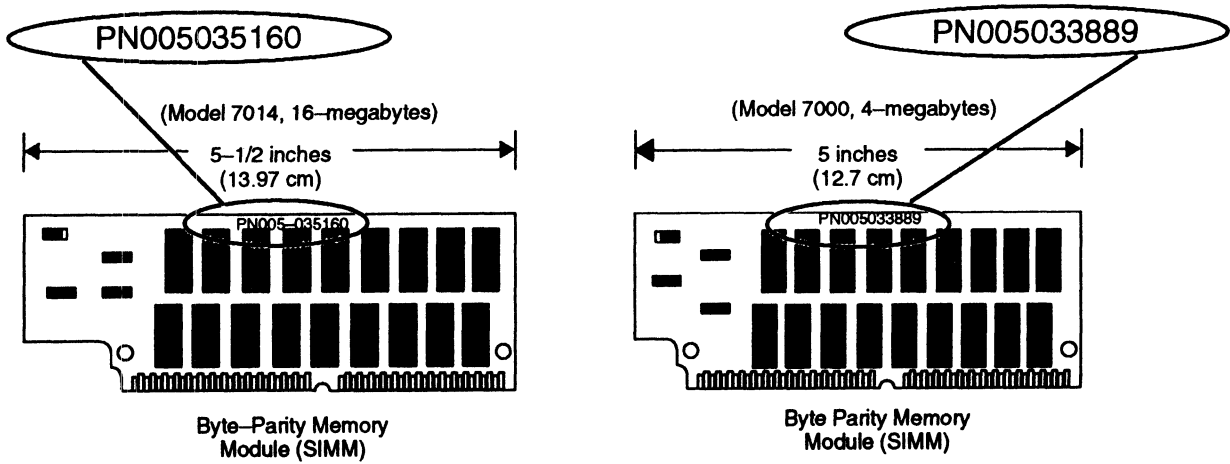


Figure 7-2 AViiON 410, 412, and 4100 Series Byte-Parity Memory Modules

Each memory module mounts in a connector on the system board as shown in Figure 7-3.

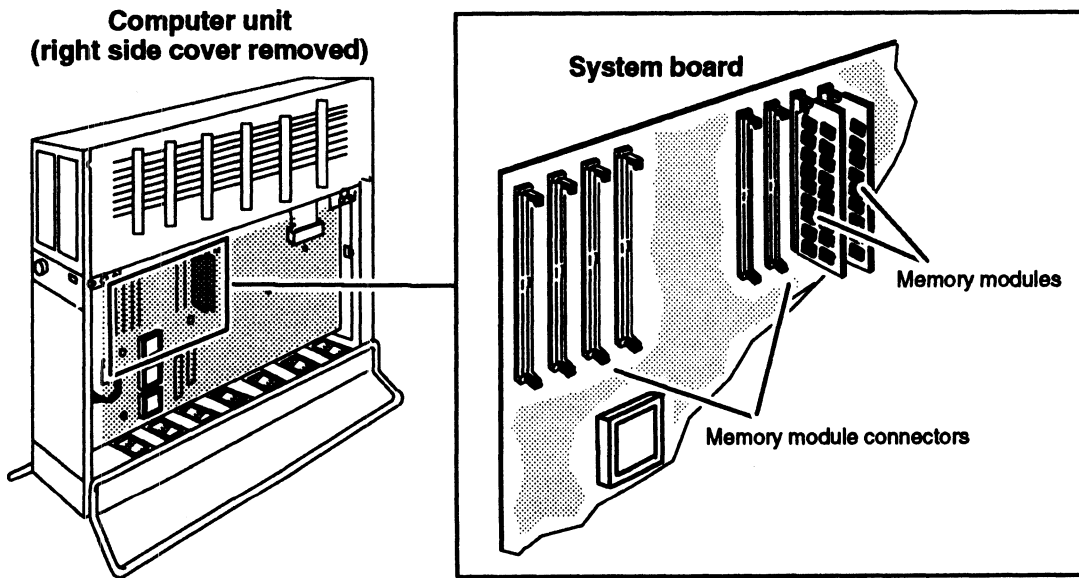


Figure 7-3 Location of Memory Modules and Connectors

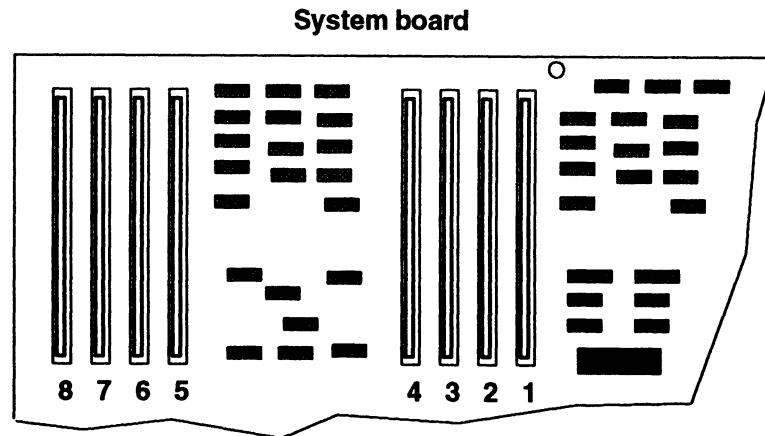


Figure 7-4 Numbering Scheme for Memory Module Connectors

## Rules for Installing Memory Modules in AViiON 4300 Series Systems

When you install memory modules in the AViiON 4300 series system, you must follow the configuration and installation rules listed next. Note that Figure 7-4 shows the numbering scheme for AViiON 4300 series memory modules on the system board.

- You must install memory modules in *consecutive* memory module connector pairs, starting with the rightmost pair (connector numbers 1 and 5) and working towards the left (connector numbers 2 and 6; 3 and 7, and 4 and 8). Never leave a connector empty between memory module pairs.
- You must configure memory modules in *pairs* on the system board. Odd numbers of modules will not work. For example, a module in connector 1 on the system board requires a memory module in connector 5; a memory module in connector 2 will not work without a corresponding module in connector 6.
- Each pair requires modules of equal capacity. For example, a 16-Mbyte memory module in connector 3 requires a 16-Mbyte module in connector 7.
- You must install all pairs of 16-Mbyte modules *first* (in the lower-numbered slots) when installing a mix of 4-Mbyte and 16-Mbyte modules. For example, in a configuration that combines two pairs of 16-Mbyte and one pair of 4-Mbyte memory modules, the 16-Mbyte pairs must occupy connectors 1 and 5, and 2 and 6 on the system board, and the 4-Mbyte modules must occupy connectors 3 and 7.
- If you are replacing a memory module, you must temporarily remove *all* the memory module(s) installed to the left of the one you are replacing, starting with the leftmost memory module and working toward the right.

For example, if memory modules occupy connectors 1 through 6 and you are replacing the module in connector 3, then you must first remove the memory module in connector 6, then the memory module in connector 5, and then the memory module in connector 4, before you can remove the memory module in connector 3.

Table 7–1 lists valid memory configurations for AViiON 4300 series systems.

**Table 7–1 Valid Memory Configurations for AViiON 4300 Systems**

Connector Number								Total Mbytes Memory
1	2	3	4	5	6	7	8	
4 Mb				4 Mb				8
4 Mb	4 Mb			4 Mb	4 Mb			16
4 Mb	4 Mb	4 Mb		4 Mb	4 Mb	4 Mb		24
4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4Mb	32
16 Mb				16 Mb				32
16 Mb	4 Mb			16 Mb	4 Mb			40
16 Mb	4 Mb	4 Mb		16 Mb	4 Mb	4 Mb		48
16 Mb	4 Mb	4 Mb	4 Mb	16 Mb	4 Mb	4 Mb	4Mb	56
16 Mb	16 Mb			16 Mb	16 Mb			64
16 Mb	16 Mb	4 Mb		16 Mb	16 Mb	4 Mb		72
16 Mb	16 Mb	4 Mb	4 Mb	16 Mb	16 Mb	4 Mb	4 Mb	80
16 Mb	16 Mb	16 Mb		16 Mb	16 Mb	16 Mb		96
16 Mb	16 Mb	16 Mb	4 Mb	16 Mb	16 Mb	16 Mb	4Mb	104
16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	16Mb	128

## Rules for Installing Memory Modules in AViiON 410, 412, and 4100 Series Systems

When you install memory modules in AViiON 410, 412, and 4100 series systems, you must follow the configuration and installation rules listed next. Note that Figure 7–4 shows the numbering scheme for AViiON 410, 412, and 4100 series memory modules on the system board.

- Install memory modules beginning with connector number 1.
- Install memory modules contiguously: never leave an empty connector between memory modules.
- To make it possible to remove or install a memory module from a connector, temporarily remove any memory module(s) installed to the left of the one you are replacing. For example, if memory modules occupy connectors 1 through 6 and you are replacing the module in connector 3, then you must first remove the memory module in connector 6, then the memory module in connector 5, and then the memory module in connector 4, and finally the memory module in connector 3.

If you are installing memory modules in the AViiON 410, 412, or AViiON 4100 series systems, you can install the 16-Mbyte and 4-Mbyte memory modules in any combination with the following exception:

- You must install all 16-Mbyte modules first (in the lower-numbered slots) when installing a mix of 4-Mbyte and 16-Mbyte modules.

Table 7-2 lists valid memory configurations for AViiON 410, 412, and 4100 series systems.

**Table 7-2 Valid Memory Configurations for AViiON 410, 412, and 4100 Series Systems**

Connector Number								Total Mbytes Memory
1	2	3	4	5	6	7	8	
4 Mb	4 Mb							8
4 Mb	4 Mb	4 Mb						12
4 Mb	4 Mb	4 Mb	4 Mb					16
16 Mb								16
16 Mb	4 Mb							20
4 Mb	4 Mb	4 Mb	4 Mb	4 Mb				20
4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb			24
16 Mb	4 Mb	4 Mb						24
16 Mb	4 Mb	4 Mb	4 Mb					28
4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb		28
4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4Mb	32
16 Mb	16 Mb							32
16 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb			36
16 Mb	16 Mb	4 Mb						36
16 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb		40
16 Mb	16 Mb	4 Mb	4 Mb					40
16 Mb	16 Mb	4 Mb	4 Mb	4 Mb				44
16 Mb	16 Mb	16 Mb						48
16 Mb	16 Mb	4 Mb	4 Mb	4 Mb	4 Mb			48
16 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	48
16 Mb	16 Mb	16 Mb	4 Mb					52
16 Mb	16 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	4 Mb	52
16 Mb	16 Mb	16 Mb	4 Mb	4 Mb				56
16 Mb	16 Mb	16 Mb	4 Mb	4 Mb	4 Mb			60
16 Mb	16 Mb	16 Mb	4 Mb	4 Mb	4 Mb	4 Mb		64
16 Mb	16 Mb	16 Mb	16 Mb					64
16 Mb	16 Mb	16 Mb	16 Mb	4 Mb				68
16 Mb	16 Mb	16 Mb	16 Mb	16 Mb				80
16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	4 Mb			84
16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	4 Mb	4 Mb		88
16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	4 Mb	4 Mb	4 Mb	92
16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	16 Mb			96
16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	4 Mb		100
16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	4 Mb		104
16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	4 Mb		108
16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	16 Mb	16 Mb		112



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’s right side cover and attach the ESD wrist strap as described in the “Opening the Computer Unit” section of Chapter 5.

**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.

**NOTE:** You must temporarily remove all memory module(s) installed to the left of the one you are replacing, starting with the leftmost memory module and working toward the right.

1. Using your finger, gently push the locking tab on the *bottom* of the connector *down* as shown in Figure 7–5 . Then gently push the locking tab on the *top* of the connector *up* as shown in Figure 7–5 . The memory module will spring up slightly, indicating that the module is released.

**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.*

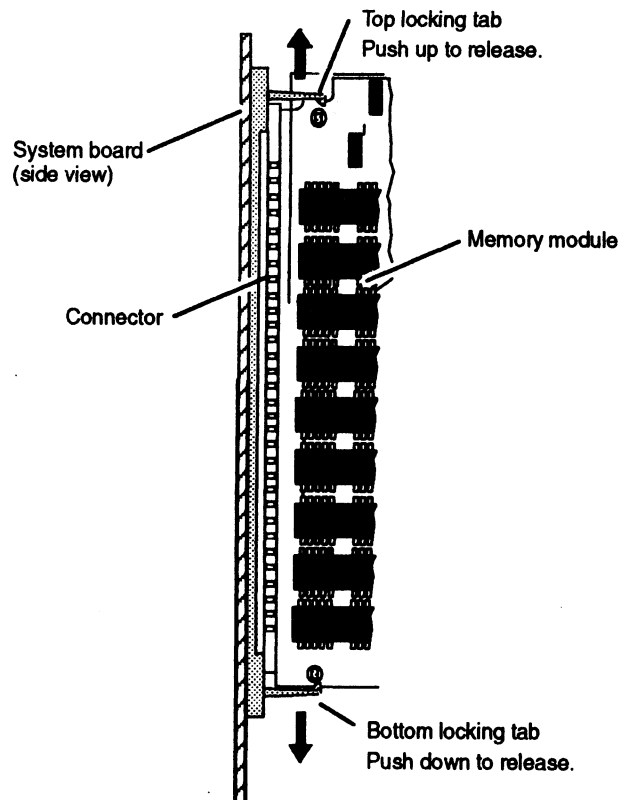


Figure 7-5 Releasing the Memory Module Locking Tabs

2. With the locking tabs released, raise the memory module to about a  $20^{\circ}$  –  $30^{\circ}$  angle as shown in Figure 7-6 , then *gently* pull the module from its connector.

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

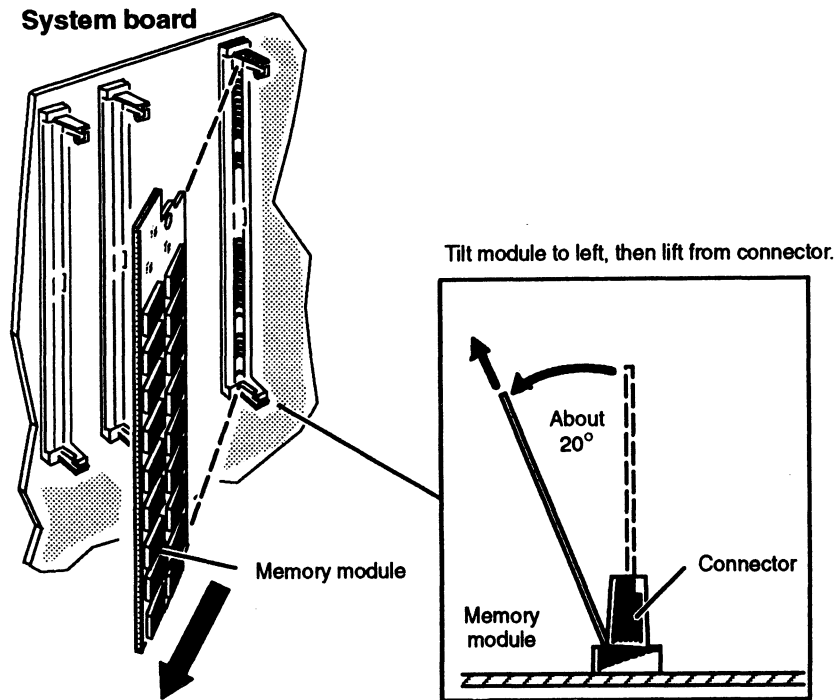


Figure 7-6 Removing a Memory Module

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 the 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's right side cover and attach the ESD wrist strap as described in Chapter 5, "Expanding and Maintaining Your Computer."

When installing memory modules you must begin by installing the rightmost memory module first (the module that will occupy the lowest numbered connector).

Figure 7-4 in this chapter shows the numbering scheme for the memory module connectors. If any memory modules are installed to the left of the memory modules you are installing, you must remove them temporarily if you have not done so already.

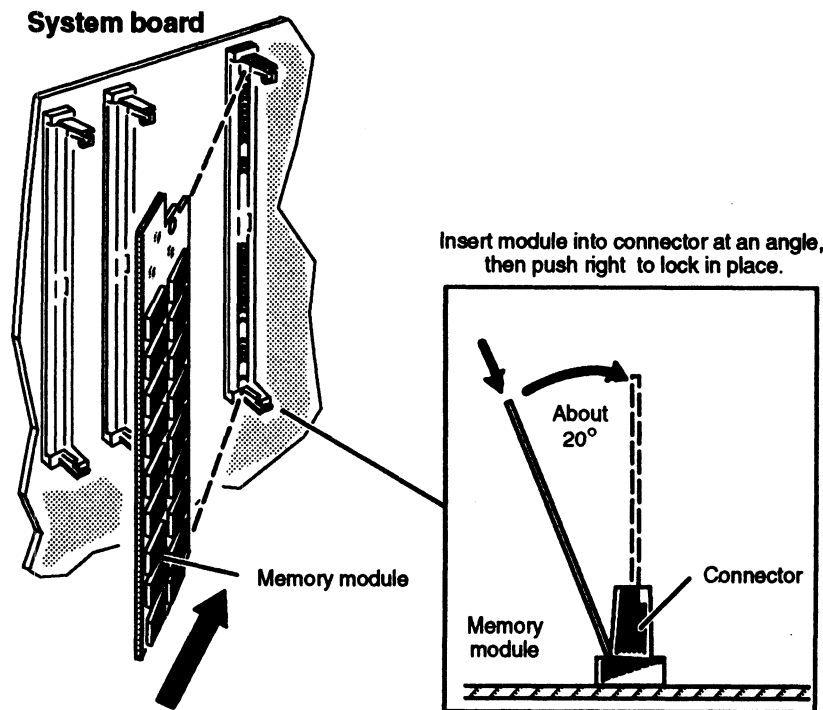
To install a memory module, use the following steps below.

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. Position the memory module in the connector at approximately a 20° –30° angle as shown in Figure 7–7 , and then *gently* push the top of the module left towards the perpendicular. You will hear a click as each connector tab locks the module into place.

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



**Figure 7–7** *Installing the Memory Module in the Connector*

Repeat steps 1 and 2 to install or reinstall any remaining memory module(s).

3. If you are not replacing any other CRUs, reinstall the top and side covers as described in the section “Closing the Computer Unit” in Chapter 5.

**NOTE:** Your system sizes the amount of memory at each powerup. If you have increased or reduced system memory, your system will interrupt its next powerup and ask you to confirm your memory configuration before continuing.

End of Chapter

# Chapter 8

## Adding or Replacing CPU and Graphics Boards

This chapter contains instructions for adding or replacing *daughter* printed-circuit boards that attach directly to the AViiON 410, 412, 4100, and 4300 series system board. All systems contain one central processing unit (CPU) option board. Depending on configuration restraints described in Chapter 6, your AViiON 410 and 412 series system can also include an 8-bit or 24-bit graphics controller board. Systems with a graphics controller can also add a Z-buffer board for enhanced graphics capabilities.

Figure 8-1 shows the locations of the AViiON 410, 412, 4100, and 4300 series system daughter boards.

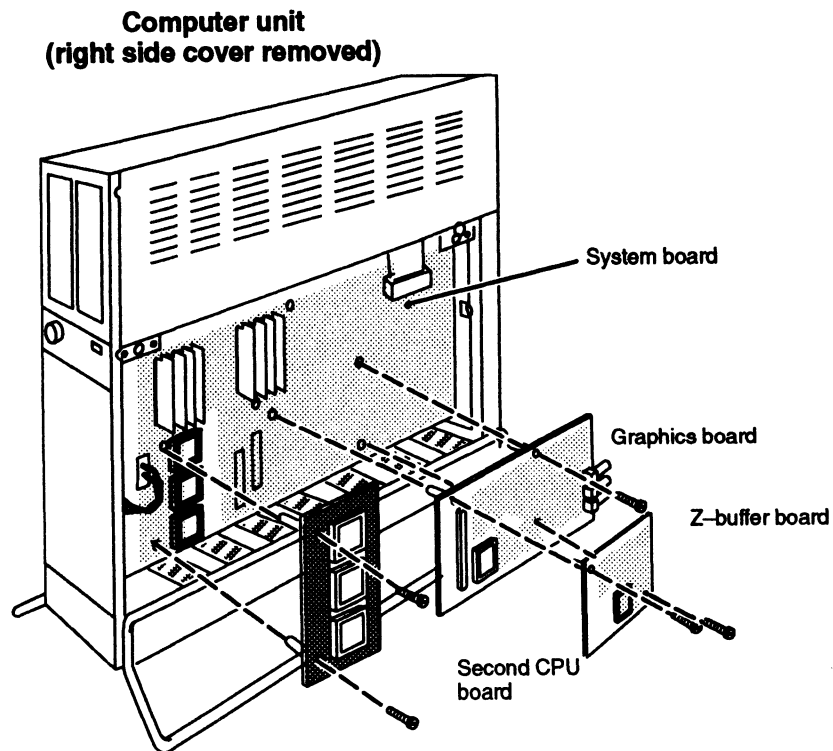


Figure 8-1 AViiON 410, 412, 4100, and 4300 Series System Board and CPU and Graphics Option Boards

## Adding or Replacing a CPU Option Board

This section tells how to add a second CPU option board to an AViiON 410, 412, 4100, or 4300 series computer unit and how to replace a failed CPU option board. You will also need to remove your CPU option board if you need to replace a failed system board.

A CPU option board contains one Motorola 88100 central processing unit and two Motorola 88200 Cache Memory Management Units (CMMUs). Your system's CPU option board attaches to two interboard connectors on the system board. Figure 8-2 shows the CPU option board used in AViiON 410, 412, 4100, or 4300 series systems.

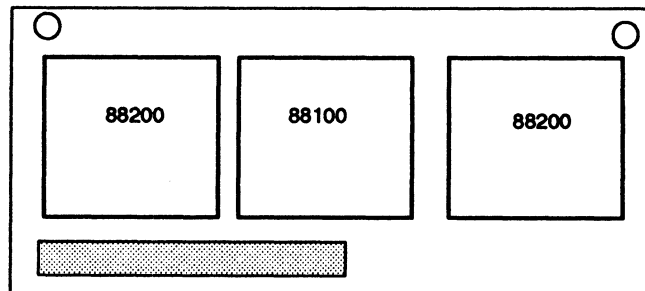


Figure 8-2 AViiON 410, 412, 4100, and 4300 Series CPU Option Board

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

### Removing a CPU Option Board

You will need to remove the CPU option board to replace it or to replace a failed system board. Before you can remove a CPU option board, you must prepare your worksite, remove the computer unit's right side cover, and attach the ESD wrist strap as described in Chapter 5, "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 CPU option board, use the following steps. You will need a medium Phillips screwdriver.

1. Remove the two screws, shown in Figure 8-3, that secure the CPU board to the system board.

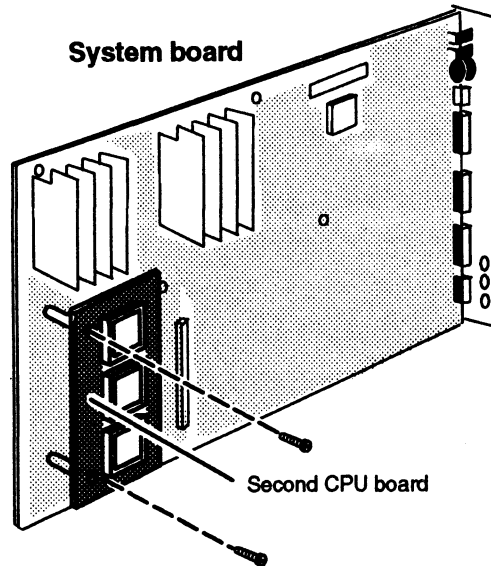


Figure 8-3 Removing the CPU Option Board Screws

2. Separate the interboard connector on the back of the CPU option board from the interboard connector on the board beneath it as shown in Figure 8-4.

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

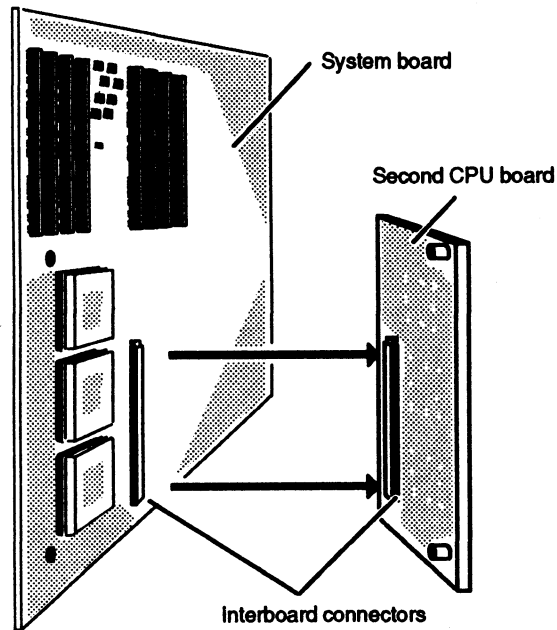


Figure 8-4 Separating the Interboard Connectors

3. Pull the CPU option board away from the board beneath it, and place it in an antistatic bag.

If you are replacing the CPU option 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 option 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 9, "Replacing the System Board." Otherwise, continue to the next section, "Installing a CPU Option Board."

## Installing a CPU Option Board

Before you can install a CPU option board, you must remove the computer unit's right side cover and attach the ESD wrist strap as described in the "Opening the Computer Unit" section of Chapter 1.

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

To install a CPU option board, follow the steps below.

1. Align the interboard connector on the CPU option board with the interboard connector on the board beneath it, as shown in Figure 8-5, and press them together. If you cannot press the connectors together, make sure that the connectors are aligned correctly, and then try pressing them together again.

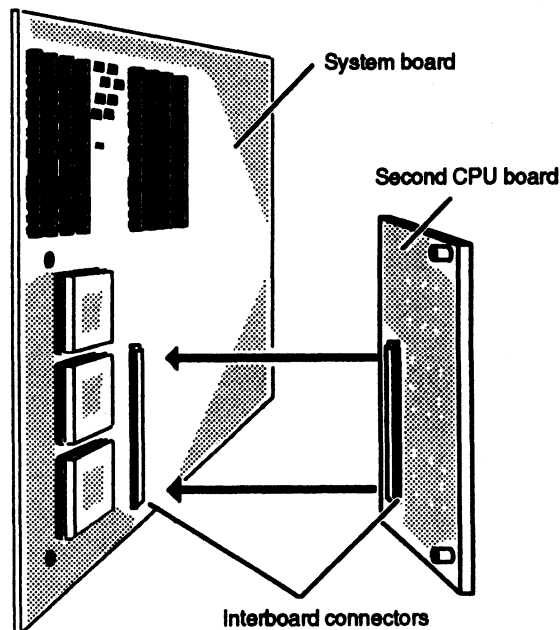
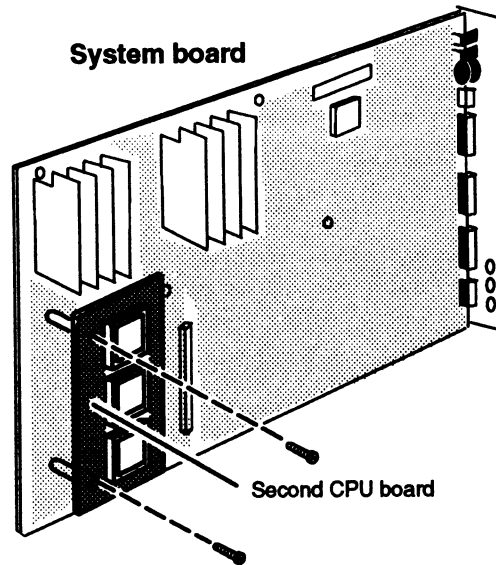


Figure 8-5 Joining the Interboard Connectors



2. Secure the CPU option board to the system board with the two screws as shown in Figure 8-6.



*Figure 8-6 Securing CPU Option Board to the System Board*

3. Reinstall the side cover as described in Chapter 5, "Expanding and Maintaining Your Computer System."

## Adding or Replacing a Graphics or Z-Buffer Board (AViON 410 and 412 Series)

This section explains how to add a graphics or Z-buffer board to your computer unit and to replace a failed graphics board or Z-buffer board in an AViON 410 and 412 series computer unit. If your computer system has a graphics board or Z-buffer board, you will need to remove them to replace a failed system board.

A graphics board plugs into an interboard connector on the system board. The Z-buffer board plugs into an interboard connector on the graphics board. Figure 8-7 shows the location of graphics and Z-buffer boards on the system board.

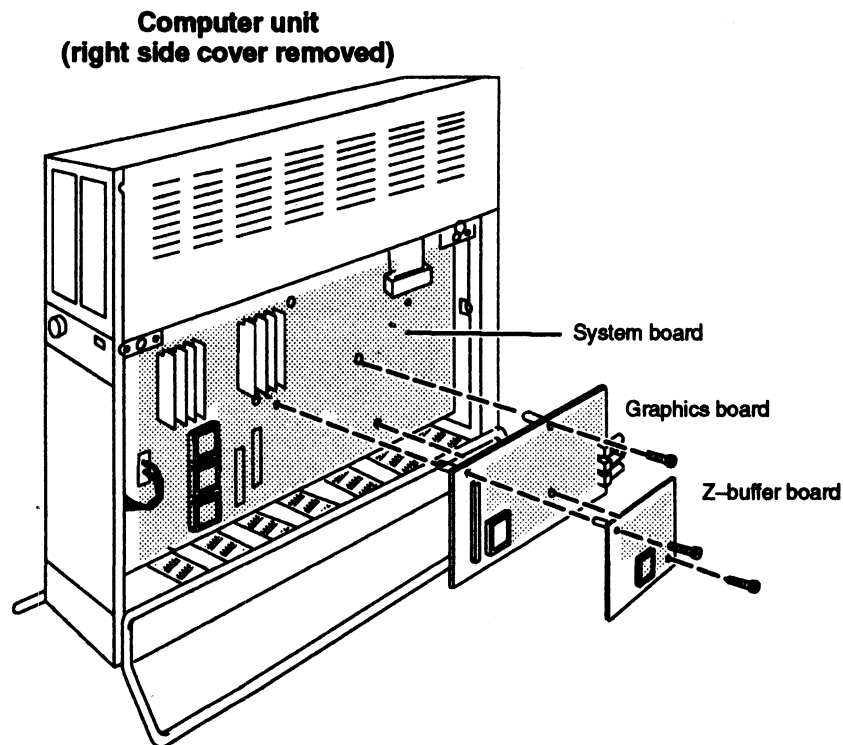


Figure 8-7 Location of the Graphics and Z-Buffer Boards on the AViON 410 and 412 Series System Board

### Removing the Graphics or Z-Buffer Board

You will need to remove a graphics board or z-buffer board to replace them or a failing system board. Before you can remove the graphics board or Z-buffer board, you must remove the computer unit's right side cover and attach the ESD wrist strap as described in the "Opening the Computer Unit" section of Chapter 1.

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

To remove the graphics or Z-buffer boards, follow the steps below. You will need a medium Phillips screwdriver. If you are installing a graphics controller board, you might also need a flat blade screwdriver and a medium-sized adjustable wrench.

1. If you are removing a graphics controller board, remove the hexagonal retaining nuts and the washers that secure the monitor connectors to the computer unit bulkhead, as shown in Figure 8-8. If you cannot release the nuts with your fingers, use an adjustable wrench.

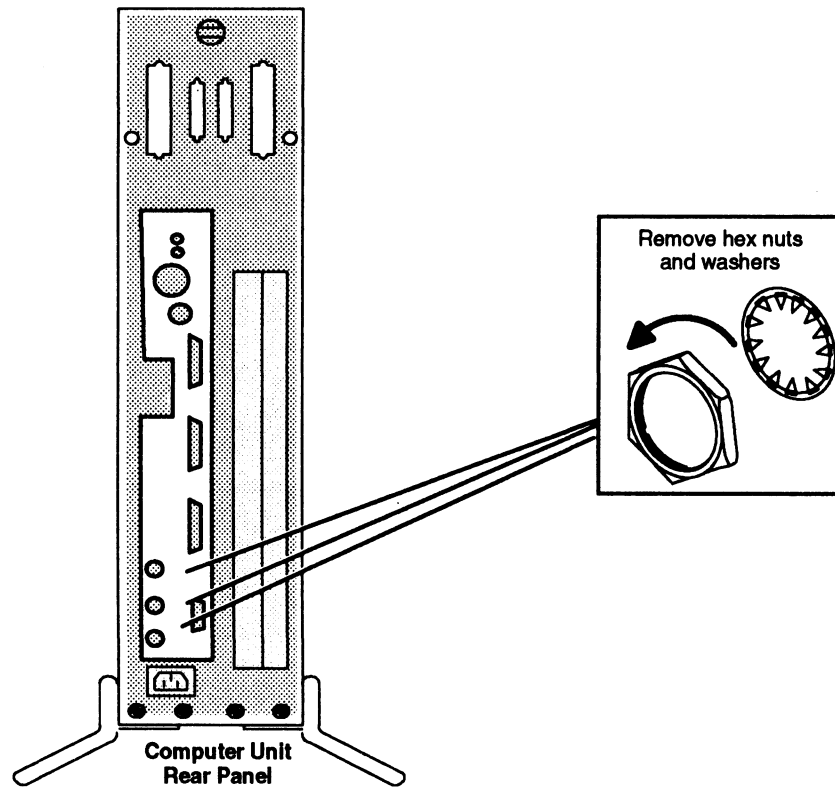
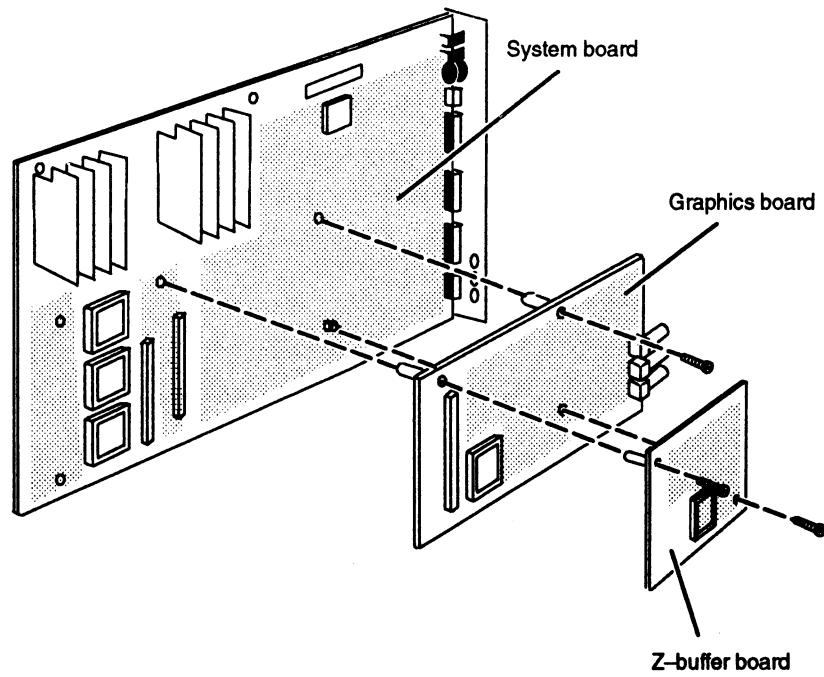


Figure 8-8 Releasing the BNC Connectors from the Computer Bulkhead

2. Remove the board-retaining screws from the board you are removing. Figure 8-9 shows the location of the board retaining screws on the option boards.



*Figure 8-9 Removing the Board-Retaining Screws*

3. Separate the interboard connector on the back of the top board from the interboard connector on the board behind it as shown in Figure 8-10.

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

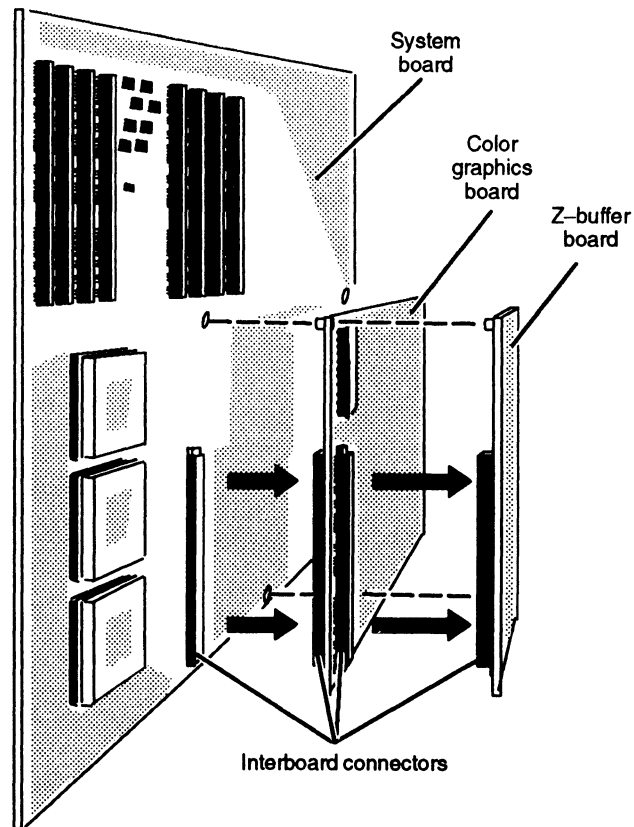


Figure 8-10 Separating the Interboard Connectors

4. Lift the board away from the board stack, and set it aside.

If you removed a failed graphics 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 temporarily removed a board, put it inside an antistatic bag until you are ready to reinstall it.

If you have not yet removed the appropriate option board, or if you are removing all option boards to replace the system board, remove the next option board by repeating steps 1 through 3 above. After you remove the appropriate option board, continue with the next section, "Installing the Graphics or Z-Buffer Board." If you have removed all option boards to replace the system board, proceed to the next chapter, "Replacing the System Board."

## Installing the Graphics or Z-Buffer Board

Before you can install a graphics board or Z-buffer board, you must remove the computer unit's right side cover and attach the ESD wrist strap as described in Chapter 5, "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 the graphics board or Z-buffer board, follow the steps below. If you are installing a new graphics controller board, start with Step 1. To install a new Z-buffer board, start with Step 2. If you are reinstalling a board you removed temporarily, start with Step 3.

1. From inside the computer unit, push out the three filler plugs that cover the monitor connector slots on the computer unit bulkhead, as shown in Figure 8-11.

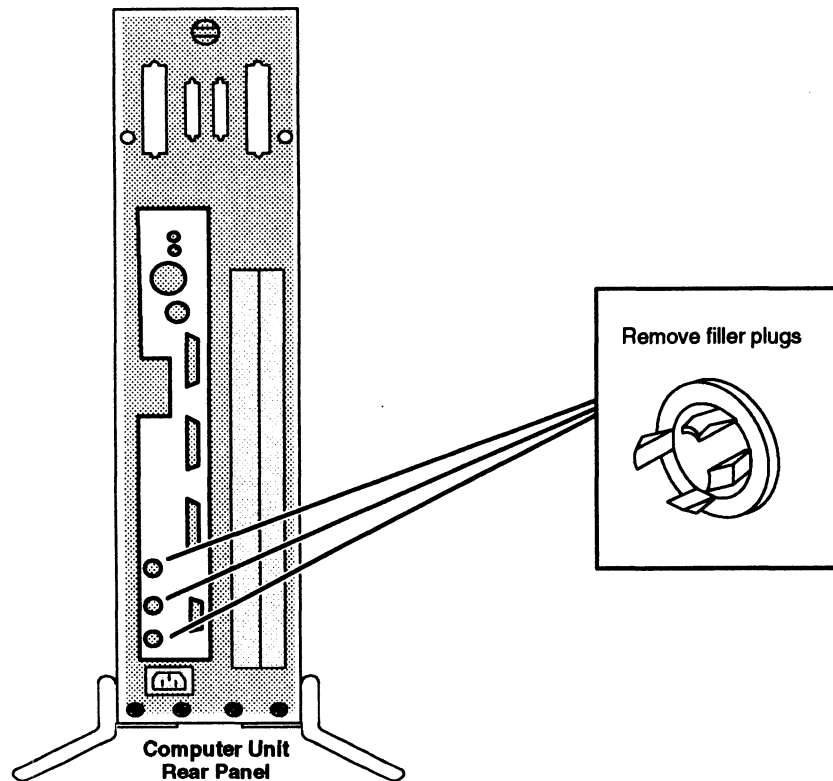


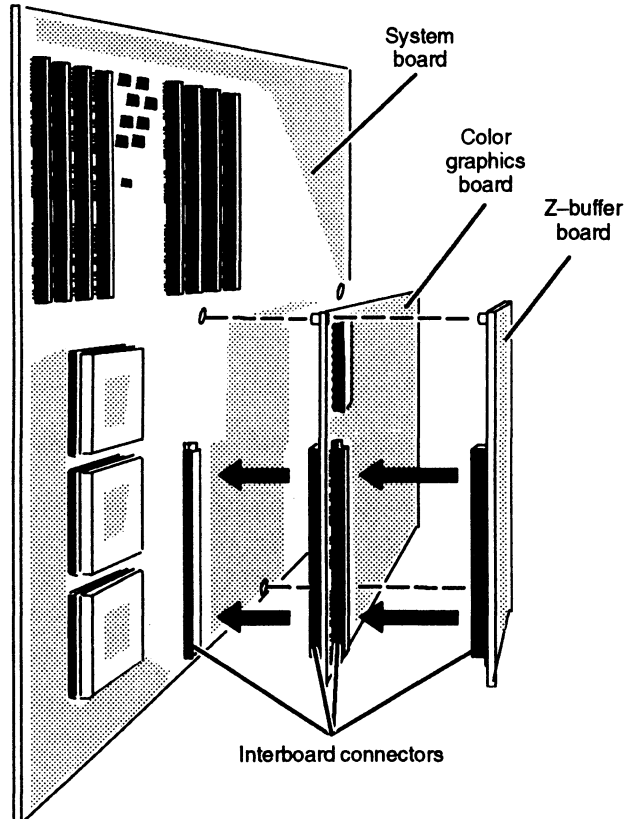
Figure 8-11 Removing the BNC Connector Filler Plugs

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 graphics controller board, insert the three BNC monitor connectors through the holes in the computer unit bulkhead before continuing with this step.

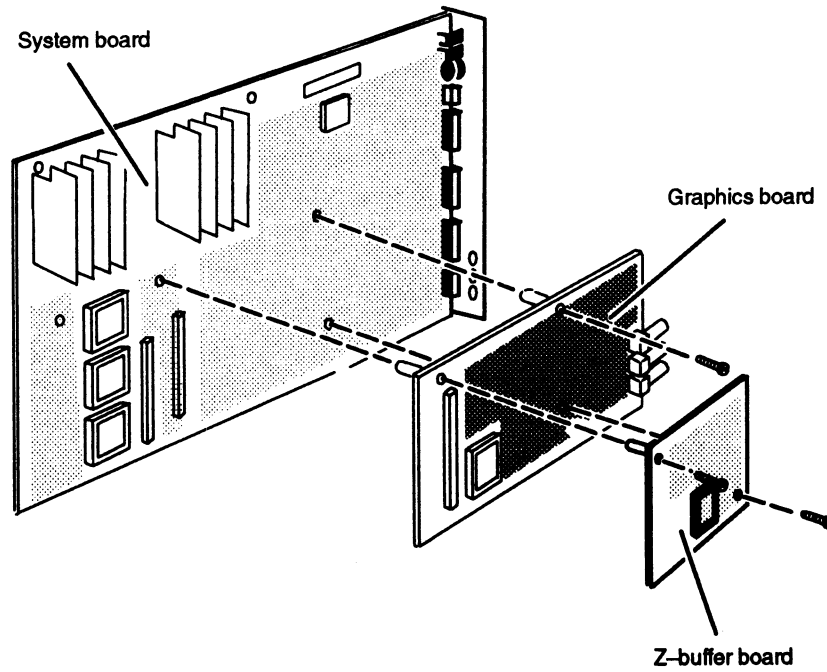
Align the interboard connectors and press them together as shown in Figure 8-12. If you cannot press the connectors together, make sure that the connectors are aligned correctly, and then try pressing them together again.



*Figure 8-12 Joining the Interboard Connectors*

If you are inserting another option board, repeat Steps 1 and 2 above. Otherwise, repeat Step 3.

4. Replace the board-retaining screws after you have installed all the option boards as shown in Figure 8-13.



*Figure 8-13 Replacing the Board-Retaining Screws*

**NOTE:** The Z-buffer board requires longer board-retaining screws. If you are adding or replacing a Z-buffer board, discard two of the three shorter board-retaining screws and replace them with the two longer board-retaining screws shipped with the Z-buffer board.



1. If you are installing a graphics controller board, install the hexagonal retaining nuts that secure the monitor connectors to the computer unit bulkhead, as shown in Figure 8–14. Use an adjustable wrench to secure the nuts to the bulkhead.

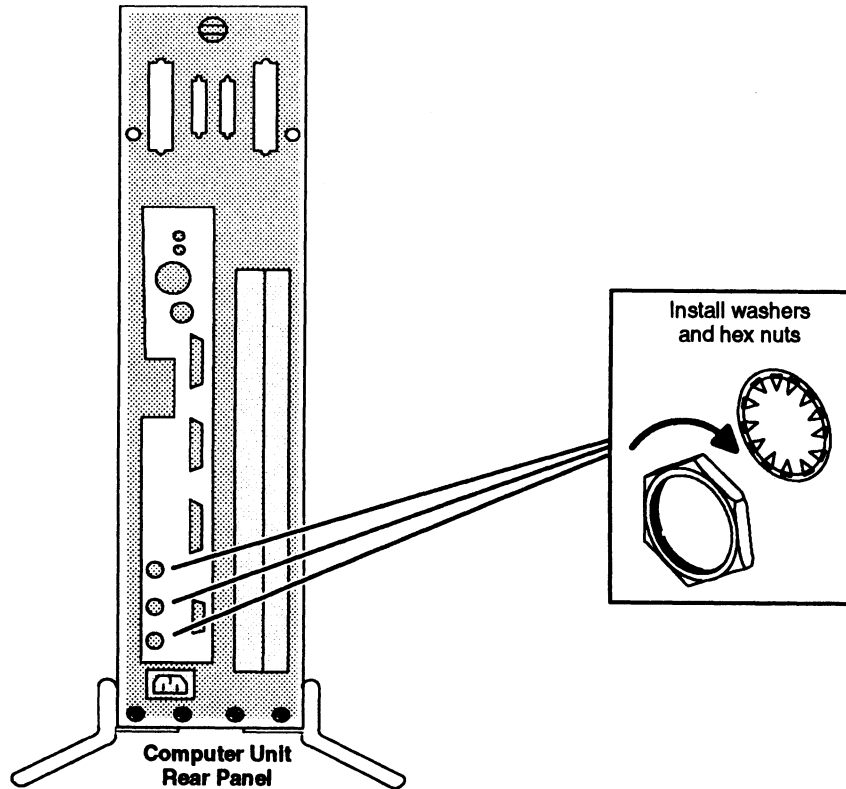


Figure 8–14 Securing BNC Connectors to the Computer Bulkhead

2. Reinstall the side cover as described in Chapter 5, "Expanding and Maintaining Your Computer System."

To connect a graphics display monitor, mouse and keyboard to your system, refer to Chapter 2, "Setting Up Your Computer System."

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

End of Chapter



# Chapter 9

## Replacing the System Board

This chapter describes how to replace a failed system board. Figure 9–1 shows an exploded view of the system board and the components that mount on the system board.

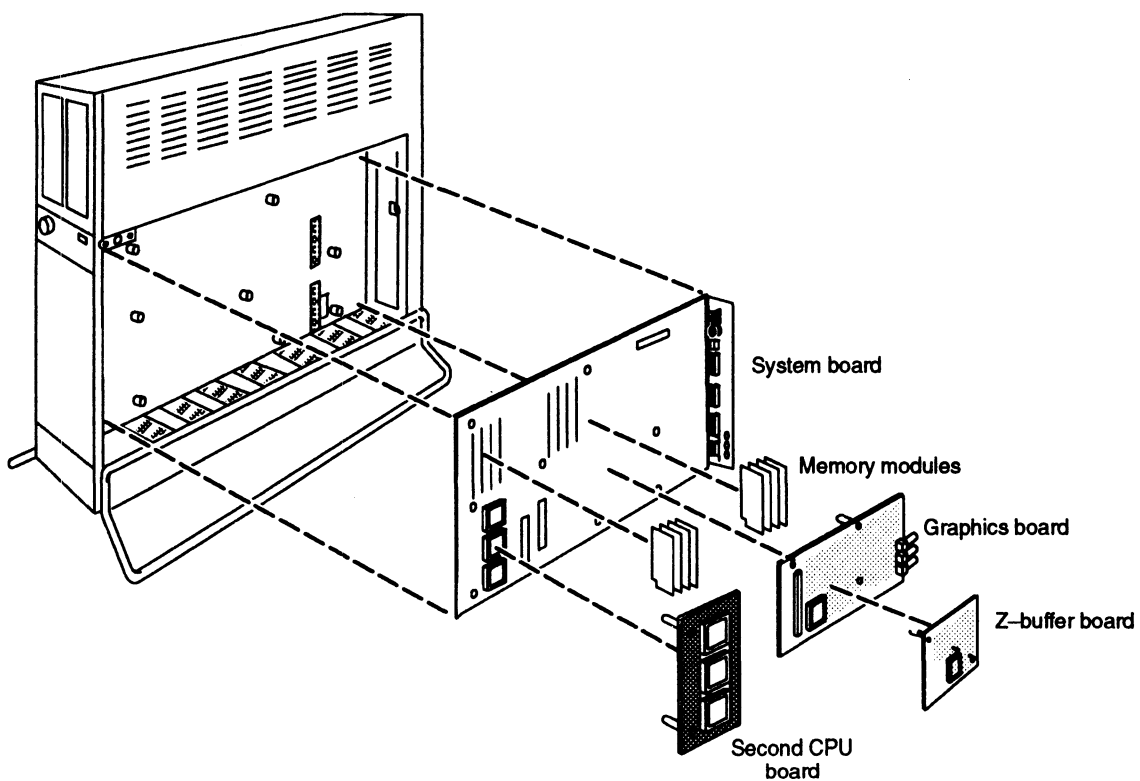


Figure 9–1 AViiON 410, 412, 4100, and 4300 Series System Board and Mounted Components

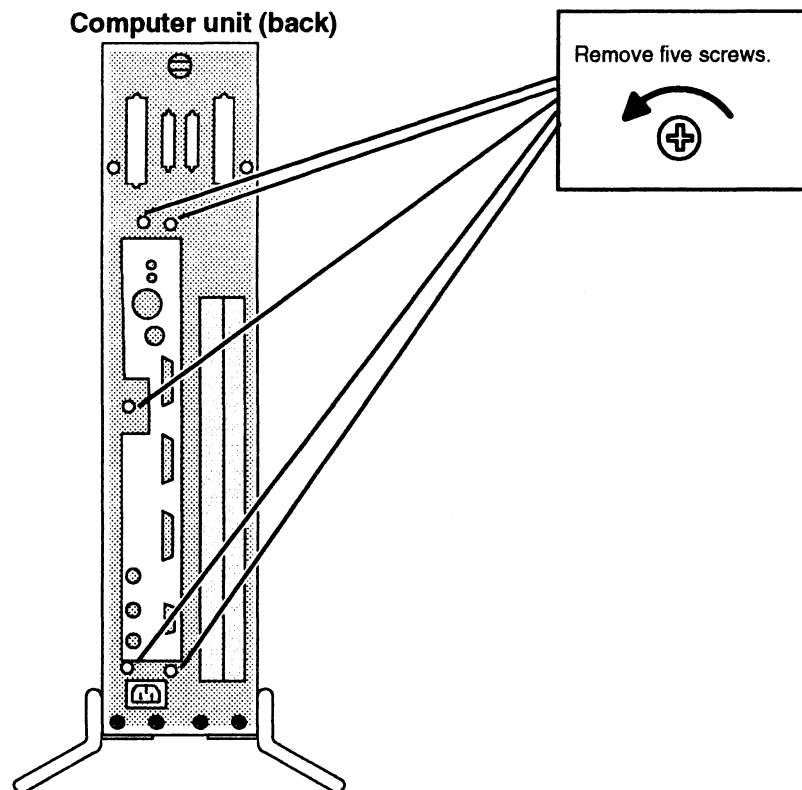
### Removing the System Board

Before you can remove the system board, you need to prepare your worksite, remove the computer unit's right side cover, and attach the ESD wrist strap, as described in Chapter 5, "Expanding and Maintaining Your Computer System."

To remove the system board, follow the steps below. You will need a small (#1) and a medium (#2) Phillips screwdriver, and a small flat-blade screwdriver.

1. Remove all the memory modules as described in Chapter 7, "Adding or Replacing Memory Modules."

2. For AViiON 410, 412, 4100, and 4300 series systems, remove the CPU option board as described in Chapter 8, “Adding or Replacing CPU and Graphics Boards.”
3. Remove any graphics boards as described in Chapter 8, “Adding or Replacing CPU or Graphics Boards.”
4. Using the small Phillips screwdriver, remove the five screws, shown in Figure 9–2, that secure the system board bracket to the back of the computer unit.



*Figure 9–2 Releasing the System Board Bracket from the Back of the Computer Unit*

5. Unplug the speaker and SCSI bus cables from the system board as shown in Figure 9–3.

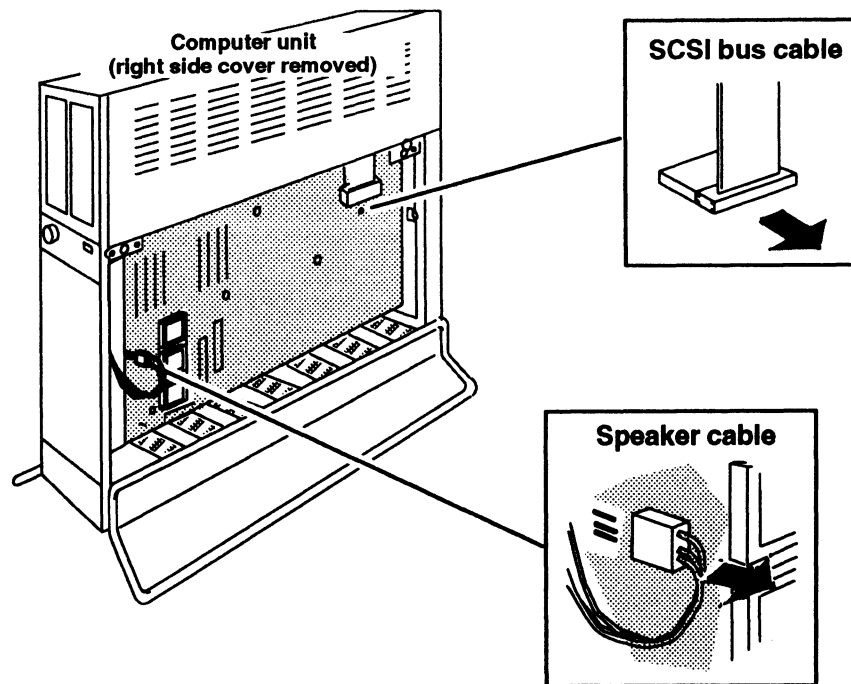


Figure 9-3 Unplugging Cables from the System Board

6. Using the medium Phillips screwdriver, remove the eight screws, shown in Figure 9-4, that secure the system board to the computer unit.

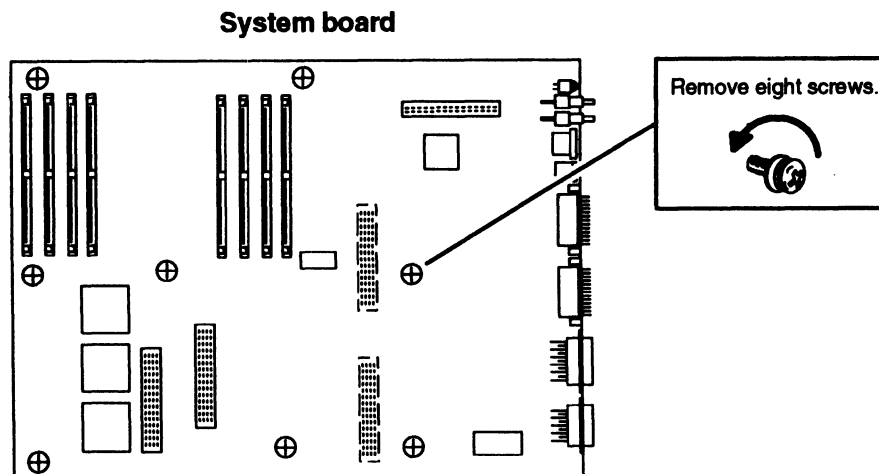


Figure 9-4 Unscrewing the System Board from the Computer Unit

7. Push the two ejector levers to the right as shown in Figure 9-5 to disconnect the system board from the VME connectors behind it.

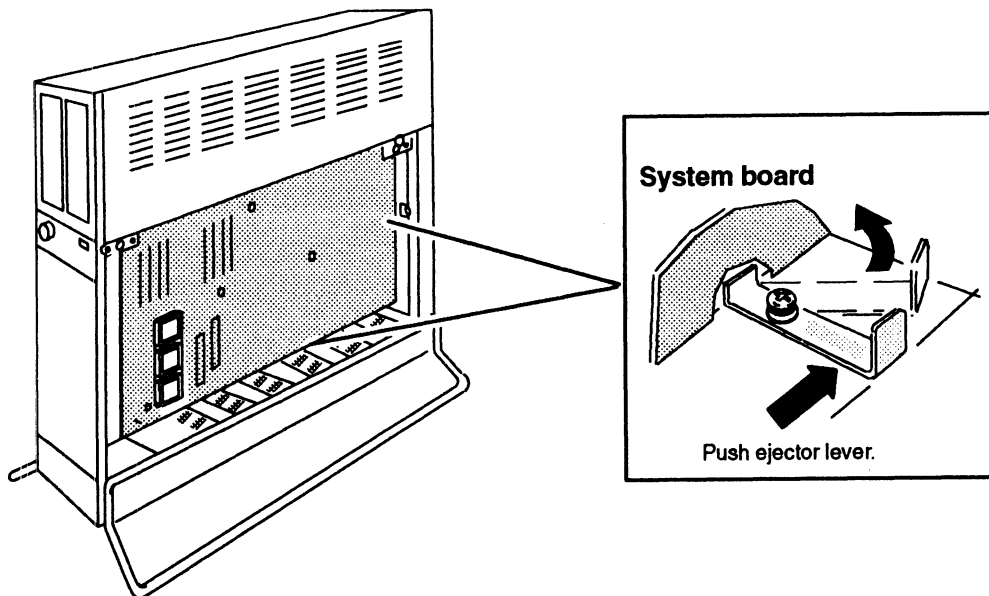


Figure 9-5 Releasing the System Board from the VME Backplane

8. Remove the system board by pulling its bracket away from the computer unit, and then lifting the board out of the computer unit as shown in Figure 9-6.

**CAUTION:** Grasp the system board by its edges to avoid damaging any components.

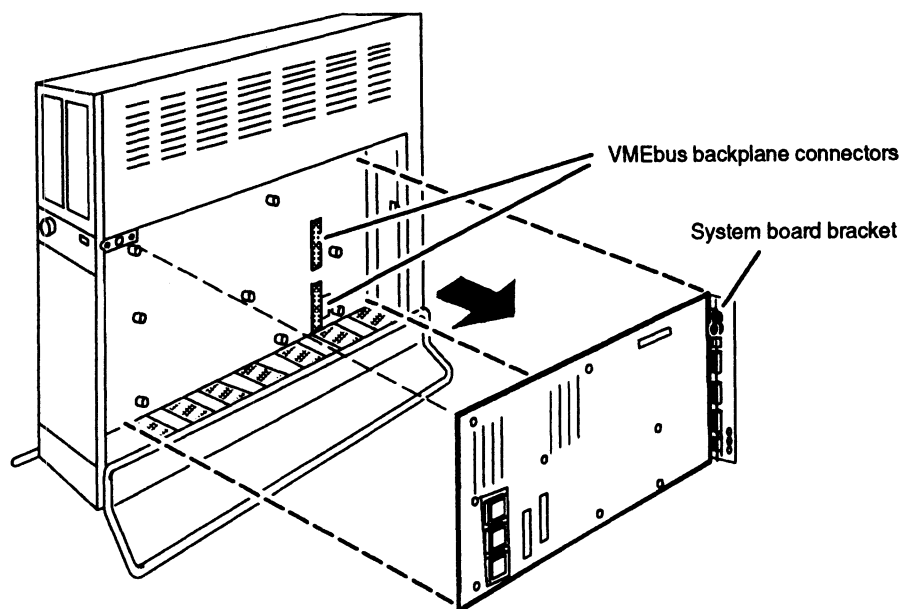


Figure 9-6 Removing the System Board

9. Place the system board, face up, on an ESD-free surface.
10. Using a flat-blade screwdriver, *gently* pry up one end and then the other end of the PROM component as shown in Figure 9-7 until it is loose enough to remove by hand.

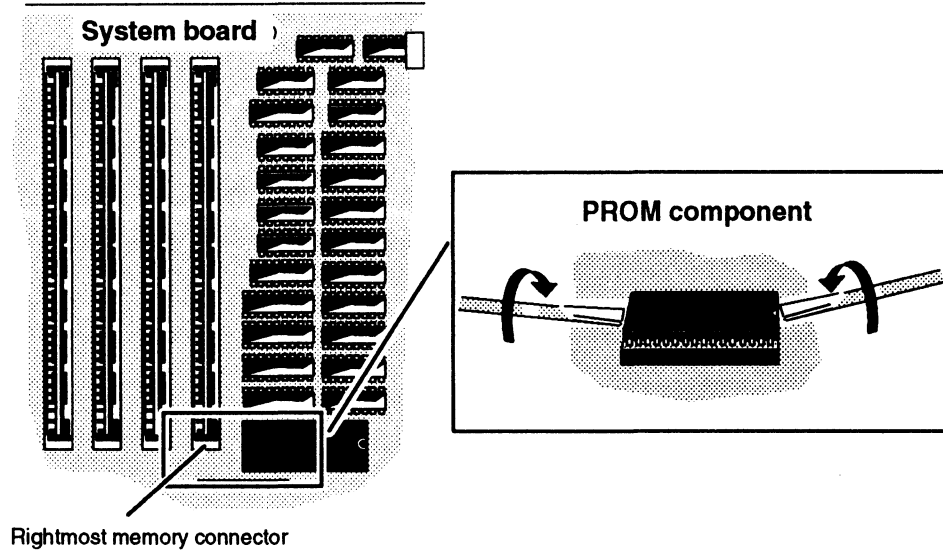


Figure 9-7 Removing the PROM Component

11. Lift the PROM component out of its socket, put it in an antistatic bag, and set it aside for later installation on the replacement system board.

**CAUTION:** To access applications software, you must install this original PROM on the replacement system board.

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

To install the replacement system board, go to the next section “Installing the System Board.”

## Installing the System Board

Before you can install the new system board, you need to prepare your worksite, remove the computer unit’s right side cover, and attach the ESD wrist strap as described in Chapter 5, “Expanding and Maintaining Your Computer Unit.”

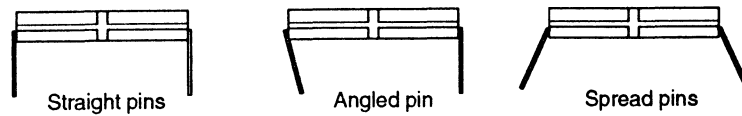
**NOTE:** If the *replacement* system board has a PROM installed as shown in Figure 9-7, you need to remove the PROM component from the replacement system board following steps 10 and 11 in the previous section “Removing the System Board.”

To install the system board, follow the steps below. You will need a small (#1) and a medium (#2) Phillips screwdriver.

1. Examine the pins on the *original* PROM component (the PROM component you removed from the *failed* system board) to see if they are straight as shown in Figure 9-8. If they are spread too far apart or angled incorrectly as shown in Figure 9-8, you must straighten the pins as follows.

Lay the PROM component down on one side on a table, and carefully roll the component to bend the pins into line as shown in Figure 9-8. Once the pins are in line on one side, repeat this procedure with the other side of the component.

### PROM component pin positions



### Straightening PROM component pins

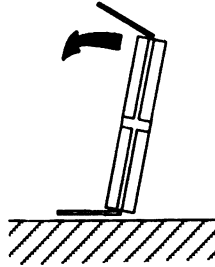


Figure 9-8 Straightening the Pins on the PROM Component

2. Matching the notch on the PROM component with the notch on the replacement system board socket, align the pins of the PROM component with the holes in the socket as shown in Figure 9-9, and insert the PROM component into the socket. If your PROM component has no notch, align the component with the round surface dot in the upper right corner, as shown in Figure 9-9.

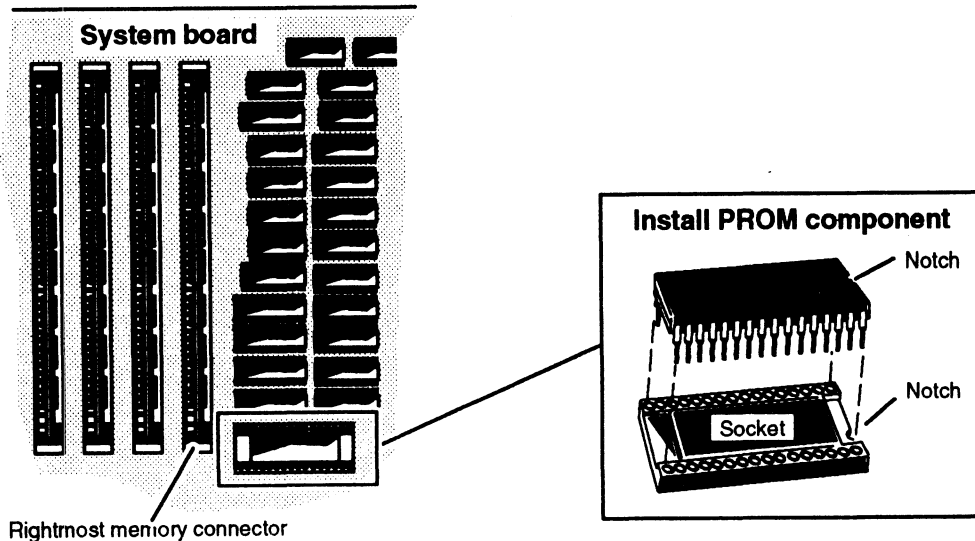
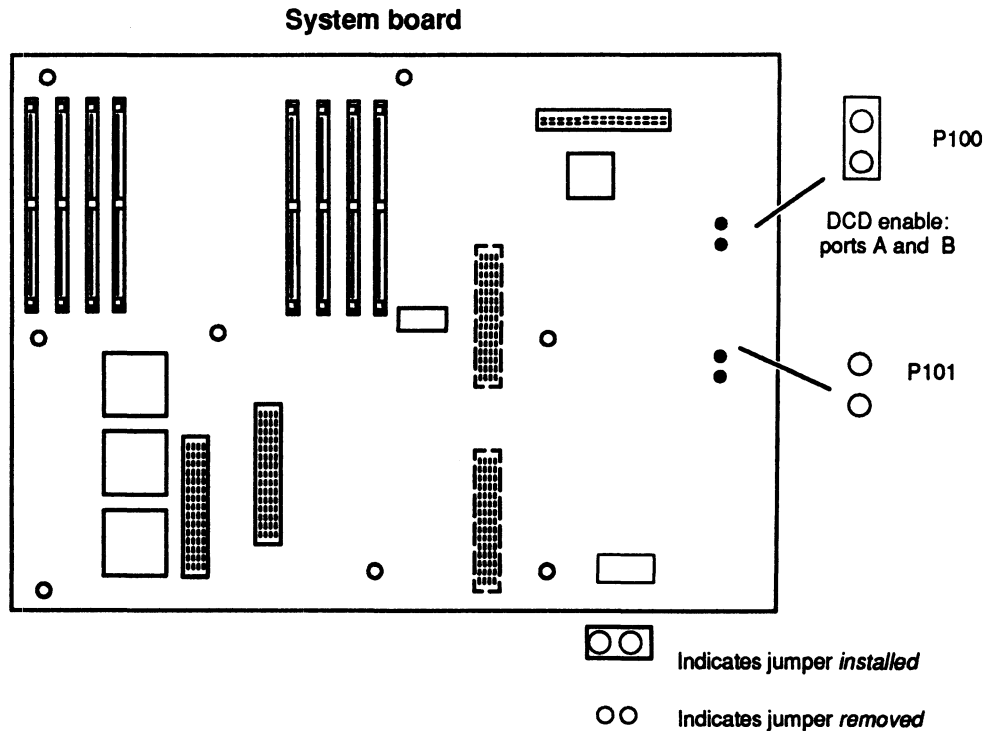


Figure 9-9 Installing the PROM Component

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



4. If you are installing the system board in an AViiON 4300, verify that the jumpers indicated in Figure 9–10 are set as shown.



*Figure 9–10 AViiON 4300 Series System Board*

**NOTE:** Jumpers installed at asynchronous serial port jumpers P100 and P101 enable Data Carrier Detect operation by pulling the signal up to +12 V. The DG/UX™ operating system requires the installation of these jumpers for proper terminal operation. If you use an operating system other than DG/UX, refer to your operating system documentation for system console and other serial port requirements.

5. Insert the system board in the computer unit, aligning the two VME connectors on the back panel, shown in Figure 9–11, with the two connectors on the back of the system board.

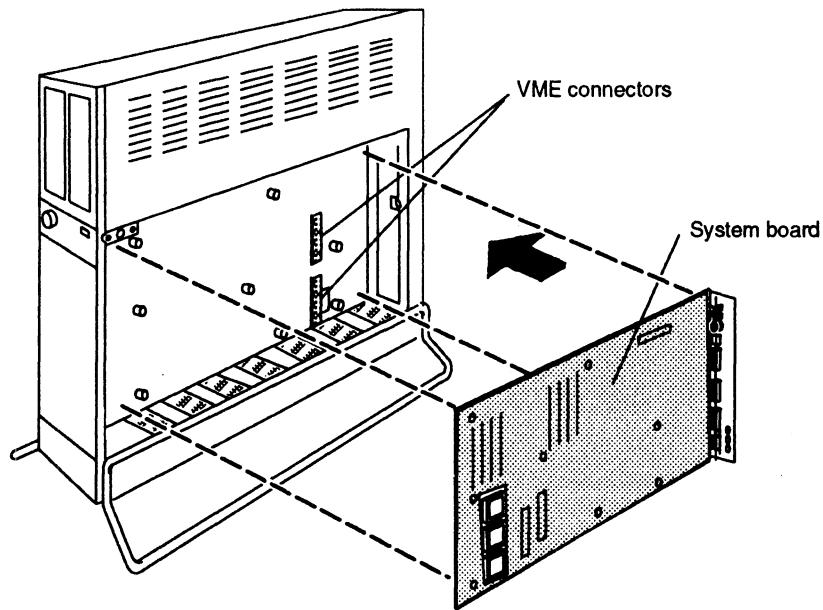


Figure 9-11 Inserting the System Board into the Computer Unit

6. Press the system board firmly on each side of the VME connector pins shown in Figure 9-12. Press on one side of the top pins and then on the other side of the top pins, and continue to work your way down the connectors pressing on one side of the pins and then the other. Since the pins are surrounded by components, you will have to press on the components.
7. Using the medium Phillips screwdriver, secure the system board to the computer unit with the eight screws and washers shown in Figure 9-12.

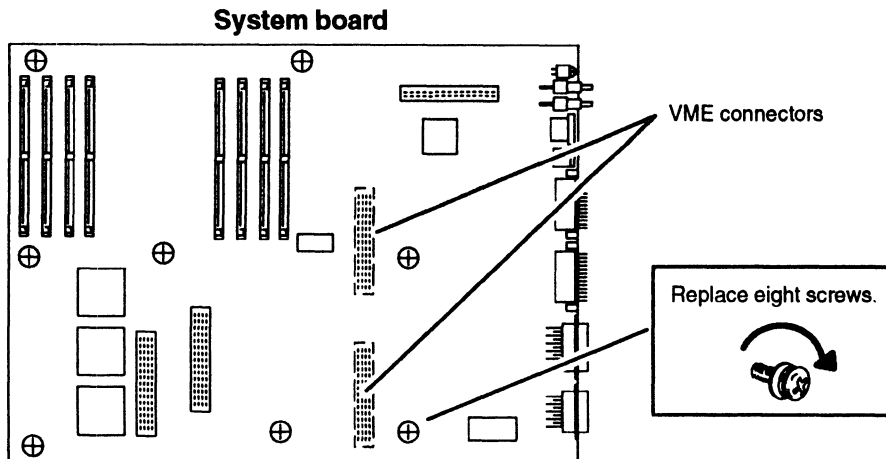


Figure 9-12 Securing the System Board to the Computer Unit

**NOTE:** Some of the screws that secure the system board to the chassis also secure CPU option and graphics boards to the parent board. You will need to remove, and later reinstall, these screws when you replace your CPU option and graphics boards.

- Using the small Phillips screwdriver, secure the system board bracket to the back of the computer unit with the five screws as shown in Figure 9–13.

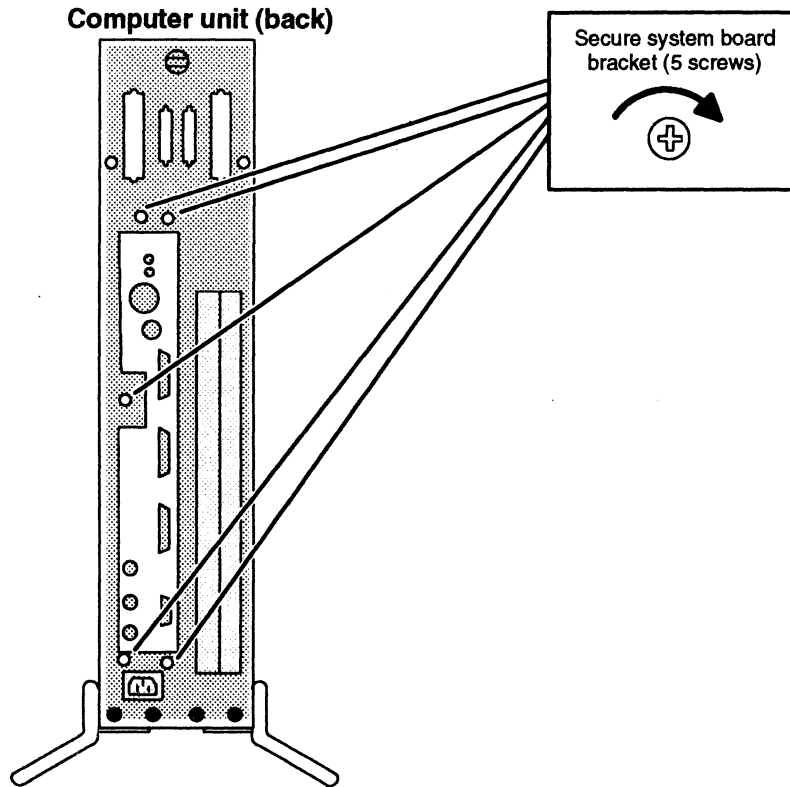


Figure 9–13 Securing the System Board Bracket to the Back of the Computer Unit

- Plug the SCSI bus, and speaker cables into the system board as shown in Figure 9–14.

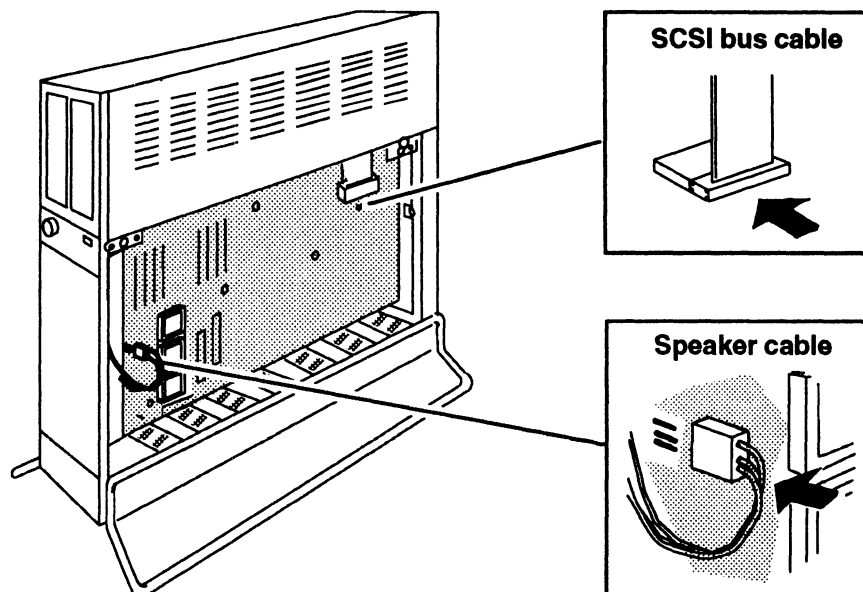


Figure 9–14 Plugging Cables into the System Board

10. Reinstall the CPU option board, memory modules, graphics boards, and Z-buffer boards that you removed from the failed system board. Refer to Chapter 7, “Adding and Replacing Memory Modules,” and Chapter 8, “Adding or Replacing CPU or Graphics Boards,” as appropriate.
11. If you removed the PROM from the *replacement* system board, you should insert this PROM on the *failed* system board as described in Steps 1 through 3 of this section.

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 side cover as described in Chapter 5, “Expanding and Maintaining Your Computer System.”

End of Chapter

# Chapter 10

## Replacing the Fan Assembly

This chapter explains how to remove and install a failed fan assembly.

### Removing 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's left side cover as described in the "Opening the Computer Unit" section of Chapter 5.

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

To remove a fan assembly, follow the steps below. You will need a medium (#2) Phillips screwdriver.

1. Unplug the fan assembly power cable from the power supply, and push it down through the hole in the computer unit as shown in Figure 10-1.

**CAUTION:** The hole for the fan assembly power cable may have sharp edges. Avoid personal and cable contact with the edges as you push the connector through the hole.

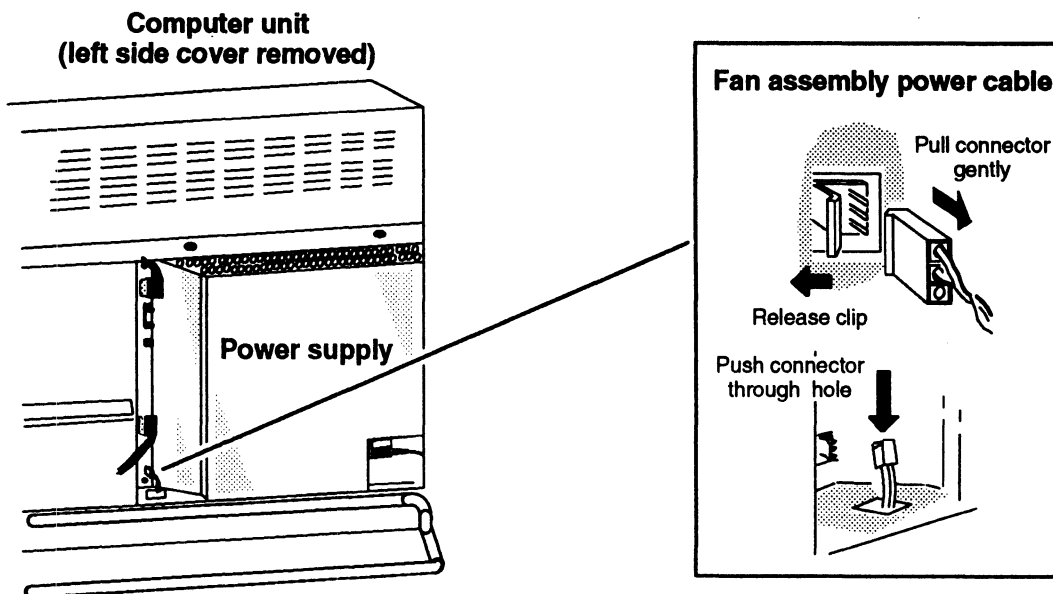


Figure 10-1 Unplugging the Fan Assembly Power Cable from the Power Supply

2. To prevent the assembly from dropping when you remove the securing screws, support the bottom of the back of the fan assembly with one hand. Then use a medium Phillips screwdriver to remove the two screws and washers that secure the fan assembly to the back of the computer unit, as shown in Figure 10-2.

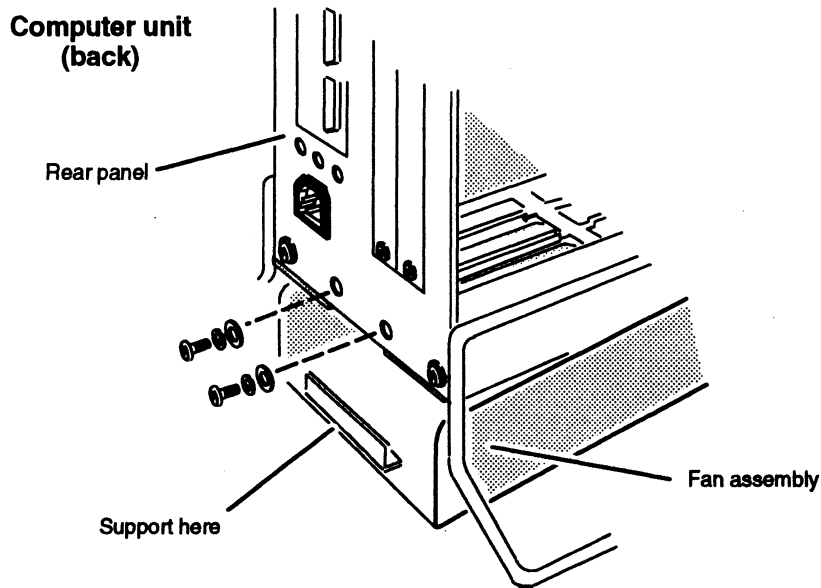


Figure 10-2 Releasing the Fan Assembly from the Back of the Computer Unit

3. Still supporting the bottom, pull the fan assembly out and down to disengage it from the computer unit as shown in Figure 10-3.

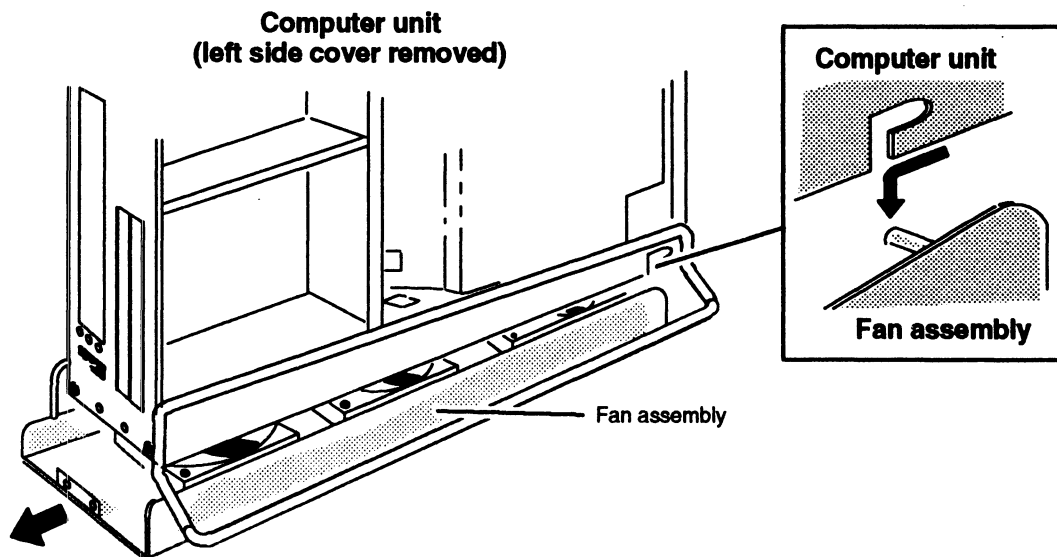


Figure 10-3 Removing the Fan Assembly from the Computer Unit

4. Slide the fan assembly out from under the computer unit.

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, go to the next section, “Installing the Fan Assembly.”

## Installing the Fan Assembly

Before you can install a new fan assembly, you need to power down any peripherals and the computer unit, and remove the computer unit’s left side cover as described in the “Opening the Computer Unit” section of Chapter 5.

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

To install a fan assembly, follow the steps below. You will need a medium (#2) Phillips screwdriver.

1. Slide the fan assembly directly under the computer unit as shown in Figure 10–4.
2. Pull the fan assembly power cable up through the hole in the computer unit as shown in Figure 10–4.

**CAUTION:** *The hole for the fan assembly power cable may have sharp edges. Avoid personal and cable contact with the edges as you push the power cable through the hole.*

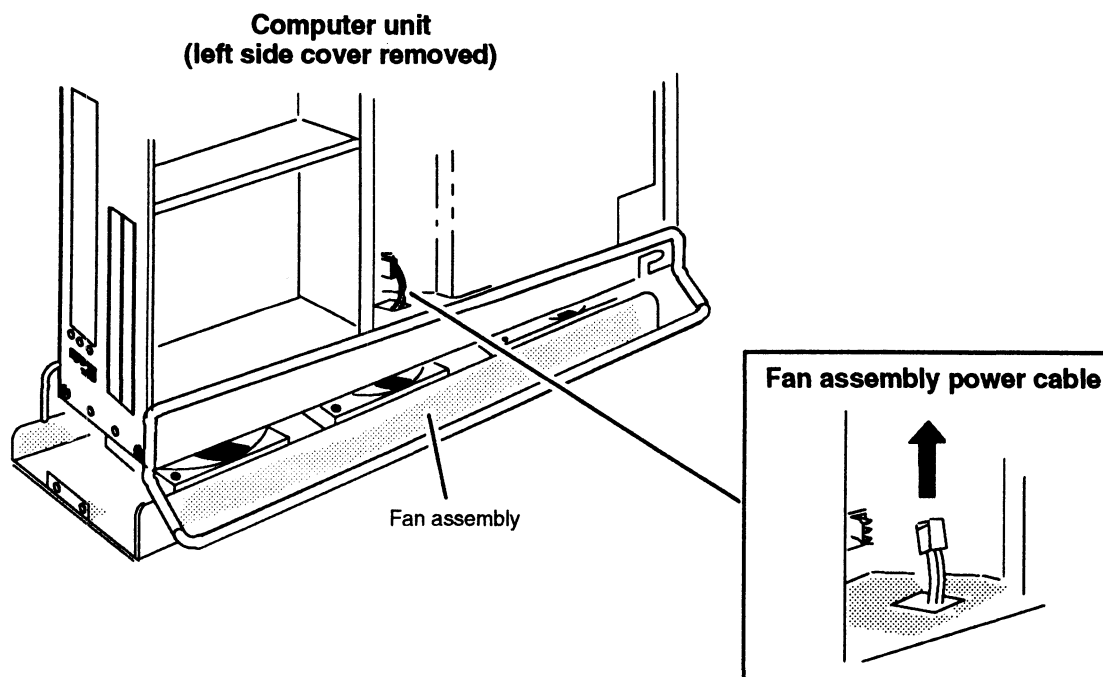


Figure 10–4 Positioning the Fan Assembly Under the Computer Unit

3. Insert the two pins on the fan assembly into the two slots on the bottom front of the computer unit as shown in Figure 10-5, and then push the fan assembly forward to secure it to the computer unit.

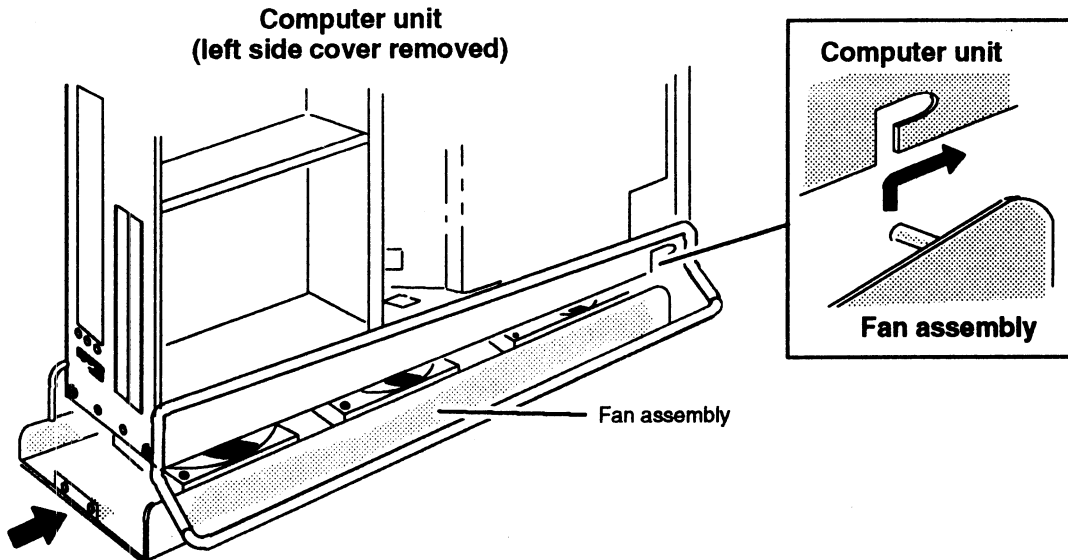


Figure 10-5 Installing the Fan Assembly in the Computer Unit

4. Use one hand to lift and support the back of the fan assembly in position, and align the assembly and computer unit screw holes as shown in Figure 10-6.

NOTE: The securing bracket on the fan assembly fits *inside* the rear panel of the computer unit.

5. Using a medium Phillips screwdriver, secure the fan assembly to the back of the computer unit with the two screws and washers shown in Figure 10-6.

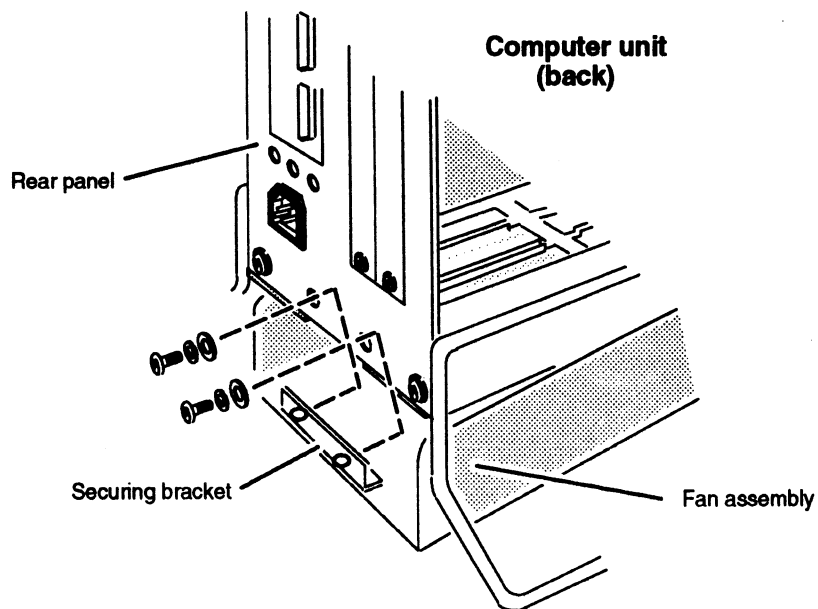
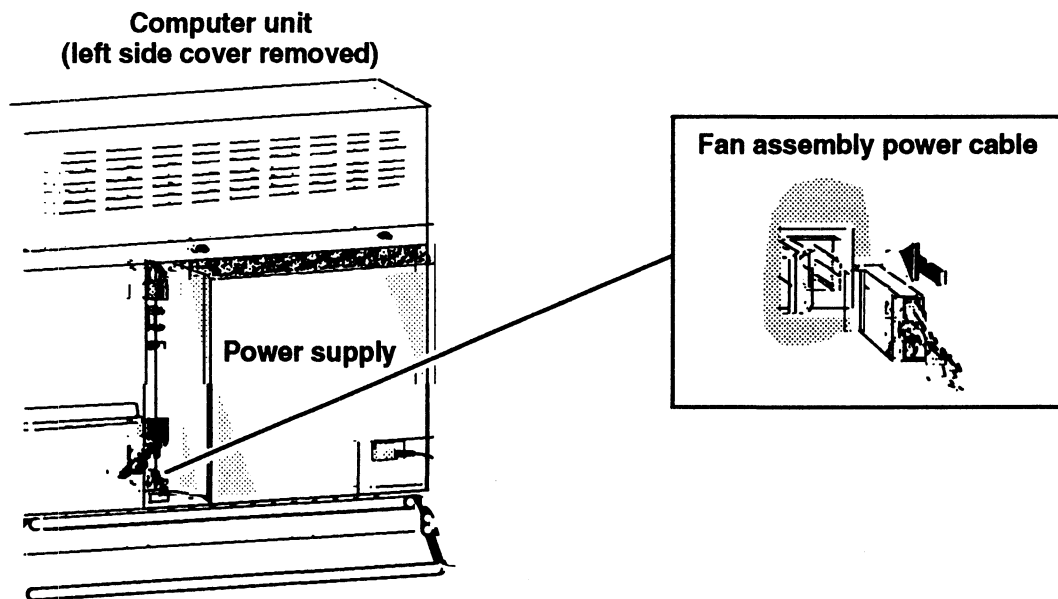


Figure 10-6 Securing the Fan Assembly to the Back of the Computer Unit



6. Plug the fan assembly power cable into the power supply as shown in Figure 10-7.



*Figure 10-7 Plugging the Fan Assembly Power Cable into the Power Supply*

7. Reinstall the side cover as described in the section, “Closing the Computer Unit” in Chapter 5.

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 Chapter 3 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® System Diagnostics* manual.

End of Chapter



# Chapter 11

## Replacing the Power Supply and Fuses

This chapter describes how to replace a failed power supply. The last section in this chapter describes how to replace the tape/disk fuse in the power supply.

**WARNING:** The inside of a 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, you need to power down any peripherals and the computer unit, and remove the computer unit's top and left side covers as described in the "Opening the Computer Unit" section of Chapter 5. Make certain you unplug the power cord from the ac power outlet and from the receptacle on the back of the computer unit *before* removing the covers.

1. Unplug the ac power and fan assembly power cables from the power supply as shown in Figure 11-1.

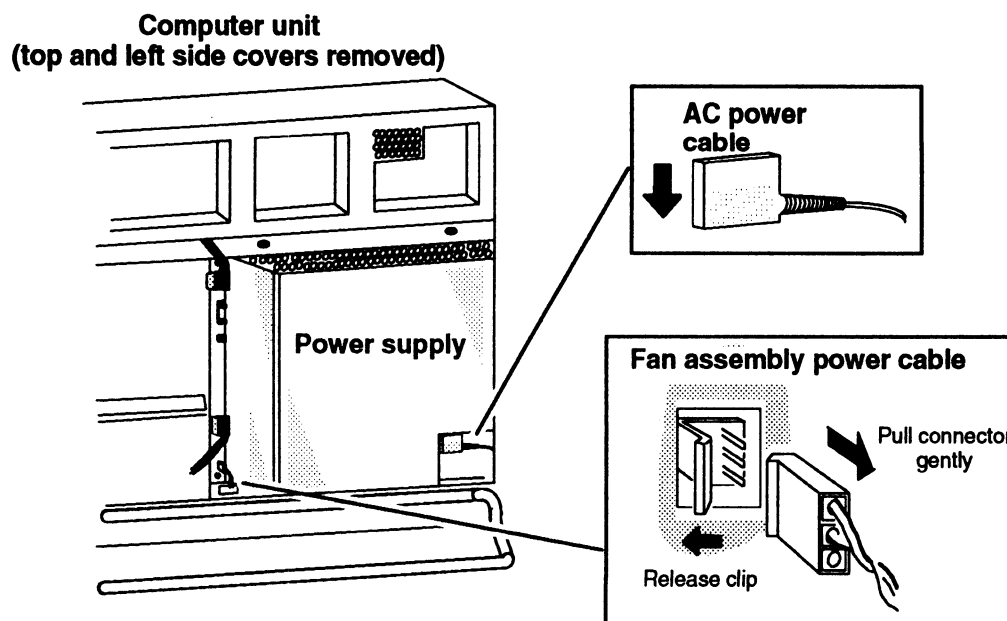


Figure 11-1 Unplugging the Ac Power and Fan Assembly Power Cables

2. Unplug the tape/disk power and logic power cables from the power supply as shown in Figure 11-2.

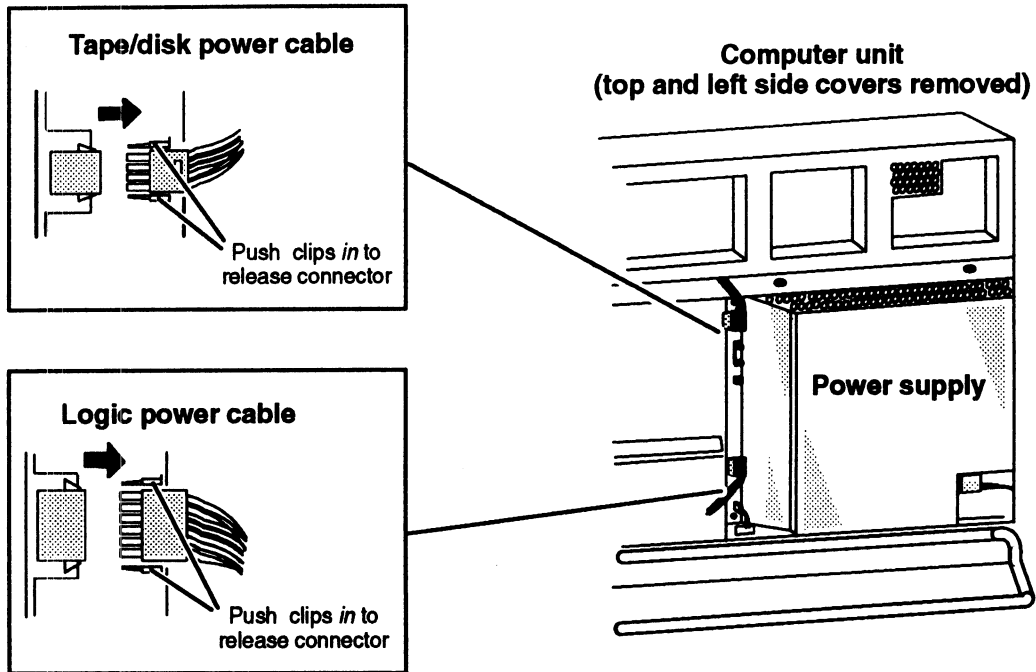


Figure 11-2 Unplugging the Tape/Disk Power and Logic Power Cables

3. Release the power supply from the computer unit by gently pulling out the power supply latches, as shown in Figure 11-3.

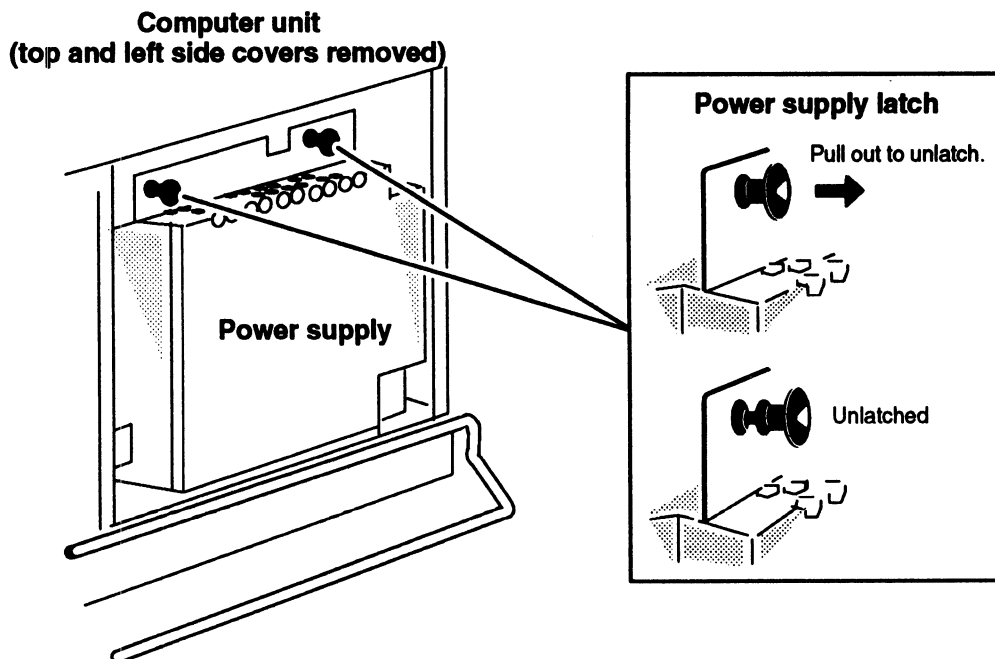
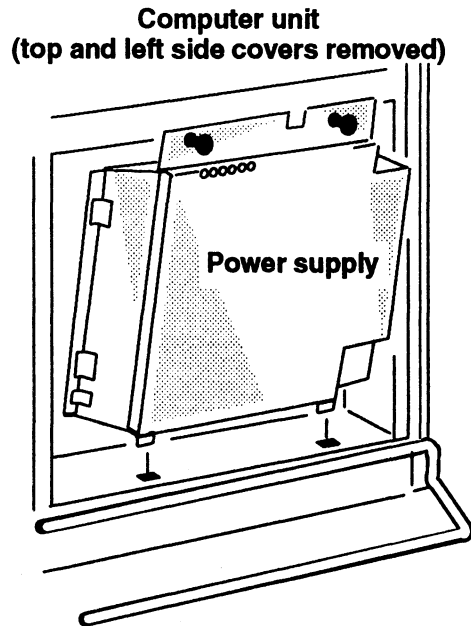


Figure 11-3 Releasing the Power Supply from the Computer Unit

4. Lift the power supply up and then out of the computer unit as shown in Figure 11–4.



*Figure 11–4 Removing 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

Before you can install a new power supply, you need to remove the computer unit’s top and left side covers as described in the “Opening the Computer Unit” section of Chapter 5.

**WARNING:** **Make certain you unplug the power cord from the ac power outlet and from the receptacle on the back of the computer unit before removing the covers.**

To install a power supply, follow the steps below.

1. Carefully remove the power supply from its package. Save the packing materials to use if you have to return the power supply.
2. Set the voltage selection switch on the power supply to the ac power voltage for your site as shown in Figure 11–5. If your installation site has 100 or 120 V ac power, set the voltage selection switch to 115 V; if it has 220 or 240 V ac power, set the switch to 230 V.

Most sites in the United States and Canada have 120 V ac power. If you are not sure about the correct ac power voltage at your site, consult a licensed electrician.

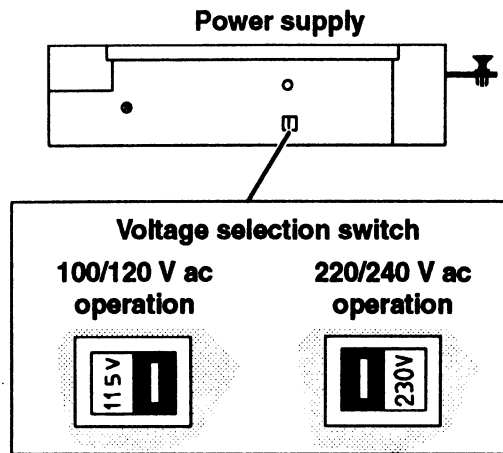


Figure 11-5 Setting the Voltage Selection Switch

**CAUTION:** Powering up the computer unit with the voltage switch set incorrectly can damage the computer.

3. Insert the two tabs on the bottom of the power supply into the slots at the base of the computer unit as shown in Figure 11-6.

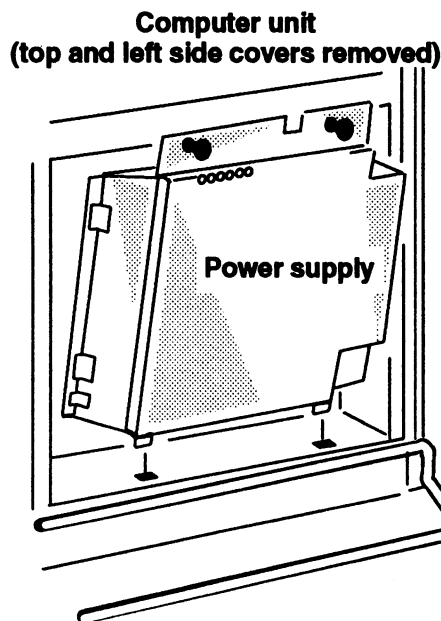


Figure 11-6 Inserting the Power Supply into the Computer Unit

4. Secure the power supply to the computer unit by pushing in the two power supply latches shown in Figure 11-7.

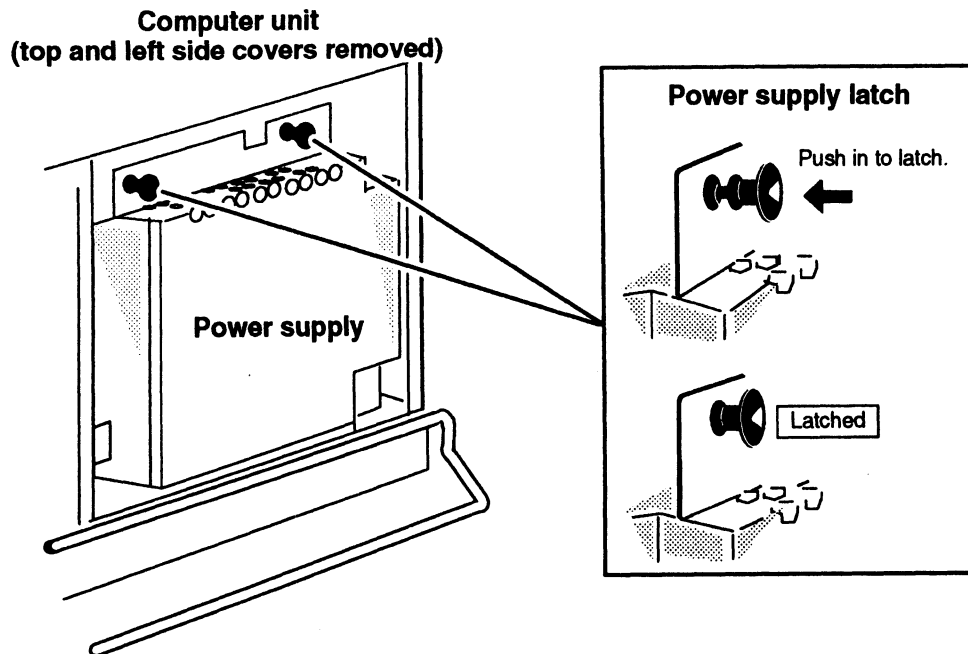


Figure 11-7 Securing the Power Supply to the Computer Unit

5. Plug the tape/disk power and logic power cables into the power supply as shown in Figure 11-8.

**NOTE:** You can insert the tape/disk and logic power cables one way only because their connectors have beveled edges to match the receptacles on the power supply.

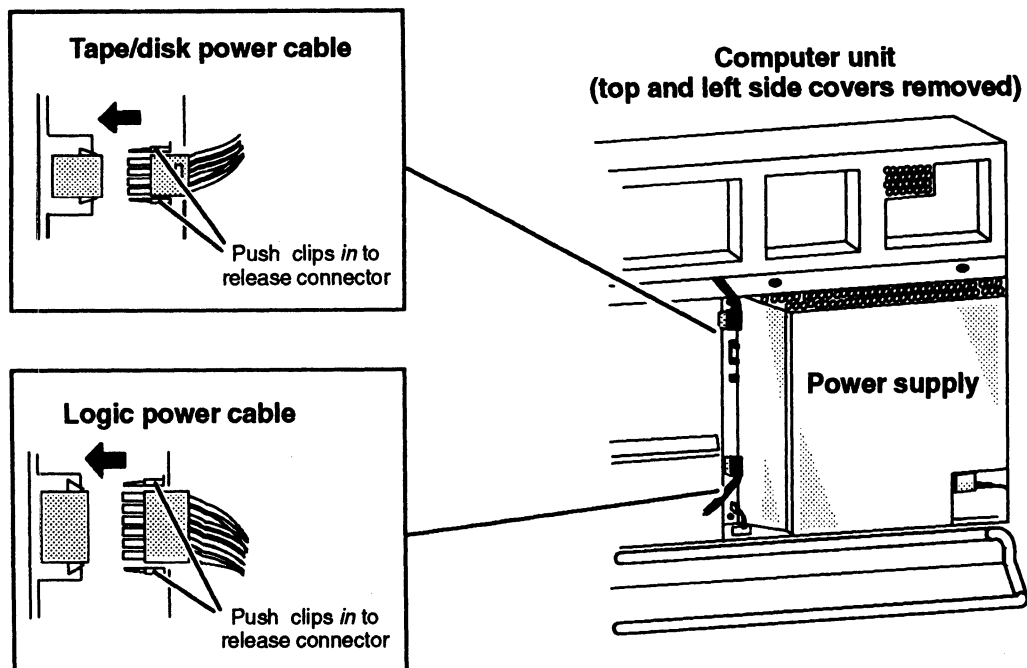


Figure 11-8 Connecting the Tape/Disk Power and Logic Power Cables

6. Plug the fan assembly power and the ac power cables to the power supply as shown in Figure 11–9.

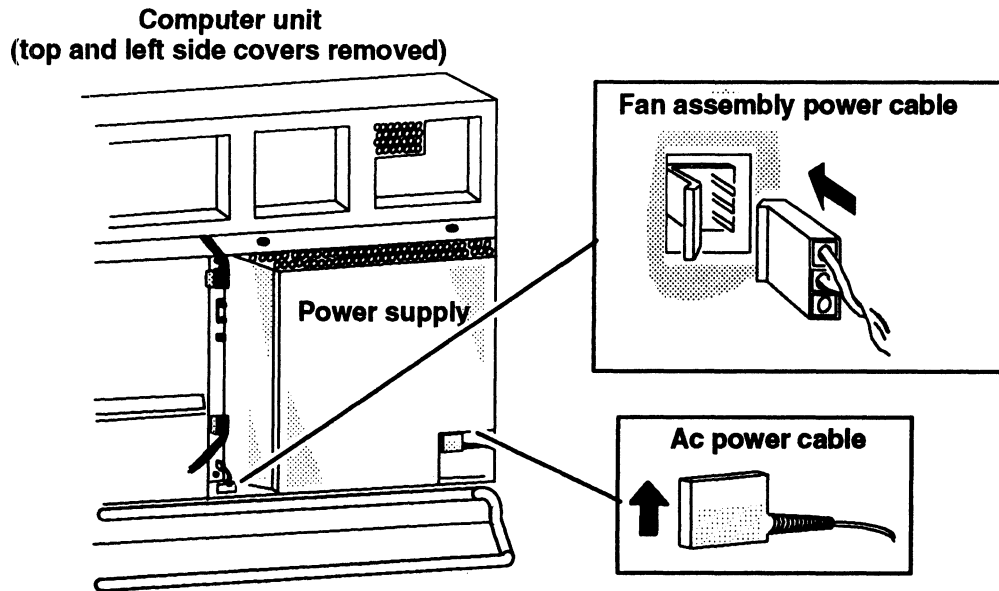


Figure 11–9 Connecting the Fan Assembly Power and the AC Power Cables

7. Reinstall the top and side covers as described in the section, “Closing the Computer Unit” in Chapter 5.

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 Chapter 3 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® System Diagnostics* manual.

## Replacing the Tape/Disk Fuse

This section tells how to replace a blown tape/disk fuse in the power supply.

Before you can replace the tape/disk fuse you need to power down any peripherals and the computer unit and remove the computer unit’s left side cover as described in the “Opening the Computer Unit” section of Chapter 5.

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



To replace the tape/disk fuse, follow the steps below and refer to Figure 11–10. You will need a medium (#2) flat-blade screwdriver.

1. Using the screwdriver, gently lift the fuse until you can pull it out of the holder with your fingers. Remove the fuse from the holder.
2. Press a new 250–V, 12–A fuse into the holder until it is firmly seated.

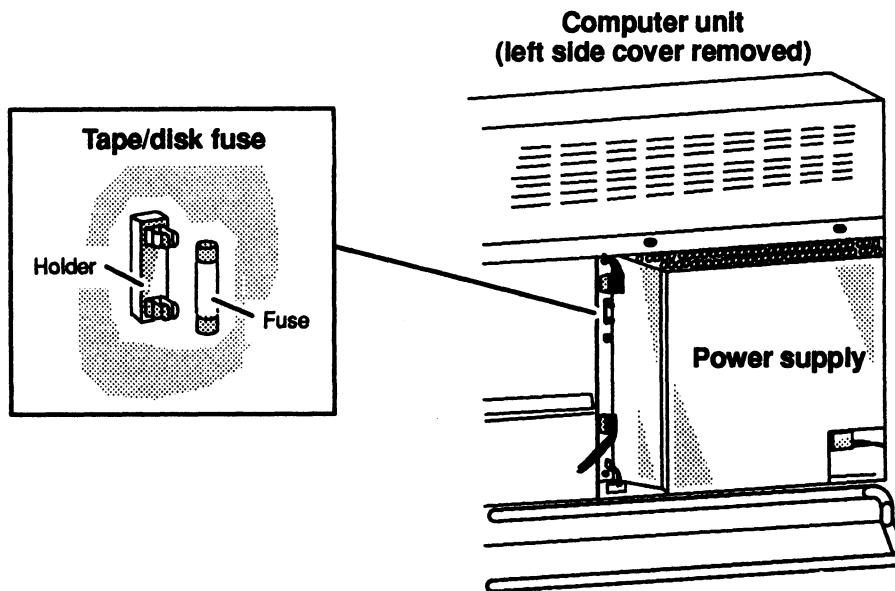


Figure 11–10 Replacing the Tape/Disk Fuse

3. Reinstall the side cover as described in the section, “Closing the Computer Unit” in Chapter 5.

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 Chapter 3 and your operating system software documentation. Next, you should test your computer system by running the AViON System Diagnostics as described in the *Using AViON® System Diagnostics* manual.

End of Chapter



# Appendix A

## Solving Powerup Problems

This appendix provides step-by-step procedures for resolving simple powerup problems and describes error codes and messages. It begins with a quick summary of problems and suggested strategies for fixing them.

**NOTE:** Chapter 3 describes only the hardware-specific portion of your computer system's powerup sequence. If your computer system successfully completes powerup testing but does not boot your operating system automatically, refer to the documentation that came with your operating system. Appendix B provides information about the default boot path. If you cannot resolve the problem after consulting these manuals, contact Data General as described in the Preface.

During a normal powerup, your system displays the message *Passed* before it boots the DG/UX operating system or displays the SCM prompt. This signifies that the computer system has successfully completed the powerup diagnostic tests. Chapter 3 describes the sequence of a normal powerup.

If your computer system fails a powerup diagnostic test, your screen either remains blank, *hangs* (does not continue testing), or displays an error message on the screen to indicate the failure. If powerup testing stops at the number 2 or if your screen displays an error message related to your memory configuration, refer to the "Memory Configuration Change" section. If your system hangs at any point in the powerup testing besides the number 2, or if the screen display is unreadable, refer to Table A-1. Refer to the "Error Codes and Messages" section if you receive other indications of error.

**Table A-1 Reading Path for Powerup Testing Hangs**

If you have this computer	Read this Section
AViiON 410 or 412 series	Blank Monitor Screen at Powerup (AViiON 410 and 412 series)  Unclear Monitor Display
AViiON 4100 or 4300 series	Blank Asynchronous Terminal Screen at Powerup  Unclear Terminal Display

If you cannot resolve your problem using the information in this appendix, contact Data General as described in the Preface.

**NOTE:** If you do not have a specific problem with your computer system, but want to run a thorough system check, refer to the manual *Using AViiON® System Diagnostics* for a description of how to use the AViiON System Diagnostics hardware acceptance test.

Table A-2 and Table A-3 summarize the steps you can take when your screen remains blank at powerup, when your powerup display is unreadable, or when an error message appears. These steps are described in more detail in the following sections.

**Table A-2 Quick Reference for Powerup Problems (Graphics Console)**

For This Condition	Try This
<b>Blank or Distorted Display</b>	
Has the graphics monitor screen been blank for 2 minutes?	Rotate the Brightness dial clockwise. <ol style="list-style-type: none"> <li>1. Power down the computer unit,</li> <li>2. Power down the terminal and unplug its power cord from its ac outlet.</li> <li>3. Test the terminal's ac power supply with a desk lamp or other electrical device.</li> <li>4. Tighten power cord connections to the monitor and computer unit.</li> <li>5. Tighten the keyboard connection and all other cabling.</li> <li>6. Make sure all connected peripherals are powered on and on line.</li> <li>7. Turn power back on and try again.</li> </ol>
Is text garbled on the screen?	Restore default video timing parameters. (For the 70-Hz monitor enter <b>Ctrl-V</b> , then type 1 after you hear a beep.) (For the 60-Hz monitor enter <b>Ctrl-V</b> , then type 2 after you hear a beep.)
Do you have a color monitor?	Press the degauss switch.
Is the screen still blank or unclear?	Use another monitor or a terminal to test the computer (if terminal, disconnect graphics keyboard). Contact Data General.
<b>System Displays Text but Fails Powerup</b>	
Is the last display in the powerup message the number 2?	If you have <i>not</i> added memory since the last powerup, contact Data General.  If you have added memory since the last powerup, press the space bar to continue.
Do you see a numerical code other than 2, and/or a text message?	Write down the number or text; then <ul style="list-style-type: none"> <li>• Turn power off to the computer unit, monitor, and any peripherals.</li> <li>• Tighten all cabling.</li> </ul> Power on peripherals, monitor, and computer unit again.
Does the problem repeat?	Contact Data General.

**Table A-3 Quick Reference for Powerup Problems (Nongraphics Console)**

For This Condition	Try This
<b>Blank or Distorted Display</b>	
<p>Has the screen been blank for 2 minutes?</p>	<p>Adjust brightness control to maximum. Turn all power off; then</p> <ol style="list-style-type: none"> <li>1. Test the ac power supply with a desk lamp or other electrical device.</li> <li>2. Tighten power cord connections to the system console and computer unit.</li> <li>3. Tighten the keyboard connection and all other cabling.</li> <li>4. Make sure all connected peripherals are powered on and online.</li> <li>5. Turn power back on and try again.</li> </ol>
<p>Is the screen still blank or unclear?</p>	<p>Use another terminal to test the computer. Contact Data General.</p>
<b>System Displays Text but Fails Powerup</b>	
<p>Is the last display in the powerup message the number 2?</p>	<p>If you have <i>not</i> added memory since the last powerup, contact Data General.</p> <p>If you have added memory since the last powerup, press the space bar to continue.</p>
<p>Do you see a numerical code other than 2, and/or a text message?</p>	<p>Write down the number or text; then</p> <ul style="list-style-type: none"> <li>• Turn power off to the computer unit, terminal, and any peripherals.</li> <li>• Tighten all cabling.</li> </ul> <p>Power on peripherals, system console, and computer unit again.</p>
<p>Does the problem repeat?</p>	<p>Contact Data General.</p>

## **Blank Monitor Screen at Powerup (AViiON 410 and 412 Series)**

Complete the steps in this section if you cannot see diagnostic messages on your monitor screen during the powerup sequence. Follow these steps only if your monitor screen remains blank for more than 2 minutes after powerup. Use the section “Unclear Monitor Display” if you can see messages, but they are unreadable or distorted.

1. Turn the computer unit power off.
2. Make sure the computer unit’s power cord is plugged tightly into an ac power outlet that is supplying power. Test the outlet with a desk lamp or other ac device if you are uncertain whether it is supplying power.
3. Make sure the monitor’s power cord is plugged tightly into the ac power outlet.
4. Make sure the keyboard is plugged tightly into the computer unit connector, and that the connection between the keyboard and extension cable is tight.
5. Turn the monitor on. (The green LED on the monitor’s power switch is illuminated when power is on).
6. Rotate the monitor brightness dial clockwise to the maximum setting, as shown in Figure A-1 .
7. Make sure the cables that connect your AViiON 410 and 412 series computer components together are undamaged and their connectors are secured tightly so that they make a good connection.
8. Turn power on to all connected peripherals.
9. Turn power on to the computer unit again.
10. If the display remains blank but the computer unit LED and speaker signaled at least four times, your monitor or monitor cables may have a problem. Try to power up using a different display device. You can use another graphics monitor that meets the specifications listed in Appendix C; or, if you have an asynchronous terminal to connect for use as a system console, try the steps in the section, “Testing With an Asynchronous Terminal.”

## Blank Terminal Screen at Powerup (AViiON 4100, and 4300 Series)

Complete the steps in this section if you cannot see diagnostic messages on your terminal screen during the powerup sequence. Follow these steps only if your terminal screen remains blank for more than 2 minutes after powerup. Use the section "Unclear Terminal Display" if you can see messages, but they are unreadable or distorted.

1. Turn the computer unit power off.
2. Make sure the computer unit's power cord is plugged tightly into an ac power outlet that is supplying power. Test the outlet with a desk lamp or other ac device if you are uncertain whether it is supplying power.
3. Make sure the terminal's power cord is plugged tightly into the ac power outlet.
4. Make sure the graphic keyboard connector on the computer unit rear panel is *empty*. (This graphic keyboard connector is a round, DIN-8 connector labeled with a keyboard icon).
5. Make sure the system console cable is connected to the *first* computer unit RS-232-C connector (labeled RS232A).
6. Make sure the cables that connect your computer system components together are undamaged and their connectors are secured tightly so that they make a good connection.
7. Make sure the system console terminal is set to 9600 baud, 8 data bits, no parity. For information on changing terminal switch settings, see the manual that shipped with the terminal.
8. Turn the system console power on.
9. Move the system console brightness control to the maximum setting to ensure the screen intensity is adjusted brightly enough for you to see messages on the screen.
10. Turn power on to all connected peripherals.
11. Turn power on to the computer unit again.
12. If the display remains blank but the computer unit LED and speaker signaled at least four times, your system console terminal or cables may have a problem. Try to power up using a different terminal using the steps later in this section, "Testing With an Asynchronous Terminal."



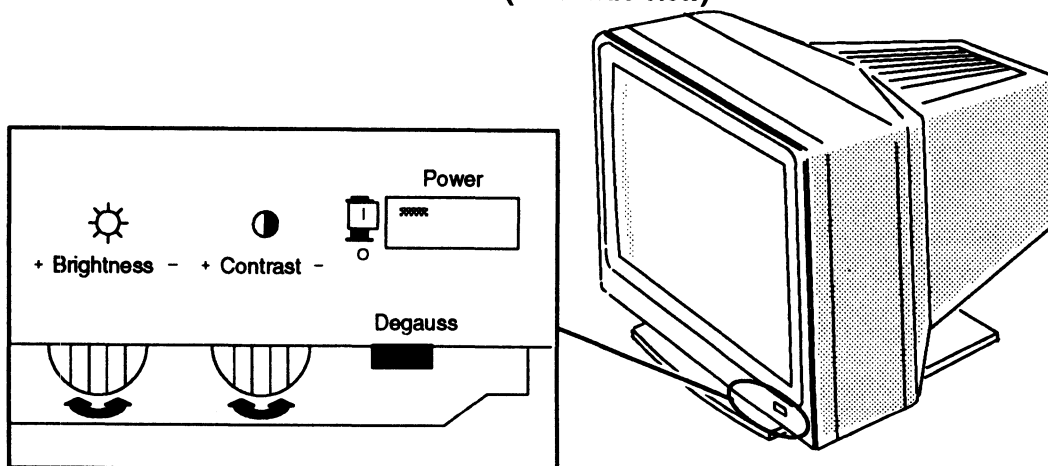
## Unclear Monitor Display (AViiON 410 and 412 Series)

Try the following if your monitor screen displays messages, but they are distorted or unreadable.

**NOTE:** You may want to use AViiON System Diagnostics graphics tests to verify your monitor display, as described in the manual *Using AViiON® System Diagnostics*.

1. Make sure the default video timing parameters are properly set for your monitor. To set video timing for the 70-hertz color or monochrome monitor you received from Data General, turn on monitor power, press **Ctrl-V**, and then type **1** after you hear one beep tone. To set parameters for a 60-hertz monitor, press **Ctrl-V**, and then type **2** after you hear one beep tone. Try both frequencies if you are not certain of the correct timing for your monitor.
2. If you have a color monitor, make sure the screen is properly demagnetized. Press the Degauss switch (located next to and just beneath the monitor's power button), shown in Figure A-1.

**Color monitor (front/side view)**



**NOTE:** Rotate Brightness and Contrast controls left and right to activate. Press Power and Degauss switches in to activate. The Power switch LED illuminates when monitor power is on.

*Figure A-1 Monitor Brightness and Degauss Switch*

3. If your screen display remains unreadable or unclear, contact Data General as described in the Preface.

## Testing With an Asynchronous Terminal

You can use a different terminal as the system console to determine whether a powerup problem is an indication of trouble with your computer or simply a faulty monitor. Your computer should complete powerup even with a monitor that is not working. You should see the diagnostic LED on the computer unit flash on and off several times, and hear beeps from the computer unit speaker. You should also hear the computer unit fan spinning inside the chassis. If the LED and speaker do *not* signal at least four times, or if the fan seems to be slow or not spinning at all, the problem is not your monitor. Contact Data General as described in the Preface.

If your display remains blank but the computer unit LED and speaker signaled at least four times, the monitor could be the problem. If you have another monitor, try that first. However, if you don't have another monitor, you can use an asynchronous terminal as a system console. Refer to Chapter 2 for information about disconnecting the graphics monitor and connecting an asynchronous device to serial Port A; then, complete the steps below to test your computer system using an asynchronous terminal.

1. Turn the computer unit power switch to off. Make sure the computer unit power cord is plugged tightly into an ac power outlet that is supplying power.
2. Make sure the terminal power cord is plugged tightly into the ac power outlet.
3. Make sure the keyboard is disconnected from the computer unit keyboard connector.
4. If you have a computer system with two serial ports, make sure the terminal cable is connected to the *first* RS-232-C connector (labeled A).
5. Make sure that all cables are secured tightly so that they make a good connection.
6. Power up the system console terminal.
7. Move the brightness control on the terminal to its maximum setting and set the terminal's characteristics as follows:

9600 baud  
8 data bits, no parity  
ANSI character set  
Enabled flow control

For information on changing terminal switch settings or configuration menus, see the manual that shipped with the terminal.

8. Turn the terminal's power switch on.
9. Turn on the computer unit power again and follow the powerup procedure described at the beginning of this chapter. If your screen display is still unreadable, contact Data General as described in the Preface.

## Unclear Terminal Display

Try the following if your terminal screen displays messages, but they are distorted or unreadable.

1. **Make sure that the cable connection from RS-232-C port A to the terminal is secure.**
2. **If the keyboard has an “On Line” key or indicator, toggle that key. If you know that the keyboard is on line and your screen is still blank, do the following:**
  - a. **Disconnect the terminal from the computer unit.**
  - b. **Turn on the terminal power to see if the terminal diagnostic self-test message appears. If the terminal does not pass its diagnostic test, try a different terminal as the system console.**
  - c. **Use the keyboard to type something. If the characters appear on your terminal screen, reconnect the terminal to the computer unit and power up the computer again. If nothing appears on your terminal screen, there could be a problem with the terminal cable.**
3. **Verify that the terminal’s baud rate, parity, number of data bits, and other characteristics are set according to the following defaults:**

9600 baud  
 8 data bits  
 No parity  
 ANSI character set  
 Enabled flow control

To change these characteristics after you successfully complete the first powerup, refer to Appendix B. For information on changing terminal switch settings or configuration menu settings, see the manual that shipped with the terminal.

If your screen display remains unreadable or unclear, contact Data General as described in the Preface.

## Error Codes and Messages

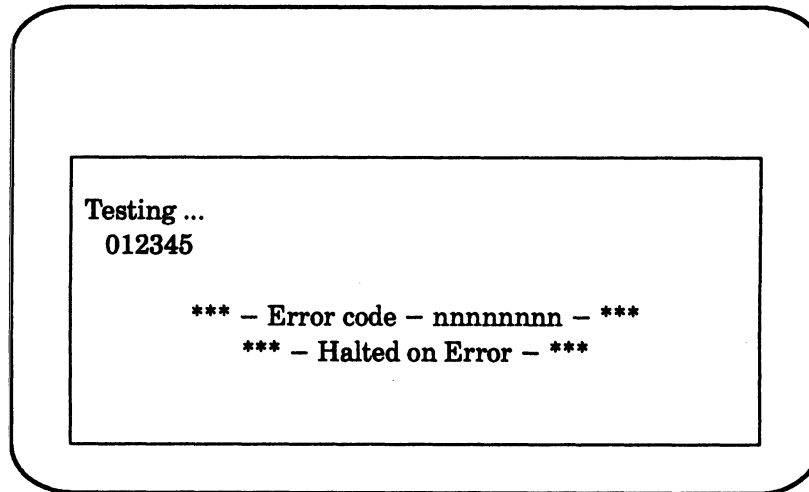
This section describes how your computer system signals an error during powerup. Refer to this section if powerup diagnostic tests halt and display an error message, if the system console “hangs” during powerup testing, or to determine whether the front panel diagnostic LED or speaker sounds indicate an error.

If your screen has been blank for more than two minutes, refer to the section, “Blank Monitor Screen” or “Blank Asynchronous Terminal Screen” earlier in this chapter. If you see meaningless display instead of an error code or message on your system

console screen, refer to the section “Unclear Monitor Display” or “Unclear Asynchronous Terminal Display.”

## Screen Display

If your computer system encounters a serious error during powerup, your screen display usually includes a Data General error code and a brief text message. Your screen display appears as follows after you receive an error:



<b>Where</b>	<b>Indicates</b>
nnnnnnnn	Data General fault code

**NOTE:** If the system console hangs at number 2 during powerup testing, refer to the “Memory Configuration Change” section later in this appendix.

If your computer system displays an error message or hangs during powerup testing at any point besides the number 2, complete the following steps.

1. Write down any text and the error code number that appears on the screen. If no error message appears, write down the last letter or number of the testing message displayed.
2. Turn off the computer unit’s power.
3. Wait at least 30 seconds.
4. Turn on power to the computer unit again. If the problem repeats, contact Data General as described in the Preface.

## LED Signals

The green LED indicator normally pulses on and off during powerup diagnostic tests to signal the completion of individual tests. The LED then remains on while the system is booting, until your operating system successfully starts. If the LED remains on *before* powerup testing is complete, or if the system seems to be hung up after one or two pulses, an abnormal condition exists. Ordinarily, there are screen indications of an error; be sure to record carefully all error indicators, including LED activity, before contacting Data General about an error condition.

## Speaker Signals

The beeps that sound during the powerup tests also provide some indication of the condition of the computer hardware. If your powerup tests complete normally, your computer unit speaker will beep several times in a unique sequence. If no beeps sound during powerup testing, if the system seems to be hung up after one or two beeps, or if the sequence of beeps is unlike that of previous powerups, an error condition exists. Sometimes you can determine the problem even if there is no discernible screen display. Table A-4 lists beep codes and suggests how to respond to any of these abnormal conditions.

**Table A-4 Beep Codes**

Beep Code	Error Condition	Solution
No sound		Probable system or speaker problem. Contact Data General.
One beep	FATAL BBSRAM ERROR	Contact Data General.
Two beeps	FATAL MEMORY ERROR	Problem with first memory module. Refer to Chapter 7 to verify that the first memory module is properly seated in its connector. If the problem repeats, contact Data General.
Three or four beeps	FATAL CACHE ERROR	Contact Data General.
Seven beeps	KEYBOARD NOT FOUND	Verify that the keyboard cable is securely connected to the computer unit if you are using a graphics monitor and keyboard as your system console. If the problem repeats, contact Data General.

Contact Data General as described in the Preface if you cannot determine the error condition or if you discover a problem you cannot solve. Ordinarily, there are screen indications of error; be sure to carefully record all error indicators before contacting Data General.

**NOTE:** Often, the first two beeps are so close in sequence they sound like a single beep. You may want to check that the first memory module is properly connected (as described in Chapter 7) before contacting Data General.

End of Appendix

# Appendix B

## Using the System Control Monitor

The System Control Monitor (SCM) manages and tests your computer at powerup and maintains control until the operating system or other system software takes over. Whenever your system software halts, the SCM resumes control. The SCM consists of microprograms stored in programmable read-only memory (PROM); these PROM-based programs are part of your computer hardware (often called *microcode* or *firmware*).

The SCM provides a command interpreter and several interactive menus. You can use SCM commands and menu items to view or change system configuration parameters, control program flow, debug programs, and boot system software.

This chapter explains how to use the SCM menus to set or change your system configuration parameters. It also describes basic SCM commands you can use to boot, program, and debug your system. Refer to *AViiON® 100, 200, 300 and 400 Series Stations and AViiON® 3000 and 4000 Series Systems: Programing System Control and I/O Registers* for a description of additional SCM functions not described in this manual.

### Using the SCM Configuration Menus

This section describes the menus you can use to view or change system configuration parameters while in the System Control Monitor (SCM). Use these menus to set configuration parameters before you install your operating system, or to alter an existing configuration.

You must be at the SCM prompt to display the primary SCM menu, View or Change System Configuration. From there, you access all other SCM menus. Refer to the “Powering Up” section of Chapter 3 for information about entering the SCM during your first powerup; The section “Getting to the SCM” describes other means of getting to the SCM prompt.

The following section contains a summary of SCM menus and information about using them. The rest of this section describes how to use menu items to accomplish common tasks.

## Summary of Menus and Menu Conventions

You access all SCM menus from the View or Change System Configuration menu. From this primary menu you can display or modify several system configuration parameters.

To display the View or Change System Configuration menu, use the **FORMAT** command. Enter the following command line at SCM prompt :

```
SCM> f ↵
```

The system displays the View or Change System Configuration menu, as follows:

```
View or Change System Configuration

1  Change boot parameters
2  Change console parameters
3  Change [serial port] parameters1
4  Change printer parameters
5  View system configuration
6  Change testing parameters
7  Return to previous screen

Enter choice->
```

<sup>1</sup> Either *mouse* port or *modem* port, depending upon your AViON model.

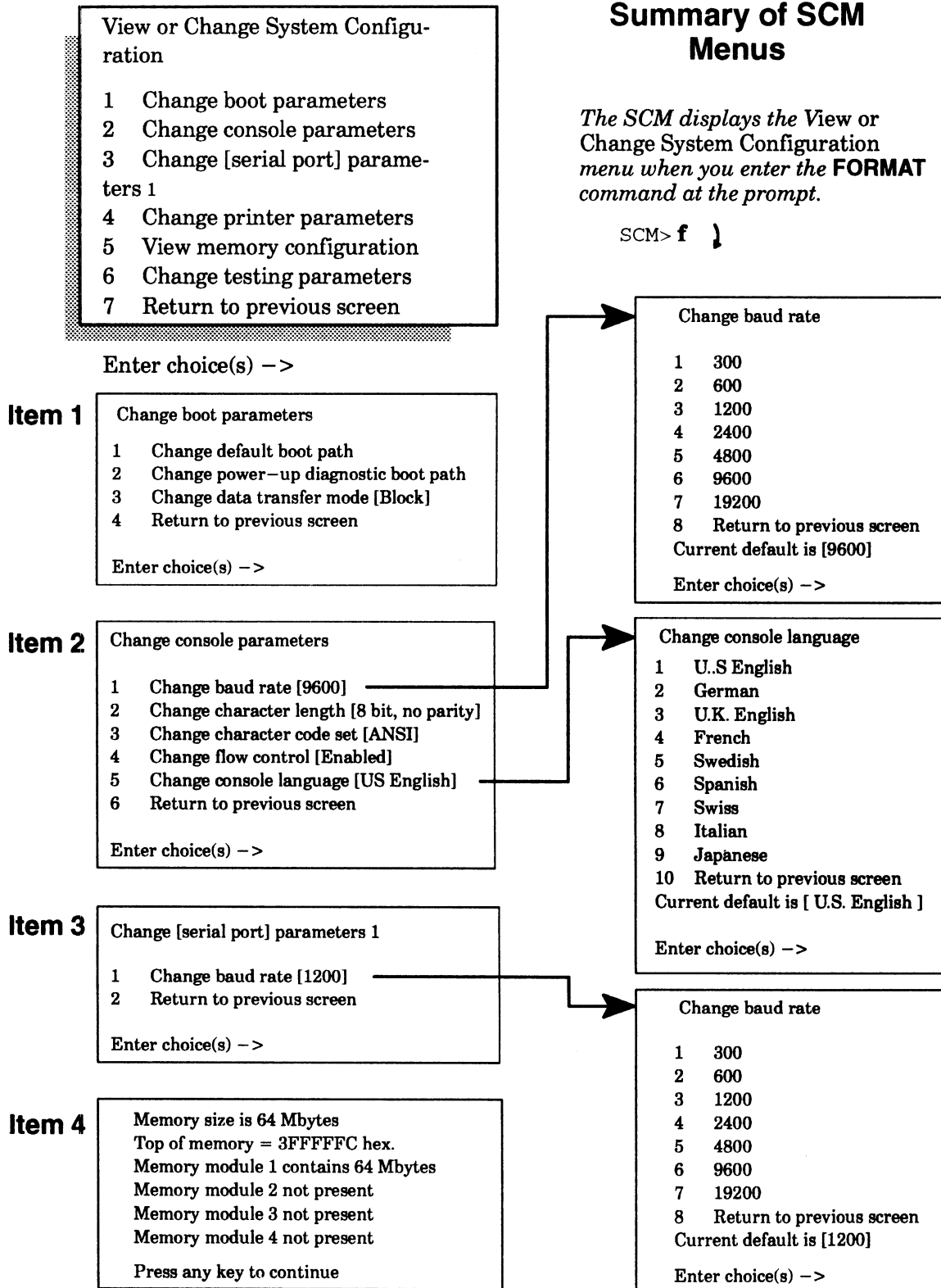
Figure B-1 summarizes the submenus you can access from the View or Change System Configuration menu.



## Summary of SCM Menus

The SCM displays the View or Change System Configuration menu when you enter the **FORMAT** command at the prompt.

SCM> **f** ↵



<sup>1</sup> Either mouse port or modem port, depending upon your AViiON model.

Figure B-1 SCM Menus

**NOTE:** If you have a remote assistance agreement with Data General, you will see menu items not shown in Figure B-1. They are described in the manual *AViON Series Systems Automatic Reporting and Remote Assistance User's Guide* (015-000356), listed in the Preface.

Changes you make while using SCM menus become effective the next time you power up or reset the computer. You can reset the computer by using the **RESET** command at the SCM prompt or by cycling power to the system. See Chapter 3 for information about operator switches and the powerup process.

You can exit from any menu by selecting the last item on the menu or by pressing New Line at the prompt to select the default. You return to the previous menu, *except* when you leave the View or Change System Configuration menu; when you exit from the View or Change System Configuration menu you return to the SCM prompt.

You can select multiple items to view or change at the `Enter choice(s)->` prompt on each menu. The SCM executes the items in sequence before returning to the menu screen. Use a space or a comma to separate item numbers.

The rest of this chapter contains sections that describe how to use menu items accessible from the View or Change System Configuration menu.

## Changing the Default Boot Path

Whenever you start your system, the SCM begins an automatic boot sequence after powerup testing completes. The SCM uses the default system boot path to find the automatic boot device. It uses this same default system boot path whenever you use the **BOOT** command without an argument. The default system boot path is usually your operating system.

If you do not set a valid default system boot path (if you leave the boot path empty, or you have not added the boot path in the appropriate operating system file), the default boot path is not initialized. When you power on the computer without an initialized boot path, the SCM uses a hardwired sequence to attempt a boot from the first SCSI disk. If it cannot boot from disk, it enters the System Control Monitor and displays the SCM prompt.

**NOTE:** If you purchased a preloaded operating system from Data General, the default system boot path was initialized at the factory to boot the DG/UX Starter operating system from the preloaded system disk.

## Specifying Boot Devices

This section briefly describes the device specifications for booting your computer from disk, tape, or across a LAN. You use this information as a *boot path* argument to the SCM **BOOT** command or as an entry for your system's *default* boot path in the View or Change System Configuration menu. Refer to the section "Using SCM Commands" for details about the **BOOT** command, or for general information about accessing the SCM.

Since the boot process is very flexible, it can sometimes be complex; this section provides only a quick reference. The section “Using SCM commands” contains a detailed description of boot path specifications. You may need to refer to the section “Using SCM commands” if you have any nonstandard devices configured with your computer.

## About the Bootstrap Process

To identify any peripheral device to the system, you must provide a *device specification*, a software descriptor that uniquely identifies that device. The *boot path* is a device specification for a bootable hardware device and, optionally, a second software descriptor that points to an executable image on the booted media called the *file path*. The SCM passes the file path to the booted program after loading the first stage bootstrap from the boot device.

Together, the boot device specification and the optional file path represent a first and second stage boot process; they comprise a full boot path. Figure B–2 shows their combined formats. A full boot path contains a maximum of 80 characters.

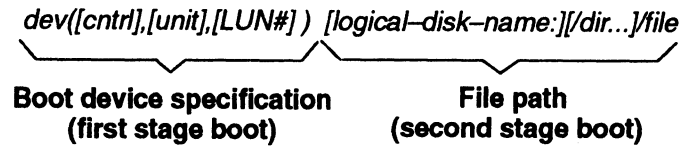


Figure B–2 Full Boot Path Format

**NOTE:** The syntax for booting over a LAN is slightly different; refer to the section, “Booting Over a Local Area Network.”

The following subsections provides first– and second–stage boot path examples for disk, tape, and LAN boot devices.

## Booting from Disk or Tape

This section provides first-stage boot path specifications for SCSI-based disk and tape drives. Refer to the next section for information about booting your computer from a LAN server. Refer to the section “Using SCM commands” for a detailed description of device specification syntax.

Table B-1 lists the device specification you use when your drives, either internal or external, are installed on the first SCSI bus (controller 0).

**Table B-1 Boot Specifications for Disk and Tape Drives**

Device	Specification
First disk drive	<b>sd(insc(0),0)</b>
Second disk drive	<b>sd(insc(0),1)</b>
Third disk drive	<b>sd(insc(0),2)</b>
Fourth disk drive	<b>sd(insc(0),3)</b>
First tape drive	<b>st(insc(0),4)</b>
Second tape drive	<b>st(insc(0),5)</b>
Third tape drive	<b>st(insc(0),6)</b>

**NOTE:** These specifications assume that drive jumpers are set according to their factory configuration.

- Your system applies a default value of 0 to an unspecified LUN field.

## Specifying a Second-Stage Boot File

Typically, the first-stage boot brings up the operating system second-stage bootstrap, which uses any text it finds after the device specification in the boot path to bring up and properly initialize your operating system. You can use this second stage, or *file path*, argument to specify any executable file or program parameter (such as run level). Refer to the section “Using SCM commands” for details.

For example, the file path **usr:/stand/diags** refers to the AViiON System Diagnostics program file, called **diags**, located in the directory **stand** on the logical disk **usr**. To boot **diags** from the disk at SCSI ID 0, use the following full boot path:

```
sd(insc(),0)usr:/stand/diags
```

You can also specify a tape file number using the file path argument. For example, if **diags** is the third file on a tape defined as SCSI ID 4, the full boot path is **st(insc(),4)2**.

## Booting Over a Local Area Network

This section provides boot path specifications for LAN devices currently available for use with AViiON 410, 412, 4100, and 4300 series systems. Refer to the section “Using SCM commands” for a detailed description of device specification syntax.

Table B–2 lists the specifications for LAN controllers you may have in your system configuration.

**Table B–2 Specifications for LAN Devices**

Device	Specification
Integrated Ethernet LAN	<b>insc()</b>
Integrated AMD Ethernet LAN	<b>dgen(0)</b>
First VME (Interphase Hawk) Ethernet LAN	<b>hken(0)</b>
Second VME (Interphase Hawk) Ethernet LAN	<b>hken(1)</b>
First VME Token Ring LAN	<b>vitr(0)</b>
Second VME Token Ring LAN	<b>vitr(1)</b>

**NOTE:** You *cannot* boot over a token ring LAN. The device specifications in Table B–2 include all LAN devices supported by AViiON 410, 412, 4100 and 4300 series systems.

When you boot over a LAN, the boot device is your computer’s LAN controller, for example **dgen**. In the second–stage bootstrap argument, you optionally specify the Internet address of the server system. For example, the following boot path command specifies the server at Internet address **128.111.2.3** on the Ethernet LAN:

**b dgen(0)128.111.2.3:**

## Examples of Valid Boot Paths

These examples show boot path arguments to the **BOOT** command. Use the boot path text only (not the **b** command) if you are entering a default boot path using the SCM’s “Change Boot Parameter’s” menu.

1. Boot the default system boot path.

```
SCM> b ↵
```

2. Boot from file 0 on the first QIC tape drive in the system.

```
SCM> b st(insc(),4) ↵
```

(Default third parameter and second stage boot: specifies **st(insc(),4)**)

3. On a multiprocessor computer, boot from the third file on the tape in the second tape drive (SCSI ID 5).

```
Jp#0/SCM> b st(insc(),5)2 ↵
```

4. Boot your DG/UX operating system kernel to run level 3.  
SCM> **sd(insc())root:/dgux -3** ↵
5. Using a Danish keyboard, boot the DG/UX system from the system disk.  
SCM> **sd(insc)=,0=rootAE-dgux.file +1** ↵
6. Using a Norwegian keyboard, boot the DG/UX system from the system disk.  
SCM> **sd(insc)=,0=rootO-dgux.file +1** ↵
7. Boot AViiON System Diagnostics (the program file **diags** located in the directory called **stand** on the logical disk **usr**) from the default system disk.  
SCM> **sd(insc(),0)usr:/stand/diags** ↵
8. Boot the executable file called **bootfile** in the root directory on the second SCSI disk (SCSI ID 1).  
SCM> **sd(insc(),1)root:/bootfile** ↵
9. Boot from the first host that responds on the Ethernet LAN.  
SCM> **dgen()** ↵
10. Boot from the host at Internet address 128.111.5.6 on the Ethernet LAN (you are connected to two different LANs, managed by an integrated and a VME Ethernet controller).  
SCM> **hken()128.111.5.6:** ↵

## Using the Change Default Boot Path Menu

To view, initialize, change, and optionally boot the default boot device, follow these steps:

1. While in the View or Change System Configuration menu, type **1** and press New Line to select item 1, "Change boot parameters."
2. The system displays the current system boot path [inside square brackets] with a prompt asking if you want to change the current default boot path, as follows:

```
System boot path = [ ]  
Do you want to modify the default boot path? Y/[N]
```

**NOTE:** The boot path is *not initialized* when the brackets are empty.

To keep the existing boot path, press New Line at the prompt, and then skip to step 5.

```
Do you want to modify the default boot path? [N] ↵
```

To set or change the system boot path, type **y** and press New Line at the prompt.

```
Do you want to modify the default boot path? [N] y ↵
```

The system displays the following prompt.

```
Enter new system boot path ->
```

3. Type a valid boot path (*device specification*) and press New Line. Refer to the last section of this chapter, “Specifying Boot Devices” for valid entries.

For example, to boot the DG/UX operating system from the first SCSI disk -- boot path **sd(insc(),0)** and file path **root:/dgux** -- type the following:

```
Enter new default boot path -> sd(insc(),0)root:/dgux ↵
```

The SCM will now automatically boot DG/UX from this disk at every powerup.

4. After you specify a new default boot path, the SCM displays your entry in brackets, followed by a prompt giving you a chance to make further changes, as follows:

```
System boot path = [sd(insc(),0)root:/dgux]
Do you want to modify the default boot path? [N]
```

Press New Line to accept the new boot path. Enter **y** and repeat step 3 to change the boot path again.

5. The system prompts you to boot from the new default boot path.

```
Do you want to boot? [N]
```

To return to the View or Change System Configuration menu without rebooting, press New Line. The next time you do reboot, the SCM will use the new default system boot path.

6. To boot, type **Y** and press New Line .

```
Do you want to boot? [N] Y ↵
```

The next message you see is from the program you booted.

## Changing Console Parameters

Items on the Change Console Parameters menu allow you to set the operating parameters for a device connected to the system console port (or to view the default values for these parameters). The following subsections describe how to view or change console parameters.

The *system console* refers to the keyboard and display device that receive powerup diagnostic test messages and from which you bring up your operating system. In most cases, the system console communicates directly with the computer’s system board.

The system console port is the *first* RS 232 port on the computer unit rear panel (labeled A); refer to Chapter 2 for information about its rear panel location and about connecting an asynchronous terminal

A computer's system console consists of either an asynchronous terminal or a graphics monitor and keyboard. You can use items 4, 5, and 6 on the Change Console Parameters menu if you have a graphics monitor rather than an asynchronous terminal as system console. Items 1, 2, and 3 are only useful if you connect an asynchronous terminal for use as a system console.

**NOTE:** If you connect a terminal for use as a system console, make sure that the characteristic settings on the terminal correspond to the parameter settings for the system console port. Power down the computer if you are connecting a new terminal or changing the terminal characteristics using the SCM. If you have a graphics computer, you *must* disconnect the graphics monitor and keyboard before powering up using a terminal as system console.

You can use a keyboard control sequence (Ctrl-I) to restore the parameters for the system console port to the following factory defaults: 9600 baud, 8 data bits, no parity, ANSI character set, enabled flow control, U.S. English keyboard language. Refer to the section "Using SCM commands" for a description of keyboard control sequences.



## Changing the System Console Baud Rate

While in the View or Change System Configuration menu, type **2** and press New Line to select item 2 “Change console parameters.” The system displays the Change Console Parameters menu, with the current baud rate shown in brackets next to item 1, “Change baud rate.” Use item 1 to change the baud rate for the system console port. The default baud rate is 9600 baud.

**NOTE:** Item 1 only applies if you are using an asynchronous terminal as system console; this parameter does not apply to a graphics monitor.

```
Change console parameters
```

- |   |  |
|---|--|
| 1 | Change baud rate [9600]                  |
| 2 | Change character size [8 bit, no parity] |
| 3 | Change character code set [ANSI]         |
| 4 | Change flow control [Enabled]            |
| 5 | Change console language [US English]     |
| 6 | Return to previous screen                |

```
Enter choice(s) ->
```

Type **1** and press New Line to select item 1, “Change baud rate.” The system displays the Change Baud Rate menu.

```
Change baud rate
```

- |   |                           |
|---|---------------------------|
| 1 | 300                       |
| 2 | 600                       |
| 3 | 1200                      |
| 4 | 2400                      |
| 5 | 4800                      |
| 6 | 9600                      |
| 7 | 19200                     |
| 8 | Return to previous screen |

```
Current baud rate [9600]
```

```
Enter choice(s)->
```

Type the item number of the baud rate you want and press New Line. You return to the Change Console Parameters menu. The baud rate you select will be the default for your system console port the next time you power up or reset the system.

## Changing the System Console Character Length

While in the View or Change System Configuration menu, type **2** and press New Line to select item 2, "Change console parameters." The system displays the Change Console Parameters menu, with the current value in brackets next to item 2, "Change character length". Use item 2 to change the default character size for your system console port. The default value is 8 data bits, no parity.

**NOTE:** Item 2 applies only if you are using an asynchronous terminal as system console; this parameters does not apply to a graphics monitor.

```
Change console parameters

1   Change baud rate [9600]
2   Change character length [8 bits, no parity]
3   Change character code set [ANSI]
4   Change flow control [Enabled]
5   Change console language [US English]
6   Return to previous screen

Enter choice(s) ->
```

Type **2** and press New Line to select item 2, "Change character size." The system displays the Change Character Size menu.

```
Change character size

1   8 bit, no parity
2   7 bit, even parity
3   7 bit, odd parity
4   7 bit, mark parity
5   7 bit, no parity
6   Return to previous screen

Current character size is [8 bit, no parity]

Enter choice(s)->
```

Type the item number of the character size you want and press New Line. You return to the Change Console Parameters menu. The character size you selected will be the default for your system console port the next time you power up or reset the system.

## Changing the System Console Mode

While in the View or Change System Configuration menu, type **2** and press New Line to select item 2 “Change console parameters.” The system displays the current value in brackets next to item 3 on the Change Console Parameters menu. Use item 3, “Change character code set” to change the default character code setting for the system console port. The default character mode is ANSI with is compatible with DG/UX requirements. The alternate is DG mode. Refer to the documentation that came with the terminal for information about supported character modes.

**NOTE:** Item 3 only applies if you are using an asynchronous terminal as system console; this parameter does not apply to a graphics monitor.

```

Change console parameters

1      Change baud rate [9600]
2      Change character size [8 bit, no parity]
3      Change character code set [ANSI]
4      Change flow control [Enabled]
5      Change console language [US English]
6      Return to previous screen

Enter choice(s) ->

```

**CAUTION:** *The console character code set must be ANSI if you use the DG/UX operating system.*

Type **3** and press New Line to select item 3, “Change character code set.” If the character set is currently ANSI, you will change the specification to DG mode. If the character set is currently DG mode, you will change it to ANSI. You return to the Change Console Parameters menu without further screen display. Select item 3 again to toggle it to its previous setting. The character mode selected when you exit from the Change Console Parameters menu will be the default for your system console port the next time you power up or reset the system.

## Enabling or Disabling Flow Control

With flow control (XON/XOFF protocol) enabled, you can use the Ctrl-S sequence to suspend screen output and Ctrl-Q to resume screen display while in the SCM. Flow control is enabled within the SCM by default.

While in the View or Change System Configuration menu, type **2** and press New Line to select item 2 “Change console parameters.” From there, you can use item 4, “Change flow control” to enable or disable the default flow control setting (while in the SCM).

The system displays the current value in brackets on the Change Console Parameters menu. When flow control is enabled, you can use the Ctrl-S command sequence to suspend screen display and Ctrl-Q to resume screen display.

```
Change console parameters

1      Change baud rate [9600]
2      Change character size [8 bit, no parity]
3      Change asynch console mode [ANSI]
4      Change flow control [Enabled]
5      Change console language [US English]
6      Return to previous screen

Enter choice(s) ->
```

If flow control is currently enabled, selecting item 4 will disable it; if flow control is currently disabled, the selection will enable it.

**NOTE:** Your selection at this menu does not affect flow control for your operating system or stand-alone programs.

## Changing the Keyboard Language

To select an international font to match your keyboard, use item 5, “Change console language” on the Change Console Parameters menu. U.S. English is the default language in the SCM. The system displays the current value in brackets on the Change Console Parameters menu, and in your powerup initialization display. To change the current keyboard language, complete the following steps.

1. While in the View or Change System Configuration menu, type **2** and press New Line to select item 2 “Change console parameters.” The system displays the Change Console Parameters menu, as follows:

```
Change console parameters

1      Change baud rate [9600]
2      Change character size [8 bit, no parity]
3      Change character code set [ANSI]
4      Change flow control [Enabled]
5      Change console language [U.S. English]
6      Return to previous screen

Enter choice(s) ->
```

2. Type 5 and press New Line to select item 5, "Change console language." The system displays the Change Console Language menu, as follows:

```

Change console language

1      U.S. English
2      German
3      U.K. English
4      French
5      Swedish
6      Spanish
7      Swiss
8      Italian
9      Japanese
10     Other
11     Return to previous screen

Current language is [U.S. English]

Enter choice(s)->

```

3. Proceed to the next step if your keyboard language does not appear on the Change Console Language menu.

If the language that is compatible with your keyboard and system software *does* appear on the menu, select the corresponding item number and press New Line. You will return to the Change Console Parameters menu. The next time you reset or restart your computer, the system will use the new console language.

4. If your keyboard language is *not* listed in items 1 through 9 but *is* listed in Table B-3, you initialize your language type by selecting item 10, "Other." The system prompts you for the numeric code for your keyboard type. The item number of the current type appears in brackets next to the prompt, as follows:

Enter language type [1]:

NOTE: Type 1 is the U.S. English keyboard.

Enter the code for your keyboard type and press New Line, as follows.

Enter language type [1]: 11 ↵

You return to the Change Console Language menu, where your new selection appears in brackets (e.g. [type 11] ). You will need to reset or restart your computer before booting the operating system to use the new console language.

**Table B-3 Alternate Keyboard Codes**

Alternate Keyboard Language	Keyboard Type Code
Danish	10
Norwegian	11
Portuguese	12

**NOTE:** When you initialize a keyboard language using item 10, “Other,” the console language remains U.S. English *within the SCM*; however, the SCM passes the alternate language type to your operating system or other system software. You will need to use special keyboard characters in order to use your keyboard while you are in the SCM. Refer to steps 4 and 5 in the “Examples of Valid Boot Paths” section for alternate boot command syntax.

## Changing Modem Port Parameters

Use the Change Modem Port Parameters menu to specify the proper configuration for the modem port.

The modem port is the second RS-232 port on the computer unit rear panel, labeled B; Chapter 2 describes its rear panel location. When you change modem port parameters, you change the characteristics of this second serial port. If you do not have a modem, you can use the modem port for any asynchronous device. Make sure that characteristic settings on the device you have connected to that port correspond to the parameters set with this menu.

While in the View or Change System Configuration menu, type **3** and press New Line to select item 3, “Change modem port parameters.” The system displays the Change Modem Port Parameters menu (with current default values in brackets), as follows:

```

Change modem port parameters

1      Change baud rate [1200]
2      Change character size [8 bit, no parity]
3      Return to previous screen

Enter choice(s)->
    
```

Select the item you want to change (baud rate or character length) by entering the item number and pressing New Line. The system prompts you with a menu. Proceed with the instructions in the appropriate section below.

### Changing the Modem Port Baud Rate

The default baud rate for the modem port is 1200 baud. The system displays the current baud rate in brackets. Refer to the documentation that came with your modem for information about the correct baud rate.

To change the baud rate of a your modem port, follow these steps:

While in the Change Modem Port Parameters menu, type 1 and press New Line to select item 1, "Change baud rate." The system displays the Change Baud Rate menu.

```
Change baud rate

1      300
2      600
3      1200
4      2400
5      4800
6      9600
7      19200
8      Return to previous screen
Current baud rate [9600]

Enter choice(s)->
```

Type the item number of the baud rate you want, and press New Line. The baud rate you select will be the default baud rate for your modem port the next time you reset or restart the computer.

### Changing the Modem Port Character Size

Use item 2, "Change character size" to toggle the default character size setting for your modem port. The default value is 8 data bits, no parity. Refer to the documentation that came with your modem for information about setting the correct character length and parity.

While in the Change Modem Port Parameters menu, type **2** and press New Line to select item 2, "Change character size." The system displays the following menu:

```
Change character size

1      8 bit, no parity
2      7 bit, even parity
3      7 bit, odd parity
4      7 bit, mark parity
5      7 bit, no parity
6      Return to previous screen

Current character size is [8 bit, no parity]

Enter choice(s)->
```

The next time you reset or restart your computer, the system will conform to the character size last set.

## Changing the Mouse Baud Rate

Use the Change Mouse Parameters menu to specify the proper configuration for your computer's mouse, or to view the default values.

While in the View or Change System Configuration menu, type **3** and press New Line to select item 3, "Change mouse parameters." The system displays the following menu:

```
Change mouse baud rate

1      300
2      600
3      1200
4      2400
5      4800
6      9600
7      19200
8      Return to previous screen
Current baud rate [1200]

Enter choice(s)->
```

Type the item number of the baud rate you want and press New Line. Refer to the documentation that came with your mouse for information about supported baud rates. The next time you reset or restart your computer, the system will conform use the baud rate you set.



## Viewing the Memory Configuration

While in the View or Change System Configuration menu, type **5**, and press New Line to select item 5, "View memory configuration." The system displays current system memory information.

The following example shows the memory configuration display for a system configured with one 16-Mbyte memory module and two 4-Mbyte modules. Refer to Chapter 4 for configuration limitations and instructions for removing and installing memory modules.

```

Memory size is 32 Mbytes
Top of memory = fffffc hex
Memory module 0 contains 16 Mbytes
Memory module 1 contains 4 Mbytes
Memory module 2 contains 4 Mbytes
Memory module 3 not present
Memory module 4 not present
Memory module 5 not present
Memory module 6 not present
Memory module 7 not present

Press any key to continue

```

The memory display shows module numbers for each available memory slot and indicates whether or not each slot contains a memory module.

## Getting to the SCM

You can tell you are in the SCM when you see its command interpreter prompt. You'll only see the SCM prompt when your operating system is completely shut down and the job processor (or CPU, Central Processing Unit) is halted. The default SCM prompt appears as follows:

```
SCM>
```

If you have a multiprocessor model, all processors must be halted before you see the SCM prompt. Your default SCM prompt indicates the currently attached job processor, as follows:

```
Jp#n/SCM>
```

You can use the SCM to load, start, modify, control, or halt programs, but the SCM never runs at the same time as system software. During normal operation, you access the SCM only when system software encounters a problem it cannot handle while running.

Your computer displays the SCM command interpreter prompt under the following circumstances:

- **The automatic boot sequence fails or is interrupted**

The SCM controls powerup testing and then brings up your system software through an automatic boot sequence. You enter the SCM if a diagnostic test fails or if the automatic boot sequence does not complete successfully.

You can access the SCM intentionally by executing the SCM interrupt sequence **<Ctrl-C>** before your operating system software boots at powerup. After powerup testing completes, execute the sequence repeatedly until you see the SCM prompt.

*CAUTION: Never use the SCM **Ctrl-C** sequence during powerup testing. If you want to interrupt the automatic boot sequence, wait until you see the message **Passed** after the diagnostic test messages on your screen.*

- **A user command halts the operating system**

You can use UNIX operating system commands to shut down the system, stop all processors, and display the SCM prompt. If you are running the DG/UX system, always try the following command sequence to shut down the operating system properly:

```
# cd /  
# shutdown
```

**NOTE:** You can modify the **shutdown** command to specify whether you want to bring down the system immediately, or provide a period of time for users to log out. Refer to your DG/UX documentation for information.

Then, halt the operating system to display the SCM prompt, as follows:

```
# halt -q  
SCM>
```

If you don't have the DG/UX system, refer to your operating system documentation for information about properly shutting down before halting the system.

*CAUTION: Always try to shut down your operating system properly before attempting to halt the system. Halting your system while the operating system or other software is running may result in lost or corrupted data.*

- **A user keyboard command break sequence halts the operating system**

Most system software supports a keyboard break sequence you can use to halt current processing and display the SCM prompt. Which keys you press depend on both your keyboard type and the support of your operating system or stand-alone program. For information about the proper keyboard sequence to halt your system and enter the SCM, refer to the documentation that came with your operating system or other system software.

*CAUTION: Always try to shut down your operating system properly before attempting to halt the system. Halting your system while the operating system or other software is running may result in lost or corrupted data.*

To halt the DG/UX system when it is hung (seems frozen and you cannot continue operation), hold down the **Ctrl** key and type three sets of right and left bracket keystrokes in sequence, as follows:

][][][ (be sure to hold down the **Ctrl** key while doing this)

This should halt current processing and display the SCM prompt.

- **A user presses a hardware reset or power switch**

If your operating system or stand-alone program is hung (seems frozen and you cannot continue operation), resetting the hardware may enable you to restart.

*CAUTION: Always try to shut down your operating system properly before attempting to reset the computer. Resetting the hardware while your operating system or other software is running may result in lost or corrupted data.*

You can reset your system by pressing the hardware reset switch on the computer unit (a *warm* reset), or by turning power off and then on again (a *cold* reset). You see the SCM prompt after a warm reset; the computer completes powerup testing and its automatic boot sequence after a cold reset. Refer Chapter 3 for more information about the reset switch.

- **The operating system halts after encountering an unsupported program breakpoint or interrupt**

Your system software handles all exceptions (program breakpoints and interrupts); it halts if it encounters an exception it does not expect or cannot handle. For information about program breakpoints and interrupts, refer to *AViiON® 100, 200, 300, and 400 Series Stations and AViiON® 3000 and 4000 Series Systems: Programming System Control and I/O Registers*.

## Using SCM Commands

This section describes SCM command interpreter conventions, explains how to execute commands, lists all SCM commands with their functions, and provides reference pages for the commands you are most likely to use.

An SCM command line consists of one valid command and, in many cases, one or more arguments (required or optional) that you enter at the SCM prompt. Follow these guidelines when using SCM commands:

- Type no more than 80 characters in one command line.
- You do not have to type the entire command name; the SCM accepts the first letter of a command as its minimal mnemonic.
- SCM commands and arguments are *not* case-sensitive (with the exception of device specification arguments to the **BOOT** command, which *must* be lowercase).

If you use a command incorrectly, the SCM displays a brief error message and returns the prompt so you can try again.

The SCM supports several keyboard control characters. Table B-4 describes keyboard control sequences you can use to edit command lines, to interrupt and exit from several SCM commands, and to restore default settings for configuration parameters.

**Table B-4 SCM Line Editing Features and Keyboard Control Sequences**

Keyboard Entry	Function
↵	Completes the current input line, begins execution of command input, and returns the SCM prompt.
<Ctrl-A>	Recalls and displays the last command string you entered at the SCM prompt.
<Ctrl-C> <sup>1</sup>	Interrupts execution of an SCM command and returns the SCM prompt. This is a polled interrupt; some procedures complete before they break. If you do not have an auto-repeat keyboard, execute the Ctrl-C sequence repeatedly until you see the SCM prompt.
<Ctrl-I> <sup>2</sup>	Restores default configuration parameters to the following factory settings. System console port: 9600 baud, 8 data bits, no parity, ANSI character set, enabled flow control, U.S. English keyboard language. Parallel printer: Centronics interface. SCSI tape drives: block transfer mode. Mouse or modem port: 1200 baud. Also restores video timing parameters (see Ctrl-V below). Enter <Ctrl-I>, wait until you hear one beep; then, enter <b>1</b> if you have a 70-Hz monitor, or enter <b>2</b> for a 60-Hz monitor.
<Ctrl-Q>	Resumes SCM output display that was suspended with the Ctrl-S sequence.
<Ctrl-S>	Suspends SCM output display until you resume it with the Ctrl-Q sequence.
<Ctrl-U>	Erases the current line of text, from the left of the cursor to the SCM prompt.
<Ctrl-V> <sup>2</sup>	Allows you restore the default video parameters for the 70-Hz graphics monitor, or to change the defaults for a 60-Hz monitor. Use this control sequence only if the window that appears at powerup on your graphics monitor is distorted or does not appear. After you type Ctrl-V, wait until you hear a beep; then, type <b>1</b> for 70-Hz parameters, or type <b>2</b> to configure for a 60 Hz. monitor. The monitor is configured to the new frequency when you hear a second beep. If the screen display on your graphics monitor is not clear after trying both frequencies, refer to "Solving Powerup Problems" in Appendix B.

<sup>1</sup> Only functions as an interrupt to SCM functions.<sup>2</sup> You can execute this sequence only while in the SCM.

## Summary of Commands

The rest of this appendix contains reference pages for those SCM commands you may need for program control or system operation. Table B-5 lists these commands and their likely functions; refer to *AViiON® 100, 200, 300 and 400 Series Stations and AViiON® 3000 and 4000 Series Systems: Programing System Control and I/O Registers* for information about more commands useful for hardware and program debugging. Use the **HELP** command to view all commands available on your system.

**Table B-5 Summary of SCM Commands and Command Functions**

Command	Description	Function
. (period)	Displays processor status	Debugging
<b>ATTACH</b>	Specifies attached processor	Program control, system operation <sup>1</sup>
<b>BOOT</b>	Starts system from bootstrap device	System operation
<b>CONTINUE</b>	Restarts attached processor	Program control, debugging
<b>DISPLAY</b>	Shows register file contents	Debugging
<b>EXAMINE</b>	Opens or edits contents of registers and memory locations	Debugging
<b>FORMAT</b>	Displays View or Change Configuration menu	System operation, debugging, program control
<b>HELP</b>	Lists valid SCM commands	System operation, debugging, program control
<b>INITIALIZE</b>	Writes data to a range of memory	Debugging
<b>LOCATE</b>	Searches memory for a data pattern	Debugging
<b>MOVE</b>	Duplicates a memory block in new location	Debugging
<b>ONESTEP</b>	Executes the next program instruction	Debugging, program control
<b>PROMPT</b>	Changes text of SCM prompt	System operation
<b>RESET</b>	Initializes system to powerup state	System operation
<b>START</b>	Begins processor at specified address	Program control, system operation
<b>TRAP</b>	Views or inserts breakpoints	Debugging
<b>UNTRAP</b>	Removes breakpoints	Debugging
<b>VIEW</b>	Displays a range of memory	Debugging
<b>WRITE</b>	Inserts data in one memory location	Debugging
<b>ZLOADER</b>	Starts s-record loader utility	System operation

<sup>1</sup> Multiprocessor systems only.

---

## ATTACH

**Specifies the active job processor.**

---

**ATTACH** *[jp#]*

### Description

The **ATTACH** command is valid only for multiprocessor systems. It allows you to attach the SCM to a specified job processor for subsequent operations (in other words, it makes a particular processor active). Unattached processors remain in an idle state. The SCM prompt indicates which job processor is currently attached (Jp#n/SCM> where n is the number of the attached job processor). By default, Jp#0 is the attached processor after powerup.

The system returns the currently attached processor if you use this command without an argument.

### Arguments

*[jp#]* The number of the job processor to attach.

### Related Commands

<b>CONTINUE</b>	Resumes program execution at the program counter value on the currently attached processor.
<b>PROMPT</b>	Changes the SCM prompt text.
<b>START</b>	Begins program execution at a specified address on the currently attached processor.

### Related Messages

Jp#n attached

### Examples

1. Attach SCM to job processor #1.

```
Jp#0/SCM> A 1 ↵
Jp#1 attached
```

2. Display the currently attached job processor.

```
Jp#1/SCM> A ↵
Jp#1 attached
```

---

## BOOT

**Starts the system from a specified device.**

---

**BOOT** [*device*][*file*]

### Description

The **BOOT** command first resets system hardware; it then loads a bootstrap program from the device you specify in an optional argument [*device*]. Valid boot device arguments vary according to your peripheral configuration. After the first-stage boot completes, the SCM passes the second optional argument, [*file*], to the booted program for further processing.

Typically, the booted program is the operating system second-stage bootstrap. With disk and tape boots, you can use the second stage, or *file*, argument to specify a particular program or program parameter (such as run level) to bring up and properly initialize your operating system.

In a LAN boot, the optional arguments specify the physical LAN connection and the server system's Internet address. When you omit the second argument in a LAN boot, the SCM probes the LAN for any server that recognizes your computer's Ethernet address and then boots the default boot file.

When you use the **BOOT** command with *neither* optional argument, the SCM attempts to boot from a default boot path. Refer to the section "Changing the Default System Boot Path" for information about using the Change Boot Parameters menu to set or change this default boot path. If the default boot path is not set or not valid, the SCM tries to find a bootstrap file on the first SCSI disk.

### Related Commands

**FORMAT** Displays View or Change System Configuration menu, where you change the default system boot path.

### Related Messages

Booting from ...

Unable to load boot file ...

### Arguments

Together, the optional boot device specification [*device*] and the optional file specification [*file*] represent the first- and second-stage boot process; they comprise a full boot path (shown in Figure B-2). A full boot path contains a maximum of 80 characters.



## BOOT (cont)

NOTE: A complete discussion of DG/UX device naming as it applies to all system devices is contained in *Installing the DG/UX System* (for DG/UX Release 5.4 users) and *Installing and Managing the DG/UX System* (for users of any DG/UX Release prior to 5.4 )

If you do not use the DG/UX system, refer to your operating system documentation for information about device–naming conventions.

### First–Stage Argument

The device specification (first–stage boot) consists of a mnemonic that identifies the type of device and names the device driver, plus three optional parameters that provide additional information to fully specify that device.

Boot device syntax includes the device mnemonic (*device*), followed by open and close parentheses. Mnemonics are always in lowercase type. The minimum specification is **device()**. The three optional parameters are included inside the parentheses, separated by a comma or a space, as follows:

*device([controller],[unit],[lun#])*

Table B–6 lists the mnemonic names for bootable devices and defines the optional parameters for each device.

**Table B–6 Mnemonics and Parameters for Bootable Devices**

Mnemonic <i>device</i>	Device Type	Parameters		
		<i>controller</i>	<i>unit</i>	<i>lun</i>
insc	Integrated SCSI adapter	I/O address	N/A	N/A
sd	SCSI disk <sup>1</sup>	<b>insc(0)</b> or	SCSI ID <sup>2</sup>	0
st	SCSI tape	<b>insc(0)</b> or	SCSI ID <sup>2</sup>	0
dgen	Integrated Ethernet LAN	<b>0</b> or <b>1</b>	N/A	N/A
hken	VME Ethernet LAN controller	<b>0</b> or <b>1</b>	N/A	N/A

<sup>1</sup>Includes CD–ROM devices on systems running firmware Revision 8.0 or greater.

<sup>2</sup>An integer, determined by configuration jumpers. Refer to Table B–8 for values.

NOTE: These specifications assume that disk and tape drive jumpers are set according to their factory configuration.

When a parameter value is numeric, it uses zero–based logical numbering; when you use 0 you are specifying the *first* value for that parameter. Device drivers interpret missing parameters as 0, so you can omit a number–based parameter to specify its *first* value.

NOTE: Even when all three device parameters are 0 and are therefore omitted, you *must* include both the open and close parentheses after the device mnemonic.

**BOOT (cont)****Specifying the Controller: First Parameter**

To name a peripheral device, you must name the controller that manages it. The first parameter (*controller*) points to the device controller's memory-mapped I/O address. You can specify standard controllers by their device mnemonic; Table B-7 lists both the mnemonic name and the memory-mapped I/O address associated with each standard controller.

**Table B-7 Controller (*cntr*) Parameter Values**

To specify this controller:	Enter one of these values:	
	Mnemonic	I/O Address
SCSI interface adapter	<b>insc(0)</b>	fff8a000
Integrated AMD Ethernet	<b>dgen(0)</b>	fff8c000
First VME Hawk Interphase Ethernet	<b>hken(0)</b>	fff4000 <sup>1</sup> 5590000 <sup>2</sup>
Second VME Hawk Interphase Ethernet	<b>hken(1)</b>	fff5000 <sup>1</sup> 5598000 <sup>2</sup>

<sup>1</sup> VME A16 address

<sup>2</sup> VME A32 address

The simplest device specification combines the device mnemonic with the controller parameter specification. For example, **sd(insc())** specifies the first SCSI disk unit on the first SCSI adapter. In both cases, the disk hardware is jumpered according to its default factory configuration.

To *explicitly* specify a controller, you use its I/O address as the first parameter. For example, rather than **sd(insc(0))** the specification is **sd(fff8a000,0,0)**. You should need to use this method only if you have nonstandard devices configured with your system; refer to the "Specifying Nonstandard Boot Devices" section of this chapter.

When you boot over a LAN, the bootstrap device is your computer's LAN controller. Therefore, the minimum LAN boot path is simply your LAN controller's device driver name: **dgen()**, **hken()**, or **vitr()**. If you have more than one type of LAN controller, you specify the controller number inside the parentheses. For example, the specification for the *second* Hawk VME Ethernet controller is **hken(1)**.

**BOOT (cont)****Specifying a Device Unit: Second Parameter**

The second parameter (*unit*) specifies the identification number of the device on the specified controller. Different controller types have a different unit parameter. As shown in Table B-8, the *unit* parameter for your SCSI devices is the SCSI ID number. Logical numbering for the *unit* parameter begins at 0 and is determined by configuration jumpers. By omitting the second parameter, you specify the first unit for that device type (that is, SCSI ID 0).

Table B-8 defines factory-default SCSI ID numbering for AViON systems.

**Table B-8 Default SCSI Device ID and LUN Numbers**

Drive	SCSI ID	LUN
First disk <sup>1</sup>	0	N/A
Second disk	1	N/A
Third disk	2	N/A
First cartridge tape	4	N/A
Second cartridge tape	5	N/A
Third cartridge tape	6	N/A

<sup>1</sup> Hard disk drives include Winchester and CD-ROM types.

**Specifying a Logical Unit: Third Parameter**

The third parameter specifies a drive's logical unit number (LUN). You rarely use the third parameter (*lun#*); it supplies additional information when the second parameter (*unit*) does not uniquely identify the bootstrap device.

If you have more than one drive managed by the same SCSI adapter board, the drives have the same SCSI ID number. The LUN differentiates drives managed by the same SCSI adapter. As seen in Table B-8, two drives managed by the same adapter will have the same SCSI ID, but different LUNs.

**Second-Stage Argument**

Typically, the first-stage boot brings up the operating system second-stage bootstrap. The second-stage bootstrap uses any text it finds after the device specification in the boot path to bring up and properly initialize your operating system. You can use this second stage, or *file path*, argument to specify any executable file or program parameter (such as run level).

To specify a file path, append its specification just after the device specification (do not type a space after the right parenthesis), as described in the following subsections.

## BOOT (cont)

---

### Booting from Disk

When booting from disk, you include the name of the executable image (*file*), preceded by the directory path to that file (*dir...*) and the name of the logical disk (*ld*) which contains the file. Include a colon after the logical disk name (:) and separate each directory partition with a slash, according the following format:

```
[ld:][/dir...]/file
```

You can omit the boot device specification and use the file path argument alone when booting from the default boot device (the system boot path stored in the Change Boot Parameters menu). The logical disk name and directory path are also optional; the file path starts from the root (**root:**) by default. The following is sufficient to boot the executable image **file** in the root directory of the default boot device:

```
SCM> b file
```

### Booting from Tape

When booting from cartridge tape, you can specify the tape file number as the file path argument. For example, to boot file #1 (the second file) on a cartridge tape in the drive at SCSI ID #4, the full boot path is **st(insc(),4)2**.

### Booting Over a LAN

When booting as a client to a local area network server, you can specify the Internet address of the operating system server. Use the following format to specify a LAN boot path argument:

```
LAN-controller()[Server-Internet-address:]
```

For example, the following boot path specifies the server at Internet address **128.111.2.3** on the first Ethernet LAN:

```
dgen()128.111.2.3:
```

If you don't know your operating system server's Internet address, you can omit the second-stage argument and use only the LAN controller specification; your workstation gets the Internet address of the server and other information necessary to boot over the network.

An operating system server keeps information about each configured client in a boot parameters file. During the second-stage boot, the server sends the client its boot parameters. Refer to your operating system and network administration documentation for information about these boot parameters and for details about the LAN boot process.

## BOOT (cont)

---

### Specifying Nonstandard Boot Devices

AViiON device drivers use a particular memory address (or addresses) to access each device controller. The device specification you use when booting a device includes this memory location, either explicitly or via device tables. Since the devices supplied by Data General are preconfigured to default memory-mapped I/O addresses, you do not explicitly name their addresses. In this chapter, we call these devices at default addresses *standard* boot devices. This “Arguments” section of this command description explains the syntax for booting standard devices.

If you configure devices that are *not* listed in Table B-8 or if you do not use the DG/UX operating system’s device drivers, standard device specifications apply only to the first-stage boot and may not apply at all. This section describes an extended format for specifying boot devices.

There are several reasons for using the extended, nonstandard-device format for boot device specifications. You may need to configure a device controller at a different I/O address than the current Data General convention, or you may have more devices configured than can be named by the current defaults. You may want to change device configurations to accommodate your operating system or to configure additional devices not supplied by Data General.

Without the default parameter values used for standard devices, a boot path specification is even more complex. The extended format for an SCM boot path includes information you do not need when specifying standard boot devices. (Your operating system may store device information in this extended format, however.)

When you use nonstandard boot devices, you need to set configuration jumpers on the device and include its I/O address as the first parameter (*param1*) in device specifications.

The following is the format for an expanded or nonstandard disk or tape boot path argument:

```
dev[@vector]([param1],[param2],[param3])
```

Where	Means
<i>dev()</i>	The name of the device driver that supports the device.
<i>[@vector]</i>	The interrupt vector number, or device code.
<i>[param1]</i>	The memory-mapped I/O address of the controller.
<i>[param2]</i> and <i>[param3]</i>	Additional parameters, defined by the device driver, to fully identify the device.

For example: **sd@70(ffffe000,1)usr:/ops/program** specifies an executable image called **program** in directory **ops** located on the logical disk **usr**, the second physical disk connected to a SCSI adapter at the nonstandard base address FFFFE000; its device code (interrupt vector) is 70<sub>16</sub>. This example assumes that the device driver **sd** is present, and that it defines each parameter as described.

**BOOT (cont)** 

---

The following is the format for an expanded or nonstandard LAN boot path argument:

```
dev[@vector]([param1],[param2],[param3])
```

Where	Means
<i>dev()</i>	The name of the device driver that supports the LAN controller.
<i>[@vector]</i>	The interrupt vector number, or device code.
<i>[param1]</i>	The memory-mapped I/O address of the controller. (VME A16 address).
<i>[param2]</i>	Additional parameter, defined by the device driver, to further identify the device. (VME A32 address).
<i>[param3]</i>	Additional parameter, defined by the device driver, to fully identify the device. (Alternate Ethernet address).

For example, the default specification for the first VME Ethernet controller (jumpered according to its factory configuration) is **hken()**. To specify a *different* Hawk Interphase Ethernet LAN controller at nonstandard addresses, the device specification includes the device code (interrupt vector) and both the VME A16 and A32 address, as follows: **hken@14(fff4d000,e1400000)**.

**Examples**

1. Boot the default system boot path.

```
SCM> b )
```

2. Boot from file #0 on the first tape drive (SCSI ID#4).

```
SCM> b st(insc(),4) )
```

Default third parameter and second stage boot: specifies **st(insc(),4,0)0**

3. On a multiprocessor computer, boot from the third file on the tape in the second tape drive (SCSI ID#5).

```
Jp#0/SCM> b st(insc(),5)2 )
```

4. Boot your DG/UX operating system kernel to run level 3.

```
SCM> b sd(insc())root:/dgux -3 )
```

**BOOT (cont)**

---

5. *Using a Danish keyboard*, boot the DG/UX system from the system disk.

```
SCM> b sd)insc)=,0=rootAE-dgux.file +1 ↵
```

6. *Using a Norwegian keyboard*, boot the DG/UX system from the system disk.

```
SCM> b sd)insc)=,0=rootO-dgux.file +1 ↵
```

7. Boot AViiON System Diagnostics (the program file **diags** located in the directory called **stand** on the logical disk **usr**) from the default system disk.

```
SCM> b sd(insc(),0)usr:/stand/diags ↵
```

8. Boot any executable file called **bootfile** in the root directory on the second SCSI disk (SCSI ID#1).

```
SCM> b sd(insc(),1)root:/bootfile ↵
```

9. Boot from the first host that responds on the Ethernet LAN (your computer is connected to only one network).

```
SCM> b dgen() ↵
```

10. Boot from the host at Internet address 128.111.5.6 on the alternate Ethernet LAN (you are connected to two different LANs, one managed by an integrated and a one VME Ethernet controller).

```
SCM> b hken()128.111.5.6: ↵
```

---

## CONTINUE

Restarts a halted processor.

---

**CONTINUE** [*trace-count*]

### Description

The **CONTINUE** command resumes program execution at the address stored in the program counter (NPC) of the attached processor, for the number of instructions specified in the optional trace count argument. The NPC is CR5 (Control Register 5). When you use the command without the trace count argument, system control passes completely to the continued program.

### Arguments

[*trace-count*]

The hexadecimal number of instructions you want the program to execute. The system displays the address, data, and mnemonic (in that order) after each instruction, then halts, displays processor status information, and returns the SCM prompt.

### Related Commands

. (period)

Displays attached processor status information, including the value of the NPC.

**DISPLAY**

Shows the contents of all register files without allowing you to modify them.

**START**

Begins program execution at a specified address.

### Related Messages

None

### Examples

Resume program execution at the NPC value; leave the SCM.

```
SCM> C ↓
```



---

## FORMAT

### Displays Configuration Menus.

---

## FORMAT

### Description

The **FORMAT** command displays the “View or Change System Configuration” menu. You access all SCM menus to set configuration parameters from the View or Change System Configuration menu.

Refer to the section “Using SCM Menus” for further information about SCM menu items.

### Arguments

None

### Related Commands

**BOOT** Boots a device or displays the Change Boot Parameters menu.

### Related Messages

None

### Examples

Display the View or Change System Configuration menu.

```
SCM> F ↵
```

```
View or Change System Configuration
```

- 1 Change default system boot path
- 2 Change console parameters
- 3 Change [serial port] parameters
- 4 Change printer parameters
- 5 View system configuration
- 6 Change testing parameters
- 7 Return to previous screen

```
Enter Choice(s) ->
```

---

## HELP

**Displays available SCM commands.**

---

## HELP

### Description

Displays an alphabetical list of the minimal mnemonic for valid SCM commands, the arguments each command accepts, and a brief command description.

### Arguments

None

### Related Messages

None

### Examples

Determine valid SCM commands, their associated arguments, and what you can do with each one.

```
SCM> H ↵

*** SCM Commands - Rev xx.xx ***

.                -Display processor status
A                -Attach current job processor
B [dev([cntrl],[unit],[part])] -Boot a device
C                -Continue
D                -Display all registers
E address        -Examine/modify memory
E register       -Examine/modify R#, CR#,FCR#
F                -View/Change System Configuration
H                -Display help message
I data beg_addr end_addr      -Initialize memory range
L data [beg_addr end_addr]    -Locate data pattern
M count source_addr dest_addr -Move memory range
O [trace count]              -Single step
P [new prompt]                -Change prompt
R                              -Reset system
S address [trace count]       -Start processor
T [address] [...]             -Set breakpoint
U [breakpoint #] [...]        -Delete breakpoint
V beg_addr [end_addr]         -View memory range
W address data                 -Write to a location without read
Z                              -Start s-record loader
```

NOTE: The first command is a period; press the period key and then New Line.

---

## PROMPT

### Changes SCM prompt text prefix.

---

**PROMPT** [*new-prompt*]

### Description

The **PROMPT** command changes the default SCM prompt prefix to any specified ASCII string. This can be useful if you want to uniquely identify your workstation when you have multiple computers. The right bracket symbol ( `]` ) appears after the text prefix; if you change the prompt text to a null text string, your prompt is simply the right bracket symbol.

### Arguments

[*new-prompt*]

Text string of ASCII characters to replace the prompt. The ASCII string can have as many as 1510 characters. There are no character or symbol restrictions.

### Related Messages

Argument(s) out of range

### Examples

Display the current SCM prompt; then change it to **Station1**.

```
SCM> P ]
```

```
SCM>
```

```
SCM> P Station1 ]
```

```
Station1>
```

---

## RESET

**Restores system to powerup state.**

---

### RESET

#### Description

Initializes system hardware elements (excluding memory) to their original powerup state. Unlike a *cold reset* (power applied to the system), a *warm reset* (initiated by software, the **RESET** command, or a Reset switch) does not initialize memory or run power-up diagnostics.

*CAUTION:* Be careful not to enter **R** at the SCM prompt accidentally. You cannot use *Ctrl-C* or an *SCM* command to recover.

#### Arguments

None

#### Related Commands

**BOOT** Boots a device.

#### Related Messages

System Reset

#### Examples

Reset the system (processors, keyboard port, graphics controller, etc.).

```
SCM> R ↵  
  
PSR      XPC      DCSH      DMMU      ICSH      IMMU  
A00003F2 FFC039DE N          N          N          N
```

---

## START

**Begins job processor at specified address.**

---

**START** *address* [*trace-count*]

### Description

The **START** command begins executing a program at the main memory address specified. The operating system or user program resumes system control unless you use the *trace-count* argument.

### Arguments

*address*

Memory location at which the processor starts executing.

[*trace-count*]

The system displays the address, data, and mnemonic (in that order) after executing the hexadecimal number of instructions you specify with this argument. Then the system halts and the monitor displays status information.

### Related Commands

**BOOT**

Boots a device.

**CONTINUE**

Begins program execution at the address stored in the program counter (PC).

### Related Messages

None

### Examples

Start processor executing at address 398F0.

```
SCM> S 398F0 ↵
```

---

## ZLOADER

**Starts the s-record load utility.**

---

### ZLOADER

#### Description

The **ZLOADER** command starts a loader utility program that downloads files in Motorola s-record format (S3/S7 type) into memory from a device connected to the system console serial port. The SCM recognizes s-records only after you use the **ZLOADER** command.

An s-record is a file that contains an unlimited number of records; each record has a maximum of 256 bytes. A server machine uses s-records to download an entire file serially. The loader utility copies s-records from the serial port into system memory on the local (client) system. The SCM reads information appended to individual s-records, stores each record at locations specified in the s-record header, and then verifies checksums. Information appended to the last s-record notifies the SCM when the entire file has been sent.

For this command to function, you must configure your system to use an s-record utility and a server machine must be sending s-record files. If you are not familiar with your system's s-record loader utility, if your system is not configured to receive s-records, or if the server is not sending, press the Ctrl-C sequence to exit from the **ZLOADER** command.

**NOTE:** Your system will pause indefinitely until it receives the last s-record in a file, or until you execute a Ctrl-C command sequence to exit to the SCM prompt.

#### Arguments

None

#### Related Commands

None

#### Related Messages

DLL Started

DLL (downline loader) is an s-record load utility

DLL Done

#### Example

Execute utility program to receive s-record files from a server system.

```
SCM> Z ↵
```

End of Chapter

# Appendix C

## Technical Specifications

This appendix contains technical specifications for AViiON 410, 412, 4100, and 4300 series computer system hardware components. The base system for any of these computers consists of a desktide chassis, a system board, a Central Processing Unit (CPU) option board with two Cache Memory Management Units (CMMUs), a power subsystem, Byte Parity memory (AViiON 410, 412, and 4100 series), Error Checking and Correction (ECC) memory (AViiON 4300), an integrated Small Computer System Interface (SCSI) bus for mass storage drives, an integrated Ethernet LAN controller, and a VMEbus standard backplane.

AViiON 410 and 412 computer systems further include a monochrome or color graphics monitor, an optical mouse, a keyboard, and a graphics controller board.

**NOTE:** The configuration parameters included in this appendix apply to individual components, and do not consider all system variables. Since power, cable, and bus constraints may prohibit some configurations, you should use these specifications in conjunction with the appropriate information on planning a system in Chapters 4 and 5 of this manual.

### Physical and Environmental Specifications

This section contains physical specifications and environmental requirements for the operation and storage of AViiON desktide computer systems. These computer systems satisfy FCC Class A standards.

#### Computer Unit Dimensions and Capacity

24.75 inches (62.87 cm) high, 5.75 inches (14.61 cm) wide, 22 inches (55.88 cm) deep

#### Temperature

Operating: 50° through 100.4° Fahrenheit; 10° through 38° Celsius  
Storage: -40° through +149° Fahrenheit; -40° through +65° Celsius

#### Heat dissipation

1485 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

#### Noise

0–40 decibels (Quiet Office rating)

## System Board and System Bus Options

This section describes the contents of the AViiON 410, 412, 4100, and 4300 series system board and those *integrated* components that attach to the system bus on daughter boards.

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

### System Board

12 by 18 inches (30.48 by 45.72 cm) printed-circuit board with side panel mounting  
One NCR single-ended SCSI controller  
One AMD 802.3 Ethernet LAN controller  
One parallel printer port; Centronics LPT1 compatible  
Two asynchronous serial peripheral ports  
(RS-232 C; Data Carrier Detect jumperable)  
One mouse port (AViiON 410 and 412 support)  
One Keyboard (AViiON 410 and 412 support)

### CPU Option Board

3 x 6.4 inches, stacked on system board with one 96-pin DIN connector  
One 33-megahertz Motorola 88100 32-bit RISC microprocessor  
with integral floating-point unit  
Two Motorola 88200 cache and memory management units (CMMUs)

### Main Memory

Socket connectors for four pairs of Single In-Line Memory Modules (SIMMs)  
(4-megabyte or 16-megabyte)  
Byte-parity with single- and double-bit error detection  
ECC with single- and double-bit error detection

AViiON System	Minimum	Maximum
AViiON 410	16 megabytes	128 Mbytes
AViiON 412	16 megabytes	128 Mbytes
AViiON 4100	16 megabytes	128 Mbytes
AViiON 4120	16 megabytes	128 Mbytes
AViiON 4300	16 megabytes	128 Mbytes
AViiON 4320	32 megabytes	



### **Graphics Controller Boards (AViiON 410 and 412 Systems)**

8-bit/pixel or 24-bit/pixel color graphics controller board

Maximum of One

12.7 x 5.9 inches, stacked on system board with one 96-pin DIN connector

Three BNC color or monographic monitor connectors

8-bit color graphics controller

Sixty 256-Kbyte dual ported video RAMS

256 displayable colors (16.7 million palette combinations)

Addressable resolution: 1536 x 1024

Double buffering : 2 x 4 plane (16 colors)

24-bit color graphics controller

Fifty-six 1-Mbyte dual ported video RAMS

16.7 million displayable colors (16.7 million palette combinations)

Addressable resolution: 2048 x 1024

Double buffering: 2 x 12 plane (4096 colors)

### **Z-Buffer Controller (AViiON 410 and 412 Systems)**

24-bit Z-buffer board (slave processor to graphics controller board)

Maximum of one

3.8 x 5.9 inches, stacked on graphics controller with one 96-pin DIN connector

Selectable 16- or 24-plane Z-buffer support (256-Kbyte x 4 DRAMs)

Fixed internal 24-bit resolution

Programmable Hither and Yon clipping planes

## **VMEbus Backplane and Options**

This section describes the AViiON 410, 412, 4100, and 4300 series VMEbus backplane and the devices it supports.

### **VMEbus**

Electrically compliant with Motorola VME specification, Revision C.1

Burst block mode VMEbus transfer rate: 16 Mbytes/s

Sustained block mode VMEbus transfer rate: 9.7 Mbytes/s

Sustained nonblock (single word) mode VMEbus transfer rate: 5.1 Mbytes/s

Supports maximum of two optional 6U form factor controller or adapter boards  
(maximum subject to configuration-dependent power constraints)

### **VMEbus Option Boards**

VME Asynchronous Controller (VAC/16)

Maximum of two

Sixteen full-duplex RS-232-C lines per controller

Signals supported: CTS, DCD, DSR, DTR, RTS, RXD, TXD, GROUND

38.4-Kb/s maximum transfer rate

**VME Distributed Asynchronous Host Adapter (VDA/255)**

Maximum of one

255 asynchronous lines per VDA/255 host adapter;  
each supports devices via RG62 coaxial cable connected to  
VDC/16 and VDC/8P downloadable cluster controllers  
2.5-Mb/s transfer rate to controllers

**VME Distributed Cluster Controllers (VDC/16, VDC/8P)**

**VDC/16**

Maximum of sixteen VDC/16 per VDA/255 adapter  
Connected externally via RG62 coaxial cable  
Sixteen full-duplex RS-232-C asynchronous lines per VDC/16  
Maximum transfer rate 19.2 Kb/s per line  
Signals supported on each line:  
CTS, DCD, DSR, DTR, RTS, RXD, TXD, GROUND

**VDC/8P**

Maximum of sixteen VDC/8P per VDA/255 adapter  
Connected externally via RG62 coaxial cable  
Eight full-duplex asynchronous RS-232-C lines per controller  
Maximum transfer rate 19.2 Kb/s per line  
One Centronics parallel printer port  
Signals supported on each asynchronous line:  
CTS, DCD, DSR, DTR, RTS, RXD, TXD, GROUND

**VME LAN Controller (VLC)**

Maximum of two  
10-Mb/s transfer rate  
Supports thick and thin Ethernet coaxial cable

**VME Synchronous Controller (VSC/3)**

Maximum of 2 per system  
Three full-duplex synchronous RS-232-C lines per VSC/3  
1.6-Mb/s transfer rate per line  
Signals supported on each synchronous line:  
CTS, DCD, DSR, DTR, RTS, RXD, TXD, TX Clock, RCV Clock, RI, SI, SC

**VME Terminal Controller (VTC)**

Maximum of two  
Operates over IEEE 802.3 compliant LAN  
Supports 256 asynchronous connections

**VME Token Ring Controller (VTRC)**

Maximum of two  
IEEE 802.5 compliant  
Supports 4- and 16-Mb/s networks

## Mass Storage Options

This section lists mass storage drives supported by AViiON 410, 412, 4100, and 4300 series systems in April, 1992. Please contact your Data General representative for a complete list of currently supported drives.

### SCSI Bus

Integrated NCR 53C700 Small Computer System Interface (SCSI 1) controller

Maximum of one per system

Single-ended SCSI interface

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

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

Supports seven drives maximum (internal or external)

Maximum of four internal drives (4 half-height drive bays)

### External Subsystems

Combined Storage Subsystem 2 (CSS2/DC)

24 x 8.75 x 19 inches; stand-alone tower

10 half-height slots supporting maximum of seven 5.25-inch SCSI drives

(five full-height, seven half-height, or combination totaling seven or less)

Model 10565 Peripheral Housing Unit (PHU)

12.75 x 8 x 10 inches stand-alone box

3 half-height slots supporting maximum of three 5.25-inch SCSI drives

(three half-height, one full-height with one half-height maximum)

### Devices

1/4-inch cartridge (QIC) tape

150-Mbyte (half-height):

Read/write QIC 120 Mbytes; read-only QIC 40 and 60 Mbytes

135-Kbytes/s sustained data transfer rate

Multicapacity (half-height):

read/write QIC 150, 325, 525 Mbytes

240-Kbytes/s average data transfer rate

2-Gbyte archival cartridge tape (full-height)

246-Kbytes/s sustained data transfer rate

150 IPS

600-Mbyte read-only memory compact disk (CD-ROM) drive (half-height)

153.6-Kbytes/s sustained data transfer rate

600-Mbyte rewritable optical disk (full-height)

620-Kbytes/s user data transfer rate (drive interface 7.4-Mbytes/s)

(requires ESDI-SCSI adapter board)

Diskette drives

SA450-SCSI adapter board required

1.2-Mbyte 5.25-inch diskette (half-height)

1.44-Mbyte 3.5-inch diskette (half-height)

**3.5-inch Winchester hard disk**

520-Mbyte (full-height):

3-Mbytes/s (async) — 5.0-Mbytes/s (sync) data transfer rate

12-ms average seek

332-Mbyte (full-height):

3-Mbytes/s (async) — 5.0-Mbytes/s (sync) data transfer rate

12-ms average seek

**5.25-inch Winchester hard disks**

662-Mbyte (full-height):

1.5-Mbytes/s (async) — 4.0-Mbytes/s (sync) data transfer rate

16.5-ms average seek

1-Gbyte (full-height):

1.5-Mbytes/s (async) — 4.0-Mbytes/s (sync) data transfer rate

1.4-Gbyte (full height):

1.65-Mbytes/s (async) — 1.5-Mbytes/s (sync) data transfer rate

15-ms average seek

## Power Subsystem Specifications

This section contains specifications for the power subsystem, which includes a modular off-line switching converter and cooling fan. The power module is located on the system board; the ac power switch is located on the side of 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, +15 percent, -15 percent

Maximum current: 120 Vac 8.0 amperes  
220 Vac 5.0 amperes

Power consumption Less than 112 watts (< nnn watts initial startup peak)

### Dc power output

Output power 326 watts

37 amperes +5V dc maximum

10 amperes +12V dc maximum

1 ampere -12V dc maximum

1 ampere +9V dc maximum

### Current Requirements

Table C-1 lists devices supported by AViiON 410, 412, 4100, and 4300 series systems and the nominal values of current (in amperes) required by each device.

**Table C-1 Internal Component Current Requirements  
for AViiON 410, 412, 4100, and 4300 Series Systems**

Component Name	Model No.	Current (Amperes)		
		+5 V dc	+12 V dc	-12 V dc
System Board (without CPU option board)		14.4	0.7	0.1
CPU Option Board				
Memory SIMMs				
4-Mbyte (each, average)	7018	.1	0	0
16-Mbyte (each, average)	7019	.15	0	0
<b>410 Series Options</b>				
Graphics Boards				
8-bit		1.0	0	0
24-bit		3.0	0	0
Z-Buffer		0.5	0	0
Keyboard		0.5	0	0
Mouse		0	0.015	0.02
<b>Internal Mass-Storage Drives</b>				
150-Mbyte QIC tape	6577	1.5	1.5	0
525-Mbyte QIC tape	6677	1.5	1.5	0
2-Gbyte tape	6590	2.4	0.65	0
Digital audio tape (DAT)	6762	2.4	0.65	0
332-Mbyte disk	6662	1.0	0.75	0
520-Mbyte disk	6796	1.0	0.75	0
662-Mbyte disk	6554	2.0	4.0	0
1-Gbyte disk	6685	2.0	4.0	0
1.4-Gbyte disk	6716	0.60	1.7	0
600-Mbyte CD-ROM	6629	1.6	1.8	0
1.44-Mbyte diskette (3.5")	6563	0.51	1.0	0
1.2-Mbyte diskette(5.25")	6562	1.2	0	0
SCSI Adapter Board (required for diskette)		0.07	0	0
SCSI Terminator		0.07	0	0
<b>VMEbus Option Boards</b>				
VAC/16		4.5	.25	.25
VDA/255		5.2	0.0	.055
VLC		2.8	.45	0
VSC/3		3.4	.07	.07
VTC		3.0	0.5	0
VTRC		2.0	0	0

## Peripherals Specifications (AViiON 410 and 412 Series)

This section provides specifications for the display monitor, keyboard, and mouse included with AViiON 410 and 412 computer systems. For specifications of the internal graphics controllers and graphics performance boards in AViiON 410 and 412 computer systems, refer to the "System Board and System Bus Options" section earlier in this appendix.

### Display Monitor

This section describes the Data General Model 6486 (monochrome) and the Model 6487 (color) ultra-high resolution, 70-hertz display monitor.

**NOTE:** You can toggle the default horizontal scan rate, screen refresh rate, and pixel rates to operate with a 60-hertz monitor by using the Ctrl-V function, described in Appendix A, "Solving Powerup Problems."

#### Dimensions

19.2 inches (48.8 centimeters) high  
18.1 inches (45.9 centimeters) wide  
19.5 inches (49.4 centimeters) deep

#### Weight

62 pounds including swivel base

#### CRT

Color 21 inches (53.3 cm) *diagonal* measure  
90 degree, in-line gun  
0.31 millimeter tri-dot P22, gray glass (72%), silica-coated  
(anti-reflective panel)

Monochrome 21 inches (53.3 cm) *diagonal* measure  
90 degree, in-line gun  
L3 phosphor, chemical etch glare reduction

#### Scanning Frequency

Horizontal 75.12 kilohertz  
Vertical 70.14 hertz

#### Display resolution

Horizontal 1280 pixels (dots)  
Vertical 1024 pixels (lines)

#### Video Bandwidth

Color 110 megahertz  
Monochrome 125 megahertz

#### Linearity

+/- 7%

#### Screen refresh rate

70 hertz, flicker-free

### Misconvergence (Color)

Center 0.3 millimeter maximum  
 Corners 0.5 millimeter maximum

### Input Signal

Analog video (RS343-A) 0.7Vpp  
 Color R, G, B analog; sync on green  
 Monochrome Composite sync

### 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 milliseconds (1071 hertz)
	Front Porch	0.013 milliseconds (1 hertz)
	Sync Width	0.053 milliseconds (4 hertz)
	Back Porch	0.559 milliseconds (42 hertz)
	Blanking Time	0.626 milliseconds (47 hertz)
	Display Time	13.631 milliseconds (1024 hertz)

### Power Input

100/120 volts ac 50/60 hertz  
 220/240 volts ac 50 hertz

### Power Consumption

Color 110 watts (without DDC)  
 Monochrome 100 watts (without DDC)

### Connectors

Signal input (color) 3 BNC connectors (R, G, B)  
 Signal input (monochrome) BNC connector  
 Power input 3-pin connector, CEE-22

## Keyboard

### Type

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.

## Mouse

### Switches

Three momentary switches with tactile and audible feedback

## Technical Specifications

### **Protocol**

Compatible with EIA RS-232-C interface;  
1200-baud asynchronous serial

### **Power**

Uses power from RS-232-C interface  
Maximum current 15 milliamps  
Maximum voltage +/- 13.2 volts ac

### **Size**

Mouse      3.75 by 2.5 inches (9.5 by 5 cm)  
Pad         7.75 by 9 inches (19.7 by 22.9 cm)

### **Mechanical life**

1000 miles (621.4 km) of travel



## Integrated I/O Connections and Signals

This section lists the I/O connections and signals available on the AViiON 410, 412, 4100, and 4300 computer system and system bus daughter 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 (AViiON 4300)

Serial devices connect to the RS-232-C ports through one of two 9-pin, male D-connectors located on the back of the computer unit. Figure C-1 lists the signals and shows the pin numbers for the serial connectors.

Pin	Signal
*1	Data Carrier Detect <
2	Receive Data <
3	Transmit Data>
4	Data Terminal Ready >
5	Signal Ground
6	Data Set Ready <
7	Request to Send >
8	Clear to Send <
9	Ring Indicator <

(Male)

\*Proper terminal operation while running the DG/UX™ operating system requires the DCD signal pulled up by the presence of a system board jumper. We describe this jumper in Chapter 10.

Figure C-1 Asynchronous Serial Port (RS232A-C) Connector Signals for AViiON 4300 Systems

An adapter cable (part number 005-38420) converts signals from the 9-pin connector on the computer bulkhead to a 25-pin cable connector. Figure C-2 shows the 9- to 25-pin conversion accomplished by the asynchronous adapter cable.

Figure C-2 also shows the signal routing in the DB25-to-DB25 cables used with the adapter cable to connect modems and terminals to the AViiON 410, 412, and 4100 series computer bulkhead.

Asynchronous Adapter Cable Signal Pins		Modem Cable Signal Pins		Terminal Cable Signal Pins	
Female DB9 Connector	to Female DB25 Connector	System	to Modem	System	to Terminal
1	8	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	6	4	4	4	4
5	7	5	5	5	5
6	20	6	6	6	6
7	5	20	20	20	20
8	4	7	7	7	7
9	22	8	8	8	8

Figure C-2 Asynchronous Cable Signal Routing

### Asynchronous Serial Port Connectors (AViiON 410, 412, and 4100 Series)

Serial devices connect to the RS-232-C ports through one of two 25-pin, male D-connectors located on the back of the computer unit. Figure C-3 lists the signals and shows the pin numbers for the serial connectors.

Pin	Signal	Direction
1	Chassis Ground	Not applicable
2	RS-232-C Transmit Data	Out
3	RS-232-C Receive Data	In
4	Request to Send	Out
5	Clear to Send	In
6	Data Set Ready	In
7	Signal Ground	Both
8	Data Carrier Detect	In
9	Not used	
10	Not used	
11	Not used	
12	Not used	
13	Not used	
20	Data Terminal Ready	Out
22	Ring Indicator	In

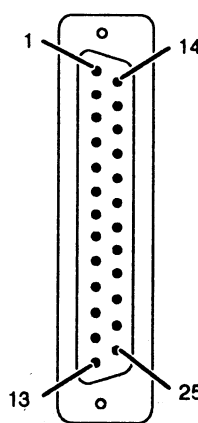


Figure C-3 Asynchronous Serial Port (RS232A-C) Connector Signals for AViiON 410, 412, and 4100 Series

## Parallel Port Connector

The I/O cable from a parallel printer connects to the system board port through a 25-pin, female D-connector located on the back of the computer system.

Figure C-4 illustrates the pin numbering and lists the signals and pin numbers for the parallel printer connector.

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)
14	Unused
15	- Fault (error)
16	- Reset
17	Unused
18-25	Ground

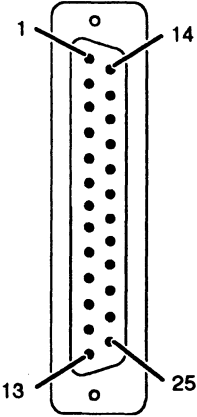


Figure C-4 Printer Connector (25-Pin)

## SCSI Bus Connector

The SCSI bus connector(s) located on the back of the AViiON 410, 412, 4100, and 4300 series computer unit support an ANSI standard single-ended SCSI interface.

Figure C-5 lists the signals and pin numbers for the single-ended SCSI connector.

Pin	Signal	Pin	Signal
1-25	Unused		
26	Data Bus 0		
27	Data Bus 1		
28	Data Bus 2		
29	Data Bus 3		
30	Data Bus 4		
31	Data Bus 5		
32	Data Bus 6		
33	Data Bus 7		
34	Data Bus P		
35	Ground		
36	Ground		
37	Ground		
38	Termination Power		
39	Ground		
40	Ground		
41	Attention		
42	Ground		
43	Busy		
44	Acknowledge		
45	Reset		
46	Message		
47	Select		
48	Control/Data		
49	Request		
50	Input/Output		

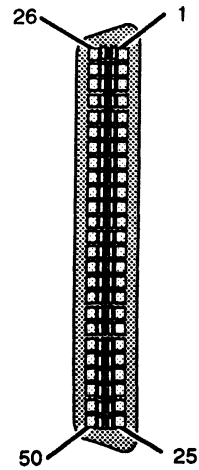


Figure C-5 SCSI Connector (50-Pin)

## LAN Connector

The LAN interface provides a female 15-pin connector for an attachment unit interface (AUI) cable. The AUI cable connects the computer system 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 LAN interface via the 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 (proposed Ethernet over twisted pair), or any other 10-MHz AUI compatible MAU or MAU-like device that does not require the Control Out signal specified in the AUI definition. Figure C-6 lists the signals and shows the pin numbers for the LAN connector.

Pin	Signal	Circuit Name
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 Connect	CO-A (Control Out A)
8	Ground	CO-S (Control Out Shield)
9	Collision -	CI-B (Control In B)
10	Transmit -	DO-B (Data Out 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)

Figure C-6 LAN Connector (15-Pin)

## Keyboard Connector (AViiON 410 and 412 Series)

The keyboard cable includes a 5-pin DIN connector that plugs into the AViiON 410 and 412 series computer system through an 8-pin DIN connector located on the left side of the computer unit. Figure C-7 lists the signals and shows the pin numbers for the keyboard and connector.

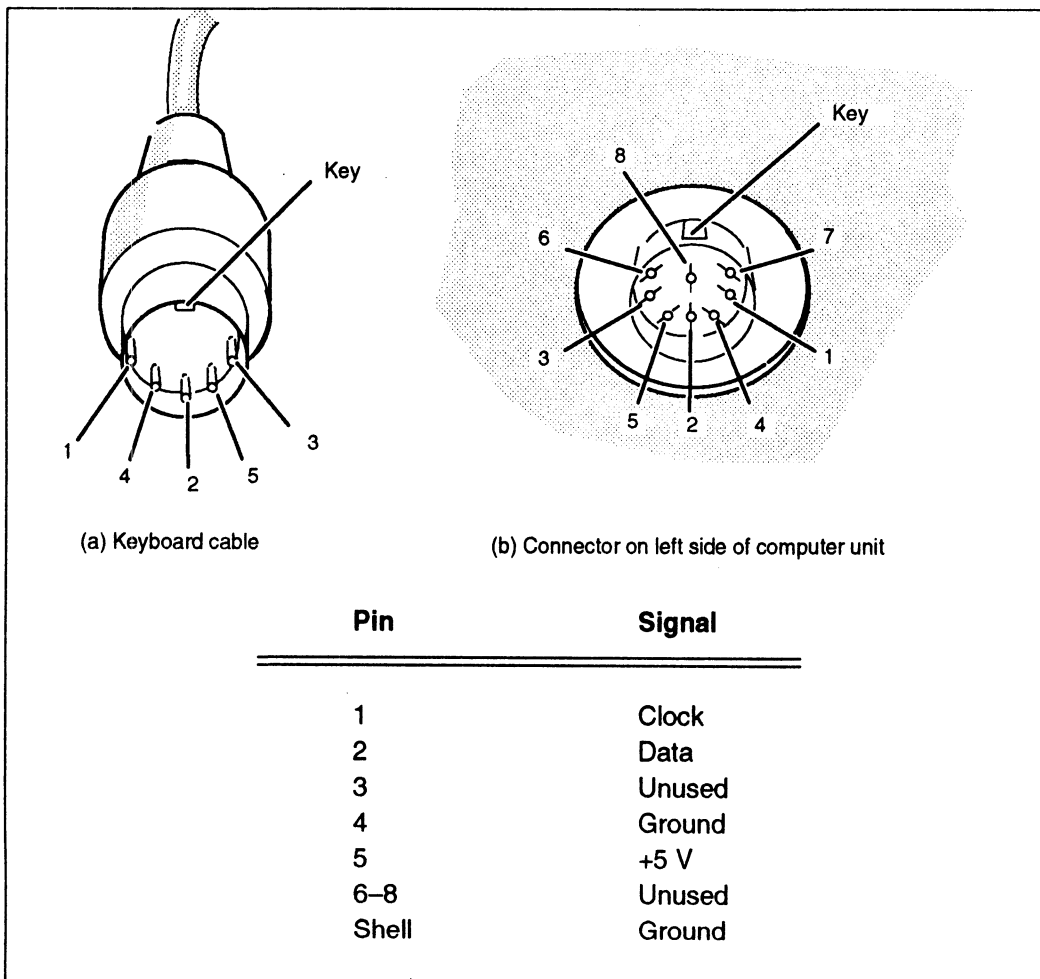


Figure C-7 Keyboard Connector and Cable Pin Numbering

## Mouse Connector (AViiON 410 and 412 Series)

The mouse cable connects to the AViiON 410 and 412 series computer system through an 8-pin DIN connector located on the right side of the computer unit. Figure C-8 lists the signals and shows the pin numbers for the connector.

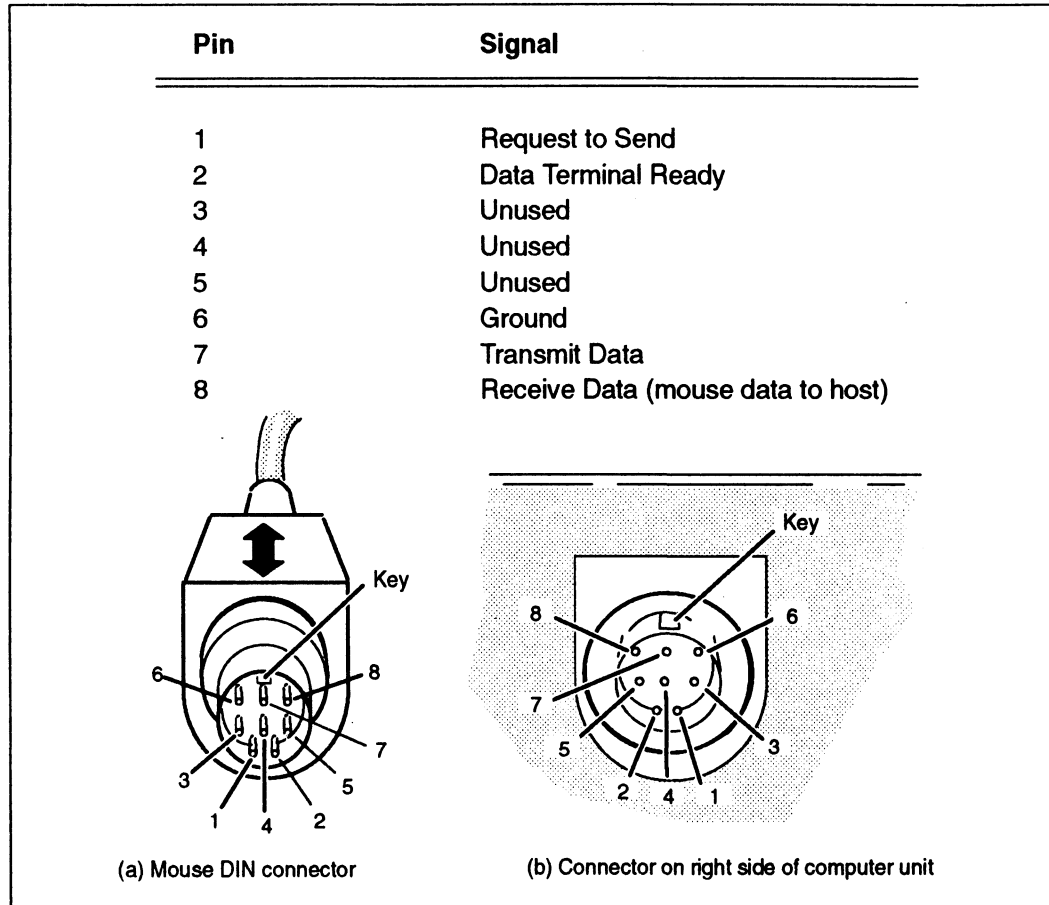


Figure C-8 Mouse DIN Connector and Cable Pin Numbering

End of Appendix





# Appendix D

## Starting Your Computer System (any preloaded DG/UX system with a release prior to 5.4)

This appendix describes a normal power-up sequence. After you install your computer system hardware (for the first time, as described in Chapter 2, or after hardware maintenance, as described in Chapter 5), follow the steps in the “Powering Up” section of this appendix to start the computer and boot your operating system.

### Starting the Computer System

Each time you apply ac power to your computer system, a series of diagnostic tests in the firmware verify that the hardware is functioning well enough to run your operating system and its applications. Appendix A describes what you can do if your computer system fails to successfully complete power-up diagnostic tests. The following sections describe how to power up your system, and describe what you should do the first time you start up your AViiON 410, 412, 4100, or 4300 series computer.

Once you install and customize your operating system, the sequence of events and displays you see after power-up testing will change; refer to your operating system documentation for information on booting software.

*CAUTION: Verify that the computer unit, monitor, peripherals, and all power cords have appropriate ac power voltage for your site as described in Chapter 2, before turning on power to your computer system.*

### Powering Up

This section describes how to power up your computer system. It is important that you turn power on to the computer unit and peripherals in the proper sequence, and that your computer system complete the power-up testing properly.

1. Turn on power to the system console. For graphics workstations, turn on power to the display monitor, as shown in Figure D-1.

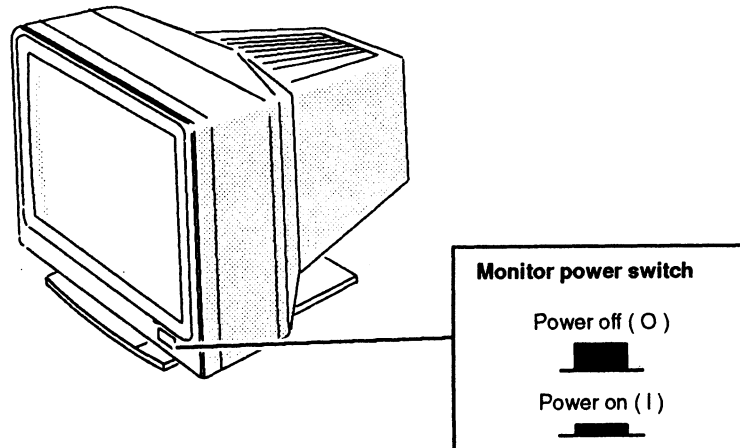


Figure D-1 Monitor Power Switch

2. If you have a Peripheral Housing Unit (PHU), a combined storage subsystem (CSS2/DC), or another external peripheral unit connected to your computer system, turn on power to that device. Figure Figure D-2 shows how to turn on power to a PHU or CSS/DC.

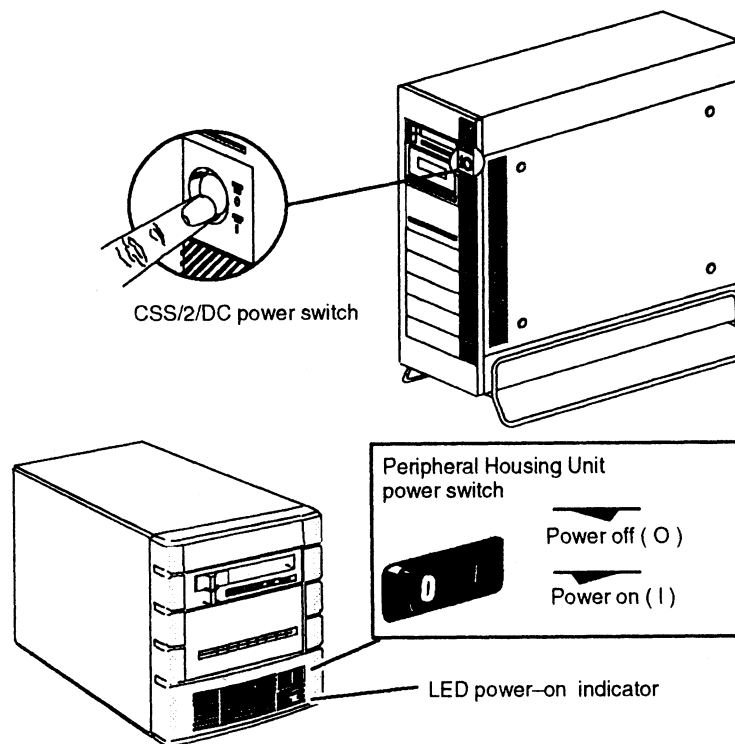


Figure D-2 Peripheral Housing Unit (PHU) and Combined Storage Subsystem Deskside Chassis (CSS2/DC) Power Switch

3. If you have a printer or other devices connected to your computer system, including those connected to VME-based controllers, turn on power and make sure that each is *on line*. For specific information, see the documentation that came with the devices.
4. Turn on power to the computer unit by pressing the computer unit's power switch as shown in Figure D-3.

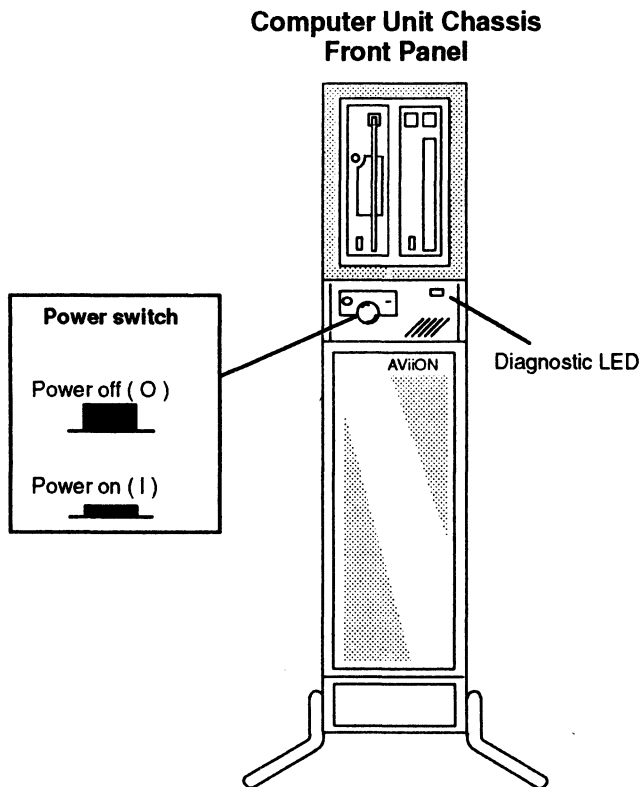
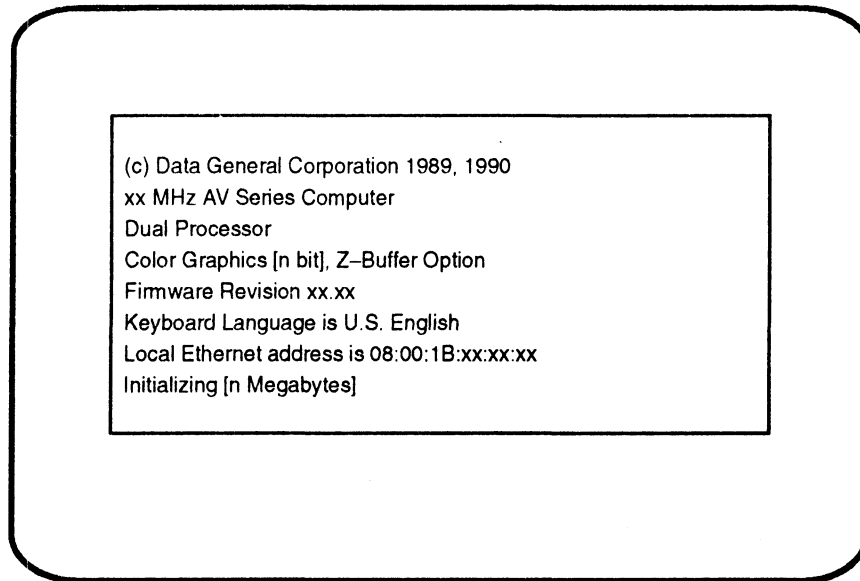


Figure D-3 Computer Unit Power Switch and LED Power-On Indicator

5. Watch the system console (or graphics display monitor on an AViiON 410 or 412 series system) carefully. You will hear beep tones from the computer unit speaker. After approximately 10 seconds, the screen displays a power-up window in the center of the screen with a black cursor in its top left corner, followed by initialization messages after another several seconds. Continue with the next step when you see text messages in the power-up window. If the console does not behave in this manner, refer to Appendix A, "Solving Power-Up Problems."

Your AViiON 410 or 412 series system should display initialization text similar to the following example:



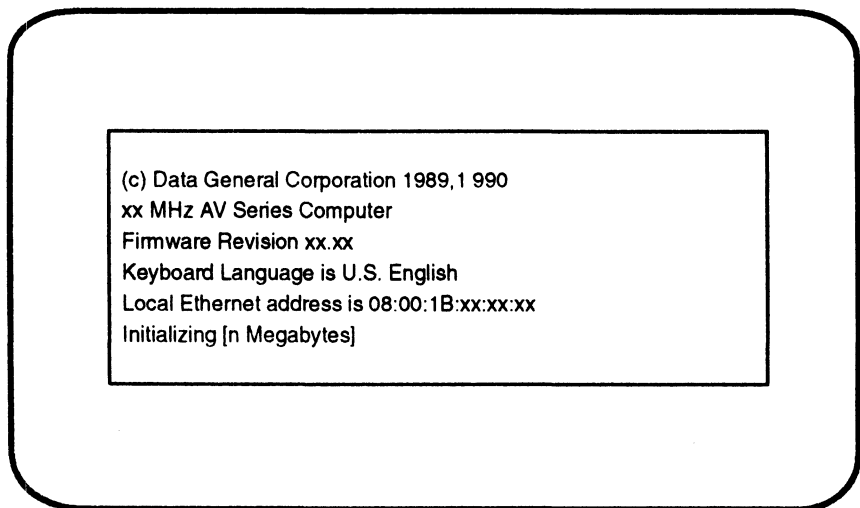
**Where**

xx MHz  
Dual Processor  
Single Processor  
n bit  
Z-Buffer Option  
n Megabytes

**Indicates**

Computer system clock speed, in megahertz  
Second CPU installed  
Second CPU option not installed  
Type of graphics board installed  
Enhanced graphics board installed  
Amount of memory installed

Your AViiON 4100 or 4300 series system should display initialization text similar to the following example:



**Where**

xx MHz  
n Megabytes

**Indicates**

Computer system clock speed, in megahertz  
Amount of memory installed

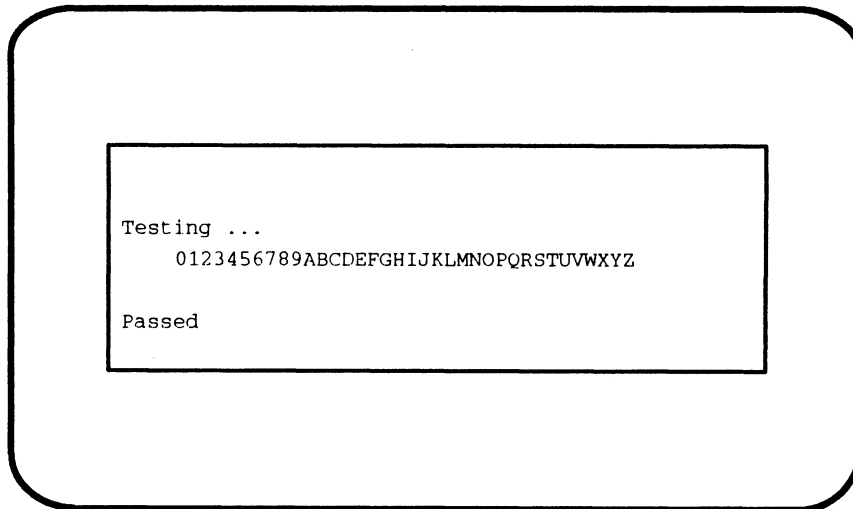
If your display does not appear as described, turn power off to the computer unit, to the graphics or nongraphics console, and to all connected peripherals; wait approximately one minute, and then repeat steps 1 through 4. If the trouble persists, refer to Appendix A, “Solving Power–Up Problems.”

6. Examine the initialization information in your power–up display carefully. Once you have verified that the information is correct, continue with the next step.

**NOTE:** Write down the computer system Ethernet address for future use. If any of the initialization messages report inaccurate information, or if your system does not find components that you ordered, contact Data General immediately.

7. After the computer system hardware is initialized, power–up tests begin. As testing progresses, each character in the alphanumeric sequence 0123...ABC...Z appears on the screen, indicating that a subtest has passed.

Make sure that power–up tests complete. Once the system displays the message *Passed*, continue to the next step. Your console screen appears as follows:



If the test messages are incomplete or include an error message, refer to Appendix A, “Solving Power–Up Problems.”

**NOTE:** If you installed add–on memory modules, the testing may halt when the “2” is displayed. Simply press the space bar to continue the self test.

8. After power–up testing is completed, your computer system tries to automatically boot the operating system. If your systems has a preloaded disk, your screen displays the name of the disk and file that your computer system is attempting to boot, as follows:

```
Booting sd (insc(),0)root:/dgux.starter (DG/UX 4.3x systems)
```

If your system does not have a preloaded disk, the `SCM>` prompt will be displayed on your system console screen.

What happens next depends on whether or not you ordered a preloaded DG/UX operating system package.

Once your firmware has successfully booted the starter system, the hardware powerup is complete and the booted operating system takes over.

**NOTE:** If you ordered a preloaded DG/UX operating system package, but the starter operating system fails to boot automatically, first refer to Appendix A, “Solving Power–Up Problems,” to verify that the trouble is not caused by the way you set up your hardware. Then try to boot DG/UX manually by typing the following command line at the SCM prompt:

```
SCM> b sd(insc(),0)root:/dgux.starter }
```

If the DG/UX starter system fails to boot again, contact Data General as described in the Preface.

The DG/UX bootstrap program displays initialization and sizing messages. It then starts the DG/UX Starter operating system. Your screen display stops for your input at the `Device Name?` prompt

**CAUTION:** *Your response to the Starter operating system Device Name? prompt is very important. Do not respond or press New Line before referring to Installing and Managing the DG/UX System.*

You will reach this point each time you power up, until you configure and build a new DG/UX kernel. Refer now to the appropriate DG/UX installation documentation as described below.

If you are unfamiliar with installing and managing the DG/UX operating system, or if you prefer a step–by–step installation approach using a standard configuration, refer to one of the following manuals:

- If your AViiON computer system will be a DG/UX server, or a client of a DG/UX server, use *Initially Installing and Setting Up the DG/UX System on AViiON Servers with Clients*.
- If your computer system will function as a traditional minicomputer supporting a multitude of asynchronous data terminal devices, use *Initially Installing and Setting Up the DG/UX System on a Multiuser AViiON Computer*.

End of Appendix

# Index

## A

- ABORT switch, 3-8
- Ac power cable, connection to power supply, 11-1, 11-6
- Adding
  - cartridge tape drives, 6-1
  - CD ROM drives, 6-1
  - CPU option board, 8-2-8-5
  - disk drives, 6-1
  - diskette drives, 6-1
  - graphics board, 8-6-8-13
  - memory modules, 7-1-7-3
  - SCSI adapter board, 6-15
  - Z-buffer board, 8-6-8-13
- Altitude parameters, C-1
- ANSI character set, B-13
- Arguments, SCM command, displaying all, B-36
- Assistance, telephone, xi
- Asynchronous devices
  - connecting, 2-14
  - port A characteristics, 2-16, 2-18
  - system console characteristics, 2-3, 2-5
- ATTACH command, B-25
- Attaching a processor, B-25
- Automatic boot, setting path, B-4-B-40
- AViiON computer system
  - powering up, 3-1, D-1
  - setting up. Chapter 2
  - shutting down, 3-7-3-9
- AViiON System Diagnostics
  - graphics tests, A-7
  - shipped with computer, 1-18

## B

- Backup devices, 1-10
- Baud rate
  - default setting, 2-16, 2-18, A-8
  - modem port, B-17

- mouse, B-18
- system console, 2-3, 2-5, B-11-B-19
- Beep codes at powerup, A-11-A-12
- Blank screen, graphics monitor, A-5, A-6
- Boards
  - CPU option
    - installing, 8-4-8-6
    - removing, 8-2-8-4
  - graphics
    - installing, 8-9-8-13
    - removing, 8-6-8-9
  - SCSI adapter board
    - adding and replacing, 6-15
    - installing, 6-17-6-19
    - removing, 6-15-6-19
  - See also* Memory modules
  - system board
    - installing, 9-5-9-10
    - removing, 9-1-9-10
  - Z-buffer
    - installing, 8-9-8-13
    - removing, 8-6-8-9
- BOOT command, 3-6, 3-9, B-26
  - examples, B-7-B-40
- Boot path
  - argument to BOOT command, B-26
  - specifying, B-4-B-40
- Booting
  - automatically, B-4
  - BOOT command, examples, B-7-B-40
  - from disk, B-6
  - from tape, B-6
  - from the default device, B-4, B-7-B-19, B-32
  - operating system, 3-9
  - over a LAN, B-7
  - SCM BOOT command, B-26
- Bootstrap process, B-5
- Bootstrap, second-stage, disk or tape, B-6
- Brackets
  - attaching to drives, 6-9-6-19
  - removing from drives, 6-6-6-19
- Brightness dial, monitor, 1-8, A-5

## C

### Cables

- color monitor, 1-17
- connection to fan assembly, 10-1, 10-5
- connection to power supply, 11-1-11-2, 11-5-11-7
- drop, for Ethernet LAN, 1-17
- Ethernet LAN, 1-17
- keyboard, 1-17
- LAN, 1-17
- modem, 1-17
- monitor, 1-17
- mouse, 1-17
- PHU, 1-17
- SCSI bus, 1-17
- SCSI bus cabling rules, 4-5-4-14
- serial printer, 1-17
- system console, 2-2, 2-3
- terminal, 1-17, 2-2, 2-3

### Calculating power requirements, 5-3-5-6

### Carriage Return key, defined, x

### Cartridge tape drives

- adding or replacing, 6-1
- attaching brackets to, 6-9-6-19
- internal, 1-3
- removing
  - brackets from, 6-6-6-19
  - drive assembly from, 6-3-6-19

### Case-sensitivity, boot paths, B-27

### CD ROM drives

- adding or replacing, 6-1
- attaching brackets to, 6-9-6-19
- internal, 1-3
- removing
  - brackets from, 6-6-6-19
  - drive assembly, 6-3-6-19

### CHAMP connector

- connecting, 4-13
- removing, 2-21

### Changing

- baud rate, mouse port, B-18
- boot parameters, B-4
- console language, B-14-B-16
- mouse parameters, B-18
- SCM prompt, B-37
- system console parameters, B-9

### Changing SCM parameters

- baud rate
  - modem port, B-17-B-18
  - system console, B-11
- character length, B-17-B-19

- console mode, B-13
- graphics monitor frequency, B-23
- modem port parameters, B-16-B-19
- system console character size, B-12

### Character code set

- default setting, 2-16, 2-18, A-8
- system console, 2-3, 2-5

### Character length, B-17-B-19

### Character set, system console. *See* Console mode

### Character size, system console, B-12

### Characteristics, default

- serial port A, 2-16, 2-18
- system console, 2-3, 2-5

### Checklist

- before installation, 1-19
- cables and cords, 1-17
- power-up problems, A-3

### Closing the computer unit, 5-13-5-17

### Code, device, VME devices, B-31

### Codes

- beep, A-11-A-12
- error, A-9

### Color monitor controls, 1-8

### Commands, SCM, B-22

### Components, basic computer system, connecting. Chapter 2

### Computer, installing, CPU option board, 8-4-8-6

### Computer system

- inspecting, 1-11
- powering up, 3-1, D-1
- starting, 3-1, D-1
- unpacking, 1-11

### Computer unit

- closing, 5-13-5-17
- installing
  - covers, 5-13-5-17
  - CPU option board to, 8-4-8-6
  - drive assembly, 6-11-6-19
  - fan assembly, 10-3-10-5
  - graphics board to, 8-9-8-13
  - memory modules to, 7-9-7-10
  - power supply, 11-3-11-7
  - PROM component on system board, 9-5-9-6
  - SCSI adapter board, 6-17-6-19
  - system board, 9-5-9-10
  - z-buffer board to, 8-9-8-13
- plugging in power cord, 5-16
- power cord, 2-22-2-23



- power switch, 3-8
- removing
  - covers, 5-10-5-13
  - CPU option board, 8-2-8-4
  - drive assembly, 6-3-6-19
  - fan assembly, 10-1-10-5
  - graphics board from, 8-6-8-9
  - memory modules, 7-7
  - power supply, 11-1-11-7
  - PROM component from system board, 9-4
  - SCSI adapter board, 6-15-6-19
  - system board, 9-1-9-10
  - Z-buffer from, 8-6-8-9
- Configuration, system, 5-3
  - restoring defaults, B-23
  - SCM menus, B-35
- Configurations
  - SCSI bus, worksheets, 4-8
  - system, C-2
- Configuring SCSI devices, 4-3-4-8
- Connecting
  - asynchronous devices, 2-14
  - CHAMP connectors, 4-13
  - components
    - cable checklist, 1-17
    - checklist before starting, 1-19
  - graphics monitor, 2-6
  - keyboard, 2-9
  - LAN transceiver cable, 2-12
  - monitor, power cord, 2-7
  - mouse, 2-10
  - printer
    - parallel, 2-19
    - serial, 2-14
  - SCSI bus, 4-1-4-2, 4-12-4-14
  - system console, 2-1, 2-3
  - terminal, 2-1, 2-3, 2-14
- Connector location, 1-5, 1-6, 1-7
  - asynchronous ports, 2-15, 2-18
  - keyboard, 2-9
  - LAN, 2-13
  - monitor, 2-8
  - mouse, 2-10
  - parallel printer, 2-19
  - RS-232-C, 2-15, 2-17
    - Port A, 2-2, 2-4
  - SCSI bus, 2-20, 4-2, 4-12
  - serial, 2-15, 2-17
  - system console, 2-2, 2-4
  - VDA/255, 2-11
- Connectors
  - keyboard, C-16
  - LAN, C-15
- location of, 1-6, 1-7
- memory module, 7-3
- mouse, C-17
- parallel printer, C-13
- SCSI bus, C-14
- serial
  - AViiON 410, 412, 4100, C-12
  - AViiON 4300, C-11
- Console mode, B-13
- Console port, SCM, 2-3, 2-5
- Console, system, x, 2-1, 2-3
  - connecting, asynchronous terminal, 2-15, 2-17
  - default character size, B-12
  - defined, B-9
  - graphics monitor frequency, B-23
  - setting parameters, B-9
- Contacting Data General, xi, 5-2
- CONTINUE command, B-34
- Contrast dial, monitor, 1-8
- Control sequence
  - Ctrl-A, B-23
  - Ctrl-C, B-23
    - to cancel ZLOADER command, B-40
  - Ctrl-Q, B-13, B-23
  - Ctrl-S, B-13, B-23
  - Ctrl-U, B-23
  - Ctrl-V, B-23
- Controller
  - as boot path parameter, B-28
  - as device parameter, B-26
  - Ethernet, I/O address, B-28
  - integrated, I/O address, B-28
  - SCSI, I/O address, B-28
- Controls
  - computer unit, 3-8
  - monitor, 1-8, A-7
- Conventions
  - ANSI character set, B-13
  - SCM command interpreter, B-22-B-23
- Conventions, manual, x
- Covers, installing on computer unit, 5-13-5-17
- CPU option board
  - adding and replacing, 8-2-8-5
  - installing, 8-4-8-6
  - location, 8-2
  - removing, 8-2-8-4
- Ctrl-I, B-23
- Current draw, 5-4-5-6
- Customer Replaceable Units (CRUs)
  - isolating a faulty part, 5-2

reading path for adding, vii–viii  
reading path for replacing, viii

## D

Danish keyboard, BOOT command, B-8,  
B-33

Danish keyboard language, B-15–B-16

Data General, contacting, xi

Default boot device, 3-9

Default characteristics  
serial port A, 2-16, 2-18  
system console, 2-3, 2-5

Degauss switch, monitor, 1-8

Demagnetizing the monitor, A-7

### Device

backup, 1-10  
booting, B-26  
examples, B-7–B-40  
connectors, 1-5, 1-6, 1-7  
default boot, 3-9  
display, 1-8  
ID, 4-3–4-8  
SCSI, defined, 1-10  
standard, defined, B-31

### Devices

internal, standard, 1-3  
SCSI, 1-10–1-19  
specifying, B-4–B-40

### DG/UX operating system

booting, 3-9  
prompt, x

Diagnostic LED, A-11

Dial, monitor brightness, 1-8, A-5

Dial, monitor contrast, 1-8

### Disconnecting

ac power cord, 2-22–2-23  
graphics monitor, 2-6  
keyboard, 2-9  
LAN, 2-12  
mouse, 2-10  
printer  
parallel, 2-19  
serial, 2-14

Disk boot, specifications, B-6

Disk drive, boot path specification, B-6

### Disk drives

adding or replacing, 6-1

attaching brackets to, 6-9–6-19  
drive assembly, removing, 6-3–6-19  
external, 1-4  
internal, 1-3  
removing, brackets from, 6-6–6-19

### Diskette drives

adding or replacing, 6-1  
attaching brackets to, 6-9–6-19  
internal, 1-3  
removing  
brackets from, 6-6–6-19  
drive assembly, 6-3–6-19

### Displaying

SCM menus, B-35  
valid SCM commands, B-36

Distortion, screen, clearing, 1-8, A-7, A-9

### Documentation

related, ix  
required for installation, 1-18–1-19

### Drive assemblies

installing, 6-11–6-19  
removing, 6-3–6-19

Drive assembly, mass–storage devices,  
6-2

### Drives

adding or replacing, 6-1  
attaching brackets to, 6-9–6-19  
external, 1-4  
removing, drive assembly, 6-3–6-19

Drives, mass–storage, 1-10

Drop cables for Ethernet LAN, 1-17

## E

Electrical requirements, C-6

Electrostatic discharge (ESD) damage,  
avoiding, 5-7–5-8

### English console language

U.S, B-15  
UK, B-15

Enter key, defined, x

Entering the SCM, B-19

Environmental requirements, C-1

Error messages, A-9

ESD. *See* Electrostatic discharge (ESD)  
damage

Ethernet devices, specifying, B-7

### Ethernet LAN

cables, 1-17

workstation address, 3-5, D-5

## Exiting

from SCM menus, B-4  
with Ctrl-C, B-23

Expansion memory. *See* Memory modules

Expansion memory board, specifications, C-2

External drives, 1-4

External options, mass-storage, 1-10

## F

### Fan assembly

cable connections, 10-1, 10-5  
installing, 10-3-10-5  
power cable, connection to power supply, 11-1, 11-6  
removing, 10-1-10-5  
replacing, 10-1

FCC Class A rating, C-1

File number argument (tape media), B-26

File number, specifying, in tape boot, B-6

File number, tape, B-30

File path, B-26

### Flow control, B-23

default setting, 2-16, 2-18, A-8  
enabling or disabling, B-13  
system console, 2-3, 2-5

FORMAT command, B-35

Fuse, tape/disk, replacing, 11-6-11-7

## G

Gathering required documentation and media, 1-18-1-19

German, console language, B-15

### Graphics board

adding or replacing, 8-6-8-13  
installing, 8-9-8-13

Graphics monitor. *See* Monitor

Gray-scale operation, 2-7, 2-8

Grounding. *See* Electrostatic discharge (ESD) damage

## H

Hangs, at powerup, A-9

HELP command, B-36

Help from Data General, xi, 5-2

Humidity parameters, C-1

## I

Identifying SCSI devices, 4-3-4-8

### Initializing

new SCM defaults, B-4  
system, B-38

Inspecting the computer system, 1-11

Installation Checklist, 1-19

Installation rules, memory modules, 7-3-7-10

### Installing

cartridge tape drives, 6-9-6-11  
components, checklist before starting, 1-19

CPU option board, 8-4-8-6

drive assembly, 6-11-6-19

fan assembly, 10-3-10-5

graphics board, 8-9-8-13

jumpers, 5-8-5-10

modem, 2-14

power supply, 11-3-11-7

printer, serial, 2-14

PROM component on system board, 9-5-9-6

SCSI adapter board, 6-17-6-19

side covers on computer unit, 5-14-5-17

system board, 9-5-9-10

system console, 2-1, 2-3

tape/disk fuse, 11-6-11-7

terminal, 2-1, 2-3, 2-14

terminator plug, 6-18-6-19

top cover on computer unit, 5-13-5-17

Z-buffer board, 8-9-8-13

Integrated devices, boot path specification, B-6

### Interface, cable connector

SCSI bus, 4-12

VDA host adapters, 2-11

Internal devices, 1-3

International keyboards, 1-18

Internet address, specifying the server's, B-30

Inventory of equipment, 1-14, 1-16  
Italian, console language, B-15

## J

Japanese, console language, B-15  
Jumpers, installing, 5-8–5-10

## K

Keyboard  
  about, 1-8  
  cable, part number, 1-17  
  connector pin numbers, C-16  
  connector signals, C-16  
  international, 1-18  
  language, displayed at powerup, 3-5, D-5  
  model number suffixes, 1-18  
  specifications, C-9  
Keyboard features  
  command interpreter, B-23  
  language, B-14–B-16

## L

LAN (local area network)  
  booting over a, B-7  
  device specifications, B-7  
  Ethernet, address displayed at powerup, 3-5, D-5  
LAN (local area network) connector  
  location, 1-5, 1-6, 1-7  
  pin numbers, C-15  
  signals, C-15  
LAN (local area network), Ethernet  
  cables, 1-17  
  connecting, 2-12  
  disconnecting, 2-12  
Language, console, B-14–B-16  
Language, keyboard, 1-18  
  changing, 2-12  
  displayed at powerup, 3-5, D-5  
LED, diagnostic, A-11  
Loading s--record files, B-40  
Locations of connectors. *See* Connector location

Logic power cable, connection to power supply, 11-2, 11-5  
LUN (logical unit number), B-29–B-40  
  boot path parameter, B-29

## M

Manual conventions, x  
Manuals, related, ix–x  
Mass–storage devices  
  external, 1-4  
  internal, 1-3  
Mass–storage options, 1-10  
Mass–storage subsystems, external  
  drives within, 1-4  
Memory  
  amount displayed at powerup, 3-5, D-5  
  configuration, B-19  
  viewing, system configuration, B-19  
Memory board, expansion, C-2  
Memory modules  
  connectors, 7-3  
  installation rules, 7-3–7-10  
  removing, 7-7–7-10  
  replacing, 7-1–7-3  
  rules for installing, 7-3–7-10  
Menus  
  Change baud rate, B-11, B-17  
  Change character size, B-12  
  Change modem port parameters, B-16  
Menus, displaying SCM, B-35  
Menus, SCM, Change character size, B-18  
Messages, error, A-9  
Mnemonics, device, B-26  
Model number suffixes, keyboard, 1-18  
Modem  
  cables, 1-17  
  connecting, 2-14  
Modem port  
  baud rate, B-17–B-18  
  default character length, B-17–B-19  
Monitor  
  brightness dial, 1-8, A-5  
  cables, 1-17  
  changing parameters, B-9  
  connecting, 2-6  
  contrast dial, 1-8  
  degauss switch, 1-8, A-7

- demagnetizing, A-7
- international models, 1-15
- power switch, 1-8
- power voltage suffix, 1-15
- technical specifications, C-8
- voltage suffixes, 1-15

Motorola s-record format, B-40

#### Keyboard

- asynchronous system console, 2-15, 2-17
- cable, plugging into the keyboard connector, 2-9
- connecting, 2-9
- connector, location on the computer unit, 2-9
- disconnecting, 2-9
- language setting in SCM, 2-12

#### Mouse

- about, 1-8
- cable, plugging into the mouse connector, 2-10
- connecting, 2-10
- connector, location on the computer unit, 2-10
- connector pin numbers, C-17
- connector signals, C-17
- disconnecting, 2-10
- technical specifications, C-9

Mouse port, changing baud rate, B-18

Multiprocessor systems, attaching processor, B-25

## N

New Line key, defined, x

Noise rating, C-1

Nonstandard devices, defined, B-31

Norwegian keyboard, BOOT command, B-8, B-33

Norwegian keyboard language, B-15-B-16

## O

Opening the computer unit, 5-10-5-13

#### Option boards

- CPU, C-2
- graphics controller, C-3
- memory, C-2
- removing, 8-6-8-9

- sized at powerup, 3-5, D-5
- VMEbus, C-3-C-5
- z-buffer controller, C-3

#### Options

- mass-storage, 1-10
- See also* Option boards

Overview information. Chapter 1.

## P

Packing slip, 1-11

Parallel printer, connector, location on the computer unit, 2-19

Parallel printer connector  
location, 1-5, 1-6, 1-7  
signals, C-13

#### Parity

- default setting, 2-16, 2-18, A-8
- memory, C-2
- modem port character length, B-17-B-19
- system console, 2-3, 2-5
- system console characters, B-12
- terminal setting, 2-3, 2-5

Part numbers, cables and cords, 1-16

Pausing screen display, B-13

Peripheral devices, 1-10

Peripheral Housing Unit (PHU), cables, 1-17

#### Pin numbers

- keyboard connector, C-16
- LAN connector, C-15
- mouse connector, C-17
- parallel printer connector, C-13
- SCSI bus connector, C-14
- serial connectors, C-11, C-12

Portuguese keyboard language, B-15-B-16

#### Power cord

- computer unit, 2-22-2-23
  - connecting, 2-22-2-23
- monitor, connecting, 2-7
- plugging into computer unit, 5-16

#### Power requirements

- calculating, 5-3-5-6
- calculation form, 5-5, 5-6

#### Power supply

- cable connections, 11-1-11-2, 11-5-11-7
- installing, 11-3-11-7

- removing, 11-1-11-7
- replacing, 11-1
- technical specifications, C-6
- voltage selection switch, setting, 11-4

Power switch, monitor, 1-8

Power voltage selection

- graphics monitor, 1-15
- power cords, 1-15

Power-up

- diagnostics
  - beep codes, A-11-A-12
  - LED display, A-11
  - passing, 3-5-3-9, D-5-D-6
- problems
  - blank monitor screen, A-5, A-6
  - error messages, A-9
  - quick checklist, A-3
  - testing with asynchronous terminal, A-8
  - sequence, 3-1, D-1

Power-up state, resuming, B-38

Powering up, 3-1, D-1

- quick checklist, A-3

Printer

- parallel
  - connecting, 2-19
  - disconnecting, 2-19
  - installing, 2-19
- serial
  - connecting, 2-14
  - disconnecting, 2-14

Problems, powerup. *See* Power-up problems

Processor

- attaching, B-25
- continuing after halt, B-34

PROM component

- installing on system board, 9-5-9-6
- removing from system board, 9-4

Prompt

- DG/UX, x
- SCM, x
  - changing, B-37
  - defined, B-19
  - entering menus from, B-1
  - multiprocessor, B-19

PROMPT command, B-37

## R

Rear panel

- AViiON 410, 1-5
- AViiON 4100, 1-6
- AViiON 412, 1-5
- AViiON 4300, 1-7

Related manuals, ix

Removing

- brackets from drives, 6-6-6-19
- CHAMP connectors, 2-21
- CPU option board, 8-2-8-4
- drive assembly, 6-3-6-19
- fan assembly, 10-1-10-5
- graphics board, 8-6-8-9
- memory modules, 7-7-7-10
- power supply, 11-1-11-7
- PROM component from system board, 9-4-9-5
- SCSI adapter board, 6-15-6-19
- side covers from computer unit, 5-10-5-12
- system board, 9-1-9-10
- tape/disk fuse, 11-6-11-7
- terminator plug, 6-18-6-19
- top cover from computer unit, 5-12-5-13
- Z-buffer board, 8-6-8-9

Replacing

- cartridge tape drives, 6-1
- CD ROM drives, 6-1
- CPU option board, 8-2-8-5
- disk drives, 6-1
- diskette drives, 6-1
- fan assembly, 10-1
- graphics board, 8-6-8-13
- memory modules, 7-1-7-3
- power supply, 11-1
- SCSI adapter board, 6-15
- system board, 9-1
- tape/disk fuse, 11-6-11-7
- Z-buffer board, 8-6-8-13

Requirements

- electrical, C-6
- environmental, C-1
- power, calculating, 5-3-5-6

RESET command, B-4, B-38

RESET switch, 3-8

Reset, system, B-4, B-38

Resetting, the computer system, 3-8

Restarting, 3-9

Restoring system configuration defaults, B-23

Resuming halted system, B-34

Return key, defined, x

RS-232-C

cable and connector specifications,

C-11, C-12

connectors, 2-15, 2-17

Port A, 2-2, 2-4

RS-422, cable and connector specifications, C-11, C-12

## S

s-record utility, B-40

SCM, A-8

BOOT command, 3-6, 3-9, D-6

default keyboard language, 2-12

defined, B-1

entering after reset, 3-8

entering at power up, 3-6

prompt, x

SCM commands

ATTACH, B-25

BOOT, B-26

examples, B-7-B-40

CONTINUE, B-34

FORMAT, B-35

HELP, B-36

PROMPT, B-37

RESET, B-4, B-38

START, B-39

summary, B-24

ZLOADER, B-40

SCM menus

Change baud rate, B-18

Change character size, B-12, B-18

Change console language, B-14-B-16

Change console parameters, B-9

Change mouse parameters, B-18

View or Change System Configuration, B-2

Screen

blank, A-5, A-6

error display, A-10

power-up messages, 3-4, D-4

Screen distortion, clearing, 1-8

SCSI

configuration rules, 4-3-4-8

device identification, 4-3-4-8

SCSI adapter board

adding and replacing, 6-15

cable connections, 6-15, 6-16, 6-17, 6-18

installing, 6-17-6-19

removing, 6-15-6-19

SCSI bus

AViiON 410, cabling rules, 4-5-4-14

AViiON 4100, cabling rules, 4-5-4-14

AViiON 412, cabling rules, 4-5-4-14

AViiON 4300, cabling rules, 4-5-4-14

cable, connecting to the computer unit, 2-20, 4-2

configuration, worksheets, 4-8

connecting, 4-1-4-2, 4-12-4-14

terminator plug, 6-18-6-19

SCSI bus connector

location, 1-5, 1-6, 1-7

pin numbers, C-14

signals, C-14

SCSI device, specifications, B-6

SCSI ID number, B-29

Serial connectors

location, 1-5, 1-6, 1-7

signals, C-11, C-12

Serial printer

cables, 1-17

connecting, 2-14

Server system, specifying Internet address, B-30

Setting up AViiON computer system. Chapter 2

Settings, default

serial port A, 2-16, 2-18

system console, 2-3, 2-5

Side covers

installing on computer unit, 5-14-5-17

removing from computer unit, 5-10-5-12

Signals

keyboard, C-16

LAN, C-15

LED, A-11

mouse, C-17

parallel printer connector, C-13

SCSI bus, C-14

serial connectors, C-11, C-12

serial ports, C-11-C-12

speaker tone, A-11-A-12

Small Computer System Interface. See SCSI

Software, system

booting, B-26

examples, B-7-B-40

- console language, B-14–B-16
- entering SCM from, B-19
- resuming, with CONTINUE command, B-34
- starting, SCM START command, B-39
- Spanish, console language, B-15
- Specifications
  - reviewing, 5-2
  - system. Appendix C
- Specifying, boot path arguments, B-4–B-40
- Standard devices, defined, B-31
- START command, B-39
- Starting processor
  - BOOT command, B-26
  - CONTINUE command, B-34
  - START command, B-39
- Starting the computer system, 3-1, D-1
  - See also* Powering up
- Static electricity, and computer damage, 5-7–5-8
- Storage peripherals, 1-10
- Suffixes, part number, 1-14, 1-16
- Swedish, console language, B-15
- Swiss, console language, B-15
- Switches
  - computer unit
    - power, 3-8
    - reset, 3-8
  - DIP, 5-9
  - monitor
    - degauss, 1-8, A-7
    - power, 1-8
    - setting, 5-9
- System board
  - cable connections, 9-2, 9-9
  - CPU option board
    - installing, 8-4–8-6
    - removing, 8-2–8-4
  - installing, 9-5–9-10
  - location, 9-1
  - memory modules, removing, 7-7–7-10
  - optional components, 1-4
  - PROM component
    - installing, 9-5–9-6
    - removing, 9-4
  - removing, 9-1–9-10
  - replacing, 9-1
- System board assembly
  - removing graphics board from, 8-6–8-9

- removing z–buffer board from, 8-6–8-9
- System board specifications, C-2
- System configurations, C-2
- System console
  - cables, 2-2, 2-3
  - connecting, 2-1, 2-3
    - asynchronous terminal, 2-15, 2-17
  - default console mode, B-13
  - default settings, 2-3, 2-5
  - defined, B-9
  - definition, x
  - requirements, x, 2-1, 2-3
- System Control Monitor (SCM). *See* SCM
- System specifications. Appendix C

## T

- Tape, specifying the file number, B-30
- Tape boot, specifications, B-6
- Tape drive, boot path specification, B-6
- Tape drives
  - adding or replacing, 6-1
  - attaching brackets to, 6-9–6-19
  - removing
    - brackets from, 6-6–6-19
    - drive assembly, 6-3–6-19
- Tape/disk power cable, connection to power supply, 11-2, 11-5
- Technical specifications, system. Appendix C
- Telephone assistance, xi
- Temperature parameters, C-1
- Terminal
  - as system console, x, 2-1, 2-3, 2-15, 2-17
  - cables, 1-17, 2-2, 2-3
  - connecting, 2-1, 2-3, 2-14
  - system console characteristics, 2-3, 2-5
  - using to test power–up diagnostics, A-8
- Terminator plug, 6-18
  - replacing, 6-18–6-19
- Test messages, powerup, 3-4, D-4
- Token ring devices, specifying, B-7
- Top cover
  - installing on computer unit, 5-13–5-14
  - removing from computer unit, 5-12–5-13



Top of memory, viewing, B-19  
Transceiver, LAN, connecting, 2-12  
Troubleshooting  
  help from Data General, 5-2  
  power-up problems. Chapter 4  
  using asynchronous terminal, A-8

## U

Unit parameter, B-26  
  boot path, B-29  
UNIX, terminal requirements, 2-1, 2-3  
Unpacking, 1-11  
  computer unit, 1-11-1-12

## V

Video parameters, C-8  
View or Change System Configuration  
  Menu, displaying, B-2  
Viewing system configuration  
  memory, B-19  
  modem port parameters, B-16-B-19  
  mouse parameters, B-18  
  system console parameters, B-9  
VMEbus, options, 1-9, C-3-C-4  
Voltage selection switch, setting, 11-4

## Z

Z-buffer board  
  adding, 8-9-8-13  
  adding or replacing, 8-6-8-13  
  installing, 8-9-8-13  
ZLOADER command, B-40



# TIPS ORDERING PROCEDURES

## TO ORDER

9. An order can be placed with the TIPS group in two 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.
  - B. Send your order form with payment to:  
Data General Corporation  
ATTN: Educational Services/TIPS G155  
4400 Computer Drive  
Westboro, MA 01581-9973
  - C. **TELEPHONE** – Call TIPS at (508) 870-1600 for all orders that will be charged by credit card or paid for by purchase orders over \$50.00. Operators are available from 8:30 AM to 5:00 PM EST.

## METHOD OF PAYMENT

10. 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. **Credit Card** – A minimum order of \$20 is required for MasterCard or Visa orders.

## SHIPPING

11. 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
1-4 Items	\$5.00
5-10 Items	\$8.00
11-40 Items	\$10.00
41-200 Items	\$30.00
Over 200 Items	\$100.00

If overnight or second day shipment is desired, this information should be indicated on the order form. A separate charge will be determined at time of shipment and added to your bill.

## VOLUME DISCOUNTS

12. The TIPS discount schedule is based upon the total value of the order.

Order Amount	Discount
\$0-\$149.99	0%
\$150-\$499.99	10%
Over \$500	20%

## TERMS AND CONDITIONS

13. Read the TIPS terms and conditions on the reverse side of the order form carefully. These must be adhered to at all times.

## DELIVERY

14. Allow at least two weeks for delivery.

## RETURNS

15. Items ordered through the TIPS catalog may not be returned for credit.  
16. Order discrepancies must be reported within 15 days of shipment date. Contact your TIPS Administrator at (508) 870-1600 to notify the TIPS department of any problems.

## INTERNATIONAL ORDERS

17. 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.



**TIPS ORDER FORM**

Mail To: Data General Corporation  
 Attn: Educational Services/TIPS G155  
 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
<input type="checkbox"/> UPS <span style="float:right">ADD</span> 1-4 Items <span style="float:right">\$5.00</span> 5-10 Items <span style="float:right">\$8.00</span> 11-40 Items <span style="float:right">\$10.00</span> 41-200 Items <span style="float:right">\$30.00</span> 200+ Items <span style="float:right">\$100.00</span>
<b>Check for faster delivery</b>
Additional charge to be determined at time of shipment and added to your bill.
<input type="checkbox"/> UPS Blue Label (2 day shipping) <input type="checkbox"/> Red Label (overnight shipping)

B VOLUME DISCOUNTS	
Order Amount	Save
\$0-\$149.99	0%
\$150-\$499.99	10%
Over \$500.00	20%

Tax Exempt # or Sales Tax (if applicable) \_\_\_\_\_

ORDER TOTAL	
Less Discount See B	-
SUB TOTAL	
Your local* sales tax	+
Shipping and handling - See A	+
TOTAL - See C	

C PAYMENT METHOD															
<input type="checkbox"/> Purchase Order Attached (\$50 minimum) P.O. number is _____ (Include hardcopy P.O.) <input type="checkbox"/> Check or Money Order Enclosed <input type="checkbox"/> Visa <input type="checkbox"/> MasterCard      (\$20 minimum on credit cards)															
Account Number	Expiration Date														
<table border="1" style="width:100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width:12.5%; height: 15px;"> </td><td style="width:12.5%; height: 15px;"> </td><td style="width:12.5%; height: 15px;"> </td><td style="width:12.5%; height: 15px;"> </td><td style="width:12.5%; height: 15px;"> </td><td style="width:12.5%; height: 15px;"> </td><td style="width:12.5%; height: 15px;"> </td><td style="width:12.5%; height: 15px;"> </td><td style="width:12.5%; height: 15px;"> </td><td style="width:12.5%; height: 15px;"> </td> </tr> </table>											<table border="1" style="width:100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width:25%; height: 15px;"> </td><td style="width:25%; height: 15px;"> </td><td style="width:25%; height: 15px;"> </td><td style="width:25%; height: 15px;"> </td> </tr> </table>				
_____ 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.

\* 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 508-870-1600.

# 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.**

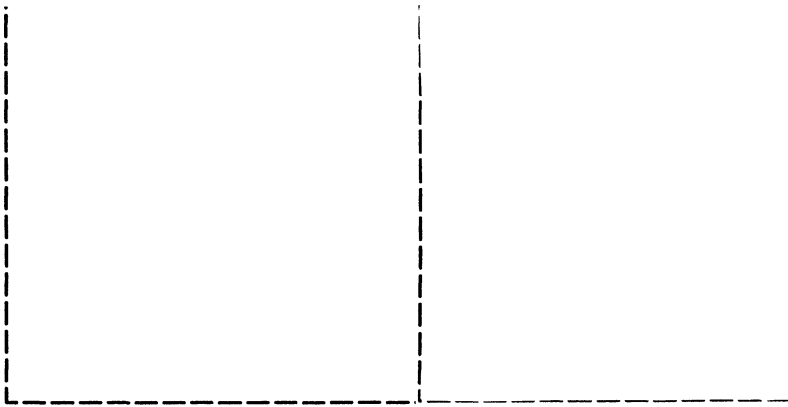
**B. ANY ACTION AGAINST DGC MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE CAUSE OF ACTION ACCRUES.**

### 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.



**Cut here and insert in binder spine pocket**

