Data General

Data General Corporation, Westboro, Massachusetts 01580

Customer Documentation

Setting Up and Installing VMEbus Options in AViiON® Systems

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AViiON®

PRODUCT LINE

Setting Up and Installing VMEbus Options in AViiON® Systems

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Notice

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A vertical bar in the margin of a page indicates substantive technical change from the previous revision. The exception is Appendix E, 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.

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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 contains information that you will need to add VMEbus-related hardware to your AViiON® system. It supplements your system's setting up, expanding, and maintaining manuals that list the VME options supported by your particular model. You should also refer to your most recent Technical Notices, software updates, and Release Notices for current information.

The first three chapters in this manual describe how to add and replace optional controllers and adapters that communicate with your system's central processing unit over a VMEbus. Chapter 4 describes how to connect devices to the VME controllers and adapters supported by Data General—most readers will need this chapter alone.

WARNING: **Unqualified personnel attempting to remove, install, or service internal components or options in AViiON 5000, 6000, 7000, and 8000 series systems risk both personal injury and damage to the system. Data General Corporation supports the maintenance and expansion of these systems by qualified Data General personnel *only*. Service by other than Data General personnel may void product warranties. For more information regarding Data General warranties, refer to your Data General sales and field engineering contracts.**

Organization of This Manual

This manual is organized as follows:

Chapter 1	Provides configuration rules and guidelines. It also describes supported boards and how to avoid electrostatic discharge (ESD) damage to your equipment. You should read this chapter carefully *before you begin* to replace or add VME options.
Chapter 2	Describes how to install and remove jumpers and change switch settings on printed circuit boards. Provides tables of settings for AViiON computer systems running the DG/UX™ operating system.
Chapter 3	Describes how to install or remove a VME board in an AViiON computer.
Chapter 4	Describes how to connect external devices such as terminals, printers, modems, and LAN transceivers to your VME controller(s).
Appendix A	Shows the pin numbers and lists the VMEbus signals for the J1 and J2 backplane connectors.

Appendix B	Provides forms for recording the computer's card cage configuration, calculating configuration power requirements, and recording device line information.
Appendix C	Provides Data General part and model numbers for cables that connect external devices to VME option boards. Describes pin assignments for option board connector signals.
Appendix D	Provides special instructions for installing and removing model-specific VME hardware. Describes how to mount VAC/16 junction boxes to an office wall or other surface, and how to attach the Model 7431 air dam to the board.
Appendix E	Provides guidelines for assigning VME data bus and interrupt priorities within the Data General AViiON systems environment. Primarily, the discussion centers around the VME Data Transfer Bus (DTB) and interrupt priority architecture and the demands that various types of VME controllers place on bus and system resources. This information is very technical and intended for properly trained users only.

Related Documents

This manual refers directly to the documentation listed in this section.

AViiON Systems Documentation

Setting Up, Starting, Expanding, and Maintaining AViiON® Computer Systems: 400, 3000, and 4000 Series (014–002083) and

Setting Up, Starting, Expanding, and Maintaining AViiON® 530 and 4600 Series Computers (014–002091)

Describe how to unpack and connect system components and optional devices. Explain how to power the computer systems up and down. Describe how to add or replace mass-storage devices, memory modules, and option boards, and how to remove and replace the power supply, fan assembly, and system board. Explain how to use the System Control Monitor (SCM) commands and menus to boot software, control the system environment, and debug programs.

Testing and Troubleshooting AViiON® Computers: AV/Alert and the AViiON® Diagnostic Tool Set (014–002183)

Describes the diagnostic features available for AViiON® computers. It provides steps necessary to enable and operate the AV/Alert system, and describes how to use the DG/UX™–based Service Manager software. The manual also describes how to use the utilities and tests available with the stand–alone AViiON System Diagnostics.

VME Options Documentation

The VMEbus Specification (Motorola document number HB212)

Defines the mechanical and electrical specifications, protocols, and terminology of the VMEbus (Versa Modula Europa bus, or Versa Module European bus).

HPS VMEbus Multiplexer (HPS–6236 / 6237) Technical Manual (014–001817)

Contains board layout and a detailed technical description of the VAC/16 asynchronous controller board.

HPS Downloadable Cluster Controller Installation Guide (014–001814)

Describes how to install the hardware of the VDA/128 and VDA/255 cluster controllers (VDC/16 and VDC/8P).

HPS Downloadable Cluster Controller Technical Manual (Model 020 VDC / 8P and VDC / 16) (014–001813)

Describes how to install, program, and operate Model 020 VDC/8P and VDC/16 cluster controllers.

Model 030 Cluster Controller Technical Manual (014–002047)

Describes how to install, program, and operate Model 030 VDC/8P and VDC/16 cluster controllers.

HPS VMEbus Host Adapters Technical Manual (014–001815)

Contains board layout and a detailed technical description of the VDA/128 asynchronous host adapter board.

VDA / 255 Host Adapter Technical Manual (014–002049)

Contains board layout and a detailed technical description of the VDA/255 asynchronous host adapter board.

Technical Notice: Setting Up and Installing VMEbus Termserver Controllers (VTC) (014–002109)

Describes how to configure the VTC board and connect it to an Ethernet IEEE 802.3 LAN.

VMEbus Termserver Controller (VTC) Hardware Technical Manual (014–002108)

Contains board layout and a detailed technical description of the Data General VMEbus Termserver Controller (VTC) board.

VMEbus Data Communications Processor (DCP-8820) Technical Manual (014–001816)

Contains board layout and a detailed technical description of the Data General VME Synchronous Controller (VSC/3) board.

Setting Up and Installing Model 7428 VME Synchronous Controllers (VSC / 3i) in AViiON® Systems (014–002151)

Describes board layout and how to configure the VME synchronous controller (VSC/3i) board.

Installing, Configuring, and Programming the Model 7430 VME SCSI-2 Adapter (VSA) in AViiON® Systems (014–002163)

Shows board layout and describes how to set jumpers on the VSA board, connect device cables, and program the board for use with the DG/UX operating system.

Technical Notice: Installing, Configuring, and Programming the Model 7430 VME SCSI-2 Adapter (VSA) in AViiON® Systems (014–002220)

Provides information update for the *Installing, Configuring, and Programming the Model 7430 VME SCSI-2 Adapter (VSA) in AViiON® Systems* manual (014–002163)

V / Ethernet 3207 Hawk Local Area Network Controller for Ethernet User's Guide (014–001818)

Contains board layout and a detailed technical description of the Data General VME LAN Controller (VLC) board.

Technical Notice: Setting Up and Installing VLCi Controllers in AViiON® Systems (014–002153)

Describes how to configure a VLCi controller for use with the DG/UX operating system and connect it to an Ethernet IEEE 802.3 LAN.

CMC–130 VMEbus LAN Controller (VLCi) Reference Guide (014–002152)

Contains illustrations, technical descriptions, and jumper locations for the VLCi controller board.

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

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

Technical Notice: Setting Up and Installing VMEbus FDDI Controllers (VFC) in AViiON® Systems (014–002155)

Contains installation and configuration information for the VME FDDI controller (VFC) board.

VMEbus FDDI Controller (VFC) User's Guide (014–002154)

Contains board layout and detailed technical description for the VFC controller.

Data General Fiber Optic Cable Plant Design and Verification Manual (014–001653).

Contains detailed descriptions of FDDI network ring topology and configuration.

Configuring the VME Token Ring Controller (VTRC) for AViiON® Systems (014–002016)

Describes jumper locations and other information you need to configure your VTRC controller to operate in an AViiON system.

DG / Token Ring Local Area Network Installation Guide (014–001730)

Explains how to install a token-ring local area network (LAN), including Trunk Access Units (TAUs), Media Access Units (MAUs), and network hardware.

DG/UX Operating System Documentation

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

Describes how to install the base DG/UX system on AViiON hardware.

Customizing the DG / UX™ System (093–701101)

Describes how to build a custom DG/UX kernel for your site. Included are descriptions of how to add user home directories, printers, terminals, additional packages, operating system clients and secondary releases.

Managing the DG / UX™ System (093–701088)

Discusses the concepts and tasks related to DG/UX system management, providing general orientation to the administrator's job as well as instructions for managing disk resources, user profiles, file systems, printers and tape drives, and other features of the system. The manual approaches system administration through the **sysadm** facility.

Reader, Please Note

In this manual, we use the term *backplane* to describe the interconnecting printed circuit board that passes bus and power signals to other boards. Some other documentation refers to the backplane as the *backpanel*.

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

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Chapter 1
Preparing to Install VME Options

This chapter contains information you should know before removing or installing any hardware equipment in your AViiON® computer system.

WARNING: **Unqualified personnel attempting to remove, install, or service internal components or options in AViiON 5000, 6000, 7000, and 8000 series systems risk both personal injury and damage to the system. Data General Corporation supports the maintenance and expansion of these systems by qualified Data General personnel *only*. Service by other than Data General personnel may void product warranties. For more information regarding Data General warranties, refer to your Data General sales and field engineering contracts.**

About the VMEbus

The circuits that make up the VME (Versa Modula Europa or Versa Module European) bus on your AViiON system can connect a variety of devices in a closely coupled hardware configuration. The bus provides data processing, data storage, and peripheral control devices with a standard interface used throughout the computer industry. Most VME printed circuit boards also conform to standard size specifications; your AViiON system uses Eurocard 6U or 9U form-factor option boards.

How to Use This Manual

The VMEbus Specification manual from Motorola Corporation and the documentation on programming your computer's system I/O (input and output) provide detailed descriptions of how the VMEbus operates. This manual describes only the minimum steps you need to perform before, during, and immediately after the addition of VME option boards to your computer system. It probably contains some information you do not need. For example, most readers setting up their AViiON systems for the first time can turn directly to Chapter 4 to connect external devices to their factory-installed VME boards. Readers adding a new VME board need to read this chapter and the sections in Chapters 2 through 4 that apply to their VME option.

To use this book effectively, you may need accompanying documentation. All the procedures in this book refer you to your computer's setting up and installing manual(s) for model-specific information. Other documents you will need depend on the task you want to complete and the option(s) you plan to install. For example, to add a VME option board to the computer, you must do the following:

1. Plan your system configuration and work site. Chapter 1 provides step-by-step instructions and worksheets to help you with this process.
2. Configure the board. Chapter 2 describes how to set jumpers and switches; it also contains tables indicating how to correctly jumper the boards *for a DG / UX™ operating system environment only.* To determine how to configure the boards for computers that do not use the DG/UX system, you must refer to the device-specific technical manuals *and* the operating system documentation.
3. Remove the air dam or cover plate covering the assigned slot in your VME card cage, and install the option board. Chapter 3 contains the hardware instructions you need for this step. To complete an installation, you must refer to your operating system documentation. In addition, for some boards you will need the appropriate communications software manuals.
4. If necessary, install backplane jumpers. Chapter 3 includes instructions on backplane jumpering. Your system's maintaining and/or expanding manuals describe how to open or remove any panels that prevent access to the rear of the VME backplane.
5. Connect your external devices to the board in the computer card cage. The instructions in Chapter 4 of this manual assume that your basic computer system is already set up, and that all of your external devices are also set up and ready for installation.
6. If you are adding a VME board to an AViiON computer currently running the DG/UX operating system, you must rebuild the operating system kernel. Refer to your DG/UX operating system documentation. If your computer does not run the DG/UX system, you must refer to the operating system documentation for your system.

Before you begin any procedure, you should read the relevant sections of this manual to determine what additional documentation you will need to complete your task. Then make certain you have all the proper manuals, updates, and Release Notices at hand.

Overview of Pre-Installation Steps

The rest of this chapter covers the following procedures, all of which you should perform before unpacking or installing a VME option board or assembly:

1. Review your system specifications to ensure hardware and software support for any planned additions to your computer system.
2. Calculate your system's power requirements to ensure that the configuration you plan doesn't exceed the limits of your power supply.
3. Assign VME card cage slots to your VME boards.
4. Prepare a safe environment for working on delicate electrical components.

The next three sections in this chapter provide rules and guidelines to help you plan and review the type, number, and arrangement of the various elements that make up your computer system. We refer to these combined factors as your system *configuration*.

The section "Avoiding ESD Damage," which concludes this chapter, describes measures you should take to avoid damaging your equipment.

Reviewing System Specifications

The installing, expanding, and maintaining manual(s) for your AViiON system, the system software documentation, the Release Notice, and any updates associated with those books contain 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 addition.

You should also 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 rules that apply to your system.

For those AViiON computer systems that use controller and adapter boards designed to the VME specification, we offer hardware and software support for the following options:

- **VME Asynchronous Controller (VAC/16)**. Each VAC/16 board in a computer system supports a maximum of sixteen asynchronous lines. External data terminal devices, such as terminals, serial printers, or modems, connect to these asynchronous lines via 8-line junction boxes mounted near your computer unit.
- **VME Distributed Asynchronous Host Adapter (VDA/128, VDA/255)**. Each VDA board in a computer system supports a maximum of 128 (VDA/128) or 255 (VDA/255) asynchronous lines. External data terminal devices, such as terminals, printers, or modems, connect to their host adapter via VDC/16 and/or VDC/8P cluster controller units mounted 1000 feet, maximum, from the AViiON computer unit.

  VDC/16 cluster controller unit — Each VDC/16 unit supplies sixteen asynchronous ports for data terminal devices.

  VDC/8P cluster controller unit — Each VDC/8P unit supplies eight asynchronous ports for data terminal devices and one Centronics parallel printer port.

  VDC/16 and VDC/8P units are linked to their host adapter and to each other via coaxial cable.
- **VME Terminal Controller (VTC)**. Each VTC in your system can support multiple asynchronous user connections over a standard Ethernet IEEE 802.3 local area network; the transceiver in the network connects to the controller board in your computer unit via a LAN drop cable.
- **VME Synchronous Controller (VSC/3)**. Each VSC/3 board in a computer system supports three synchronous RS–232–C lines; external devices connect directly to the controller board mounted in your computer unit.
- **VME Synchronous Controller (VSC/3i)**. Each VSC/3i board in a computer system supports three synchronous lines, each of which you can configure for the RS–232–C, RS–449, RS–530, X.21, or V.35 electrical interface. External devices connect directly to the controller board mounted in your computer unit.

- **VME SCSI-2 Adapter (VSA)**. Each VSA board in a computer system supports two SCSI-2 buses, each of which can be single-ended or differential. The SCSI devices connect directly to the controller board mounted in your computer unit.
- **VME LAN Controller (VLC, VLCi)**. Each VLC board in a computer system supports an Ethernet LAN; the transceiver in the network connects directly to the controller board in your computer unit.
- **VME Distributed Token Ring Controller (VTRC)**. Each VTRC board in a computer system supports an IEEE 802.5 token-ring LAN and connects to the LAN via a Trunk Access Unit, also called a Media Access Unit.
- **VME Fiber Distributed Data Interface (FDDI) Controller (VFC)**. Each VFC board in a computer system supports connection to a 100 Mb/sec fiber–optic FDDI network.

Review the configuration guidelines in your system documentation to determine which of these options your computer system supports. 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 proposed configuration 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 VME options, 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 procedure may appear complicated, but actually it requires only that you record information listed in other manuals, perform some simple arithmetic, 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 1–1 and the example of Figure 1–2 as you proceed; Appendix B contains extra forms that you can copy.

1. Refer to your computer's expanding and/or maintaining manuals for a list or table of the amperes provided by your power supply for the +5, +12, and –12 voltage sources. Enter those values as maximum amperes in the "Available" column of the Power Supply/Amperage section on your calculation form (Figure 1–1).
2. Refer to the technical specifications in your expanding and/or maintaining manuals 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: Make 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 Peripheral Housing Units do not draw current from the system power supply.

If your configuration includes devices not listed in your system documentation, refer to the device-specific technical manuals to determine *current draw* (the amount of electric current the device draws from your power supply).

If your system reads from and writes to only one memory module at a time, enter one memory module at "active" current draw and all others at the "idle" or "inactive" values listed in your computer system manual. If you have a multiple processor system that can have more than one memory module active at a time, use active values accordingly. See lines 3 and 4 in Figure 1–2 for an example.

3. Enter the current values for applicable VME option boards on your calculation form. Table 1–1 lists these values.

Table 1–1 Current Requirements for VME Option Boards

Board Name	Current (amperes)		
	+5 V dc	+12 V dc	–12 V dc
VAC/16	4.5	.25	.25
VDA/128	3.4	NA*	.17
VDA/255	5.2	0.0	.055
VFC	8.0	1.0	NA*
VLC	2.8	.45	NA*
VLCi	6.0	.5**	0.2
VSA	5.0	NA*	NA*
VSC/3	3.4	.07	.07
VSC/3i	3.5	.15	0.4
VTC	3.0	0.5	NA*
VTRC	2.0	NA*	NA*

* Not applicable

** This value includes power drawn by the transceiver on the LAN. For a VLCi controller without a transceiver, use the value .02.

4. 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 "Total Amperes Used" column of the Power Supply/Amperage section.

5. Compare the *maximum available* from step 1 with your *amperes used* totals from step 4.

If any current draw total exceeds the maximum available 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.

6. Refer to the technical specifications in the computer's installation manual to determine the output of your power supply. Enter the output value on your calculation form in the "Available" column of the Power Supply/Wattage section.

7. Multiply the number of volts from each power source (+5, +12, and –12) by the corresponding amperage totals you calculated in step 4. Enter the results on your calculation form in the "Watts Used" column of the Power Supply/Wattage section.

8. Add the wattage values for each voltage source and enter the total in the lower right corner of your form as "Total Watts Used."

9. Compare the maximum wattage supplied by your power supply (step 6) with the total watts used by all sources from step 8.

   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 1–2 shows a completed calculation form for an AViiON computer with four memory boards, a non-graphics system console, and a 330-watt power supply. Appendix B includes extra forms that you can copy.

If your proposed new configuration meets all the power requirements described in this section, you should now determine where to physically install your VME option boards. Continue with the next section to assign slots along the VMEbus to your option boards.

		Current (Amperes)		
Device		**+5 V dc**	**+12 V dc**	**–12 V dc**
0	SYSTEM BOARD			
1	*Keyboard (with graphics console only)*			
2	*Mouse (with graphics console only)*			
3	*Memory*			
4				
5	*hard disk*			
6	*hard disk*			
7	*tape drive*			
8	*VME options:*			
9	*slot 1 –*		.	.
10	*slot 2 –*		.	.
11				
12				
	Total Amperes Used			

Power Supply

Maximum Amperes Available	**Total Amperes Used (from Table above)**		
+ 5 V Total = _____ amps	____*A*		
+12 V Total = _____ amps		____*A*	
–12 V Total = _____ amps			____*A*

Wattage (volts x amperes) Available				**Watts Used**
+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 1–1 Current and Power Calculation Form

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	*4 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	*30.72*	*7.22*	*0.42*

SAMPLE

Power Supply

Maximum Amperes Available	Total Amperes Used (from Table above)		
+ 5 V Total = *37.0 amps*	*30.72* A		
+12 V Total = *10.0 amps*		*7.22* A	
–12 V Total = *1.0 amps*			0.*42* A

Maximum Wattage (volts x amperes) Available			Watts Used
+5 V wattage total	(5 V x *30.72* A)		= *152.36*
+12 V wattage total		(12 V x *7.22* A)	= *86.64* –12 V
wattage total		(12 V x *0.42* A)	= *5.04*
Maximum Power Supply Output = 330 Watts		Total Watts Used	= *244.04*

Figure 1–2 Sample Current and Power Calculation Form

Assigning Card Cage Slots

This section provides the general rules and guidelines for configuring VME option boards supported by AViiON computers. Use this information to determine the exact placement of your option(s) before jumpering and installing boards. Refer to Appendix E for a detailed technical explanation of slot priority assignments.

CAUTION: On six–slot (five user slots) AViiON systems, slot 2 (first user slot) is restricted exclusively to the use of Data General Corporation qualified VME controller boards. On these systems, the J2 connector on slot 2 has reserved areas with power and ground potentials that could cause damage to unqualified VME boards (See Table A–2, Appendix A).

On AViiON systems, the VMEbus originates on either a system board or a VME system control board, both of which include circuitry implementing and managing the entire bus. A factory-installed printed circuit board (called the VME *backplane*) extends the bus to one or more removable printed circuit boards built to VME specifications. We refer to the enclosure that holds these boards as the VME *card cage*. Figure 1–3 shows the card cage in a typical AViiON computer with connectors for two option boards.

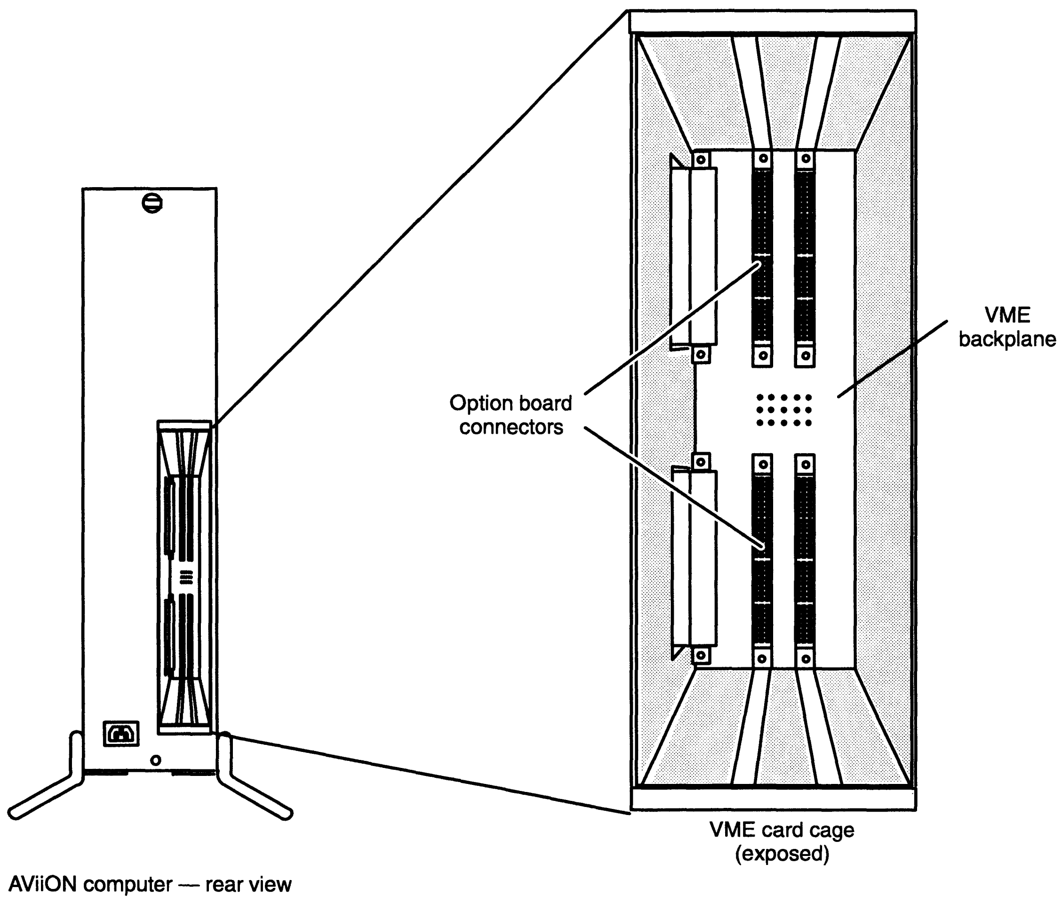


Figure 1–3 VME Card Cage

The VMEbus carries signals between the host logic board (either system board or VME system control board) and the VME controller boards in the VME card cage. On some systems, a cable with associated repeaters can extend the bus between the system's chassis, system logic chassis, and user VME card cage.

The card cage assembly provides standard P1 and P2 VMEbus signals to each set of board connectors on the backplane. Appendix A lists the connector signals on the backplane; for more information about the VMEbus specification, refer to the manual *The VMEbus Specification.* The assembly can also provide special proprietary bus signals, described in the programming system I/O documentation for your computer.

Board Slots

Figure 1–4 shows the card cage's location and board slot arrangement for a computer that supports two VME option boards. Note that on the particular AViiON system depicted, the system board occupies the first slot on the VMEbus, and resides outside the VME card cage (other AViiON systems may be configured differently).

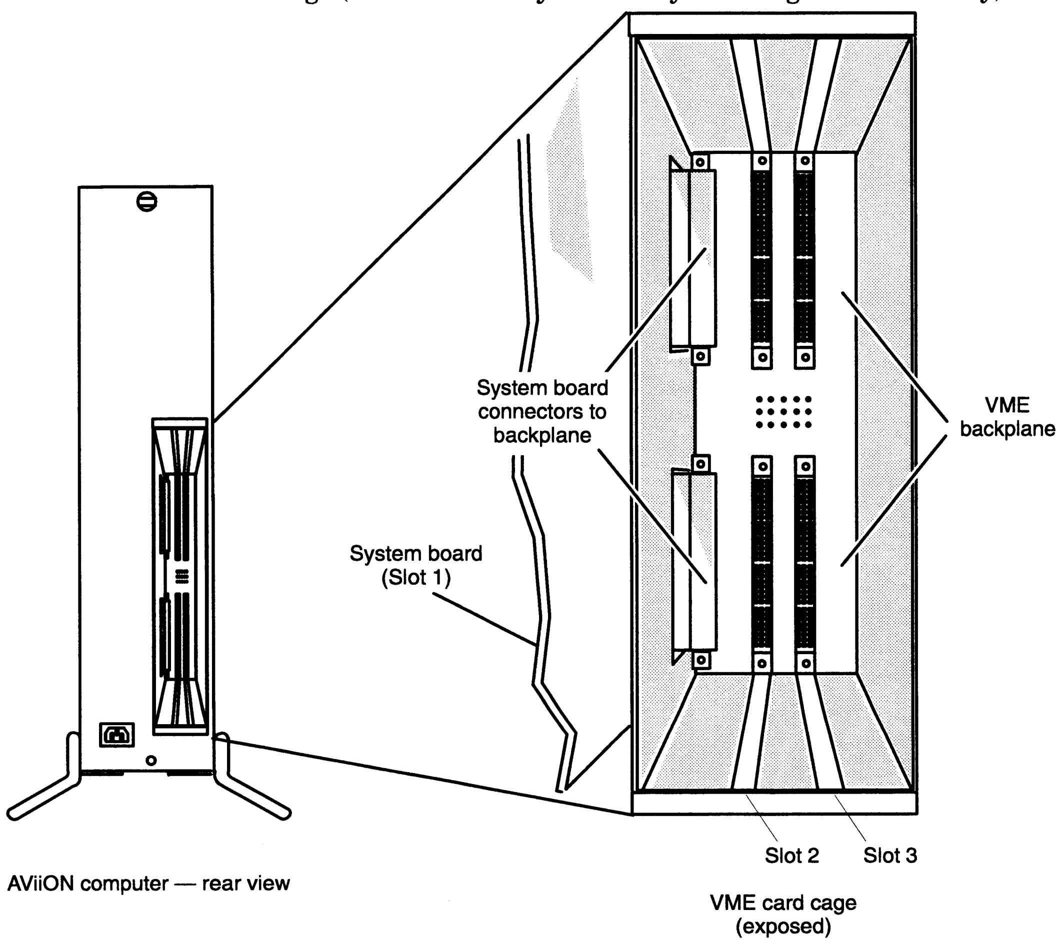


Figure 1–4 Board Slots in the VME Card Cage

Arbiter

That part of the host logic that arbitrates requests and controls traffic on the VMEbus is referred to as the arbiter. On some AViiON systems, the arbiter is part of the system board which occupies the first place, slot 1, on a VMEbus even though physically the board does not reside within the VME card cage. On other AViiON systems, the arbiter may be part of or attaches to the input/output controller (IOC) that resides either in slot 1 or some other location within the system logic area.

In cases where the arbitrating logic is not physically located within slot 1, its function is extended via repeaters and/or an interconnecting bus to the first slot of the VMEbus card cage. *This manual refers to the place occupied by the system board or bus generator / extender, as the case may be, as slot 1. Therefore, it refers to the first slot in the VME card cage (the slot closest to slot 1) as slot 2.* Slot 2 in the card cage is your first VME option board slot.

Slot Priority

Arbitration logic on the system board permits access to the VMEbus in a *daisy chain* arrangement. Requests to use the bus travel from requesting controller boards via the VME bus through intervening controllers to the arbiter, located either in slot 1 or in the system logic chassis, as the case may be. The arbiter processes the requests and grants the bus to the requestor having the highest priority.

Table 1–2 lists the VME option boards supplied and supported by Data General in the order of suggested *slot priority* for 2–slot systems. Assign your boards to the card cage slots beginning with any VTC board in slot 2 (VMEbus slot 1 is used by the system and is unavailable to the user) and ending with a VSA board in the last occupied slot. If your planned configuration includes more than one VME option of the same type — for example, a VSC/3 and a VSC/3i (both synchronous controllers), or a VDA/128 and a VAC/16 (both asynchronous controllers) — assign the first board (0) to the position of highest slot priority (slot 2). Chapter 2 describes how to identify and specify board numbers.

NOTE: The recommended slot priority shown in Table 1–2 is for 2–slot systems and assumes all VME boards are jumpered to the default interrupt and bus request values listed in Chapter 2. For information about assigning VMEbus priority levels on systems with more than two slots, refer to Appendix E of this manual and to *The VMEbus Specification* manual. Also refer to the manual on programming system I/O for your computer.

Figure 1–5 contains two slot layouts for a 2-slot computer card cage. The first is a sample configuration; use the second illustration to record your configuration for future reference. When you assign a board to a slot, write the board's name into the appropriate slot of the illustration to the right. If the slot is empty, write the word "empty" in the slot. Make certain you enter any existing boards along with the new boards in the planned configuration. Appendix B contains extra illustrations that you can copy.

Assign slots beginning with slot 2. If slot 2 is empty and slot 3 contains a VME board, you must install jumpers on the backplane; you should avoid this task if possible. Note any need for backplane jumpers, since you will need this information to finish configuring your system.

Once you have assigned the card cage slot for each VME option board, read the next section on avoiding electrostatic discharge damage before you begin to physically handle the boards or any other system components.

Table 1–2 Board Slot Priority – Two–Slot Systems*

Board Name	Priority
VTC	High
VDA/128 or VDA/255	▲
VSC/3	│
VAC/16	│
VSC/3i	│
VLC or VLCi	│
VTRC	│
VFC	▼
VSA	Low

* This table does not apply for systems with more than two VMEbus slots, refer to Appendix E for a detailed discussion of priority assignments. When boards are jumpered for the same Interrupt or Bus Request level, the board closest to the system board has the highest priority.

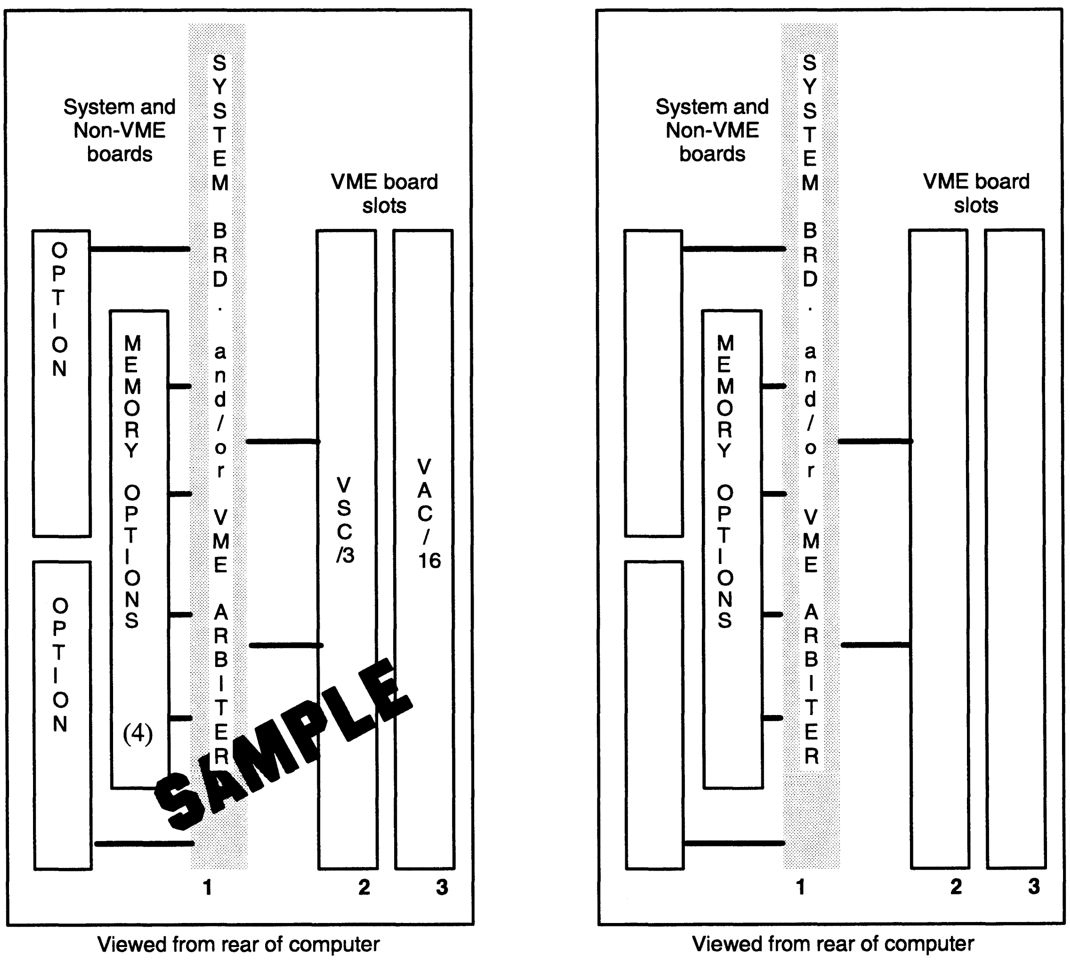


Figure 1–5 Board Slot Assignment Map

Avoiding Electrostatic Discharge (ESD) Damage

The covers, air dams, cover plates, and filler panels installed on your equipment protect the electronic circuits inside the equipment from electrostatic discharge (ESD) and other damage. When you remove these protective covers to replace or install VME options, you can inadvertently damage the sensitive electronic circuits in the equipment by simply touching them: Electrostatic charge that has accumulated on your body discharges through the circuits.

If the air in your work area is very dry, running a humidifier in the work area will help decrease the risk of ESD damage. To prevent damage to your equipment, you *must* follow the procedures below.

CAUTION: Read and understand the following instructions before you remove the cover(s) or panel(s) from your equipment, or unpack any new components.

- Provide enough room to work on the equipment. Clear the work site of any unnecessary materials or materials that naturally build up electrostatic charge, such as foam packaging, foam cups, cellophane wrappers, and similar materials.
- Do not remove replacement or upgrade subassemblies from their antistatic packaging until the exact moment that you are ready to install them.
- Gather the tools, manuals, an ESD kit, and all other materials you will need before you remove covers and panels from the equipment. Procedures for removing subassemblies usually list required materials at the beginning. After you remove a cover or panel, you should avoid moving away from the work site; otherwise, you may build up an electrostatic charge.
- Use an ESD kit when handling circuit boards or when touching the electronic circuits inside the equipment. If you don't have an ESD kit, you can order one from Data General. If an emergency arises and an ESD kit is not available, follow the procedures in the "Emergency Procedures (without an ESD kit)" section.
- Replace the cover(s) or panel(s) on the equipment as soon as possible so that the electronic circuits are protected.
- If the equipment has an opening for an optional device (such as a mass-storage drive), and the device is not installed, make sure a filler panel is installed in the opening before connecting the equipment to the ac power outlet.

Emergency Procedures (without an ESD kit)

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

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

- Before touching any electronic circuits or boards inside the equipment, firmly touch a bare (unpainted) metal surface of the equipment.
- Before removing any replacement or upgrade subassembly from its antistatic bag, place one hand firmly on an unpainted metal surface of the chassis, and at the same time, pick up the replacement or upgrade subassembly while it is still sealed in the antistatic bag. Once you have done this, *do not* move around the room or contact other furnishings, personnel, or surfaces until you have installed and *secured* the subassembly in the equipment.
- Remove the subassembly from the antistatic bag, handling printed circuit boards by the edges. Avoid touching components and circuits on a printed circuit board.
- If you must move around the room or touch other surfaces before securing the subassembly in the equipment, first place the subassembly back in the antistatic bag. When you are ready again to install the subassembly repeat these procedures.
- Order an ESD kit from Data General for the next time you need to add or remove a cover or panel.

End of Chapter

Chapter 2
Configuring VME Option Boards

Once you have thoroughly planned or reviewed your system configuration, read the appropriate sections in this chapter for instructions on how to prepare each new or replacement VME board. Be certain to read the first section, "Installing Board Jumpers and Setting Switches." You can skip sections for boards that are not in your planned configuration or for existing boards that are already properly jumpered and installed.

WARNING: **Unqualified personnel attempting to remove, install, or service internal components or options in AViiON 5000, 6000, 7000, and 8000 series systems risk both personal injury and damage to the system. Data General Corporation supports the maintenance and expansion of these systems by qualified Data General personnel *only*. Service by other than Data General personnel may void product warranties. For more information regarding Data General warranties, refer to your Data General sales and field engineering contracts.**

You *configure* an option board by setting switches and/or installing jumper plugs over exposed pins to complete specified circuits on the board. This chapter explains how to configure the following VME option boards before installing them in your computer's card cage:

- VME Asynchronous Controller (VAC/16) board
- VME Distributed Asynchronous (VDA/128) adapter board
- VME Distributed Asynchronous (VDA/255) adapter board
- VME Terminal Controller (VTC) board
- VME Synchronous Controller (VSC/3) board
- VME Synchronous Controller (VSC/3i) board
- VME SCSI-2 Adapter (VSA) board
- VME Ethernet LAN Controller (VLC) board
- VME Ethernet LAN Controller (VLCi) board
- VME Token Ring Controller (VTRC) board
- VME Fiber Distributed Data Interface (FDDI) Controller (VFC) board

NOTE: This chapter contains the minimum information needed to configure these boards for an AViiON computer system that uses the DG/UX™ operating system software. If you require more information about a specific controller board, refer to the technical manual you received with the board. See *Guide to AViiON® and DG / UX™ Documentation* for DG/UX system information.

Your operating system requires that you identify each board by *board* number. The board number is the functional position within the assigned addressing for that board type (async, sync, LAN, etc.). The board numbers must be assigned sequentially (0, 1, 2, 3, ...). For example, board 0 is the first board *of its type* in your system configuration, and board 1 is the second board *of the same type*. (Type refers to the driver being used.) The tables in this chapter indicate how to specify up to eight boards of a single type. The number of boards that you can actually configure is limited by the number of slots available in your system.

Unless previously installed in your system, the VME option board(s) you received from Data General are preconfigured for board 0 function. The tables that follow in this chapter show you how we set the jumpers and switches, and point out those you might need to change to suit your planned configuration and DG/UX revision.

NOTE: The tables list all the default jumpers and switch settings. The boards you receive will be jumpered to the default settings for board position 0 and for DG/UX revision 5.4.1 or earlier. Normally you do not need to reference the tables except to change jumpers for a different board position (the tables list all the default jumpers just in case you want to check other board jumpers). Verify that the VME controller you plan to install is jumpered appropriately for the revision of your DG/UX operating system and for the board position it is to occupy.

Installing Board Jumpers and Setting Switches

This section explains how to physically change the jumper and switch settings on printed-circuit boards. The information in this section applies to all of the individual VME option boards described in the following sections of this chapter.

Before you begin configuring a VME option board, you will need the following:

- A thorough understanding of the section “Avoiding ESD Damage” in Chapter 1.
- The device-specific technical manual for your option that shows the location of the jumpers and switches on the VME board.
- 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 2–1 shows a row of jumpered and unjumpered jumper pins.

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

To install or remove jumpers from a printed-circuit board, follow these steps *after* setting up an ESD kit:

1. Remove the controller board from its antistatic bag and place it, component-side up, on a static-free surface. Do not touch the electronic components on the board; handle printed-circuit boards by the edges only.
2. Refer to the device specific section later in this chapter for a listing of the jumper(s) you need to change. The jumper board locations are given in the associated illustrations. If you require further information on the jumper functions, refer to the manual that came with your device.
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 onto the board if you install the proper jumper in the right location.

Figure 2–1 illustrates how to install and remove jumpers from a typical row of pins.

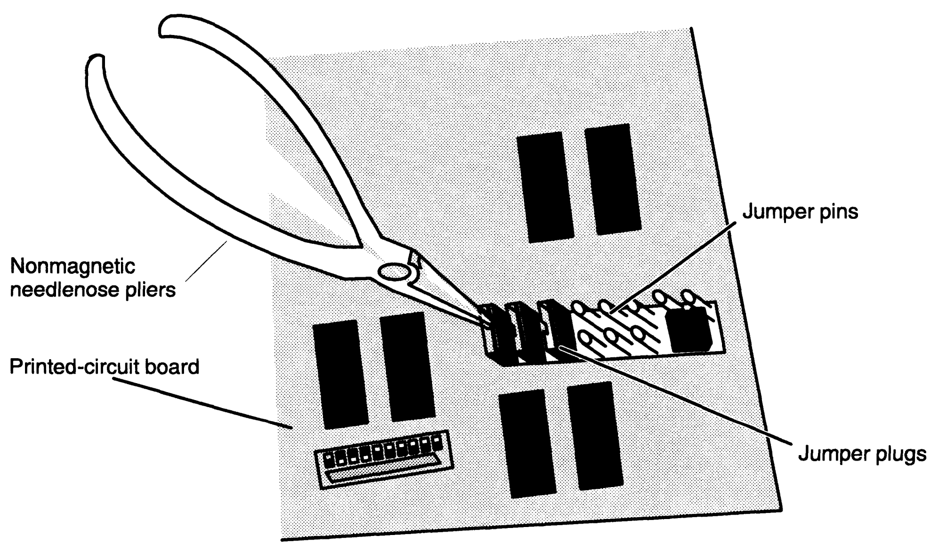


Figure 2–1 Removing or Installing Jumper Plugs

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 device 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 device-specific technical manual to determine the location and in/out position of the switches you need to change.

3. Use a nonmagnetic small-pointed device to carefully push the proper switch(es) to the in or out position, as required.

Figure 2–2 shows a typical row of DIP switches.

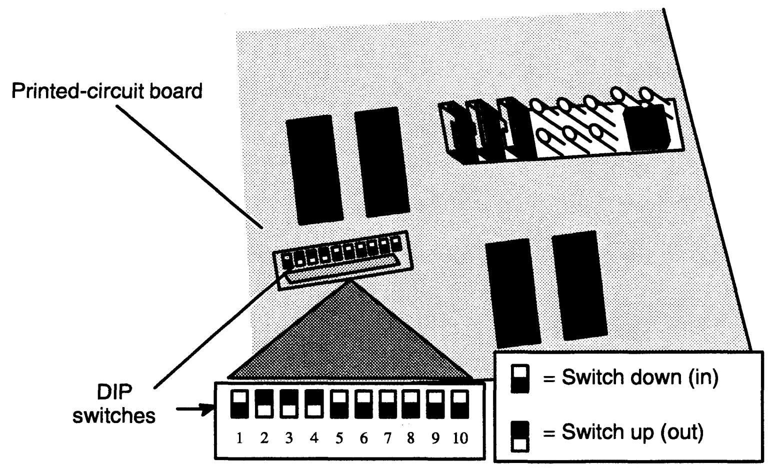


Figure 2–2 DIP Switches on Printed-Circuit Boards

Configuring Asynchronous and Terminal Controller Boards

This section describes how to configure VAC/16, VDA/128, VDA/255, and VTC boards for use in a computer that will run the DG/UX system.

Configuring Models 7400 and 7411 VME Asynchronous Controller (VAC/16) Boards

When you receive the VAC/16 board from Data General Corporation, it is factory configured for board 0 default switch and jumper settings and for DG/UX revision 5.4.1 or earlier. If the board you are installing is not the first of its type, you must reconfigure the board for the position that it is to occupy. Tables 2–1 through 2–4 provide switch settings and jumpering information. For example, to reconfigure a VAC/16 board to board 1, locate the column for board 1 in Table 2–3 or 2–4 and remove or install the jumpers as indicated in the rectangles. If your configuration includes more than one board of the same type, make sure that no two boards have the same board number.

NOTE: Since the DG/UX operating system recognizes VDA/128, VDA/255, VAC/16, and VTC boards by the same device name, **syac**, no two asynchronous controller and terminal controller boards can have the same board number. For example, do not configure both a VDA/128 and a VAC/16 board to 0; give them unique board numbers.

Figure 2–3 shows the location of the jumpers and the SW1 switch pack on the board. For further information about the board, refer to *HPS VMEbus Multiplexer (HPS-6236/6237) Technical Manual.*

NOTE: Verify that the VME controller you plan to install is jumpered appropriately for the current revision of your DG/UX operating system.

Once you have installed the board jumpers and verified the switch settings, follow the special instructions in Chapter 4 that describe connecting the VAC/16 controller to its junction box (J-box) assembly. After you connect the board and J-box(es), follow the instructions in Chapter 3 to install the VAC/16 board into the card cage.

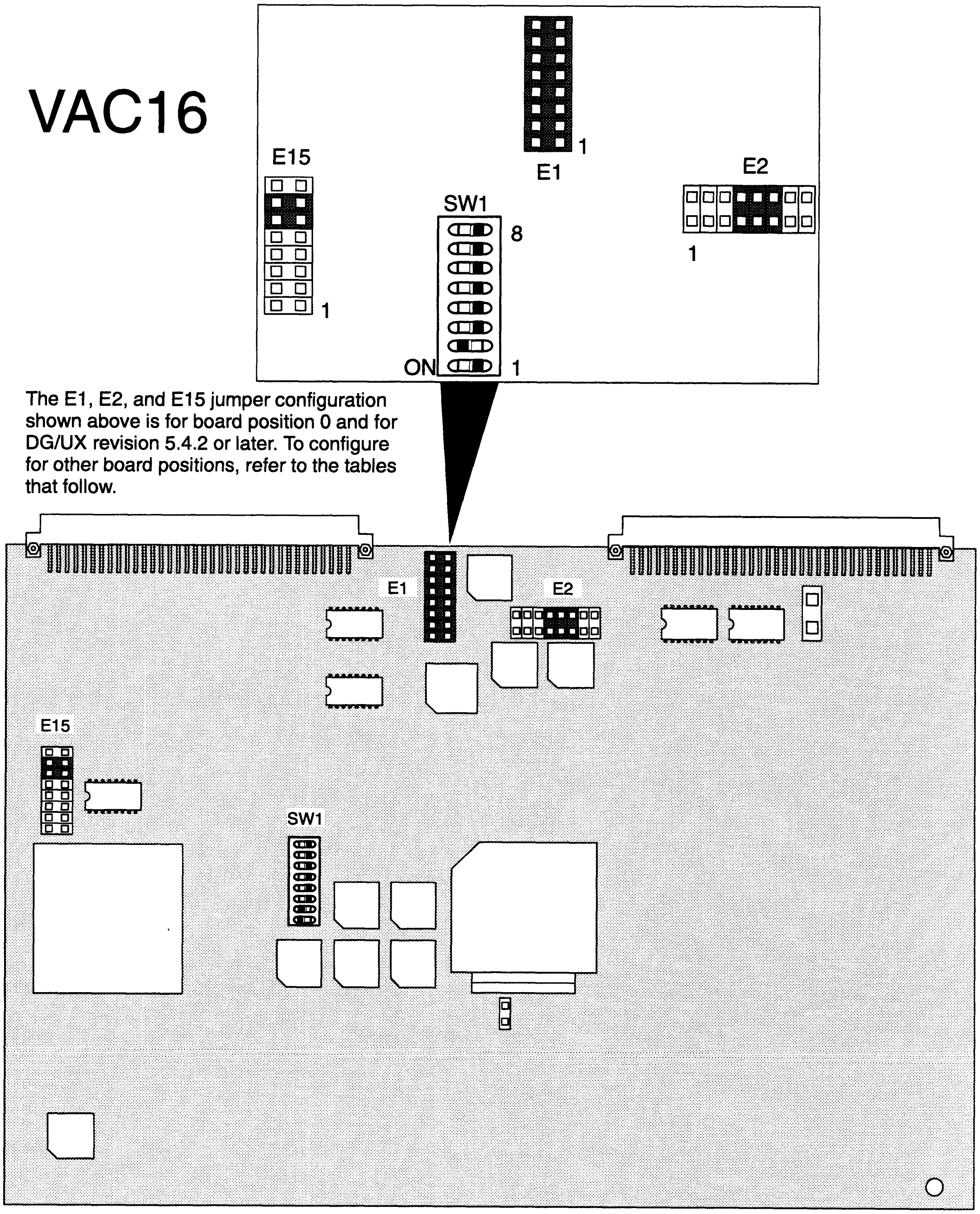


Figure 2–3 VAC/16 Board Jumper Locations

Table 2–1 SW1 Switch-Pack Settings for VAC/16 Boards (All Board Positions)

Switch	No.	Setting	Function
SW1	1	Off	Reserved
	2	On	Self test
	3	Off	Self test
	4	Off	Self test
	5	Off	Self test
	6	Off	Reserved
	7	Off	Long word transfer
	8	Off	Reserved

Table 2–2 Default Jumper Settings for VAC/16 Boards (All Board Positions)

Jumper	Pins	Status	Function
E3	1–2	Out	Interrupt request 1; see Note 1
	3–4	Out	Interrupt request 2; see Note 1
	5–6	Out	Interrupt request 3; see Note 1
	7–8	In	Interrupt request 4; see Note 1
	9–10	Out	Interrupt request 5; see Note 1
	11–12	Out	Interrupt request 6; see Note 1
	13–14	Out	Interrupt request 7; see Note 1
E4	2–3	In	BG 0 primary jumper
E5	2–3	In	BG 1 primary jumper
E6	2–3	In	BG 2 primary jumper
E7	1–2	In	BG 3 (selected level)
	3–4	In	BG 3 (selected level)
E8	1–2	Out	Bus request 0
E9	1–2	Out	Bus request 1
E10	1–2	Out	Bus request 2
E11	1–2	In	Bus request 3 (selected level)
E12	1–2	Out	Extended addressing
E13	1–2	Out	Extended addressing
E14	1–2	In	DPRAM super space
E16	2–3	In	27256 EPROMS
E17	1–2	In	Address bit A13; see Note 2
	3–4	In	Address bit A12; see Note 2
	5–6	In	Address bit A11; see Note 2
	7–8	In	Address bit A10; see Note 2
	9–10	In	Address bit A9; see Note 2
	11–12	In	Address bit A8; see Note 2
	13–14	Out	Unused
	15–16	Out	Unused

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

Note 1: These interrupt jumpers operate with E21, E22, and E23.
Note 2: These jumpers installed for convenience. They have no meaning unless E12 is in.

(Continued)

Table 2–2 Default Jumper Settings for VAC/16 Boards (All Board Positions)

Jumper	Pins	Status	Function
E18		In	Address bit A15
E19		In	DPRAM program space
E20		In	DPRAM data space
E21		Out	Interrupt acknowledge; see Note 3
E22		In	Interrupt acknowledge; see Note 3
E23		In	Interrupt acknowledge; see Note 3
E24		In	Address bit A14
E25		Out	12.5 ms RTC
E26		Out	25.0 ms RTC
E27		In	50.0 ms RTC
E28		Out	100.0 ms RTC
E29		Out	SYSFAIL
E30	2–3	In	DCD termination

Note 3: These jumpers operate with E3.

(Concluded)

Table 2–3 Default Jumper Settings, VAC/16 Boards 0 Through 7 Variations (DG/UX 5.4.2 or later)

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
E1	1–2	In	In	In	In	In	In	In	In	Address bit A23
	3–4	In	In	In	In	In	In	In	In	Address bit A22
	5–6	In	In	In	In	In	In	In	In	Address bit A21
	7–8	In	In	In	In	In	In	In	In	Address bit A20
	9–10	In	In	In	In	*Out*	*Out*	*Out*	*Out*	Address bit A19
	11–12	In	In	*Out*	*Out*	In	In	*Out*	*Out*	Address bit A18
	13–14	In	*Out*	In	*Out*	In	*Out*	In	*Out*	Address bit A17
	15–16	In	In	In	In	In	In	In	In	Address bit A16
E2	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A31
	3–4	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A30
	5–6	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A29
	7–8	In	In	In	In	In	In	In	In	Address bit A28
	9–10	In	In	In	In	In	In	In	In	Address bit A27
	11–12	In	In	In	In	In	In	In	In	Address bit A26
	13–14	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A25
	15–16	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A24
E15	1–2	Out	*In*	Out	*In*	Out	*In*	Out	*In*	Interrupt vector D0
	3–4	Out	Out	*In*	*In*	Out	Out	*In*	*In*	Interrupt vector D1
	5–6	Out	Out	Out	Out	*In*	*In*	*In*	*In*	Interrupt vector D2
	7–8	Out	Out	Out	Out	Out	Out	Out	Out	Interrupt vector D3
	9–10	Out	Out	Out	Out	Out	Out	Out	Out	Interrupt vector D4
	11–12	In	In	In	In	In	In	In	In	Interrupt vector D5
	13–14	In	In	In	In	In	In	In	In	Interrupt vector D6
	15–16	Out	Out	Out	Out	Out	Out	Out	Out	Interrupt vector D7

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
In or *Out*	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

Table 2–4 Default Jumper Settings, VAC/16 Boards 0 – 7 Address Variations (DG/UX 5.4.1 or earlier)

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
E2	1–2	In	In	In	In	In	*Out*	*Out*	*Out*	Address bit A31
	3–4	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A30
	5–6	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A29
	7–8	In	In	In	In	In	In	In	In	Address bit A28
	9–10	In	In	In	In	In	In	In	In	Address bit A27
	11–12	In	In	In	In	In	In	In	In	Address bit A26
	13–14	In	In	In	In	In	*Out*	*Out*	*Out*	Address bit A25
	15–16	In	In	In	In	In	*Out*	*Out*	*Out*	Address bit A24

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
In or *Out* (boxed)	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

NOTE:The E1 and E15 jumpers shown in the previous table also apply.

Configuring Models 7401 and 7418 VME Distributed Asynchronous (VDA/128 and VDA/255) Adapter Boards

When you receive a VDA/128 or VDA/255 board from Data General Corporation, it is factory configured for board 0 default switch and jumper settings and for DG/UX revision 5.4.1 or earlier. If the board you are installing is not the first of its type, you must reconfigure the board for the position that it is to occupy. Tables 2–5 through 2–8 provide switch settings and jumpering information for the VDA/128 board. Tables 2–9 through 2–11 provide jumpering information for the VDA/255 board. For example, to reconfigure a VDA/128 board for board 1 operation, locate the column for board 1 in Table 2–7 or 2–8 and remove or install the jumpers as indicated in the rectangles. If your configuration includes more than one board of the same type, make sure that no two boards have the same board number.

NOTE: Since the DG/UX operating system recognizes the VDA/128, the VDA/255, the VAC/16, and the VTC boards by the same device name, **syac**, no two asynchronous controller and terminal controller boards can have the same board number. For example, do not configure both a VDA/128 and a VTC to board 0; give them unique board numbers.

Figure 2–4 shows the location of the jumpers and the SW1 switch pack on the VDA/128 board. Figure 2–5 shows the location of the jumpers on the VDA/255 board. For further information about the boards, refer to *HPS VMEbus Host Adapters Technical Manual* for the VDA/128 board and to *VDA / 255 Host Adapter Technical Manual* for the VDA/255 board.

NOTE: Verify that the VME controller you plan to install is jumpered appropriately for the revision of your DG/UX operating system and for the board position it is to occupy.

Once you have installed the board jumpers, follow the directions in Chapter 3 to install the VDA/128 and/or VDA/255 board(s) in the card cage.

VDA128

The jumper configuration shown on the right is for board position 0 and for DG/UX revision 5.4.2 or later. To configure for other board positions or other revisions of the operating system, refer to the tables that follow.

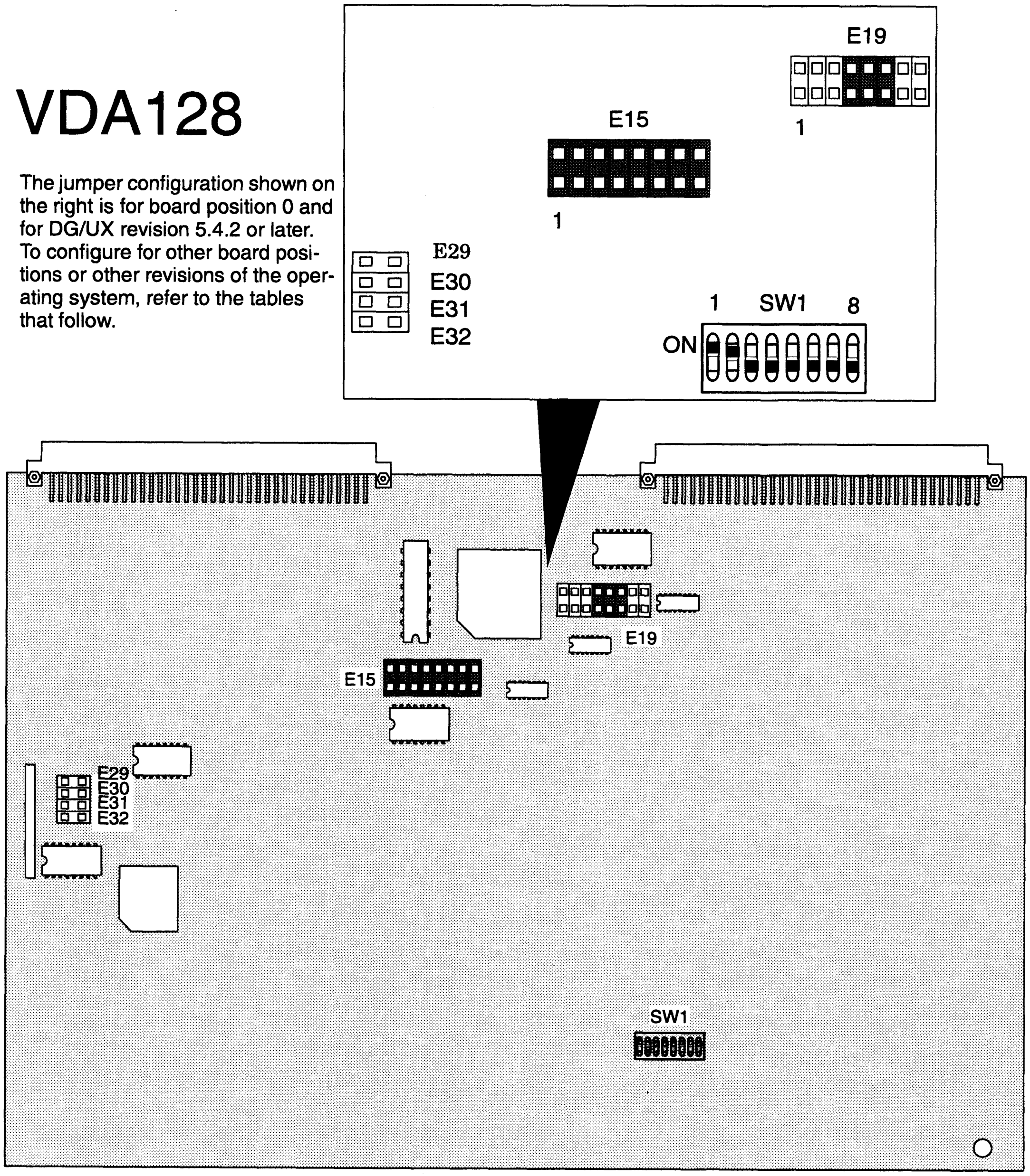


Figure 2–4 VDA/128 Board Jumper and Switch Locations

Table 2–5 SW1 Switch-Pack Settings for VDA/128 Boards (All Board Positions)

Switch	No.	Setting	Function
SW1	1	On	Reserved
	2	On	Self test
	3	Off	Self test
	4	Off	Self test
	5	Off	Self test
	6	Off	Reserved
	7	Off	Long word transfer
	8	Off	Reserved

Table 2–6 Default Jumper Settings for VDA/128 Boards (All Board Positions)

Jumper	Pins	Status	Function
E1		In	Extended address space
E2		In	Supervisor
E3		Out	DPRAM program space
E4		Out	DPRAM data space
E5		In	DPRAM program or data
E6		Out	DPRAM user space
E7		Out	Interrupt request 7
E8		Out	Interrupt request 6
E9		Out	Interrupt request 5
E10		In	Interrupt request 4 (selected)
E11		Out	Interrupt request 3
E12		Out	Interrupt request 2
E13		Out	Interrupt request 1
E14		In	Factory reserved
E33		In	Bus request Level 3 (selected)
E34		Out	Bus request Level 2
E35		Out	Bus request Level 1
E36		Out	Bus request Level 0
E37		Out	Factory reserved
E38		Out	Factory reserved
E39		Out	Factory reserved
E40		Out	P/O BG jumpering
E41		In	P/O BG jumpering
E42		In	P/O BG jumpering
E43		Out	RWD release
E44		Out	3.1 ms timeout
E45		Out	6.3 ms timeout
E46		Out	12.5 ms timeout
E47		In	25.0 ms timeout
E48		Out	12.5 ms timeout
E49		Out	25.0 ms timeout
E50		In	50.0 ms timeout
E51		Out	100.0 ms timeout
E52		Out	SYSFAIL
E53	1–2	In	Small PROMS
E54	1–2	In	Small PROMS
E55		In	Terminate coaxial cable at host adapter
E56	1–2	In	Transport node address
	3–4	In	” ” ”
	5–6	In	” ” ”
	7–8	In	” ” ”
	9–10	In	” ” ”
	11–12	In	” ” ”
	13–14	In	” ” ”
	15–16	In	” ” ”
E57		Out	BCLR signal

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

Table 2–7 Default Jumper Settings, VDA/128 Boards 0 Through 7 Variations (DG/UX 5.4.2 or later)

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
E15	1–2	In	In	In	In	In	In	In	In	Address bit A23
	3–4	In	In	In	In	In	In	In	In	Address bit A22
	5–6	In	In	In	In	In	In	In	In	Address bit A21
	7–8	In	In	In	In	In	In	In	In	Address bit A20
	9–10	In	In	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit A19
	11–12	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit A18
	13–14	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	Address bit A17
	15–16	In	In	In	In	In	In	In	In	Address bit A16
E16		In	In	In	In	In	In	In	In	Address bit A15
E17		In	In	In	In	In	In	In	In	Address bit A14
E18		In	In	In	In	In	In	In	In	Extended addressing
E19	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A31
	3–4	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A30
	5–6	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A29
	7–8	In	In	In	In	In	In	In	In	Address bit A28
	9–10	In	In	In	In	In	In	In	In	Address bit A27
	11–12	In	In	In	In	In	In	In	In	Address bit A26
	13–14	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A25
	15–16	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A24
E20		Out	Out	Out	Out	Out	Out	Out	Out	Factory reserved
E25		Out	Out	Out	Out	Out	Out	Out	Out	Status/ID bit D7
E26		In	In	In	In	In	In	In	In	Status/ID bit D6
E27		In	In	In	In	In	In	In	In	Status/ID bit D5
E28		Out	Out	Out	Out	Out	Out	Out	Out	Status/ID bit D4
E29		Out	Out	Out	Out	Out	Out	Out	$\boxed{\textit{In}}$	Status/ID bit D3
E30		Out	Out	Out	Out	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	Out	Status/ID bit D2
E31		Out	Out	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	Out	Out	$\boxed{\textit{In}}$	Out	Status/ID bit D1
E32		Out	$\boxed{\textit{In}}$	Out	$\boxed{\textit{In}}$	Out	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	Out	Status/ID bit D0

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
$\boxed{\textit{In}}$ or $\boxed{\textit{Out}}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

Table 2–8 Default Jumper Settings, VDA/128 Boards 0 – 7 Address Variations (DG/UX 5.4.1 or earlier)

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
E19	1–2	In	In	In	In	In	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	Address bit A31
	3–4	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A30
	5–6	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A29
	7–8	In	In	In	In	In	In	In	In	Address bit A28
	9–10	In	In	In	In	In	In	In	In	Address bit A27
	11–12	In	In	In	In	In	In	In	In	Address bit A26
	13–14	In	In	In	In	In	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	Address bit A25
	15–16	In	In	In	In	In	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	Address bit A24

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
$\boxed{In}$ or $\boxed{Out}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

NOTE:The E15 through E18, E20, and E25 through E32 jumpers shown in the previous table also apply.

VDA255

The jumper configuration shown on the right is for board position 0 and for DG/UX revision 5.4.2 or later. To configure for other board positions or other revisions of the operating system, refer to the tables that follow.

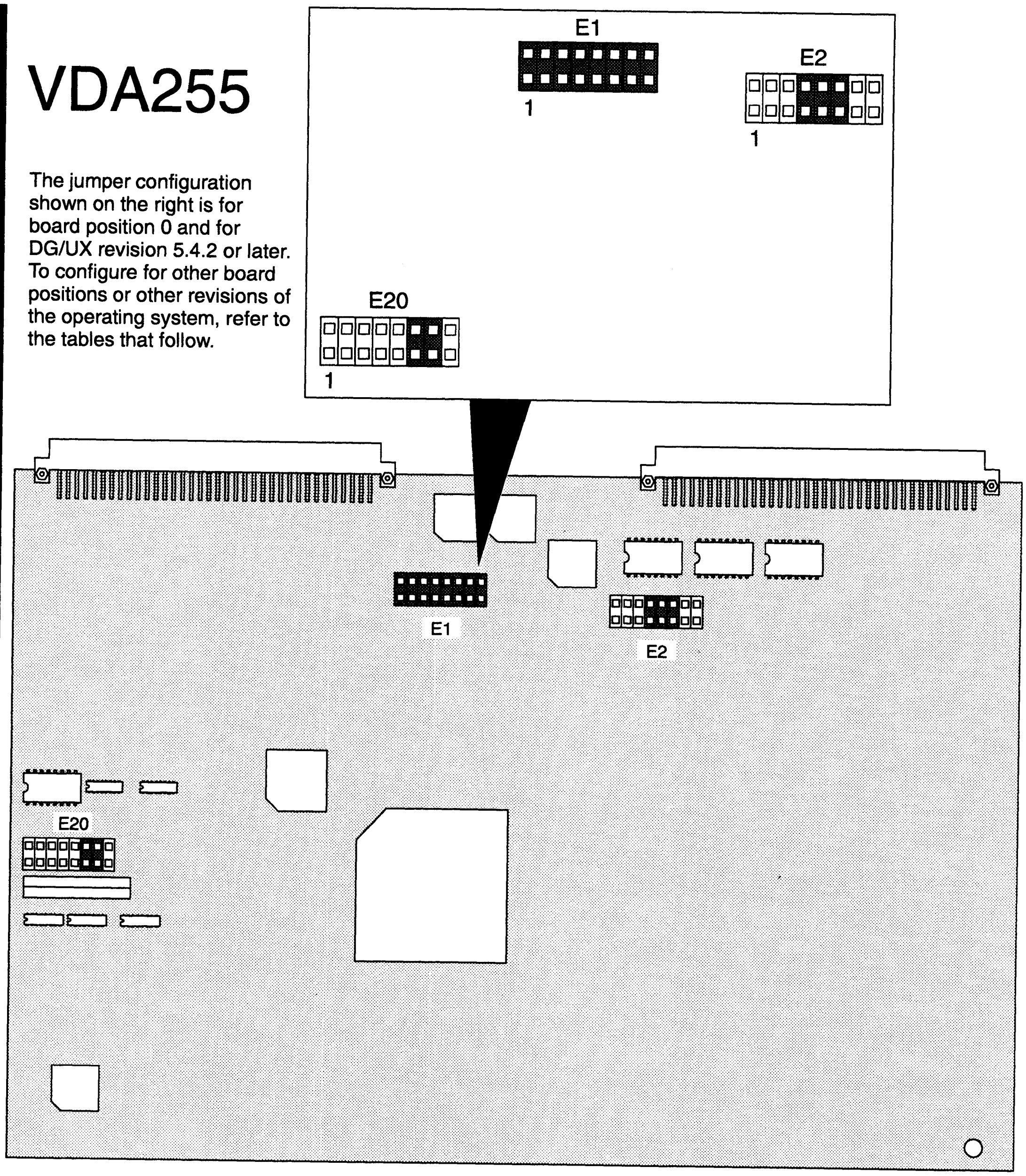


Figure 2–5 VDA/255 Board Jumper Locations

Table 2–9 Default Jumper Settings for VDA/255 Boards (All Board Positions)

Jumper	Pins	Status	Function
E3	2–3	In	Bus grant 0
E4	2–3	In	Bus grant 1
E5	2–3	In	Bus grant 2
E6	1–2	In	Bus grant 3
	3–4	In	Bus grant 3 (selected)
E7		Out	Bus request Level 0
E8		Out	Bus request Level 1
E9		Out	Bus request Level 2
E10		In	Bus request Level 3
E11	1–2	Out	Interrupt request 1
	3–4	Out	Interrupt request 2
	5–6	Out	Interrupt request 3
	7–8	In	Interrupt request 4 (selected)
	9–10	Out	Interrupt request 5
	11–12	Out	Interrupt request 6
	13–14	Out	Interrupt request 7
E12	1–2	Out	PROM size 27512
	2–3	In	PROM size 27256
E13		In	DP RAM program space
E14		In	DP RAM data space
E15		Out	DP RAM I/O space
E16		Out	DP RAM standard space
E17		In	DP RAM supervisor space
E18		In	Watchdog timer
E19		Out	SYSFAIL
E21	1–2	Out	Address bit A13
	3–4	Out	Address bit A12
	5–6	Out	Address bit A11
	7–8	Out	Address bit A10
	9–10	Out	Address bit A9
	11–12	Out	Address bit A8
	13–14	Out	Address bit A7 (unused)
	15–16	Out	Address bit A6 (unused)
E22	1–2	Out	Factory reserved
	3–4	In	No read/write test
	5–6	Out	Factory reserved
	7–8	Out	Test/clear static RAM
	9–10	Out	Clear RAMs
	11–12	Out	Factory reserved
	13–14	In	32-bit long words
	15–16	Out	Factory reserved
E23		In	Address bit A15
E24		In	Address bit A14
E25		Out	Interrupt acknowledge
E26		In	Interrupt acknowledge
E27		In	Interrupt acknowledge
E28		Out	12.5 ms timeout
E29		Out	25.0 ms timeout
E30		In	50.0 ms timeout
E31		Out	100.0 ms timeout

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

(Continued)

Table 2–9 Default Jumper Settings for VDA/255 Boards (All Board Positions)

Jumper	Pins	Status	Function
E32	1–2	In	Transport node add bit 7
	3–4	In	Transport node add bit 6
	5–6	In	Transport node add bit 5
	7–8	In	Transport node add bit 4
	9–10	In	Transport node add bit 3
	11–12	In	Transport node add bit 2
	13–14	In	Transport node add bit 1
	15–16	In	Transport node add bit 0
E33		In	Terminate coaxial cable at host adapter

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

(Concluded)

Table 2–10 Default Jumper Settings for VDA/255 Boards 0 Through 7 Variations (DG/UX 5.4.2 or later)

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
E1	1–2	In	In	In	In	In	In	In	In	Address bit A23
	3–4	In	In	In	In	In	In	In	In	Address bit A22
	5–6	In	In	In	In	In	In	In	In	Address bit A21
	7–8	In	In	In	In	In	In	In	In	Address bit A20
	9–10	In	In	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit A19
	11–12	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit A18
	13–14	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	Address bit A17
	15–16	In	In	In	In	In	In	In	In	Address bit A16
E2	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A31
	3–4	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A30
	5–6	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A29
	7–8	In	In	In	In	In	In	In	In	Address bit A28
	9–10	In	In	In	In	In	In	In	In	Address bit A27
	11–12	In	In	In	In	In	In	In	In	Address bit A26
	13–14	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A25
	15–16	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A24
E20	1–2	Out	$\boxed{\textit{In}}$	Out	$\boxed{\textit{In}}$	Out	$\boxed{\textit{In}}$	Out	$\boxed{\textit{In}}$	Status/ID bit D0
	3–4	Out	Out	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	Out	Out	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	Status/ID bit D1
	5–6	Out	Out	Out	Out	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	Status/ID bit D2
	7–8	Out	Out	Out	Out	Out	Out	Out	Out	Status/ID bit D3
	9–10	Out	Out	Out	Out	Out	Out	Out	Out	Status/ID bit D4
	11–12	In	In	In	In	In	In	In	In	Status/ID bit D5
	13–14	In	In	In	In	In	In	In	In	Status/ID bit D6
	15–16	Out	Out	Out	Out	Out	Out	Out	Out	Status/ID bit D7

Notation	Indicates
In	Jumper installed
Out	Jumper removed
$\boxed{\textit{In}}$ or $\boxed{\textit{Out}}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

Table 2–11 Default Jumper Settings, VDA/255 Boards 0 Through 7 Address Variations (DG/UX 5.4.1 or earlier)

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
E2	1–2	In	In	In	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit A31
	3–4	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A30
	5–6	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A29
	7–8	In	In	In	In	In	In	In	In	Address bit A28
	9–10	In	In	In	In	In	In	In	In	Address bit A27
	11–12	In	In	In	In	In	In	In	In	Address bit A26
	13–14	In	In	In	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit A25
	15–16	In	In	In	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit A24

Notation	Indicates
In	Jumper installed
Out	Jumper removed
$\boxed{\textit{In}}$ or $\boxed{\textit{Out}}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

NOTE:The E1 and E20 jumpers shown in the previous table also apply.

Configuring a Model 7425 VME Terminal Controller (VTC) Board

When you receive a VTC board from Data General Corporation, it is factory configured for board 0 default switch and jumper settings and for DG/UX revision 5.4.1 or earlier. If the board you are installing is not the first of its type, you must reconfigure the board for the position that it is to occupy. Tables 2–13 through 2–14 provide jumpering information for the VTC board. For example, to reconfigure a VTC board to board 1, locate the column for board 1 in Table 2–13 or 2–14 and remove or install the jumpers as indicated in the rectangles.

NOTE: If your configuration includes more than one board of the same type, make sure that no two boards have the same board number. The DG/UX operating system recognizes VTC, VDA/128, VDA/255, and VAC/16 options by the same device name, **syac**. Make certain all the asynchronous and terminal controller boards in your system have unique board numbers.

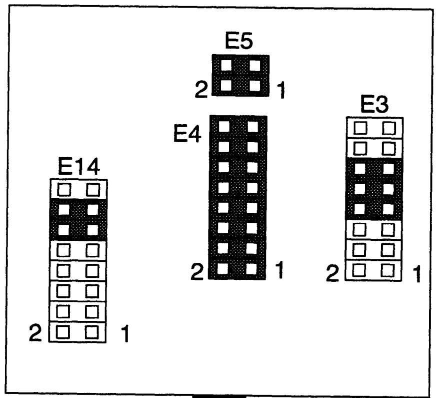
Figure 2–6 shows the location of the jumpers on the VTC board. For further information on the board, refer to the *VMEbus TermServer Controller (VTC) Hardware Technical Manual.*

NOTE: Verify that the VME controller you plan to install is jumpered appropriately for the current revision of your DG/UX operating system.

Once you have installed the board jumpers, follow the directions in Chapter 3 to install the VTC board(s) in the card cage.

VTC

The jumper configuration shown on the right is for board position 0 and for DG/UX revision 5.4.2 or later. To configure for other board positions or other revisions of the operating system, refer to the tables that follow.



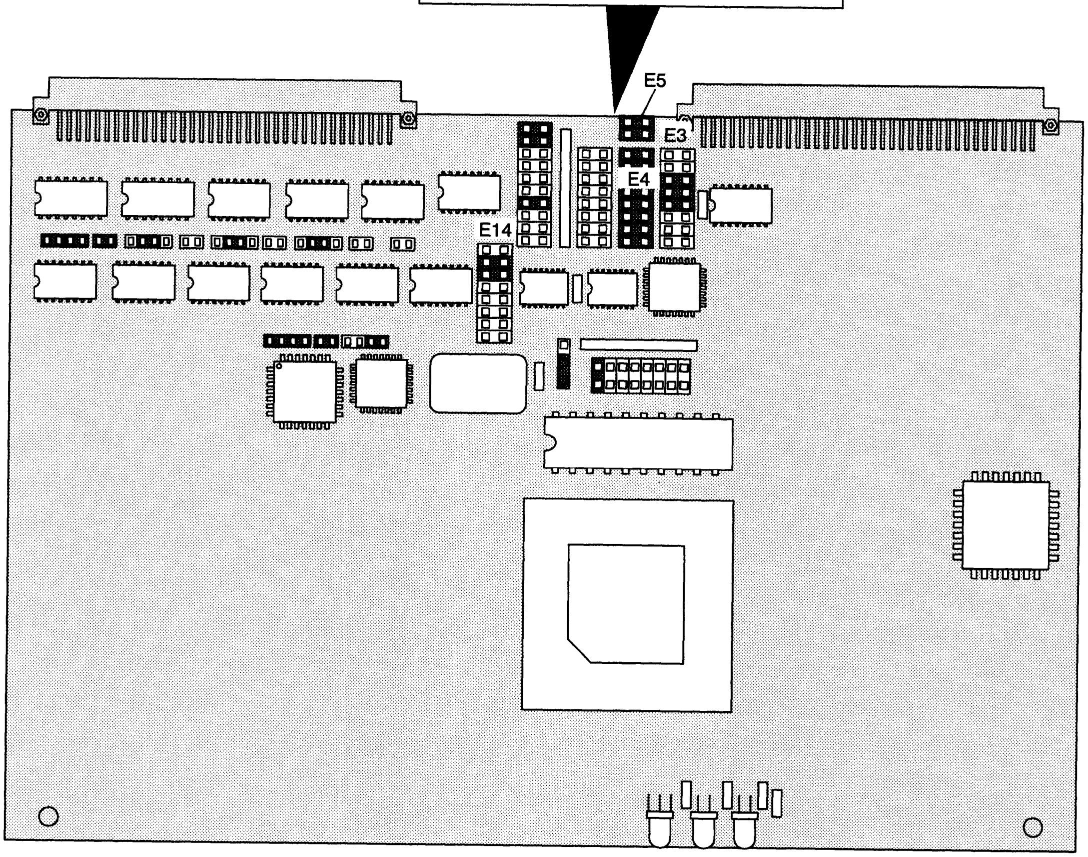


Figure 2–6 VTC Board Jumper Locations

Table 2–12 Default Jumper Settings for VTC Boards (All Board Positions)

Jumper	Pins	Status	Function
E1	1–2	Out	IRQ level 1
	3–4	Out	IRQ level 2
	5–6	Out	IRQ level 3
	7–8	In	IRQ level 4 (selected)
	9–10	Out	IRQ level 5
	11–12	Out	IRQ level 6
	13–14	Out	IRQ level 7
	15–16	Out	Unused
E2	1–2	Out	Interrupt acknowledge
	3–4	In	Interrupt acknowledge
	5–6	In	Interrupt acknowledge
E6	1–2	In	Bus grant 3
	3–4	In	Bus grant 3
E7		In	Bus request 3
E8	2–3	In	Bus grant 2
E9		Out	Bus request 2
E10	2–3	In	Bus grant 1
E11		Out	Bus request 1
E12	2–3	In	Bus grant 0
E13		Out	Bus request 0
E15		Out	Limit bus transfers
E16		Out	Enable E15
E17		In	DPRAM supervisor space
E18		In	DPRAM data space
E19		Out	DPRAM standard space
E20		In	DPRAM program space
E21		In	32-bit cycles
E22	1–2	In	EPROM size
E23	1–2	In	Host handshake enable
	3–4	Out	RAM tests
	5–6	Out	Serial port baud
	7–8	Out	Memory endian
	9–10	Out	Reserved
	11–12	Out	Reserved
	13–14	Out	Reserved
	15–16	Out	Self test

Notation	Indicates
In	Jumper installed
Out	Jumper removed

Table 2–13 Default Jumper Settings for VTC Boards 0 Through 7 Variations (DG/UX 5.4.2 or later)

Jumper Pins		Board Number 0	1	2	3	4	5	6	7	Function
E3	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 31
	3–4	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 30
	5–6	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 29
	7–8	In	In	In	In	In	In	In	In	Address bit 28
	9–10	In	In	In	In	In	In	In	In	Address bit 27
	11–12	In	In	In	In	In	In	In	In	Address bit 26
	13–14	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 25
	15–16	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 24
E4	1–2	In	In	In	In	In	In	In	In	Address bit 23
	3–4	In	In	In	In	In	In	In	In	Address bit 22
	5–6	In	In	In	In	In	In	In	In	Address bit 21
	7–8	In	In	In	In	In	In	In	In	Address bit 20
	9–10	In	In	In	In	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	Address bit 19
	11–12	In	In	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	In	In	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	Address bit 18
	13–14	In	$\boxed{\mathit{Out}}$	In	$\boxed{\mathit{Out}}$	In	$\boxed{\mathit{Out}}$	In	$\boxed{\mathit{Out}}$	Address bit 17
	15–16	In	In	In	In	In	In	In	In	Address bit 16
E5	1–2	In	In	In	In	In	In	In	In	Address bit 15
	3–4	In	In	In	In	In	In	In	In	Address bit 14
E14	1–2	Out	$\boxed{\mathit{In}}$	Out	$\boxed{\mathit{In}}$	Out	$\boxed{\mathit{In}}$	Out	$\boxed{\mathit{In}}$	Status/ID D7
	3–4	Out	Out	$\boxed{\mathit{In}}$	$\boxed{\mathit{In}}$	Out	Out	$\boxed{\mathit{In}}$	$\boxed{\mathit{In}}$	Status/ID D6
	5–6	Out	Out	Out	Out	$\boxed{\mathit{In}}$	$\boxed{\mathit{In}}$	$\boxed{\mathit{In}}$	$\boxed{\mathit{In}}$	Status/ID D5
	7–8	Out	Out	Out	Out	Out	Out	Out	Out	Status/ID D4
	9–10	Out	Out	Out	Out	Out	Out	Out	Out	Status/ID D3
	11–12	In	In	In	In	In	In	In	In	Status/ID D2
	13–14	In	In	In	In	In	In	In	In	Status/ID D1
	15–16	Out	Out	Out	Out	Out	Out	Out	Out	Status/ID D0

Notation	Indicates
In	Jumper installed
Out	Jumper removed
$\boxed{\mathit{In}}$ or $\boxed{\mathit{Out}}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

Table 2–14 Default Jumper Settings, VTC Boards 0 Through 7 Address Variations (DG/UX 5.4.1 or earlier)

Jumper Pins		Board Number 0	1	2	3	4	5	6	7	Function
E3	1–2	In	In	In	In	In	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	Address bit 31
	3–4	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 30
	5–6	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 29
	7–8	In	In	In	In	In	In	In	In	Address bit 28
	9–10	In	In	In	In	In	In	In	In	Address bit 27
	11–12	In	In	In	In	In	In	In	In	Address bit 26
	13–14	In	In	In	In	In	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	Address bit 25
	15–16	In	In	In	In	In	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	$\boxed{\mathit{Out}}$	Address bit 24

Notation	Indicates
In	Jumper installed
Out	Jumper removed
$\boxed{\mathit{In}}$ or $\boxed{\mathit{Out}}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

NOTE:The E4, E5, and E14 jumpers shown in the previous table also apply.

Configuring Models 7413–A and 7428 VME Synchronous Controller Boards (VSC/3, VSC/3i)

When you receive a VME synchronous controller board from Data General Corporation, it is factory configured for board 0 default jumper settings and for DG/UX revision 5.4.1 or earlier. If the board you are installing is not the first of its type, you must reconfigure the board for the position that it is to occupy. Tables 2–15 through 2–16 provide jumpering information for the VSC/3 board. Tables 2–17 through 2–18 provide jumpering information for the VSC/3i board. For example, to reconfigure a VAC/3 board to board 1, locate the column for board 1 in Table 2–16 and remove or install the jumpers as indicated in the rectangles. You can configure the three ports on the VSC/3i board to support any of these interfaces: RS–232–C, RS–449/530, V.35, or X.21 (see discussion under heading *Changing the Synchronous Electrical Interface for VSC / 3i Channels* later in this section).

NOTE: If your configuration includes more than one synchronous communication board, make certain that each board (whether VSC/3 or VSC/3i) in your configuration has a unique board number even if your synchronous communication software uses different device names for each board. For example, SNA software refers to its controller as an **sdcp**, and X.25 communications software uses **ssid**, but if your system includes both, it nonetheless requires that they have different board numbers.

Figure 2–7 shows the location of the jumpers on the VSC/3 board. For further information about the VSC/3 board, refer to the manual *VMEbus Data Communications Processor (DCP-8820) Technical Manual.*

NOTE: Verify that the VME controller you plan to install is jumpered appropriately for the current revision of your DG/UX operating system.

Figure 2–8 shows the location of the jumpers on the VSC/3i board. For further information on the VSC/3i board, refer to the manual *Setting Up and Installing Model 7428 VME Synchronous Controllers (VSC / 3i) in AViiON® Systems*.

For software requirements and dependencies on either the VSC/3 or VSC/3i board, refer to the documentation for the synchronous software products you plan to install. Once you have installed the board jumpers, follow the directions in Chapter 3 to install the board into the card cage.

VSC/3

The jumper configuration shown on the right is for board position 0 and for DG/UX revision 5.4.2 or later. To configure for other board positions or for other revisions of the operating system, refer to the tables that follow.

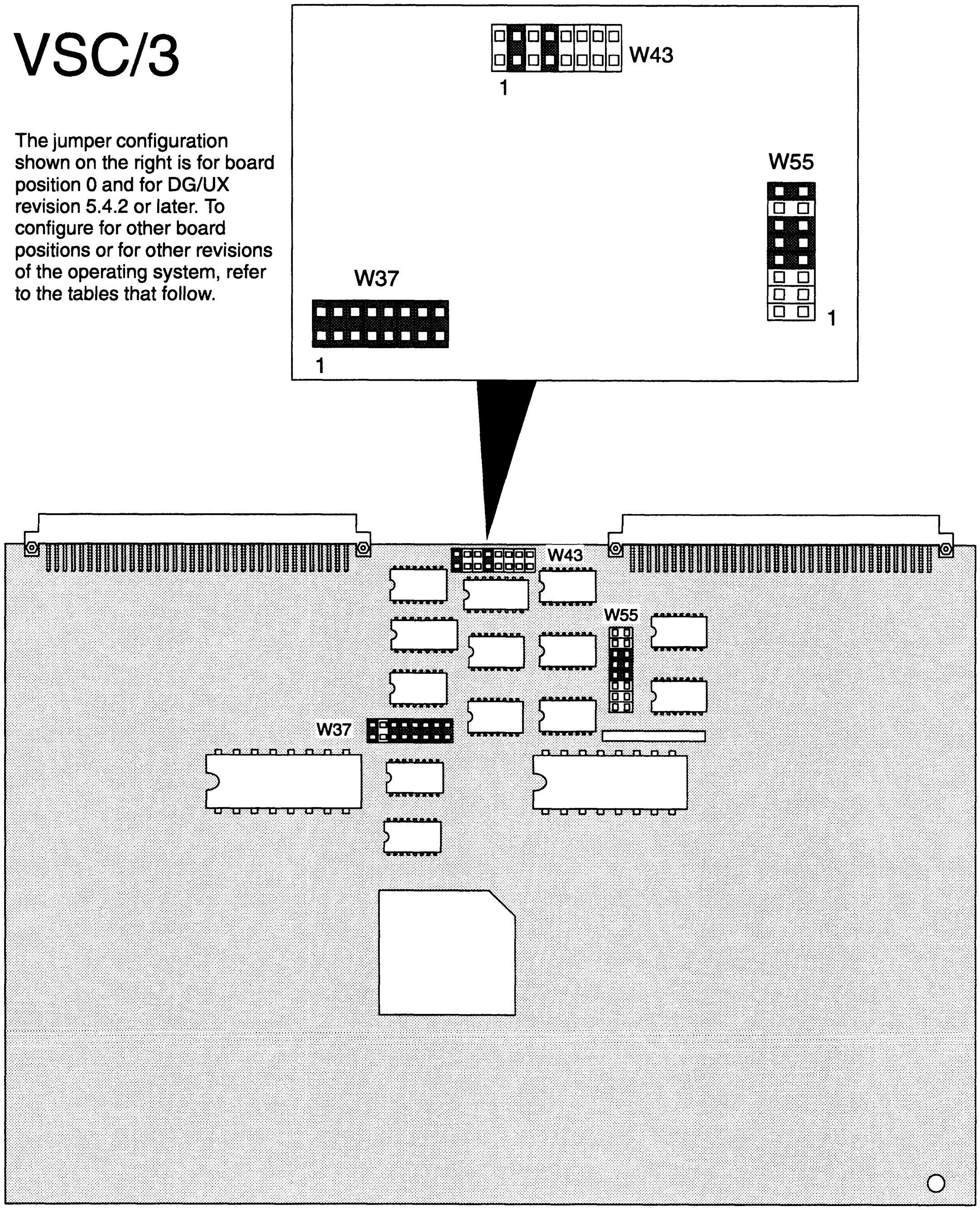


Figure 2–7 VSC/3 Board Jumper Locations

Table 2–15 Default Jumper Settings for VSC/3 Boards (All Board Positions)

Jumper	Pins	Status	Function
W1	1–2	Out	Option 0
	3–4	Out	Option 1
	5–6	Out	Option 2
	7–8	In	Option 3
W3	1–2	In	Reset from bus
W5	1–2	In	Supervisor slave decode
	3–4	In	Factory reserved
W6	2–3	In	Bus grant 0
W7	2–3	In	Bus grant 1
W8	1–2	Out	Program space slave decode
	3–4	Out	Data space slave decode
	5–6	In	Program/data slave decode
	7–8	Out	User slave decode
W9	1–2	In	Timeout to local bus error selection
W10	2–3	In	Bus grant 2
W11	1–2	In	Bus grant 3 (selected)
	3–4	In	Bus grant 3 (selected)
W12	1–2	In	Bus request 3 (selected)
	3–4	Out	Bus request 2
	5–6	Out	Bus request 1
	7–8	Out	Bus request 0
W13	1–2	Out	Bus release option
W15		In	Channel A RS–232–C ground
W16		Out	Channel A RC ground
W17		Out	Channel A frame ground
W19	1–2	In	DMA A 19/15
W21		In	A03 Interrupt level decode
W22	1–2	Out	A02 Interrupt level decode
W23	1–2	Out	A01 Interrupt level decode
W27	1–2	Out	Interrupt request level 7 (High)
	3–4	Out	Interrupt request level 6
	5–6	Out	Interrupt request level 5
	7–8	Out	Interrupt request level 4
	9–10	In	Interrupt request level 3 (selected)
	11–12	Out	Interrupt request level 2
	13–14	Out	Interrupt request level 1 (Low)
W31	1–2	Out	Channel A multidrop enable
W34	1–2	In	DMA address select
	3–4	In	DMA address select

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

(Continued)

Table 2–15 Default Jumper Settings for VSC/3 Boards (All Board Positions)

Jumper	Pins	Status	Function
W13	1–2	Out	Bus release option
W15		In	Channel A RS–232–C ground
W16		Out	Channel A RC ground
W17		Out	Channel A frame ground
W19	1–2	In	DMA A 19/15
W21		In	A03 Interrupt level decode
W22	1–2	Out	A02 Interrupt level decode
W23	1–2	Out	A01 Interrupt level decode
W27	1–2	Out	Interrupt request level 7 (High)
	3–4	Out	Interrupt request level 6
	5–6	Out	Interrupt request level 5
	7–8	Out	Interrupt request level 4
	9–10	In	Interrupt request level 3 (selected)
	11–12	Out	Interrupt request level 2
	13–14	Out	Interrupt request level 1 (Low)
W31	1–2	Out	Channel A multidrop enable
W34	1–2	In	DMA address select
	3–4	In	DMA address select
W35	2–3	In	EPROM size
W36	2–3	In	EPROM size
W40	1–2	Out	Channel B multidrop
W45	1–2	In	Channel B RS–232–C ground
W46	1–2	Out	Channel B RC ground
W47	1–2	Out	Channel B frame ground
W51	1–2	In	Channel B clock option
W53	1–2	In	Byte swap
W54	1–2	In	Std/Ext slave decode
W57	1–2	In	Channel A clock option
W59	1–2	In	Channel C RS–232–C ground
W61	1–2	Out	Channel C RC ground
W62	1–2	Out	Channel C frame ground
W64	1–2	In	Channel D clock option
W65	1–2	Out	Channel D multidrop
W70	1–2	In	Channel C clock option
W71	1–2	Out	Channel C multidrop enable
W77	1–2	In	Channel D RS–232–C ground
W78	1–2	Out	Channel D RC ground
W79	1–2	Out	Channel D frame ground

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

(Concluded)

Table 2–16 Default Jumper Settings for VSC/3 Boards 0 Through 7 Variations

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
W55	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A31
	3–4	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A30
	5–6	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A29
	7–8	In	In	In	In	In	In	In	In	Address bit A28
	9–10	In	In	In	In	In	In	In	In	Address bit A27
	11–12	In	In	In	In	In	In	In	In	Address bit A26
	13–14	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A25
	15–16	In	In	In	In	In	In	In	In	Address bit A24
W37	1–2	In	In	In	In	In	In	In	In	Address bit A23
	3–4	In	In	In	In	In	In	In	In	Address bit A22
	5–6	In	In	In	In	In	In	In	In	Address bit A21
	7–8	In	In	In	In	In	In	In	In	Address bit A20
	9–10	In	In	In	In	In	In	In	In	Address bit A19
	11–12	In	In	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit A18
	13–14	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit A17
	15–16	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	Address bit A16
W43	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Status/ID bit 7
	3–4	In	In	In	In	In	In	In	In	Status/ID bit 6
	5–6	Out	Out	Out	Out	Out	Out	Out	Out	Status/ID bit 5
	7–8	In	In	In	In	In	In	In	In	Status/ID bit 4
	9–10	Out	Out	Out	Out	Out	Out	Out	Out	Status/ID bit 3
	11–12	Out	Out	Out	Out	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	Status/ID bit 2
	13–14	Out	Out	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	Out	Out	$\boxed{\textit{In}}$	$\boxed{\textit{In}}$	Status/ID bit 1
	15–16	Out	$\boxed{\textit{In}}$	Out	$\boxed{\textit{In}}$	Out	$\boxed{\textit{In}}$	Out	$\boxed{\textit{In}}$	Status/ID bit 0

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
$\boxed{\textit{In}}$ or $\boxed{\textit{Out}}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

VSC/3i

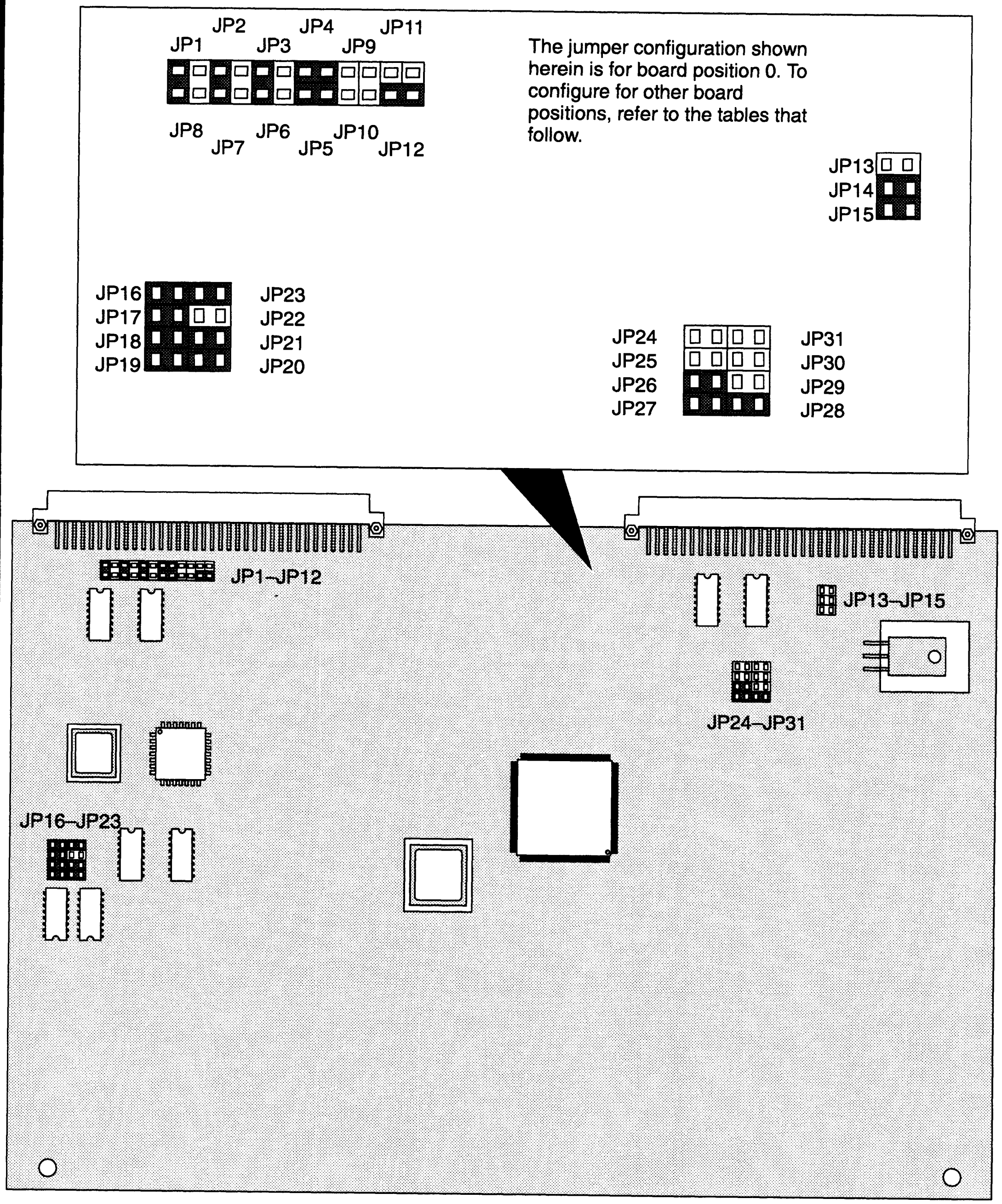


Figure 2–8 VSC/3i Board Jumper Locations

Refer to the manual *Setting Up and Installing Model 7428 VME Synchronous Controllers (VSC/3i) in AViiON® Systems* for complete configuration information.

Table 2–17 Default Jumper Settings for VSC/3i Boards (All Board Positions)

Jumper	Pins	Status	Function
JP1 JP8	2, 1	In	Bus grant level
JP2 JP7	2, 1	In	Bus grant level
JP3 JP6	2, 1	In	Bus grant level
JP4	1, 2	In	Bus grant level
JP5	1, 2	In	Bus grant level
JP9		Out	Bus request level
JP10		Out	Bus request level
JP11		Out	Bus request level
JP12		In	Bus request level
JP13		Out	Interrupt level
JP14		In	Interrupt level
JP15		In	Interrupt level

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

Table 2–18 Default Jumper Settings for VSC/3i Boards 0 Through 7 Variations (Any Operating System)

Jumper Pins	Board Number 0	1	2	3	4	5	6	7	Function
JP16	In	*Out*	In	*Out*	In	*Out*	In	*Out*	Address bit A16
JP17	In	In	*Out*	*Out*	In	In	*Out*	*Out*	Address bit A17
JP18	In	In	In	In	*Out*	*Out*	*Out*	*Out*	Address bit A18
JP19	In	In	In	In	In	In	In	In	Address bit A19
JP20	In	In	In	In	In	In	In	In	Address bit A20
JP21	In	In	In	In	In	In	In	In	Address bit A21
JP22	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A22
JP23	In	In	In	In	In	In	In	In	Address bit A23
JP24	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A24
JP25	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A25
JP26	In	In	In	In	In	In	In	In	Address bit A26
JP27	In	In	In	In	In	In	In	In	Address bit A27
JP28	In	In	In	In	In	In	In	In	Address bit A28
JP29	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A29
JP30	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A30
JP31	Out	Out	Out	Out	Out	Out	Out	Out	Address bit A31

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
In or *Out* (boxed)	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

Changing the Synchronous Electrical Interface for VSC/3i Channels

You can independently configure each full–duplex channel on a VSC/3i controller to support RS–232–C, RS–449, RS–530, V.35, or X.21 synchronous devices. RS–530, RS–449, and X.21 devices share the same electrical interface; the VSC/3i also provides separate V.35 and RS–232–C communication.

As shown in Figure 2–9, each connector has three rows of 20 jumper pins associated with it. You can change the electrical interface between each channel and the Motorola 68302 Integrated Multiprotocol Processor by placing two 10–pin headers (or *jumper blocks)* across the appropriate row of jumper pins.

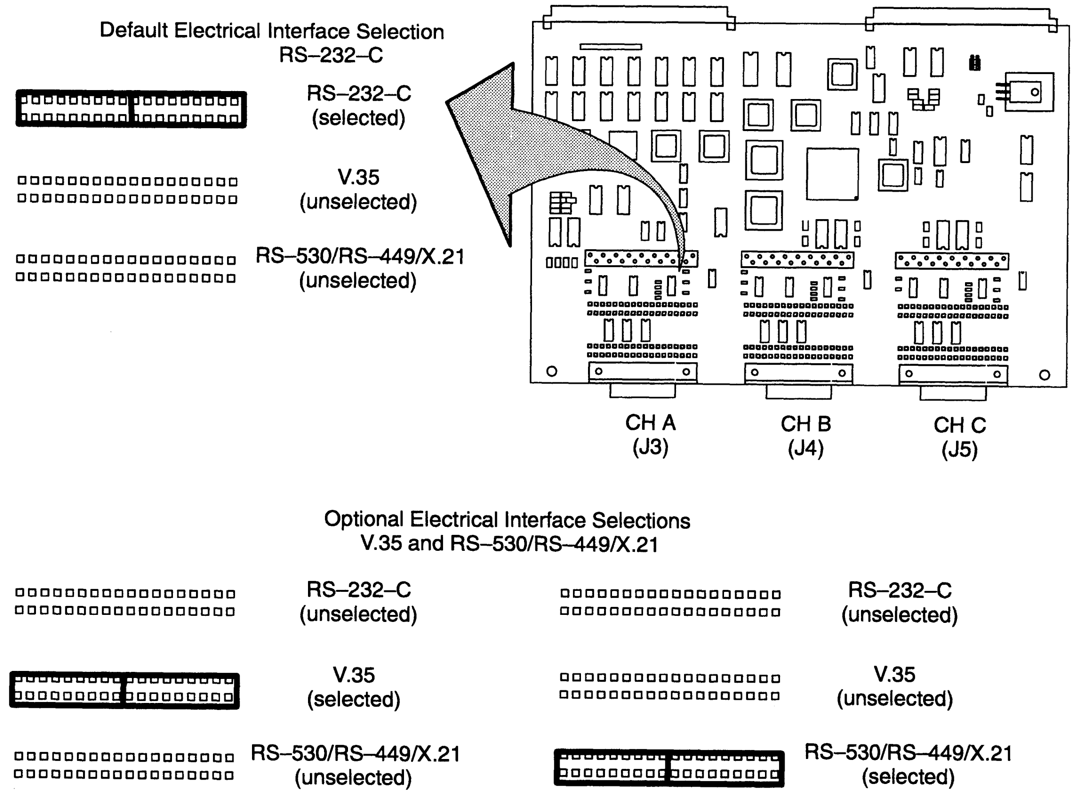


Figure 2–9 VSC/3i Electrical Interface Jumpers

CAUTION: The VSC/3i controller board contains fragile etch underneath the electrical interface selection jOumpers. ***Do not*** *use a screwdriver or similar device to pry the jumper blocks off the jumper pins.*

To move a VSC/3i jumper block from one row of pins to another, use narrow needlenose pliers to hold a plastic edge of the block at one end, then gently pull up until you feel the block releasing from the pins. Repeat this procedure at the other end of the jumper block, then return to the first end of the block to gently rock the header off the pins.

CAUTION: ***Do not*** *attempt to hold the jumper block from its outer sides; you may damage the pins underneath, or the block itself.*

Figure 2–10 shows the correct way to remove a jumper block from a VSC/3i board.

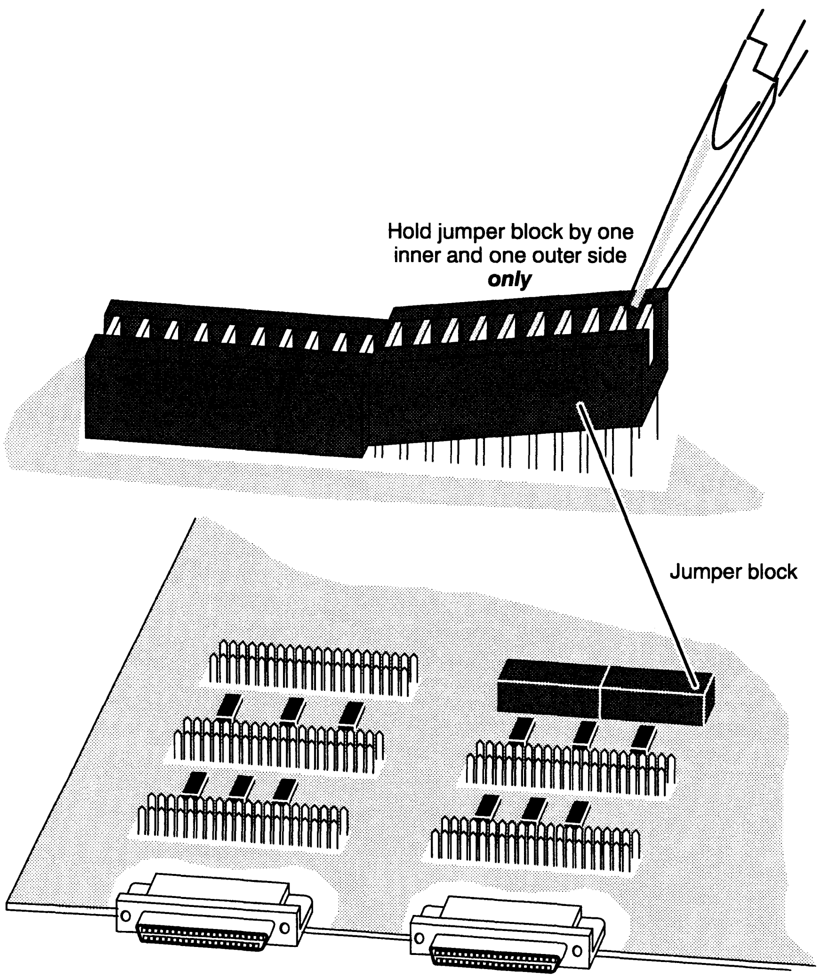


Figure 2–10 Removing Electrical Interface Selection Jumper Blocks

When you reconfigure the electrical interface for a VSC/3i channel, be sure you change the configuration tag (usually attached to the board's lower handle) to correctly indicate the configuration of each VSC/3i port. Proper identification on the tag allows other users to determine the channel configuration without removing the board from the computer unit. Figure 2–11 shows the configuration tag and a VSC/3i board with ports configured for RS–232–C, V.35, and RS–530 support.

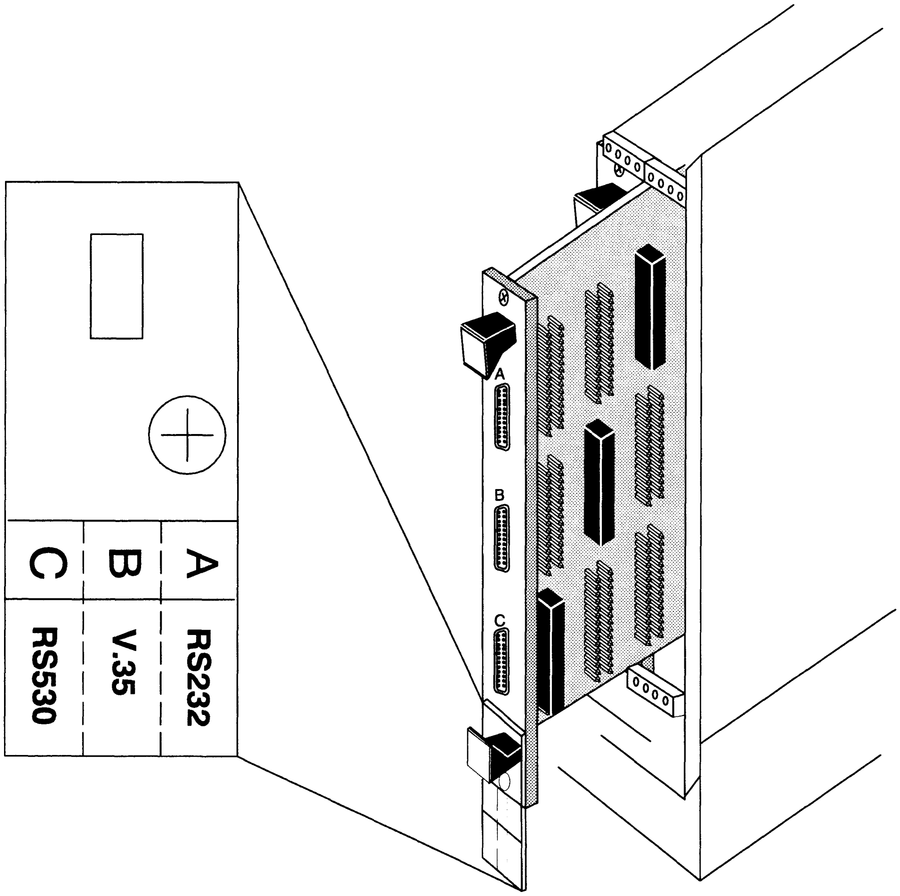


Figure 2–11 VSC/3i Channel Configuration and Configuration Tag

Configuring a Model 7430 VME SCSI-2 Adapter (VSA) Board

When you receive a VSA board from Data General Corporation, it is factory configured for board 0 default jumper settings. If the board you are installing is not the first of its type, you must reconfigure the board for the position that it is to occupy. Tables 2–19 through 2–20 provide jumpering information for the VSA board. For example, to reconfigure a VSA board to board 1, locate the column for board 1 in Table 2–20 and remove or install the jumpers as indicated in the rectangles.

NOTE: If your configuration includes more than one VSA board, make certain their jumper configurations specify a different board number for each. The DG/UX operating system recognizes all VSA options by the same device name, **dgsc**.

Figure 2–12 shows the location of the jumpers on the VSA board. For information on how to position the VSA's two daughter boards for single-ended or differential SCSI operation, refer to the later section *Selecting Single–Ended or Differential SCSI Bus Operation*.

Once you have installed the board jumpers and verified the positioning of the daughter boards, follow the directions in Chapter 3 to install the VSA board(s) in the card cage.

VSA

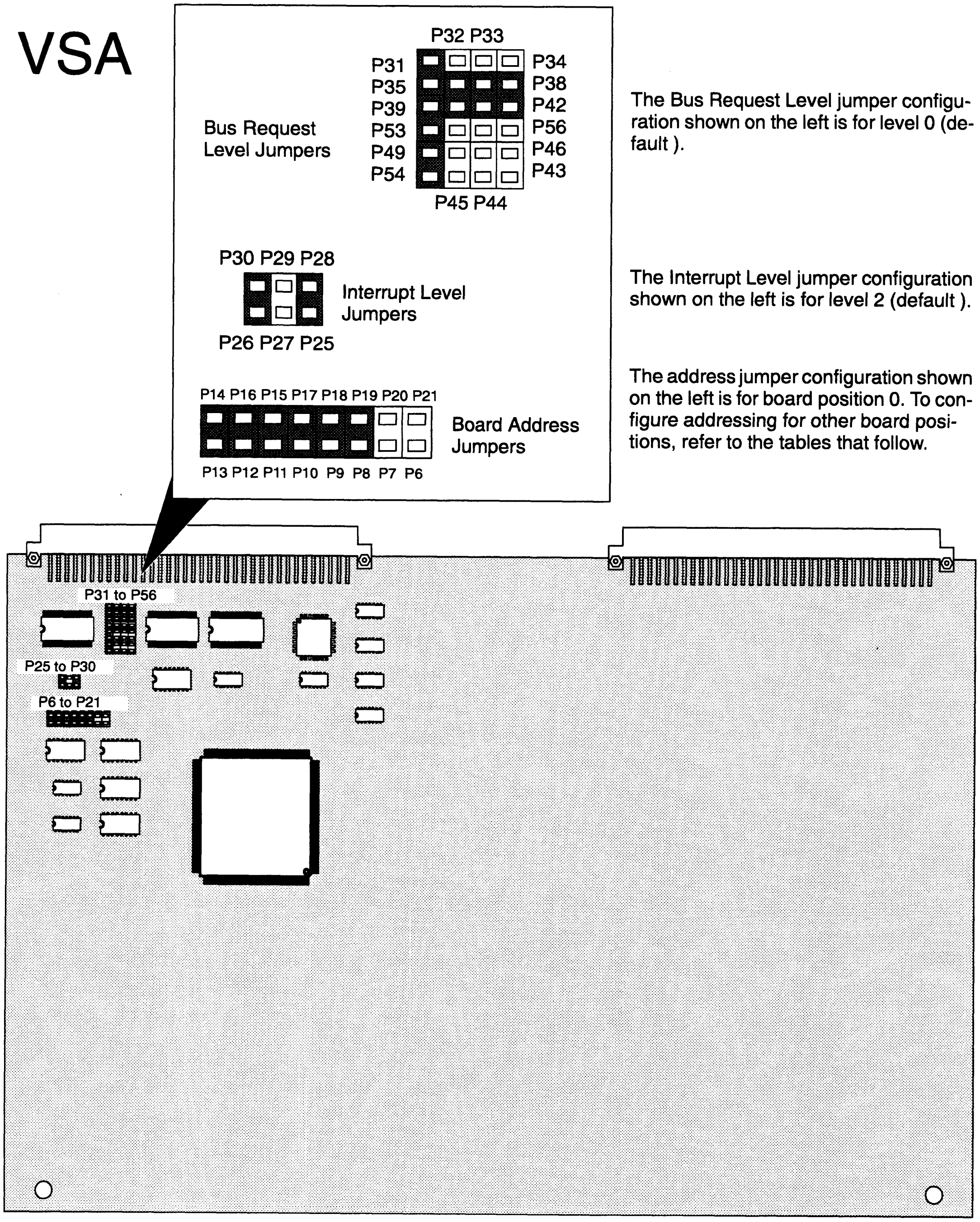


Figure 2–12 VSA Board Jumper Locations

Table 2–19 Default Jumper Settings for VSA Boards (All Board Positions)

Jumper Pins	Status	Function
P31, P35	In	Bus request level 0
P39, P53	In	Bus request level 0
P49, P54	In	Bus request level 0
P36, P40	In	Bus request level 0
P37, P41	In	Bus request level 0
P38, P42	In	Bus request level 0
P30, P26	In	Interrupt level 2
P29, P27	Out	Interrupt level 2
P28, P25	In	Interrupt level 2

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

Table 2–20 Default Jumper Settings for VSA Boards 0 Through 7 Variations

Jumper Pins	Board Number 0	1	2	3	4	5	6	7	Function
P14, P13	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	In	$\boxed{\textit{Out}}$	Address bit 8
P16, P12	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit 9
P15, P11	In	In	In	In	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	$\boxed{\textit{Out}}$	Address bit 10
P17, P10	In	In	In	In	In	In	In	In	Address bit 11
P18, P9	In	In	In	In	In	In	In	In	Address bit 12
P19, P8	In	In	In	In	In	In	In	In	Address bit 13
P20, P7	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 14
P21, P16	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 15

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
$\boxed{\textit{In}}$ or $\boxed{\textit{Out}}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

Selecting Single–Ended or Differential SCSI Bus Operation

You can independently configure each SCSI port on your VSA board for either single-ended or differential operation by changing the orientation of a small daughter board. The default is single-ended; you will need differential only if you will use differential SCSI devices. Your SCSI ports might already be configured as you need them, but if you must change one or both, this section explains how.

Determining the Board's Current Orientation

If you received your VSA board factory-installed in your AViiON® computer, it should be configured as you need it. The board has a tag attached to one of its handles, on which the orientation of the ports is labeled at the factory (see Figure 2–13). Each SCSI port will be labeled S.E. (for single-ended) or DIFF (for differential), so you will not have to remove the VSA board to determine the orientation of the daughter boards.

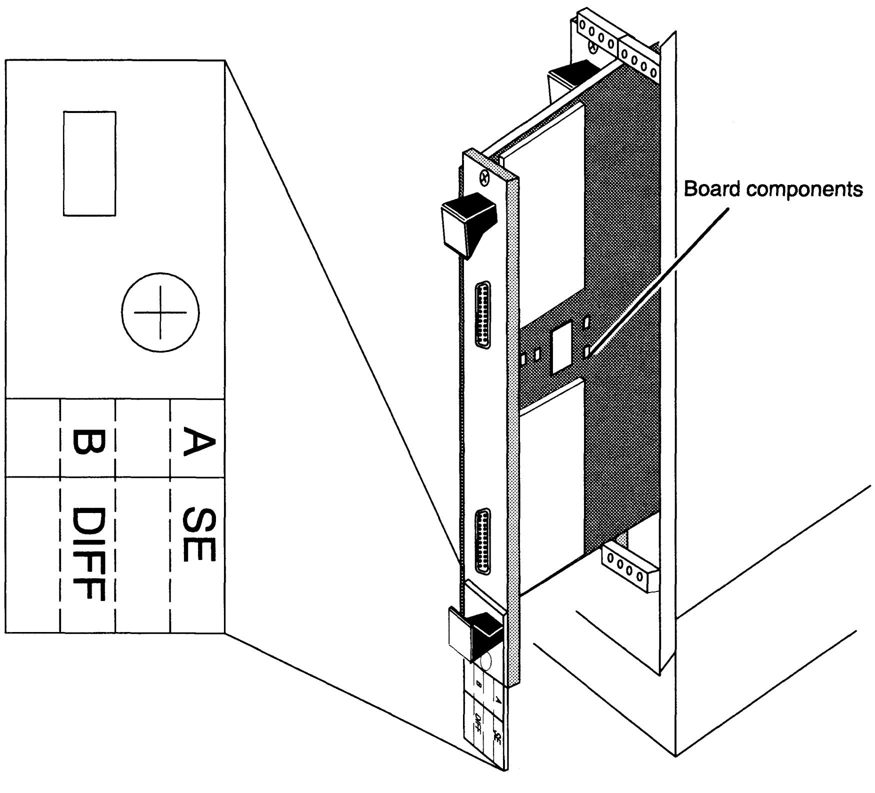


Figure 2–13 Labeled SCSI Ports

NOTE: Figure 2–13 is accurate only for customer-installable AViiON systems with no more than two 6U VME option slots. The instructions in this manual that deal with installing and/or removing the VSA board do not apply to systems in which the VSA board mounts in a 6U-to-9U adapter before installation.

If you must install the VSA board yourself, or if the daughter boards are not oriented the way you need them, you will have to position the daughter boards and fill in the label yourself. Each daughter board has the abbreviations S.E. and DIFF silk-screened onto opposite corners. The corner that is adjacent to the SCSI connector shows which way the board is oriented. For example, Figure 2–14 shows one daughter board positioned for single-ended operation and one positioned for differential.

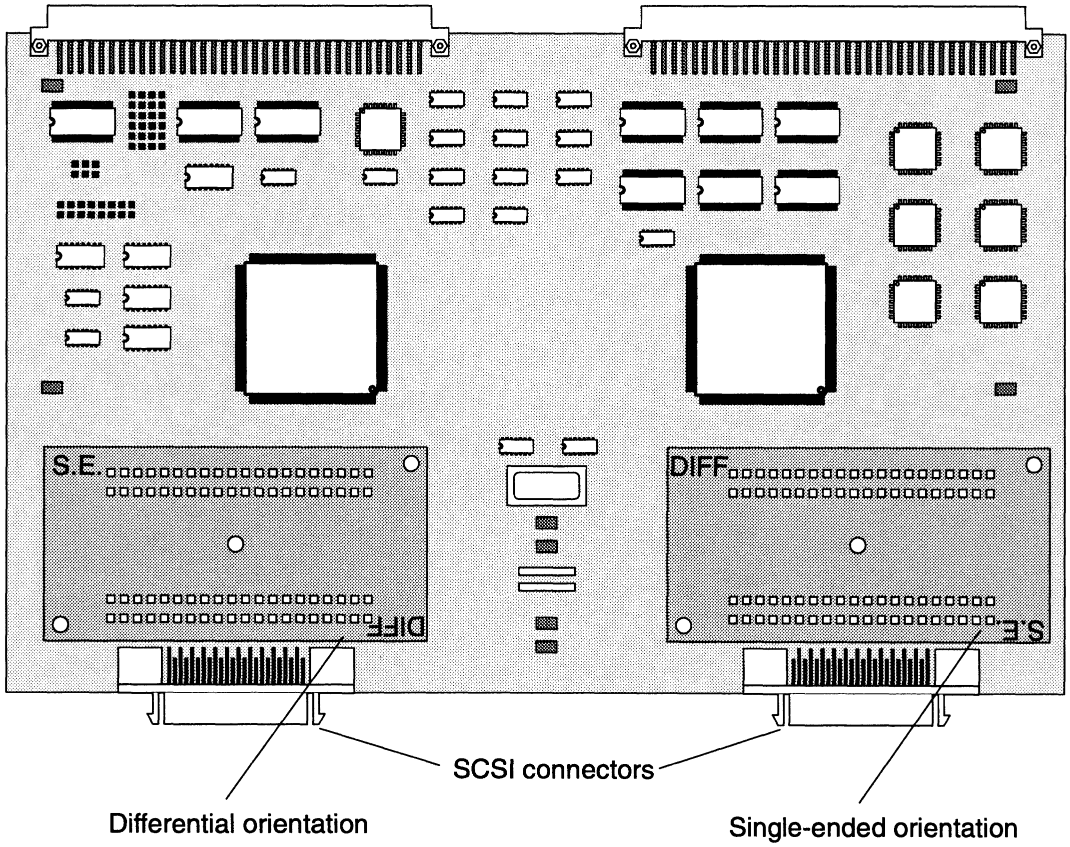


Figure 2–14 VSA Board with Daughter Boards Oriented for Differential and Single-Ended Operation

Changing the Orientation of a Daughter Board

To change the orientation of a daughter board from single-ended to differential or vice-versa, follow these steps:

1. Read the instructions on avoiding ESD damage, earlier in this document, and set up an ESD kit.

2. Putting your fingers under the edges of the daughter board, and being careful not to bend the pins on the underside of the board, carefully pry up one side of the board just until it comes loose.

3. Again using your fingers, pry up the other side of the daughter board until it comes loose.

4. Lift the daughter board from the mother board and rotate it 180°, so that the corner reading S.E. or DIFF, whichever orientation you want, is closest to the SCSI connector.

5. Carefully align the pins on the daughter board with the connectors on the mother board, as shown in Figure 2–15.

   NOTE: Before proceeding to step 6, carefully inspect the boards from all sides to be sure that the pins are aligned correctly.

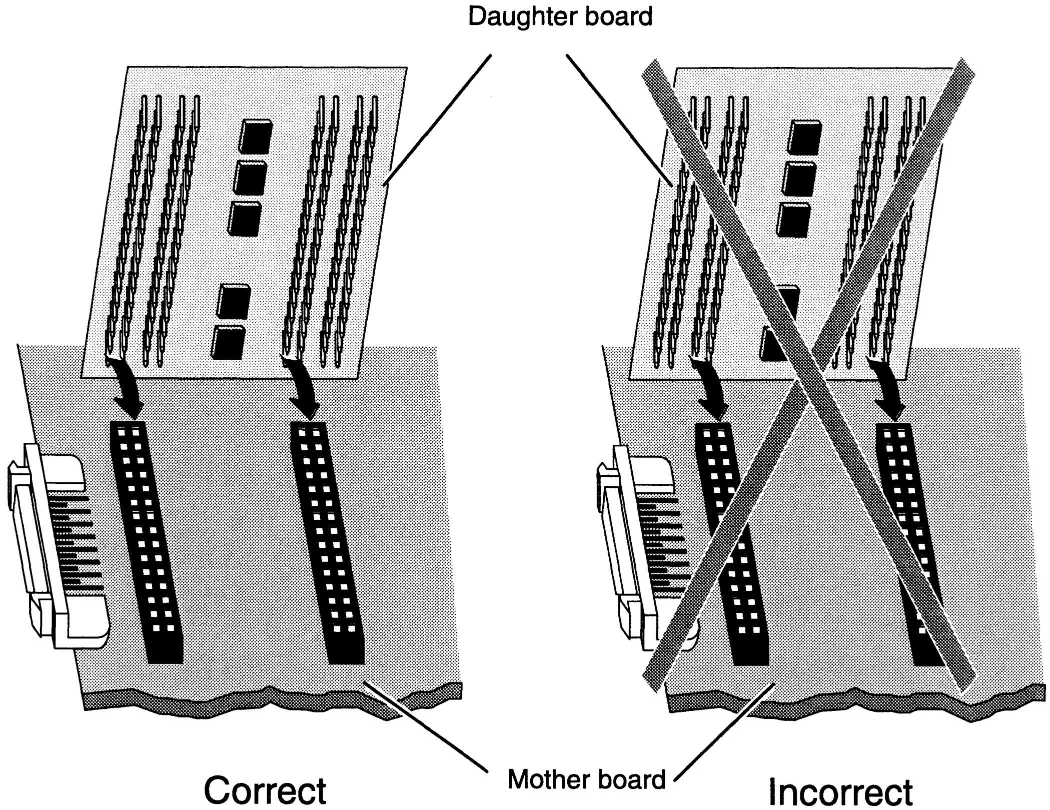


Figure 2–15 Positioning the Daughter Board for Reattachment

6. Press down both sides of the daughter board to connect the rows of pins on each side to the connectors on the mother board.

Configuring Models 7405 and 7429 Ethernet LAN Controller Boards (VLC and VLCi)

When you receive an Ethernet LAN controller board from Data General Corporation, it is factory configured for board 0 default switch/jumper settings and for DG/UX revision 5.4.1 or earlier. If the board you are installing is not the first of its type, you must reconfigure the board for the position that it is to occupy. Tables 2–21 through 2–23 provide switch settings and jumpering information for the VLC board. Tables 2–24 through 2–26 provide jumpering information for the VLCi board. For example, to reconfigure a VLC board to board 1, locate the column for board 1 in Table 2–22 or Table 2–23 and set the switches as indicated in the rectangles.

The DG/UX operating system identifies VLC controllers with the device mnemonic **hken**; VLCi controllers are specified as **cien** devices. Make certain that no two **hken** controllers have the same board number by changing the switch pack settings on the second board. Make certain that no two **cien** controllers have the same board number by changing jumper settings on the second board.

Once you have configured the proper switch or jumper settings, follow the directions in Chapter 3 to install the board in the card cage.

Figure 2–16 shows the location of the switches and their settings on the VLC board for DG/UX revision 5.4.2 or later. For further information about the board, refer to the manual *V/Ethernet 3207 Hawk Local Area Network Controller for Ethernet User's Guide*.

NOTE: Verify that the VME controller you plan to install is jumpered appropriately for the current revision of your DG/UX operating system.

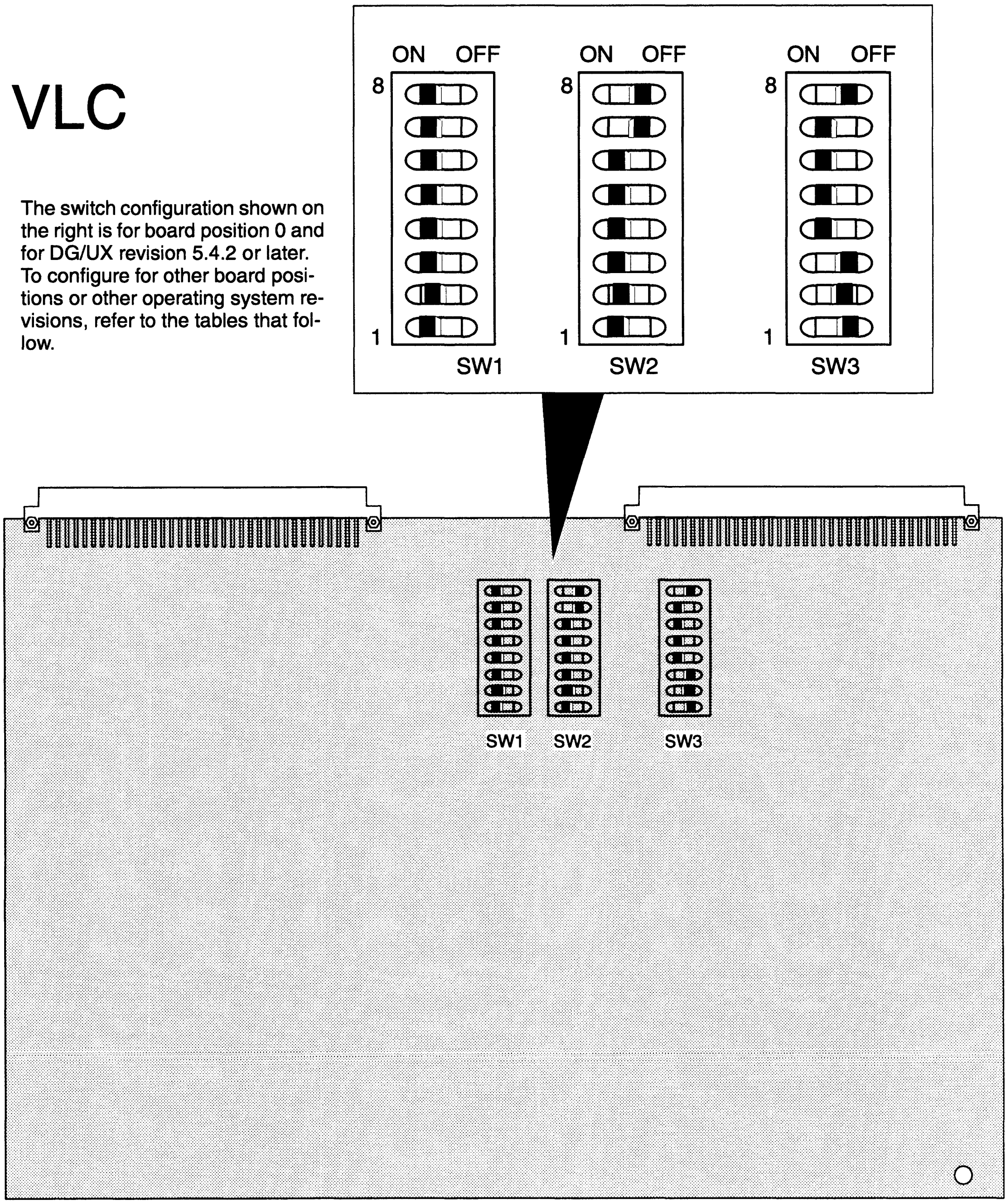


Figure 2–16 VLC Board Switch Locations

Table 2–21 Default Jumper Settings for VLC Boards (All Board Positions)

Jumper	Pins	Status	Function
JA1	1, 2	In	+12V fused to Ethernet port
JA4	1, 2	In	Slow DTACK
JA6	1, 2	In	32–bit wide on–board DRAM
JA7	1, 2	Out	Test point
JA8	2, 3	In	Disable special parity error
JA9	2, 3	In	Parity errors
JA10	1, 2	In	SYSCLK supplied by VME bus
JA11	1, 2	Out	SYSFAIL to VME bus disabled
JA12	1, 2	In	Parity errors
JA13	1, 2	Out	IEEE 802.3 operation

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

Table 2–22 Default Switch Settings for VLC Boards 0 Through 7 Address Variations (DG/UX 5.4.2 or later)

Switch Pack	Switch No.	Board Number 0	1	2	3	4	5	6	7	Function
SW1	1	On	On	On	On	On	On	On	On	Address bit 15
	2	Off	Off	Off	Off	Off	Off	Off	Off	Address bit 14
	3	On	On	On	On	On	On	On	On	Address bit 13
	4	On	$\boxed{\text{Off}}$	On	On	On	On	On	On	Address bit 12
	5	On	On	On	On	On	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	Address bit 11
	6	On	On	On	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	On	On	$\boxed{\text{Off}}$	Address bit 10
	7	On	On	$\boxed{\text{Off}}$	On	$\boxed{\text{Off}}$	On	$\boxed{\text{Off}}$	On	Address bit 9
	8	On	On	On	On	On	On	On	On	16–bit modifier
SW2	1	On	On	On	On	On	On	On	On	Address bit 23
	2	On	On	On	On	On	On	On	On	Address bit 22
	3	On	On	On	On	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	Address bit 21
	4	On	On	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	On	On	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	Address bit 20
	5	On	$\boxed{\text{Off}}$	On	$\boxed{\text{Off}}$	On	$\boxed{\text{Off}}$	On	$\boxed{\text{Off}}$	Address bit 19
	6	On	On	On	On	On	On	On	On	Address bit 18
	7	Off	Off	Off	Off	Off	Off	Off	Off	32–bit modifier
	8	Off	Off	Off	Off	Off	Off	Off	Off	24–bit modifier
SW3	1	Off	Off	Off	Off	Off	Off	Off	Off	Address bit 31
	2	Off	Off	Off	Off	Off	Off	Off	Off	Address bit 30
	3	Off	Off	Off	Off	Off	Off	Off	Off	Address bit 29
	4	On	On	On	On	On	On	On	On	Address bit 28
	5	On	On	On	On	On	On	On	On	Address bit 27
	6	On	On	On	On	On	On	On	On	Address bit 26
	7	On	On	On	On	On	On	On	On	Address bit 25
	8	Off	Off	Off	Off	Off	Off	Off	Off	Address bit 24

Notation	Indicates
On	Switch on.
Off	Switch off.
$\boxed{\text{On}}$ or $\boxed{\text{Off}}$	Switches that you must place in the *off* or *on* position in the field; all other settings are factory-configured, as indicated.

Table 2–23 Default Switch Settings, VLC Boards 0 Through 7 Address Variations (DG/UX 5.4.1 or earlier)

Switch Pack	Switch No.	Board Number 0	1	2	3	4	5	6	7	Function
SW1	1	On	On	On	On	On	On	On	On	Address bit 15
	2	Off	Off	Off	Off	Off	Off	Off	Off	Address bit 14
	3	On	On	On	On	On	On	On	On	Address bit 13
	4	On	$\boxed{\text{Off}}$	On	On	On	On	On	On	Address bit 12
	5	On	On	On	On	On	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	Address bit 11
	6	On	On	On	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	On	On	$\boxed{\text{Off}}$	Address bit 10
	7	On	On	$\boxed{\text{Off}}$	On	$\boxed{\text{Off}}$	On	$\boxed{\text{Off}}$	On	Address bit 9
	8	On	On	On	On	On	On	On	On	16–bit modifier
SW2	1	Off	Off	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	Address bit 23
	2	On	On	On	On	On	On	On	On	Address bit 22
	3	On	On	On	On	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	Address bit 21
	4	Off	Off	Off	Off	$\boxed{\text{On}}$	$\boxed{\text{On}}$	Off	Off	Address bit 20
	5	On	$\boxed{\text{Off}}$	On	$\boxed{\text{Off}}$	On	$\boxed{\text{Off}}$	On	$\boxed{\text{Off}}$	Address bit 19
	6	On	On	On	On	On	On	On	On	Address bit 18
	7	Off	Off	Off	Off	Off	Off	Off	Off	32–bit modifier
	8	Off	Off	Off	Off	Off	Off	Off	Off	24–bit modifier
SW3	1	On	On	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	Address bit 31
	2	Off	Off	Off	Off	Off	Off	Off	Off	Address bit 30
	3	On	On	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	$\boxed{\text{Off}}$	Address bit 29
	4	Off	Off	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	Address bit 28
	5	On	On	On	On	On	On	On	On	Address bit 27
	6	Off	Off	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	$\boxed{\text{On}}$	Address bit 26
	7	On	On	On	On	On	On	On	On	Address bit 25
	8	Off	Off	Off	Off	Off	Off	Off	Off	Address bit 24

Notation	Indicates
On	Switch on.
Off	Switch off.
$\boxed{\text{On}}$ or $\boxed{\text{Off}}$	Switches that you must place in the *off* or *on* position in the field; all other settings are factory-configured, as indicated.

Figure 2–17 shows the location of the jumpers and their settings on both the mother and daughter boards of the VLCi. For further information on the VLCi, refer to the manuals *CMC–130 VMEbus LAN Controller (VLCi) Reference Guide* and *Setting Up and Installing VLCi Controllers in AViiON® Systems.*

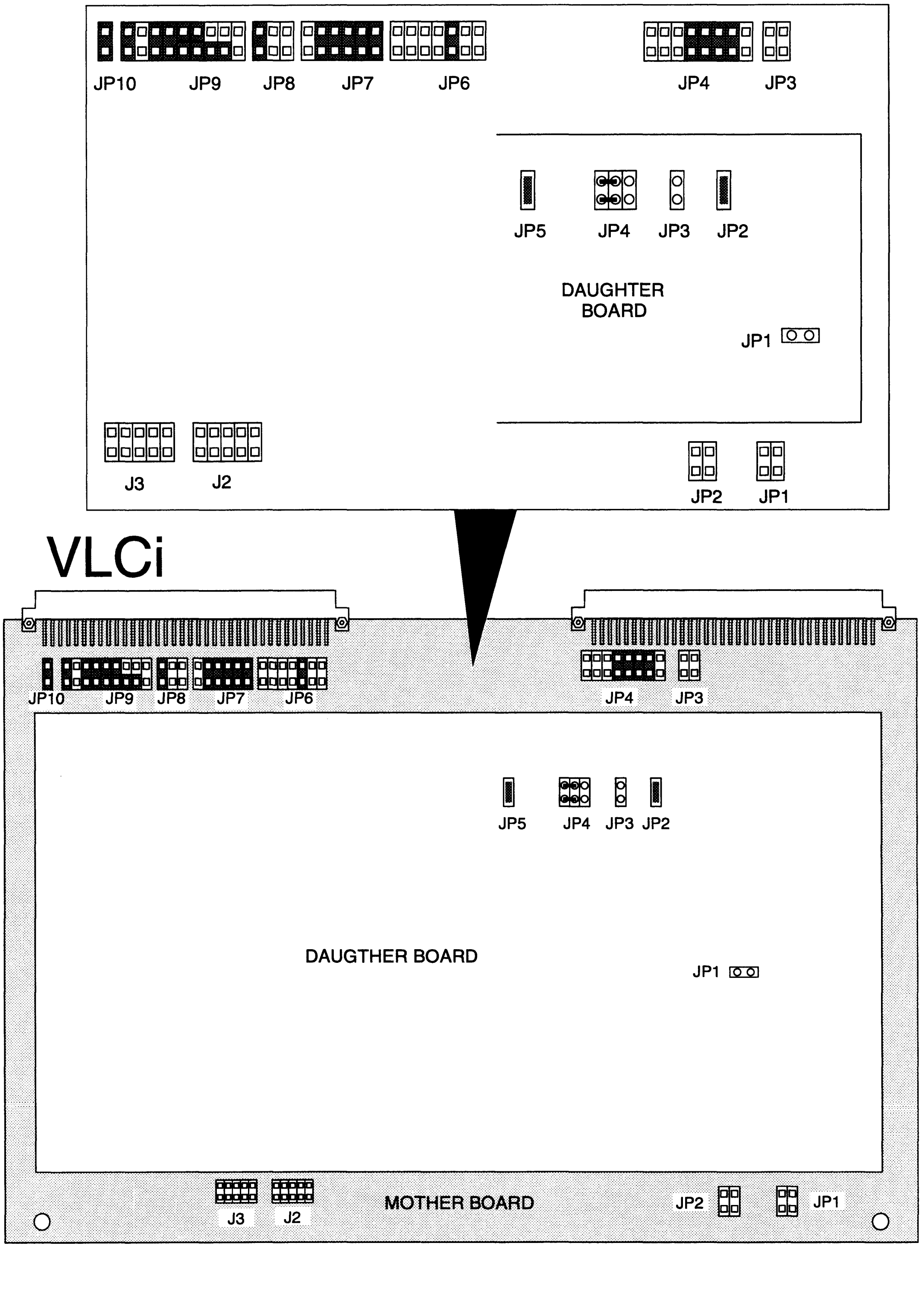


Figure 2–17 VLCi Board Jumper Locations

Table 2–24 Default Jumper Settings for VLCi Daughter Board

Jumper	Pins	Status	Function
JP1		Out	Interface type select
JP2		In	EPROM disabled
JP3		Out	MPU cache enabled
JP4	1, 2	In	EPROM type/size
	3, 4	In	EPROM type/size
	5, 6	Out	EPROM type/size
JP5	1, 2	In	68020 page mode

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

Table 2–25 Default Jumper Settings for VLCi Boards (All Board Positions)

Jumper	Pins	Status	Function
JP1	1, 2	Out	VME longword burst size
	3, 4	Out	VME longword burst size
JP2		Out	Ethernet interface type select
JP3		Out	Network connect via DB15
JP6	1, 2	In	Interrupt request level
	3, 4	Out	Interrupt request level
	5, 6	Out	Interrupt request level
	7, 8	Out	Interrupt request level
	9, 10	In	Interrupt request level
	11, 12	Out	Interrupt request level
	13, 14	Out	Interrupt request level
JP9	1, 2	In	Bus request level
	3, 4	Out	Bus request level
	5, 6	In	Bus request level
	7, 8	In	Bus request level
	9, 11	In	Bus request level
	10, 12	In	Bus request level
	13, 15	In	Bus request level
	14, 16	Out	Bus request level
	17, 18	Out	Bus request level
JP10	1, 2	In	32–bit address mode

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

Table 2–26 Default Jumper Settings, VLCi Boards 0 Through 7 Address Variations

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
JP4	1, 2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 31
	3, 4	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 30
	5, 6	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 29
	7, 8	In	In	In	In	In	In	In	In	Address bit 28
	9, 10	In	In	In	In	In	In	In	In	Address bit 27
	11, 12	In	In	In	In	In	In	In	In	Address bit 26
	13, 14	In	In	In	In	In	In	In	In	Address bit 25
	15, 16	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 24
JP7	1, 2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 23
	3, 4	In	In	In	In	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	Address bit 22
	5, 6	In	In	$\boxed{Out}$	$\boxed{Out}$	In	In	$\boxed{Out}$	$\boxed{Out}$	Address bit 21
	7, 8	In	$\boxed{Out}$	In	$\boxed{Out}$	In	$\boxed{Out}$	In	$\boxed{Out}$	Address bit 20
	9, 10	In	In	In	In	In	In	In	In	Address bit 19
	11, 12	In	In	In	In	In	In	In	In	Address bit 18

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
$\boxed{In}$ or $\boxed{Out}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

Configuring a Model 7416 VME Token Ring Controller (VTRC) Board

When you receive a VTRC board from Data General Corporation, it is factory configured for board 0 default jumper settings and for DG/UX revision 5.4.1 or earlier. If the board you are installing is not the first of its type, you must reconfigure the board for the position that it is to occupy. Tables 2–27 through 2–29 provide jumper settings for the VTRC board. For example, to reconfigure a VTRC board to board 1, locate the column for board 1 in Table 2–28 or 2–29 and set the jumpers as indicated in the rectangles.

NOTE: If your configuration includes more than one Token Ring LAN controller board, make sure that no two boards have the same board number. The DG/UX operating system can then distinguish between **vitr(0), vitr(1)**, etc. as it refers to the VTRC boards.

Figure 2–18 shows the location of the jumpers and their settings on the VTRC board. For further information on the VTRC, refer to *Configuring the VME Token Ring Controller (VTRC) for AViiON® Systems.*

NOTE: Verify that the VME controller you plan to install is jumpered appropriately for the current revision of your DG/UX operating system.

Once you have positioned the proper jumper settings, follow the directions in Chapter 3 to install the VTRC board in the card cage.

NOTE: To prepare and install a token-ring LAN, TAUs, MAUs, and network hardware, see *DG / Token Ring Local Area Network Installation Guide.*

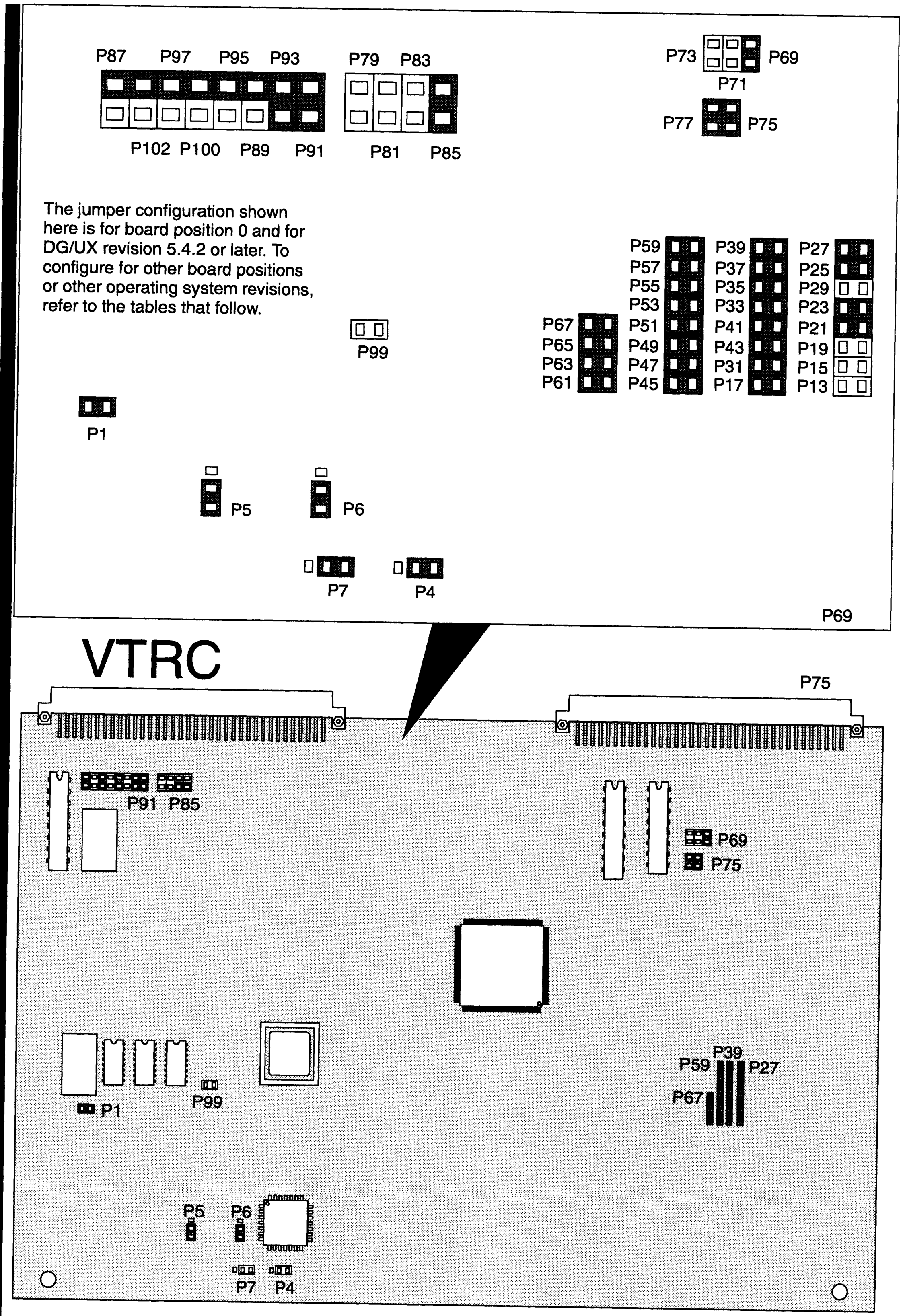


Figure 2–18 VTRC Board Jumper Locations

Table 2–27 Default Jumper Settings for VTRC Boards (All Board Positions)

Jumper	Pins	Status	Function
P1	1–2	In	Clock
P4	2–3	In	4Mb/s LAN speed
P5	2–3	In	Equalizer disconnect
P6	2–3	In	Equalizer disconnect
P7	1–2	In	4Mb/s LAN speed
P99	1–2	Out	4Mb/s LAN speed
P75	1, 2	In	Address size
P77	1, 2	In	Address size
P85	1–2	In	Bus request level 3
P83	1–2	Out	Bus request level 2
P81	1–2	Out	Bus request level 1
P79	1–2	Out	Bus request level 0
P91	1–2	In	Bus grant level 3
P93	1–2	In	Bus grant level 3
P89–2	P95–2	In	Bus grant level 2
P100–2	P97–2	In	Bus grant level 1
P102–2	P87–2	In	Bus grant level 0
P69	1–2	In	Interrupt request level
P71	1–2	Out	Interrupt request level
P73	1–2	Out	Interrupt request level

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

Table 2–28 Default Jumper Settings for VTRC Boards 0 Through 7 Address Variations (DG/UX 5.4.2 or later)

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
P13	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 31
P15	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 30
P19	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 29
P21	1–2	In	In	In	In	In	In	In	In	Address bit 28
P23	1–2	In	In	In	In	In	In	In	In	Address bit 27
P29	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 26
P25	1–2	In	In	In	In	In	In	In	In	Address bit 25
P27	1–2	In	In	In	In	In	In	In	In	Address bit 24
P17	1–2	In	In	In	In	In	In	In	In	Address bit 23
P31	1–2	In	In	In	In	In	In	In	In	Address bit 22
P43	1–2	In	In	In	In	In	In	In	In	Address bit 21
P41	1–2	In	In	In	In	In	In	In	In	Address bit 20
P33	1–2	In	In	In	In	In	In	In	In	Address bit 19
P35	1–2	In	In	In	In	In	In	In	In	Address bit 18
P37	1–2	In	In	In	In	In	In	In	In	Address bit 17
P39	1–2	In	In	In	In	In	In	In	In	Address bit 16
P45	1–2	In	In	In	In	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	Address bit 15
P47	1–2	In	In	$\boxed{Out}$	$\boxed{Out}$	In	In	$\boxed{Out}$	$\boxed{Out}$	Address bit 14
P49	1–2	In	$\boxed{Out}$	In	$\boxed{Out}$	In	$\boxed{Out}$	In	$\boxed{Out}$	Address bit 13
P51	1–2	In	In	In	In	In	In	In	In	Address bit 12
P53	1–2	In	In	In	In	In	In	In	In	Address bit 11
P5	1–2	In	In	In	In	In	In	In	In	Address bit 10
P57	1–2	In	In	In	In	In	In	In	In	Address bit 09
P59	1–2	In	In	In	In	In	In	In	In	Address bit 08
P61	1–2	In	In	In	In	In	In	In	In	Address bit 07
P63	1–2	In	In	In	In	In	In	In	In	Address bit 06
P65	1, 2	In	In	In	In	In	In	In	In	Address bit 05
P67	1–2	In	In	In	In	In	In	In	In	Address bit 04

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
$\boxed{In}$ or $\boxed{Out}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

Table 2–29 Default Jumper Settings, VTRC Boards 0 Through 7 Address Variations (DG/UX 5.4.1 or earlier)

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
P13	1–2	In	In	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	Address bit 31
P15	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 30
P19	1–2	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 29
P21	1–2	In	In	In	In	In	In	In	In	Address bit 28
P23	1–2	In	In	In	In	In	In	In	In	Address bit 27
P29	1–2	In	In	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	Address bit 26
P25	1–2	In	In	In	In	In	In	In	In	Address bit 25
P27	1–2	Out	Out	$\boxed{In}$	$\boxed{In}$	$\boxed{In}$	$\boxed{In}$	$\boxed{In}$	$\boxed{In}$	Address bit 24
P17	1–2	In	In	In	In	In	In	In	In	Address bit 23
P31	1–2	In	In	In	In	In	In	In	In	Address bit 22
P43	1–2	In	In	In	In	In	In	In	In	Address bit 21
P41	1–2	In	In	In	In	In	In	In	In	Address bit 20
P33	1–2	In	In	In	In	In	In	In	In	Address bit 19
P35	1–2	In	In	In	In	In	In	In	In	Address bit 18
P37	1–2	In	In	In	In	In	In	In	In	Address bit 17
P39	1–2	In	In	In	In	In	In	In	In	Address bit 16
P45	1–2	In	In	In	In	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	$\boxed{Out}$	Address bit 15
P47	1–2	In	In	$\boxed{Out}$	$\boxed{Out}$	In	In	$\boxed{Out}$	$\boxed{Out}$	Address bit 14
P49	1–2	In	$\boxed{Out}$	In	$\boxed{Out}$	In	$\boxed{Out}$	In	$\boxed{Out}$	Address bit 13
P51	1–2	In	In	In	In	In	In	In	In	Address bit 12
P53	1–2	In	In	In	In	In	In	In	In	Address bit 11
P5	1–2	In	In	In	In	In	In	In	In	Address bit 10
P57	1–2	In	In	In	In	In	In	In	In	Address bit 09
P59	1–2	In	In	In	In	In	In	In	In	Address bit 08
P61	1–2	In	In	In	In	In	In	In	In	Address bit 07
P63	1–2	In	In	In	In	In	In	In	In	Address bit 06
P65	1, 2	In	In	In	In	In	In	In	In	Address bit 05
P67	1–2	In	In	In	In	In	In	In	In	Address bit 04

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
$\boxed{In}$ or $\boxed{Out}$	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

Configuring a Model 7431 VME FDDI Controller (VFC) Board

When you receive a VFC board from Data General Corporation, it is factory configured for board 0 default jumper settings. If the board you are installing is not the first of its type, you must reconfigure the board for the position that it is to occupy. Table 2–31 provides jumpering information for the VFC board. For example, to reconfigure a VFC board to board 1, locate the column for board 1 in Table 2–31 and set the jumpers as indicated in the rectangles.

NOTE: If your configuration includes more than one VFC board, make sure that no two boards have the same board number. The DG/UX operating system recognizes all VFC options by the device name **pefn**.

Figure 2–19 shows the location of the jumpers and their settings on the VFC board. For further information on the VFC, refer to the *VMEbus FDDI Controller (VFC) User's Guide*.

NOTE: Verify that the current revision of your DG/UX operating system is suitable for the VME controller you plan to install.

Once you have installed the board jumpers, follow the directions in Chapter 3 to install the VFC board(s) into the card cage.

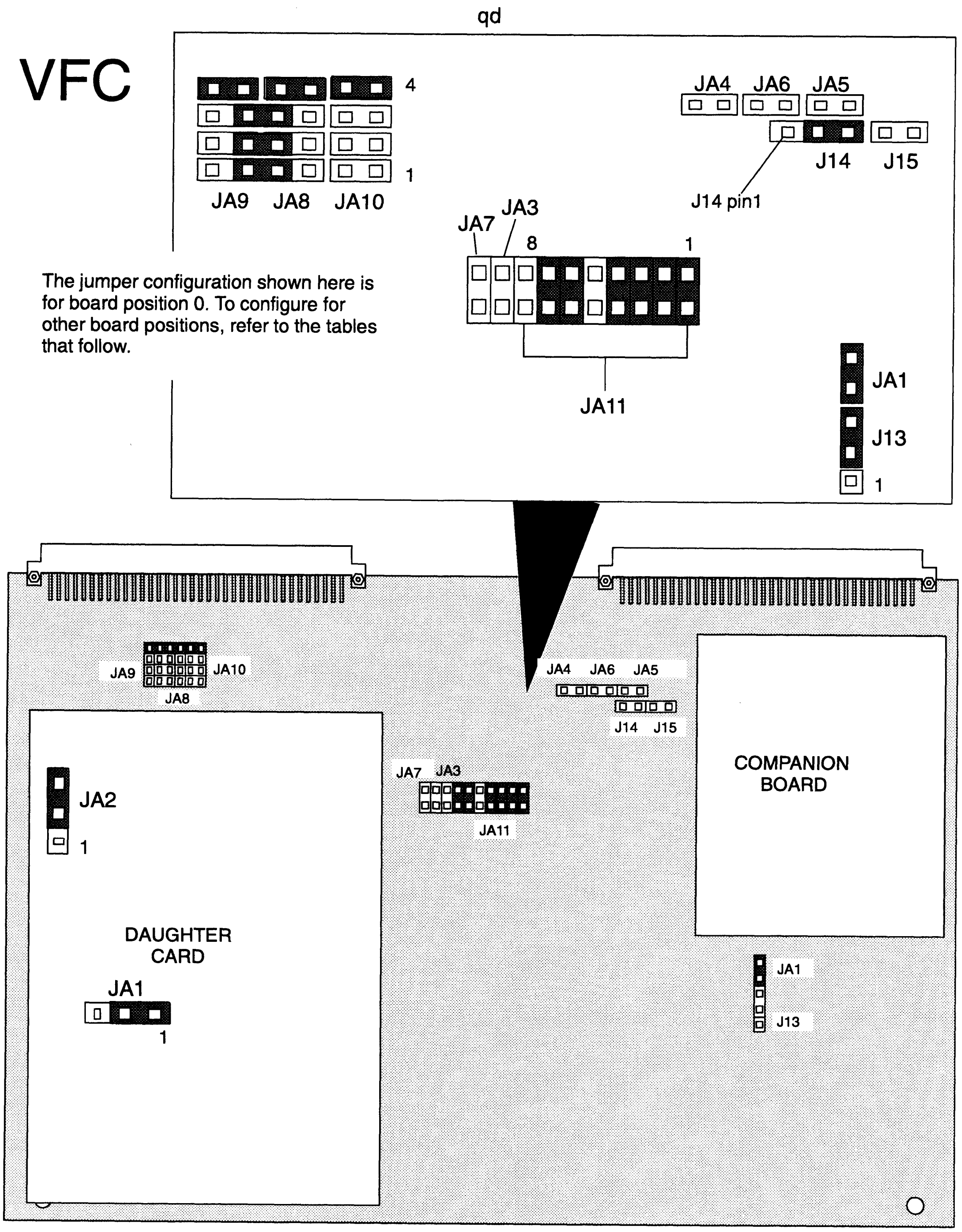


Figure 2–19 VFC Board Jumper Locations

Table 2–30 Default Jumper Settings for VFC Boards (All Board Positions)

Jumper Pins		Status	Function
JA1		In	Dual PHY
JA3		Out	BCLK termination
JA4		Out	Local clock enabled
JA5		Out	Optical bypass control
JA6		Out	Optical bypass control
JA7		Out	BBSY early release
JA8 pin 8 to JA9 pin 1		In	Bus request priority level 3
JA8 pin 7 to JA9 pin 2		In	Bus request priority level 3
JA8 pin 6 to JA9 pin 3		In	Bus request priority level 3
JA8	4–5	In	Bus request priority level 3
JA9	4–5	In	Bus request priority level 3
JA10	4–5	In	Bus request priority 3
J13	2, 3	In	Missed frame interrupts
J14	2, 3	In	Frame segmentation
J15		Out	Restricted token interrupts
Daughter Board			
JA1	1–2	In	EPROM size
JA2	2–3	In	Single vs. split export register

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.

Table 2–31 Default Jumper Settings, VFC Boards 0 through 7 Address Variations

Jumper	Pins	Board Number 0	1	2	3	4	5	6	7	Function
JA11	1	In	*Out*	In	*Out*	In	*Out*	In	*Out*	Address bit 9
	2	In	In	*Out*	*Out*	In	In	*Out*	*Out*	Address bit 10
	3	In	In	In	In	*Out*	*Out*	*Out*	*Out*	Address bit 11
	4	In	In	In	In	In	In	In	In	Address bit 12
	5	Out	Out	Out	Out	Out	Out	Out	Out	Address bit 13
	6	In	In	In	In	In	In	In	In	Address bit 14
	7	In	In	In	In	In	In	In	In	Address bit 15
	8	Out	Out	Out	Out	Out	Out	Out	Out	Address modifier

Notation	Indicates
In	Jumper installed.
Out	Jumper removed.
In or *Out*	Jumpers that you must install (*In*) or remove (*Out*) in the field; all other jumpers are factory-configured, as indicated.

End of Chapter

Chapter 3
Installing and Removing VME Option Boards

This chapter contains information and general instructions for removing and installing VME option boards in an AViiON computer card cage. The information in this chapter assumes you have planned and verified your configuration as described in Chapter 1, and configured any new boards as described in Chapter 2.

Before you begin to install or remove a VME option board, you will need the following:

- A thorough understanding of the section “Avoiding ESD Damage” in Chapter 1.
- The expanding and/or maintaining manuals for your system if you need to jumper the backplane as noted in “Assigning Card Cage Slots” in Chapter 1.
- Nonmagnetic needlenose pliers if you need to jumper the backplane.
- A number 1 flat-blade screwdriver.
- A medium Phillips screwdriver.

WARNING: Unqualified personnel attempting to remove, install, or service internal components or options in AViiON 5000, 6000, 7000, and 8000 series systems risk both personal injury and damage to the system. Data General Corporation supports the maintenance and expansion of these systems by qualified Data General personnel *only*. Service by other than Data General personnel may void product warranties. For more information regarding Data General warranties, refer to your Data General sales and field engineering contracts.

Card Cage Assembly

The card cage assembly in an AViiON computer system consists of a metal housing with formed board slots and a backplane printed circuit board that attaches to the metal housing. The card cage’s mechanical and electrical designs comply with the specifications described in *The VMEbus Specification* manual.

The formed slots on computer systems covered in this manual align two Eurocard 6U form factor boards (233 mm x 160 mm) to the connectors on the backplane board. Figure 3–1 shows a typical 6U board assembly. Figure 3–2 shows the location of the VMEbus options card cages in the rear of typical AViiON computers.

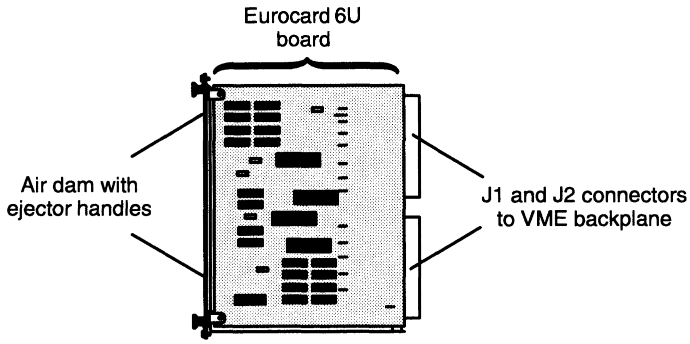


Figure 3–1 Typical VME Board Assembly

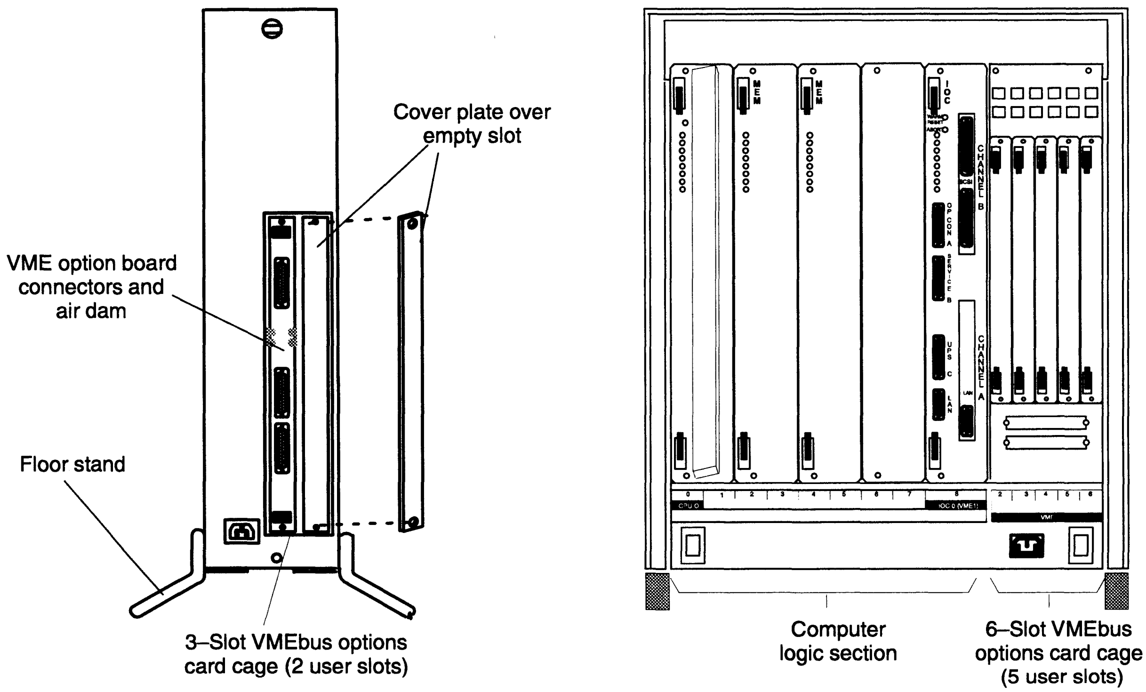


Figure 3–2 Rear View of Typical AViiON Computer Systems

A backplane printed circuit board attaches to the rear of the card cage (as viewed from the rear of the unit) and contains two connectors (J1 and J2) for each board slot. Figure 3–3 shows a card cage layout with the guide rails and backplane connectors for two VME option boards. A system supporting more option boards has a similar layout, but differs in size of cage, backplane, and number of guide rails and connectors. Appendix A lists the J1 and J2 bus signals.

Air dams on the front of the VME controller boards and cover plates that fill in the empty slots direct the air flow over the boards and contain electromagnetic discharge interference (EMI). *Never run the computer without an air dam or cover plate over every slot.* Some of the computers also require a filler board for each empty slot in the card cage. Always make sure that you have at least 2 inches of clearance around the computer and between the computer's bottom skirt and the floor so that the blower can properly circulate cooling air. Figure 3–4 shows the rear of a typical 2–slot AViiON computer unit with an air dam, cover plate, and floor stand properly installed. Also see the section "Installing an EMI/Air Dam Upgrade Kit" that follows.

NOTE: If you are installing a VME FDDI Controller (VFC) board, you may need to refer to Appendix D for instructions on attaching the air dam to the board before you install it in your computer.

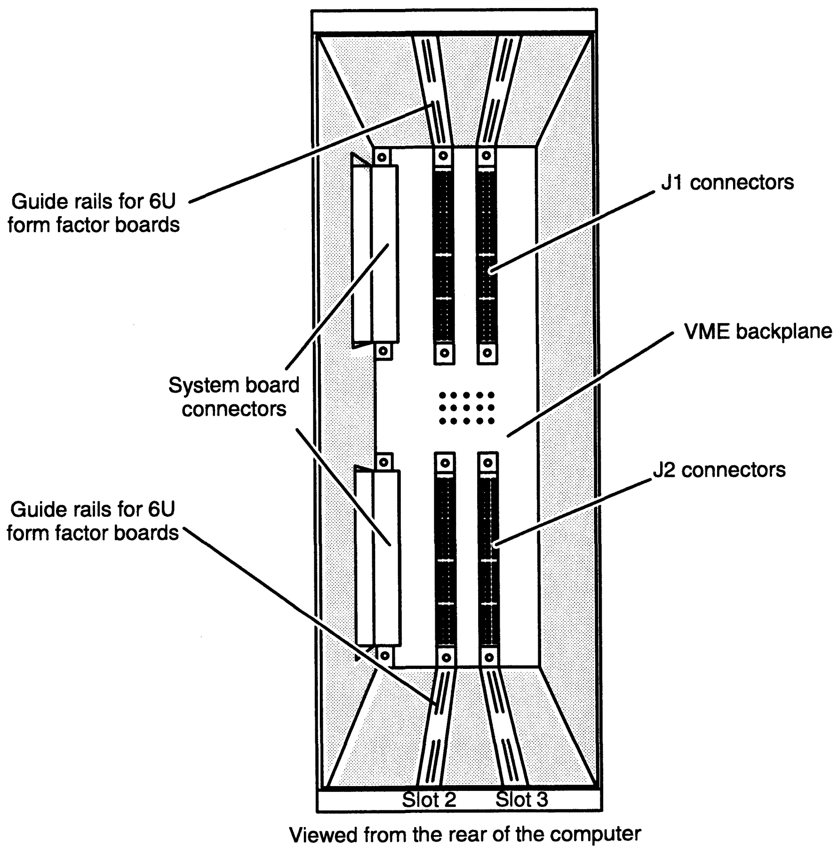


Figure 3–3 2–Slot Card Cage Layout Showing Guide Rails and Backplane Connector

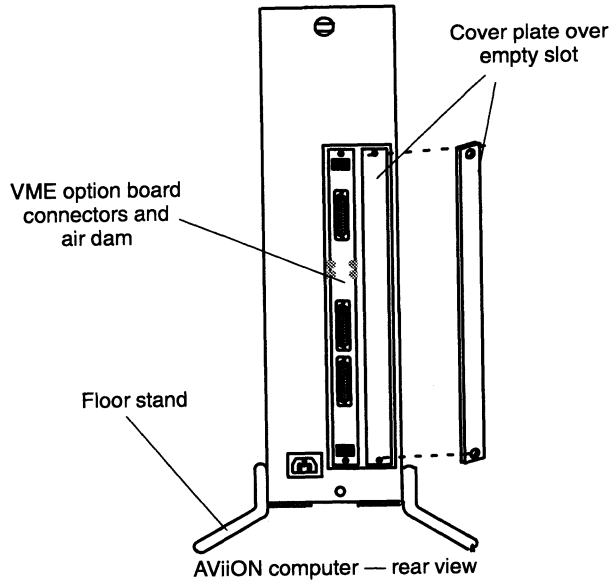


Figure 3–4 Air Dams on an AViiON VME Card Cage

Installing an EMI/Air Dam Upgrade Kit

If your model AViiON system has the old EMI (ElectroMagnetic Interference) /air dam system, you must install an EMI/air dam upgrade kit before you can add new VME controller boards or replace existing boards with spares received from Data General. Figure 3–5 shows both old and new air dams.

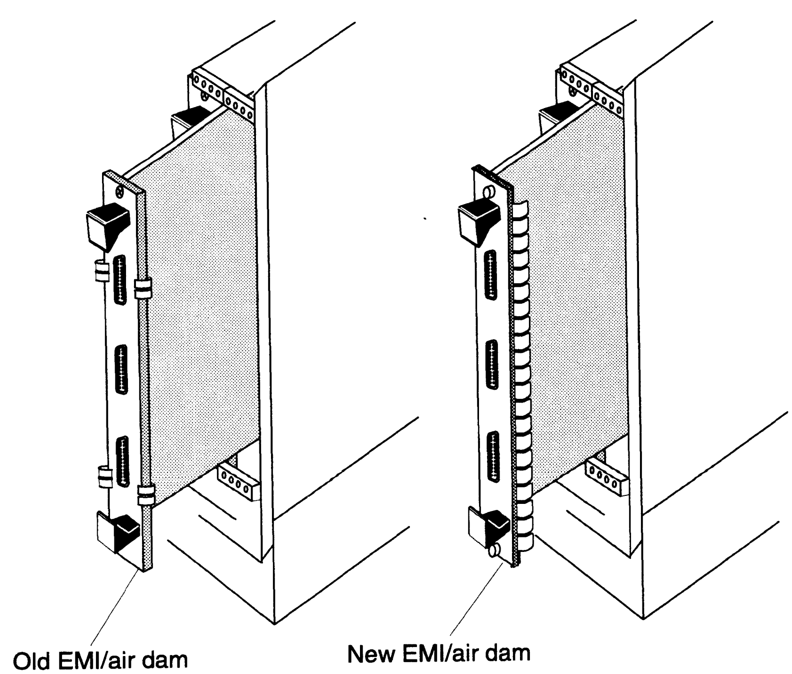


Figure 3–5 Old–Style and New–Style EMI/Air Dams

This upgrade kit consists of two metal strips that attach to the sides of the card cage as shown in Figure 3–6. These strips provide EMI shielding and, in conjunction with air dams on the controller boards, maintain proper cooling pressure within the card cage. New VME controller boards and the replacement spares for your existing boards have the new air dams that work with the EMI/Air Dam Upgrade.

CAUTION: *An improper arrangement of old and new boards within a card cage can cause boards to short out and be damaged. See Figure 3–7 for allowed and disallowed configurations. Also, if in the same card cage you mix a controller having the old air dam along with a controller having the new air dam, you must install only the stick–on metal strip of the EMI / Air Dam Upgrade kit shown in Figure 3–6.*

Install the upgrade kit as follows:

1. Install the metal strip with adhesive patches as shown in Figure 3–6. Take care that the strip is oriented as shown in the illustration (the adhesive patch at the bottom of the strip must be aligned with the bottom of the card cage).
2. If both of the VME controller boards have the new air dams, install the angled strip (with EMI clips) from the update kit as shown in Figure 3–6. The strip attaches to the card cage with two screws and associated washers.

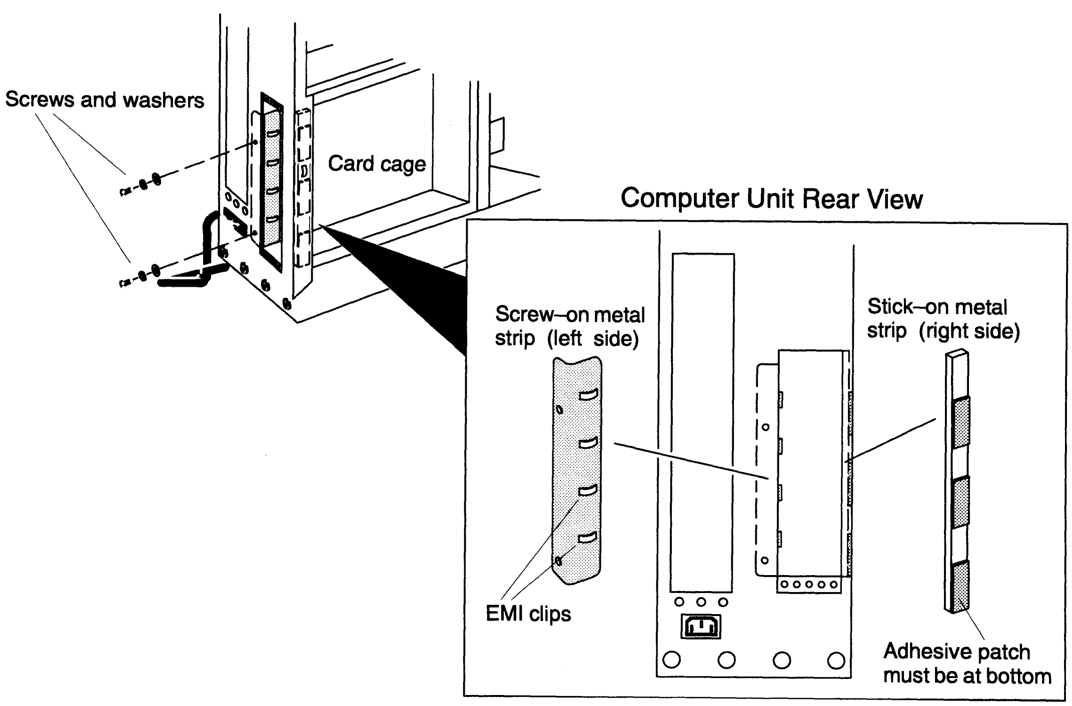


Figure 3–6 EMI/Air Dam Upgrade Kit Installed on an AViiON VME Card Cage

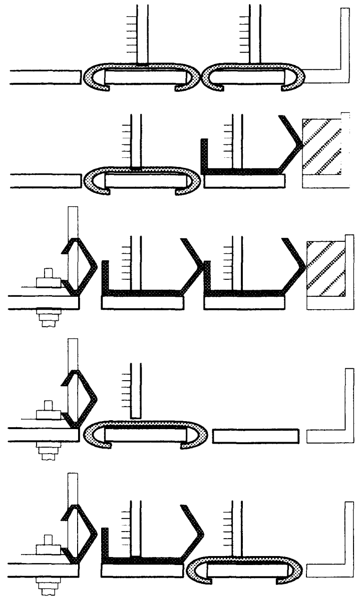
Yes – Configuration Allowed
(both boards with old EMI/air dams)

Yes – Configuration Allowed
(1 board with old EMI/air dam;
1 board with new EMI/air dam;
right–side stick–on metal strip
installed)

Yes – Configuration Allowed
(both boards with new EMI/air dam;
both left and right–side metal strips
installed)

No – Configuration Not Allowed
(1 board with old EMI/air dam;
new EMI clips installed;
left–side screw–on metal strip
installed)

No – Configuration Not Allowed
(1 board with new EMI/air dam;
1 board with old EMI/air dam;
left–side screw–on metal strip
installed)



Legend

Old EMI/Air dam
New EMI/Air dam
Stick–on metal strip
EMI clips

Figure 3–7 Mixing Configurations – Boards with Old and New EMI/Air Dams

Removing and Installing Boards

This section describes how to remove and install VME option boards.

WARNING: **Unqualified personnel attempting to remove, install, or service internal components or options in AViiON 5000, 6000, 7000, and 8000 series systems risk both personal injury and damage to the system. Data General Corporation supports the maintenance and expansion of these systems by qualified Data General personnel *only*. Service by other than Data General personnel may void product warranties. For more information regarding Data General warranties, refer to your Data General sales and field engineering contracts.**

NOTE: The instructions in this chapter cover all standard VME option boards supported by your AViiON system, including the Model 7411–KA VAC/16 board. Data General Model 7411–K VAC/16 boards, however, include nonstandard air dams and junction box assemblies. For instructions on removing and installing Model 7411–K option boards, refer to Appendix D, "Special Instructions for Model-Specific VME Hardware."

CAUTION: If your system has the old EMI / air dam system, you must install an EMI / Air Dam Upgrade Kit as described in the previous section before installing new or replacement VME controller boards with the new EMI / air dams.

Removing Boards from the VME Card Cage

To remove a VME option board, follow these instructions:

1. Set up an ESD kit (see Chapter 1 for instructions).
2. Shut down your operating system, and then turn off your computer system power. Refer to your expanding and/or maintaining manuals for instructions, if necessary.
3. Disconnect any external devices.
4. Release the securing screws on the top and bottom of the board's air dam, shown in Figure 3–8. Put the screws in a safe place so you can use them later (on newer models, do not remove the screws completely from the air dam).

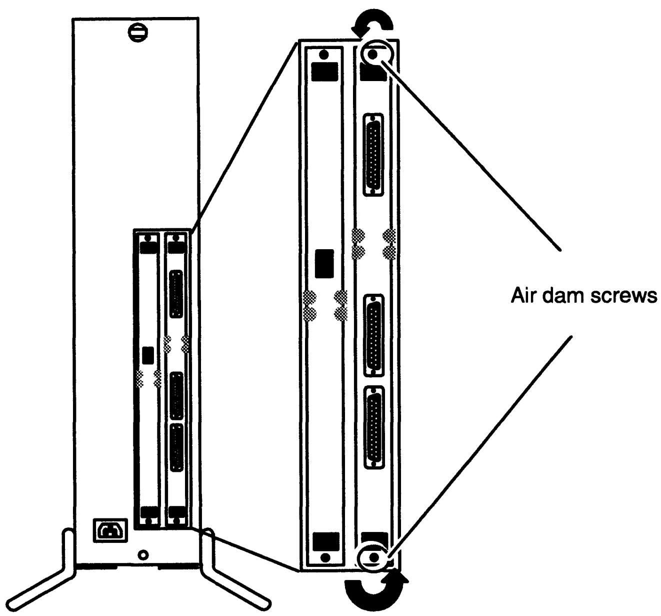


Figure 3–8 Releasing Air Dam Screws

7. Release the board from the backplane connectors by simultaneously pressing the top ejector handle up and the bottom handle down, as shown in Figure 3–9. You will feel the board release as the connector leaves the backplane pins.

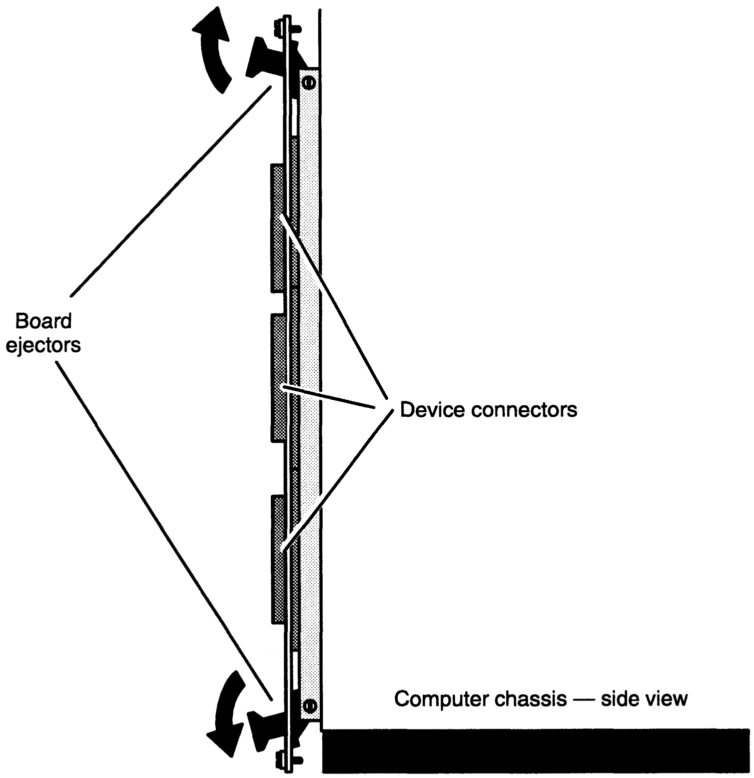


Figure 3–9 Releasing an Option Board

8. Pull the board straight out of the card cage, pulling *gently* by the handles. Do not pull from side to side or otherwise risk bending or breaking the connector pins.

9. Lay the removed board on a static-free mat or bag.

10. Install a replacement board as described in the next section, or install a cover plate over the cage opening by inserting and tightening the securing screws. Use Figure 3–4 if necessary for reference.

CAUTION: Never run the computer without an air dam or cover plate over every empty slot.

Installing Boards in the VME Card Cage

To install a VME option board, follow these instructions:

1. Set up an ESD kit.

2. Shut down your operating system; then turn off your computer system power. Refer to your expanding and/or maintaining manual(s) for instructions, if necessary.

3. Remove the existing board or cover plate as described in the preceding section. Make certain that you save the plate and screws; you may need them later.

4. Align the board you configured as described in Chapter 2 with the guide rails in the card cage slot you assigned as described in Chapter 1. Hold the board vertically by the ejector handles; make certain the board is right side up (the component side faces to the right). Figure 3–10 identifies the guide rails and shows how to align a board in a typical VME card cage.

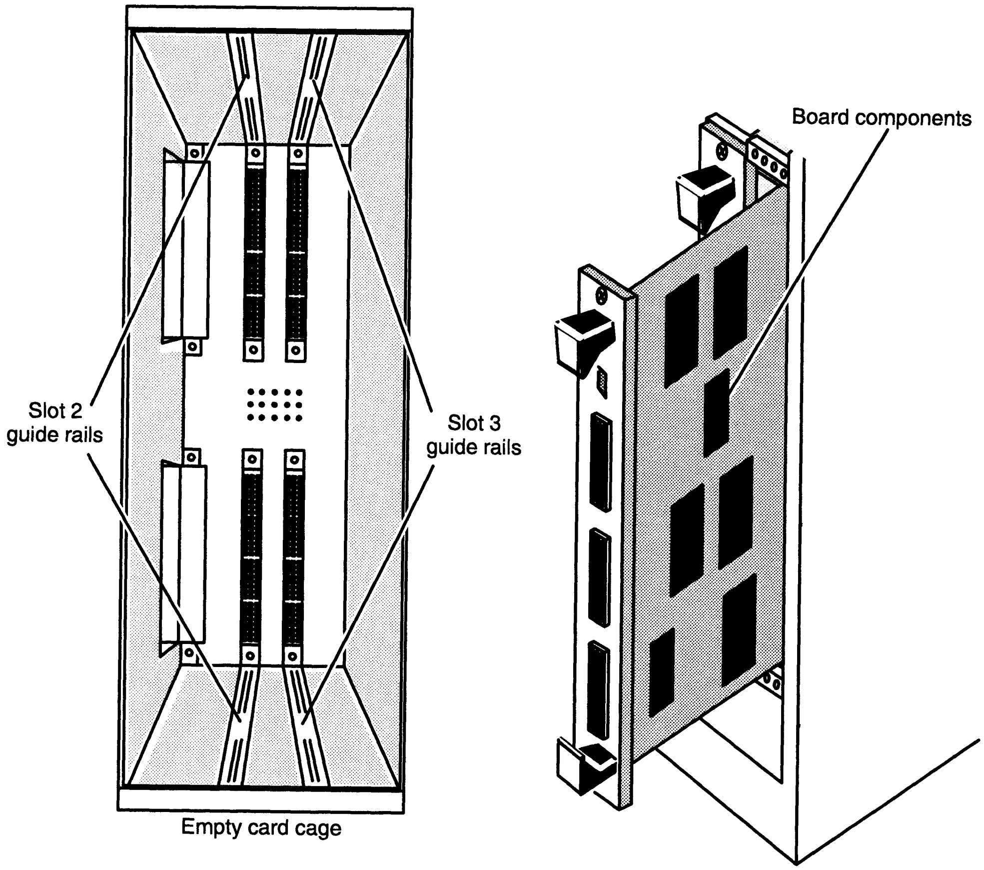


Figure 3–10 Aligning Board in Card Cage

5. Engage the board carefully in the rails of the card cage. Push the board straight in one-half of the way, using the handles as shown in Figure 3–11.

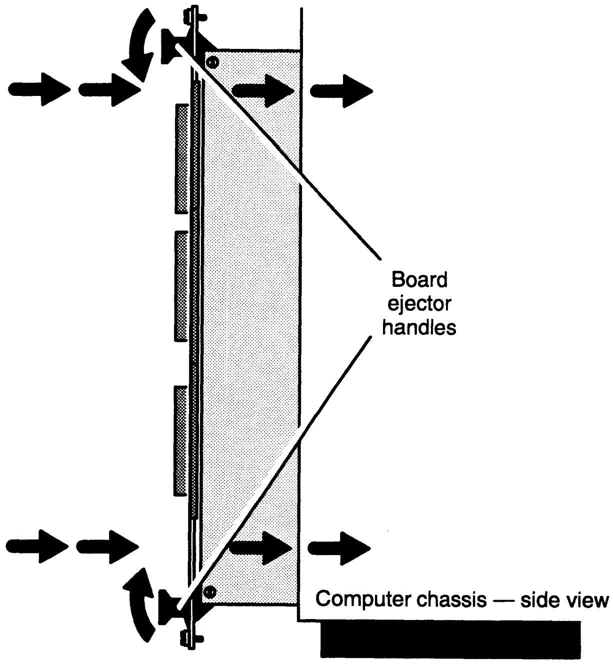


Figure 3–11 Board-Ejector Positions When Installing Board

6. With the board one-half of the distance into the slot, verify that the board rests in both the top and bottom guide rails. With the top and bottom board ejectors positioned as shown in Figure 3–11, carefully slide the board straight into the slot until you feel the connectors seat with the backplane connectors. Do not push the board from side to side or otherwise risk bending or breaking the connector pins. The air dam on your VME board should be flush against the securing bar when the board is properly seated. Figure 3–12 identifies the securing bar in the card cage.

7. Once the board is seated in the card cage slot, secure the board in place by inserting and tightening the securing screws above and below the handles into the securing bar, as shown in Figure 3–12.

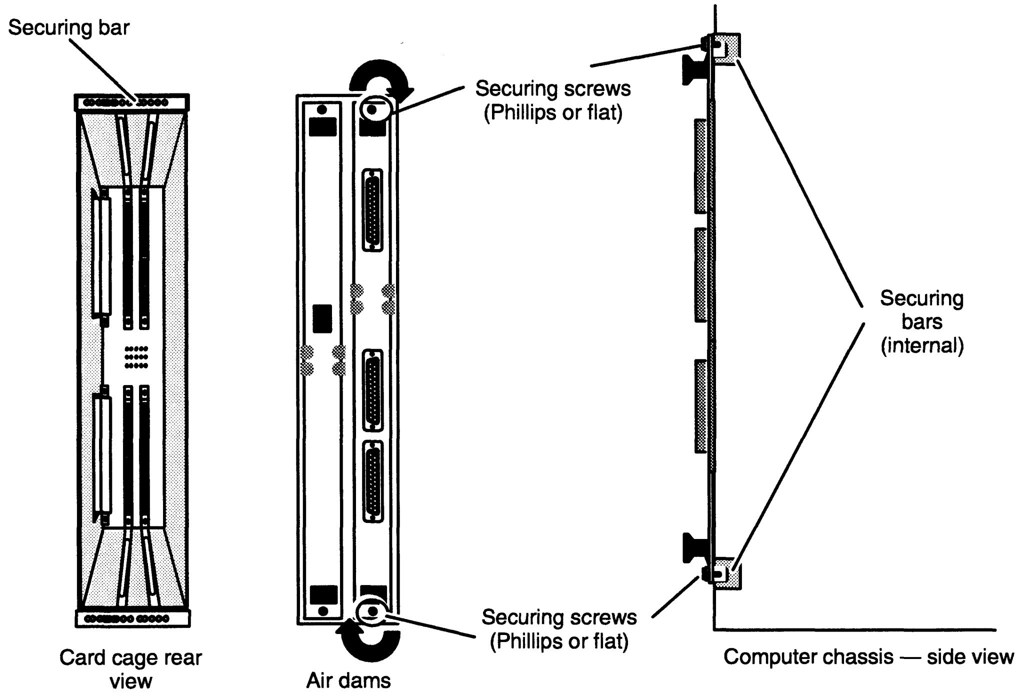


Figure 3–12 Securing a VME Board in the Card Cage

Once you have secured the boards in the card cage, follow the directions in the next section, "Completing the Configuration."

NOTE: If your board appears properly seated, but you cannot secure the captive stand-off screws on your board's air dam, refer to the section on "Securing Boards with Captive Stand-Off Screws" in Appendix D.

Completing the Configuration

Once you have installed the board(s) in the planned configuration, you need to install any necessary backplane jumpers, connect external devices to the VME board(s), and rebuild the DG/UX operating system kernel. We also recommend that you verify your new configuration by running an AViiON System Diagnostics acceptance test after adding any new devices to your computer system.

Installing Backplane Jumpers for Empty Slots

If the VME card cage contains one or more empty slots *between* two boards, you must install five jumpers on the backplane pins of each empty slot's J1 connector. (You noted this necessity when you assigned card cage slots to your configuration in Chapter 1; we recommend that you avoid this configuration whenever possible.) If your previous card cage configuration combined an empty slot 2 with an option board in slot 3, and your new configuration includes a board in slot 2, you must *remove* the backplane jumpers from slot 2.

If neither of these conditions applies to your system, you can skip the remainder of this chapter and go directly to Chapter 4, "Connecting Devices to the External Connectors."

NOTE: In most cases, you need to remove a side or rear panel from your computer unit chassis to gain access to the rear of the VME backplane. Refer to your system's expanding and/or maintaining manual(s) for instructions; Figure 3–13 shows an AViiON 4000 series computer unit with the power supply and backplane exposed.

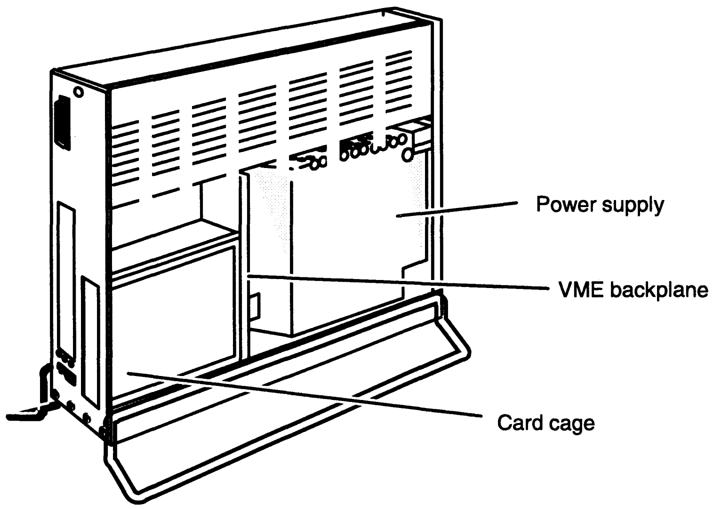


Figure 3–13 Typical AViiON Unit with VME Backplane Exposed

To correctly configure your VME backplane, refer to Figure 3–14. The upper left part of that figure shows the position of the J1 connectors on the rear of the backplane. The right side of Figure 3–14 shows the five jumpers that you must install on each empty slot that is *between* two boards in the card cage. You must remove these jumpers from any slot that contains a board*; do not leave jumpers on slots that contain VME option boards.*

After you install or remove the required backplane jumpers, reinstall any panels you removed to gain access to the backplane. Continue with the remainder of this chapter.

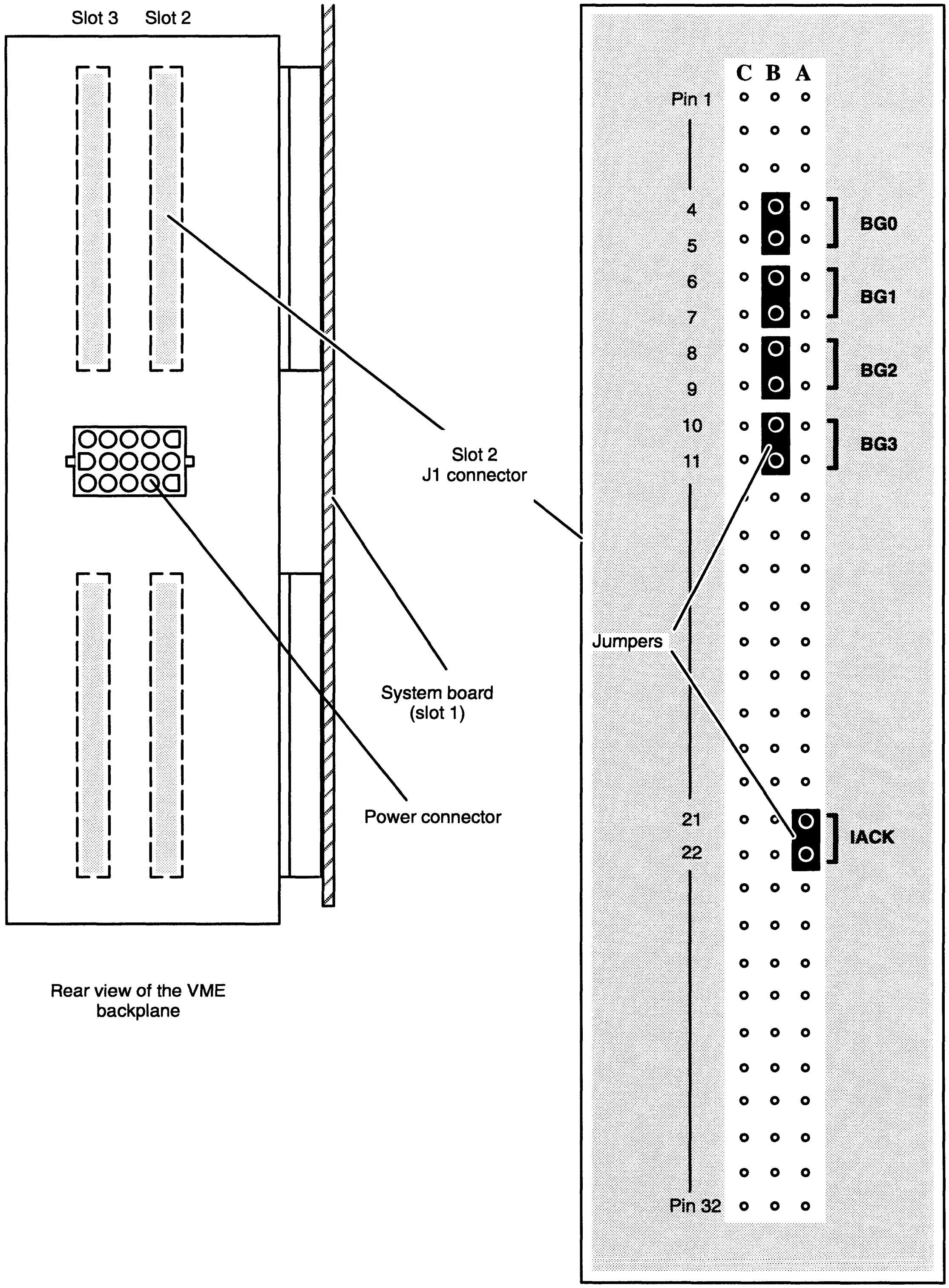


Figure 3–14 Installing or Removing Backplane Terminators

Connecting Devices to the External Connectors

Once you have configured the computer, you can connect terminals, printers, modems, and other devices to the connectors on the computer's rear panel by following the instructions in your setting up and/or expanding manuals. The next chapter in this manual explains how to connect such devices to VAC/16, VDA/128, VDA/255, VTC, VSC/3, VSC/3i, VSA, VLC, VLCi, VTRC, and VFC device connectors.

Rebuilding the DG/UX Operating System Kernel

After you install a new VME option board, configure your backplane, and connect external devices, you must power up your computer system, and then modify your system software to recognize and use the new devices. If your system uses the DG/UX operating system, you must rebuild the DG/UX kernel. To do this, refer to *Installing and Managing the DG/UX™ System* if you are running DG/UX Release 4.3*n* or lower, or to *Customizing the DG/UX™ System* if you are running DG/UX Release 5.4.0 or higher.

Running an Acceptance Test

We recommend that you run an AViiON System Diagnostics acceptance test after adding any new devices to your system. You can run the acceptance test before or after rebuilding your operating system kernel (for convenience, you might want to test the new configuration immediately after rebuilding the DG/UX system kernel). Refer to the manual *Using AViiON System Diagnostics* or *Testing and Troubleshooting AViiON® Computers: AV/Alert and the AViiON® Diagnostic Tool Set* for instructions.

End of Chapter

Chapter 4
Connecting External Devices to VME Option Boards

This chapter describes how to connect peripheral devices to VME boards installed in your computer unit's VME card cage. It also describes the cables and connectors you need, and how to set up and connect VDA/128 and VDA/255 communications clusters.

WARNING: **All of the instructions in this chapter begin with the assumption that your computer is turned OFF, and that you have disconnected the power cord(s) from your computer system's power source(s). Refer to your installing and/or expanding manuals to review safety precautions, if necessary.**

You should review the configuration guidelines in your setting up manual(s), and read the sections on each optional device your system will include, *before* you begin setting up the remainder of your system. Set up your peripherals according to the device-specific manuals for each device, and then follow the procedures in this chapter to connect them to your system.

NOTE: After you connect devices to your VME option board(s), you must power up your computer system, and then modify your system software to recognize and enable the new devices. If your system will run DG/UX Release 4.30 or one of its updates, refer to *Installing and Setting Up the DG / UX™ System on Stand-Alone Multiuser AViiON® Computers* for instructions. If your system will run DG/UX Release 5.4.0 or higher, see *Customizing the DG / UX™ System.*

We recommend that you run an AViiON System Diagnostics acceptance test the first time you power up, and after adding any new devices to your system. Refer to *Using AViiON® System Diagnostics* or *Testing and Troubleshooting AViiON® Computers: AV / Alert and the AViiON® Diagnostic Tool Set* for instructions.

Tools and Equipment

To set up and connect the various peripheral components of your system, you will need the following tools and equipment as a minimum set. Some devices may require additional equipment as indicated in the installation manuals for each device.

- All manuals describing how to set up and configure peripheral devices; in some cases, this includes several manuals for a single device.
- Small flat-head screwdriver.
- Needlenose pliers.
- Phillips screwdriver.

Organization of This Chapter

This chapter contains instructions for VME option boards in this general order: asynchronous controllers, synchronous controllers, SCSI controller, Ethernet LAN controllers, token ring LAN controller, and FDDI controller. The major sections are as follows:

- Connecting Asynchronous Devices to a VAC/16 Controller
- Connecting VDA/128 and VDA/255 Communications Clusters
- Connecting a VTC Controller to an Ethernet LAN
- Connecting Synchronous Devices to a VSC/3 Controller
- Connecting Synchronous Devices to a VSC/3i Controller
- Connecting SCSI Devices to a VSA SCSI-2 Controller
- Connecting a VLC Controller to an Ethernet LAN
- Connecting a VLCi Controller to an Ethernet LAN
- Connecting a VTRC Controller to a Token Ring LAN
- Connecting a VFC Controller to a FDDI Ring

Connecting Asynchronous Devices to a VAC/16 Asynchronous Controller

Each VAC/16 controller in your system supports 16 lines, with ports on attached 8-line junction boxes (J-boxes). Each full-duplex line on a J-box can support any data terminal device with an RS–232–C interface, such as an asynchronous terminal, a modem, or a serial printer. Figure 4–1 shows a VAC/16 junction box and the 8 asynchronous device connectors on the J-box.

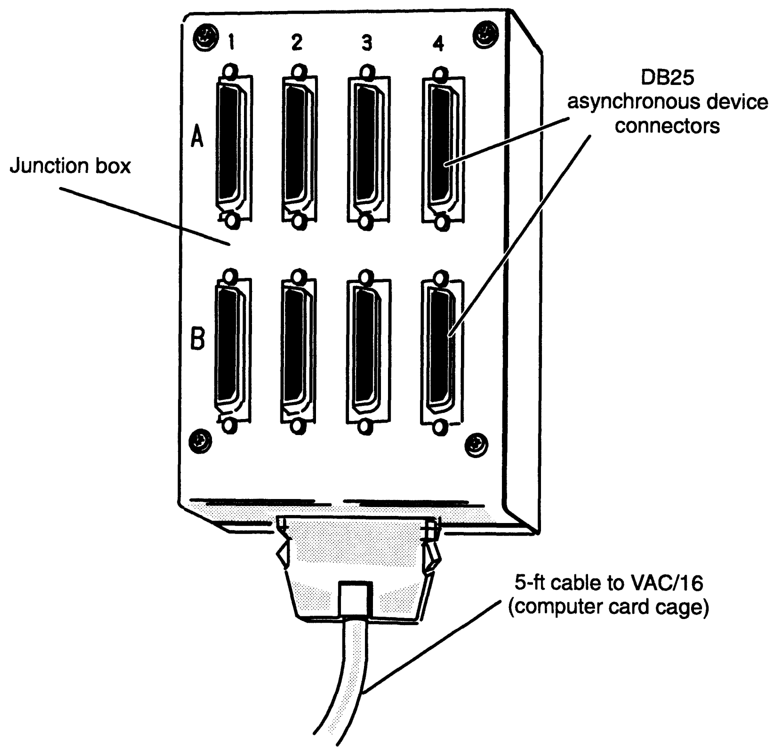


Figure 4–1 VAC/16 Junction Box

You can place your VAC/16 junction boxes on any convenient and safe horizontal surface, such as a floor, desk, or table. You can also *mount* (secure with screws) a VAC/16 J-box to a wall or other surface panel. If you plan to mount a J-box on a surface, follow the special instructions for doing so in Appendix D *before* you connect the J-box to your VAC/16 controller board or connect any external devices to the J-box device connectors. If you do not plan to mount a junction box on a surface, continue with the next section in this chapter.

Before you can connect asynchronous devices to a VAC/16 junction box, you need to attach the J-box to the controller board in your computer chassis. The following section illustrates this process for the Model 7411–KA VAC/16 assembly. To attach a Model 7411–K VAC/16 J-box and board assembly, refer to Appendix D for special instructions.

Connecting a Junction Box to a Model 7411–KA VAC/16 Controller

Each Model 7411–KA VAC/16 controller board in your computer extends its signals to two 8-port junction boxes through a 5-ft cable with 68-pin connectors at either end. Figure 4–2 shows the location of the J1 and J2 connectors on the VAC/16 board. Each connector supports an 8-port junction box.

NOTE: This chapter describes the Model 7411–KA VAC/16 assembly. Its counterpart Model 7411–K VAC/16 assembly uses nonstandard hardware (heavy gauge air dam without ejector handles, ribbon rather than hose cable between controller and J-box, and 64- rather than 68-pin connectors). To attach Model 7411–K junction boxes and controller boards, refer to Appendix D for special instructions.

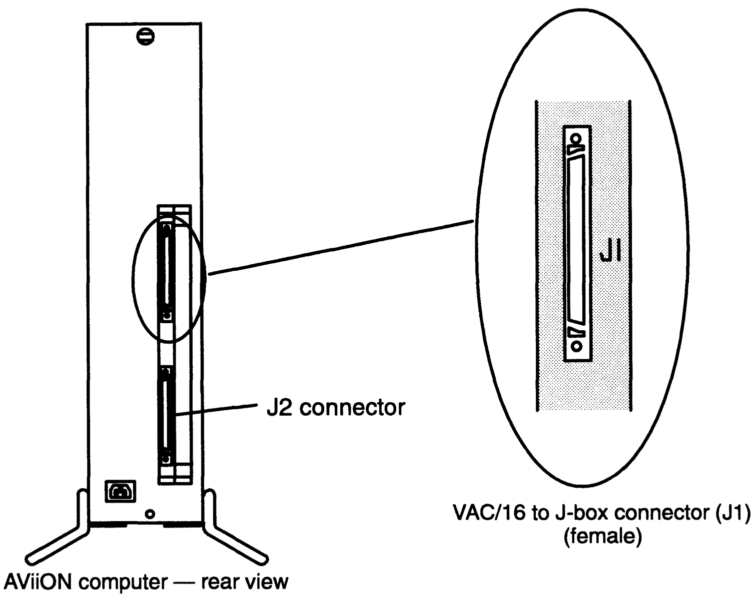


Figure 4–2 VAC/16 Controller Connectors

To connect a J-box to your controller, align the connector pins and D-shaped bevels on the cable, controller, and junction box connectors before gently pushing the connectors together as shown in Figures 4–3 and 4–4.

Plug each 68-pin cable connector into the proper J1 or J2 connector on the VAC/16 board, as shown in Figure 4–3.

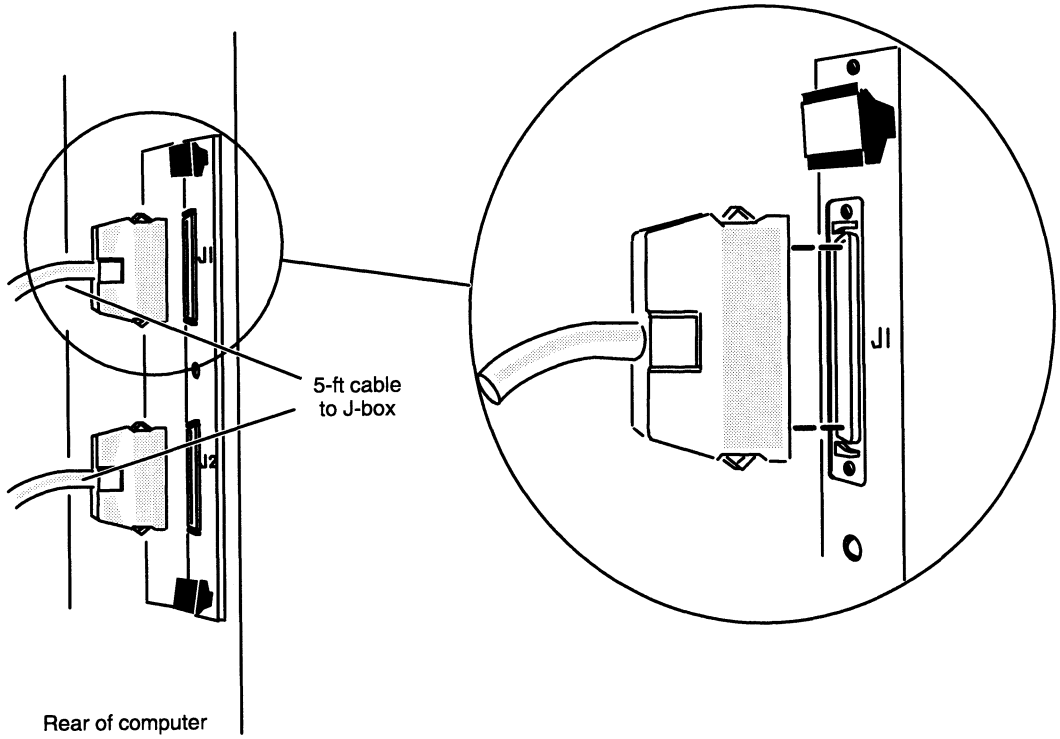


Figure 4–3 Plugging VAC/16 Controller Connectors to J-Box Cables

To remove a VAC/16 assembly cable, release the connection by simply squeezing the clips at either side of the cable connector, as shown in Figure 4–4. With the connector released, gently pull the cable straight out.

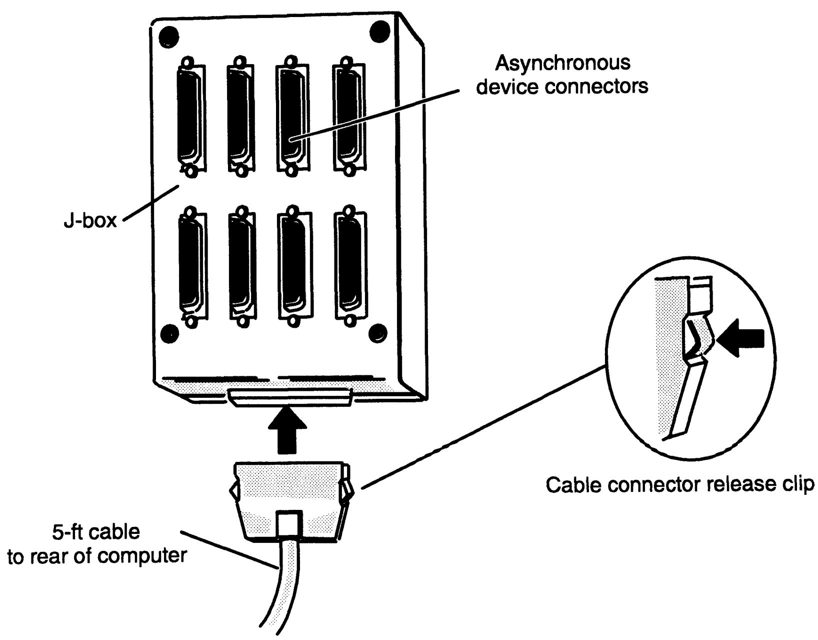


Figure 4–4 Plugging Together J-Box Connectors

Connecting Devices to a VAC/16 Junction Box

Each full-duplex line on a VAC/16 junction box can support an RS–232–C asynchronous terminal, modem, serial printer, or other device. Figure 4–5 shows the location of the device connectors on a VAC/16 J-box assembly.

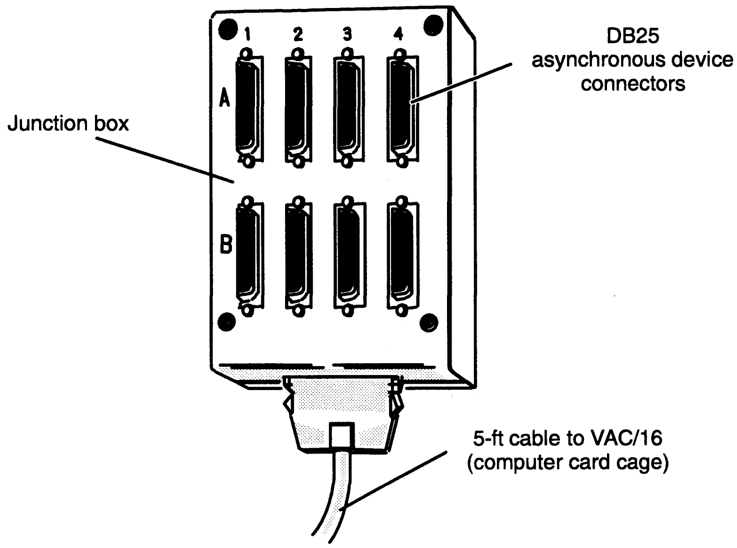


Figure 4–5 VAC/16 Device Connectors

Recording Device Line Information

If your system uses the DG/UX operating system, fill out the worksheet in Figure 4–6 as you connect external devices to your VAC/16 J-boxes. (Use the sample in Figure 4–7 as a reference.) You will need the information recorded on the worksheet later, when your operating system documentation directs you to set device characteristics such as baud rate and parity. Leave the "tty Line" column on your device worksheet blank. Appendix B contains extra worksheets that you can copy.

If your system will run DG/UX Release 4.30 or one of its updates, see *Installing and Setting Up the DG / UX™ System on Stand-Alone Multiuser AViiON® Computers* for information on determining tty lines and specifying device characteristics. If your system will run DG/UX Release 5.40 or higher, see *Customizing the DG / UX™ System* for this information.

Board no:		Device name: syac		Range of tty lines:			
J1 Connector				J2 Connector			
Port No.	tty Line	Device Type	Description	Port No.	tty Line	Device Type	Description
A1 (0)				A1 (8)			
A2 (1)				A2 (9)			
A3 (2)				A3 (10)			
A4 (3)				A4 (11)			
B1 (4)				B1 (12)			
B2 (5)				B2 (13)			
B3 (6)				B3 (14)			
B4 (7)				B4 (15)			

Figure 4–6 VAC/16 Device Worksheet

Board no: 0		Device name: syac()		Range of tty lines:			
J1 Connector				J2 Connector			
Port No.	tty Line	Device Type	Description	Port No.	tty Line	Device Type	Description
A1 (0)		serial printer	office A1 conn 1100	A1 (8)		D216+	office A10 conn 1118
A2 (1)		serial printer	office A2 conn 1102	A2 (9)		VT100	office A11 conn 1120
A3 (2)		D216+	office A3 con 1104	A3 (10)		D462+	office A12 conn 1122
A4 (3)		D462+	office A4 conn 1106	A4 (11)		D462+	office A14 conn 1124
B1 (4)		VT100	office A5 conn 1108	B1 (12)		D462+	office A14 conn 1124
B2 (5)		VT100	office A6 conn 1110	B2 (13)		D216+	office A18 conn 1128
B3 (6)		D216+	office A8 conn 1114	B3 (14)		D413	office A20 conn 1130
B4 (7)		D462+	office A9 conn 1116	B4 (15)		D413	office A21 conn 1132

SAMPLE

Figure 4–7 Sample VAC/16 Device Worksheet

Connecting Devices

Asynchronous devices attach to the J-box with male DB25 cable connectors. To connect an asynchronous device to the J-box, use one of the cables listed in Table 4–1.

Table 4–1 Asynchronous Device Cables

Device	Cable Part No.	Cable Model No.	Cable Length (ft)
Terminals	005–34256	15340E010	10
	005–34990	15340E015	15
	005–34991	15340E025	25
Modems	005–36256	15369E010	10
	005–36257	15369E015	15
	005–36258	15369E025	25

Align the connector pins and D-shaped bevels before gently pushing the cable connector over the J-box connector. Align the two captive connector screws as shown in Figure 4–8, and then tighten them securely.

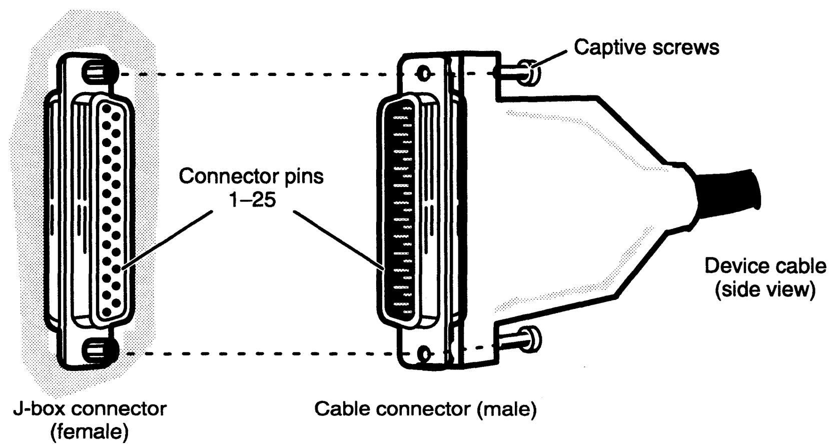


Figure 4–8 Plugging Together VAC/16 Device Connectors

If you haven't already connected the remote ends of the cables to your asynchronous devices, do so now. Refer to the device-specific documentation for your option, if necessary.

When you finish connecting all external devices to your VME option board(s), refer to your starting manual for instructions on powering up your system. You should then refer to your operating system documentation for instructions on what to do after booting or rebooting your system hardware.

Connecting VDA/128 and VDA/255 Communications Clusters

This section describes how to connect a linked chain of downloadable cluster controllers to a VDA/128 or VDA/255 adapter in your computer. It also describes how to connect asynchronous peripheral devices to a cluster controller box.

This manual does not describe how to set up or configure a cluster controller system. For this information, refer to the *HPS Downloadable Cluster Controller Installation Guide.*

NOTE: If your system uses the DG/UX operating system, you can use *only* the cluster-controller node addresses 01 through 10 hexadecimal (1 through 16 decimal) when setting up your cluster controller system.

The DG/UX operating system further requires that you specify the first node on each VDA/128 or VDA/255 adapter in your system as node address 01.

A VDC/8P cluster controller (or *cluster box* or *node)* includes eight serial RS–232–C ports and one Centronics-compatible parallel printer port. A VDC/16 cluster controller includes sixteen RS–232–C ports. You use RG–62 coaxial cable to link as many as 16 cluster boxes to a single VDA/128 or VDA/255 adapter. Each VDA/128 adapter and its cluster controllers support a maximum of 128 external devices; each VDA/255 adapter and its cluster controllers support a maximum of 255 external devices.

Each connection along the chain uses a BNC T-fitting to allow the removal of a single cluster box without disrupting communications along the cable. Figure 4–9 shows the basic elements of a VDA/128 or VDA/255 communications cluster.

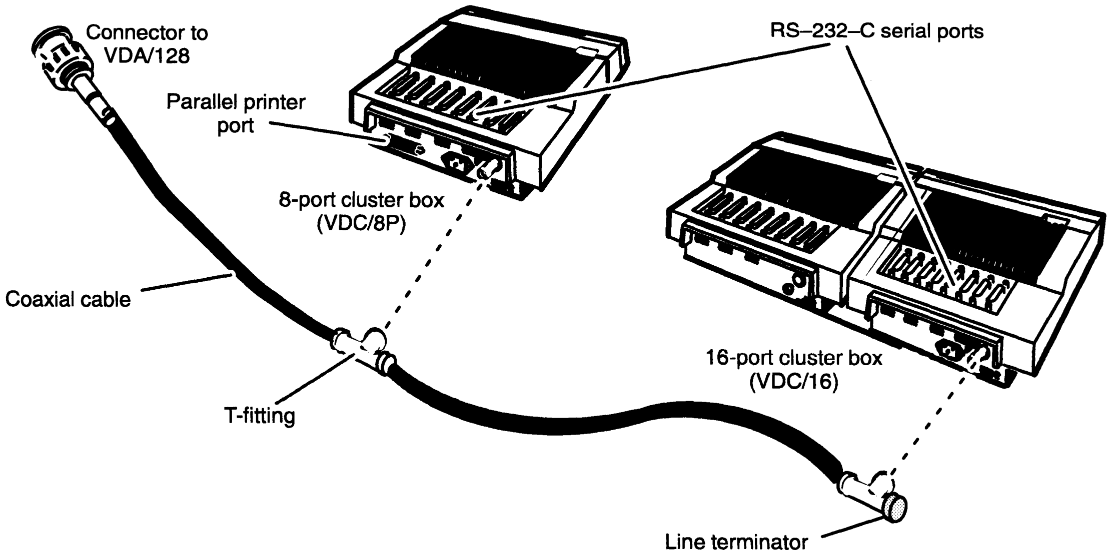


Figure 4–9 Communications Cluster Elements

To connect a daisy chain of cluster controllers to your controller card, use one of the cables listed in Table 4–2. These cables include a BNC host connector.

Table 4–2 Cables for Cluster Controllers

Cable Part Number	Model Number	Cable Length (ft)
005–34246	15338E025	25
005–34247	15338E050	50
005–34248	15338E100	100

Connecting a Cluster Controller Cable to a VDA Adapter

To attach a controller cluster to a VDA/128 or a VDA/255 adapter, you need a BNC host connector, which connects to the BNC connector on your VDA/128 or VDA/255 board. Figure 4–10 shows the host connector and the location of the VDA port.

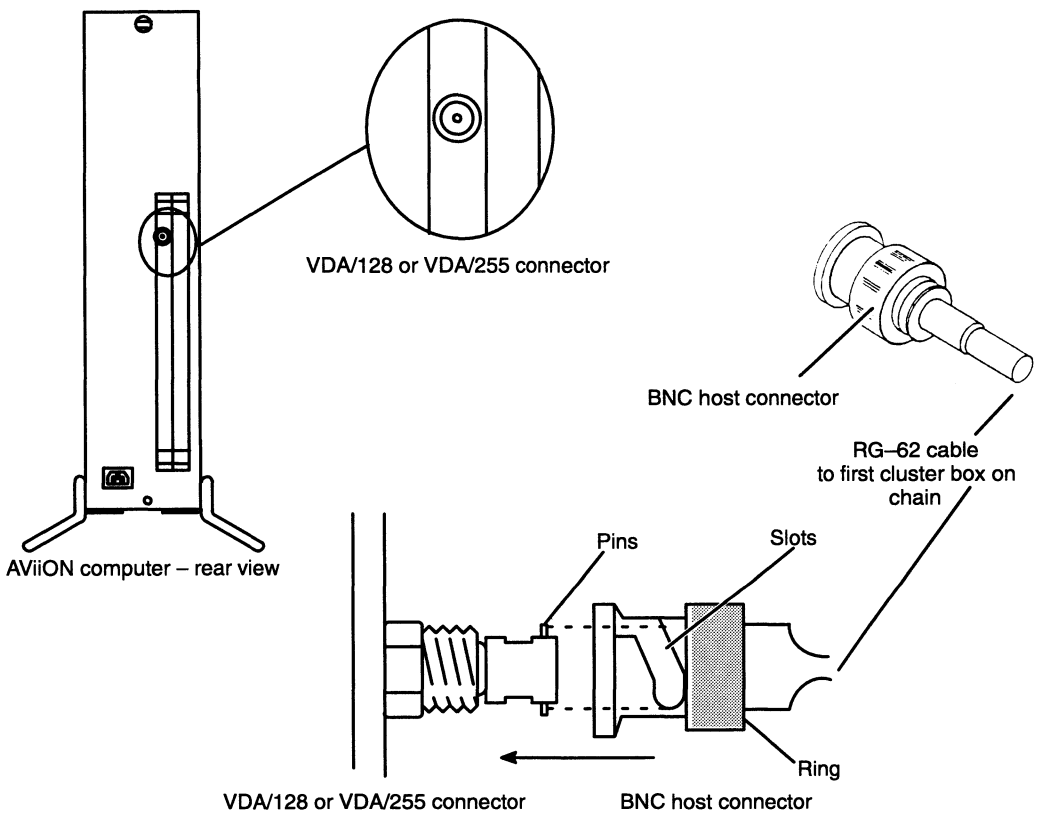


Figure 4–10 VDA/128 or VDA/255 Connectors

NOTE: You must connect the cluster line cable to your computer with a host connector rather than a T-fitting.

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 4–11.) Then turn the knurled ring on the connector clockwise until the pins on the receiving connector snap into place.

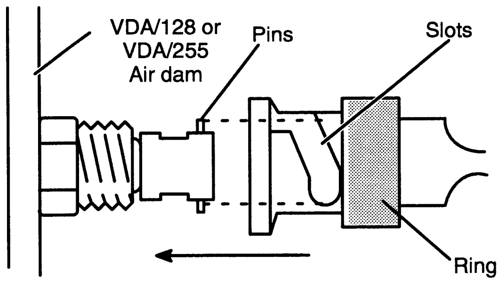


Figure 4–11 Attaching a BNC Host Connector to a VDA/128 or VDA/255 Receptacle

Connecting Asynchronous Devices to a Cluster Box

Each terminal or modem line on a cluster box can support any RS–232–C asynchronous device. Figure 4–12 shows the location of the asynchronous device connectors on the box.

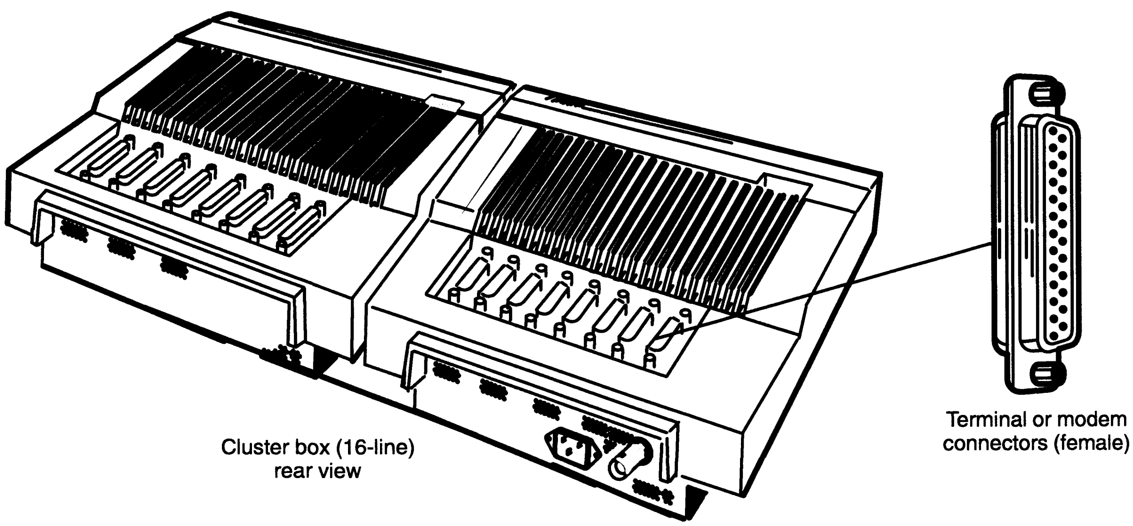


Figure 4–12 Cluster Box Device Connectors

Recording Device Line Information

If your system uses the DG/UX operating system, fill out a copy of the worksheet in Figure 4–13 as you connect external devices to your cluster boxes. (Figure 4–15 shows a sample worksheet.) Use more than one page if necessary. You will need the information recorded on the worksheets later, when your operating system documentation directs you to set device characteristics such as baud rate and parity. Leave the "tty Line" column on your device worksheet blank. Appendix B contains extra worksheets that you can copy.

If your system will run DG/UX Release 4.30 or one of its updates, see *Installing and Setting Up the DG / UX™ System on Stand-Alone Multiuser AViiON® Computers* for information on determining tty lines and specifying device characteristics. If your system will run DG/UX Release 5.40 or higher, see *Customizing the DG / UX™ System* for this information.

VDA Host Adapter Device Worksheet

Sheet 1 of ____

Board type:			**Board no:**	**Device name:**			**Range of tty lines:**		
Cluster Address	**Port No.**	**tty Line**	**Device Type**	**Description**	**Cluster Address**	**Port No.**	**tty Line**	**Device Type**	**Description**
01	0				02	0			
	1					1			
	2					2			
	3					3			
	4					4			
	5					5			
	6					6			
	7					7			
	8					8			
	9					9			
	10					10			
	11					11			
	12					12			
	13					13			
	14					14			
	15					15			

(continued)

Record the cluster controller node address (`Net ID` number) in the "Cluster Address" column. For a VDC/8P controller, draw a vertical arrow from the cluster address you entered down to the dashed line. This indicates that only nine ports (8 RS–232–C ports and 1 Centronics port) are available on this box. For a VDC/16, draw the vertical line through the dashed line to the bottom of the column to indicate 16 available RS–232–C ports.

Figure 4–13 VDA Device Worksheet

014–001867

VDA Host Adapter Device Worksheet

Sheet ___ of ___

Board type:			**Board no:**						
Cluster Address	**Port No.**	**tty Line**	**Device Type**	**Description**	**Cluster Address**	**Port No.**	**tty Line**	**Device Type**	**Description**
	0					0			
	1					1			
	2					2			
	3					3			
	4					4			
	5					5			
	6					6			
	7					7			
	8					8			
	9					9			
	10					10			
	11					11			
	12					12			
	13					13			
	14					14			
	15					15			

(concluded)

Record the cluster controller node address (`Net ID` number) in the "Cluster Address" column. For a VDC/8P controller, draw a vertical arrow from the cluster address you entered down to the dashed line. This indicates that only nine ports (8 RS–232–C ports and 1 Centronics port) are available on this box. For a VDC/16, draw the vertical line through the dashed line to the bottom of the column to indicate 16 available RS–232–C ports.

Figure 4–14 VDA Device Worksheet

VDA Host Adapter Device Worksheet

Sheet 1 of 4

Board type: VDA/255 **Board no:** 1 **Device name:** syac(1) **Range of tty lines:** 17 – 271

Cluster Address	Port No.	tty Line	Device Type	Description	Cluster Address	Port No.	tty Line	Device Type	Description
01	0		D216+	office B1 conn 1200	02	0		VT100	office B9 conn 1216
	1		D216+	office B2 conn 1202		1		VT100	office B10 conn 1218
	2		D462+	office B3 conn 1204		2		D216+	office B11 conn 1220
	3		VT100	office B4 conn 1206		3		D462+	office B12 conn 1222
	4		VT100	office B5 conn 1208		4		D462+	office B13 conn 1224
	5		VT100	office B6 conn 1210		5		VT100	office B14 conn 1226
	6		D216+	office [illegible] conn 1212		6		VT100	office B15 conn 1228
	7					7		D462+	office B16 conn 1230
	8		6640 printer	lab B2 conn 2204		8		462+	office B17 conn 1232
	9					9		D462+	office B18 conn 1234
	10					10		D462+	office B19 conn 1236
	11					11		D462+	office B20 conn 1238
	12					12		D462+	office B21 conn 1240
	13					13		D413	office B22 conn 1242
	14					14			
	15					15			

SAMPLE

Record the cluster controller node address (`Net ID` number) in the "Cluster Address" column. For a VDC/8P controller, draw a vertical arrow from the cluster address you entered down to the dashed line. This indicates that only nine ports (8 RS–232–C ports and 1 Centronics port) are available on this box. For a VDC/16, draw the vertical line through the dashed line to the bottom of the column to indicate 16 available RS–232–C ports.

Figure 4–15 Sample VDA Device Worksheet

Connecting Devices

To connect an asynchronous device to the cluster box, use one of the cables listed in Table 4–3.

Table 4–3 Asynchronous Device Cables

Device	Cable Part Number	Cable Model Number	Cable Length (ft)
Terminals	005–34256	15340E010	10
	005–34990	15340E015	15
	005–34991	15340E025	25
Modems	005–36256	15369E010	10
	005–36257	15369E015	15
	005–36258	15369E025	25

You should plan your connecting sequence to work from one side of the box to the other to avoid constricting your work space and crossing the cables unnecessarily.

Align the connector pins and D-shaped bevels before gently pushing the cable connector onto the cluster box connector. Align the two captive connector screws as shown in Figure 4–16, and then tighten them securely.

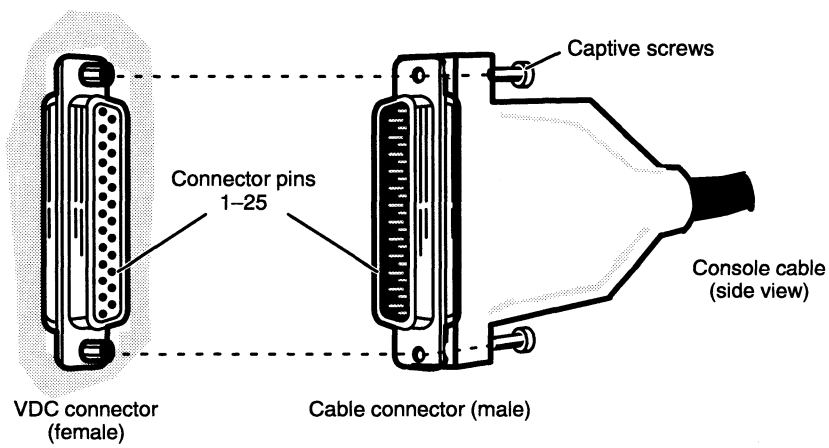


Figure 4–16 Plugging Together Cluster Box Device Connectors

If you haven't already connected the remote ends of the cables to your asynchronous devices, do so now. Refer to the device-specific documentation for your option, if necessary. If your cluster controller system includes any parallel printers, continue with the next section, "Connecting a Parallel Printer to a Cluster Box."

When you finish connecting all external devices to your VME option board(s), refer to your starting manual for instructions on powering up your system. You should then refer to your operating system documentation for instructions on what to do after booting or rebooting your system hardware.

Connecting a Parallel Printer to a Cluster Box

Each VDC/8P cluster controller on your system can support a parallel printer with a Centronics interface. Figure 4–17 shows the location of the parallel printer port on each controller.

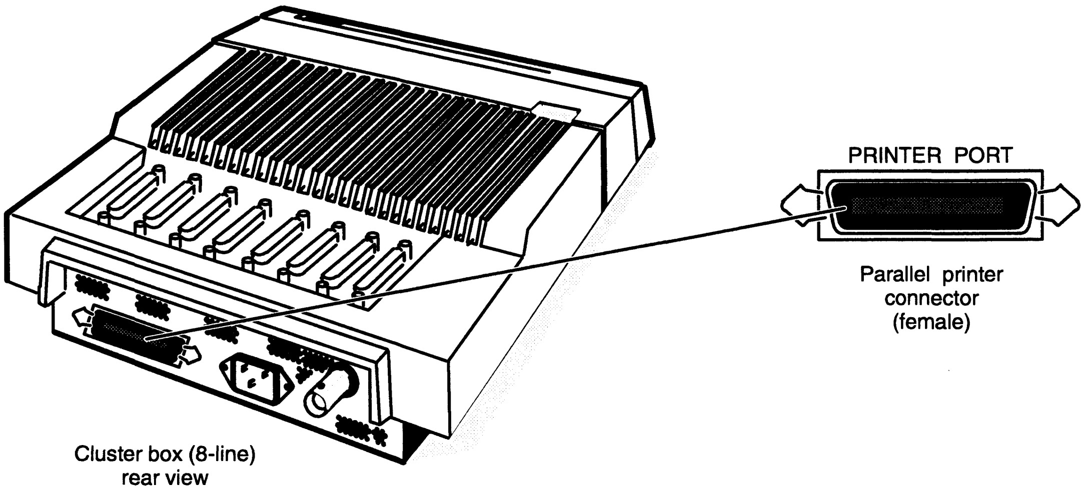


Figure 4–17 VDC/8P Parallel Printer Port

Specify any characteristics unique to each printer, such as vertical form unit (VFU) or tab memory, before connecting the printer to a cluster box. You specify other characteristics of printers attached to a cluster controller through your operating system software.

A parallel printer connects to the cluster box with one of the cables listed in Table 4–4. If your printer requires an adapter, connect the adapter connector/cable before you attach the cable to your cluster box.

Table 4–4 Parallel Printer Cables

Printer Interface	Cable Part No.	Cable Model No.	Cable Length (ft)
Centronics	005–37910	15345E015	15
Centronics	005–37911	15345E025	25

Figure 4–18 shows how to align the connector pins and the D-shaped connector bevels before gently inserting the cable connector into the VDC/8P connector.

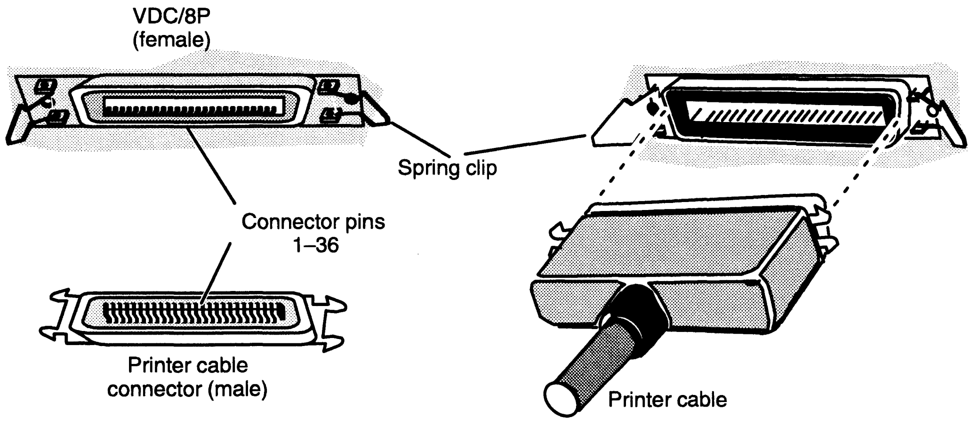


Figure 4–18 Plugging Together VDC/8P Printer Connectors

Push the spring clips attached to the top and bottom of the printer port connector sideways into the brackets on the cable connector as shown in Figure 4–19. Your horizontal pressure will push the clips into place; do not squeeze or pull the clips out of shape.

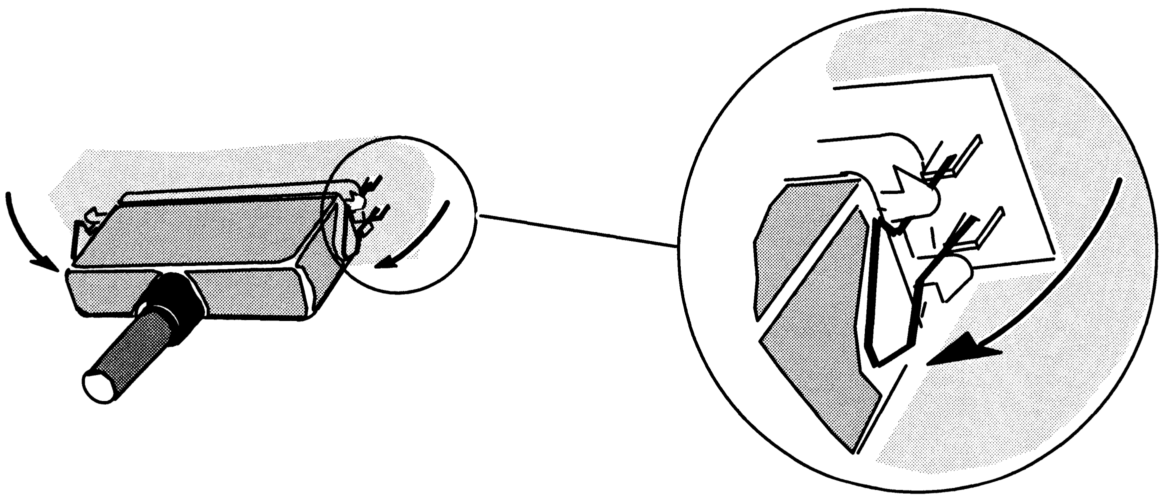


Figure 4–19 Securing the VDC/8P Printer Connector

If you haven't already connected the remote end of the cable(s) to each printer in your system, do so now. Refer to the device-specific documentation for each printer, if necessary.

When you finish connecting all external devices to your VME option board(s), refer to your starting manual for instructions on powering up your system. You should then refer to your operating system documentation for instructions on what to do after booting or rebooting your system hardware.

Connecting a VTC Controller to an Ethernet LAN

An Ethernet/IEEE 802.3 local area network (LAN) can incorporate several devices that communicate over a common system of cables and transceivers. This section describes how to connect the drop cable between your VTC controller board and its transceiver on a LAN.

NOTE: For information on setting up the cables and transceivers on your LAN, refer to *Ethernet / IEEE 802.3 Local Area Network Installation Guide.*

Figure 4–20 shows the location of the DB15 local area network connector on an installed VTC board.

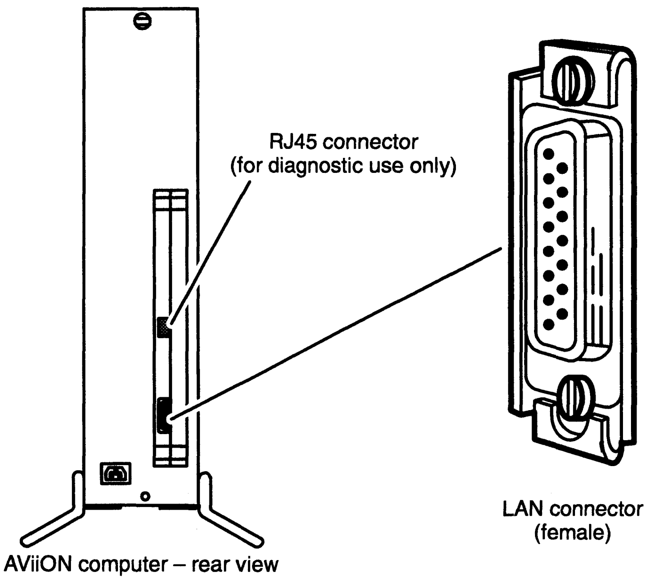


Figure 4–20 VTC LAN Connector

Use one of the drop cables listed in Table 4–5 to connect your LAN transceiver to the computer.

Table 4–5 LAN Drop Cables, VTC

Cable Type	Part Number	Model Number	Cable Length (m)
Plenum-grade	005–33791	1326	5 (16.4 ft)
	005–33787	1326A	20 (65.6 ft)
PVC	007–5414	40028	1 (3.3 ft)
	007–6253	40028A	3 (9.9 ft)
	005–33766	15274E005	5 (16.4 ft)
	005–31694	15274E020	20 (65.6 ft)

As shown in Figure 4–21, LAN cable connectors include slide clip mounts rather than the captive screws found on most asynchronous device connectors. The female connector on the VTC option board includes a slide clip.

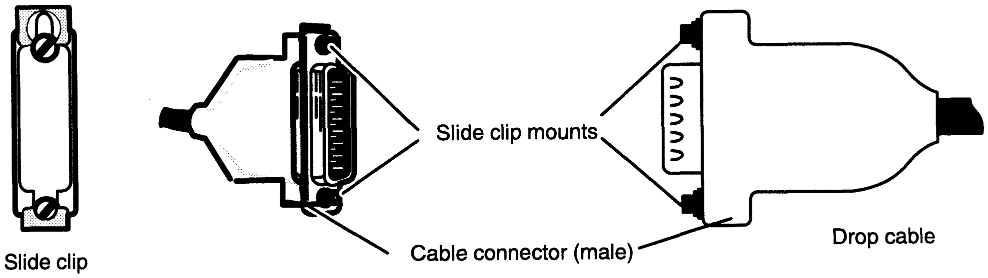


Figure 4–21 Connector Slide Clip and Slide Clip Mounts

To connect your LAN drop cable to a standard slide clip, follow these directions.

1. Before you connect your first LAN transceiver to the VTC board in your computer's card cage, disconnect electrical power to the system. Refer to the *Ethernet / IEEE 802.3 Local Area Network Installation Guide* if necessary.
2. Align the larger mount slot on the clip with the screw behind it as shown in Figure 4–22. This position allows the cable connector to fit completely over the VTC connector before you secure the connection.

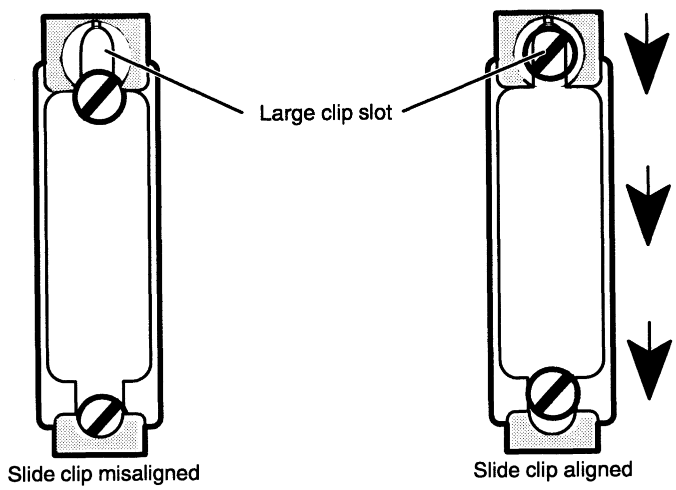


Figure 4–22 LAN Connector Slide Clip Before Connection

3. Align the connector pins, clip mounts, and D-shaped bevels as shown in Figure 4–23 before gently pushing the cable connector completely over the connector. Make certain the slide clip has not hindered a secure connection.

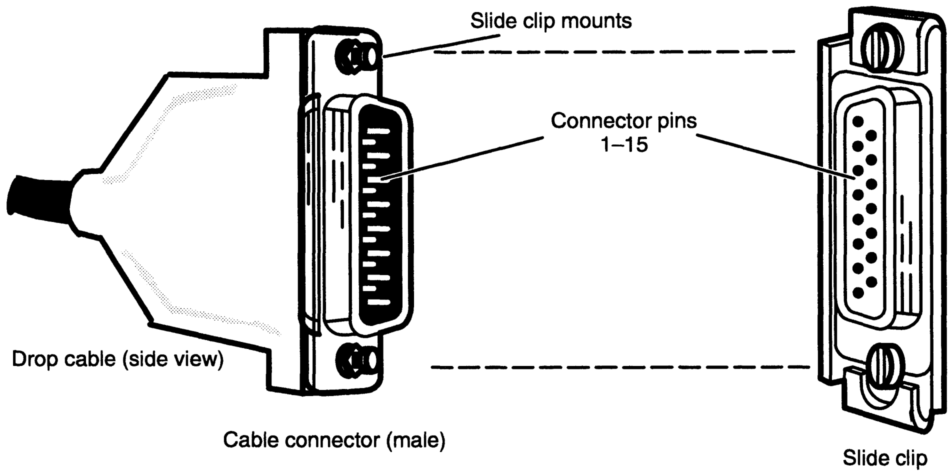


Figure 4–23 Aligning Slide Clip Mounts with a LAN Connector

4. Push the edge of the slide clip into position, so the small mount slot surrounds its cable connector mount. Figure 4–24 illustrates how to secure a slide clip connection.

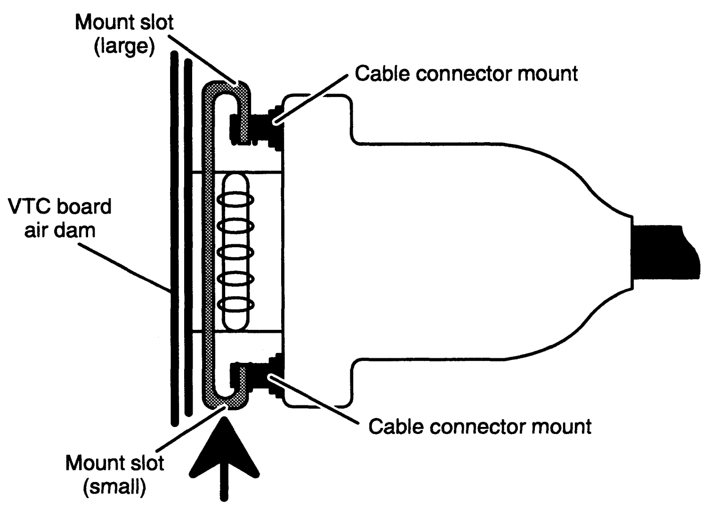


Figure 4–24 Securing a LAN Drop Cable to a VTC Connector

If you haven't already connected the remote end of the cable to your transceiver, do so now. Refer to the device-specific documentation for your transceiver, if necessary.

When you finish connecting all external devices to your VME option board(s), refer to your starting manual for instructions on powering up your system. You should then refer to your operating system documentation for instructions on what to do after booting or rebooting your system hardware.

Connecting Synchronous Devices to a VSC/3 Controller

A single VSC/3 controller in your system can support three lines, with ports on the air dam at the rear of the VSC/3 board. Each full-duplex line can support an RS–232–C synchronous modem or other device. Figure 4–25 shows the location of the device connectors on a VSC/3 board.

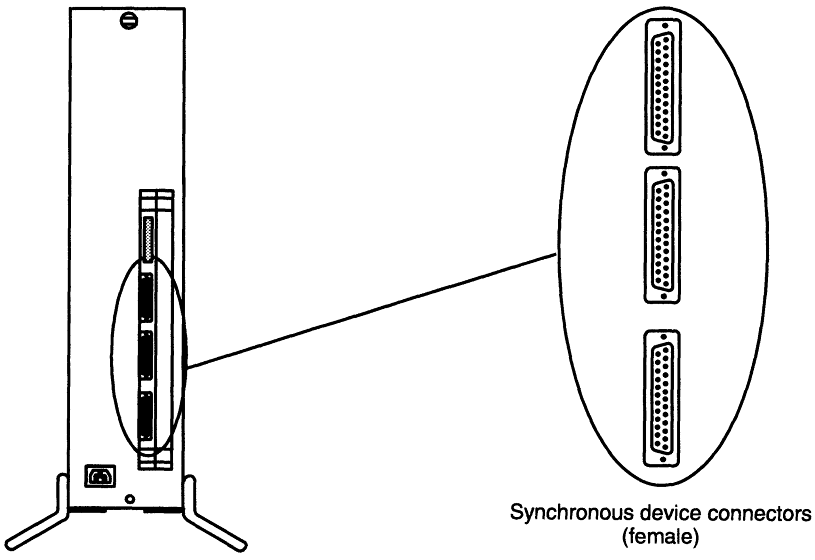


Figure 4–25 VSC/3 Device Connectors

NOTE: You specify the characteristics of synchronous devices through your communications software. You should refer to the device-specific documentation and your X.25, SNA, PAD, or other synchronous communications documentation for information on setting characteristics, such as baud rate, to conform to your system requirements.

Synchronous devices connect to the VSC/3 board in your computer through cables with male DB25 connectors. To connect synchronous devices to the VSC/3 board, use one of the cables listed in Table 4–6.

Table 4–6 Cables for Synchronous devices and the VSC/3 Board

Cable Part No.	Cable Model No.	Cable Length (m)
005–32917	15290E006	1.7 (6 ft)
005–32918	15290E015	4.5 (15 ft)
005–32919	15290E025	7.6 (25 ft)

NOTE: Make certain you use the correct cables to connect your synchronous devices. Although the RS–232–C interface supports many devices, your device requires the correct cable in order to work properly.

Align the connector pins and D-shaped bevels before gently pushing the cable connector onto the synchronous board connector. Align the two captive connector screws as shown in Figure 4–26, and then tighten them securely.

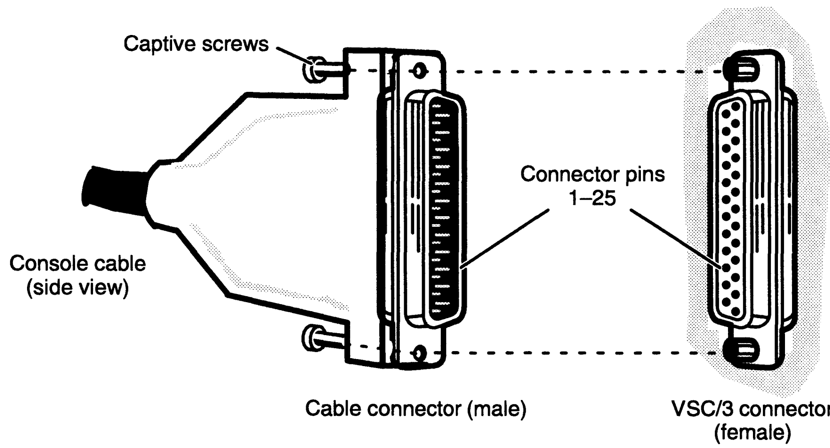


Figure 4–26 Plugging a DB25 Connector Into a VSC/3 Connector

If you haven't already connected the remote end of the cable to your synchronous device, do so now. Refer to the device-specific documentation for your option, if necessary. Then continue with the next section that applies to your system.

When you finish connecting all external devices to your VME option board(s), refer to your starting manual for instructions on powering up your system. You should then refer to your operating system and communications software documentation for instructions on what to do after booting or rebooting your system hardware.

Connecting Synchronous Devices to a VSC/3i Controller

A single VSC/3i controller in your system can support three channels (or lines) through ports that protrude through the air dam at the rear of the VSC/3i board. Each independent full-duplex line can support an RS–232–C, RS–449, RS–530, V.35, or X.21 synchronous device. Figure 4–27 shows the location of the device connectors on a VSC/3i board.

The tag hanging from the lower handle of the VSC/3i board indicates which electrical interface each port currently supports. When you receive your board from Data General, it will be configured for the default, RS–232–C, on all three lines. If you reconfigure any of the lines, write the correct interface type on the tag for the appropriate port; then other users can tell how you have configured each port without removing the board from the computer unit. Figure 4–27 shows the tag and a VSC/3i board with ports configured for RS–232–C, V.35, and RS–530 support.

Refer to the manual *Setting Up and Installing Model 7428 VME Synchronous Controllers (VSC/3i) in AViiON® Systems* for complete configuration information.

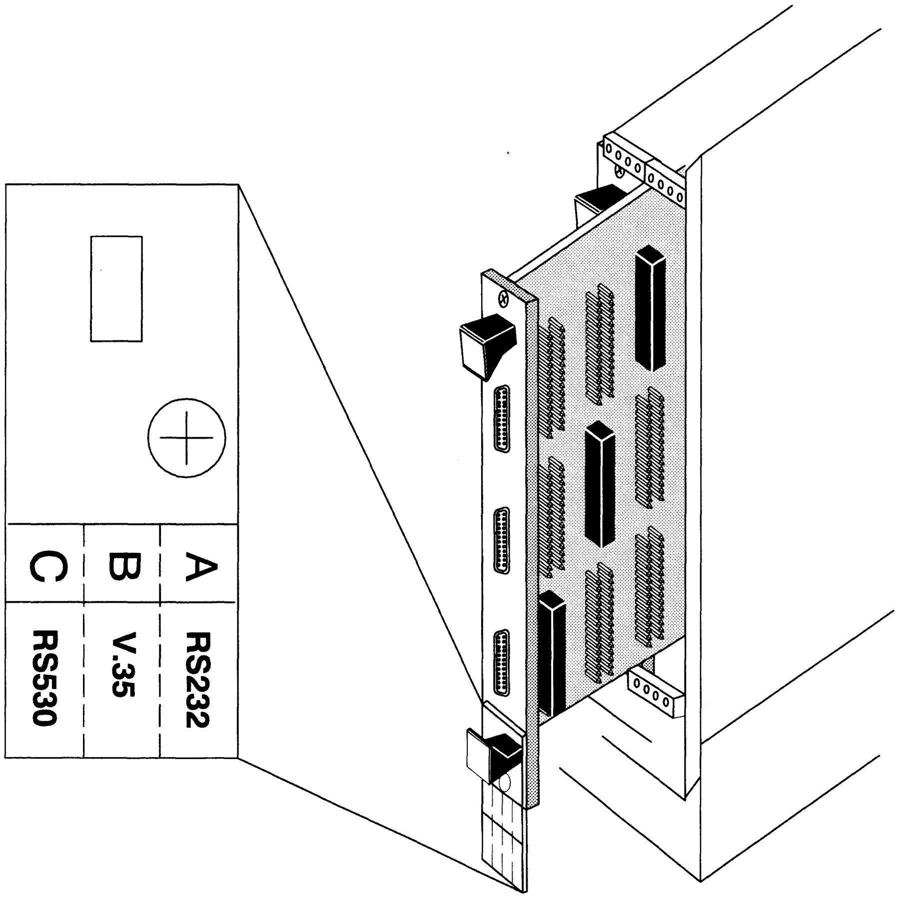


Figure 4–27 VSC/3i Device Connectors and Channel Configuration Tag

NOTE: You specify the characteristics of synchronous devices through your communications software. Refer to the device-specific documentation and your X.25, SNA, PAD, or other synchronous communications documentation for information on setting characteristics, such as baud rate, to conform to your system requirements.

The DG/UX operating system recognizes all VSC/3i controllers by the device mnemonic **vsxb**, regardless of port configuration.

Synchronous devices connect to the VSC/3i board in your computer through cables with male DB25 connectors at the controller end. For each port you *must* use the correct cable for the type of electrical interface you select. For several interfaces — RS–530, RS–449, and X.21 — you configure the port on the VSC/3i board in the same way, but each type of device requires a different device cable. Select the appropriate cable for each port as listed in Table 4–7.

Table 4–7 VSC/3i External Connector Cables

Interface Type	Connectors	Model Number	Part Number	Length (m)
RS–232–C	DB25 to DB25	15290E006	005–32917	1.7 (6 ft)
		15290E015	005–32918	4.5 (15 ft)
		15290E025	005–32919	7.6 (25 ft)
RS–449	DB25 to DB37	15408E015	005–39805	4.5 (15 ft)
RS–530	DB25 to DB25	15409E015	005–39804	4.5 (15 ft)
V.35	DB25 to V.35	15410E015	005–39806	4.5 (15 ft)
X.21	DB25 to DB15	15411E015	005–39800	4.5 (15 ft)

When you have selected the correct cable, align the connector pins and D-shaped bevels before gently pushing the cable's DB25 connector onto the synchronous board connector. Align the two captive connector screws as shown in Figure 4–28, and then tighten them securely.

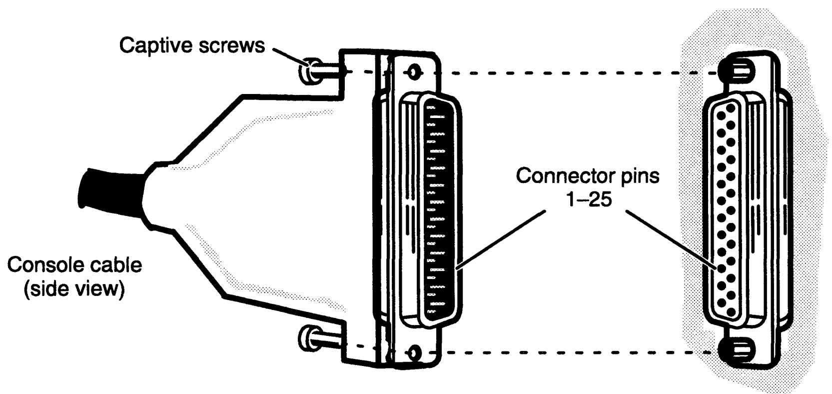


Figure 4–28 Plugging a DB25 Connector Into a VSC/3i Connector

If you haven't already connected the remote end of the cable to your synchronous device, do so now. Refer to the device-specific documentation for your option, if necessary. Then continue with the next section that applies to your system.

When you finish connecting all external devices to your VME option board(s), refer to your starting manual for instructions on powering up your system. You should then refer to your operating system and communications software documentation for instructions on what to do after booting or rebooting your system hardware.

Connecting SCSI Devices to a VSA SCSI-2 Controller

This section describes how to connect the cables from a VSA board to your SCSI peripherals. The VSA board has two SCSI ports, each of which can connect to a SCSI peripheral. You can configure each port independently for either single-ended or differential SCSI operation by changing the orientation of the port's small daughter board on the VSA board. See Chapter 2 in this manual, or refer to the manual *Installing, Configuring, and Programming the Model 7430 VME SCSI-2 Adapter (VSA) in AViiON® Systems* for information on orienting a VSA controller's daughter boards for single-ended or differential operation.

The SCSI cables you use to connect peripheral devices are specific to the VSA board; they have a 50-pin high-density connector that plugs into a SCSI connector on the VSA board, and a 50-pin connector that connects to your peripheral device at the other end.

The SCSI cable is available in several lengths. Table 4–8 lists the cable model (ordering) numbers, part numbers, and lengths for use with AViiON systems. Check the 005 part number on the label of each of your cables to be sure you have the right cables.

NOTE: For single-ended operation, you must use a 1.5–m (5-ft) or 3–m (10-ft) cable. You can use any of the listed cables for differential operation.

Table 4–8 SCSI Device Cables

Model Number	Part Number	Length (m)
15396E005	005–039718	1.5 (5 ft)
15396E010	005–039719	3 (10 ft)
15396E020	005–039720	6 (20 ft)
15396E040	005–039721	12 (40 ft)

To attach the cable, press the 50-pin high-density connector end onto the appropriate SCSI connector on the VSA board (see Figure 4–29), and turn the thumbscrews clockwise to tighten.

CAUTION: Do not connect a differential device to a VSA daughter board oriented for single-ended operation, or vice versa.

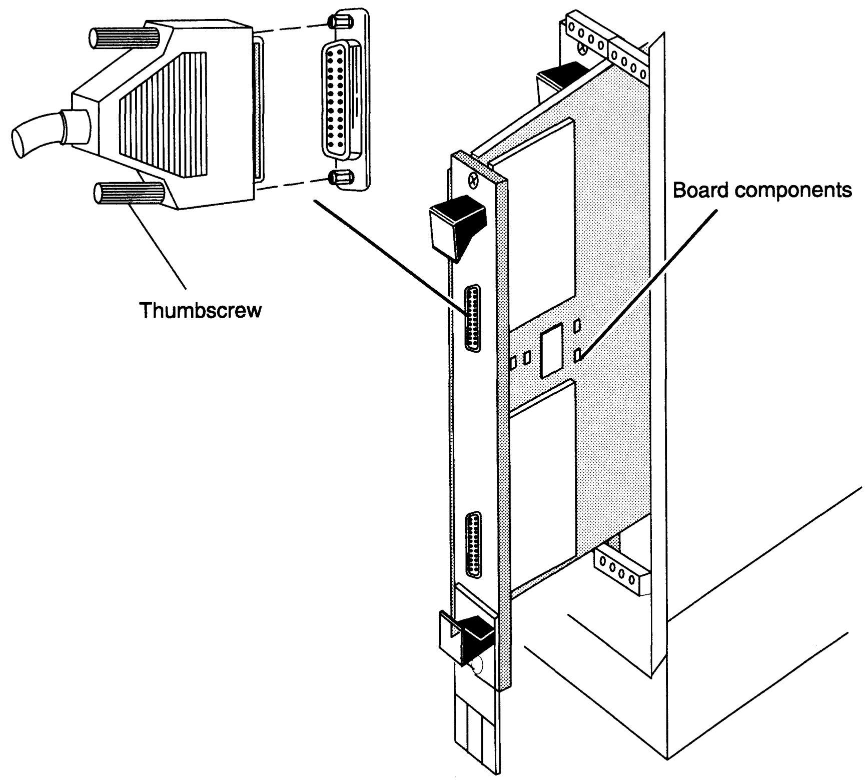


Figure 4–29 Connecting a Device Cable to a VSA Board

If you haven't already connected the remote end of the cable to your peripheral device, do so now. Refer to the device-specific documentation you received with the device. Then continue with the next section that applies to your system.

When you finish connecting all external devices to your VME option board(s), refer to your starting manual for instructions on powering up your system. Then refer to your operating system documentation for instructions on what to do after booting or rebooting your system hardware.

Connecting a VLC Controller to an Ethernet LAN

An Ethernet LAN can incorporate several devices that communicate over a common system of cable and transceivers. This section describes how to connect the drop cable between your VLC controller board and the first transceiver on a LAN.

NOTE: For information on setting up the cables and transceivers on your Ethernet LAN, refer to *Ethernet / IEEE 802.3 Local Area Network Installation Guide.*

Figure 4–30 shows the location of the DB15 local area network connector on an installed VLC board.

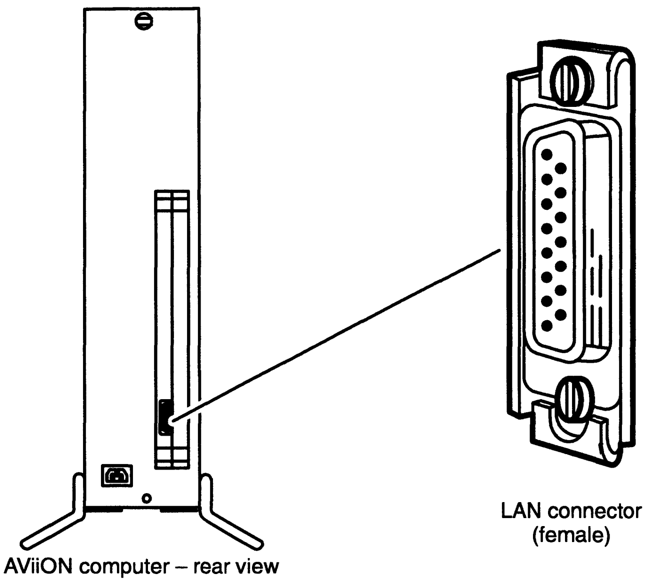


Figure 4–30 VLC LAN Connector

Use one of the drop cables listed in Table 4–9 to connect your LAN transceiver to the computer.

Table 4–9 LAN Drop Cables, VLC

Cable Type	Cable Part Number	Cable Length (m)
Plenum-grade	005–33791	5 (16.4 ft)
	005–33787	20 (65.6 ft)
PVC	005–33766	5 (16.4 ft)
	005–31694	20 (65.6 ft)

As shown in Figure 4–31, LAN cable connectors include slide clip mounts rather than the captive screws found on most asynchronous and synchronous device connectors. The female connector on the VLC option board includes a slide clip.

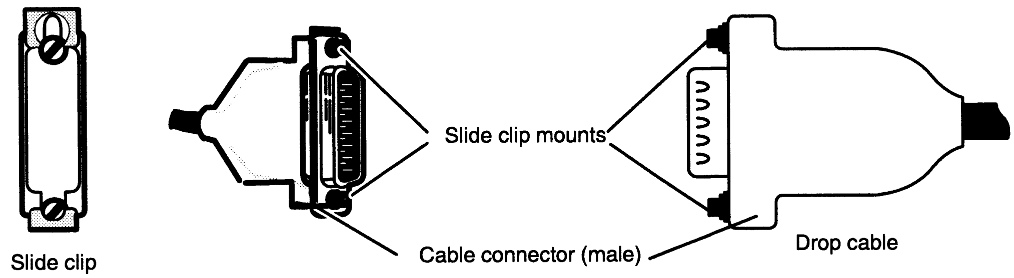


Figure 4–31 LAN Connector Slide Clip and Slide Clip Mounts

To connect your LAN drop cable to a standard slide clip, follow these directions.

1. Before you connect your first LAN transceiver to the VLC board in your computer's card cage, disconnect electrical power to all devices along the network. Refer to the *Ethernet/IEEE 802.3 Local Area Network Installation Guide* if necessary.

2. Align the larger mount slot on the clip with the screw behind it as shown in Figure 4–32. This position allows the cable connector to fit completely over the VLC connector before you secure the connection.

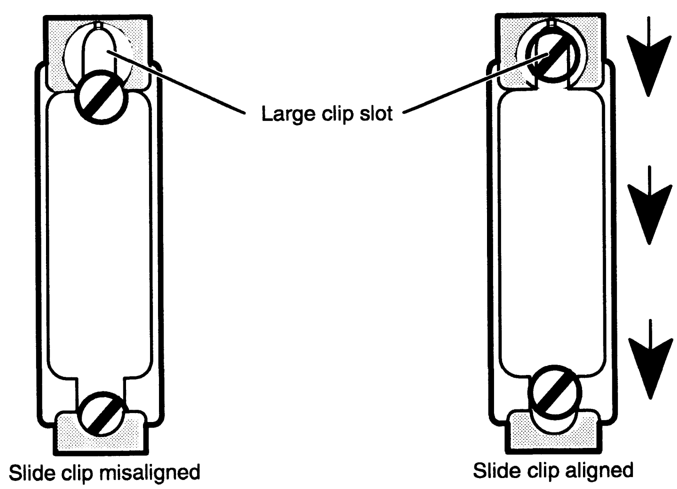


Figure 4–32 Aligning a LAN Connector Slide Clip Before Connection

3. Align the connector pins, clip mounts, and D-shaped bevels as shown in Figure 4–33 before gently pushing the cable connector completely over the connector. Make certain the slide clip has not hindered a secure connection.

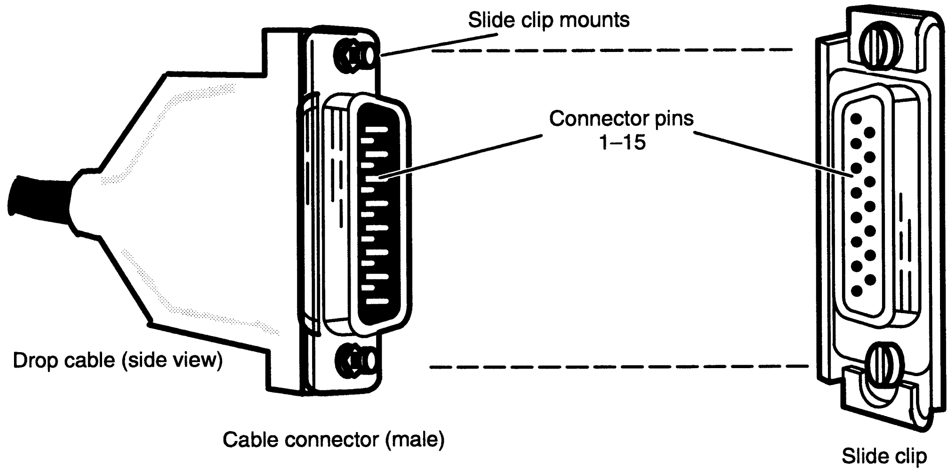


Figure 4–33 Aligning Slide Clip Mounts with a LAN Connector

4. Push the edge of the slide clip into position, so the small mount slot surrounds its cable connector mount. Figure 4–34 illustrates how to secure a slide clip connection.

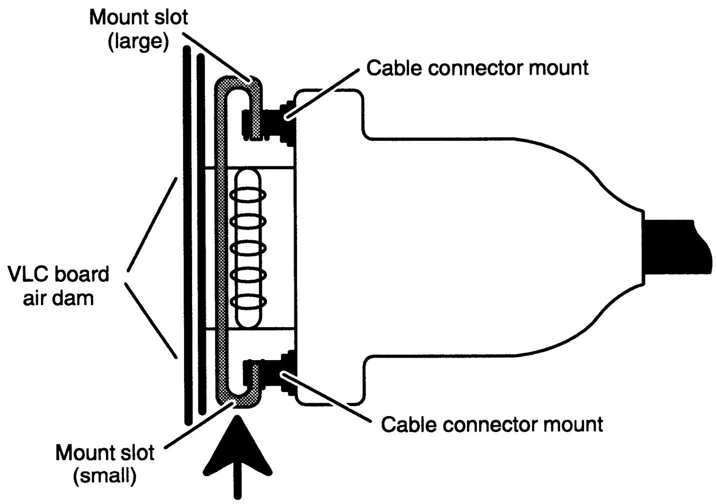


Figure 4–34 Connecting a LAN Drop Cable to a VLC Connector

If you haven't already connected the remote end of the cable to your transceiver, do so now. Refer to the device-specific documentation for your transceiver, if necessary. Then continue with the next section that applies to your system.

When you finish connecting all external devices to your VME option board(s), refer to your starting manual for instructions on powering up your system. You should then refer to your operating system documentation for instructions on what to do after booting or rebooting your system hardware.

Connecting a VLCi Controller to an Ethernet LAN

An Ethernet/IEEE 802.3 local area network (LAN) can incorporate several devices that communicate over a common system of cables and transceivers. This section describes how to connect the drop cable between your VLCi controller board and its transceiver on the LAN.

NOTE: For information on setting up the cables and transceivers on your LAN, refer to *Ethernet / IEEE 802.3 Local Area Network Installation Guide.*

Figure 4–35 shows the location of the DB15 local area network connector on an installed VLCi board.

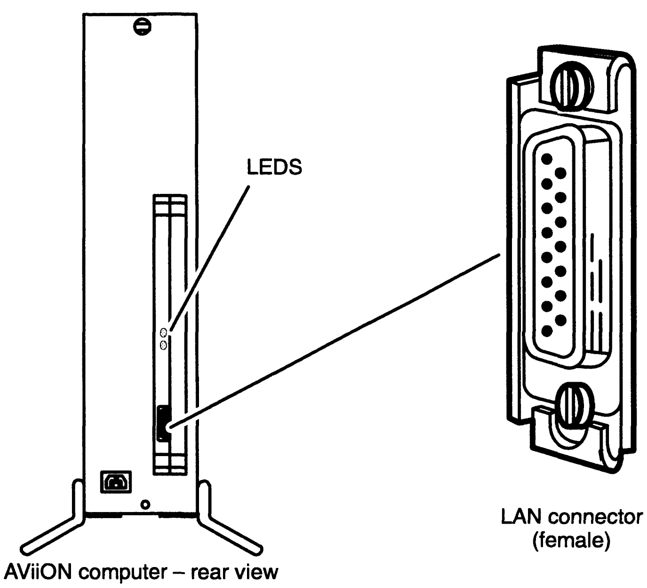


Figure 4–35 VLCi LAN Connector

Use one of the drop cables listed in Table 4–10 to connect your LAN transceiver to the computer.

Table 4–10 LAN Drop Cables, VLCi

Cable Type	Part Number	Model Number	Cable Length (m)
Plenum-grade	005–33791	1326	5 (16.4 ft)
	005–33787	1326A	20 (65.6 ft)
PVC	007–5414	40028	1 (3.3 ft)
	007–6253	40028A	3 (9.9 ft)
	005–33766	15274E005	5 (16.4 ft)
	005–31694	15274E020	20 (65.6 ft)

As shown in Figure 4–36, LAN cable connectors include slide clip mounts rather than the captive screws found on many device connectors. The female connector on the VLCi option board includes a slide clip.

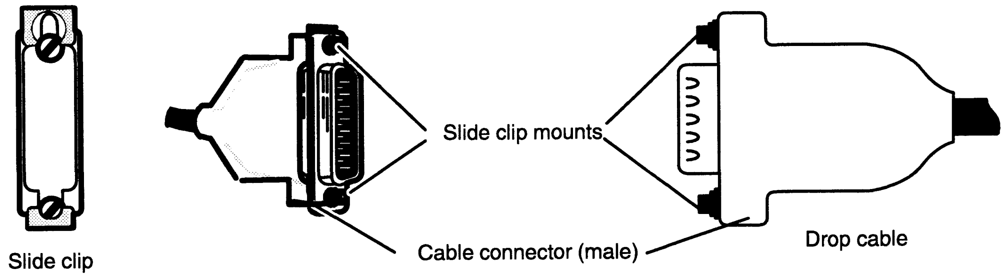


Figure 4–36 Connector Slide Clip and Slide Clip Mounts

To connect your LAN drop cable to a standard slide clip, follow these directions.

1. Before you connect your first LAN transceiver to the VLCi board in your computer's card cage, disconnect electrical power to the system. Refer to the *Ethernet / IEEE 802.3 Local Area Network Installation Guide* if necessary.

2. Align the larger mount slot on the clip with the screw behind it as shown in Figure 4–37. This position allows the cable connector to fit completely over the VLCi connector before you secure the connection.

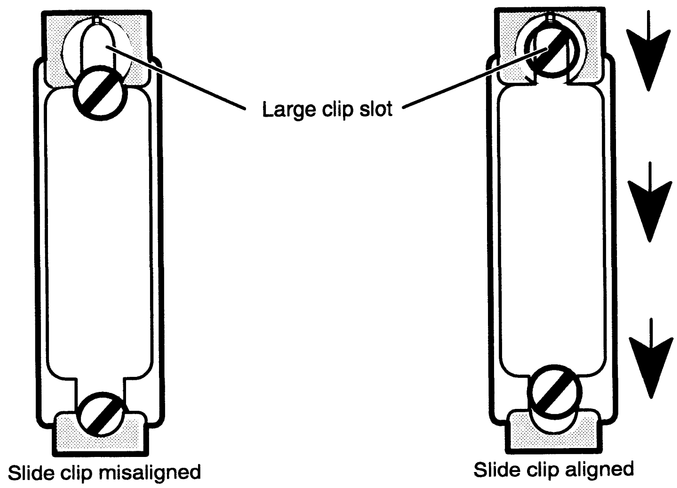


Figure 4–37 LAN Connector Slide Clip Before Connection

3. Align the connector pins, clip mounts, and D–shaped bevels as shown in Figure 4–38 before gently pushing the cable connector completely over the connector. Make certain the slide clip has not hindered a secure connection.

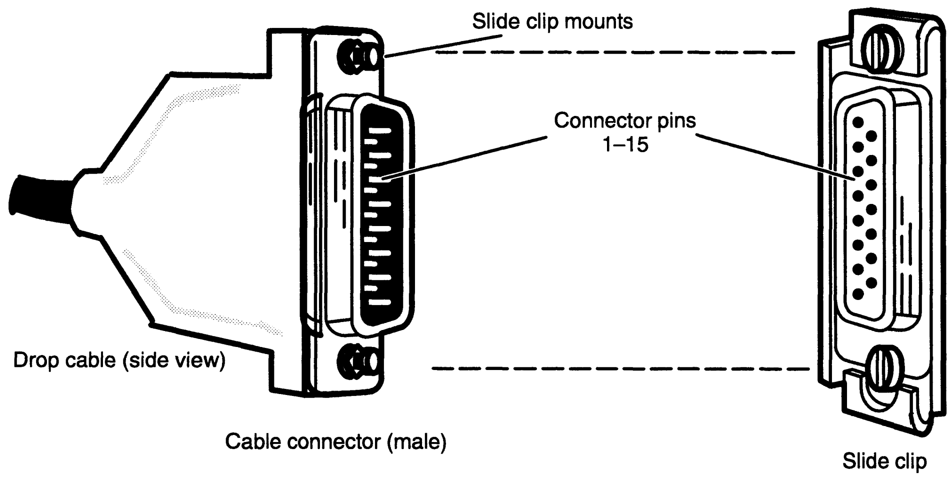


Figure 4–38 Aligning Slide Clip Mounts with a LAN Connector

4. Push the edge of the slide clip into position, so the small mount slot surrounds its cable connector mount. Figure 4–39 illustrates how to secure a slide clip connection.

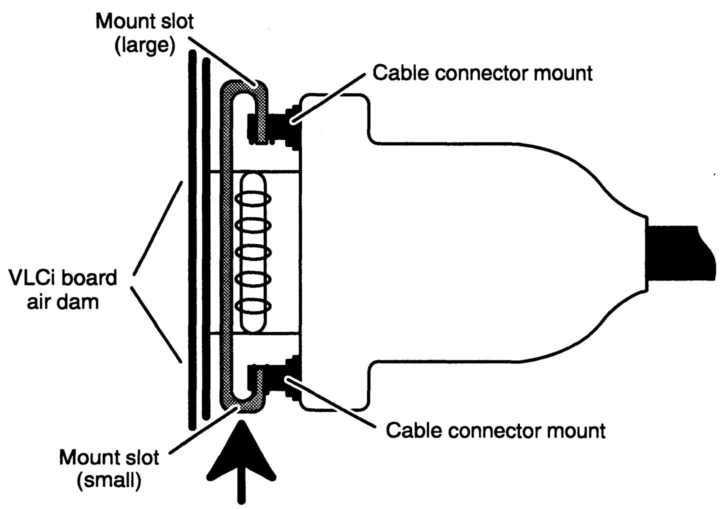


Figure 4–39 Securing a LAN Drop Cable to a VLCi Connector

If you haven't already connected the remote end of the cable to your transceiver, do so now. Refer to the device-specific documentation for your transceiver, if necessary.

When you finish connecting all external devices to your system, refer to your starting manual for instructions on powering up your system. You should then refer to your operating system documentation for instructions on what to do after booting or rebooting your system hardware.

Connecting a VTRC Controller to a Token Ring LAN

A token ring local area network (LAN) can incorporate several devices that communicate over a common system of cable and *Trunk Access Units (TAUs)*. (Some networks refer to their access units as *Media Access Units*, or *MAUs*.) This section describes how to connect the first cable between your computer's VTRC controller and a token ring LAN.

NOTE: For information on setting up the cables and TAUs on your token ring LAN, refer to *DG/Token Ring Local Area Network Installation Guide.*

Figure 4–40 shows the location of the token ring connector on a VTRC board installed in a deskside system.

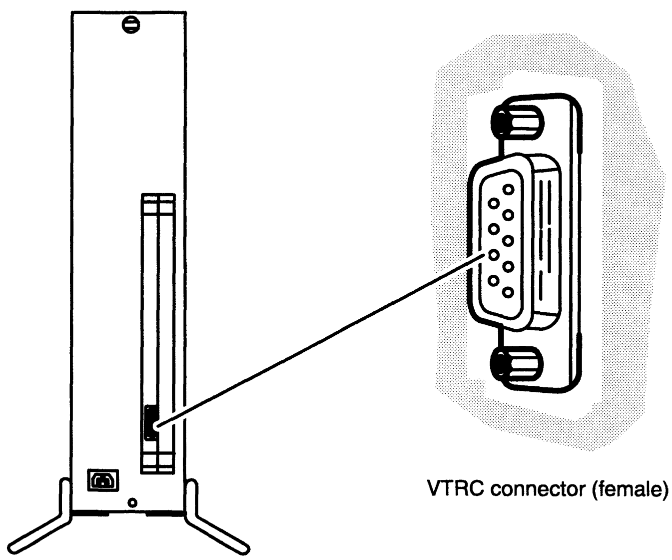


Figure 4–40 VTRC LAN Connector

A *lobe* cable from the VTRC connector at the rear of your computer to a trunk access unit attaches the controller to a token ring LAN. The lobe may consist of a single cable connecting directly, or a series of cables which indirectly connect the VTRC to a TAU.

Shielded twisted pair lobe cables have a 9-pin D connector on one end, and an IEEE 802.5 compliant data connector on the other. Indirect connections often use unshielded telephone cable with an RJ11 connector that can attach to a wall outlet or data connector. Unshielded twisted pair cables include a filter on the 9-pin connector end to diminish electronic emissions that might impair data transmission. Refer to *DG/Token Ring Local Area Network Installation Guide* for a detailed explanation of LAN cabling.

Use one of the cables shown in Table 4–11 to connect your AViiON computer to a token ring LAN.

Table 4–11 Token Ring LAN Cables

Cable Type	Part Number	Model Number	Length (m)
Shielded Twisted Pair (9-pin D to IEEE 802.5)	005–33617	15333E003	0.8 (2.5 ft)
	005–33618	15333E016	4.9 (16.0 ft)
	005–33619	15333E065	19.8 (65.0 ft)
Unshielded Twisted Pair (9-pin D to RJ11)	007–5052	15335E008	2.4 (8.0 ft)

Figures 4–41 and 4–42 show typical shielded and unshielded cable connectors, respectively, used to connect VTRC controllers to network access units.

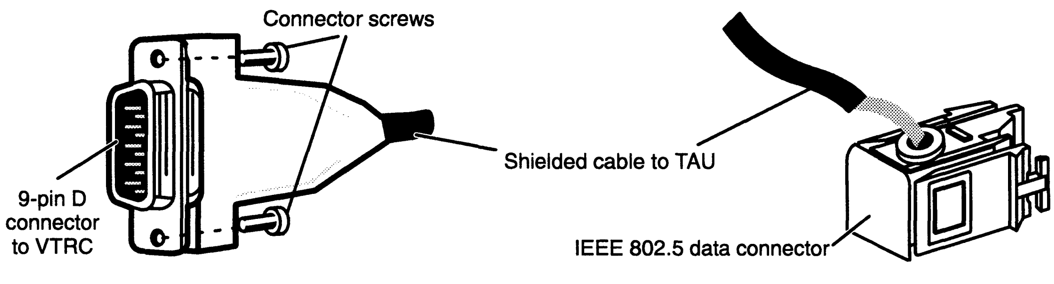


Figure 4–41 Shielded Twisted Pair Connectors

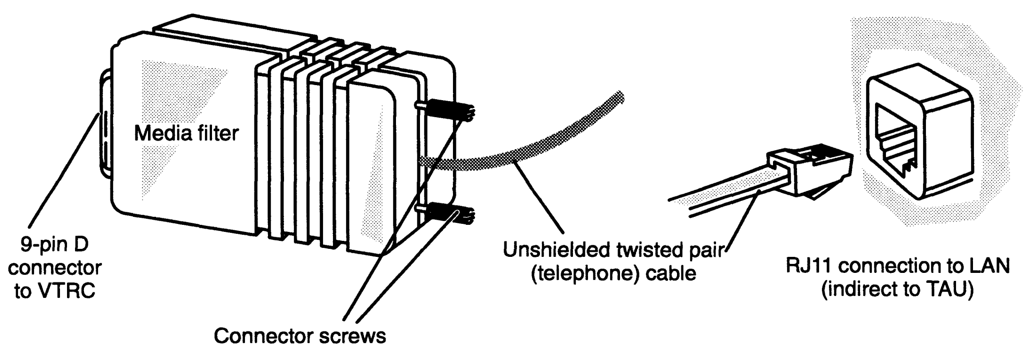


Figure 4–42 Unshielded Twisted Pair Connectors

To connect the VTRC to your LAN connection, follow these directions.

1. Align the connector pins and D-shaped bevels before gently pushing the 9-pin cable connector onto the VTRC board connector.

2. Align the two captive connector screws as shown in Figure 4–43, and then tighten them securely.

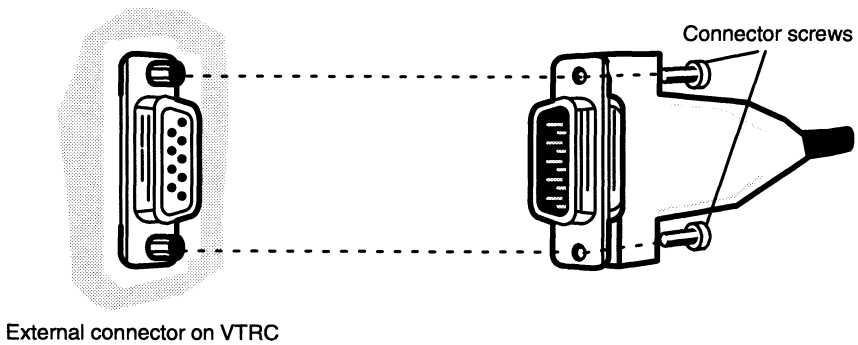


Figure 4–43 Connecting a VTRC to a LAN Cable

3. Connect the remote end of your cable to the trunk access unit or indirect LAN connection. Refer to the *DG / Token Ring Local Area Network Installation Guide* if necessary.

When you finish connecting all external devices to your system, refer to your starting manual for instructions on powering up your system. You should then refer to your operating system documentation for instructions on what to do after booting or rebooting your system hardware.

Connecting a VFC to an FDDI Network

Each VFC board in your system can support a Class B single-attachment or Class A dual-attachment connection to an ANSI X3T9.5 standard Fiber Distributed Data Interface (FDDI) local area network (*star* or *ring*). The FDDI network can function as a high-speed local area network or as a backbone connecting other networks. A FDDI network can incorporate many devices that communicate over a common system of fiber-optic cable. This section describes how to connect the cables between the VFC controller and an installed FDDI network. The information in this section assumes that your site already includes an installed FDDI network to which you are adding an AViiON® station.

For detailed descriptions of FDDI network topology and ring configuration, refer to *VMEbus FDDI Controller (VFC) User's Guide* and *Data General Fiber Optic Cable Plant Design and Verification Manual.*

The VFC board has ST®-compatible optical connectors (jacks); it therefore requires cables with bayonet plug connectors on the board end. Figure 4–44 shows the location of the optical jacks accessed through the air dam on the VFC board.

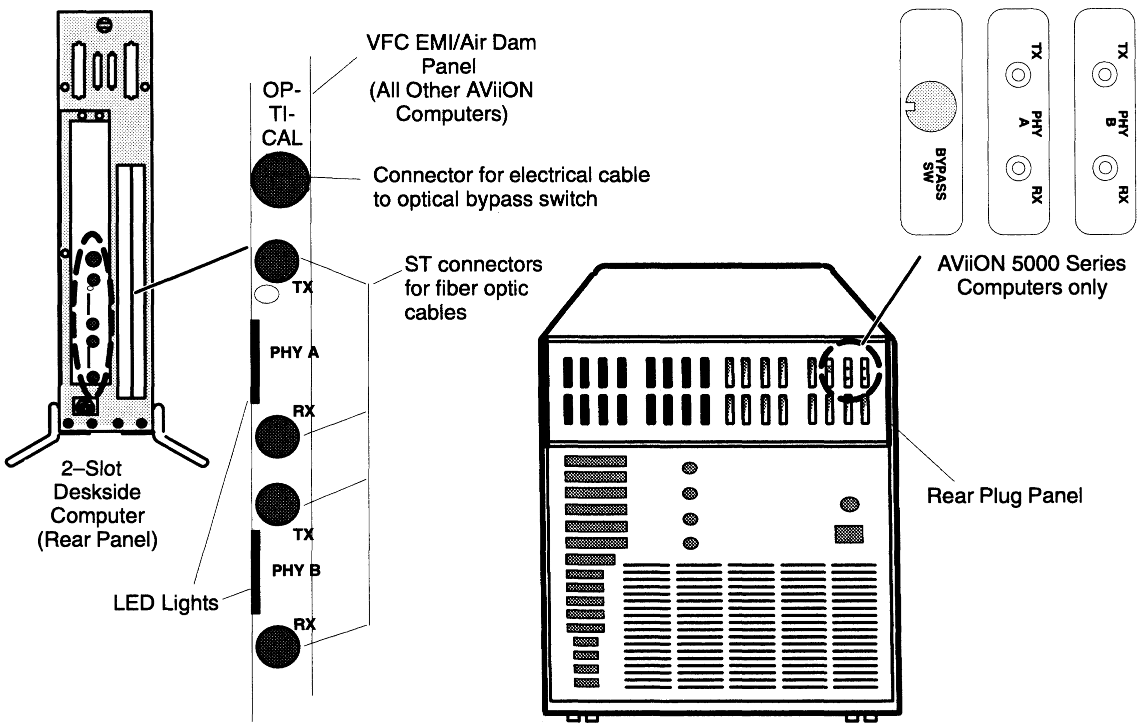


Figure 4–44 VFC Connectors

Single-Attachment Versus Dual-Attachment Connection

Your VFC board can have either a single-attachment or dual-attachment connection to the FDDI ring. In a single-attachment scenario, your VFC board connects to a concentrator, which in turn connects to the main FDDI ring. With this setup, you use only the PHY B (or Port B) of the VFC board. Figure 4–45 depicts a single-attachment setup.

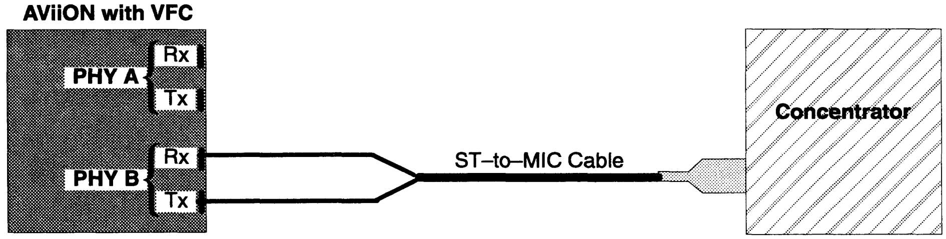


Figure 4–45 Single-Attachment Connection

In a dual-attachment connection, the VFC board allows your AViiON computer to be connected directly to the main FDDI ring network, either via the optical bypass switch or a FDDI concentrator. An optical bypass switch allows you to take the workstation off line, allowing the ring to bypass your station if the station has a failure. Figures 4–46 and 4–47 show simple FDDI ring networks, without and with optical bypass switches.

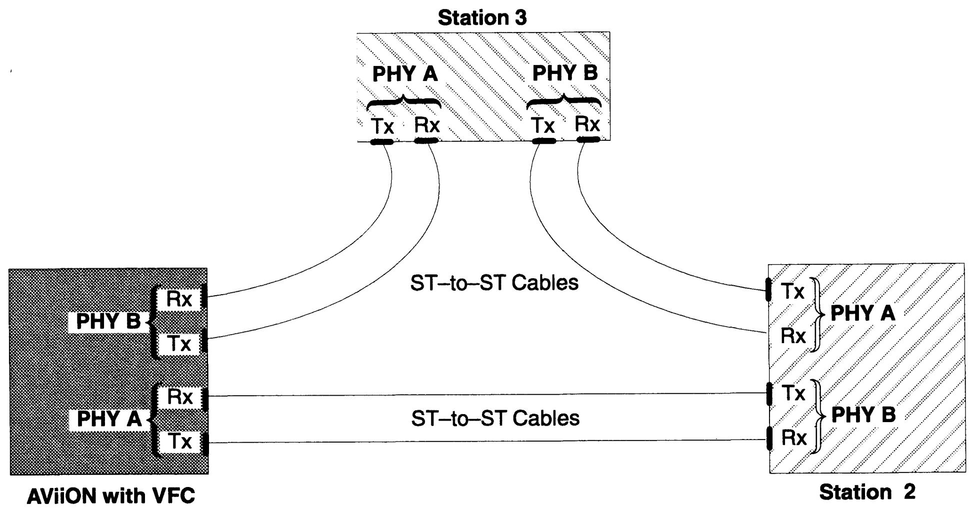


Figure 4–46 Dual–Attachment Stations in Simple Ring Configuration (Without Optical Bypass Switches – See NOTE)

NOTE: We do not recommend that you connect directly to another FDDI unit as shown above; use an optical bypass switch if at all possible.

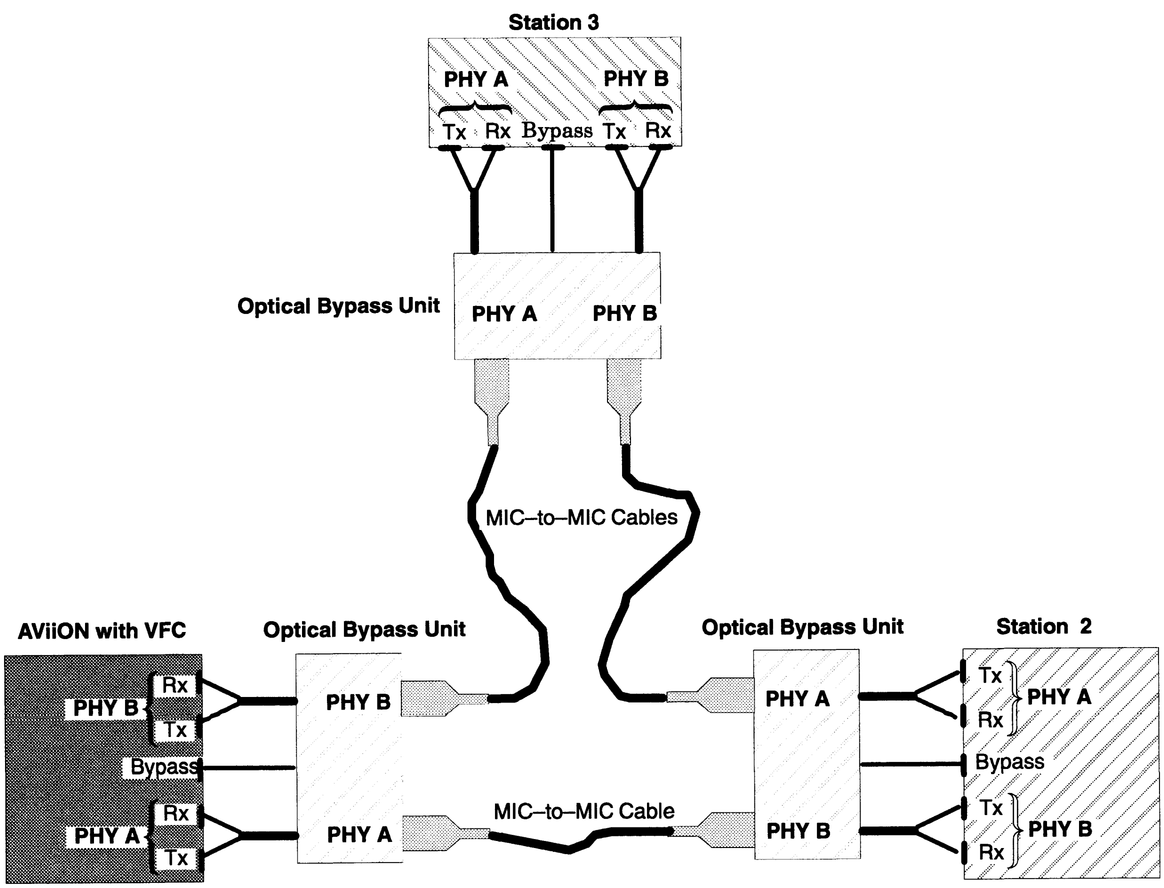
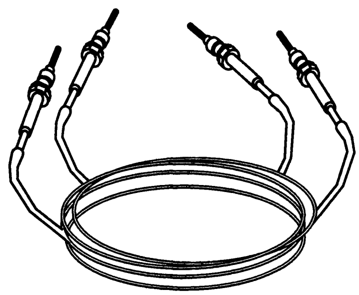
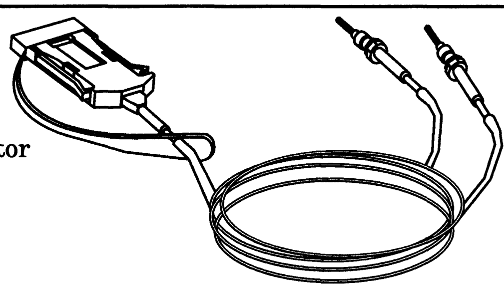
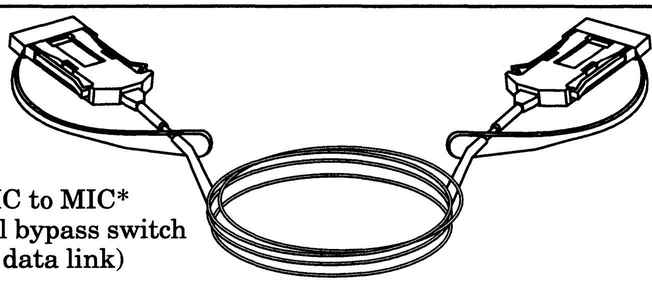


Figure 4–47 Dual–Attachment Stations in Simple Ring Configuration (With Optical Bypass Switches)

Once you have decided which type of connection you will use — single-attachment or dual-attachment — select the cables you will need for your installation. Table 4–12 lists and describes the fiber–optic cables available from Data General Corporation.

Your VFC board includes or supports ST-compatible optical connectors (jacks); it therefore requires cables with bayonet plug connectors on the host end. The type of cables you use depends on the connectors your receiving devices require; most concentrators and bridges require Media Interface Connector (MIC) connectors at their end of the VFC cable(s).

Table 4–12 VFC Fiber–Optic Cables

Connector Type	Model Number	Length (m)
ST to ST (VFC to VFC) 	40567	5
	40561	10
	40564	20
ST to MIC* (VFC to concentrator or bridge) 	40566	5
	40560	10
	40563	20
MIC to MIC* (Optical bypass switch to data link) 	40565	5
	40559	10
	40562	20

* Media Interface Connector.

NOTE: Single–attachment stations *must use* the Tx/Rx pair labeled “PHY B.”

Determining Tx and Rx Cable Strands

All the fiber–optic cables consist of two separate strands, often joined together. One strand carries signals *transmitted* by the VFC; the other carries those signals *received* by the VFC. Since they are keyed to attach in only one way, MIC connectors eliminate the need for you to determine the correct transmit and receive connection.

You cannot always tell by looking at the individual strands of an ST-to-ST or ST-to-MIC cable which connectors at each end are on the same strand. Some cables are labeled, but some are not. If your cable is not labeled, you can see if the bayonet connectors are plugged into the correct jacks on the board by checking the LED lights on the VFC board's air dam. If the cable strands are connected properly, ring state LEDs 3 and 4 should both be lit (see Figure 4–44 for the location of the LED lights). Table 4–13 shows the ring states as indicated by the ring state LEDs.

Table 4–13 Ring State LED Lights

Ring State	LED 3 (PRI)	LED 4 (THRU)	LED 5 (SEC)
Isolated	Off	Off	Off
Wrap_A	On	Off	Off
Wrap_B	Off	Off	On
Wrap_AB	On	Off	On
Thru_A	On	On	Off
Thru_B	Off	On	On
Thru_AB	On	On	On

WARNING: Never look into an active fiber-optic cable. Harmful optical radiation may be present, which could cause permanent eye damage. If necessary, use a fiber-optic power meter to determine if a signal is present.

If the ring state LEDs do not indicate that the ring is functional (that is, if LEDs 3 and 4 are not lit), unplug the two bayonet ST connectors from the VFC board and swap their positions, connecting to Tx the bayonet connector previously plugged into Rx, and vice versa. Then check the LEDs again. LEDs 3 and 4 should be lit.

With ST connectors, you must make certain to connect the correct Tx/Rx strands to the terminals on the device to which you connect your VFC. As shown in Figure 4–46, the transmit (Tx) port for one *physical layer protocol* (physical unit, or PHY) connects to the receive (Rx) port on the receiving device's opposite PHY. For example, the PHY B Tx connector supports the primary ring transmit line; its cable strand attaches to the primary receiving connector at PHY A Rx. Correspondingly, PHY B Rx attaches to PHY A Tx.

AViiON 5000 series systems do not reveal the ring–state LED lights for the VFC. If you suspect that your ring is not functional on one of these systems, unplug the two VFC bayonet connectors from the computer rear panel and swap their positions. After you connect to Tx the bayonet connector previously plugged into Rx, and vice versa, test your ring state as described in *VMEbus FDDI Controller (VFC) User's Guide.*

Connecting the VFC to a Concentrator, Bridge, or Station

This section describes how to cable your VFC board directly to a concentrator, bridge, or second station *without* an intervening optical bypass switch (also see Figure 4–46). If your system includes an optical bypass switch between your VFC and another station, go to the next section, "Connecting a VFC to an Optical Bypass Switch."

To connect your VFC to another device, follow these steps:

1. Before making any connections, run the fiber–optic cables out to the device that you will connect to the VFC board.

   CAUTION: The fiber in the cable is extremely delicate and susceptible to damage. Take particular care not to stretch, puncture, or crush a fiber–optic cable. Do not bend the cable into small radii.

2. Locate the pairs of Tx/Rx jacks for Physical Units A and B (labeled PHY A and PHY B) at the rear of your computer unit. (See Figure 4–44.)
3. Each fiber–optic cable has two bayonet ST connectors at one end that you must plug into the board's optical jacks. When you are ready to attach the cable, remove the thin cylindrical plastic dust caps from the connectors and jacks. Plug one bayonet connector into the Tx jack for the appropriate physical unit (A or B) for the VFC and turn it clockwise to secure the bayonet mechanism. Do the same for the Rx jack. (See Figure 4–48.)

   CAUTION: The connectors are extremely sensitive to dust, dirt, and oils. Always leave the plastic dust caps in place on both board connectors and cable connectors until you make the connections. Do not polish the connectors with a cloth made of synthetic fibers, as this will charge up the fiber and attract dust.

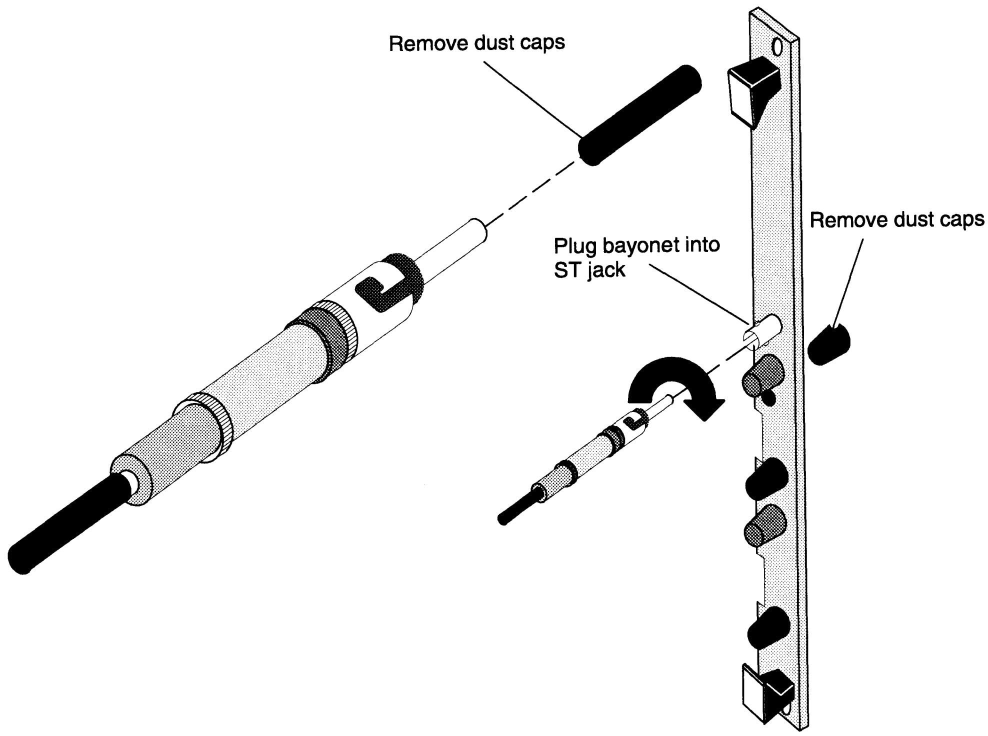


Figure 4–48 Attaching ST Bayonet Connectors to a VFC Connector Jack

4. Connect the other end(s) of the cable to your second device. Make certain that physical unit A on your second device connects to PHY B on the VFC, and that the VFC PHY A connects to physical unit B on your second device.

   NOTE: The MIC ends of ST–to–MIC cables are keyed: you can connect them only one way. Figure 4–49 shows a typical MIC connection.

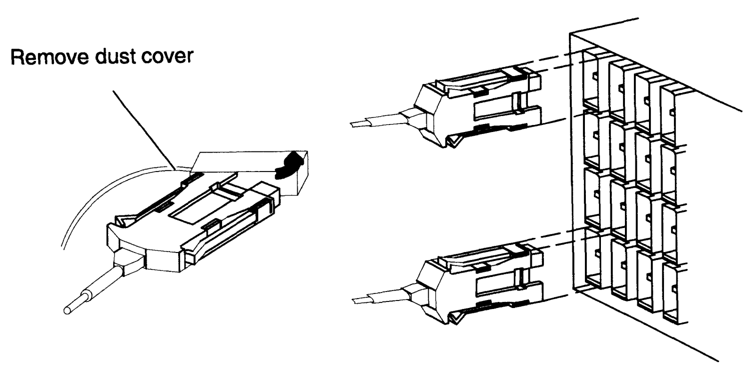


Figure 4–49 Attaching MIC Connectors to a Concentrator or Bridge

Connecting a VFC to an Optical Bypass Switch

This section assumes you are using an optical bypass switch with your VFC board. Complete the following steps (also see Figure 4–47):

1. Locate the pairs of Tx/Rx jacks for Physical Units A and B (labeled PHY A and PHY B) at the rear of your computer unit. (See Figure 4–44.)
2. Remove the plastic dust caps, then plug the bayonet connectors on the optical bypass switch cables into the Tx and Rx jacks for PHY A and PHY B on the VFC board, as indicated in Figure 4–50. (Refer to Figure 4–48 for an illustration of an ST bayonet connection to the VFC board.)

CAUTION: *The connectors are extremely sensitive to dust, dirt, and oils. Always leave the plastic dust caps in place on both board jacks and cable connectors until you make the connections. Do not polish the connectors with a cloth made of synthetic fibers, as this will charge up the fiber and attract dust.*

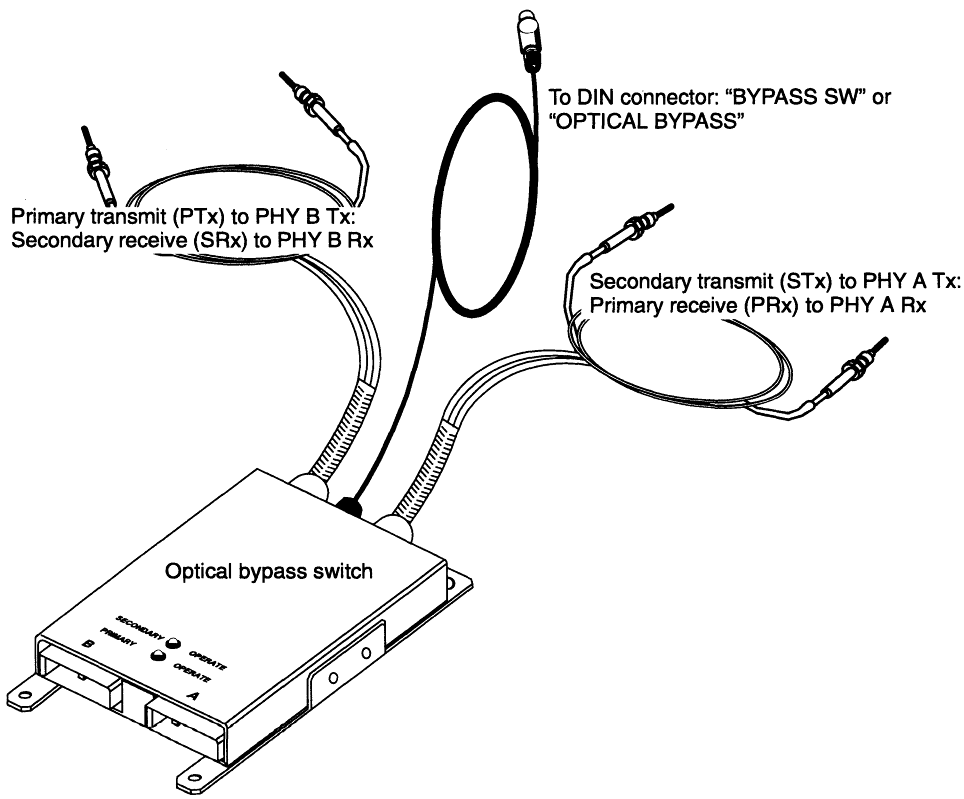


Figure 4–50 Connecting an Optical Bypass Switch to a VFC

3. The optical bypass switch includes an electrical control cable with a 6-pin mini-DIN connector. Plug the cable into the "BYPASS" connector on the VFC board. The DIN connector is keyed, and can connect only one way.

4. Connect the optical bypass switch to the FDDI ring by attaching the appropriate cables between the next device and the MIC receptacles on the optical bypass switch, as shown in Figure 4–51. Note that the MIC connectors are keyed; you can connect them only one way. See Table 4–12 for a list of cables offered by Data General.

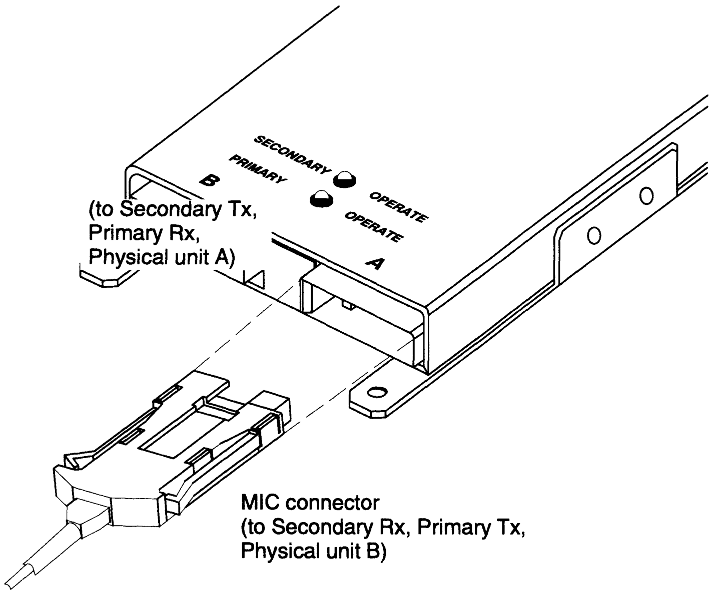


Figure 4–51 Attaching Optical Bypass Switch MIC Connectors

Optical Bypass Switch Connector Signals

Your VFC controller supports an optical bypass switch that uses a 6-pin mini-DIN connector. Figure 4–52 shows the signals and pin numbers for the optical bypass switch DIN connector.

Pin	Signal
1	+5 V secondary switch
2	+5 V primary switch
3	GND primary switch
4	GND secondary switch
5	Common to pin 6
6	Common to pin 5

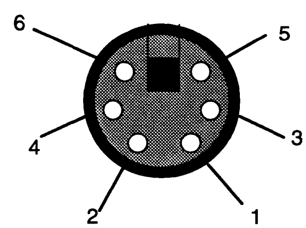


Figure 4–52 VFC Optical Bypass Switch Connector Signals

End of Chapter

Appendix A
VME Backplane Connector Signals and Power Distribution

This appendix describes the VME connector signals J1 and J2; it also describes the power signals the VME backplane receives from your computer's power supply.

Figure A–1 shows the backplane signal buses. As shown below, rows A, B, and C of the J1 connectors and row B of the J2 connectors provide the VMEbus signals to all board slots. These rows connect to the P1 and P2 board connectors described in the VMEbus specification. Row B of the J2 connectors provides the user-defined signals described in the VMEbus specification.

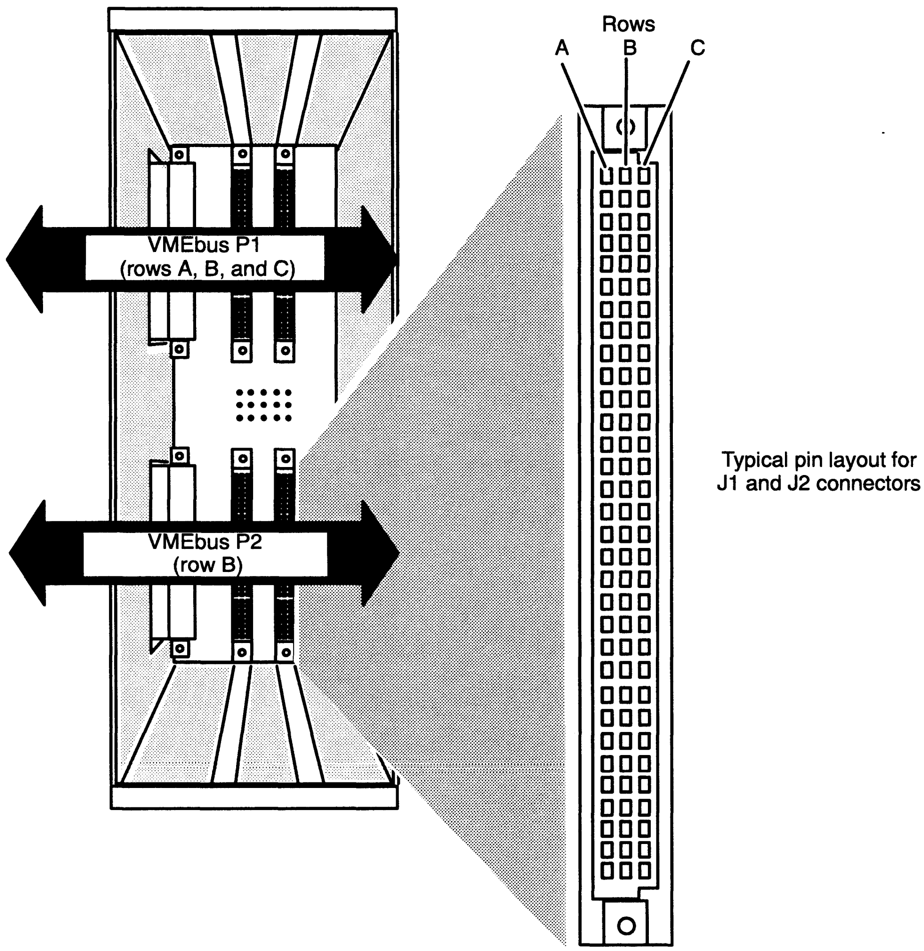


Figure A–1 VME Backplane Bus

Figure A–2 shows the pin and row positions of the 96-pin backplane connectors, J1 and J2. Connector J1 and row B of J2 provide the standard VMEbus signals across all slots in the card cage. Tables A–1 and A–2 list these signals; for a detailed description refer to the manual *The VMEbus Specification*.

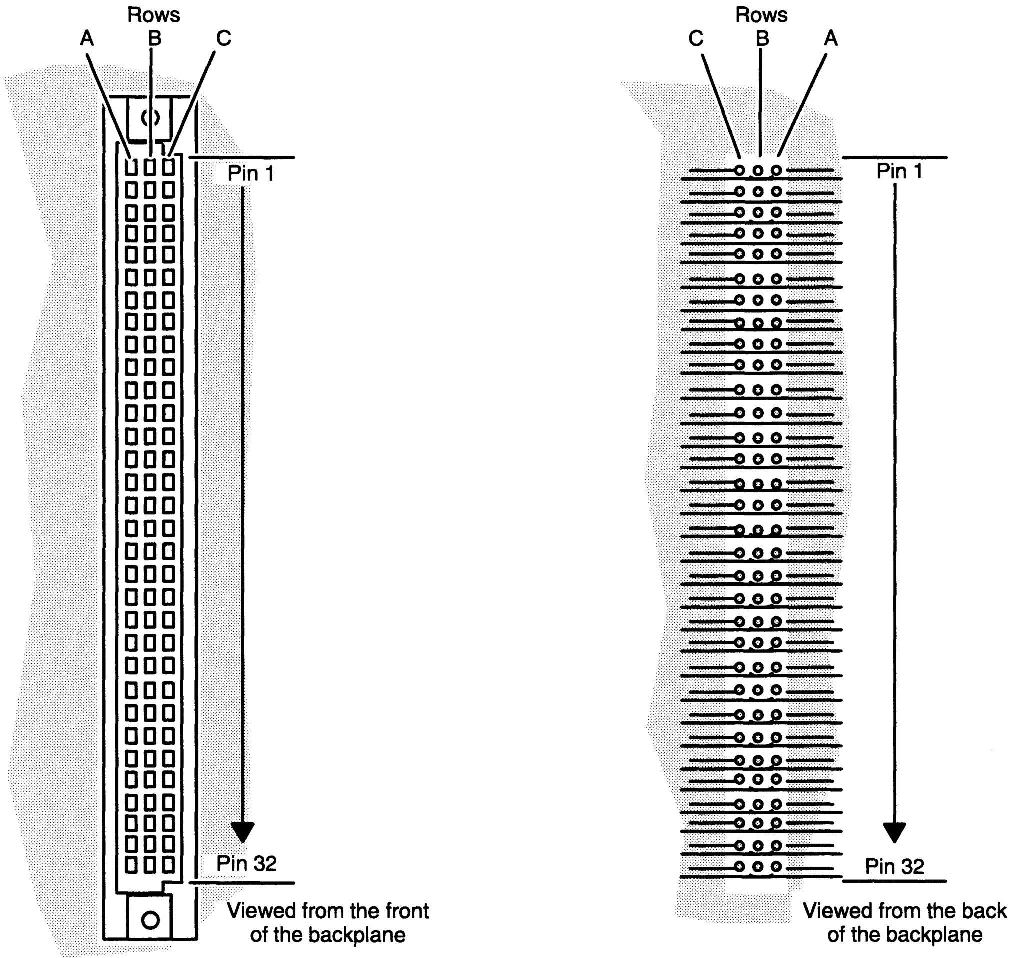


Figure A–2 Pin and Row Positions of Backplane J1 and J2 Connectors

Table A–1 Connector J1 Signals

Pin	Row A	Row B	Row C
1	D00	BBSY	D08
2	D01	BCLR	D09
3	D02	ACFAIL	D10
4	D03	BG0IN	D11
5	D04	BG0OUT	D12
6	D05	BG1IN	D13
7	D06	BG1OUT	D14
8	D07	BG2IN	D15
9	GND	BG2OUT	GND
10	SYSCLK	BG3IN	SYSFAIL
11	GND	BG3OUT	BERR
12	DS1	BR0	SYSRESET
13	DS0	BR1	LWORD
14	WRITE	BR2	AM5
15	GND	BR3	A23
16	DTACK	AM0	A22
17	GND	AM1	A21
18	AS	AM2	A20
19	GND	AM3	A19
20	IACK	GND	A18
21	IACKIN	Reserved	A17
22	IACKOUT	Reserved	A16
23	AM4	GND	A15
24	A07	IRQ7	A14
25	A06	IRQ6	A13
26	A05	IRQ5	A12
27	A04	IRQ4	A11
28	A03	IRQ3	A10
29	A02	IRQ2	A09
30	A01	IRQ1	A08
31	–12 V	+5 V STBY	+12 V
32	+5 V	+5 V	+5 V

Table A–2 Connector J2 Signals

Pin	Row A*	Row B (VMEbus)	Row C*
1	Reserved	+5 V	Reserved
2	Reserved	GND	Reserved
3	Reserved	Reserved	Reserved
4	Reserved	A24	Reserved
5	Reserved	A25	Reserved
6	Reserved	A26	Reserved
7	Reserved	A27	Reserved
8	Reserved	A28	Reserved
9	Reserved	A29	Reserved
10	Reserved	A20	Reserved
11	Reserved	A31	Reserved
12	Reserved	GND	Reserved
13	Reserved	+5 V	Reserved
14	Reserved	D16	Reserved
15	Reserved	D17	Reserved
16	Reserved	D18	Reserved
17	Reserved	D19	Reserved
18	Reserved	D20	Reserved
19	Reserved	D21	Reserved
20	Reserved	D22	Reserved
21	Reserved	D23	Reserved
22	Reserved	GND	Reserved
23	Reserved	D24	Reserved
24	Reserved	D25	Reserved
25	Reserved	D26	Reserved
26	Reserved	D27	Reserved
27	Reserved	D28	Reserved
28	Reserved	D29	Reserved
29	Reserved	D30	Reserved
30	Reserved	D31	Reserved
31	Reserved	GND	Reserved
32	Reserved	+5 V	Reserved

* Row A and Row C pins are reserved for use by the system board and memory boards; VME controllers cannot use them.

Backplane Power Distribution

Boards plugged into the slots of the VME card cage receive power through the J1 and J2 connectors on the backplane. Figure A–3 shows the distribution of power from an AViiON 400 and 4000 series power supply to the VME backplane.

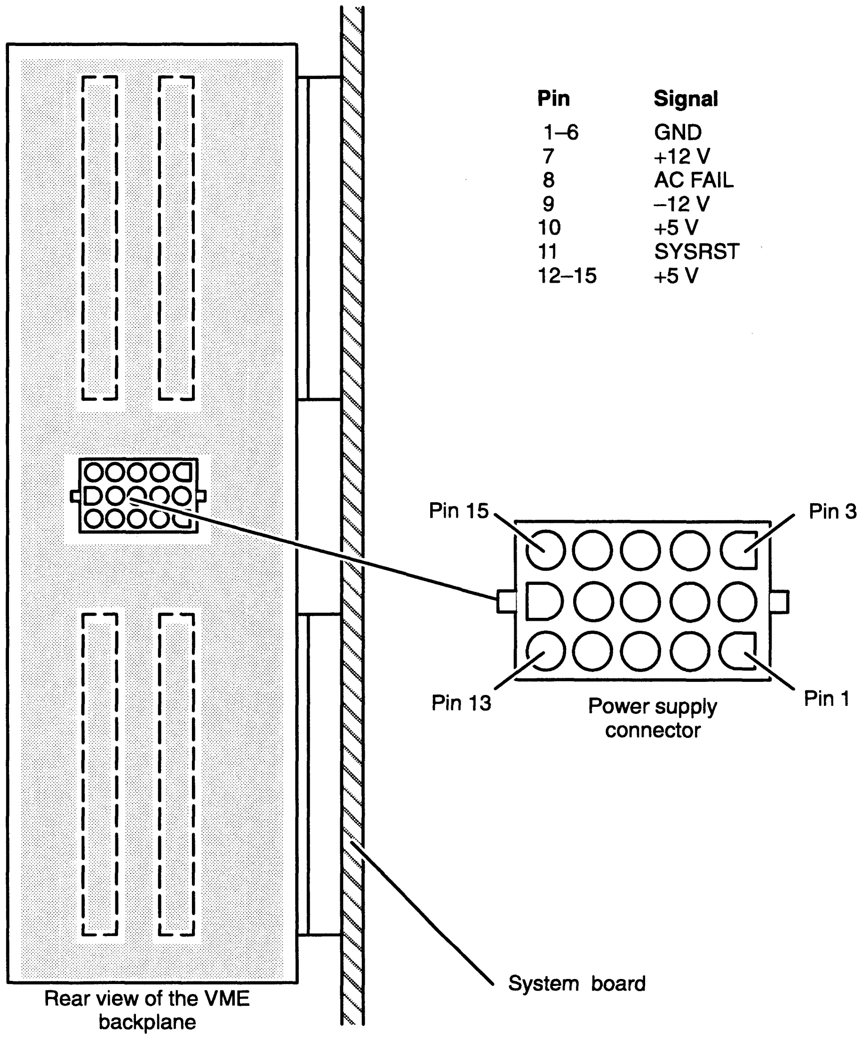


Figure A–3 VME Backplane Power Distribution

End of Appendix

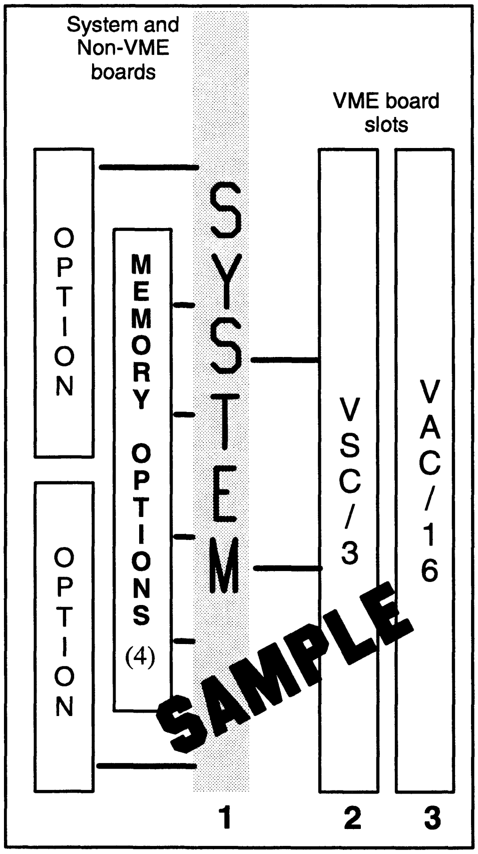
Appendix B
Board Slot Maps, Power Requirement Forms, and Device Line Worksheets

Use the form(s) in this appendix to perform the following tasks:

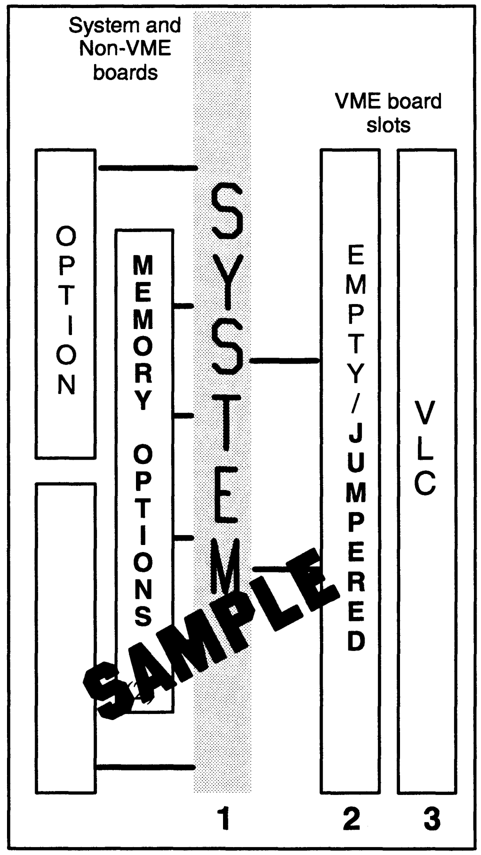
- Record the location of the boards in your system.
- Note whether slot 1 in the VME card cage requires jumpers on the backplane. (Slot 1 requires backplane jumpers only if slot 2 contains a VME board and slot 1 remains empty.)
- Calculate the current and power requirements of your computer's configuration.
- Record the connections of asynchronous devices to VAC/16 junction boxes and VDA cluster boxes.

Refer to Chapter 1 for additional information on board slot maps and power requirement forms. Refer to Chapter 4 for additional information on device line worksheets.

The examples in Figure B–1 show possible AViiON configurations. Use the diagrams that follow for your configurations.



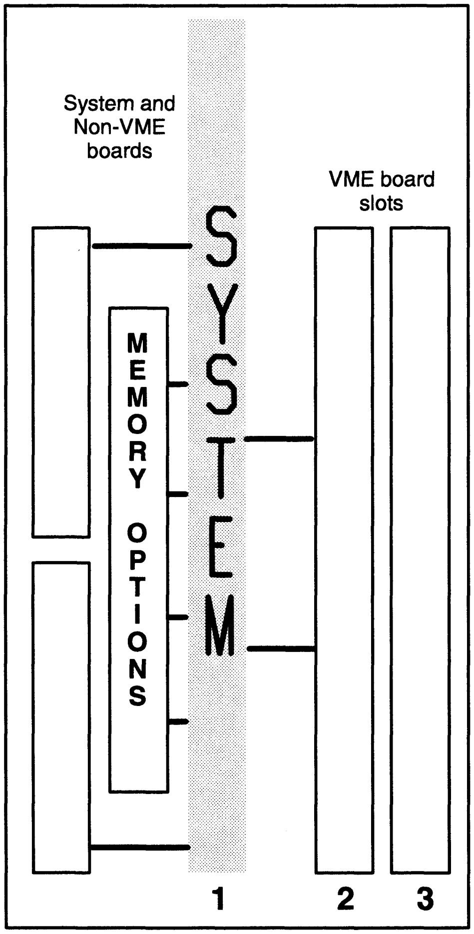
Viewed from rear of computer



Viewed from rear of computer

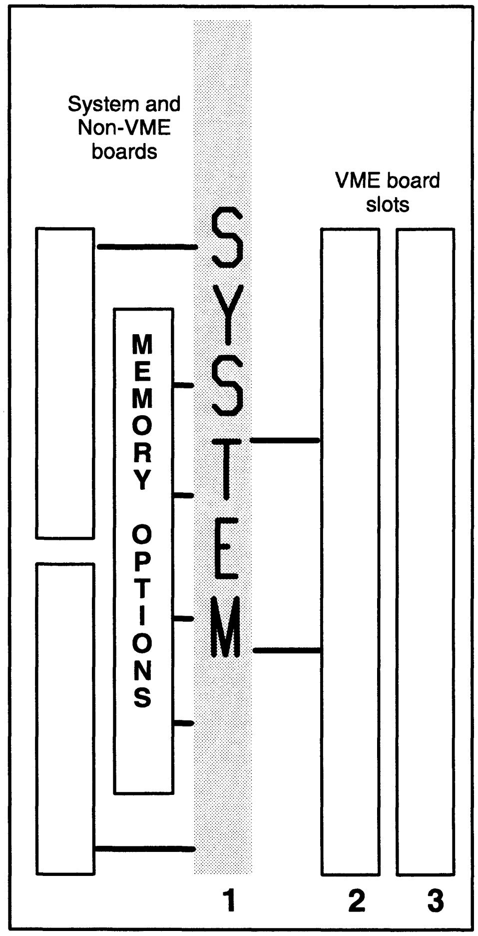
Figure B–1 Sample AViiON Configurations

Board Slot Maps



Viewed from rear of computer

NOTES



Viewed from rear of computer

NOTES

Complete the power requirement form to calculate the current and power requirements of your computer's configuration. See Chapter 1 for details.

CAUTION: *The calculated amperes and watts used by the devices in your AViiON system must not exceed the maximum amperes and watts available from your power supply.*

Power Requirement Form

Device		Current (Amperes) +5 V dc	+12 V dc	–12 V dc
0	SYSTEM BOARD			
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Total Amperes Used				

Power Supply

Maximum Amperes Available	Total Amperes Used (from Table above)		
+ 5 V Total = _____ amps	_____ A		
+12 V Total = _____ amps		_____ A	
–12 V Total = _____ amps			_____ A

Wattage (volts x amperes) Available				Watts Used
+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	=

VAC/16 Device Line Worksheet

Board no:			**Device name:** syac			**Range of tty lines:**	
J1 Connector				**J2 Connector**			
Port No.	**tty Line**	**Device Type**	**Description**	**Port No.**	**tty Line**	**Device Type**	**Description**
A1 (0)				**A1** (8)			
A2 (1)				**A2** (9)			
A3 (2)				**A3** (10)			
A4 (3)				**A4** (11)			
B1 (4)				**B1** (12)			
B2 (5)				**B2** (13)			
B3 (6)				**B3** (14)			
B4 (7)				**B4** (15)			

VDA Host Adapter Device Worksheet

Sheet ___ of ___

Board type: **Board no:**

Cluster Address	Port No.	tty Line	Device Type	Description	Cluster Address	Port No.	tty Line	Device Type	Description
	0					0			
	1					1			
	2					2			
	3					3			
	4					4			
	5					5			
	6					6			
	7					7			
	8					8			
	9					9			
	10					10			
	11					11			
	12					12			
	13					13			
	14					14			
	15					15			

End of Appendix

Appendix C
External Device Connector Pin Assignments

This appendix lists pin assignments for the external connectors on the following VME option boards:

- VAC/16 controller junction box asynchronous connectors (RS–232–C, 25-pin)
- VDC/8P and VDC/16 controller asynchronous connectors (RS–232–C, 25-pin)
- VDC/8P controller box parallel (printer) connector (CHAMP 36-pin)
- VTC controller Ethernet LAN interface connector (15-pin)
- VSC/3 controller synchronous connectors (RS–232–C, 25-pin)
- VSC/3i controller synchronous connectors (25-pin)
- VSA controller SCSI connectors (50-pin high-density)
- VLC controller Ethernet LAN connectors (15-pin)
- VLCi controller Ethernet LAN connectors (15-pin)
- VTRC controller Token Ring LAN connectors (9-pin)
- VFC optical bypass switch connector (6-pin mini-DIN)

Table C–1 lists the connector, size, and Data General part and model numbers for device cables that connect directly to AViiON VME options.

Table C–2 lists the power cords available for cluster controllers that connect to a VDA host adapter.

Figures and tables that follow Table C–2 show the pin/signal assignments for the board connectors on VME options described in this manual.

Table C–1 VME Options: Direct-Connection Cables

Device	Connector Type	Cable Part No.	Cable Model No.	Cable Length (ft)
VDC/8P, VDC/16 Asynchronous terminals	DB25	005–34256	15340E010	10 (3 m)
		005–34990	15340E015	15 (4.5 m)
		005–34991	15340E025	25 (7.6 m)
VDC/8P, VDC/16 Asynchronous modems	DB25	005–36256	15369E010	10 (3 m)
		005–36257	15369E015	15 (4.5 m)
		005–36258	15369E025	25 (7.6 m)
VDC/8P Parallel Printer (Centronics LPT1 interface)	CHAMP 36-pin	005–37910	15345E015	15 (4.5 m)
		005–37911	15345E025	25 (7.6 m)
VDA/128 and VDA/255 port Cluster controller network	RG-62 coaxial with BNC connectors	005–34246	15338E025	25 (7.6 m)
		005–34247	15338E050	50 (15.2 m)
		005–34248	15338E100	100(30.5 m)
VTC LAN interface:				
plenum-grade	D15	005–33791	1326	16.4 (5 m)
		005–33787	1326A	65.6 (20 m)
PVC	D15	007–75414	4028	3.3 (1 m)
		007–6253	4028A	9.9 (3 m)
		005–33766	15274E005	16.4 (5 m)
		005–31694	15274E020	65.6 (20 m)
VSC/3 Synchronous devices	DB25	005–32917	15290E006	6 (1.7 m)
		005–32918	15290E015	15 (4.5 m)
		005–32919	15290E025	25 (4.5 m)
VSC/3i				
RS–232–C	DB25 to DB25	005–32917	15290E006	6 (1.7 m)
		005–32918	15290E015	15 (4.5 m)
		005–32919	15290E025	25 (4.5 m)
RS–449	DB25 to DB37	005–39805	15408E015	15 (4.5 m)
RS–530	DB25 to DB25	005–39804	15409E015	15 (4.5 m)
V.35	DB25 to V.35	005–39806	15410E015	15 (4.5 m)
X.21	DB25 to DB15	005–39800	15411E015	15 (4.5 m)
VSA SCSI devices	50-pin high-density	005–039718	15396E005	5 (1.5 m)
		005–039719	15396E010	10 (3 m)
		005–039720	15396E020	20 (6 m)
		005–039721	15396E040	40 (12.2 m)

(continued)

Table C–1 VME Options: Direct-Connection Cables

Device	Connector Type	Cable Part No.	Cable Model No.	Cable Length (ft)
VLC LAN interface: plenum-grade	D15	005–33791	1326	16.4 (5 m)
		005–33787	1326A	65.6 (20 m)
PVC	D15	005–33766	15274E005	16.4 (5 m)
		005–31694	15274E020	65.6 (20 m)
VLCi LAN interface: plenum-grade	D15	005–33791	1326	16.4 (5 m)
		005–33787	1326A	65.6 (20 m)
PVC	D15	007–75414	4028	3.3 (1 m)
		007–6253	4028A	9.9 (3 m)
		005–33766	15274E005	16.4 (5 m)
		005–31694	15274E020	65.6 (20 m)
VTRC LAN interface Shielded twisted pair	D9 to IEEE 802.5	005–33617	15333E003	2.5 (0.8 m)
		005–33618	15333E016	16 (4.9 m)
		005–33619	15333E065	65 (19.8 m)
Unshielded twisted pair	D9 to RJ11	007–5052	15335E008	8.0 (2.4 m)
VFC	ST to ST (board to board)	118–15214	40567	16.4 (5 m)
		118–15215	40561	32.8 (10 m)
		118–15216	40564	65.6 (20 m)
	ST to MIC (Board to concentrator)	118–15217	40566	16.4 (5 m)
		118–15218	40560	32.8 (10 m)
		118–15219	40563	65.6 (20 m)
	MIC to MIC (Optical bypass switch to data link)	118–15220	40565	16.4 (5 m)
		118–15221	40559	32.8 (10 m)
		118–15222	40562	65.6 (20 m)

(concluded)

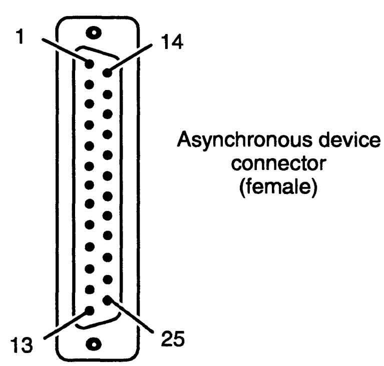
Table C–2 Cluster Controller Power Cords (VDC/8P and VDC/16)

Voltage (V ac)	Part No.	Frequency (Hz)	Power Suffix
100	NA	50/60	–1
120 (North American standard)	NA	60	none
240	109–813	50	–5
	109–809	50	–6
220	109–812	50	–7
	109–811	50	–8
	109–815	50	–9
	109–810	50	–0

NOTE: Each cluster controller package includes a 100/120 volt power cord, shipped with the controller box. If your site requires 220 or 240 volts ac, make sure you received the correct number and type of additional power cords; do not attempt to use the 100/120 volt ac cords.

VAC/16, VDC/16, and VDC/8P Asynchronous Serial Port Connectors

Serial devices connect to the serial ports through RS–232–C 25-pin female DB25 connectors. Asynchronous connectors are located either on a VDA/128 (and VDA/255) cluster box or on a VAC/16 junction box. Figure C–1 shows the signals and pin numbers for these asynchronous connectors.



Pin	Signal
1	Chassis Ground (CG)
2	Transmit Data (TxD) <
3	Receive Data (RD) >
4	Request to Send (RTS) <
5	Clear to Send (CTS) >
6	Data Set Ready (DSR) >
7	Signal Ground (SG)
8	Data Carrier Detect (DCD) >
20	Data Terminal Ready (DTR) <

< indicates received by controller
> indicates transmitted from controller

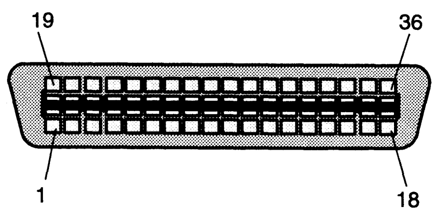
Figure C–1 Asynchronous Serial Connector Signals

NOTE: VAC/16, VDA/128, and VDA/255 boards are factory-configured as Data Communications Equipment (DCE). The female device connectors on the computer unit bulkhead and your junction and cluster boxes are also DCE.

VAC/16 controllers connect to their 8-port junction boxes through a data-transmission cable with either 64- or 68-pin connectors at either end. The signals and pin assignments for these connectors are identical except for the last four pins of the 68-pin connector, which are not used. Refer to the *HPS VMEbus Multiplexer (HPS-6236 / 6237) Technical Manual* for detailed information.

VDC/8P Parallel Port Connector

Parallel printers connect to the system through 36-pin connectors located on the back of VDC/8P controller boxes. Figure C–2 shows the signals and pin numbers for parallel printer connectors.

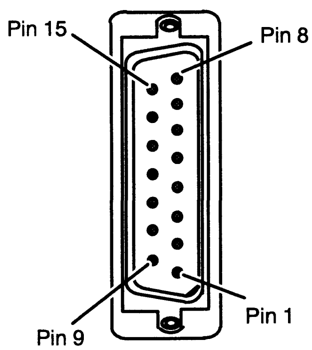


Pin	Signal	Pin	Signal
1	$\overline{\text{Data Strobe}}$	19	Ground
2	Data 1	20	Ground
3	Data 2	21	Ground
4	Data 3	22	Ground
5	Data 4	23	Ground
6	Data 5	24	Ground
7	Data 6	25	Ground
8	Data 7	26	Ground
9	Data 8	27	Ground
10	Acknowledge	28	Ground
11	Not used	29	Ground
12	Paper Empty	30	Not used
13	Select	31	Not used
14	Not used	32	$\overline{\text{Fault}}$
15	Not used	33	Ground
16	Not used	34	Not used
17	Not used	35	Not used
18	Not used	36	Not used

Figure C–2 VDC/8P Parallel Printer Connector Signals

VTC Interface Connector

The VTC controller provides a standard IEEE 802.3 local area network interface through a 15-pin sub-D connector. This connector accepts an Access Unit Interface (AUI) cable. The AUI cable connects the computer to an external Media Attachment Unit (MAU). The MAU contains the Ethernet transceiver and the Media Dependent Interface (MDI) for connection to the physical network. Figure C–3 shows the signals and pin numbers for the VTC external connector.



VTC connector to LAN
(female)

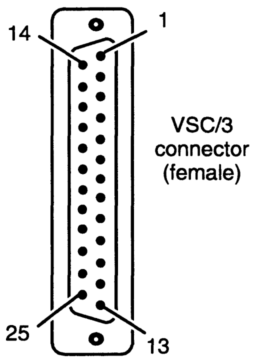
Pin	Circuit Name	
1	CI–S	(Control In circuit shield)
2	CI–A	(Control In circuit A)
3	DO–A	(Data Out circuit A)
4	DI–S	(Data In circuit shield)
5	DI–A	(Data In circuit A)
6	VC	(Voltage common)
7	CO–A	(Control Out circuit A)
8	CO–S	(Control Out circuit shield)
9	CI–B	(Control In circuit B)
10	DO–B	(Data Out circuit B)
11	DO–S	(Data Out circuit shield)
12	DI–B	(Data In circuit B)
13	VP	(Voltage plus)
14	VS	(Voltage shield)
15	CO–B	(Control Out circuit B)

The connector shell acts as a protective ground

Figure C–3 VTC Connector Signals

VSC/3 Synchronous Serial Port Connectors

Synchronous serial devices connect to the VSC/3 ports through RS–232–C 25-pin female DB25 connectors. Figure C–4 shows the signals and pin numbers for VSC/3 synchronous connectors.



Pin	Signal and Direction	
1	Chassis Ground (CG)	
2	Transmit Data (TxD)	>
3	Receive Data (RD)	<
4	Request to Send (RTS)	>
5	Clear to Send (CTS)	<
6	Data Set Ready (DSR)	<
7	Signal Ground (SG)	
8	Data Carrier Detect (DCD)	<
15	Transmit Signal Timing (Tx Clock)	<
17	Receive Signal Timing (RCV Clock)	<
20	Data Terminal Ready (DTR)	>
24	Transmit Signal Timing (SC)	>

< indicates received by controller
> indicates transmitted from controller

Figure C–4 VSC/3 Connector Signals

VSC/3i Synchronous Serial Port Connectors

Devices connect to the VSC/3i ports (or *channels*) through 25–pin female DB25 connectors marked “CH A,” “CH B,” and “CH C.” The signals supported by each connector on your VSC/3i air dam depend on the interface type you select when configuring your VSC/3i. Figure C–5 shows the VSC/3i rear panel connector, and Table C–3 lists the signals and pin numbers for each electrical interface supported by VSC/3i connectors.

IMPORTANT: This section provides only the signals leaving the VSC/3i DB25 connector, *not* the cable connector signals.

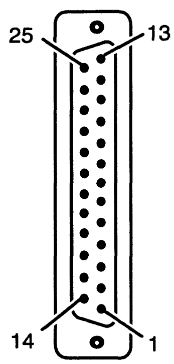


Figure C–5 VSC/3i Rear Panel Connector (Female)

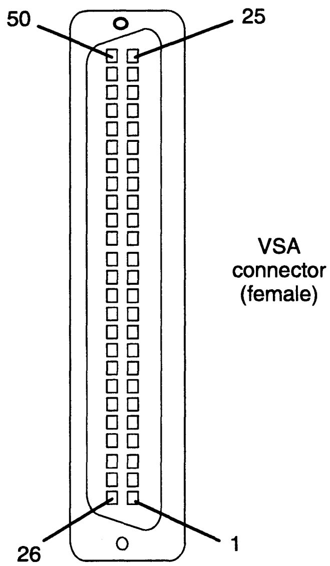
Table C–3 VSC/3i Connector Signals

Pin #	Electrical Interface: RS-232	RS-530, RS-449, X.21	V.35
1	Chassis Ground	Shield A	Shield
2	Transmit Data (TxD) >	Transmit Data (TxD) A >	Send Data (SD) A >
3	Receive Data (RD) <	Receive Data (RD) A <	Receive Data (RD) A <
4	Request to Send (RTS) >	Request to Send (RTS) A >	Request to Send (RTS) >
5	Clear to Send (CTS) <	Clear to Send (CTS) A <	Clear to Send (CTS) <
6	Data Set Ready (DSR) <	Data Set Ready (DSR) A <	Data Set Ready (DSR) <
7	Signal Ground (SG)	Signal Ground (SG) A	Signal Ground (SG)
8	Data Carrier Detect (DCD) <	Data Carrier Detect (DCD) A <	Data Carrier Detect (DCD) <
9		Receive Clock (RC) B <	Serial Clock Receive (SCR) B <
10		Data Carrier Detect (DCD) B <	
11		Transmit Clock (TxC) B >	Serial Clock Transmit (SCTE) B >
12		Transmit Clock (TxC) B <	Serial Clock Transmit (SCT) <
13		Clear to Send (CTS) B <	
14		Transmit Data B >	Send Data (SD) B >
15	Transmit Clock (TxC) <	Transmit Clock (TxC A <	Serial Clock Transmit (SCT) A <
16		Receive Data (RxD) B <	Receive Data (RxD) B <
17	Receive Clock (RC) <	Receive Clock (RC) A <	Serial Clock Receive (SCR) A <
18			
19		Request to Send (RTS) B >	
20	Data Terminal Ready (DTR) >	Data Terminal Ready (DTR) A >	Data Terminal Ready (DTR) >
21			
22		Data Set Ready (DSR) B <	
23		Data Terminal Ready (DTR) B >	
24	Transmit Clock (TxC) >	Transmit Clock (TxC) A >	Serial Clock Transmit (SCTE) A >
25			

NOTE: < indicates signal received by controller.
\> indicates signal transmitted by controller.
A and B indicate polarity.

VSA SCSI Connectors

SCSI devices connect to the VSA SCSI ports through 50-pin high-density connectors. Figures C–6 and C–7 show the signals and pin numbers for VSA SCSI connectors for single-ended and differential interfaces, respectively.



Pin	Signal
26	Data Bus 0 (DB0)
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 (GND)
36	Ground
37	Ground
38	Termination Power (TERMPWR)
39	Ground
40	Ground
41	Attention (ATN)
42	Ground
43	Busy (BSY)
44	Acknowledge (ACK)
45	Reset (RST)
46	Message (MSG)
47	Select (SEL)
48	Control/Data (C/D)
49	Request (REQ)
50	Input/Output (I/O)

NOTE: For single–ended SCSI connectors, pins 1 through 12 and pins 14 through 25 are connected to ground. Pin 13 is left open.

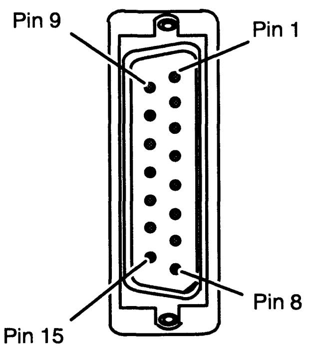
Figure C–6 VSA SCSI Connector Signals – Single-Ended Interface

Pin	Signal	Pin	Signal
1	Shield	26	Ground (GND)
2	Data Bus 0+	27	Data Bus 0 (DB0)–
3	Data Bus 1+	28	Data Bus 1–
4	Data Bus 2+	29	Data Bus 2–
5	Data Bus 3+	30	Data Bus 3–
6	Data Bus 4+	31	Data Bus 4–
7	Data Bus 5+	32	Data Bus 5–
8	Data Bus 6+	33	Data Bus 6–
9	Data Bus 7+	34	Data Bus 7–
10	Data Bus P+	35	Data Bus P–
11	DIFFSENS	36	Ground
12	Ground	37	Ground
13	Termination Power (TERMPWR)	38	Termination Power (TERMPWR)
14	Ground	39	Ground
15	Attention (ATN)+	40	Attention (ATN)–
16	Ground	41	Ground
17	Busy (BSY)+	42	Busy (BSY)–
18	Acknowledge (ACK)+	43	Acknowledge (ACK)–
19	Reset (RST)+	44	Reset (RST)–
20	Message (MSG)+	45	Message (MSG)–
21	Select (SEL)+	46	Select (SEL)–
22	Control/Data (C/D)+	47	Control/Data (C/D)–
23	Request (REQ)+	48	Request (REQ)–
24	Input/Output (I/O)+	49	Input/Output (I/O)–
25	Ground	50	Ground

Figure C–7 VSA SCSI Connector Signals – Differential Interface

VLC Interface Connector

The VLC LAN controller interface provides a 15-pin D connector for an AUI cable. The AUI cable connects the computer to an external Media Attachment Unit (MAU). The MAU contains the Ethernet transceiver and the Media Dependent Interface (MDI) for connection to the physical network. Figure C–8 shows the signals and pin numbers for these connectors.



VLC LAN connector (female)

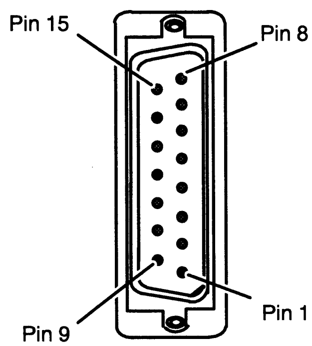
Pin	Signal	Circuit Name	
1	Ground	CI–S	(Control In circuit shield)
2	Collision +	CI–A	(Control In circuit A)
3	Transmit +	DO–A	(Data Out circuit A)
4	Ground	DI–S	(Data In circuit shield)
5	Receive +	DI–A	(Data In circuit A)
6	Ground	VC	(Voltage common)
7	No Connect	CO–A	(Control Out circuit A)
8	Ground	CO–S	(Control Out circuit shield)
9	Collision –	CI–B	(Control In circuit B)
10	Transmit –	DO–B	(Data Out circuit B)
11	Ground	DO–S	(Data Out circuit shield)
12	Receive –	DI–B	(Data In circuit B)
13	+12 Volts	VP	(Voltage plus)
14	Ground	VS	(Voltage shield)
15	No Connect	CO–B	(Control Out circuit B)

The connector shell acts as a protective ground

Figure C–8 VLC Connector Signals

VLCi Interface Connector

The VLCi controller provides a standard IEEE 802.3 local area network DTE interface through a 15–pin sub–D connector. This connector accepts an Access Unit Interface (AUI) cable. The AUI cable connects the computer to an external Media Attachment Unit (MAU). The MAU contains the Ethernet transceiver and the Media Dependent Interface (MDI) for connection to the physical network.
Figure C–9 shows the signals and pin numbers for the VLCi external connector.



VLCi connector to LAN
(female)

Pin	Circuit Name	
1	CI–S	(Control In circuit shield)
2	CI–A	(Control In circuit A)
3	DO–A	(Data Out circuit A)
4	DI–S	(Data In circuit shield)
5	DI–A	(Data In circuit A)
6	VC	(Voltage common)
7	CO–A	(Control Out circuit A)
8	CO–S	(Control Out circuit shield)
9	CI–B	(Control In circuit B)
10	DO–B	(Data Out circuit B)
11	DO–S	(Data Out circuit shield)
12	DI–B	(Data In circuit B)
13	VP	(Voltage plus)
14	VS	(Voltage shield)
15	CO–B	(Control Out circuit B)

The connector shell acts as a protective ground

Figure C–9 VLCi Connector Signals

VTRC Interface Connector

Each VTRC controller board includes a 9-pin D connector (J3.) This connector provides the signal interface for direct or indirect connection to a network Trunk Access Unit (TAU). Figure C–10 shows the signals and pin numbers for the VTRC J3 connector.

Pin	Signal
1	Ring Receive
2	Ground
3	+5
4	Ground
5	Ring Transmit
6	Ring Receive
7	Ground
8	Ground
9	Ring Transmit

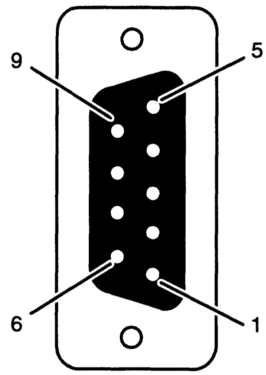


Figure C–10 VTRC Connector Signals

VFC Optical Bypass Switch Connector

The VFC board's Tx and Rx connectors for Physical Units A and B are ST-compatible jack-type connectors, and do not have pins. The optical bypass switch, however, has a 6-pin mini-DIN connector at the VFC board end. Figure C–11 shows the signals and pin numbers for the optical bypass switch connector.

Pin	Signal
1	+5 V secondary switch
2	+5 V primary switch
3	GND primary switch
4	GND secondary switch
5	Common to pin 6
6	Common to pin 5

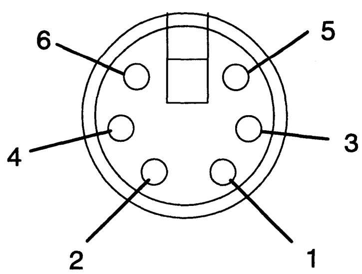


Figure C–11 VFC Optical Bypass Switch Connector

End of Appendix

Appendix D
Special Instructions for Model-Specific VME Hardware

This appendix contains special instructions for installing and removing hardware that is not covered in Chapters 3 and 4 of this manual. It contains four major sections:

- "Securing Boards with Captive Stand-Off Screws."

  You will need the instructions in this section only if you cannot secure your VME board to the securing bars in the VME card cage.

- "Installing and Removing the Model 7411–K VAC/16 and Junction Box Assembly."

  This section describes how to install and remove this model of the VAC/16 board; it also describes how to attach its junction box assembly to the VME board.

- "Mounting Junction Boxes."

  This section provides instructions and guidelines for attaching a VAC/16 junction box to a wall or other surface.

- Attaching the Air Dam to the Model 7431 VFC board.

Securing Boards with Captive Stand-Off Screws

Some option board air dams with captive stand-off screws may fail to meet and/or thread into some AViiON card cage securing bars. If you cannot secure your board in place using the stand-off screws captive on the air dam, follow these steps (illustrated in Figure D–1) *after* setting up an ESD kit:

1. Remove the board from the card cage as described in Chapter 3. Place the board, component side up, on a static-free surface. Do not touch the electronic components on the board.
2. Remove the screw and plastic stand-off assemblies by pinching the inside ends (those facing the option board) of the stand-off assembly as you push it out of the air dam's screw slot.
3. Reinstall the board as described in Chapter 3. To secure the air dam to the securing bar, use the fully threaded screws from the air dam or cover plate that previously occupied that card cage slot.

Figure D–1 illustrates how to replace securing screws on an option board air dam.

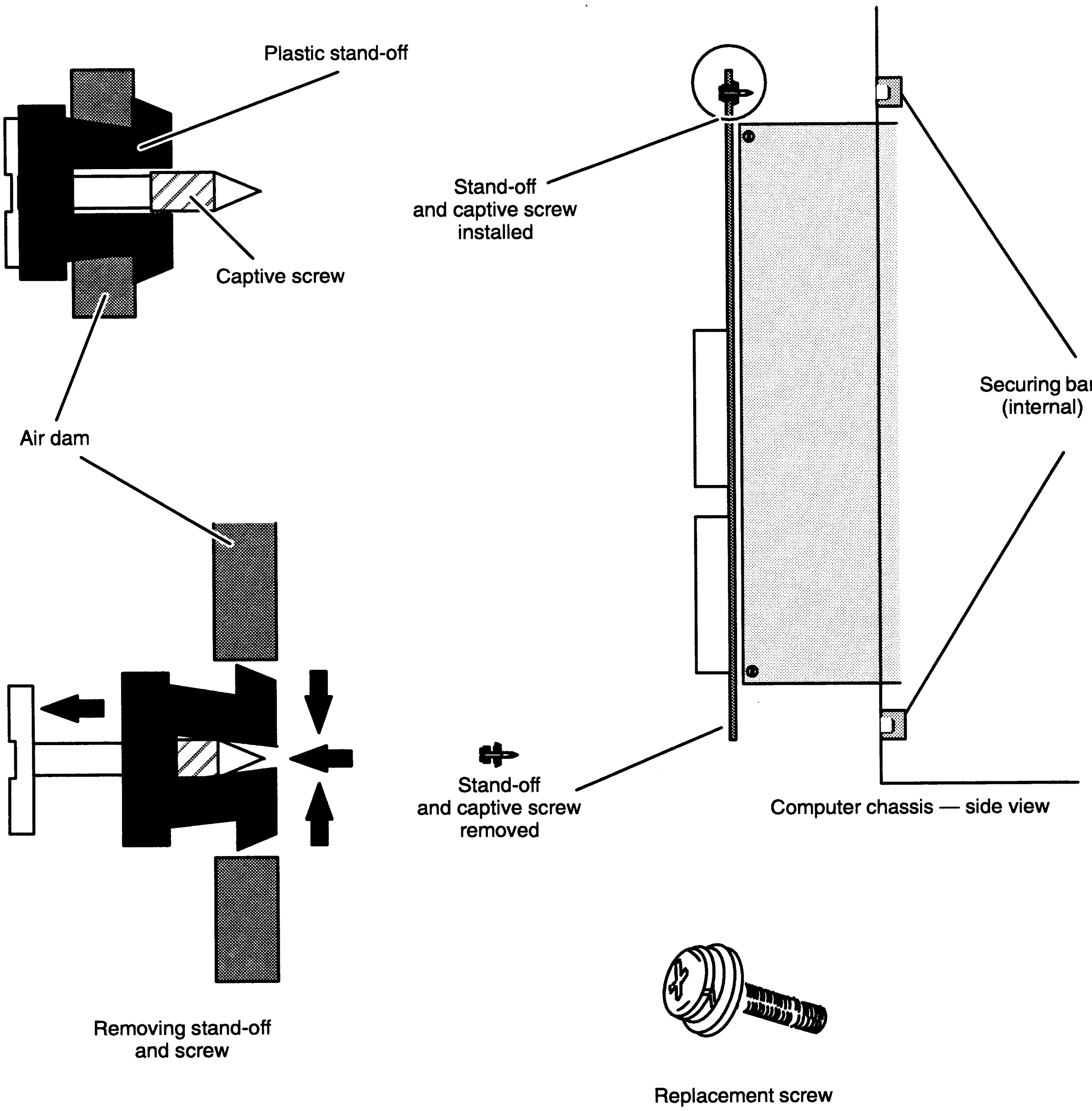


Figure D–1 Removing Screws and Stand-offs from Air Dam

Once you have secured the board(s) in the card cage, return to Chapter 3 and continue with the last section, “Completing the Configuration.”

Installing and Removing the Model 7411–K VAC/16 and Junction Box Assembly

The Model 7411–K VAC/16 differs from most VME option boards due to a special air dam and junction, or J-box assembly. We recommend that you assemble the junction box, external ribbon cable, and 7411–K VAC/16 board *before* installing the board in your computer. When removing or installing the controller board, you must use extra care because the air dam has no ejector handles to help you disengage the connectors from the backplane.

This section describes how to remove a 7411–K VAC/16 from your card cage, how to attach the J-box to your controller, and how to install the completed assembly into your card cage.

Removing Model 7411–K Boards from the VME Card Cage

To remove a Model 7411–K VAC/16, follow these instructions:

1. Shut down your operating system before turning off your computer system power. Refer to your expanding and/or maintaining manual(s) for instructions, if necessary.

2. Disconnect any external devices from the J-box.

3. Remove the securing screws and any washers on the top and bottom of the board's air dam, shown in Figure D–2.

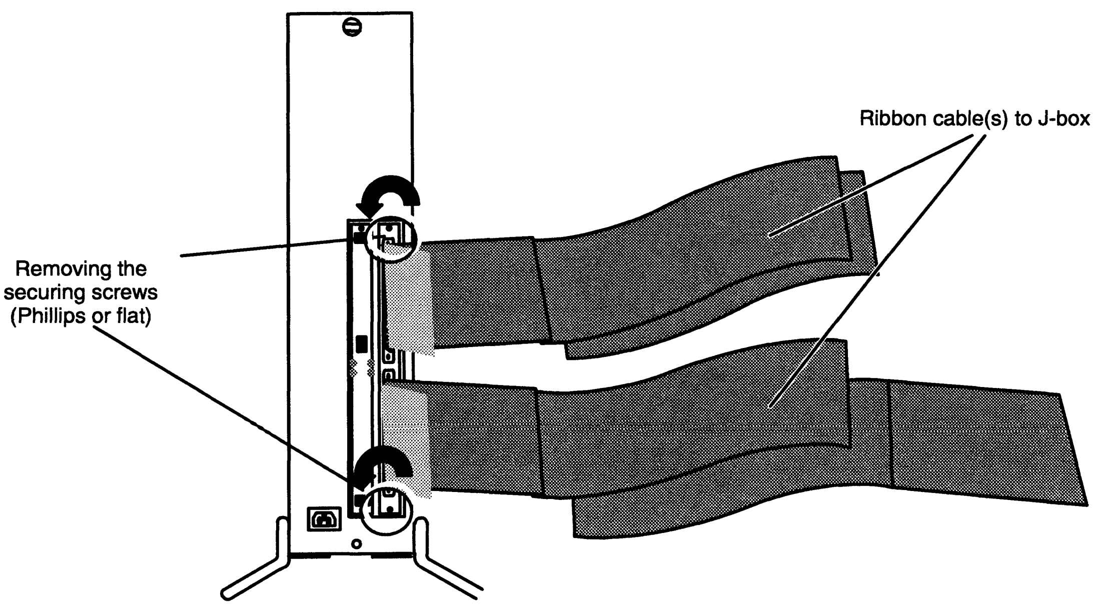


Figure D–2 Releasing Air Dam Screws

4. Grasping the air dam firmly by its edges, release the board from the backplane connectors by pulling *straight out*. Apply firm and steady pressure, but do not pull from side to side or attempt to shake the board free. You will feel the board release as the connector pins leave the backplane connector. Refer to Figure D–3.

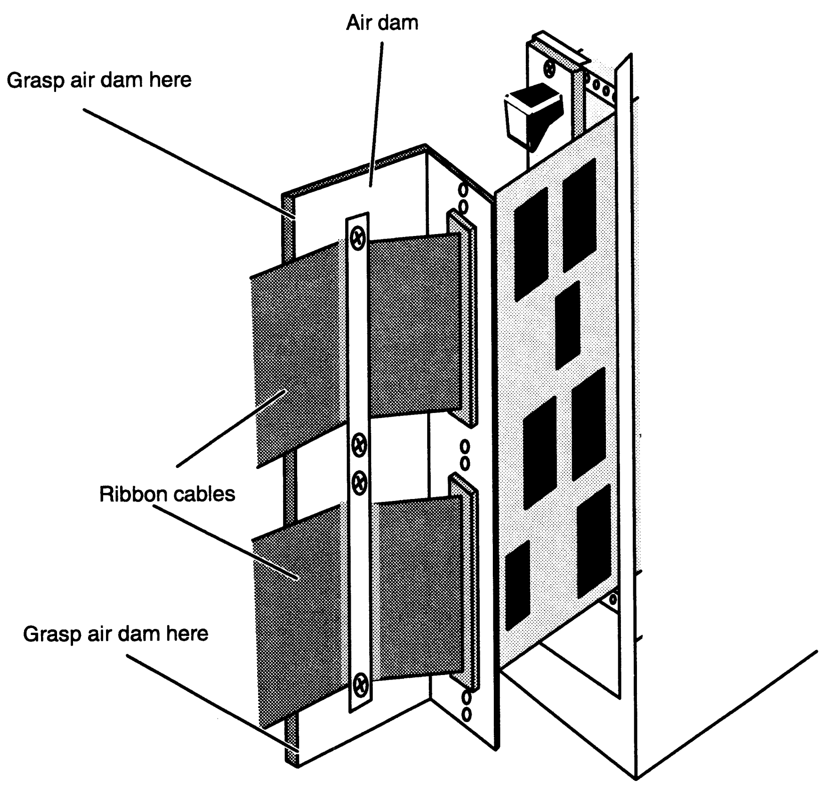


Figure D–3 Releasing a Model 7411–K Option Board

5. Lay the removed board on a static-free mat or bag.

6. Install a replacement board or cover plate as described in Chapter 3. *Never run the computer without an air dam or cover plate over every slot.*

Attaching the Model 7411–K Junction Box to the VAC/16

To connect a Model 7411–K VAC/16 controller to its J-box assembly(ies), use the instructions that follow.

NOTE: The illustrations in this section show a Model 7411–K VAC/16 that has not yet been installed in an AViiON computer chassis. (For ease of assembly, we recommend that you attach the J-box assembl(ies) before installing a new or replacement Model 7411–K in your VME card cage.) If your VAC/16 board is already installed in the card cage, skip Step 1 and follow steps 2–4 to remove the tension bar, attach the J-box ribbon cables, and reattach the cable tension bar.

1. After you configure the board as described in Chapter 2, lay it on a static-free surface with the junction box assembly(ies) you plan to install. See Figure D–4. Lay out the assembly to avoid working over, and possibly damaging, the board components.

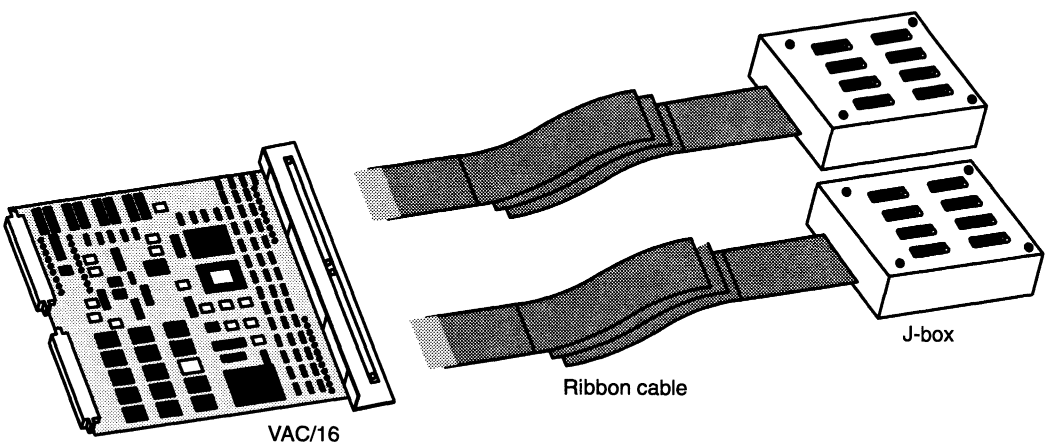


Figure D–4 Model 7411–K VAC/16 and J-Box Assembly

2. Remove the four screws holding the cable tension bar to the VAC/16 air dam; then remove the tension bar. See Figure D–5.

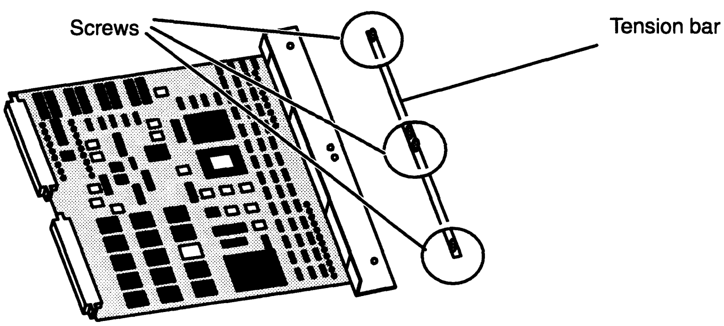


Figure D–5 Removing the VAC/16 Cable Tension Bar

3. Plug each 64-pin cable connector into the connectors on the VAC/16 board, as shown in Figure D–6. (Note the position of the J1 and J2 connectors in Figure D–6; the VAC/16 in the figure is reversed for ease of assembly.)

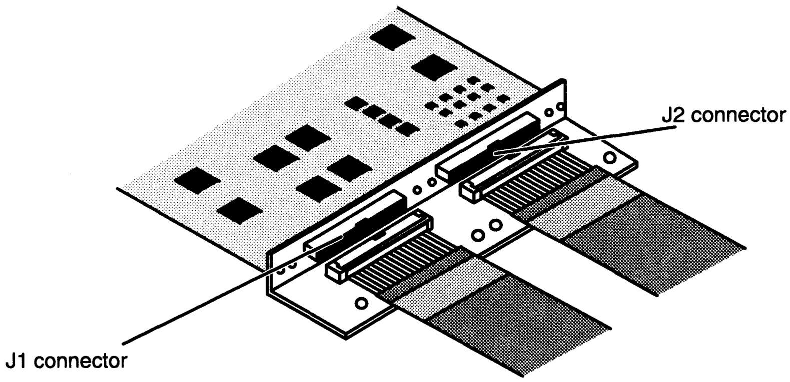


Figure D–6 Connecting External Ribbon Cable to a Model 7411–K VAC/16

4. After you firmly seat the 64-pin connector, reattach the cable tension bar by installing and securing the four screws. Make certain the connectors are not strained by the weight of the cable(s) before you secure the tension bar. Refer to Figure D–7.

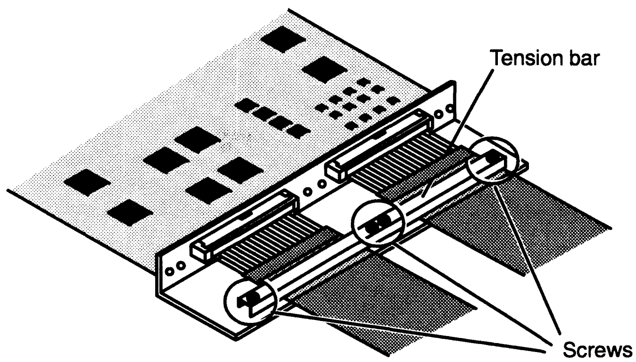


Figure D–7 Attaching the Model 7411–K VAC/16 Cable Tension Bar

If your VAC/16 board is already installed in a preconfigured VME card cage, refer to the instructions in Chapter 4 to connect external devices to your VAC/16 junction box.

To install a Model 7411–K VAC/16 in your VME card cage, continue with the instructions in the next section, “Installing Model 7411–K VAC/16 Boards in the VME Card Cage.”

Installing Model 7411–K VAC/16 Boards in the VME Card Cage

To install a Model 7411–K VAC/16 assembly, follow the instructions below.

NOTE: For ease of assembly, we recommend that you attach the J-box assembl(ies) to a Model 7411–K controller board *before* installing the board in your VME card cage. Refer to the previous section in this appendix for instructions.

1. Shut down your operating system; then turn off power to your computer system. Refer to your expanding and/or maintaining manual(s) for instructions, if necessary.
2. Remove the existing board or protective air dam as described in Chapter 3.
3. Align the VAC/16 board you configured, as described in Chapter 2, with the guide rails in the card cage slot you assigned, as described in Chapter 1. Figure D–8 identifies the guide rails in a typical VME card cage. As you hold the board vertically by the air dam, make certain the J1 and J2 connectors are aligned as shown in Figure D–8.

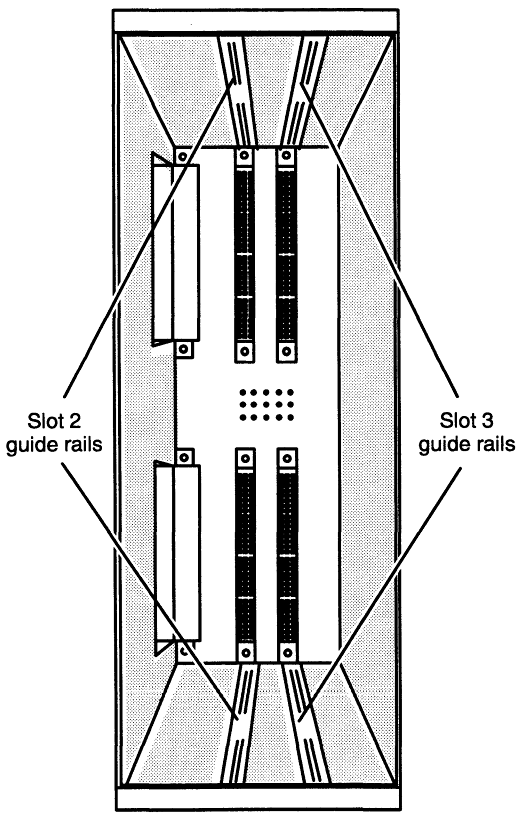


Figure D–8 Card Cage Guide Rails

4. Engage the board carefully in the rails of the card cage. Push the board straight in one-half of the way, pushing on the rear edge of the air dam as shown in Figure D–9.

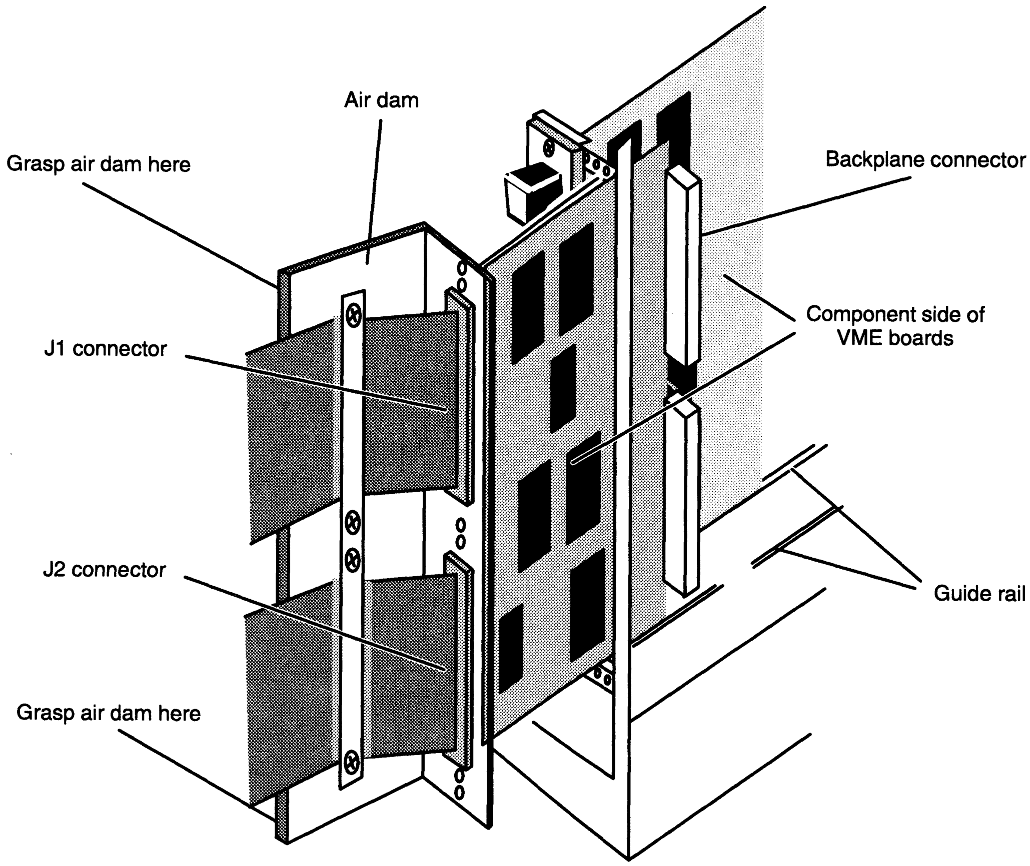


Figure D–9 Inserting a Model 7411–K VAC/16 Board

5. With the board one-half of the distance into the slot, verify that the board rests in both the top and bottom guide rails. Carefully slide the board straight into the slot until you feel it seat in the backplane connectors. Do not push from side to side or otherwise risk bending or breaking the connector pins. The air dam on your VAC/16 board should be flush against the securing bar when the board is properly seated. Figure D–10 identifies the securing bar in the card cage.

6. Once the board is seated in the card cage slot, secure the board in place by installing the air dam screws, together with any washers you removed, into the securing bar, as shown in Figure D–10.

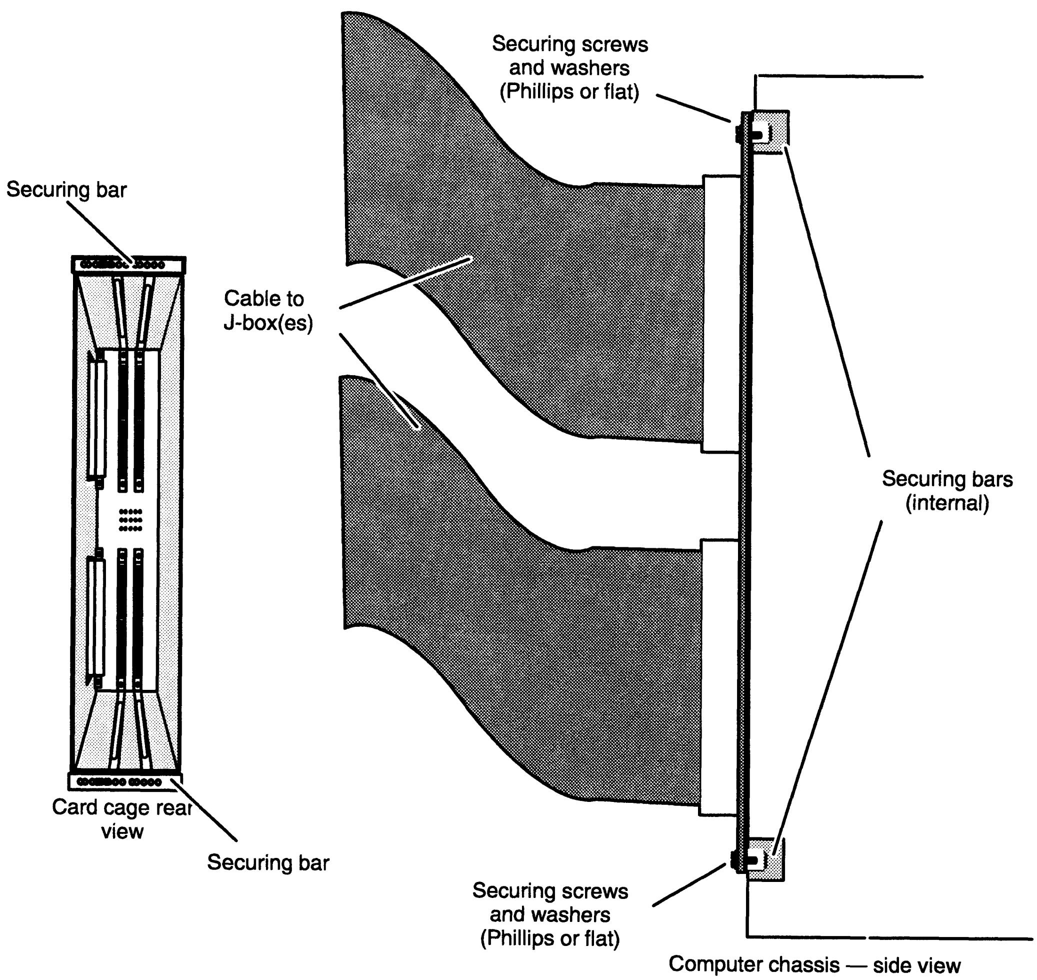


Figure D–10 Securing a VAC/16 Board in the Card Cage

When you finish securing the VAC/16 to the card cage securing bars, return to Chapter 3 and continue with the last section in that chapter, “Completing the Configuration,” before connecting external devices to your J-box(es), as described in Chapter 4.

Mounting Junction Boxes

You can place a VAC/16 junction box on any convenient and safe horizontal surface, such as a floor, desk, or table. You can also mount (secure with screws) a VAC/16 J-box to a wall or other surface panel, as shown in Figure D–11. If you plan to mount a J-box to any surface, follow the instructions in this section *before* you connect any external devices to the the J-box device connectors or attach the J-box to a VAC/16 board.

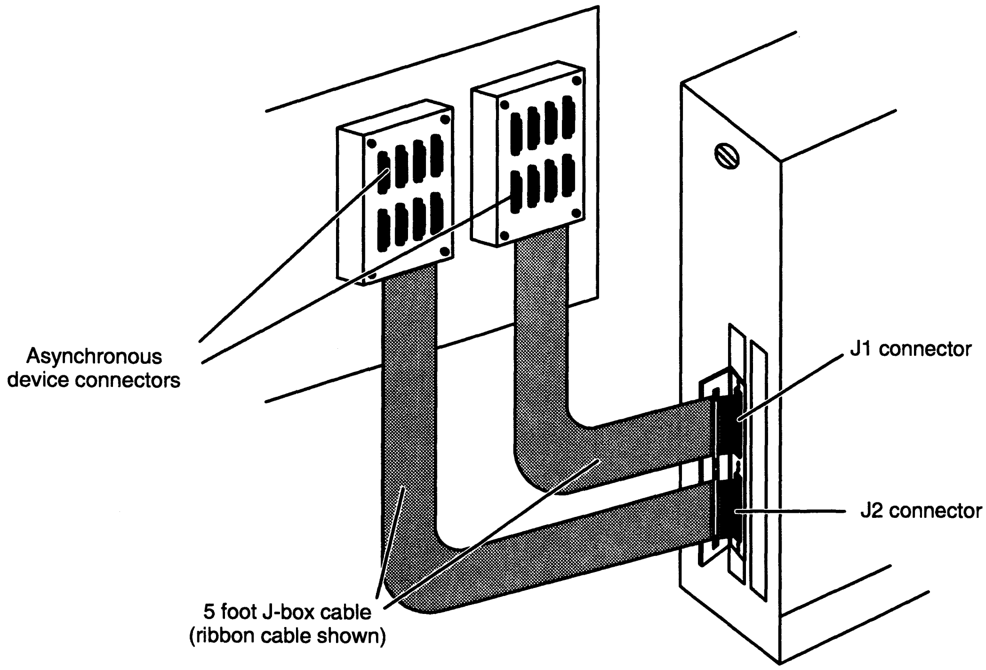


Figure D–11 Wall-Mounted VAC/16 Junction Boxes

The instructions that follow describe how to mount two models of VAC/16 junction boxes.

- The Model 7411–KA J-box assembly includes an external 68-pin connector that supports a five-foot hose cable.
- The Model 7411–K J-box assembly contains an internal 64-pin connector, uses a ribbon-type cable, and includes a cable tension bar to support the cable-to-box connection.

Figure D–12 shows both models of VAC/16 junction boxes.

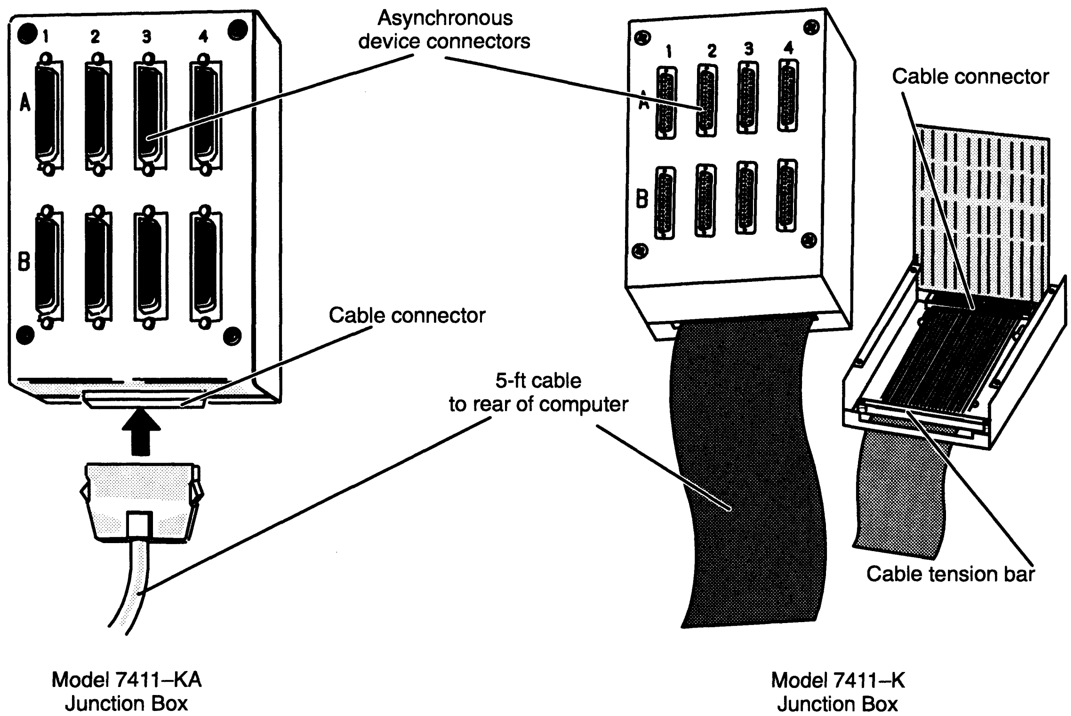
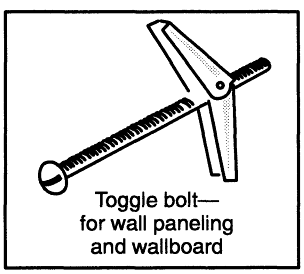
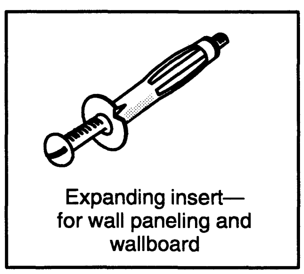


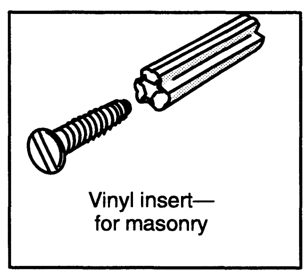
Figure D–12 VAC/16 Junction Boxes

These instructions outline how to mount a J-box to an office wall; you can adapt these procedures to suit your particular environment. As described, the installation requires the following tools and equipment:

- Appropriate anchors and screws to secure the assembly to a wall or other mounting surface; the devices below work on most surfaces.







- Medium (#2) Phillips screwdriver.
- Flat-blade screwdriver.
- Pencil.
- Punch, or hammer and large nail.
- Tape or paper clip (for Model 7411–K assembly only).

To mount a VAC/16 junction box on a wall, follow these steps:

1. Move your computer unit close to the J-box wall site, and verify that the planned arrangement meets the site requirements described in your installing and maintaining manuals. Make certain you do not require more than five feet of cable between the VAC/16 controller and the J-box; allow for any necessary folds and turns in the cable that may prevent you from using the full five feet.
2. Remove the four screws at the J-box corners, as shown in Figure D–13.

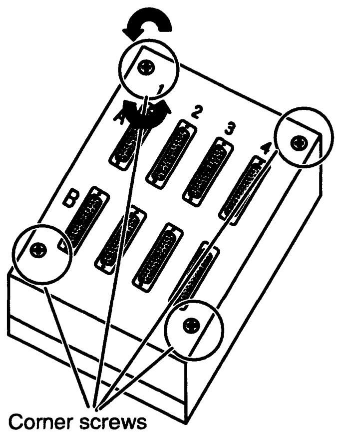


Figure D–13 Removing J-Box Corner Screws

3. If you are mounting a Model 7411–K J-box, pull the top (connector) half of the J-box forward to reveal the J-box tension bar, as shown in Figure D–14.

   To disassemble a Model 7411–KA J-box, pull the top (connector) half of the J-box sideways (A), and then pull it up and out (B), as shown in Figure D–14.

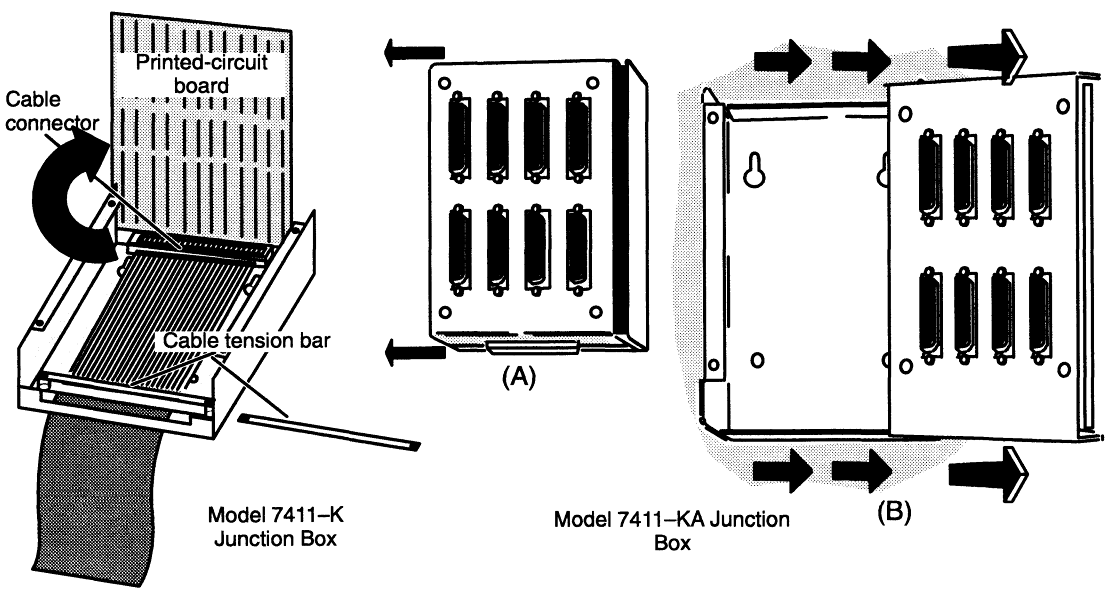


Figure D–14 Disassembling a VAC/16 Junction Box

4. If you are mounting a Model 7411–K assembly, mark the position of the tension bar on the ribbon cable with tape or a paper clip before releasing the screws and removing the J-box cable tension bar.

5. Pull the top (connector) half of the J-box assembly apart from the base, and place it on a static-free surface. If you are mounting a Model 7411–K junction box, *do not disconnect the ribbon cable from the connector board.*

6. Place the J-box base flat against your mounting surface, and use a pencil to mark the tops of the mounting slots shown in Figure D–15. Use a punch or hammer and nail to make pilot holes for your wall anchors or mounting screws.

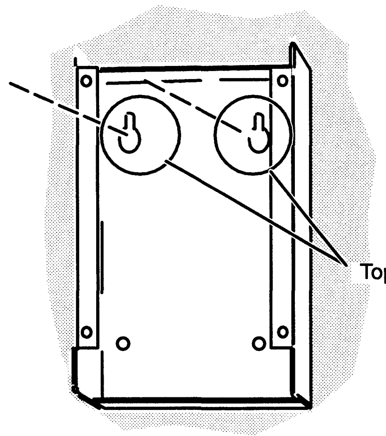


Figure D–15 VAC/16 Junction Box Top Mounting Slots

7. Install the top two wall anchors according the instructions you received with the anchors.

8. Screw two mounting screws three-quarters of the way into the anchor or mounting surface; then mount the J-box base on the screws. Mark the position of the bottom mounting screws before you make pilot holes for them. See Figure D–16.

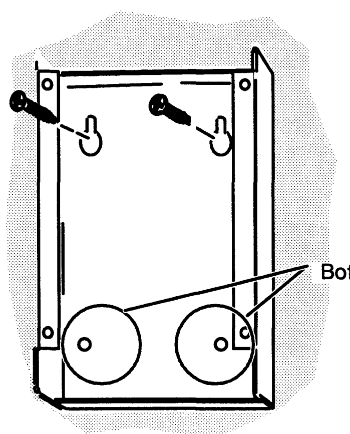


Figure D–16 VAC/16 Junction Box Bottom Mounting Slots

9. Remove the J-box base from your mounting surface, and then install the bottom two wall anchors.

10. Secure the J-box base to the mounting surface by firmly installing all four mounting screws as shown in Figure D–17.

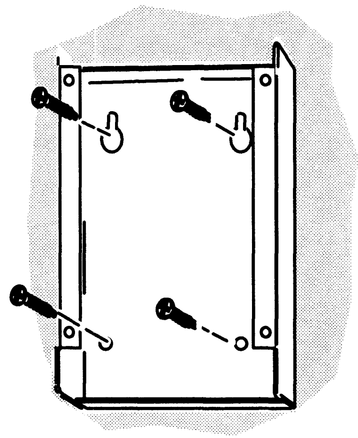


Figure D–17 Securing a VAC/16 Junction Box

11. To reassemble a Model 7411–K J-box, refer to Figure D–18 as you place the ribbon cable and connector assembly back into the J-box base. Reinstall the cable tension bar at the point marked by your tape or paper clip, close the J-box, and secure the four corner screws.

    To reassemble a Model 7411–KA J-box, refer to Figure D–18 as you slide the top (connector) assembly sideways to fit under the flange on one side (A). Pull the top slightly back until the printed circuit board fits under both side flanges, and the sheet metal covering is flush on both flanges (B). Secure the four corner screws.

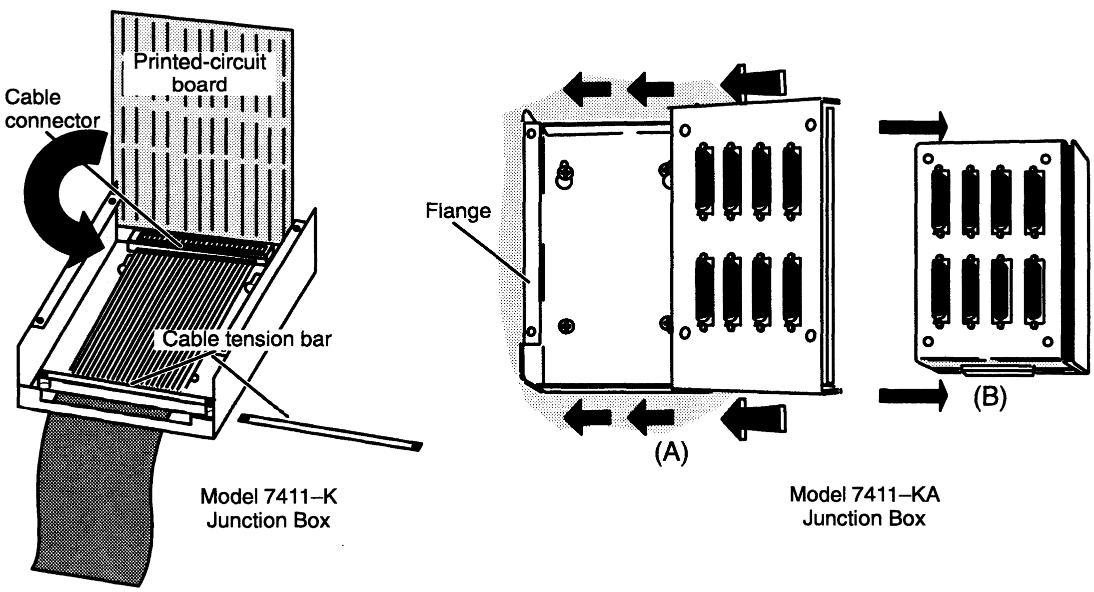


Figure D–18 Reassembling a VAC/16 Junction Box

Once your junction boxes are properly mounted, refer to the appropriate section of this manual to complete the installation of your VAC/16.

- If you need to install a Model 7411–K VAC/16 in your VME card cage, or attach your mounted J-box to the board in your computer chassis, refer to the preceding sections in this appendix that apply.

- If you need to install a Model 7411–KA VAC/16 in your VME card cage, refer to Chapter 3.

- To attach your mounted J-box to a Model 7411–KA controller board, refer to Chapter 4.

- Refer to Chapter 4 for instructions on connecting external devices to your VAC/16 junction box.

Attaching an Air Dam to a VFC Controller Board

You may have received a replacement VFC controller board without the air dam (or *front panel)* necessary to install the controller in some AViiON® computers. If so, you must remove the air dam from the board you are replacing and secure it to the replacement board before you can install the VFC assembly in your system.

CAUTION: *Do not attempt to operate your computer unit without air dams, cover panels, or filler panels in every VMEbus option slot. Lack of a proper panel could affect the safety, reliability, and performance of your AViiON computer system.*

The air dam attaches to the board edge opposite the edge with the VME connectors. If you hold the board with the component side facing you and the VME connectors to the right, the air dam will attach to the left edge. Be sure the printing on the air dam is the right way up. If you have the air dam positioned properly, the jacks for the cable connectors and optical bypass switch will protrude through the holes on the air dam.

The following steps outline how to exchange VFC boards and air dams.

1. Make certain you are working in an environment free of electrostatic discharge, as described in your system documentation and the “Avoiding ESD Damage” section(s) of Chapter 1.

2. Carefully holding the original VFC asembly by its edges, remove the three screws that secure the air dam to the controller board. (Refer to Figure D–19). Take care to retain all of the accompanying washers; try to avoid removing the plastic ejector assembly from the air dam.

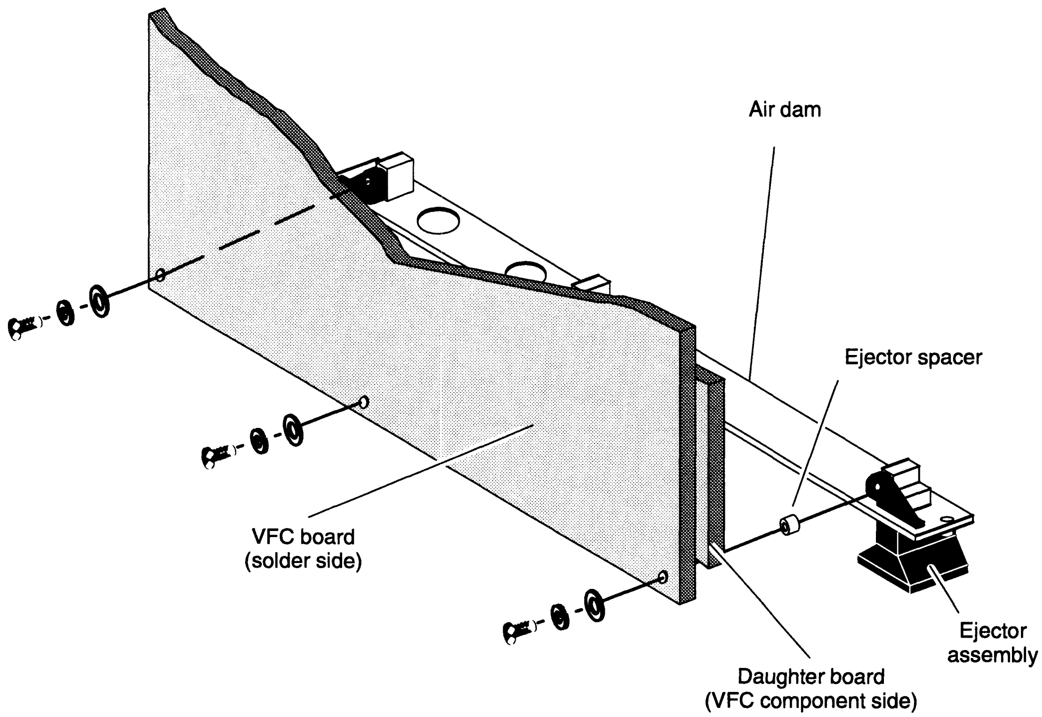


Figure D–19 VFC and 6U Air Dam Assembly

3. Place the original board *component side up* on an antistatic surface. Then, attach the air dam to the replacement controller board as shown in Figure D–19.
4. Place the original VFC board in the antistatic bag, packing material, and shipping box that accompanied your replacement board.

CAUTION: Since the VFC three–board assembly is wider than most VMEbus option boards, you should take particular care when inserting the VFC into the VME card cage.

End of Appendix

Appendix E
Assigning VME Data Bus and Interrupt Priorities

This appendix discusses VMEbus priority issues and provides guidelines for assigning VME data bus and interrupt priorities within the Data General AViiON systems environment. Primarily, the discussion centers around the VME Data Transfer Bus (DTB) and interrupt priority architecture and the demands that various types of VME controllers place on bus and system resources. *This information is very technical—it is intended for properly trained persons only.*

Reference Documents

This appendix provides practical guidelines for deriving VMEbus DTB and interrupt priority settings. For further details on these topics as well as other aspects of the VMEbus, refer to the following documents:

The VMEbus Specification, Rev. C.1 (Motorola Inc., P/H HB212)

IEEE Standard for a Versatile Backplane Bus: VMEbus
(ANSI/IEEE Document, P/N ANSI/IEEE Std 1014–1987)

The VMEbus Specification manual from Motorola Corporation is particularly useful. It defines how all hardware connected to the VMEbus will move data from one point to another. It provides a detailed description of the physical interface to the VMEbus, and defines methods each connection can use to gain access to bus resources.

Data Transfer Bus (DTB) Priority Arbitration Methods

The following sections describe the DTB priority methods used on Data General AViiON systems. Some of the important terms that you should understand are:

Bus arbitration	A term for the process by which a VMEbus slave or master device requests and obtains bus resources.
Master	A term for a controlling device on the VMEbus. Can both initiate data transfers and respond to requests from other master devices.
Slave	A term for a subservient device on the VMEbus. A slave device responds to requests from master devices.
Arbiter	The host logic that manages VMEbus arbitration.

Daisy chain priority — A priority grant signal that originates at the start of the VMEbus and propagates down the bus to the last slot. Each board on the bus can allow the grant to pass to the next board or take the bus and stop the grant. The signal jumps over empty slots.

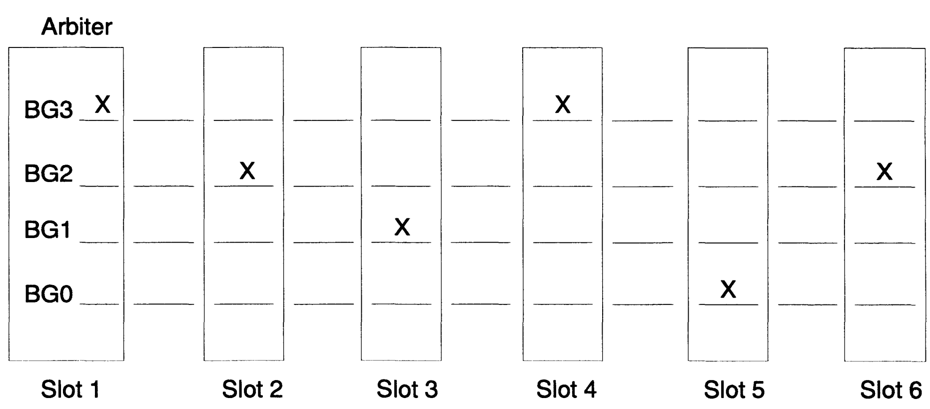
Prioritized Bus Arbitration

As you add VME controllers to the system, you must assign a DTB priority level to each. You set priority in two ways: either fixed or daisy chained. For each board in the system you can assign any one of four fixed priority levels that are independent of where the board is positioned within the system. These priority levels are numbered 0 through 3, with 3 being the highest and 0 the lowest priority. The arbiter controls the priority hierarchy. It resides in the host and consists of hardware and software that manages the interaction of the four priority levels.

Second, each fixed level includes a daisy chained priority signal, named Bus Grant (BG). The boards gate or pass the Bus Grant signal along the bus depending on their fixed (assigned) priority level. The fixed priority hierarchy always takes precedence over the Bus Grant hierarchy. A description of how the Bus Grant priority chain works is in a later section.

In Data General AViiON systems, the arbiter is always associated with Slot 1 (either through physical location or logical extension via repeaters). It carries a priority level of 3, the highest priority on the bus.

Figure E–1 shows an example of how fixed–level priority settings and board positioning within the system affect overall DTB priority arbitration.



NOTE: X– Indicates that the board in this slot has been assigned this priority level. The arbiter is always 3.

Figure E–1 Example of Fixed Prioritized Assignments

The example in Figure E–1 shows an AViiON system with fixed priority DTB assignments. In this example, the priority arbitration sequences according to the following slot order:

Highest – Slot 1 (Arbiter)
Slot 4
Slot 2
Slot 6
Slot 3
Lowest – Slot 5

Most Data General AViiON servers (except Models 400, 3000. 4000, and 4300 series) use fixed prioritized arbitration.

Single–Level Bus Arbitration

In the single–level bus arbitration scheme, all boards on the VMEbus, including the arbiter, are at fixed priority level 3. Priority for simple competing requests (for example, two concurrent requests with no requests waiting) is based on the relative position of the board with respect to the arbiter (the board closest to the arbiter has the highest priority and thus gets the bus grant). Similarly, if two or more requests are waiting when a requester releases the bus, the requesting board closest to the arbiter gets the bus grant.

Data General AViiON server Models 400, 3000, 4000, and 4300 series use single–level bus priority arbitration.

Performance Considerations

The standard DTB priority recommendations given in Chapter 1 provide a basic approach that works in most systems. However, for optimum performance on some large system configurations and with certain application programs, you may want to try a different arrangement, either of the fixed DTB priorities or of the positioning of boards within the system. Consider the following factors when evaluating and reordering a system's priority structure:

- Is data lost if the device cannot gain access to the VMEbus when required?
- How much data can be buffered by the controller, or devices attached to the controller, before system performance is affected by the device's inability to gain access to the bus?
- What is the average time a device holds the DTB bus once it has gained access?
- How much of the available VMEbus bandwidth does a device require to make the most efficient use of its time on the bus?
- Does the device have VME block transfer capabilities (refer to Motorola VMEbus Specification)?
- Is the device a master or slave on the VMEbus when it is transferring data?
- Does the system's physical constraints restrict board positioning on the VMEbus?
- Does a board create problems with other boards on the VMEbus? (Non–DGC VMEbus controllers only)

- Does the board respond to bus clear (BCLR*)?

The following sections discuss each of these factors in further detail.

Data Loss

Some devices, such as the VSC/3, are not able to manage data transfer interruptions properly and will lose data if they can not gain access to the VME DTB when required. Older, non–Data General character I/O device controllers may also fall into this category. Such devices must always have the highest priority in the system except for the host. Usually these devices have very low bandwidth requirements and are not limited in numbers by the VMEbus hardware. Concluding, you must thoroughly understand a device's data management capabilities before assigning a priority level.

Buffered Devices

Buffered devices are those devices that buffer a specific amount of data to sustain the data rates required for maximum operational efficiency. There are two types of buffered devices.

- Devices with a buffer large enough to hold the maximum allowable transfer to and from the device (such buffers are referred to as *full–block buffers*).
- Devices with a buffer that holds only a part of the maximum allowable transfer to and from the device (*partial–block buffers*).

With full–block buffer devices, a wait for access to the VME DTB does affect the device's performance; however, it does not affect the performance of the device or system that the data transfers to or from.

With partial–block buffer devices, a wait for access to the VME DTB may also affect the performance of another device or system because both the VMEbus device and the other device have to manage data transfer interruptions.

Thus, you should give full–block buffered devices a lower priority than partial–block buffered devices that require a similar amount of bandwidth and average time on the bus.

DTB Usage

Certain devices require more time on the bus than other devices. Factors that affect this variable are

- Time between commands from the operating system software.
- The amount of time it takes the device to access the required data once it has been told to do so (data latency).
- The rate at which the device transfers data.
- The average amount of data transferred per operation.
- How efficiently can the device use the VME DTB available bandwidth? (Does it do block or single word/byte DTB transfers?)

- For VME block transfers, what is the average block size?

As a general rule, set devices that require larger average amounts of bus time to a lower priority than those that require less time. There are exceptions. For example, you may want to put a higher priority to a SCSI controller (VSA) that has the system disk on it than another VSA even though the first VSA may require more time on the VMEbus. Also, if the application is a graphics data server that transfers very large blocks of data to a PC or workstation, you may want to set the VSA controlling that data to a higher priority than other VSAs in the system.

Bus Bandwidth

Every AViiON system has a maximum number of bytes it can transfer over the VMEbus within a given period of time. This number is referred to as the bus bandwidth. Depending on the system environment, the effective maximum available VME DTB bandwidth may vary depending on how devices manage their individual transfers when they are on the bus.

Some devices can sustain a data rate and manage their time on the VMEbus such that the system operates at maximum efficiency. Other devices that may not be as efficient can reduce the overall performance of the bus.

There is no absolute rule for setting priority based on the amount of VMEbus bandwidth required by a particular device. However, a good question to ask is how important it is to the system's operation that a particular device maintain peak throughput. If the system absolutely requires that the device sustains very high data rates, give that device the required priority.

Block Transfers

Block transfers mean that once a device gains access to the bus it executes more than one data transfer before releasing the bus. The difference between a block transfer and simply doing multiple DTB cycles without having to release the bus is a matter of control and addressing protocol. For a block transfer, the address phase occurs only once, at the beginning of the block, whereas for multiple DTB transfer cycles, an address phase accompanies each transfer.

Since devices capable of performing block transfers are also full–block buffered devices, the same rules apply.

Slave Only Devices

Slave–only devices are at the same priority level as the arbiter; thus their priority is not dependent on their position on the bus.

Physical Constraints

The physical constraints of the enclosure or cabling may affect how you arrange controllers in your system. Access and serviceability can also be factors. However, if you are assigning fixed VME DTB priority, in most cases the physical factors will have little effect on system performance.

If you believe you are having performance problems due to DTB priorities and cannot set up the system properly due to physical constraints, evaluate what other changes you can make to the system environment.

Board Related Problems

Boards sold by Data General are exhaustively tested to ensure that they meet VME specifications in all Data General system environments, thus they should not cause a problem.

However, if you have added a non–DGC board and unusual problems begin to occur, then suspect a board–related problem. A board may meet the VMEbus specification, yet in some environments may cause a VMEbus violation or be affected by a violation from another board.

Most of the time the only symptom of a problem is the corruption of data on the bus. Such problems are particularly troublesome because the VMEbus specification provides no way of isolating the problem. Unless detected by diagnostic programs such as RBOS, a failure of this type usually causes a catastrophic system failure, such as a system panic.

If you are having a problem with the VMEbus, things to look for are

- Has the system been modified in any way (new board added, bad board replaced, boards moved on the VMEbus, etc.) prior to the failure occurring?
- Does the failure symptom indicate a memory address problem, such as trying to access a protected area of memory?
- Is data corruption occurring? Backup data does not compare with original, or program executable code does not execute properly.

If you believe that a VME controller board is causing data corruption, contact your Data General support service office as soon as possible.

If the problem started after a system configuration change, return the system to its original configuration, if you can, until the failure has been properly evaluated by DGC support personnel.

Bus Clear (BCLR*) Response

BCLR* is driven by the arbiter to communicate to the current bus master, that a higher priority request is pending; thus, the current bus master may release the bus at the conclusion of the current transfer cycle.

General Rules for Setting DTB Priority

NOTE: Before using this section, you must be familiar with the information presented earlier in this appendix.

Use the following rules as a general guide to assigning DTB priority.

1. If your Data General system has two user slots, set both boards to a TDB priority of 3; priority will then be defined by the board positions (first slot has priority over the second).

2. Do not have empty slots between the arbiter and the last board on the VMEbus. This rule precludes an empty slot before the first VME board as well as empty slots between boards in the system.

   NOTE: If, for any reason, you must have empty slots between VMEbus controllers, those slots must have their Bus Grant and Interrupt Request lines jumpered over on the back panel.

3. Group together all VMEbus controllers that have the same fixed priority levels. Organize the groups by descending order of DTB priority: level 0 priority group first (closest to the arbiter), level 1 priority group next, and so on. This approach reduces the daisy chain priority signal etch length between loads.
4. The recommended board position within a VME DTB Group is defined by the order of the board in Table E–1 from top to bottom, with the top being closest to the arbiter. Remember position priority is only at an individual fixed priority level (Figure E–1). A level 3 board always has priority over a level 2, 1, or 0 board, no matter what their position within the system is relative to each other.

NOTE: Table E–1 lists the relative priorities of VMEbus controllers to aid you in your priority assignments. In this table, the priority relationship between boards is indicated numerically by numbers that range from 1 to 9, with 1 being the highest priority. If two or more descriptions have the same number, then their priority with respect to each other is irrelevant. If you are not sure about how to use Table E–1, contact your Data General technical support office.

Table E–1 Relative Priorities of VMEbus Controllers

General Description	Recommended Relative Priority
VME boards that are VMEbus SLAVE only devices (VLC)	N/A*
Board will lose data if VMEbus is not available.	1
System function is affected if board is denied access to the VMEbus	2
Synchronous communication controller (VSC or VSC/3)	3
Asynchronous communications controller (VAC/16 or VTC)	4
IEEE 802.3 controller (Ethernet) (VLCi)	5
IEEE 802.5 controller (Token Ring) (VTRC)	5
Communications controller (VDA/128 or VDA/255))	5
SCSI 1 interface w/slow devices attached (< 500KB/s)	6
SCSI 2 interface w/slow devices attached (< 500KB/s) (VSA)	6
SCSI 1 interface w/fast devices attached (> 500KB/s)	7
SCSI 2 interface w/fast devices attached (> 500KB/s) (VSA)	8
FDDI communication controller (VFC)	9

* Same as arbiter

Recommended DTB Priorities

Table E–2 lists the recommended (also the default) Bus Grant priority settings for VME controllers in Data General Systems.

Alternate DTB Assignments

Note that the DTB priority assignments listed in Table E–2 also list, where applicable, alternative lower fixed–priority levels that can be assigned to those boards that will tolerate it. You may want to use lower priority settings in instances where you want to give a competing board earlier access to the bus.

Table E–2 General Rules for VME TDB Priority Assignments

VME Device	Default Setting Bus Grant Priority	Alternate Setting* Bus Grant Priority	Comments/ Notes
VSA	1	same	Notes 2 & 4
VSC–3	3	same	Note 1
VDA–255	3	2	
VTC	3	2	
VLC	N/A	N/A	slave only
VLCi	3	2	
VTRC	3	2	
VFC	3	1	
VAC16	3	2	Note 3
VDA–128	3	2	Note 3
VSCi/3	3	same	Note 3

Notes

1. Within a level 3 group, place this board closest to the arbiter.
2. The positioning of VME DTB priority 1 boards depends on the function of the attached devices. Some general rules for positioning of priority 1 boards are:
   - SCSI HBA with system disk is usually closest to the arbiter.
   - If there are 2 or more SCSI HBAs in the system the ones with slower devices attached (tapes, optical disks, etc.) should be closer to the arbiter than those with faster devices like Winchester disks. Slower SCSI devices should be on SCSI channels separate from faster devices if at all possible.
3. Within its fixed priority group, this board must be farthest from the arbiter. When more than one such board exist in a system, position the boards according to their sequence in the table.
4. If you have empty slots between the arbiter and a HADA I IOP or between IOPs that cannot be filled with DTB priority level 1 boards you may fill these slots with other priority level boards as long as any VSAs in the system immediately follow the last IOP and relative positioning of the other board agrees with the positioning within the table.

* Use the alternate bus grant priority setting, if you believe that a system performance problem exists due to VMEbus DTB priority conflicts.

Introduction to Interrupt Priority

Any board on a VMEbus can interrupt the host to gain attention. A controller usually wants the host's attention because it has finished a command and needs to communicate this information, along with completion status, back to the processor that initiated the action. Even though interrupts are usually related to command management, a controller can request the host's attention whenever it has a reason to do so. The returned interrupt status will indicate to the host what type of service the board requires.

Interrupt requests are usually less frequent than requests for use of the data bus. However, the ability of a controller to gain access to host services, when required, may be as important to system performance as the ability to transfer data on demand.

The VMEbus provides a two–dimensional interrupt priority scheme similar to that previously described for prioritized DTB arbitration. The higher order hierarchy is controlled by any one of seven interrupt request lines, IRQ1 through IRQ7. IRQ7 has the highest priority and IRQ1 the lowest. Each controller on the bus is assigned to drive one of the seven request lines.

Once a host receives one or more interrupt requests, it acknowledges the highest priority interrupt request line first. If two or more controllers on the bus have requests at the same priority level, the one closest to the interrupt handler (slot 1) receives service first.

DG/UX defines what the IRQ priority level will be on all VMEbus controllers Data General sells for use in AViiON computer systems. If you suspect that the VMEbus interrupt priority settings are causing a system problem, or if you are installing a non–DGC VME controller and you require information on setting the interrupt priority level, contact your Data General Customer Support Center.

For a detail description of the VMEbus interrupt priority system, refer to the Motorola publication, *The VMEbus Specification*, revision C.1, or the ANSI/IEEE specification 1014–1987.

End of Appendix

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C

D

E

X

TIPS ORDERING PROCEDURES

TO ORDER

1. 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

2. As a customer, you have several payment options:
   A. Purchase Order – Minimum of $50. If ordering by mail, a hard copy of the purchase order must accompany order.

   B. Check or Money Order – Make payable to Data General Corporation. Credit Card – A minimum order of $20 is required for MasterCard or Visa orders.

SHIPPING

3. To determine the charge for UPS shipping and handling, check the total quantity of units in your order and refer to the following chart:

Total Quantity	Shipping & Handling Charge
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

4. 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

5. Read the TIPS terms and conditions on the reverse side of the order form carefully. These must be adhered to at all times.

DELIVERY

6. Allow at least two weeks for delivery.

RETURNS

7. Items ordered through the TIPS catalog may not be returned for credit.
8. Order discrepancies must be reported within 15 days of shipment date. Contact your TIPS Administrator at (508) 870–1600 to notify the TIPS department of any problems.

INTERNATIONAL ORDERS

9. Customers outside of the United States must obtain documentation from their local Data General Subsidiary or Representative. Any TIPS orders received by Data General U.S. Headquarters will be forwarded to the appropriate DG Subsidiary or Representative for processing.

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 (Agrees to terms & conditions on reverse side)	Title	Date	Phone (Area Code)	Ext.

ORDER #	**QTY**	**DESCRIPTION**	**UNIT PRICE**	**TOTAL PRICE**

A SHIPPING & HANDLING

☐ UPS	ADD
1–4 Items	$5.00
5–10 Items	$8.00
11–40 Items	$10.00
41–200 Items	$30.00
200+ Items	$100.00

Check for faster delivery

Additional charge to be determined at time of shipment and added to your bill.

☐ UPS Blue Label (2 day shipping)
☐ 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

☐ Purchase Order Attached ($50 minimum)
P.O. number is ______. (Include hardcopy P.O.)
☐ Check or Money Order Enclosed
☐ Visa ☐ MasterCard ($20 minimum on credit cards)

Account Number ______ Expiration Date ______

______
Authorized Signature
(Credit card orders without signature and expiration date cannot be processed.)

THANK YOU FOR YOUR ORDER

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.
PLEASE ALLOW 2 WEEKS FOR DELIVERY.
NO REFUNDS NO RETURNS.

* 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.

Form 702
Rev. 8/87

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.

Setting Up and Installing VMEbus Options in AViiON® Systems

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