

VAX 6000 Series Installation Guide

Order Number EK-600EB-IN.002

This guide is intended for use by Digital customer service engineers and self-maintenance customers installing a VAX 6000 series system.

**digital equipment corporation
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Preface

Intended Audience

This manual is written for Digital customer service engineers and self-maintenance customers installing a VAX 6000 series system.

Document Structure

This manual uses a structured documentation design. There are many topics, organized into small sections for efficient reference. Each topic begins with an abstract. You can quickly gain a comprehensive overview by reading only the abstracts. Next is an illustration or example, which also provides quick reference. Last in the structure are descriptive text and syntax definitions.

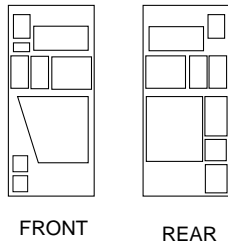
This manual has eight chapters and four appendixes, as follows:

- **Chapter 1, Site Preparation**, provides pre-installation requirements and guidelines for the VAX 6000 series.
- **Chapter 2, Unpacking**, gives instructions on how to inspect and unpack the system cabinet.
- **Chapter 3, Connecting to a DSSI Subsystem**, explains how to cable and connect TF tapes and RF disks.
- **Chapter 4, Connecting to a CI VAXcluster**, explains how to select required operating modes on certain XMI and VAXBI bus adapters.
- **Chapter 5, Connecting to Tapes and Disks**, explains how to cable TK tapes and RA disks to the system.
- **Chapter 6, Powering Up the System**, gives the power-up procedure and a functional description of the control panel switches and indicators.
- **Chapter 7, System Self-Test**, shows what to check to see if self-test was successful.
- **Chapter 8, Verification**, explains how to verify the system and how to set and save system parameters.

- **Appendix A, Digital Remote Services Console Installation**, explains how to connect the remote services console to the system.
- **Appendix B, Module Handling Procedures**, explains how to handle modules.
- **Appendix C, Installing an Expander Cabinet**, explains how to join an expander cabinet to the system cabinet.
- **Appendix D, DSSI Configuration Sheets**, provides single- and dual-host configuration sheets for use during installation.

Conventions Used in This Document

The icons shown below are used in illustrations for designating part placement in VAX 6000 series systems. A shaded area in the icon shows the location of the component or part being discussed.



VAX 6000 Series Documents

There are two sets of documentation: manuals that apply to all VAX 6000 series systems and manuals that are specific to one VAX 6000 model. Table 1 lists the manuals in the VAX 6000 series documentation set.

Table 1: VAX 6000 Series Documentation

Title	Order Number
Operation	
<i>VAX 6000 Series Owner's Manual</i>	EK-600EB-OM
<i>VAX 6000 Series Vector Processor Owner's Manual</i>	EK-60VAA-OM
<i>VAX 6000 Vector Processor Programmer's Guide</i>	EK-60VAA-PG
Service and Installation	
<i>VAX 6000 Platform Technical User's Guide</i>	EK-600EA-TM
<i>VAX 6000 Series Installation Guide</i>	EK-600EB-IN
<i>VAX 6000 Installationsanleitung</i>	EK-600GB-IN
<i>VAX 6000 Guide d'installation</i>	EK-600FB-IN
<i>VAX 6000 Guia de instalacion</i>	EK-600SB-IN
<i>VAX 6000 Platform Service Manual</i>	EK-600EA-MG
Options and Upgrades	
<i>VAX 6000: XMI Conversion Manual</i>	EK-650EB-UP
<i>VAX 6000: Installing MS65A Memories</i>	EK-MS65A-UP
<i>VAX 6000: Installing the H7236-A Battery Backup Option</i>	EK-60BBA-IN
<i>VAX 6000: Installing the FV64A Vector Option</i>	EK-60VEA-IN
<i>VAX 6000: Installing the VAXBI Option</i>	EK-60BIA-IN

Manuals specific to models are listed in Table 2.

Table 2: VAX 6000 Model Level Documentation

Title	Order Number
Model 600	
<i>VAX 6000 Model 600 Mini-Reference</i>	EK-660EA-HR
<i>VAX 6000 Model 600 Service Manual</i>	EK-660EA-MG
<i>VAX 6000 Model 600 System Technical User's Guide</i>	EK-660EA-TM
<i>VAX 6000: Installing Model 600 Processors</i>	EK-660EA-UP
Model 500	
<i>VAX 6000 Model 500 Mini-Reference</i>	EK-650EA-HR
<i>VAX 6000 Model 500 Service Manual</i>	EK-650EA-MG
<i>VAX 6000 Model 500 System Technical User's Guide</i>	EK-650EA-TM
<i>VAX 6000: Installing Model 500 Processors</i>	EK-KA65A-UP
Models 200/300/400	
<i>VAX 6000 Model 300 and 400 Service Manual</i>	EK-624EA-MG
<i>VAX 6000: Installing Model 200/300/400 Processors</i>	EK-6234A-UP

Associated Documents

Table 3 lists other documents that you may find useful.

Table 3: Associated Documents

Title	Order Number
System Hardware Options	
<i>VAXBI Expander Cabinet Installation Guide</i>	EK-VBIEA-IN
<i>VAXBI Options Handbook</i>	EB-32255-46

Table 3 (Cont.): Associated Documents

Title	Order Number
System I/O Options	
<i>CIBCA User Guide</i>	EK-CIBCA-UG
<i>CIXCD Interface User Guide</i>	EK-CIXCD-UG
<i>DEC LANcontroller 200 Installation Guide</i>	EK-DEBNI-IN
<i>DEC LANcontroller 400 Installation Guide</i>	EK-DEMNA-IN
<i>InfoServer Installation Guide</i>	EK-DIS1K-IN
<i>KDB50 Disk Controller User's Guide</i>	EK-KDB50-UG
<i>KDM70 Controller User Guide</i>	EK-KDM70-UG
<i>KFMSA Module Installation and User Manual</i>	EK-KFMSA-IM
<i>KFMSA Module Service Guide</i>	EK-KFMSA-SV
<i>RRD40 Disc Drive Owner's Manual</i>	EK-RRD40-OM
<i>RA90/RA92 Disk Drive User Guide</i>	EK-ORA90-UG
<i>RF31/RF72 Integrated Storage Element Installation Manual for BA200-Series Enclosures</i>	EK-RF72D-IM
<i>RF31/RF72 Integrated Storage Element User Guide</i>	EK-RF72D-UF
<i>RF31/RF72 Integrated Storage Element Service Guide</i>	EK-RF72D-SV
<i>SA70 Enclosure User Guide</i>	EK-SA70E-UG
<i>SF200 Storage Array Installation Guide</i>	EK-SF200-IG
<i>SF72 Storage Enclosure and SF200 Storage Array Cabinet Service Guide</i>	EK-SF72S-SG
<i>TF85 Cartridge Tape Subsystem Owner's Manual</i>	EK-TF85-OM
<i>TF857 Magazine Tape Subsystem Service Manual</i>	EK-TF857-OM

Table 3 (Cont.): Associated Documents

Title	Order Number
Operating System Manuals	
<i>Guide to Maintaining a VMS System</i>	AA-LA34A-TE
<i>Guide to Setting Up a VMS System</i>	AA-LA25A-TE
<i>Introduction to VMS System Management</i>	AA-LA24A-TE
<i>ULTRIX-32 Guide to System Exercisers</i>	AA-ME96B-TE
<i>VMS Networking Manual</i>	AA-LA48A-TE
<i>VMS System Manager's Manual</i>	AA-LA00A-TE
<i>VMS Upgrade and Installation Supplement: VAX 6000 Series</i>	AA-LB36C-TE
VAXclusters and Networking	
<i>DECbridge 500 Installation Guide</i>	EK-DEFEB-IN
<i>DEMFA Installation Guide</i>	EK-DEMFA-IN
<i>Fiber Distributed Data Interface Description</i>	EK-DFSLD-SD
<i>Guidelines for VAXcluster System Configurations</i>	EK-VAXCS-CG
<i>H4000 Digital Ethernet Transceiver Installation Manual</i>	EK-H4000-IN
<i>HSC Installation Manual</i>	EK-HSCMN-IN
<i>VAXcluster Principles</i>	EK-VAXCP-TM
<i>VAX 6000/VAX 4000-300 SF200 System Manual</i>	TBD
<i>VMS VAXcluster Manual</i>	AA-LA27B-TE

Table 3 (Cont.): Associated Documents

Title	Order Number
Peripherals	
<i>Installing and Using the VT420 Video Terminal</i>	EK-VT420-UG
<i>RV20 Optical Disk Owner's Manual</i>	EK-ORV20-OM
<i>SC008 Star Coupler User's Guide</i>	EK-SC008-UG
<i>TA78 Magnetic Tape Drive User's Guide</i>	EK-OTA78-UG
<i>TA90 Magnetic Tape Subsystem Owner's Manual</i>	EK-OTA90-OM
<i>TK70 Streaming Tape Drive Owner's Manual</i>	EK-OTK70-OM
<i>TU81/TA81 and TU/81 PLUS Subsystem User's Guide</i>	EK-TUA81-UG
VAX Manuals	
<i>VAX Architecture Reference Manual</i>	EY-3459E-DP
<i>VAX Systems Hardware Handbook — VAXBI Systems</i>	EB-31692-46
<i>VAX Vector Processing Handbook</i>	EC-H0739-46

Chapter 1

Site Preparation

This chapter provides site planning guidelines, space and environmental requirements, cabinet sizes, and system power requirements.

Sections include:

- Customer Pre-Installation Checklist
- Floor Space and Environmental Requirements
- Cabinet Sizes
- Power Requirements
- AC Power Cable and Connectors

1.1 Customer Pre-Installation Checklist

Suggested site planning guidelines and tasks are listed below. The tasks can be completed before system delivery. To facilitate the installation process, it is recommended that the customer plan ahead and coordinate site planning and scheduling details with Digital.

Planning the Site

- Plan the physical layout of the system cabinet, disk or tape cabinet, console terminal, and other system units.
- Plan to place all equipment away from heavy traffic centers.
- Determine number, type, and location of required AC power receptacles and circuit breakers.
- Determine system power consumption to calculate the input line power requirements.
- Obtain cabinet weights and dimensions to check against floor loading restrictions.
- Determine environmental cooling requirements.

Checking the Delivery Route

- Check the height, width, and location of doors and passageways.
- Check floor loading requirements and protective covering along passageways.
- If applicable, check the size, capacity, and availability of the elevator.

A VAX 6000 system works as a standalone system or as a member of a VAXcluster. The system supports a full set of VAX applications and allows for processor, memory, and I/O expansion. These I/O options are available through adapters to the XMI bus. In addition, the XMI-to-VAXBI adapter (DWMBB) enables access to I/O options connected to a VAXBI bus, and the XMI-to-VME adapter (DWMVA) enables access to a VME bus. Table 1-1 lists the I/O options supported on the XMI bus.

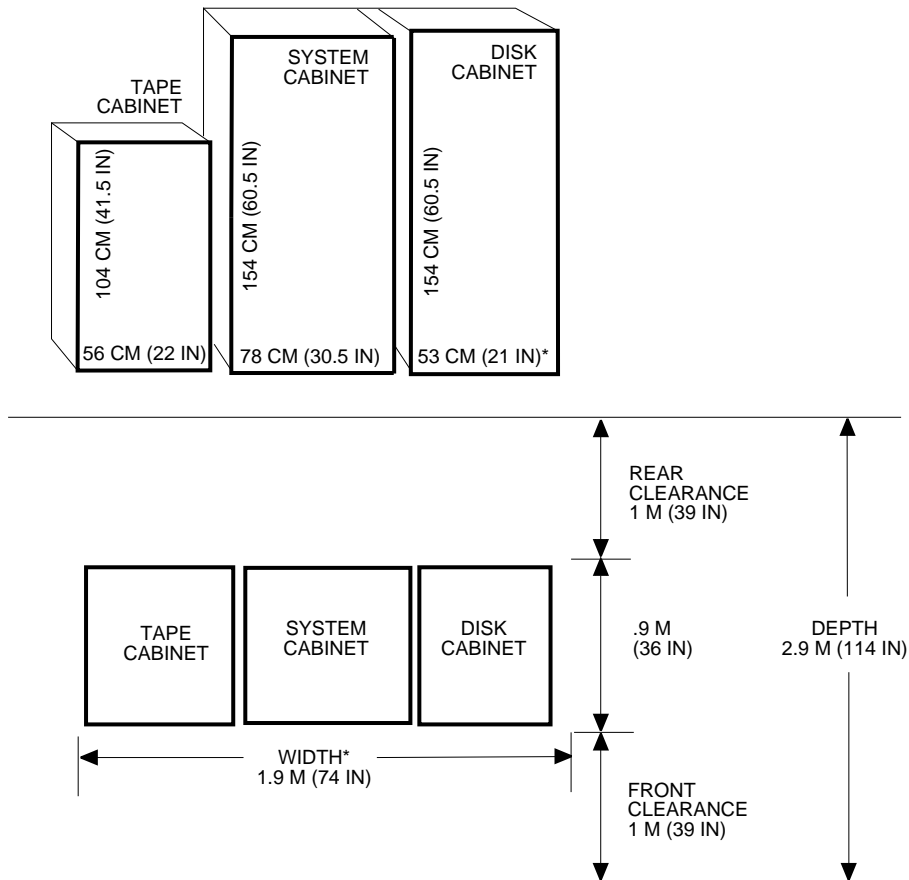
Table 1-1: VAX 6000 Series Adapters

Adapter	XMI Slots	Function
CIXCD	1	CI port interface; connects the system to a Star Coupler.
DEMFA	1	FDDI (fiber optic) port interface; connects a system to a local area network.
DEMNA	1	Ethernet port interface; connects a system to a local area network.
DWMBB	1	XMI-to-VAXBI interface, a two-module set. The DWMBB/A is in the XMI card cage; the DWMBB/B is installed in the VAXBI card cage.
DWMVA	1	XMI-to-VMEbus interface, a two-module set. The DWMVA/A is in the XMI card cage; the DWMVA/B is installed in a VMEbus expansion cabinet.
KDM70	2	Disk adapter; enables connection to RA disk drives.
KFMSA	1	DSSI adapter; enables connection to TF tape drives and to RFxx disk drives.

1.2 Floor Space and Environmental Requirements

Table 1-2 lists environmental requirements for the system.

Figure 1-1: Sample Configuration



* The SF200 storage array cabinet is 5 cm (2 in) wider.

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Table 1–2: Environmental Requirements

Condition	Temperature	Relative Humidity	Altitude
System tape in use	15°C to 32°C 59°F to 90°F	20% to 80%	0 to 2.4 km 0 to 8000 ft
System tape not in use	10°C to 40°C ¹ 50°F to 104°F	10% to 90%	0 to 2.4 km 0 to 8000 ft
Storage	–40°C to 70°C –40°F to 151°F	10% to 95%	0 to 9 km 0 to 30,000 ft

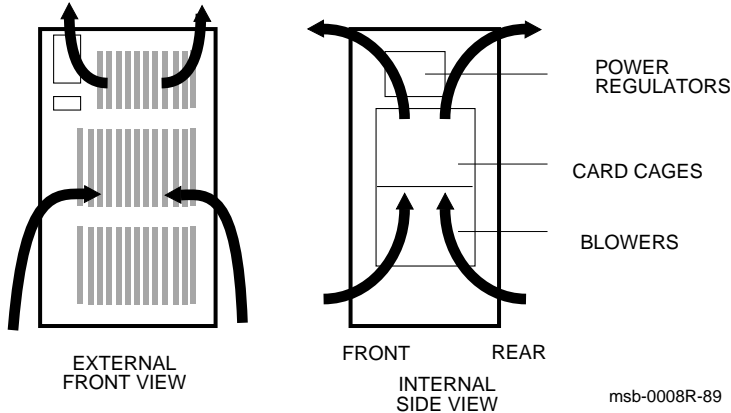
¹Model 600 range: 15°C–32°C (59°F)–90°F

The minimum amount of clearance space for the front and rear of the VAX 6000 is 1 meter (39 inches) as shown in Figure 1–1.

Air is taken in through the front and rear doors by the two blowers located in the lower half of the cabinet. The air is circulated up through the card cages and power regulators as shown in Figure 1–2. If there are in-cabinet devices such as disk drives, air enters through the bottom grill.

If you are installing a system on a raised floor, ensure that a proper airflow path is provided. If the floor has perforated tiles, position one or two tiles in areas where air will enter the cabinet. If the floor has aluminum grills, position two grills under the area where air enters the cabinet.

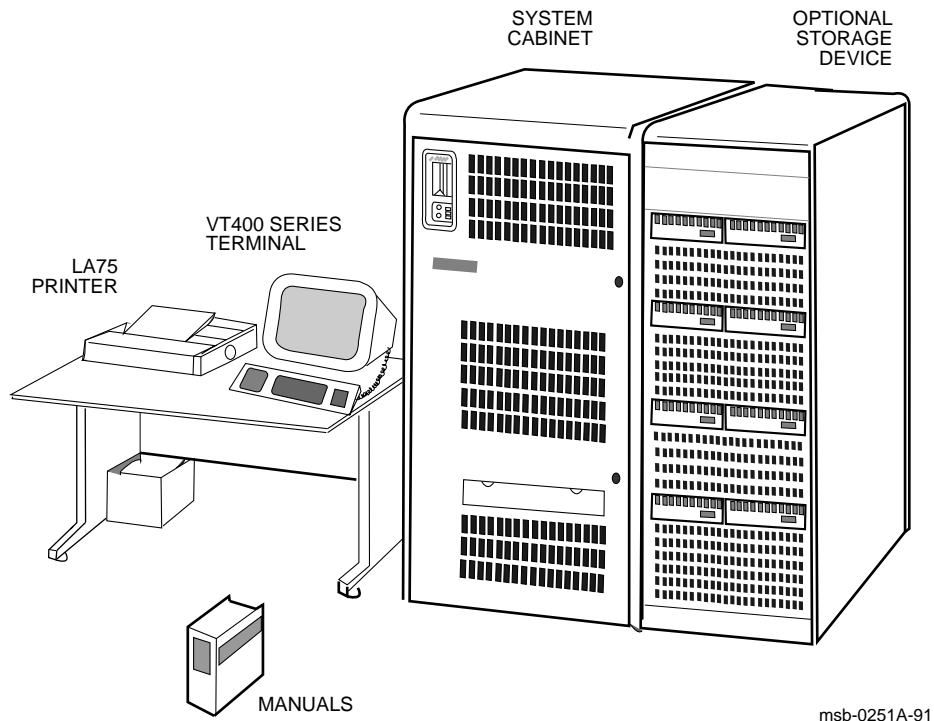
Figure 1-2: Airflow Pattern



1.3 Cabinet Sizes

Plan for all cabinets and peripherals when designing the installation site. A sample system could include a main cabinet, mass storage cabinets, and a console terminal and printer.

Figure 1-3: Sample System

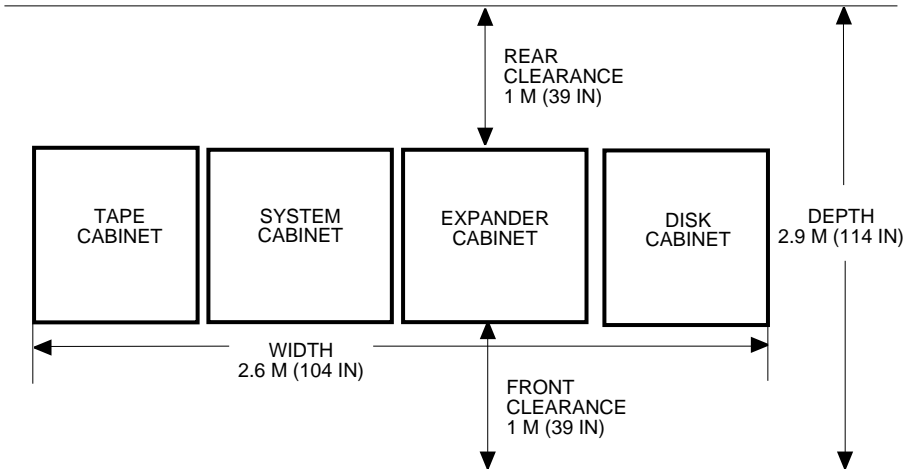


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Table 1–3: Cabinets: Dimensions and Weights

Cabinet	Height cm (in)	Width cm (in)	Depth cm (in)	Weight kg (lb)
Processor (60 Hz)	154 (60.5)	78 (30.5)	76 (30)	318 (700)
Processor (50 Hz)	154 (60.5)	78 (30.5)	76 (30)	333 (740)
Expander (60 Hz)	154 (60.5)	76 (30)	76 (30)	245 (540)
Expander (50 Hz)	154 (60.5)	76 (30)	76 (30)	308 (680)
SA Storage Cabinets	154 (60.5)	54 (21)	91 (36)	402 (885)
SF Storage Cabinets	154 (60.5)	59 (23)	91 (36)	402 (885)
H9643 Disk/Tape	104 (41.5)	54 (21)	76 (30)	—

Figure 1–4: Sample Configuration with Expander Cabinet

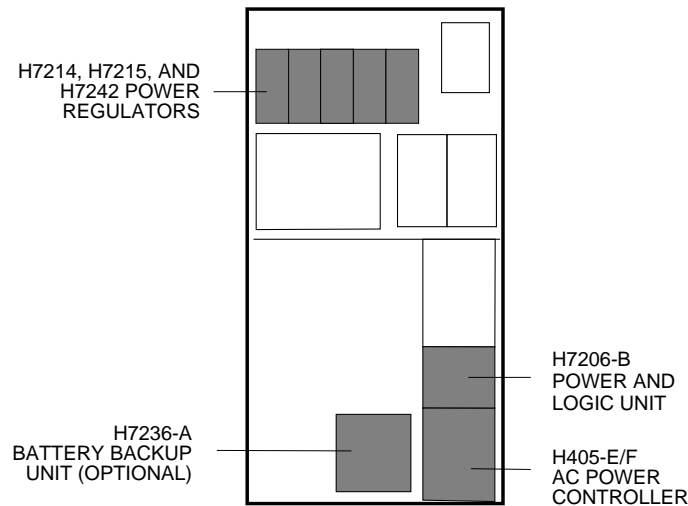


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1.4 Power Requirements

The 60 Hz power system includes the H405-E AC power controller and accepts three-phase input power from a 208V AC source. The 50 Hz power system, which includes the H405-F AC power controller and step-down transformer, accepts input power from a 380V or 416V AC source.

Figure 1-5: Location of Power Modules (Rear View)



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Table 1-4: AC Input Voltage

Model No.	Phases	Input Voltage	Surge Current	Frequency Range
H405-E (60 Hz)	3	208V RMS	60 A	47-63 Hz
H405-F (50 Hz)	3	380V RMS	60 A	47-63 Hz
H405-F (50 Hz)	3	416V RMS	60 A	47-63 Hz

Table 1–5: Power Requirements

Cabinet	AC Volts	Maximum Amps ¹	Maximum Watts	Maximum Heat Dissipation (Btu/hr)
System (60 Hz)	208	7.0/ph	1650	5570
System (50 Hz)	380	3.9/ph	1650	5570
System (50 Hz)	416	3.5/ph	1650	5570

¹This data includes power and cooling requirements for the system cabinet only.

The VAX 6000 power system has the following modules:

- H405-E/F AC power controller
- H7206-B power and logic unit
- One H7214 DC power regulator
- One H7215 DC power regulator
- One H7242 DC power regulator
- Optional H7236-A battery backup unit
- Transformer (50 Hz systems only)

Most of the power modules are visible from the rear of the cabinet (see Figure 1–5). For more information on these modules, refer to the *VAX 6000 Platform Service Manual*.

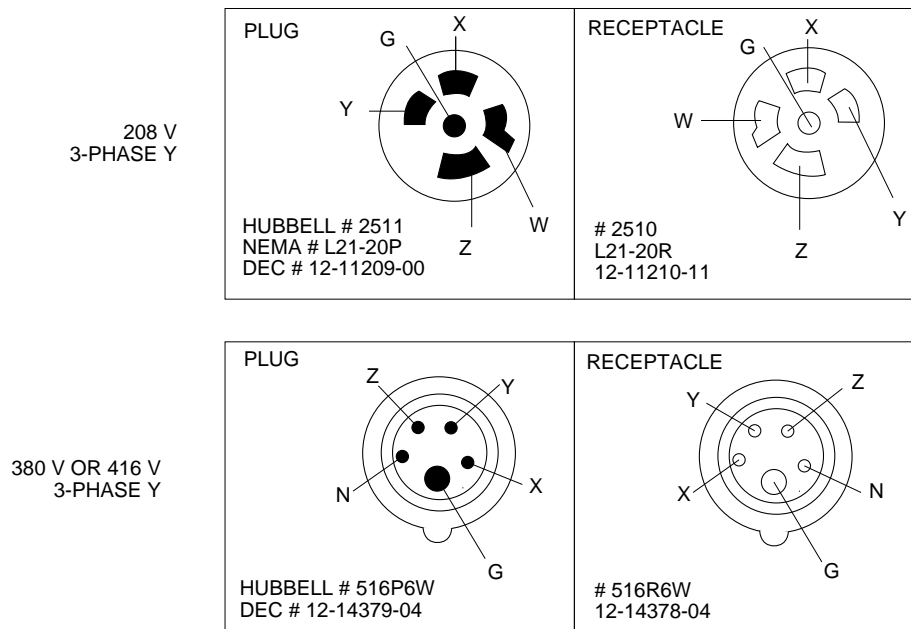
All systems have two unswitched IEC 320 receptacles located on the H405 AC power controller. The receptacles are fused at 10 amps for 60 Hz systems and at 6 amps for 50 Hz systems. They are reserved for disk drives or the H7236-A battery backup unit. All systems have one unswitched IEC 320 receptacle fused at 2 amps, but it is not used in current VAX 6000 systems. For expander cabinet power requirements, see the *VAXBI Expander Cabinet Installation Guide*.

1.5 AC Power Cable and Connectors

The AC power cable is 4.6 m (15 ft) in length. It consists of three-phase leads (X, Y, and Z) plus neutral (W/N) and ground (G). AC power connectors for 60 Hz and 50 Hz systems are shown below. See Section 6.3.

CAUTION: Neutral and ground lines must both be connected from the bulk three-phase power to complete the Wye configuration. Otherwise, power components may be damaged. Power must not be connected to the site source until the power checks of Chapter 6 are performed.

Figure 1-6: AC Power Connectors



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Chapter 2

Unpacking

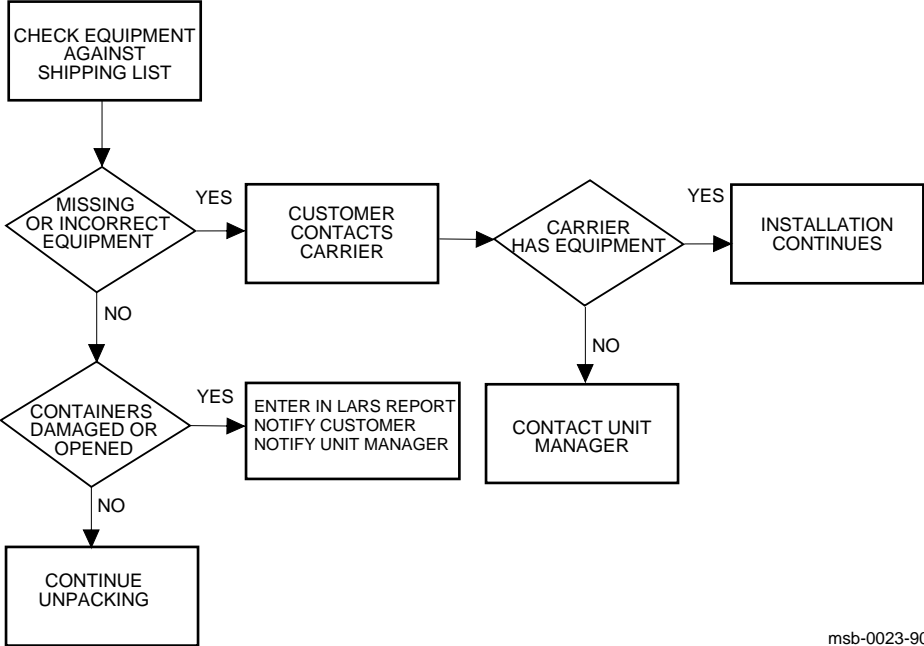
Unpacking steps are:

- Inspect the Shipment
- Collect Tools and Resources
- Remove Carton and Packing Material
- Remove from the Pallet
- Leveling the Cabinet
- Connect the Console Terminal
- Connect the Ethernet Cable
- Connect the FDDI Cable

2.1 Inspect the Shipment

Check to ensure that all system equipment is at the installation site.

Figure 2-1: Hardware Flowchart



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If you find a damaged container or package, notify the customer. Wait until the customer contacts the insurance company and gives you permission to continue unpacking.

It is important to record information on damaged or opened containers on the Labor Activity Reporting System (LARS) form.

2.2 Collect Tools and Resources

You will need the items listed in Table 2-1 to unpack and install the system cabinet. The removal of the cabinet from the pallet requires at least two people.

Table 2-1: Tools and Resources

Item	Use
Packing slip	To verify that all hardware has been delivered
Digital voltmeter	To verify power requirements at installation site
7/16 inch wrench	To remove shipping carton brackets
9/16 inch wrench	To remove pallet brackets and to lower leveler feet
Level	To verify that the cabinet is properly leveled

Review Chapter 1 (Site Preparation) for power, environmental, and space requirements for the system.

Since the cabinet is heavy and has a high center of gravity, removing it from the pallet requires at least two people.

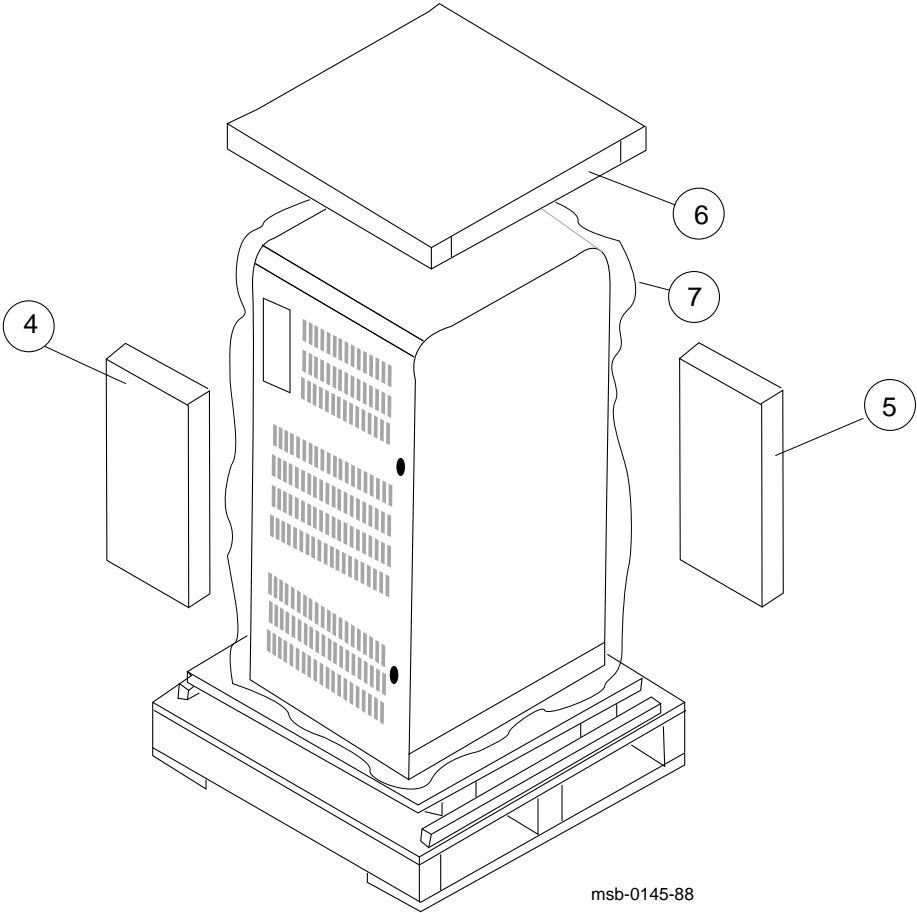
If the system includes an expander cabinet, you will need the following tools during installation.

Tool	Use
7/16 inch socket wrench	To remove side panel bolts
3/8 inch nutdriver	To remove rear door ground strap
Large Phillips screwdriver	To remove top cover

2.3 Remove Carton and Packing Material

Take off the carton and packing material to prepare the system cabinet for removal from the pallet.

Figure 2-2: Packing Material



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Use the following procedure to unpack the system cabinet.

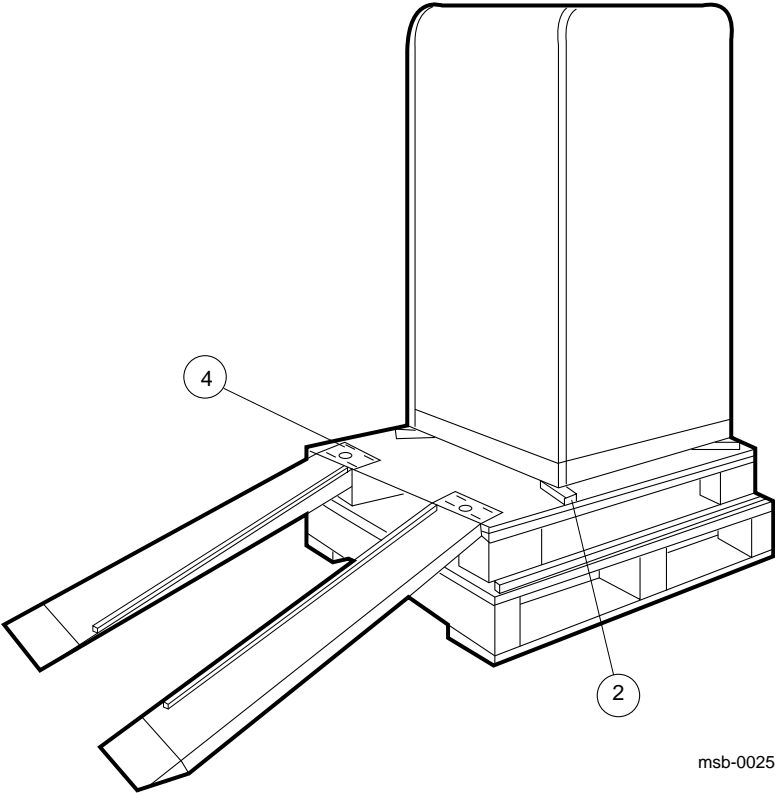
1. Cut the shipping straps from the carton.
2. Remove the top cap.
3. Using a 7/16 inch wrench, remove the four screws and metal closures that hold the carton together.
4. Remove the ramp kit from the front of the cabinet and open it. See Figure 2-2, ④.
5. Remove the loose piece box from the rear of the cabinet and open it. Use the packing slip to inventory the items in the box. See ⑤.
6. Remove the inner cap. See ⑥.
7. Remove the plastic bag. See ⑦.
8. Remove the two control panel keys. The keys are tie-wrapped to the cabinet's rear grill.

2.4 Remove from the Pallet

Check the cabinet for external damage. Remove the four shipping brackets that attach the cabinet to the pallet. Insert the ramps on the front of the pallet and remove the cabinet.

WARNING: *At least two people are required to remove the cabinet from the pallet.*

Figure 2-3: Preparation and Removal from Pallet



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1. Check the cabinet sides, top, and front and rear doors for damage. If the cabinet is damaged, do the following:
 - a. Enter the location and extent of the damage on the LARS report.
 - b. Notify the customer and your unit manager.
 - c. Stop unpacking until the customer gives you permission to continue.
2. Using a 9/16 inch wrench, remove the four bolts and shipping brackets that hold the cabinet to the pallet (see Figure 2-3, ②).
3. Check the leveler feet. They should be in the uppermost position, away from the floor.

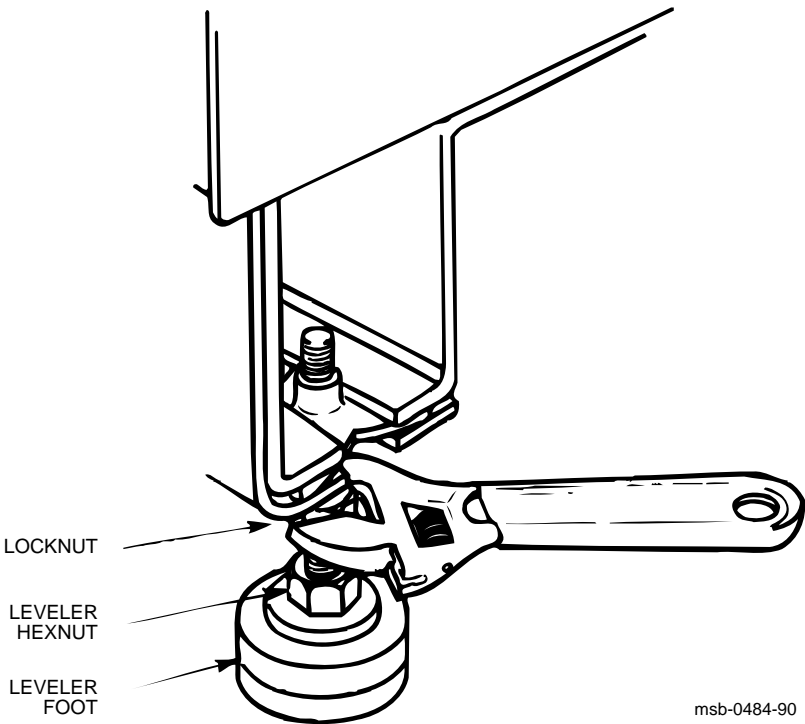
WARNING: *Serious personal injury may result if the cabinet is improperly handled or proper safety conditions are not met. During the unpacking procedure, personnel should wear safety glasses. Inspect the ramps, the ramp side rails, and metal hardware for defects described in the following list.*

- *Cracks more than 25 percent of the ramp depth, either across or lengthwise on the ramp.*
 - *Knots or knotholes going through the thickness of the ramp and greater than 50 percent of the ramp width.*
 - *Loose, missing, or broken ramp side rails.*
 - *Loose, missing, or bent metal hardware. If any of these conditions exist, DO NOT USE THAT RAMP. Investigate alternate means of removing the cabinet and/or order a new ramp.*
4. Attach the ramps by fitting the prongs into the holes on the front of the pallet. Place the ramps so that the runners are on the inside. Align the arrows on the ramps and pallet. See ④.
 5. With two people working together, slowly roll the cabinet off the pallet and down the ramps.
 6. Move the cabinet into position.

2.5 Leveling the Cabinet

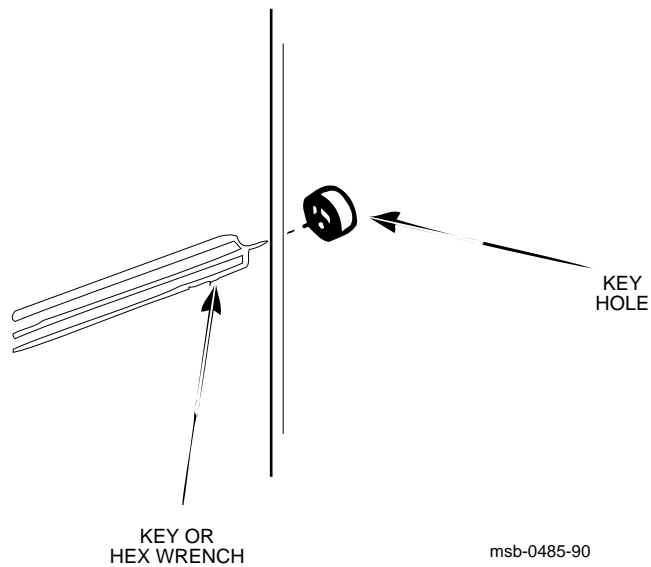
To level the cabinet, adjust the feet and check the cabinet with a bubble level. Finally, check the seating of all modules in the card cages.

Figure 2-4: Leveler Foot Adjustment



1. Using a 9/16 inch or adjustable wrench, lower and adjust the leveler feet. (A shipping bracket can also be used to lower the leveler feet. The bracket cutout and leveler feet hexnuts are the same size.)
2. Using a bubble level, check to see if the cabinet is properly leveled.
3. Unlock and open the front and rear doors (see Figure 2-5).
4. At the front of the cabinet, visually check to see that all processor, memory, and I/O modules are seated properly.
5. At the rear of the cabinet, check I/O bulkhead connections for tight connections. CIXCD and DEMFA connections use active headers and their connections may have loosened in shipment. Tighten as needed.

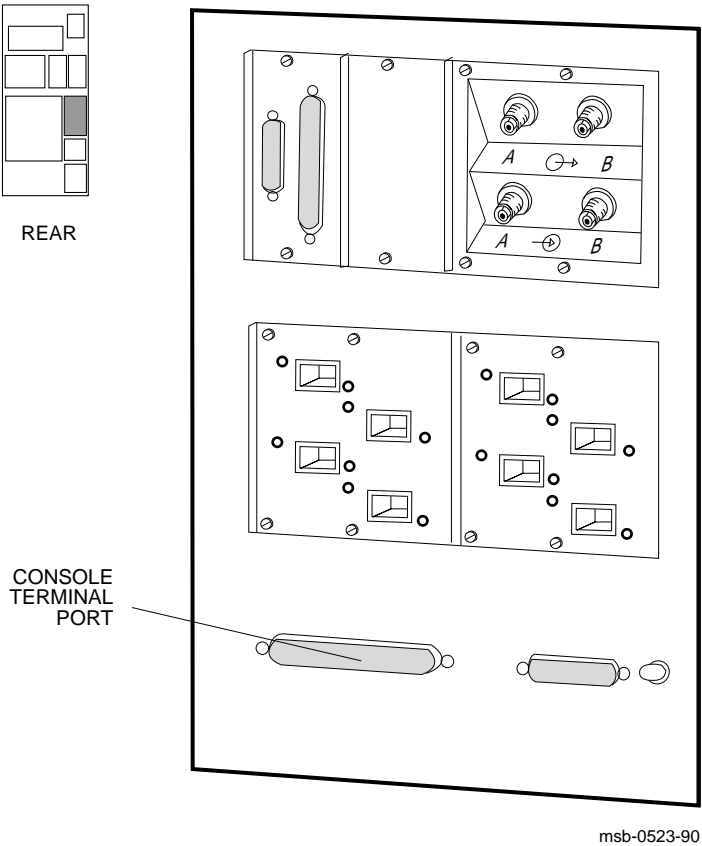
Figure 2-5: Cabinet Door Lock and Key



2.6 Connect the Console Terminal

After unpacking and positioning all other equipment, connect the console terminal to the system cabinet.

Figure 2-6: I/O Panel—Console Terminal Port



1. Unpack the console terminal. The console terminal signal cable is shipped in the loose piece box. The cable number is BC22D-25. If you are installing a remote services console, see Appendix A.
2. Unpack the printer. Connect the BC16E-10 signal cable to the printer and to the console terminal. Plug in the printer.
3. Attach the BC22D-25 signal cable to the console terminal and to the system I/O panel (see Figure 2-6). Plug in the console terminal.
4. Set the following terminal characteristics. See the console terminal user's guide for more information.

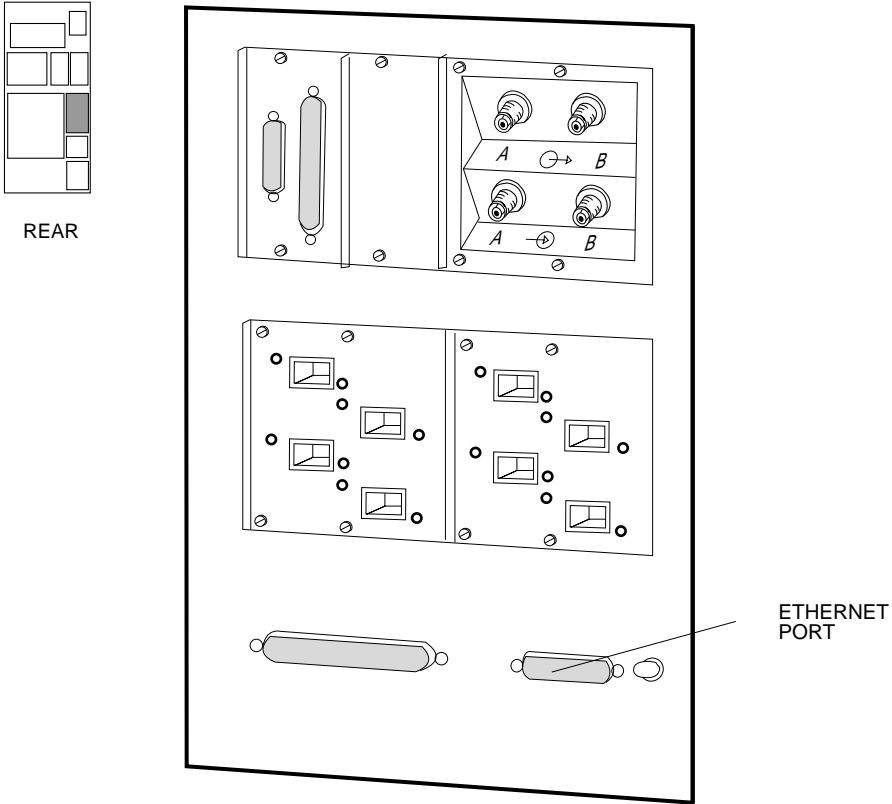
NOTE: *The system cabinet's baud rate is factory set at 1200.*

- 8 data bits, 1 stop bit
- No parity

2.7 Connect the Ethernet Cable

If the system includes an Ethernet, connect the Ethernet cable to the system I/O panel and to the Ethernet transceiver.

Figure 2-7: I/O Panel—Ethernet Port



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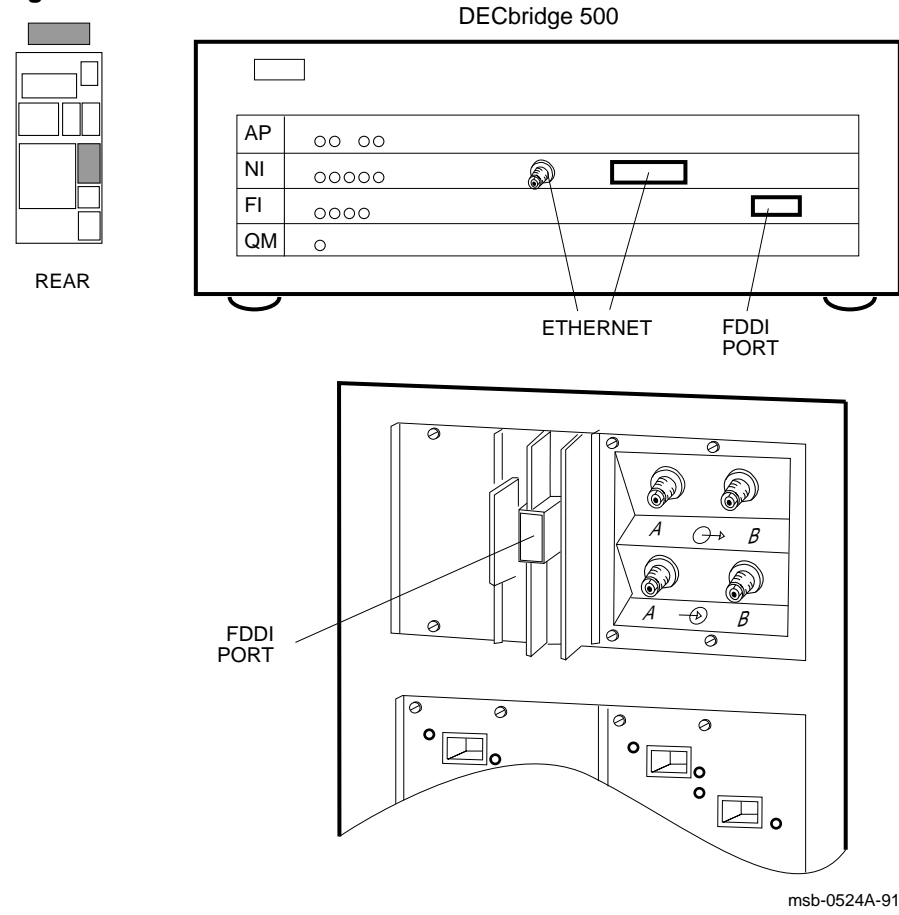
The DEC LANcontroller 400 (DEMNA) adapter connects to the Ethernet via a BNE3x or BNE4x transceiver cable.

1. Connect the transceiver cable to the Ethernet port on the system I/O panel (see Figure 2-7).
2. Connect the other end of the cable to the Ethernet transceiver. See the appropriate Ethernet transceiver manual for more information.

2.8 Connect the FDDI Cable

If the system includes an FDDI, connect the FDDI cable to the system I/O panel and to the DECbridge 500 which connects to the Ethernet.

Figure 2-8: I/O Panel—FDDI Port



The DEMFA adapter connects to the DECbridge 500, which connects to the Ethernet.

1. Connect the cable to the FDDI port on the system I/O panel (see Figure 2-8).
2. Connect the other end of the cable to the DECbridge 500. See the *DECbridge 500 Installation Guide* for more information.

Connecting to a DSSI Subsystem

VAX 6000 systems connect to tape and disk drives using several adapters. This chapter describes the concepts of connecting to TF tape and RF disk drives (known as integrated storage elements or ISEs) using the Digital Storage System Interconnect (DSSI) bus supported by the KFMSA adapter. Installation instructions are referenced in this chapter. For information on connecting to TU, TK, and TA tapes, or RA disks, see Chapter 5, and for connecting to a CI VAXcluster, see Chapter 4.

If your system has a CI adapter, complete the DSSI subsystem installation *before* you begin the CI installation. Sections in this chapter include:

- DSSI Installation Overview
- Storage Architecture and Options
- DSSI and CI VAXclusters Compared
- DSSI Basics
 - KFMSA Adapter
 - Integrated Storage Elements (ISEs)
 - SF7x Enclosure Box
 - SF2xx Storage Array Cabinet
 - Single-Host Systems
 - Dual- and Tri-Host Systems
 - Cables
- Configure the DSSI Subsystem
 - Install DSSI Cables to ISEs
 - Set Node IDs
- Configure DSSI Subsystem with EVCXF
 - Example: Boot the VAX Diagnostic Supervisor
 - Example: Run the Autosizer
 - Example: Run EVCXF
 - Example: Changing the KFMSA Node ID at the I/O Panel
 - Example: Changing the KFMSA Node ID with EVCXF

3.1 DSSI Installation Overview

This chapter provides guidelines for installation. Please refer to the manuals listed in Table 3-1 for complete installation instructions. The main steps in installation include cabling, terminating the DSSI bus, setting node IDs for the bus, and changing parameters on ISEs as required (see Table 3-2).

Table 3-1: DSSI Documentation

Title	Description
① <i>DSSI VAXcluster Installation Guide</i> (EK-DVCLU-IN)	Multi-host mixed DSSI VAXcluster systems. Includes configuration rules, supported ISEs, and installation instructions.
② <i>KFMSA Module Installation and User Manual</i> (EK-KFMSA-IM)	For installing KFMSA adapters into existing VAX 6000 systems. Describes setting termination and node IDs for the adapters using EVCXF.
③ <i>KFMSA Module Service Guide</i> (EK-KFMSA-SV)	Troubleshooting and diagnostics for the KFMSA adapter. Includes configuration information.
④ <i>VAX 6000/SF2xx Embedded Storage Installation Guide</i> (EK-EMBED-IN)	For single-host systems or DSSI VAXclusters with embedded storage. Gives acceptance procedures, setting node ID and ISE parameters, discusses disk stripping.
⑤ <i>SF7x Storage Enclosure and SF2xx Storage Array Cabinet Service Guide</i> (EK-SF72S-SG)	Fault isolation and troubleshooting guidelines for the SF7x enclosure boxes and SF2xx storage array cabinets.
⑥ <i>SF2xx Storage Array Installation Guide</i> (EK-SF200-IG)	Installing an SF2xx storage array cabinet, including cabling, configuration, acceptance, setting node IDs.
⑦ <i>TF85 Cartridge Tape Subsystem Owner's Manual</i> (EK-TF85-OM)	Operation and user instructions for the TF85 tape drive.
⑧ <i>TF85B Tape Subsystem Overview</i> (EK-TF85B-OV)	Overview of the embedded TF85 tape subsystem including configuration rules, booting, and field-replaceable units.

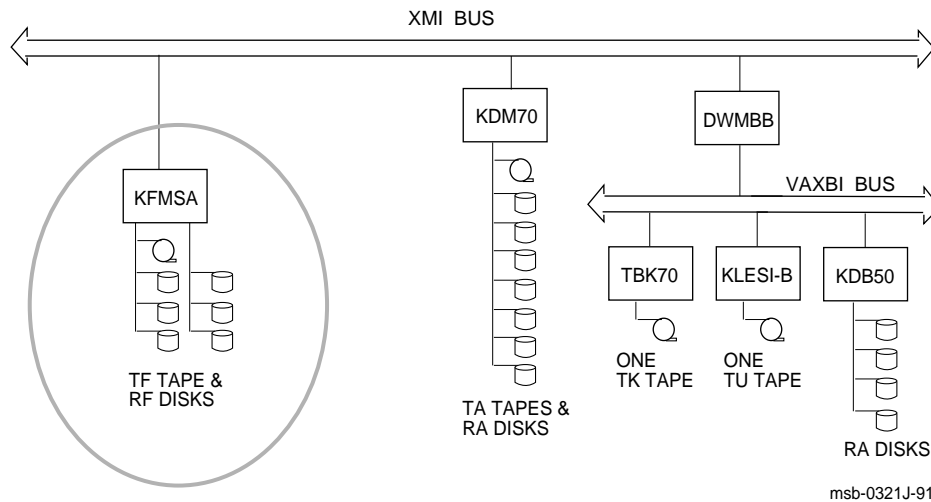
Table 3–2: DSSI Installation

Location	Single-Host Configuration¹	DSSI VAXcluster¹
Cable Installation		
ISE in VAX 6000	No change. All cables are factory installed.	Attach cables from SF7x to additional host systems. ④ ⑤ †
ISE in SF2xx storage array cabinet	Attach cables from host system to SF2xx cabinet. ⑥ ²	
Bus Termination		
Host I/O bulkhead	Install termination on each unused connector as necessary. ① ②	
SF7X Enclosure Box	Install termination on each unused connector on rear panel, as necessary. ④ ⑥	
Node ID Settings		
KFMSA	No change. Leave at factory setting of node ID 7.	Set second host node ID to 6 and third host to 5. ① ② ³
ISEs	No change. Should be correctly set at factory. Tapes are set to node ID 0; through-bus SF7x boxes are node IDs 1 to 4. split-bus SF7x boxes (for single- and dual-host) are node IDs 5 and 6.	
ISE Parameter Changes		
ISEs	See <i>KFMSA Module Installation and User Manual</i> for explicit directions on changing parameters. ②	
Adding Hosts to Existing DSSI Subsystems		
New and original hosts	Reconfigure DSSI storage bus, setting node IDs, termination, and possibly changing split-bus. ①	
¹ Assumes a new installation only; does not apply to add-on configurations. ² See the <i>SF2xx Installation Manual</i> for complete cabling instructions. ³ See the <i>KFMSA Module Installation and User Manual</i> for changing node IDs. †These callouts refer to the manuals listed in Table 3–1.		

3.2 Storage Architecture and Options

VAX 6000 systems have multiple paths for CI, DSSI, and Ethernet connections. Table 3-3 shows VAXcluster and network communications options.

Figure 3-1: System Architecture with KFMSA



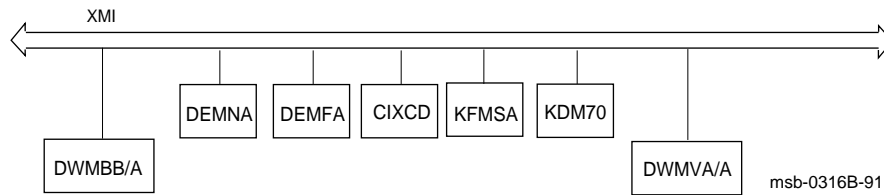
VAX 6000 systems have several choices of VAXcluster adapters and communication interconnects. Figure 3-1 shows a system architecture, and Table 3-3 lists the adapters and configuration limits.

Table 3–3: VAXcluster and Network Options

	Adapter	Maximum Configuration
VAXcluster Options		
CI	CIXCD	Up to 4 (1 XMI slot each) ¹
	CIBCA	Up to 4 (2 VAXBI slots each plus DWMBB adapter) ¹
DSSI	KFMSA	Up to 6 KFMSAs in a VAX 6000. One XMI slot, providing two DSSI buses per module.
Ethernet	DEMNA	Up to 6 (1 XMI slot each)
	DEBNA	One VAXBI slot plus DWMBB adapter
Network Interconnects		
CI	CIXCD	Up to 4 (1 XMI slot each) ¹
	CIBCA	Up to 4 (2 VAXBI slots each plus DWMBB adapter) ¹
Ethernet	DEMNA	Up to 6 (1 XMI slot each) ²
	DEBNI	Up to 6 (1 VAXBI slot plus DWMBB adapter)
FDDI	DEMFA	Up to 2 (1 XMI slot each)

¹CIXCD and CIBCA cannot be configured together on the same system.
²Power connection is provided for one H4005 transceiver.

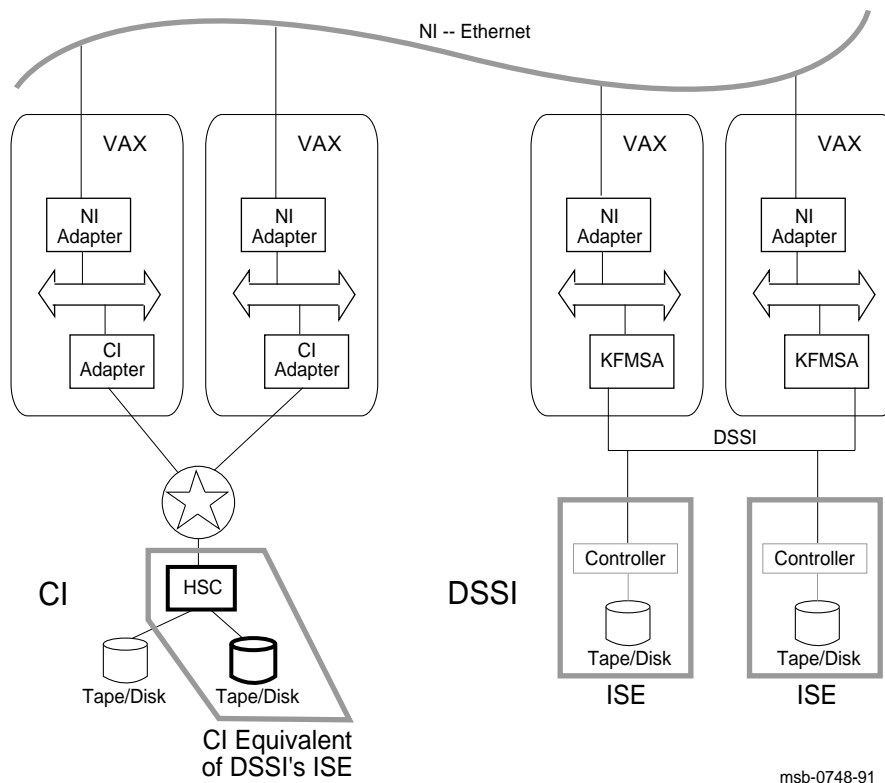
Figure 3–2: XMI Adapters



3.3 DSSI and CI VAXclusters Compared

The Digital Storage System Interconnect (DSSI) bus is supported on VAX 6000 systems using the KFMSA adapter. It is a daisy-chained multi-drop bus that connects up to eight nodes. Logically, each DSSI bus is equivalent to a small CI, including the associated logical Star Coupler. A CI storage unit and HSC is equivalent to a DSSI ISE (see Figure 3-3).

Figure 3-3: CI and DSSI Compared



On both CI and DSSI, all nodes directly connect to each other. The DSSI bus requires electrical terminators at both ends to ensure signal integrity because it is DC-coupled (the CI bus does not require physical termination).

Logically, each DSSI bus is equivalent to a small CI with its Star Coupler. The RF/TF devices on the DSSI are functionally equivalent to a combination of HSC and RA/TA devices on the CI. Like the HSC, each ISE controller can communicate with multiple VAX hosts on DSSI and order disk seeks. ISEs do not have to share an HSC like CI devices, so each additional ISE linearly increases I/O throughput and bandwidth.

DSSI can be implemented in single-, dual-, or tri-host mode. In single-host, one system has access to integrated storage elements (ISEs) across the DSSI storage bus. In dual- and tri-host configurations, the systems remain functionally independent while their common DSSI storage bus, together with VAXcluster software, makes the ISEs available to each system, providing multiple data paths for access to the ISEs.

Dual- and multi-host systems can include multiple VAX 6000 systems and VAX 4000 Model 300 systems (see Section 3.4.6).

FOR MORE INFORMATION

Primary reference: *KFMSA Module Installation and User Manual*

Secondary reference: *SF2xx Storage Array Installation Guide*

3.4 DSSI Basics

If you are familiar with DSSI terminology and concepts, go to Section 3.5 and continue the installation. For additional information on DSSI, see Table 3-4.

- VAX 6000 systems support DSSI subsystems in single-, dual-, or tri-host configurations, using the KFMSA adapter.
- Each KFMSA adapter has two buses, each of which can attach seven additional nodes (ISEs or another KFMSA adapter).
- ISEs can be RF disk or TF tape devices.
- RF ISEs are housed in SF7x enclosure boxes installed either in the system cabinet or in an SF2xx storage array cabinet.
- TF85 ISEs are housed in VAX 6000 cabinets and TF857 drive loaders are housed in SF2xx storage array cabinets.

Table 3-4: DSSI Concepts

Term	Reference	Definition
DSSI	Section 3.3	Digital Storage System Interconnect. A DSA-based storage interconnect used by the KFMSA adapter and the RF and TF series integrated storage elements to transfer data and to communicate with each other.
Dual-host	Section 3.4.6	Storage configuration where ISEs are shared between two DSSI adapters on a DSSI subsystem with two host systems.
ISE	Section 3.4.2	Integrated storage element. On the DSSI storage bus, all RF and TF storage devices are ISEs.
KFMSA	Section 3.4.1	XMI adapter for RF disks and TF tapes; enables connection to these devices.
MSCP	Section 3.4.2	Mass storage control protocol. An application layer protocol used by the host to perform disk I/O operations and I/O control functions.

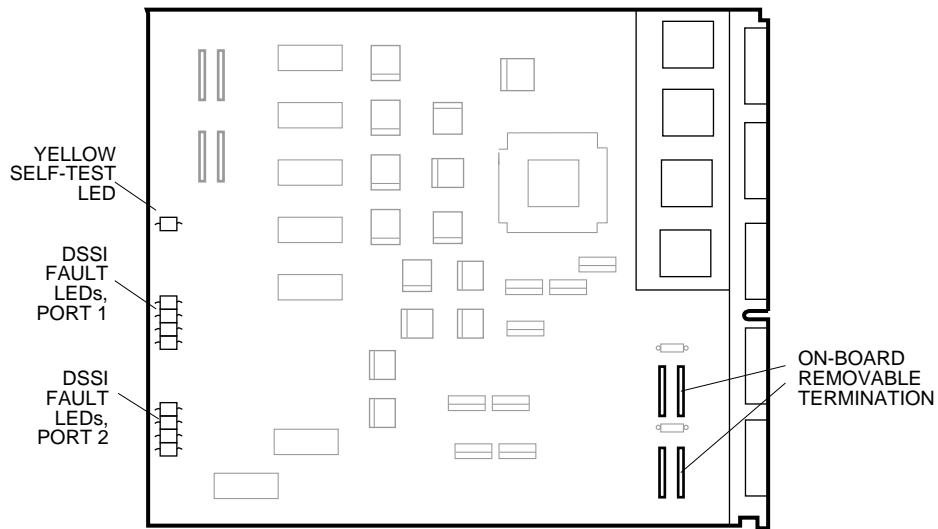
Table 3–4 (Cont.): DSSI Concepts

Term	Reference	Definition
Node name	Section 3.5.2	A 6-character (maximum) value assigned to each ISE. The node name of each ISE must be unique across the system topology.
OCP	Section 3.5.2	Operator control panel. An enclosure interface that allows remote control of DSSI node ID selection and ISE operating status.
SF7x	Section 3.4.3	A storage enclosure that houses either two or four RF disk drives. Can be installed in a system cabinet or in an SF2xx storage array cabinet. Current models are SF72 and SF73.
SF2xx	Section 3.4.4	DSSI storage array cabinet that houses up to six SF7x enclosures and up to two TF857 magazine tape loader subsystems.
Single-host	Section 3.4.5	Storage configuration where ISEs are connected to only one host system.
Split-bus	Section 3.4.3	A mode of operation where the bus servicing the ISEs on right side of an SF7x enclosure is different bus from the bus servicing the ISEs on the left side of the enclosure.
Through-bus	Section 3.4.3	A mode of operation where all the ISEs in an SF7x enclosure are on the same DSSI bus.
Tri-host	See <i>DSSI VAXcluster Installation Guide</i> .	Three host systems sharing ISEs on the DSSI storage bus. Host systems can be VAX 6000 and VAX 4000 Model 300 systems.

3.4.1 KFMSA Adapter

VAX 6000 systems support DSSI using the KFMSA adapter installed in the XMI card cage. Each KFMSA supports or has two DSSI buses. The KFMSA has diagnostic LEDs and reports status to system self-test display.

Figure 3-4: KFMSA LEDs



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The KFMSA runs a self-test during power-up and reports results to the system self-test display. The yellow LED on the KFMSA lights to indicate that self-test passed.

If a KFMSA fails self-test, check the diagnostic LEDs on the board. Two sets of four red LEDs report status for each of the logical ports associated with the two physical buses. See the *KFMSA Module Installation and User Manual* chapter, Power-On Self-Test, for details on the KFMSA LED readout.

In addition to the KFMSA adapter self-test status, each ISE has its own self-test. To check status of ISEs, for disks, check the status LEDs on the operator control panel of the SF7x enclosure box. For TF857 tapes, check the front panel of the tape loader.

The KFMSA-AA adapter has bus termination on the board, and supports single- and dual-host systems. The KFMSA-BA adapter has removable termination; with the termination present on the board, it supports single- and dual-host subsystems, and with the termination removed supports multi-host.

Each of the two DSSI buses per KFMSA has eight data lines: 1 parity line and 7 control lines. Transmission on the DSSI bus is packet-oriented. Of the eight nodes configured between any two terminators on KFMSA adapters, one to three nodes can be KFMSA adapters. The remaining nodes can be RF disk or TF tape integrated storage elements (ISEs). See Section 3.4.2.

The level 3 diagnostic, EVCXF, reports ISE node IDs and connection on each bus (described in Section 3.6.3).

FOR MORE INFORMATION

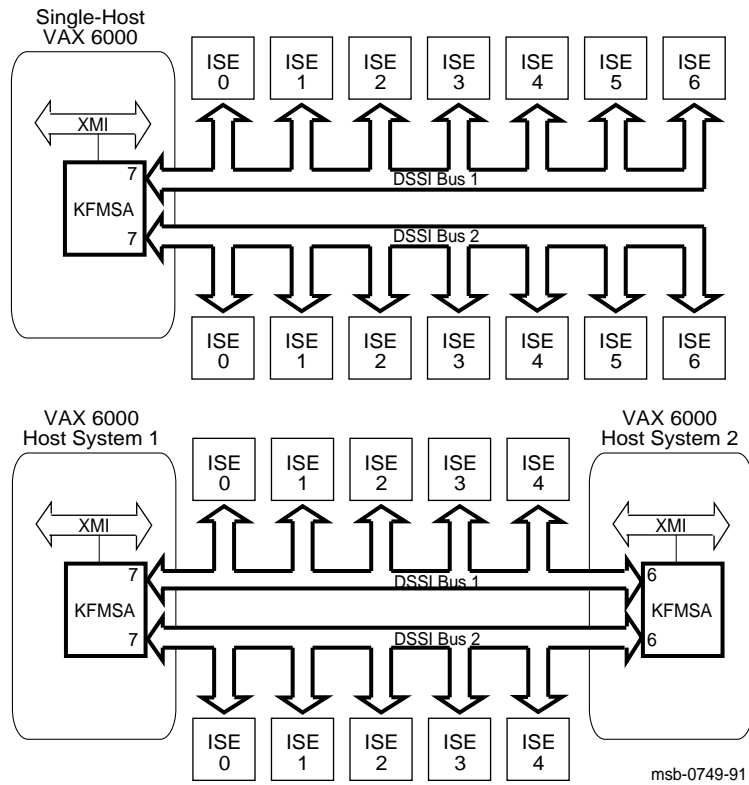
Primary reference: *KFMSA Module Installation and User Manual*

Secondary reference: *KFMSA Module Service Guide*

3.4.2 Integrated Storage Elements (ISEs)

Of the eight nodes available between any two terminators on a DSSI bus, a maximum of three nodes can be KFMSA adapters, the rest ISEs. ISEs are the RF disks and TF tapes that populate up to seven nodes on any DSSI bus. Each ISE has a controller and a disk or tape drive.

Figure 3-5: ISEs for the DSSI Storage Bus



Each DSSI bus has a limit of eight physical addresses: one, two, or three adapters (KFMSAs) and from one to seven ISEs (RF disks or TF tapes). Each ISE has a controller in the physical (tape or disk) drive which uses the mass storage control protocol (MSCP) or tape MSCP. ISEs are located in a VAX 6000 cabinet, a VAX 4000 Model 300 cabinet, or an SF2xx storage cabinet.

Each connection has an initiator and a target node. Any node on the bus can act as either an initiator or a target. The actual communications are limited to two nodes at a time. Arbitration mechanisms accommodate multiple dialogues on the DSSI bus.

The ISE receives a complete packet of information requesting a task to be done. The controller interprets the packet and performs the task without any further communication from other DSSI nodes. The controller has a command queue and handles access requests. It can start and monitor an internal diagnostic, and provide status of the storage element.

VAX 6000 DSSI subsystems support RF72 and RF73 disks, TF85 tape drives in cabinet, and TF837 and TF857 tapes in SF2xx storage cabinets.

FOR MORE INFORMATION

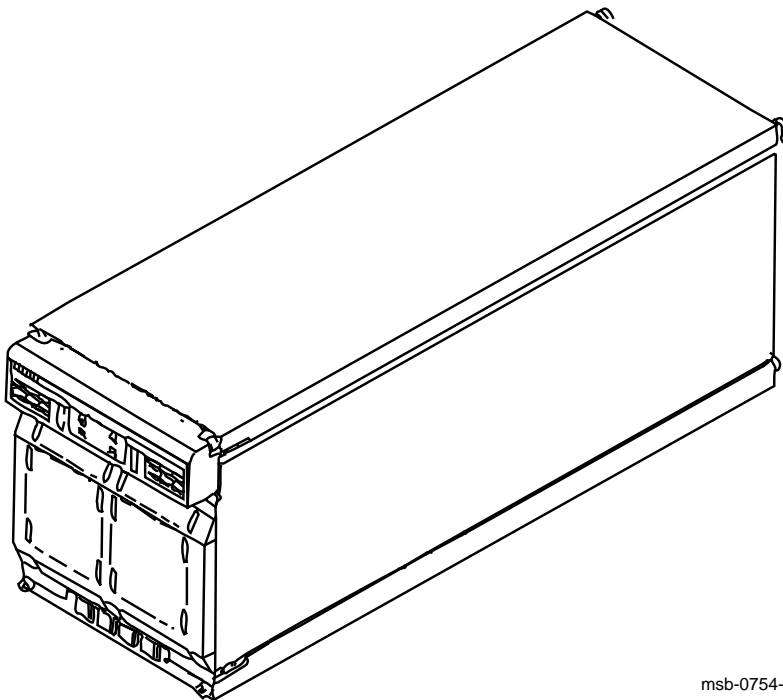
Primary reference: *SF2xx Storage Array Installation Guide*

Secondary references: *VAX 6000/SF2xx Embedded Storage Installation Guide*
SF7x Storage Enclosure and SF2xx Storage Array Cabinet Service Guide
TF85 Cartridge Tape Subsystem Owner's Manual
DSSI VAXcluster Installation Guide

3.4.3 SF7x Enclosure Box

Two or four RF disks are installed in an SF7x enclosure box (SF72 or SF73). Two SF7x enclosures can be installed in a VAX 6000 system cabinet, with a total of eight RF disks in the cabinet. Additionally, up to six SF7x enclosures can be installed in an SF2xx storage array cabinet, for an additional 24 RF disks.

Figure 3–6: SF7x Enclosure Box



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A VAX 6000 cabinet can have one TF tape in the system control assembly (in the upper left front of the cabinet) and two SF7x enclosures in the base of the system cabinet. Each SF7x enclosure houses two or four RF drives. Total in-cabinet ISE capacity is a maximum of eight RF drives and one TF tape drive.

SF2xx storage array cabinets can have up to six SF7x enclosures, each with a maximum of four RF disks for a total capacity of 24 disks in each SF2xx.

An SF7x enclosure can be configured either in split-bus or through-bus mode. Split-bus mode connects the ISEs in the right side of the SF7x enclosure to a different DSSI bus from those on the left side. Through-bus mode connects all the ISEs in the enclosure to the same DSSI bus.

On single- and dual-host systems, SF7x enclosures can be cabled as either split-bus or through-bus. On multi-host systems, all SF7xs are set through-bus (no split-bus is allowed).

FOR MORE INFORMATION

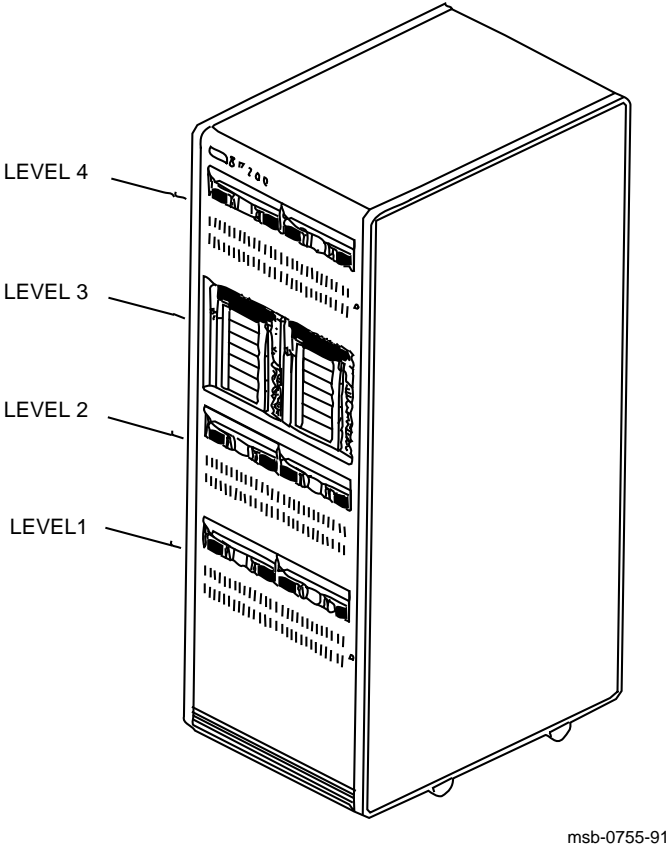
Primary reference: *SF2xx Storage Array Installation Guide*

Secondary reference: *SF7x Storage Enclosure and SF2xx Storage Array Cabinet Service Guide*

3.4.4 SF2xx Storage Array Cabinet

The SF2xx storage array cabinet houses a maximum of six SF7x storage enclosures, each of which can hold four RF drives, for a total of 24 RF drives. The second level from the top is reserved for TF857 devices.

Figure 3-7: SF2xx Cabinet



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A full SF2xx houses 24 RF disks (in six SF7x enclosure boxes) and two TF857 tape loaders (see Figure 3-7). SF2xx cabinets can be ordered with fewer disks and be upgraded in the field as the customer needs require.

The SF2xx has four levels: levels 1, 2, and 4 house RF disks in SF7x enclosure boxes (two or four disks per SF7x). Level 3 is reserved for tapes and can hold two TF857 tape loaders.

The number of buses needed to support a full SF2xx cabinet varies, depending on how the SF7x enclosures are configured: split- or through-bus.

FOR MORE INFORMATION

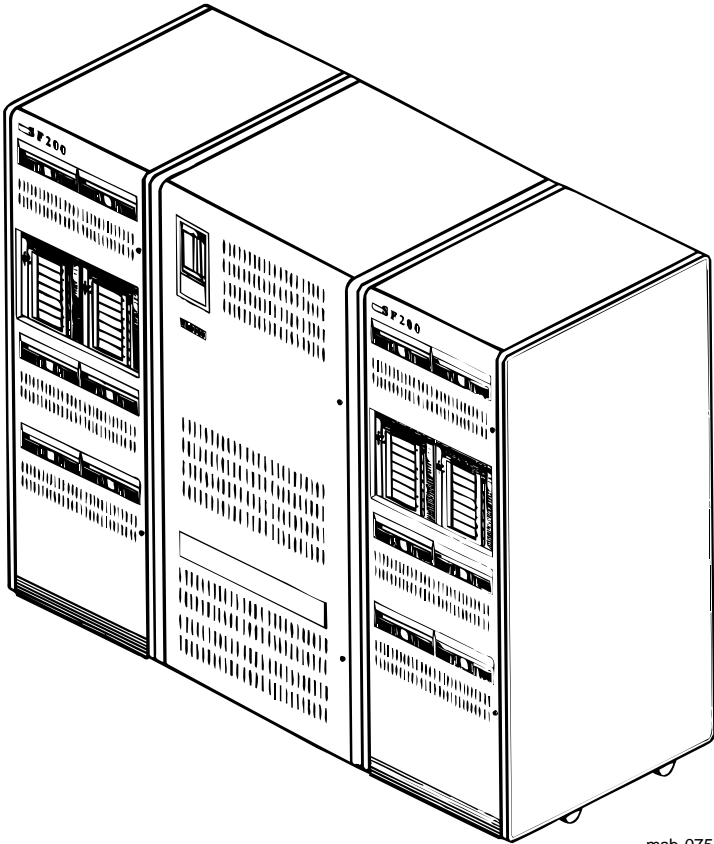
Primary reference: *SF2xx Storage Array Installation Guide*

Secondary reference: *VAX 6000/SF2xx Embedded Storage Installation Guide*
SF7x Storage Enclosure and SF2xx Storage Array Cabinet Service Guide

3.4.5 Single-Host Systems

A single-host configuration consists of one VAX 6000 system connected to ISEs on the DSSI bus. The ISEs can be in the cabinet or in an SF2xx storage array cabinet or both.

Figure 3-8: Single-Host System



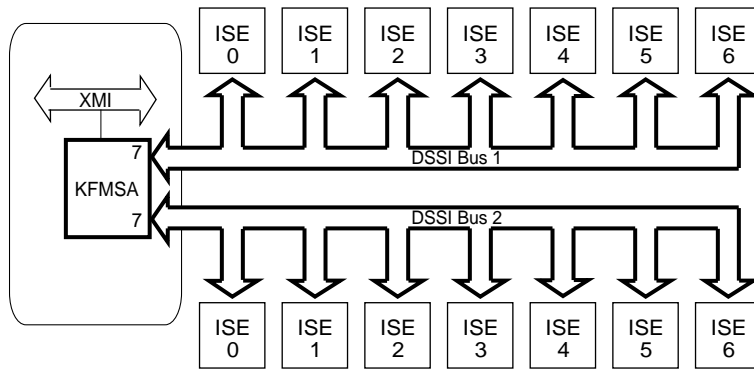
msb-0753-91

For embedded storage, a VAX 6000 can have a maximum of eight RF drives and a TF tape drive in the system control assembly box. A full system cabinet can be connected with one or two KFMSA adapters.

A single-host system can connect to a maximum of two SF2xx storage array cabinets. See Figure 3-8. One full SF2xx storage array cabinet requires two KFMSA adapters to connect to a single host. If you have two full SF2xxs, then four KFMSA adapters are required.

On single-host systems, SF7x enclosures can be cabled as either split-bus or through-bus.

Figure 3-9: Sample Single-Host Configuration



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FOR MORE INFORMATION

Primary reference: *KFMSA Module Installation and User Manual*

Secondary references: *DSSI VAXcluster Installation Guide*
SF2xx Storage Array Installation Guide

3.4.6 Dual- and Tri-Host Systems

The DSSI can connect VAX 6000 systems, VAX 4000 Model 300 systems, and ISEs.

Figure 3-10: Examples of Dual-Host Configurations

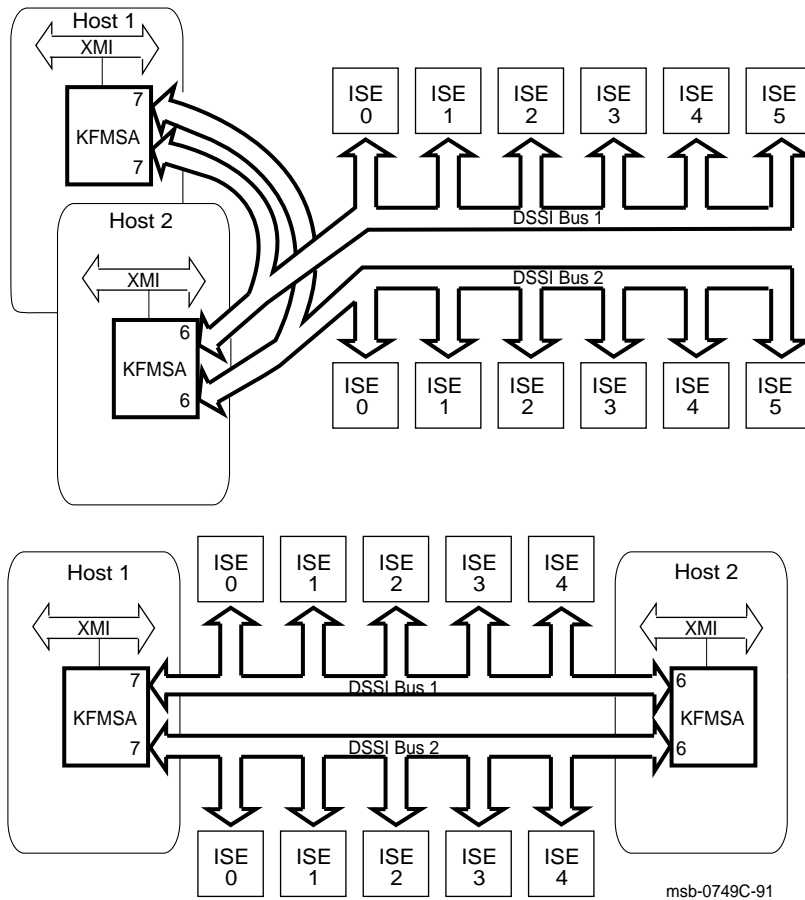


Figure 3–10 shows a dual-host configuration with one KFMSA in each system. For DSSI VAXclusters, each system can have up to six KFMSA adapters. Host systems can be VAX 6000s or VAX 4000 Model 300 systems.

The ISEs can be in either of the host systems or in SF2xx storage array cabinets. This manual covers installation of single- and dual-host systems only.

Dual- and tri-host systems must have:

- Two or more VAX 6000 or VAX 4000 systems
- Software licenses of

First System	Additional Systems
VMS	VMS ¹
VAXcluster	VAXcluster
DECnet full-function	DECnet end-node

¹On any cluster, the maximum difference in VMS revision levels between any two systems cannot be greater than one.

- DSSI adapters (KFMSA adapters for VAX 6000 systems)
- Ethernet hardware
- No more than six ISEs on each DSSI bus

FOR MORE INFORMATION

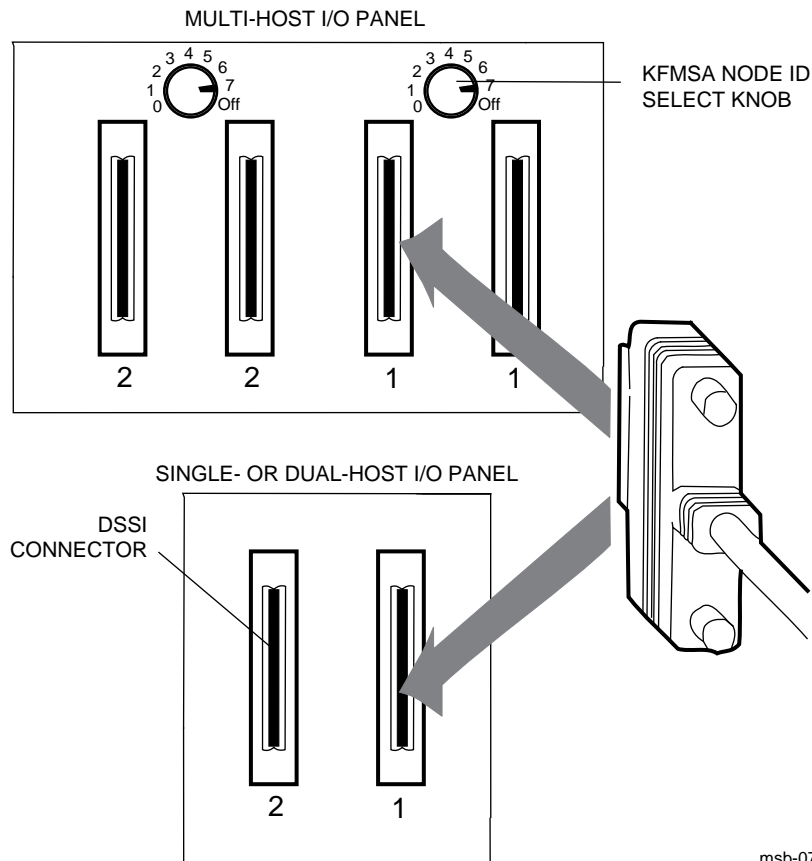
Primary reference: *DSSI VAXcluster Installation Guide*

Secondary reference: *SF2xx Storage Array Installation Guide*
KFMSA Module Installation and User Manual

3.4.7 Cables

Each KFMSA module has two separate DSSI buses (ports) cabled from the XMI backplane. The cable from section D (upper section) is designated as bus 1, and the cable from section E is bus 2. These cables connect to the system I/O bulkhead at a DSSI connector.

Figure 3-11: I/O Ports for DSSI Cables



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The DSSI buses are configured physically by the cable. Check your cables before beginning installation. If you need additional cables, see Table 3–5.

The overall physical bus length is limited. Therefore, systems and devices on the DSSI bus must reside close to each other. One external DSSI cable is required for each bus connection between systems; two cables are required to connect two systems and an SF2xx cabinet.

Table 3–5: KFMSA Options

Option	Board P/N	Contents
KFMSA-AA	T2036-AA	The KFMSA adapter with bus termination on the module; supports single- and dual-host systems.
KFMSA-BA	T2036-BA	The KFMSA adapter with removable termination on the module; supports single-host when termination is present, or multi-host when termination is removed.

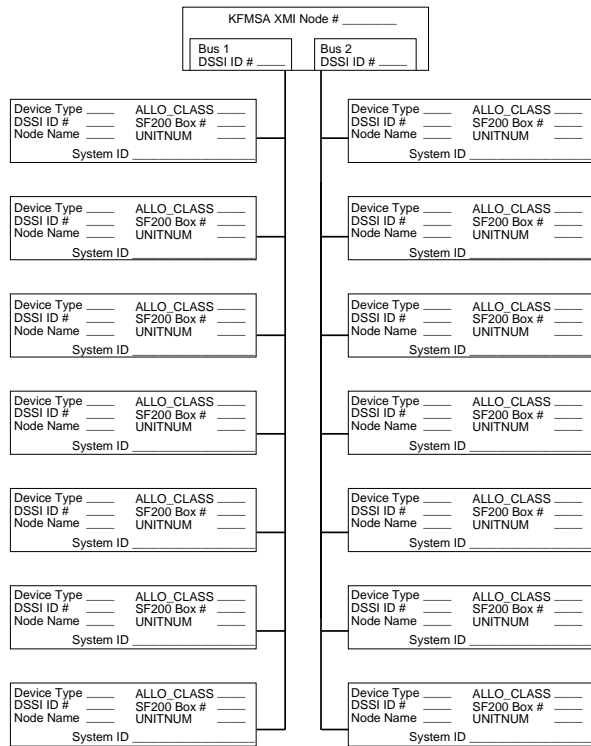
Table 3–6: DSSI Cable Kits

P/N	Qty—Length	Function
CK-SF200-LM	1 108" (2.7m) 1 70" (1.8m)	For VAX to SF connections. Contains two cables (BC21Q-09 and BC21R-5L). One kit is required for each DSSI bus used (maximum of two kits per KFMSA).
CK-KFMSA-LJ	2 48" (1.21m)	Internal cable set, connecting XMI backplane at KFMSA adapter to the I/O bulkhead on the host system. Used when the host is the end node of a DSSI subsystem.
CK-KFMSA-LN	2 48" (1.21m)	Internal cable set, connecting XMI backplane at KFMSA adapter to the I/O bulkhead on tri-host systems. Used when the host is not an end node of a DSSI subsystem.
CK-KFMSA-LR	1 120" (3.04m) 1 48" (1.21m)	Internal cable set, connecting TF85 tape controller and the KFMSA XMI backplane connections to the host I/O bulkhead.

3.5 Configure the DSSI Subsystem

Each component in the DSSI subsystem has an address. Part of the address is determined by cabling the component to a DSSI bus, and part of the address is set during installation. Use a configuration sheet when you are setting parameters (see Figure 3-12).

Figure 3-12: Sample DSSI Configuration Sheet



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To configure a DSSI subsystem, start with a configuration sheet. Appendix D has sheets for single- and dual-host configurations. Record all system information for each ISE as you cable and set the node IDs.

To configure a DSSI VAXcluster, follow this procedure:

1. If you have a dual- or tri-host system, change the node ID of the KFMSA on the second and third host systems.
2. Cable the SF2xx I/O bulkhead to a specific KFMSA (bus 1 or 2).
3. If required, set the ISE node ID using the operator control panel on the SF7x enclosure. The IDs should be factory set to acceptable values already.
4. Run the VAX Diagnostic Supervisor.
5. Run the autosizer.
6. Run the EVCXF diagnostic to confirm all node information.

FOR MORE INFORMATION

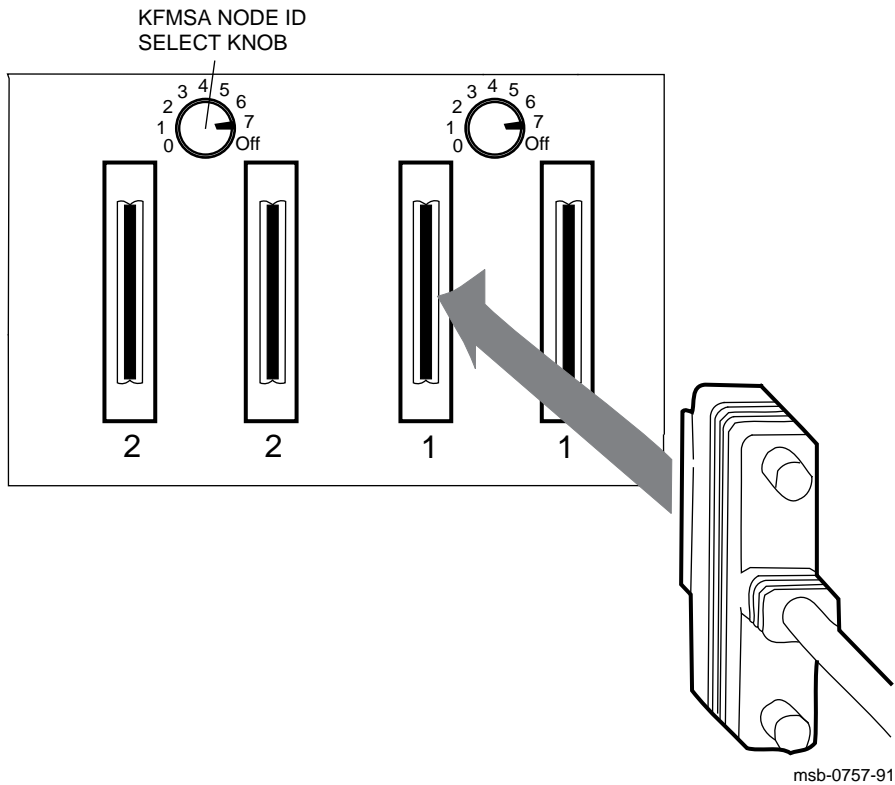
Primary reference: *KFMSA Module Installation and User Manual*

Secondary reference: *SF2xx Storage Array Installation Guide*

3.5.1 Install DSSI Cables to ISEs

Each KFMSA module has two separate DSSI buses (ports). Attach ISEs to the DSSI bus by cabling them to the system I/O bulkhead at the appropriate DSSI connector. Record bus and node ID on configuration sheets. See Figure 3-13.

Figure 3-13: I/O Port for DSSI Cables



1. **XMI Node Number**

Locate the XMI slot of the KFMSA by either looking in the XMI card cage, reading the XMI module use label on the cabinet frame by the card cage, or at the console prompt, issuing a SHOW CONFIGURATION command. The XMI node number and physical slot number are the same.

2. **DSSI Bus Number**

Each KFMSA module has two separate DSSI buses (ports) cabled from XMI backplane sections D and E. The cable from section D (upper section) is designated as bus 1, and the cable from section E is bus 2. Each bus presents a discrete set of registers to the host. For communication to occur, the host software must identify which DSSI bus is attached to which ISE. Use the color-coded labels at each connector end of a cable to make maintenance easier. Record the label colors on the configuration sheet.

When attaching cables to the SF2xx, at the rear of the SF cabinet:

1. Open the door.
2. For each populated bus, install one external cable to one of the KFMSA disk controller ports. DSSI cables are packaged in the bottom of the SF2xx storage cabinet. Tighten the two screws that secure each cable to the I/O panel.
3. If the system has more than one KFMSA adapter, install additional DSSI cables to the I/O panel, as above.

FOR MORE INFORMATION

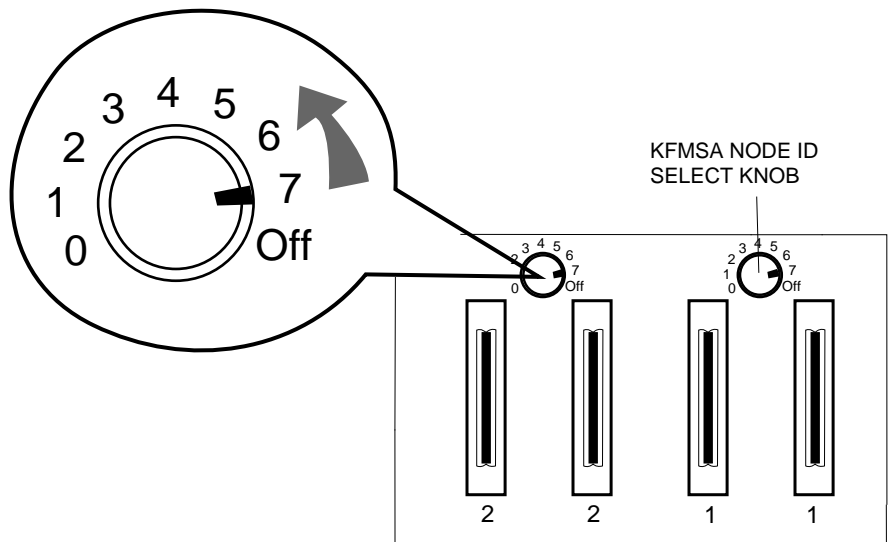
Primary reference: *KFMSA Module Installation and User Manual*

Secondary references: *SF2xx Storage Array Installation Guide*
SF7x Storage Enclosure and SF2xx Storage Array Cabinet Service Guide

3.5.2 Set Node IDs

Node IDs are factory set and usually do not require changing. If required, set the KFMSA node ID on the I/O bulkhead or using the level 3 diagnostic EVCXF. Set the DSSI node IDs for the ISEs using the switches on each SF7x operator control panel. Record the IDs on the configuration sheet.

Figure 3–14: Setting the KFMSA Node ID on the I/O Panel



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The node IDs for KFMSA modules are factory set with both ports having the node ID of 7. KFMSA node IDs for single-host systems do not have to be changed. For a dual-host system, the second host system's KFMSA node ID must be set to 6. On a tri-host system, the third host system's KFMSA node ID must be set to 5.

If the second and third hosts have multi-host I/O panels (as shown in Figure 3-14), use the KFMSA select knob to change the KFMSA node ID. Otherwise, use the diagnostic tool EVCXF described in Section 3.6.3.

If required, set the DSSI node IDs for the ISEs in each SF7x enclosure using the switches on the SF7x operator control panel. A LED display next to the switchpack shows the values selected.

NOTE: *The new ISE node IDs are not in effect until each device is turned off then on (power-cycled). After power-cycling, the node IDs have been changed at the ISE level. To integrate at the system level, run EVCXF under VAX/DS in standalone mode.*

In addition to the physical address requirements, the ISEs and operating system generate additional parameters to communicate with the host: system ID, node name, MSCP/TMSCP unit numbers, allocation class, and force name. See the *KFMSA Module Installation and User Manual* for complete description.

FOR MORE INFORMATION

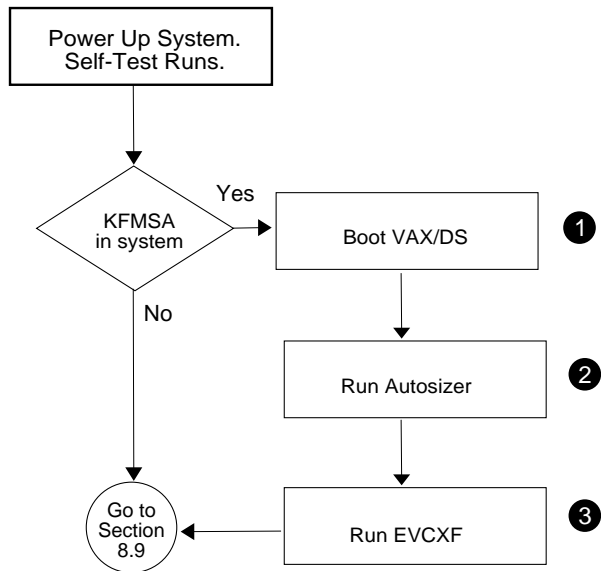
Primary reference: *KFMSA Module Installation and User Manual*

Secondary reference: *SF2xx Storage Array Installation Guide*

3.6 Configure DSSI Subsystem with EVCXF

To configure the ISE devices in software, run VAX/DS, the autosizer, and the EVCXF diagnostic. This must be completed before any CI VAXcluster installation. See Figure 3-15.

Figure 3-15: Verification of the KFMSA



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- ① After self-test ends, configure the DSSI subsystem with software that runs under VAX/DS.
- ② When you run VAX/DS programs, run the autosizer program or an attach sequence for the KFMSA adapters.
- ③ After the autosizer has completed running, run EVCXF to configure the DSSI devices.

FOR MORE INFORMATION

Primary reference: *KFMSA Module Installation and User Manual*

Secondary reference: *SF2xx Storage Array Installation Guide*

3.6.1 Example: Boot the VAX Diagnostic Supervisor

Example 3-1 shows an example of running VAX/DS from the in-cabinet console load device. You must run VAX/DS in standalone mode to run EVCXF.

Example 3-1: Running Standalone VAX/DS

```
>>> BOOT/R5:10 CSA1 ①           ! Enter BOOT command designating the
                                ! CSA1 drive as the input device; /R5:10
                                ! is the boot flag indicating the VAX/DS
                                ! program.

[self-test results print] ②

Loading system software. ③

                                VAX DIAGNOSTIC SOFTWARE
                                PROPERTY OF
                                DIGITAL EQUIPMENT CORPORATION
                                ***CONFIDENTIAL AND PROPRIETARY***

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Copyright, Digital Equipment Corporation, 1991. All Rights Reserved.

DIAGNOSTIC SUPERVISOR. ZZ-EXSAA-X14.7-001 31-DEC-1991 00:00:14

DS> ④                           ! System boots VAX/DS
                                ! and displays banner.
```

Run VAX/DS in standalone mode. EVCXF is run only in standalone mode because it is a level 3 diagnostic.

In this example the diagnostic tape containing the VAX/DS program was loaded into the console tape drive. To run VAX/DS from an InfoServer, refer to Sections 8.6.1 and 8.6.2 for instructions on loading and booting from a CD.

- 1 At the console prompt, boot VAX/DS from tape as shown in Example 3–1 using the command:

```
BOOT /R5:10 CSA1
```

where CSA1 is the name for the console tape drive, and /R5:10 is the boot flag designating the VAX/DS program.

- 2 The system executes self-test and reports results.
- 3 Next, VAX/DS is loaded and the program banner appears.
- 4 The VAX/DS prompt indicates that the Diagnostic Supervisor has been successfully loaded.

Table 3–7: VAX/DS File Names

Model Number	File Name
Model 600	EXSAA
Model 500	EMSAA
Model 400	ERSAA
Model 300	ELSAA

3.6.2 Example: Run the Autosizer

Example 3-2 shows running the autosizer program EVSBA. Certain conditions cause the generation of an unexpected trap or interrupt. The method shown avoids these conditions.

Example 3-2: Running the Autosizer

```
DS> RUN EVSBA ①
*****
                Copyright Digital Equipment Corporation
                1981, 1989, 1990, 1991.
                All Rights Reserved.
*****
.. Program: EVSBA - AUTOSIZER level 3, revision 7.65, 3 tests
   at 00:00:31.51.

.. End of run, 0 errors detected, pass count is 1,
   time is 31-DEC-1991 00:03:03.76

DS> SEL ALL ②                ! Program attaches all devices.
DS> SHOW SELECT                ! Program lists all attached devices.

_PAA0 KFMSA HUB 61880000 ③
      XMI Node Number (1 to E)=00000001(X) PORT Number (1,2)=00000001(X)
  _DIA1 RF72  _PAA0 61880000 DSSI NODE (0 - 7)=1.
  _DIA2 RF72  _PAA0 61880000 DSSI NODE (0 - 7)=2.
  _DIA3 RF72  _PAA0 61880000 DSSI NODE (0 - 7)=3.
  _DIA4 RF72  _PAA0 61880000 DSSI NODE (0 - 7)=4.

_PAB0 KFMSA HUB 61880000 ③
      XMI Node Number (1 to E)=00000001(X) PORT Number (1,2)=00000002(X)
  _DIA1 RF72  _PAB0 61880000 DSSI NODE (0 - 7)=1.
  _DIA2 RF72  _PAB0 61880000 DSSI NODE (0 - 7)=2.
  _DIA3 RF72  _PAB0 61880000 DSSI NODE (0 - 7)=3.
  _DIA4 RF72  _PAB0 61880000 DSSI NODE (0 - 7)=4.

_PAC0 KFMSA HUB 61900000 ④
      XMI Node Number (1 to E)=00000002(X) PORT Number (1,2)=00000001(X)
_PAD0 KFMSA HUB 61900000 ④
      XMI Node Number (1 to E)=00000002(X) PORT Number (1,2)=00000002(X)
```


The autosizer program EVSBA takes several minutes to execute, but will save you time as you proceed with other tests.

- ① Run EVSBA to identify the hardware on your system and build a database for VAX/DS. The autosizer eliminates the need for you to type in the name and characteristics of the hardware you intend to test under VAX/DS with level 3 diagnostic programs. A run of EVSBA can require 2 to 3 minutes. See Example 3-2.
- ② Select all devices.
- ③ You can issue a SHOW SELECT command. Here, a partial listing shows what information is reported on KFMSA devices. This system has two KFMSAs attached, with RF devices configured on the first KFMSA.
- ④ In this example, the second KFMSA is empty. You would encounter this example when a KFMSA has not been cabled to ISEs or problems exist on the bus. In this example the cables were loose on these buses; the operator reseated the cables and ran the software again. All ISEs were shown.

3.6.3 Example: Run EVCXF

Example 3-3 shows the EVCXF program configuring the storage devices connected to the KFMSA. The program prompts you for information needed to complete the installation. Run EVCXF after booting VAX/DS and the autosizer.

Example 3-3: Running EVCXF

```
DS> LOAD EVCXF ①

[banner prints]

DS> ST/SEC=TEST2 ②

.. Program: ZZ-EVCXF DSSI Configuration & DUP Diagnostic,
   revision 1.2, 4 tests, at 00:05:04.12.
Testing: _PAA0 _PAB0 _PAC0 _PAD0

Initiating KFMSA self-test, wait 10 seconds... ③

Initiating KFMSA self-test, wait 10 seconds... ③

CONFIG> SIZE ④
DSSI sizing underway, please wait...

DSSI ID   XMI node 04   XMI node 04   XMI node 05   XMI node 05 ⑤
          Bus 1/UUN   Bus 2/UUN   Bus 1/UUN   Bus 2/UUN
0         *****   *****           TF857 ⑥   *****
1         RF72    1     RF72    5     *****   *****
2         RF72    2     RF72    6     *****   *****
3         RF72    3     RF72    7     *****   *****
4         RF72    4     RF72    8     RF72    9     *****
5         *****   *****   *****   *****
6         *****   *****   *****   *****
7         KFMSA    KFMSA    KFMSA    KFMSA
```

The VAX 6000 diagnostic media includes the EVCXF test. The customer version of the program EVCXF is EXCXE, which has reduced tests. When installing, use the EVCXF which has the full suite of tests.

This example shows eight RF disks in SF7x enclosures in an SF2xx cabinet, configured to two KFMSAs using only three of the four DSSI buses available.

- ❶ Load EVCXF; the program's banner is displayed.
- ❷ Enter the START/SECTION=TEST2 command. If you enter HELP at the DS> prompt, all available commands will be displayed for you.
- ❸ The system initiates self-test on each KFMSA. In this example, two KFMSAs are installed. The program prints this message as each KFMSA begins its self-test.
- ❹ Enter the SIZE command.
- ❺ When sizing is complete, the program prints out this listing of all attached devices. Check the DSSI node IDs against those you set and recorded on your configuration sheets.
- ❻ If a device is missing from the printout, or does not appear where you expect it, check the cabling and the node ID setting, and then reissue the SIZE command.

In this example, the first time the diagnostic was run the operator expected to see a TF857 in this spot. None appeared. A cable connection was tightened, the command reissued, and the TF appeared here in the display.

FOR MORE INFORMATION

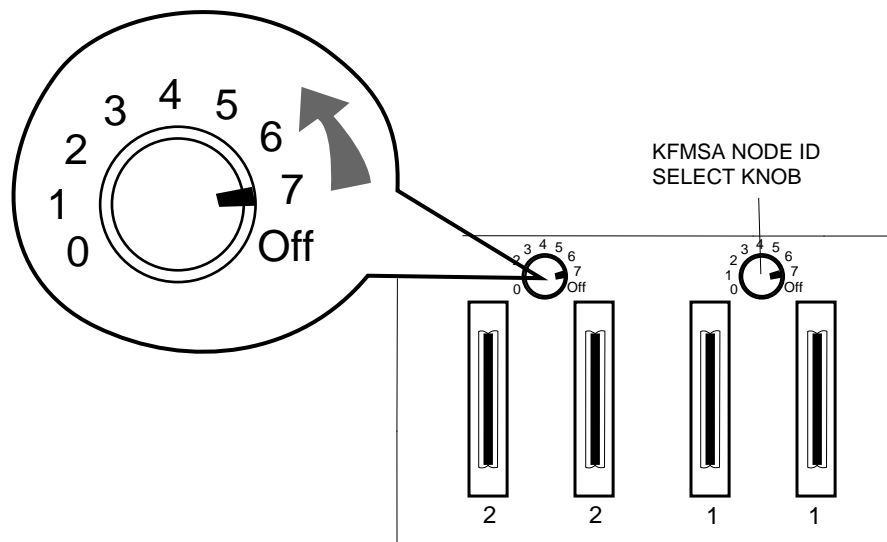
Primary reference: *KFMSA Module Installation and User Manual*

Secondary reference: *SF2xx Storage Array Installation Guide*

3.6.4 Example: Changing the KFMSA Node ID at the I/O Panel

KFMSA node IDs are factory set to 7. In dual- and tri-host systems, you must change the second host system's ID to 6, and the third host system's KFMSA ID to 5. If you have a multi-host I/O panel, change the IDs using the KFMSA node select knob (see Figure 3-16). Otherwise, use EVCXF (see Example 3-4).

Figure 3-16: Changing the KFMSA Node ID at the I/O Panel



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Figure 3–16 shows the multi-host I/O panel. At the I/O bulkhead of the host system whose KFMSA node ID you need to change, turn the KFMSA node ID select knob to the new ID number. The I/O panel's ID input has priority over any software changes. If you have access to a multi-host I/O panel, change the second host's KFMSA node ID to 6 and the third host ID to 5. Usually, both buses for each KFMSA are set to the same node ID.

If your system does not have a multi-host I/O panel, change the node ID using EVCXF (see Section 3.6.5).

FOR MORE INFORMATION

Primary reference: *KFMSA Module Installation and User Manual*

Secondary reference: *SF2xx Storage Array Installation Guide*

3.6.5 Example: Changing the KFMSA Node ID with EVCXF

In dual- and tri-host systems, you must change the second host system's ID to 6, and the third host system's KFMSA ID to 5. If you have a multi-host I/O panel, change the IDs using the KFMSA node select knob (see Figure 3-16). Otherwise, use EVCXF (see Example 3-4).

Example 3-4: Changing KFMSA Node ID with EVCXF

[Continuing from Example 3-3, EVCXF is still running.]

DS> ! VAX/DS prompt returns

DS> SET NODEID XMI NODE 5, ① DSSI BUS 1, ② NEW DSSI NODE ID 6 ③

DS> SET NODEID XMI NODE 5, DSSI BUS 2, ④ NEW DSSI NODE ID 6

Run the VAX Diagnostic Supervisor, and then load and run EVCXF. Enter the `START/SECTION=TEST2` and the `SIZE` commands, as shown in Example 3-3. Then proceed to change the node ID with the information as shown in Example 3-4 with the command string

```
DS> SET NODEID XMI NODE 5, DSSI BUS 1, NEW DSSI NODE ID 6
```

where:

- ❶ 5 is the XMI node and slot where the KFMSA resides that is going to have its node ID changed.
- ❷ 1 is the bus on the KFMSA whose node ID is going to be changed
- ❸ 6 is the new value being entered for the node ID of bus 1 on the KFMSA residing in XMI slot 5.
- ❹ This string repeats the node ID change to 6 for bus 2 on the same KFMSA.

FOR MORE INFORMATION

Primary reference: *KFMSA Module Installation and User Manual*

Secondary reference: *SF2xx Storage Array Installation Guide*

Chapter 4

Connecting to a CI VAXcluster

VAX 6000 series systems interface with various devices and systems through XMI bus adapters. For information on connecting to TU, TK, and TA tapes, or RA disks, see Chapter 5. If your system connects to a DSSI subsystem, this installation must be done before the CI connections (see Chapter 3).

Sections in this chapter include:

- Adapter Overview
- CIXCD Installation Configuration Rules
- Setting CIXCD Parameters
 - Setting the VAXcluster Node Address (Mandatory)
 - Verify Quiet Slot DELTA Time = 10 (Mandatory)
 - Setting Boot Time (Optional)
 - Setting Extend Header, ACK Timeout, and Disable Arbitration (Optional)
 - Setting Cluster Size (Optional)
- Setting CIBCA Parameters
 - Setting the VAXcluster Node Address (Mandatory)
 - CIBCA Jumper Locations and Settings
- Cabling the System to a Star Coupler (SC008)

4.1 CI Adapter Overview

The system can connect to a cluster using one of two adapters: the CIXCD connects through the XMI bus, and the CIBCA connects to a cluster through the VAXBI bus. The CIXCD and the CIBCA require some XMI backplane jumper selections to configure to a cluster.

Figure 4-1: Adapters

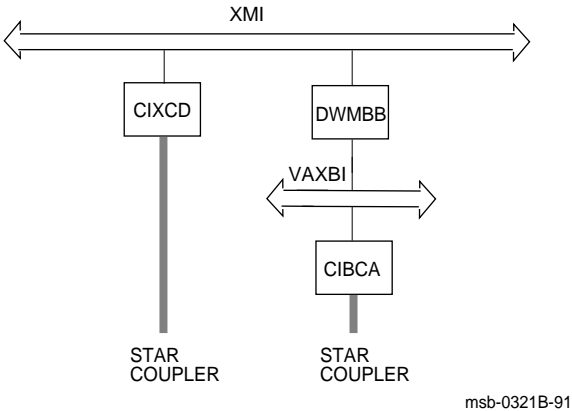


Figure 4–1 shows the options for connecting to a CI. You can use a CIXCD adapter from the XMI bus or a CIBCA adapter off the optional VAXBI bus.

When you connect to a CI using either adapter, you must set the VAXcluster node address for the system you are connecting. In addition, when you connect using a CIXCD, you must set the Quiet Slot DELTA Time to 10 on **all** systems (see Section 4.3.2).

Table 4–1 lists the adapters used in connecting to a CI.

Table 4–1: Adapters for CI Connection

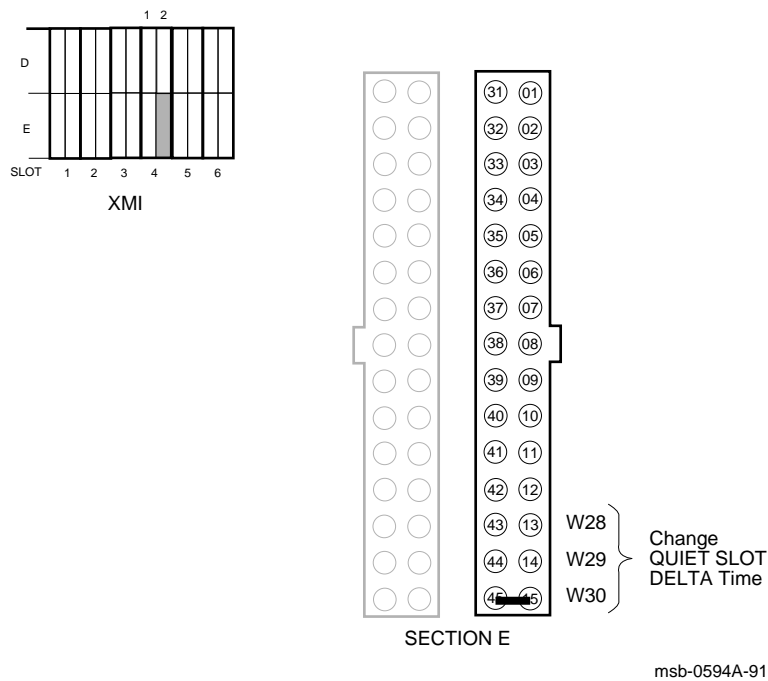
Adapter	Standard or Optional	Function
CIXCD	O	XMI-to-CI interface
CIBCA ¹	O	VAXBI-to-CI interface

¹The CIBCA resides on the VAXBI bus (see Figure 4–1). The DWMBB adapter connects the VAXBI and XMI buses and is a two-module set. The DWMBB/A is in the XMI card cage; the DWMBB/B is in the VAXBI card cage.

4.2 CIXCD Installation Configuration Rules

If you are installing a CIXCD adapter, follow these configuration rules for the HSC, adapters on other CI nodes, and for the CIXCD itself. The key parameter is Quiet Slot DELTA Time; you must use jumpers or switches to set this parameter to 10, rather than accepting the default value of 7.

Figure 4-2: CIXCD Jumper to Set Quiet Slot DELTA Time to 10



To install a system with a CIXCD adapter into an existing cluster, there are mandatory steps. The first four steps apply to the VAXcluster configuration.

1. Ensure that the LINK module on the HSC has a Quiet Slot DELTA Time of 10.

If it does not, you must change it to 10 using a switch, wire, or board replacement and switch, depending on the model of the HSC. Check the *HSC Installation Guide* for details.

2. Set the Quiet Slot DELTA Time to 10 on all nodes installed on the cluster.

Every other CI node must have Quiet Slot DELTA Time set to 10. For systems connected with CIBCA adapters, you install a jumper on the VAXBI backplane similar to the CIXCD's XMI backplane jumper. See the Section 4.3 or refer to the *CIBCA User Guide*.

3. Check that the VMS version running on all nodes is compatible with the new version of VMS being installed.

Check the VMS versions against the *Software Product Description* (SPD), or the required VMS version for your system.

4. Check the HSC microcode and LINK module against required versions in the Cluster Revision Matrix.

Update to the required version level as needed.

5. Set the Quiet Slot DELTA Time on the CIXCD to 10. Install a jumper between pins E15 and E45 on the XMI backplane's CIXCD segment. The Quiet Slot DELTA time must be set to 10 on all systems in the cluster. See Section 4.3.2 and Figure 4-5.

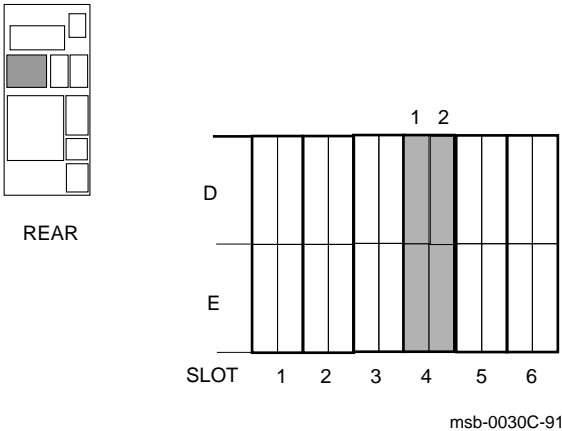
CAUTION: *Failure to follow these configuration rules may result in unreliable operation.*

4.3 Setting CIXCD Parameters

To set parameters for the CIXCD (XMI-to-CI VAXcluster) adapter to other than default values, you must install jumpers on the backplane. Note that the jumpers are only placed in segments D2 and E2.

If you are setting parameters for the CIBCA adapter, go to Section 4.4.

Figure 4-3: XMI Backplane Segments D and E



Refer to Figure 4-4 to determine which jumper corresponds to which backplane pin. The XMI backplane pin numbering is exactly the same as the VAXBI backplane pin numbering. There are 29 possible pins that may need jumpers on the backplane, in sections D and E. The corresponding jumpers are denoted W1 through W30, with W9 being reserved.

The module functions that must be modified by jumper placement are the following:

- Set CI port address (**mandatory**)
- Set Quiet Slot DELTA Time to 10 (**mandatory**)

In addition, you can modify the following characteristics:

- Boot time
- Disable arbitration
- Extend header
- Cluster size
- Extend ACK timeout

The general procedure for installing jumpers is as follows:

1. Open the rear cabinet door.
2. Find the XMI backplane slot corresponding to the CIXCD module. The internal cables are connected to the pins on the leftmost section of the module as seen from the rear. The jumpers are installed on the pins of the rightmost segment of the module.
3. Insert jumpers between backplane pins to set the desired module parameters. Specific pins for desired parameters are described in sections that follow.
4. Close the cabinet door.

You cannot use the default configuration. You must change the Quiet Slot DELTA Time to 10. The default configuration for a system with no jumpers installed would be:

- CI Node Address = 0
- Quiet Slot DELTA Time is at 7,
and must be set to 10 on all systems in the cluster
- Boot Time = 1500 seconds
- Normal CI Arbitration
- Normal Header systems in the cluster
- Cluster Size = 16
- Short ACK Timeout

4.3.1 Setting the VAXcluster Node Address (Mandatory)

The CI port address is obtained from the CIXCD port adapter module's backplane slot, with both the CI port address and its complement configured exactly the same. To configure the jumpers for the port address, see Table 4-2 and Table 4-3.

Figure 4-4: Jumper Locations for CI Port Address

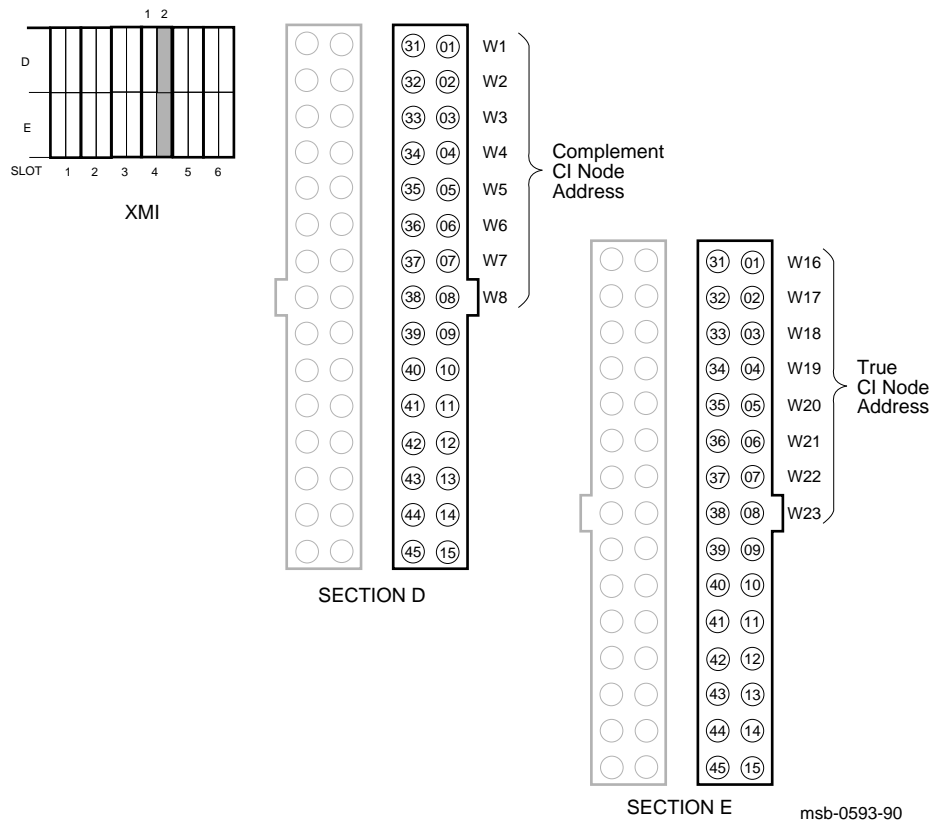


Table 4–2: CI Port True Address

CI Node Addr(10)	W16 E1/31	W17 E2/32	W18 E3/33	W19 E4/34	W20 E5/35	W21 E6/36	W22 E7/37	W23 E8/38
0	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT
1	OUT	OUT	OUT	OUT	OUT	OUT	OUT	IN
2	OUT	OUT	OUT	OUT	OUT	OUT	IN	OUT
.					.			
.					.			
.					.			
223	IN	IN	OUT	IN	IN	IN	IN	IN

Table 4–3: CI Port Complement Address

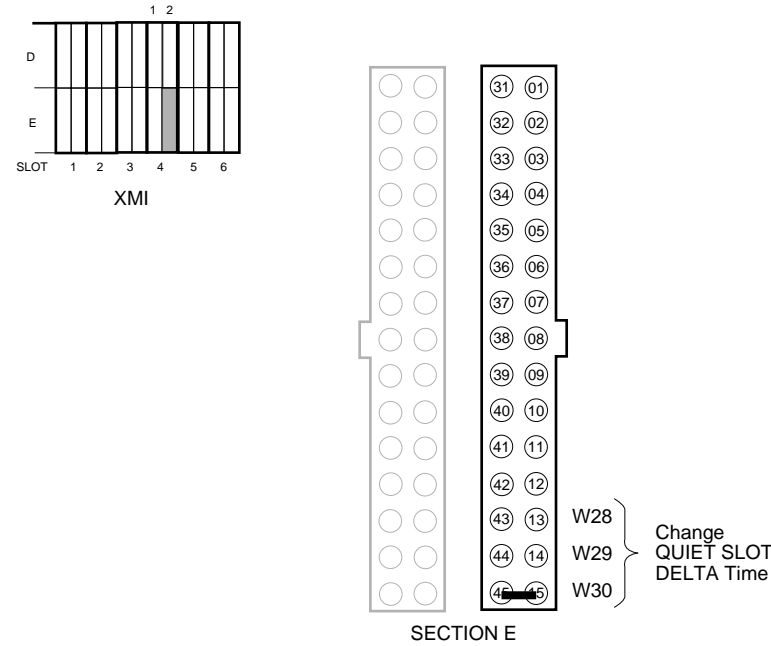
CI Node Addr(10)	W1 D1/31	W2 D2/32	W3 D3/33	W4 D4/34	W5 D5/35	W6 D6/36	W7 D7/37	W8 E8/38
0	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT
1	OUT	OUT	OUT	OUT	OUT	OUT	OUT	IN
2	OUT	OUT	OUT	OUT	OUT	OUT	IN	OUT
.					.			
.					.			
.					.			
223	IN	IN	OUT	IN	IN	IN	IN	IN

NOTE: *CI node addresses 224 through 255 are reserved for Digital.*

4.3.2 Verify Quiet Slot DELTA Time = 10 (Mandatory)

The Quiet Slot DELTA Time must be set to 10. Check the backplane at segment E. Jumper these pins if they are not already jumpered. These bits force the LINK module to increase the basic Quiet Slot DELTA Time. See Table 4-4.

Figure 4-5: Set Quiet Slot DELTA Time Jumpers



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NOTE: *The Quiet Slot DELTA Time must be set to 10 on all systems in a cluster when any one system uses a CIXCD adapter. This is required.*

For new systems just being installed, manufacturing should have jumpered pins E45 and E15. Check the backplane at segment E. Jumper these pins if they are not already jumpered.

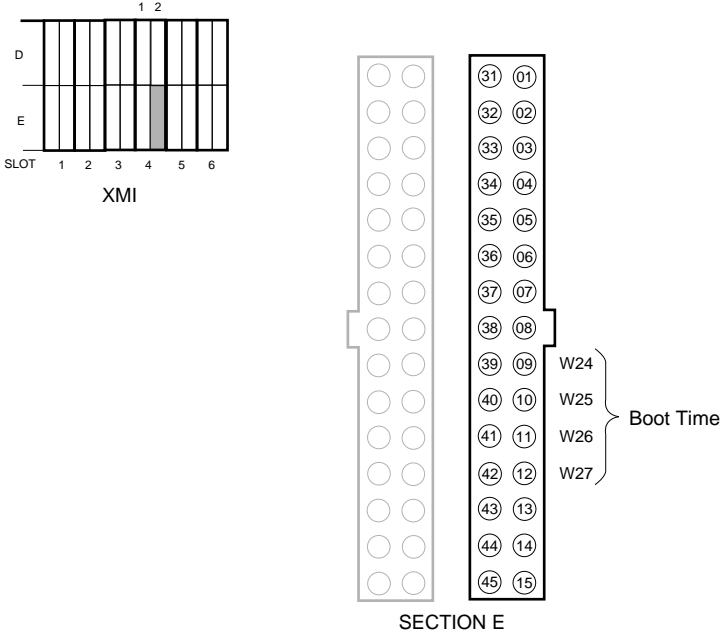
Table 4–4: Quiet Slot Time Backplane Jumpers

Quiet Slot Count	W28 E13/43	W29 E14/44	W30 E15/45
7	OUT	OUT	OUT
10	OUT	OUT	IN
Reserved	OUT	IN	OUT
Reserved	OUT	IN	IN
Reserved	IN	OUT	OUT
Reserved	IN	OUT	IN
Reserved	IN	IN	OUT
Programmable	IN	IN	IN

4.3.3 Setting Boot Time (Optional)

Boot time is the length of time the port waits after power-up to exit the UNINIT state. See Table 4-5. The default setting has all jumpers set to out, with 1500 seconds as the boot time.

Figure 4-6: Jumper Locations for Boot Time



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The default boot time is 1500 seconds.

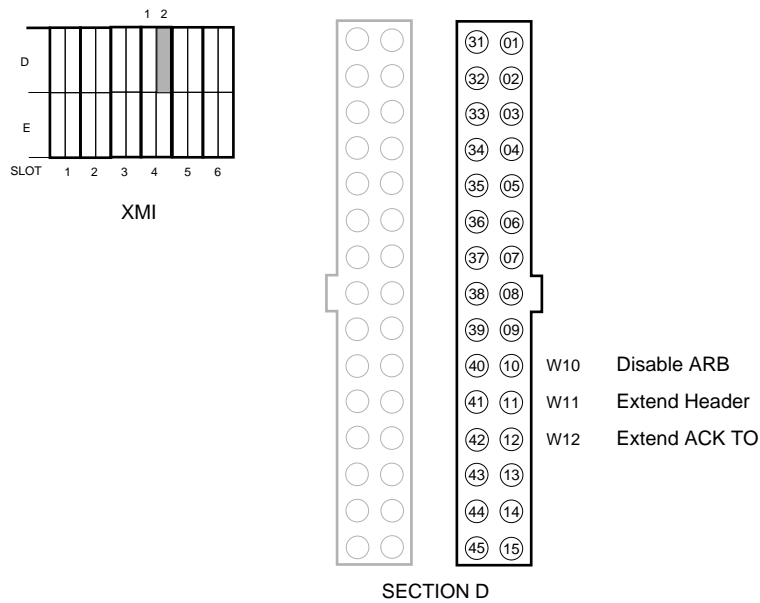
Table 4–5: Boot Time Backplane Jumpers

Time (seconds)	W24 E9/39	W25 E10/40	W26 E11/41	W27 E12/42
1500	OUT	OUT	OUT	OUT
1400	OUT	OUT	OUT	IN
1300	OUT	OUT	IN	OUT
1200	OUT	OUT	IN	IN
1100	OUT	IN	OUT	OUT
1000	OUT	IN	OUT	IN
0900	OUT	IN	IN	OUT
0800	OUT	IN	IN	IN
0700	IN	OUT	OUT	OUT
0600	IN	OUT	OUT	IN
0500	IN	OUT	IN	OUT
0400	IN	OUT	IN	IN
0300	IN	IN	OUT	OUT
0200	IN	IN	OUT	IN
0100	IN	IN	IN	OUT
0000	IN	IN	IN	IN

4.3.4 Setting Extend Header, ACK Timeout, and Disable Arbitration (Optional)

Each of these parameters is set by the absence or presence of a single jumper. The specific jumpers are detailed in this module.

Figure 4-7: Jumper Pins for Extend Header, Extend ACK Timeout, and Disable Arbitration



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Extend Header Selection

Jumper W11 (D11/41) controls the extend header bit, which when set, allows the LINK module to extend the number of bit-synchronous characters in the header.

Jumper OUT	=	Normal header (default)
Jumper IN	=	Extended header

Extend ACK Timeout Selection

The extend ACK timeout bit forces the LINK module to increase the timeout period for an ACK return. The jumper representing this bit is W12 (D12/42).

Jumper OUT	=	Short timeout (default)
Jumper IN	=	Long timeout

Disable Arbitration Selection

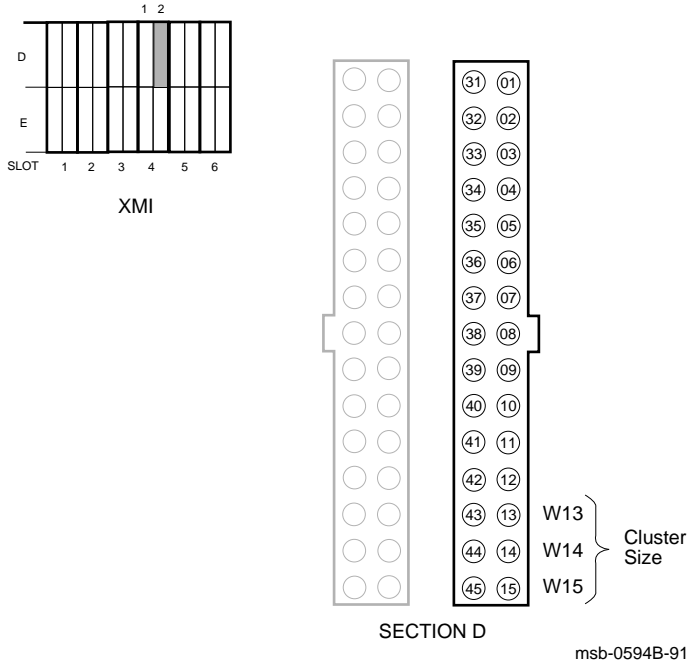
The disable arbitration bit when set, defeats the normal arbitration sequence and allows the LINK module to transmit after waiting only one basic Quiet Slot DELTA Time. The jumper that controls this bit is W10 (D10/40).

Jumper OUT	=	Allow normal CI arbitration (default)
Jumper IN	=	Disable normal CI arbitration

4.3.5 Setting Cluster Size (Optional)

The cluster size bits cause the arbitration logic to arbitrate for more than 16 nodes (which is the default). See Table 4-6.

Figure 4-8: Cluster Size Jumpers



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The default cluster size is 16.

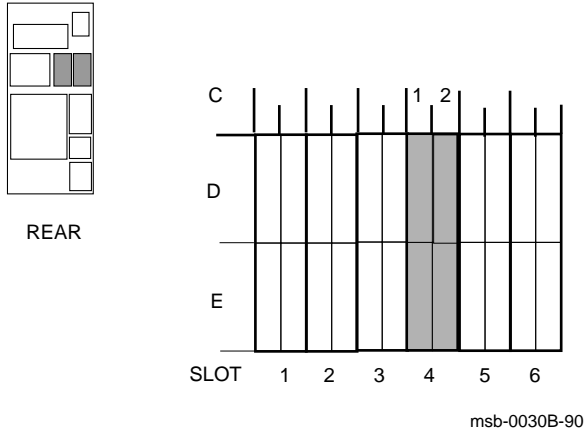
Table 4–6: Cluster Size Backplane Jumpers

Node Count (decimal)	W13 D13/43	W14 D14/44	W15 D15/45
16	OUT	OUT	OUT
32	OUT	OUT	IN
64	OUT	IN	OUT
128	OUT	IN	IN
224	IN	OUT	OUT
Reserved	IN	OUT	IN
Reserved	IN	IN	OUT
Reserved	IN	IN	IN

4.4 Setting CIBCA Parameters

To set the parameters of the CIBCA to other than default values, you must install jumpers on the VAXBI backplane. Refer to Figure 4-11 to determine which jumpers correspond to which backplane pins.

Figure 4-9: VAXBI Backplane Segments D and E



If you will use an XMI adapter for the VAXcluster, go to Section 4.3.

You must set the VAXcluster node address when connecting to a CI. In addition, you can modify the following module functions:

- Boot time
- Disable arbitration
- Extend header
- Alter DELTA time
- Cluster size
- Extend ACK timeout

The general procedure for installing jumpers is as follows:

1. Open the rear cabinet door.
2. Find the VAXBI backplane slot corresponding to the CIBCA controller module (T1045). The two CIBCA modules occupy adjacent slots. The controller module is the leftmost module as seen from the rear.
3. Insert jumpers between backplane pins to set the desired parameters.
4. Close the cabinet door.

A system with no jumpers installed would be configured in the following way:

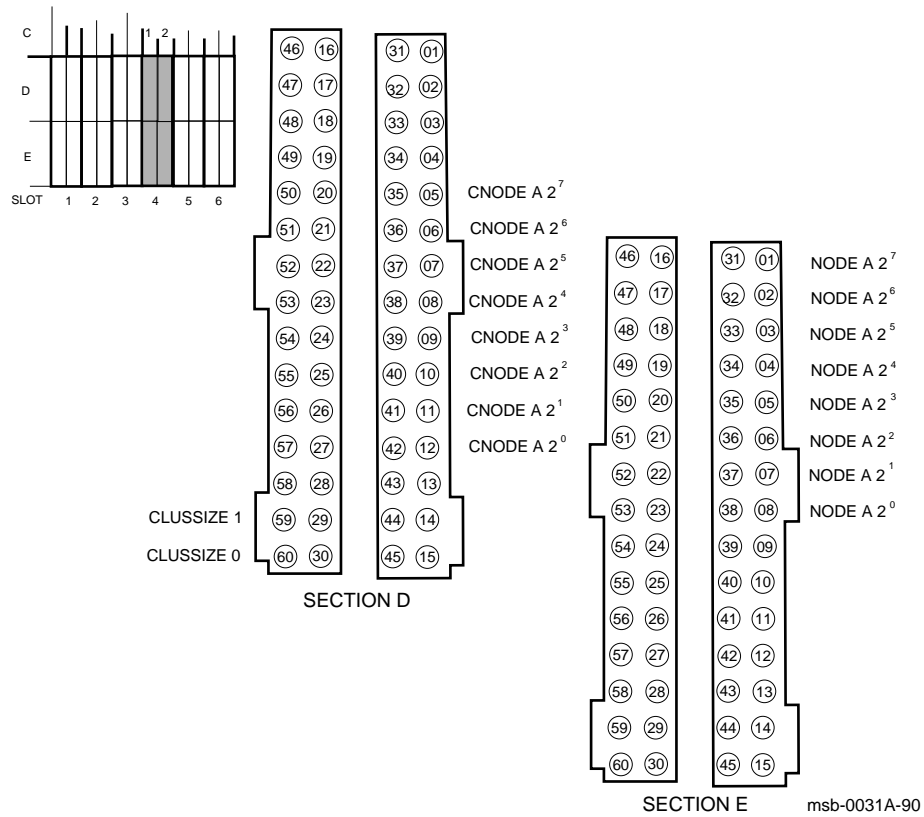
- CI Node Address = 0
- Boot Time = 1500 seconds
- Normal CI Arbitration
- Normal Header
- Quiet Slot DELTA Time = 7
- Cluster Size = 16
- Short ACK Timeout

CAUTION: *Check cluster parameters. If any system in the cluster has Quiet Slot DELTA Time of 10 (such as a system with a CIXCD adapter), you must change this CIBCA's Quiet Slot DELTA Time to 10. Failure to do so may result in unreliable operation.*

4.4.1 Setting the VAXcluster Node Address (Mandatory)

Install jumpers on the VAXBI backplane to set the system's VAXcluster node address. The CIBCA adapter's backplane slot with the address (NODE A) and its complement (CNODE A) determine the address. See Figure 4-10.

Figure 4-10: Address and Address Complement Pins



1. Open the rear cabinet door.
2. Find the VAXBI backplane slot corresponding to the CIBCA controller module (T1045). The two CIBCA modules occupy adjacent slots; the controller module is the leftmost module as seen from the rear. (Typically the controller is in the VAXBI cage on the left, fourth slot from the left as seen from the rear.)
3. Insert jumpers between backplane pins to set the cluster node address, as follows. You set the address twice—once on VAXBI segment D and once on segment E (see Figure 4–9).
4. The address is a binary number, for which you insert a jumper to represent each bit that is "one" (see Figure 4–10).
5. Table 4–7 shows jumper settings for the first 24 node addresses. For example, assume you are installing this VAX 6000 system as VAXcluster node 9 (binary 1001). You would insert jumpers on segment D between pins 9–39 and 12–42. You would also insert jumpers on segment E between pins 5–35 and 8–38.

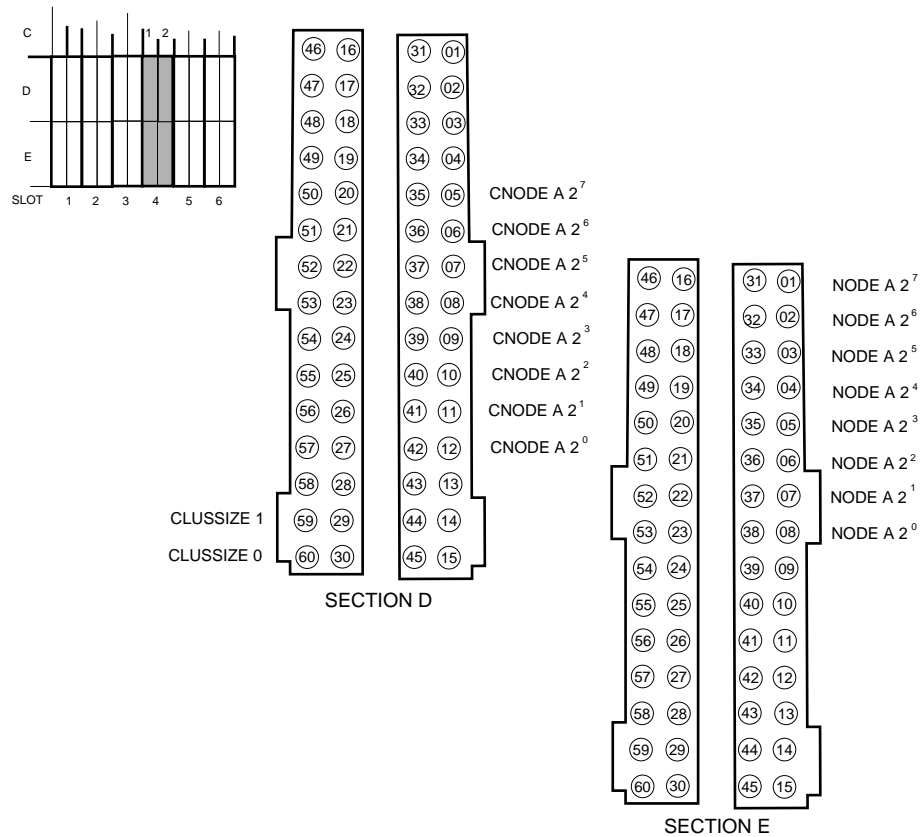
D5-35	D6-36	D7-37	D8-38	D9-39	D10-40	D11-41	D12-42
E1-31	E2-32	E3-33	E4-34	E5-35	E6-36	E7-37	E8-38
OUT	OUT	OUT	OUT	IN	OUT	OUT	IN

6. If there are more than 16 nodes in the VAXcluster, also insert a jumper in D30–D60. You may also need to install additional jumpers for VAXcluster parameters. See the *CIBCA User Guide*.
7. Close the cabinet door.

4.4.2 CIBCA Jumper Locations and Settings

When joining the system to a VAXcluster, see Figure 4-11 and Table 4-7 for CIBCA jumper locations and settings.

Figure 4-11: CIBCA Jumpers on VAXBI Backplane



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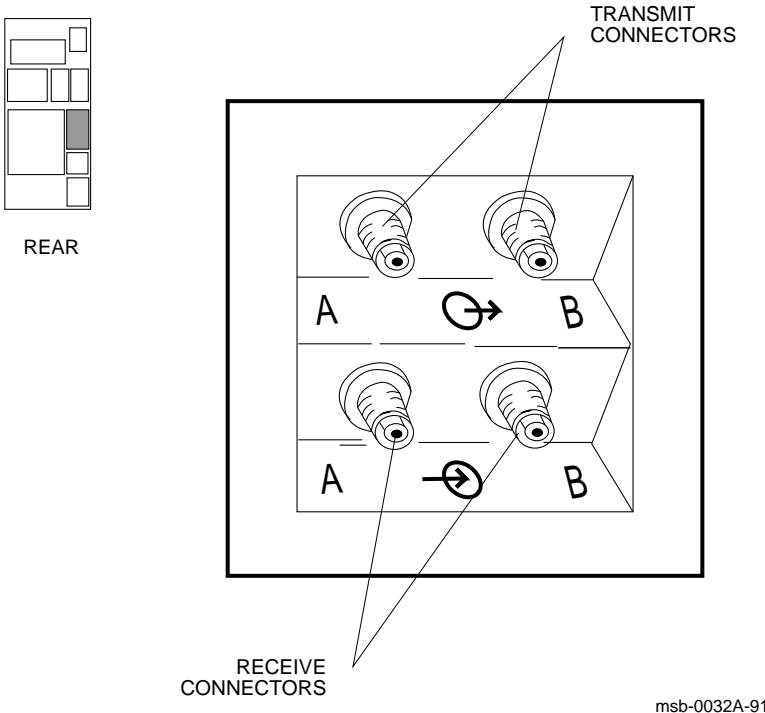
Table 4–7: CIBCA Address Jumpers on VAXBI Backplane

CI Node Address	D5–35 E1–31	D6–36 E2–32	D7–37 E3–E33	D8–38 E4–34	D9–39 E5–35	D10–40 E6–36	D11–41 E7–37	D12–42 E8–38
0	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT
1	OUT	OUT	OUT	OUT	OUT	OUT	OUT	IN
2	OUT	OUT	OUT	OUT	OUT	OUT	IN	OUT
3	OUT	OUT	OUT	OUT	OUT	OUT	IN	IN
4	OUT	OUT	OUT	OUT	OUT	IN	OUT	OUT
5	OUT	OUT	OUT	OUT	OUT	IN	OUT	IN
6	OUT	OUT	OUT	OUT	OUT	IN	IN	OUT
7	OUT	OUT	OUT	OUT	OUT	IN	IN	IN
8	OUT	OUT	OUT	OUT	IN	OUT	OUT	OUT
9	OUT	OUT	OUT	OUT	IN	OUT	OUT	IN
10	OUT	OUT	OUT	OUT	IN	OUT	IN	OUT
11	OUT	OUT	OUT	OUT	IN	OUT	IN	IN
12	OUT	OUT	OUT	OUT	IN	IN	OUT	OUT
13	OUT	OUT	OUT	OUT	IN	IN	OUT	IN
14	OUT	OUT	OUT	OUT	IN	IN	IN	OUT
15	OUT	OUT	OUT	OUT	IN	IN	IN	IN
16	OUT	OUT	OUT	IN	OUT	OUT	OUT	OUT
17	OUT	OUT	OUT	IN	OUT	OUT	OUT	IN
18	OUT	OUT	OUT	IN	OUT	OUT	IN	OUT
19	OUT	OUT	OUT	IN	OUT	OUT	IN	IN
20	OUT	OUT	OUT	IN	OUT	IN	OUT	OUT
21	OUT	OUT	OUT	IN	OUT	IN	OUT	IN
22	OUT	OUT	OUT	IN	OUT	IN	IN	OUT
23	OUT	OUT	OUT	IN	OUT	IN	IN	IN

4.5 Cabling the System to a Star Coupler (SC008)

Attach two pairs of BNCIA cables to the I/O panel allocated for the VAXcluster connection. Figure 4-12 shows the transmit cable connectors and the receive cable connectors on the VAXcluster port.

Figure 4-12: I/O Panel—VAXcluster Port



This procedure applies to all VAX 6000 systems. It does not change if the adapter is in the XMI card cage or the VAXBI card cage.

At the rear of the system cabinet:

1. Open the door.
2. Attach the cables to the VAXcluster port by hand. Screw the TNC type connectors into the receptacles and label the cables.
3. Route the cables to the SC008. See the *SC008 Star Coupler User's Guide* for cable installation instructions.

BNCIA cables can be ordered in three lengths:

- BNCIA-10 (32 feet)
- BNCIA-20 (65 feet)
- BNCIA-45 (145 feet)

Connecting to Tapes and Disks

VAX 6000 systems connect to tape and disk drives using several adapters. This chapter describes connecting to tape or disk using the TBK70, KDB50, KDM70, and KLESI-B adapters. For information on connecting a DSSI subsystem using a KFMSA adapter, see Chapter 3, and for connecting to a CI VAXcluster, see Chapter 4.

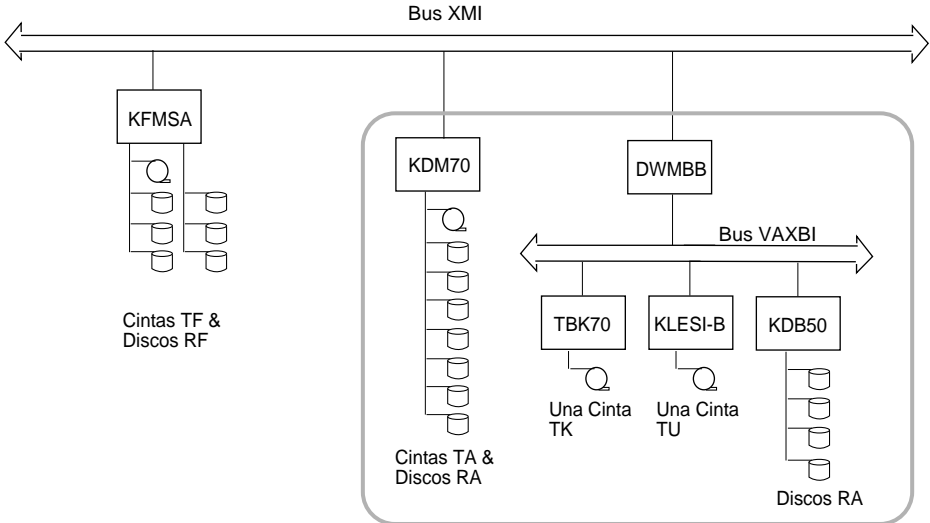
Sections in this chapter include:

- Architecture
- Cabling TU Tape Drives
- Cabling RA Disk or TA Tape Drives

5.1 Architecture

The system can connect to tapes and disks through the XMI bus using the KFMSA and KDM70, and through the VAXBI bus using the TBK70, KLESI-B, or KDB50 adapters. For information on connecting with a KFMSA adapter, see Chapter 3. Figure 5-1 shows the architecture.

Figure 5-1: Architecture



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Systems can include tape or disk drives housed in a sStorage cabinet. Several adapters offer connections to a variety of disks and tapes. Table 5–1 lists adapters and the sections of this book that give their installation instructions. See also Figure 5–1.

Table 5–1: Adapters Connecting Tapes and Disks

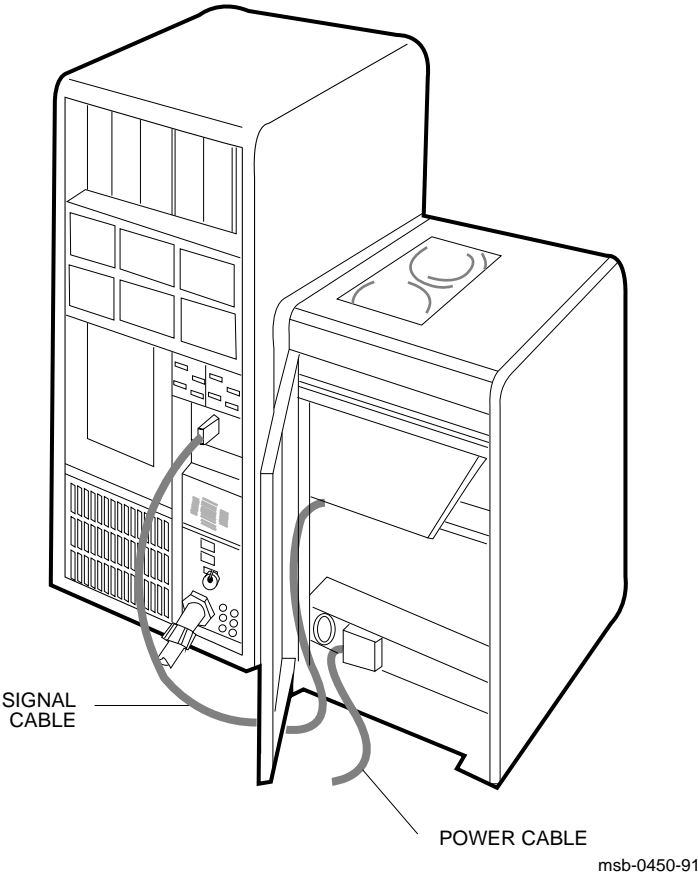
Adapter	Bus	Installation Instructions	Connects to
KDM70	XMI	Section 5.3	TA tape and RA/ESE20 disk drives; a maximum of eight devices with a limit of two tape drives and two ESE20s
KDB50	VAXBI	Section 5.3	Up to four RA disk drives
KFMSA	XMI	Chapter 3	RF disks or SF7x enclosures or TK tapes in SF2xx or system cabinet
KLESI-B	VAXBI	Section 5.2	One TU tape drive
TBK70	VAXBI	—	One TK tape drive in the system cabinet

If your system has in-cabinet storage, no additional cabling is needed.

5.2 Cabling TU Tape Drives

You can cable a TU tape drive to a VAX 6000 system only if the system has a VAXBI card cage and KLESI-B adapter. Figure 5-2 shows the cable connections from the TU tape drive cabinet to the system I/O panel.

Figure 5-2: Tape Subsystem—Interface Cabling



First unpack the TU tape drive cabinet. Then position the TU cabinet next to the system cabinet (the tape cabinet can be positioned on either side of the system cabinet, depending on the customer's configuration). Install the signal cables and power cable.

At the rear of the system cabinet:

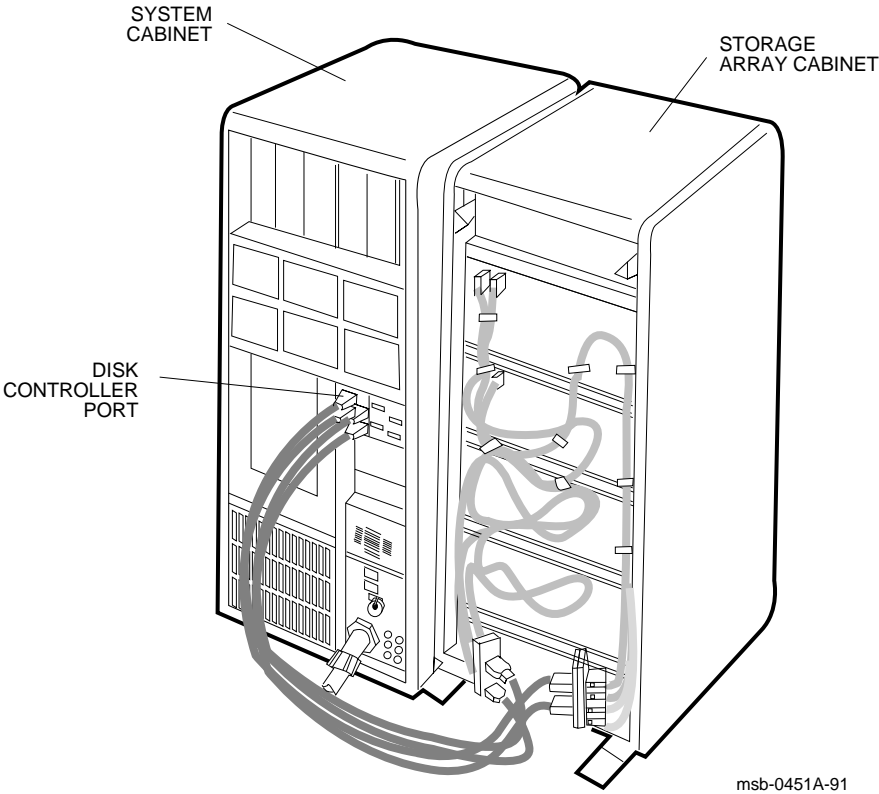
1. Open the door.
2. Insert the tape unit signal cable into the designated I/O panel and secure it with two screws.
3. Plug the tape unit power cord into the appropriate receptacle.
4. Refer to the *TU81/TA81 and TU/81 PLUS Subsystem User's Guide* for operating instructions.

The KLESI-B adapter runs a self-test during power-up. A yellow LED on the module lights to indicate that the module passed self-test. The system self-test display reports the status of all controllers (see Section 7.2 and Section 7.3). For troubleshooting information, refer to the *KLESI-B Module User and Installation Guide*.

5.3 Cabling RA Disk or TA Tape Drives

The KDM70 and KDB50 adapters support RA disk drives. Additionally, the KDM70 can support up to two TA tape drives and up to two ESE20 solid-state disk drives. Figure 5-3 shows the cable connections from the disk cabinet to the system I/O panel.

Figure 5-3: Disk Subsystem—Interface Cabling



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The KDM70 and KDB50 adapters support RA disk drives. The KDM70 can support eight devices, with a maximum of two of these being TA tape drives. The KDB50 supports up to four RA disks. Cabling is the same for both adapters.

At the rear of the main cabinet:

1. Open the door.
2. For each RA or ESE20 disk, install one external SDI cable to one of the disk controller ports (see Figure 5-3). SDI cables are packaged in the bottom of the disk cabinet. Using a small Phillips screwdriver, install the two screws that secure each cable to the I/O panel.

The adapters run self-test during power-up. A yellow LED on the module lights to indicate that the module passed self-test. The system self-test display reports the status of all controllers (see Section 7.2 and Section 7.3). For troubleshooting information, refer to the *KDM70 Controller User Guide* or the *KDB50 Disk Controller User's Guide*.

Chapter 6

Powering Up the System

This chapter provides the power-up procedure for VAX 6000 systems and a functional description of the control panel switches and indicators.

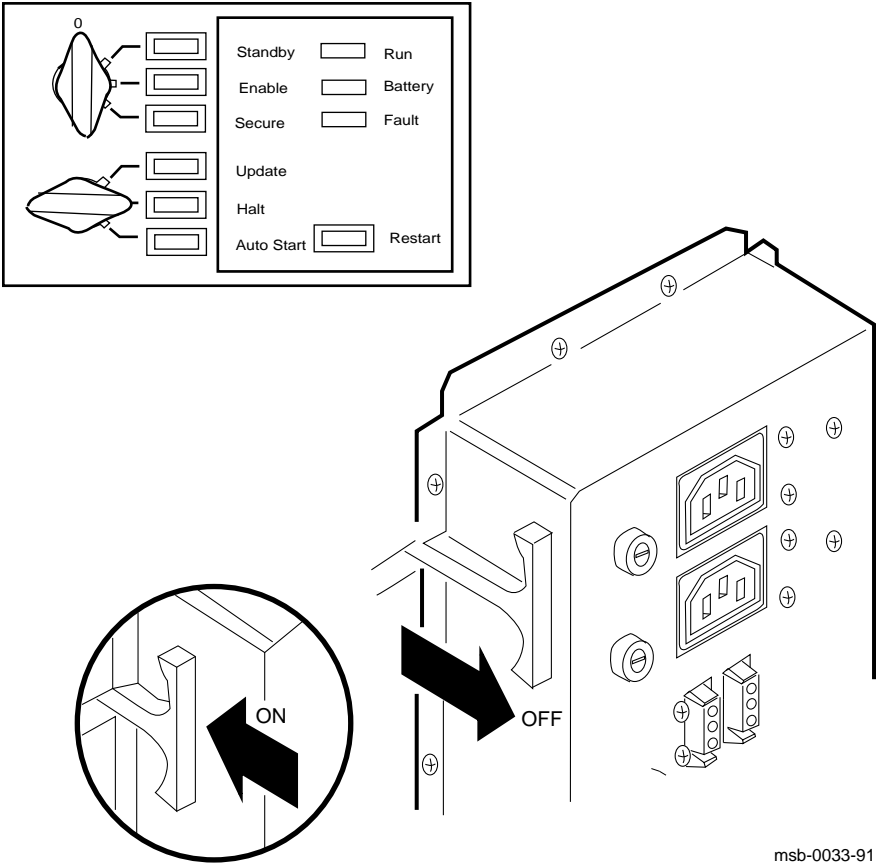
Sections include:

- Prepare the Cabinet
- Check the Transformer (50 Hz Systems Only)
- Check the Power
- Turn on Power and Check Indicators
- Operating the Control Panel
 - Upper and Lower Key Switches
 - Restart Button
 - Status Indicator Lights

6.1 Prepare the Cabinet

Prepare the cabinet for checking system power by verifying that no power is applied to the cabinet.

Figure 6-1: Preparing the System Cabinet



1. Pull out the main circuit breaker T-handle on the H405-E/F AC power controller (see Figure 6-1).
2. At the control panel, turn the upper key switch to 0.
3. Turn the lower key switch to Halt.

The main circuit breaker controls power to the system. For normal operation, the circuit breaker T-handle should be in the On position, which is pressed in. To trip the main circuit breaker, pull the T-handle out.

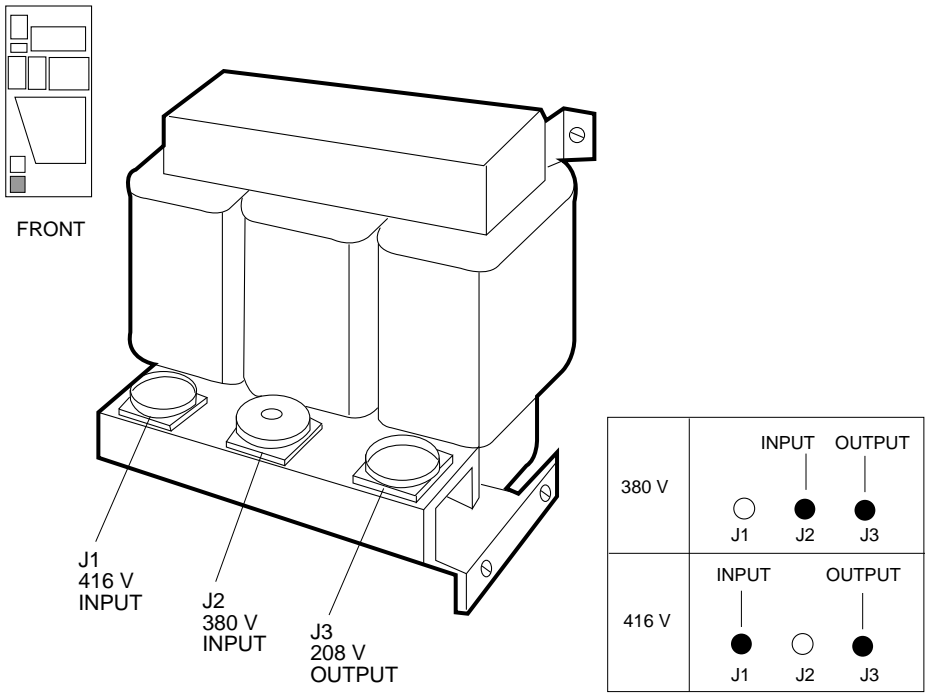
A current overload causes the main circuit breaker to automatically move to the Off position, so that power to the system is turned off.

If an overtemperature condition or an airflow blockage occurs, a contactor in the AC power controller is opened and the system powers down.

6.2 Check the Transformer (50 Hz Systems Only)

For 50 Hz systems only, check that the transformer's power input cable connection matches the customer's power source (380V AC or 416V AC). The transformer is located on the floor of the cabinet, directly below the H7206-B power and logic unit.

Figure 6-2: 50 Hz Transformer Cable Connections



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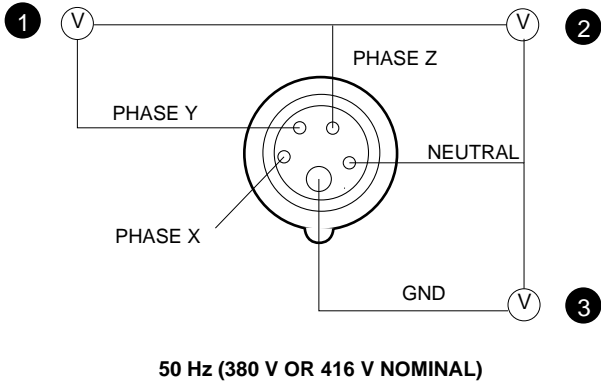
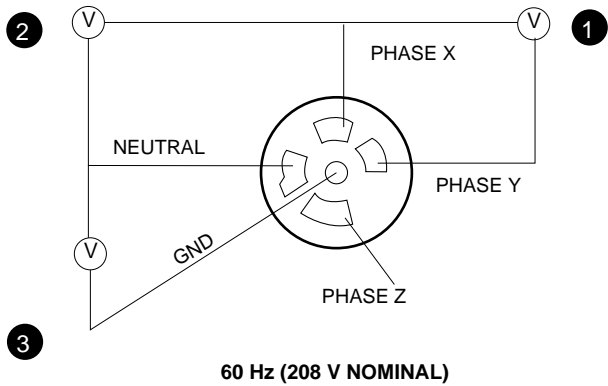
WARNING: *To avoid high voltage shock, a round, threaded cap is provided to cover the unused power input connector. When replacing, rewiring, or reconnecting the transformer, make sure that the cap is properly installed. The cap fits onto either the 380V AC (J2) or the 416V AC (J1) power input connector. Always ensure that power is off and that the power cable is unplugged before working on the transformer.*

1. Open the cabinet front door. Transformer cable connections can be viewed through the open space between the H7206-B power and logic unit and the sheet metal panel below the H7206-B.
2. Visually check to see if the power input cable connection matches the customer's power source (either 380V AC or 416V AC). See Figure 6-2. Complete procedure steps 3 through 6 if the cable requires reconnection.
3. Remove the sheet metal panel located below the H7206-B power and logic unit. Use a flat screwdriver to remove the six screws securing the sheet metal panel.
4. Remove the threaded cap and unplug the power input cable.
5. Reconnect the cable to the correct power input connector and replace the threaded cap on the unused connector.
6. Replace the sheet metal panel.

6.3 Check the Power

With a digital multimeter in the proper range and setting, check power supplied at the installation site.

Figure 6-3: Measuring System Power



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1. Check that the receptacle provided is correct (see Section 1.5).
2. Measure voltages between all three phases, each phase to neutral, and ground to neutral (see Figure 6-3).

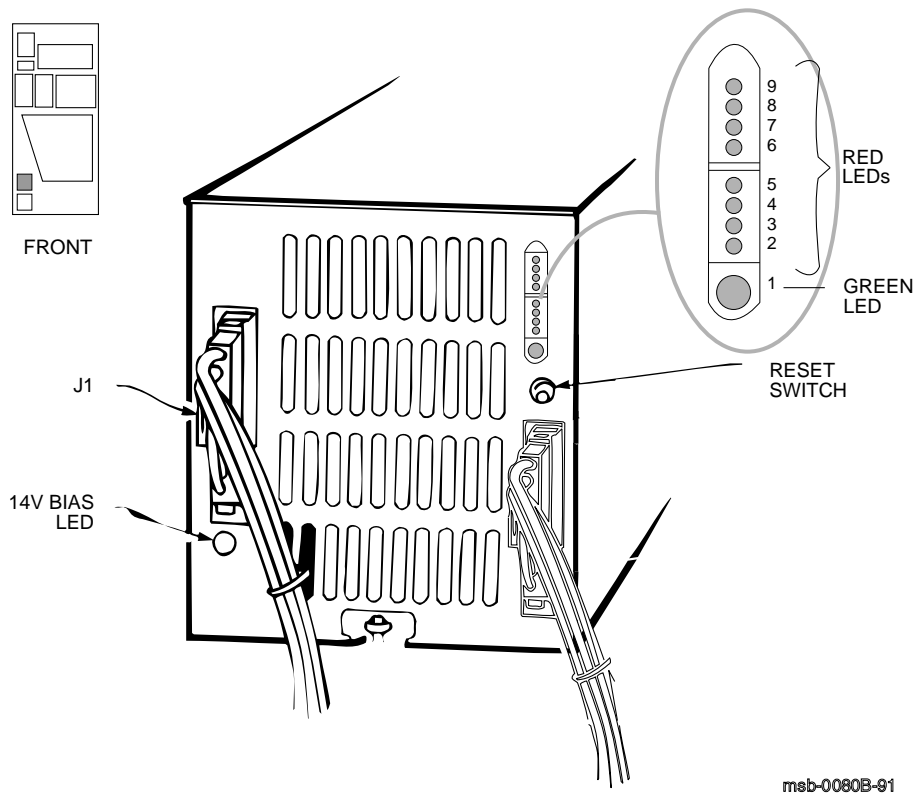
Voltage Measurement	208V Nominal	380V Nominal	416V Nominal
① Phase-to-phase	180–220V	331–407V	360–443V
② Phase-to-neutral	104–128V	190–235V	208–256V
③ Ground-to-neutral	1V maximum	1V maximum	1V maximum

3. Plug the power cord into the receptacle.

6.4 Turn on Power and Check Indicators

Power up the system by pushing in the handle on the H405 power controller (see Figure 6-1). Then monitor the LED indications on the H7206-B power and logic unit.

Figure 6-4: H7206-B Diagnostic LEDs



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The nine LEDs visible through the slot on the H7206-B panel provide fault indications for the power regulators and for certain other faults such as overtemperature.

LEDs 2 through 6 are latching and therefore detect momentary faults. These LEDs are reset to Off by cycling the key switch to Off then back to Standby or Enable. These LEDs can also be reset by pressing and releasing the reset switch located beneath the LED indicators.

If a LED does not turn off after one of these reset procedures, then you have not corrected the problem that is causing the LED to light.

Table 6-1 lists the meaning of each of the indicators.

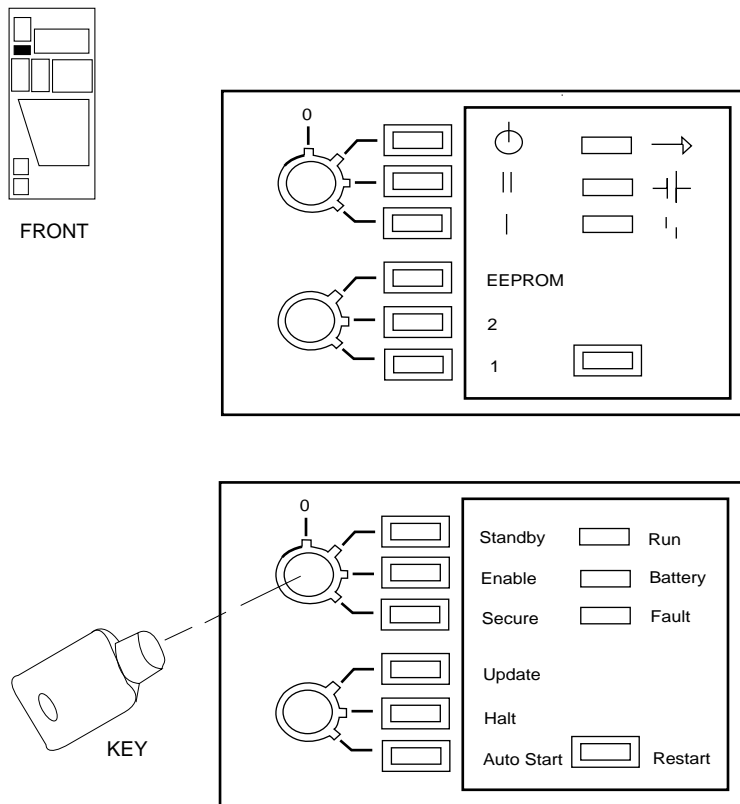
Table 6-1: H7206-B Diagnostic LEDs

LED	Condition	Color	Meaning
1	On	Green	+14V bias is okay
2	On	Red	XMI—H7215 fault
3	On	Red	XMI—H7214 fault
4	On	Red	XMI—H7242 fault
5	On	Red	VAXBI—H7215 fault
6	On	Red	VAXBI—H7214 fault
7	On	Red	H7214 or H7242 installed incorrectly
8	On	Red	XMI-1 module in the XMI-2 card cage
9	On	Red	Fault (airflow, interlock, overtemperature)

6.5 Operating the Control Panel

The control panel, located in the upper left front of the cabinet, contains upper and lower key switches, status lights, and a Restart button. The upper and lower switches are operated by a key.





Figure 6-5: International and English Control Panels



msb-0037A-91

Labels for the control panel's upper and lower key switches can be in English or in international symbols. Figure 6-6 gives the relationship between the international symbols and English equivalents.

Figure 6-6: Control Panel Symbols

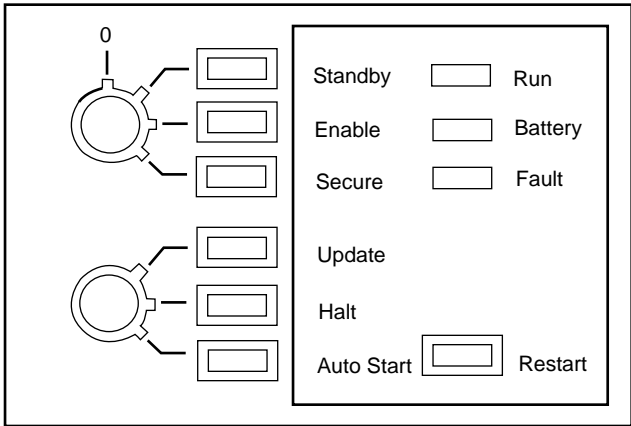
Location	English	International Symbol
Upper key switch	O	O (Off)
	Standby	
	Enable	
	Secure	
Lower key switch	Update	EEPROM
	Halt	2
	Auto Start	1
Status indicators	Run	
	Battery	
	Fault	
Restart button	Restart	(None, blank)

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6.5.1 Upper and Lower Key Switches

The control panel's upper key switch regulates power going into the system. The lower key switch controls system operation.

Figure 6-7: Control Panel Key Switches



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Table 6–2: Upper Key Switch

Position	Effect	Light Color
O (Off)	Removes all power, except to the battery backup unit and optional storage.	No light
Standby	Supplies power to XMI backplane, blowers, and in-cabinet console load device.	Red
Enable	Supplies power to whole system; console terminal is enabled. Used for console mode or restart, and to start self-test.	Yellow
Secure (Normal Position)	Prevents entry to console mode; position used while machine is executing programs. Disables Restart button and causes the lower key switch to have the effect of Auto Start, regardless of its setting.	Green

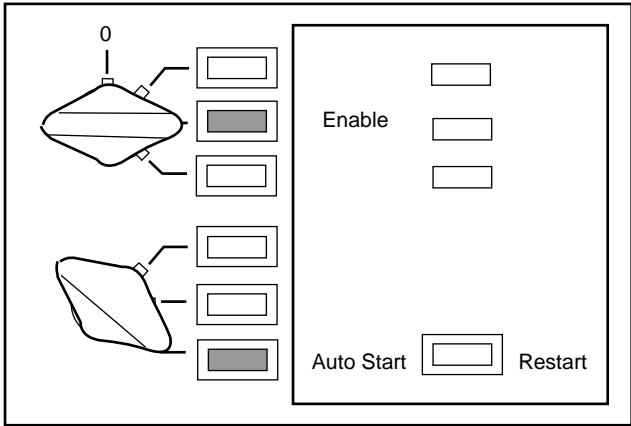
Table 6–3: Lower Key Switch

Position	Effect	Light Color
Update	Enables writing to CPUs and adapters. Halts boot processor in console mode on power-up or when Restart button is pressed. Used for updating parameters stored in EEPROMs, (upper key switch must be set to Enable). Prevents an auto restart.	Red
Halt	Prevents an auto restart if a failure or transient power outage occurs.	Yellow
Auto Start (Normal Position)	Allows restart or reboot. Uses the default boot specification to boot the system from power-up. Used for normal operation of the system.	Green

6.5.2 Restart Button

The **Restart** button begins self-test, reboot, or both depending on the position of the upper and lower key switches.

Figure 6-8: Restart Button



msb-0123-91

The upper key switch controls the effect of the Restart button. If the upper key switch is in the Enable position, the Restart button is operative. If the upper key switch is not in the Enable position, the Restart button is ignored.

Table 6–4: Restart Button

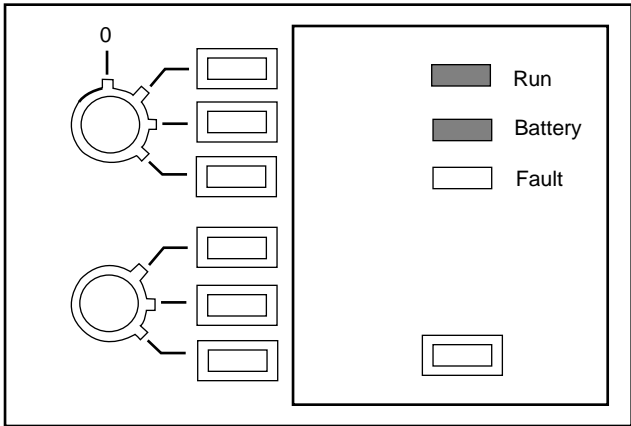
Upper Key Switch	Lower Key Switch	Restart Button Function
Enable	Update or Halt	Runs self-test, then halts.
Enable	Auto Start	Runs self-test, and attempts a restart. If the restart fails, then it reboots the operating system using the boot specification designated as the default. If the reboot fails, control returns to the console.
Standby or Secure	Any position	Does not function.

When you press the Restart button, the system runs self-test. For the Restart button to reboot the operating system, the upper key switch must be set to Enable and the lower key switch must be set to Auto Start. Figure 6–8 shows the control panel with upper and lower key switches in position for using the Restart button to reboot. If the system fails self-test, the processor does not reboot the operating system.

6.5.3 Status Indicator Lights

The control panel has three status indicator lights: Run, Battery, and Fault. These lights indicate the operating status of the system.

Figure 6-9: Control Panel Status Indicator Lights



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Table 6–5: Control Panel Status Indicator Lights

Light	Color	State	Meaning
Run	Green	On	System is executing operating system instructions on at least one processor.
		Off	System is in console mode, is set to Standby, or is turned off.
Battery	Green	On	Battery backup unit is charged to 98% of full capacity or battery backup unit is supplying power to the system.
		Flashing 1 x/sec	Battery backup unit is charging.
		Flashing 10 x/sec	Battery backup unit requires service. Call your Digital customer service engineer.
		Off	Either system does not have a battery backup unit or the battery backup unit is turned off.
Fault	Red	On	Self-test in progress. If light does not turn off, system has a hardware fault. See the <i>VAX 6000 Series Owner's Manual</i> for self-test information.
		Off	Self-test has completed, or the system is turned off.

Three status indicator lights on the control panel show the state of system execution (*Run*), the presence of a battery backup unit (*Battery*), and hardware errors (*Fault*).

Figure 6–9 shows a system that is in operation, with a charged battery backup unit installed. For more information on the battery backup unit, see the *VAX 6000 Platform Service Manual*. Table 6–5 describes the conditions indicated by the status indicator lights.

Chapter 7

System Self-Test

On power-up, the system runs an automatic self-test. Self-test results are indicated by module LEDs, the self-test display at the console terminal, and the Fault light on the control panel.

CAUTION: *Take extreme care when handling modules. You must wear the antistatic wrist strap attached to the cabinet when you handle any modules. See Appendix B.*

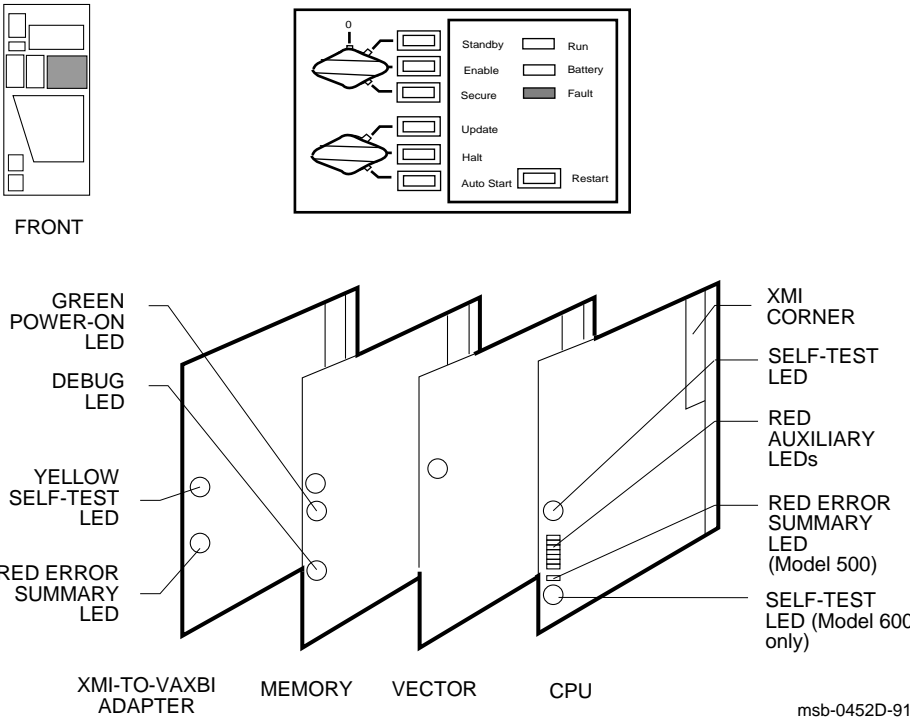
Sections in this chapter include:

- Enable the System and Check Status LEDs
- Check the Self-Test Display
- Sample Self-Test Display with VAXBI Adapter

7.1 Enable the System and Check Status LEDs

Before the VAX 6000 module status LEDs can be checked, the control panel switch must be set to Enable.

Figure 7-1: Control Panel Lights and Location of Module LEDs



1. Turn the upper key switch to Enable. The following should occur:
 - a. The red Fault indicator lights on the control panel. This indicator should turn off within 60 seconds.
 - b. The green lights on the five power regulators go on. The lights are visible from the rear of the cabinet.
 - c. The blowers turn on.
 - d. The module LEDs go on.
 - e. The console terminal prints the results of self-test for the XMI. The results printed should be similar to Example 7-1. If an optional VAXBI is installed, the printed results should be similar to Example 7-2.
2. Table 7-1 lists each module's LED status indicating self-test passed or self-test failed.

Table 7-1: LEDs After Self-Test

Module	Self-Test Passed	Self-Test Failed
Boot processor	Yellow ON, top two red ON for Models 500 and 600; only top red ON for all other models	Yellow OFF Some red ON ¹
Vector processor(s) ²	Yellow ON	Yellow OFF
Secondary processor(s)	Yellow ON, top two and bottom red ON for Models 500 and 600; top and bottom red ON for all other models	Yellow OFF Some red ON
Memory	Yellow ON Green ON	Yellow ON ³ Green ON
VAXBI adapter	Yellow ON	Yellow OFF

¹CPU modules have seven or eight red LEDs. This group of LEDs is used to display the number of the test that failed. On the Model 500 module, an additional red LED, the error summary, lights if any test failure results in any hardware error bits being set. Refer to your system's service manual for more information.

²Vectors available on Models 400 and 500 only.

³The yellow indicator on the memory module is used to indicate only that self-test has completed.

7.2 Check the Self-Test Display

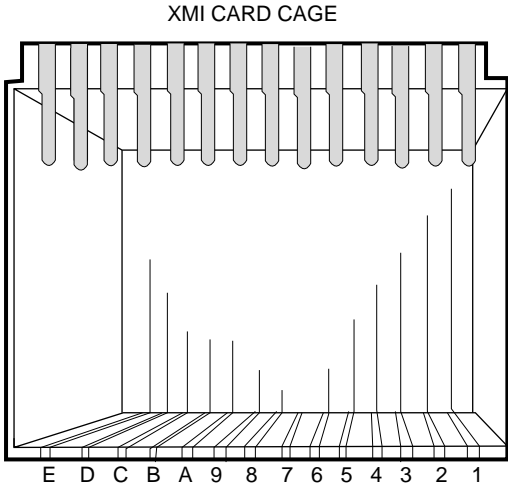
On power-up, self-test results are displayed at the console terminal.

Example 7-1: Self-Test Results

```
#123456789 0123456789 0123456789 0123456789 012345# ①
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE # ②
      A  A  .  .  .  M  M  M  M  .  .  P  P  P      TYP ③
      +  +  .  .  .  +  +  +  +  .  .  +  +  +      STF ④
      .  .  .  .  .  .  .  .  .  .  .  E  E  B      BPD
      .  .  .  .  .  .  .  .  .  .  .  +  +  +      ETF
      .  .  .  .  .  .  .  .  .  .  .  E  E  B      BPD
      .  .  .  .  .  A4 A3 A2 A1 .  .  .  .  .      ILV
      .  .  .  .  .  64 64 64 64 .  .  .  .  .      256 Mb

Console = V1.00   RBDs = V1.00   EEPROM = 1.00/1.00   SN = SG01234567
>>>
```

Figure 7-2: XMI Card Cage Slot Numbers (Front View)



msb-0396-90

- ① The first line shown in Example 7-1 is the progress trace line and, if complete, shows that the CPU in slot 1 passed all testing. If the final # sign is missing, the last number shown is the number of the failing test. This line of numbers is displayed only by the processor in slot 1, and only when this processor undergoes power-up or a system reset. This processor is not always the boot processor.

For example, when the system is reset or the INITIALIZE command is issued, the progress trace line might show:

```
#123456789 01234567          ! Test #17 (decimal) failed.
```

- ② The NODE # line lists the node numbers on the XMI bus. The nodes on this line are numbered in hexadecimal and reflect the position of the XMI slots as you view the XMI from the front of the cabinet.
- ③ The TYP line in the printout indicates the type of module at each XMI node:
 - An I/O adapter (A)
 - A scalar processor (P)
 - A vector processor (V, on Models 400 and 500 only)
 - A memory module (M)
 - A period indicates that the slot is not populated or that the module is not reporting and may be dead.
- ④ The STF line shows the results of self-test. This information is taken from the self-test fail bit in the XBER register of each module. The entries are:
 - + (pass)
 - (fail)
 - o (device is not tested at this step in the sequence)

You can enter `HELP SELFTEST_OUTPUT` at the console prompt for more information on the self-test display lines. Or refer to the *VAX 6000 Series Owner's Manual*.

7.3 Sample Self-Test Display with VAXBI Adapter

The self-test printout contains an additional line when an optional VAXBI card cage or expander cabinet is part of the system configuration. The XBI line provides information on the node numbers and self-test status for modules in the VAXBI card cages, which are connected to the XMI through DWMBB adapters.

Example 7-2: Self-Test Results: TYP, STF, and XBI Lines

```
#123456789 0123456789 0123456789 0123456789 012345#
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
      A  A  .  .  .  M  M  M  M  .  .  P  P  P      TYP  ①
      O  +  .  .  .  +  +  +  +  .  .  +  +  +      STF  ②
      .  .  .  .  .  .  .  .  .  .  .  E  E  B      BPD
      .  .  .  .  .  .  .  .  .  .  .  +  +  +      ETF
      .  .  .  .  .  .  .  .  .  .  .  E  E  B      BPD
.  .  .  .  .  .  .  .  +  .  +  +  +  +  .  XBI E + ③
      .  .  .  .  .  A4  A3  A2  A1  .  .  .  .  .  ILV
      .  .  .  .  .  64  64  64  64  .  .  .  .  .  256 Mb
Console = V1.00   RBDs = V1.00   EEPROM = 1.00/1.00   SN = SG01234567
>>>
```

- ❶ The TYP line in this printout indicates that adapters in this configuration are in XMI slots D and E. Slot E was chosen as the slot for the DWMBB/A adapter module.
- ❷ Because the DWMBB adapter does not have a module-resident self-test, its entry for the STF line will always be "o".
- ❸ The test results for the DWMBB/A and DWMBB/B modules are indicated on the XBI line, at the far right. In this example, the DWMBB modules have passed self-test (**XBI E +**). The results of the VAXBI I/O adapter self-tests are shown in columns 0 through F, which stand for the VAXBI node numbers; in this configuration, node numbers 1, 2, 3, 4, and 6 are used. All VAXBI modules have passed.

Note that XMI entries use only slots 1 through E, while the VAXBI can have entries in slots 0 through F. An XMI slot and node number are the same; VAXBI slot and node numbers are not identical. Node plugs (labeled 1 to 12) in the backplane of the VAXBI are used to identify the number of a node.

Chapter 8

Verification

After the system passes self-test, you must verify system operation. First, verify the boot device load path. After the path is verified, you can run diagnostics under the VAX Diagnostic Supervisor or load the operating system and verify it.

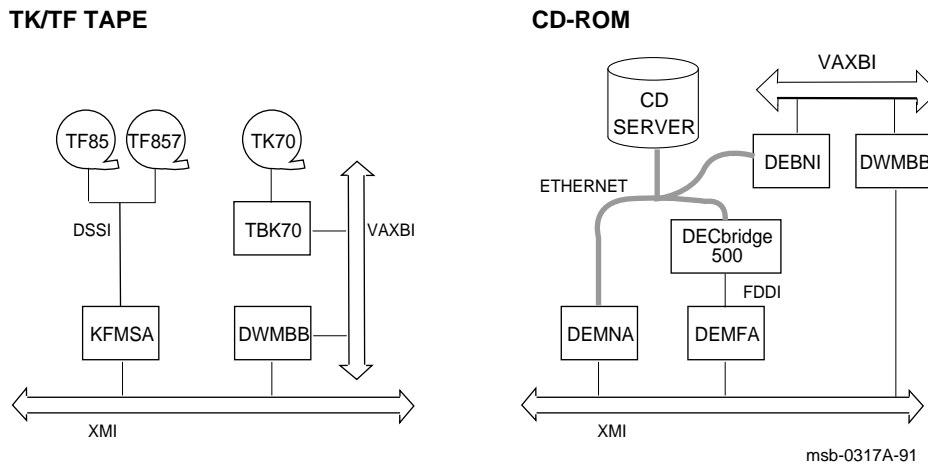
Sections in this chapter include:

- Console Load Devices
- Verification Overview
- Run Self-Test and Show Configuration
- Verify Console Load Device Path
 - Verify Ethernet Adapter and Loopback
 - Run ROM-Based Diagnostics for the Tape
- Boot Commands for Verification
- Boot Diagnostics (for Models 300 and 400)
 - Boot VAX/DS from a CD Server
 - Select CD Server and Service
 - Boot VAX/DS from Tape Drive
 - Run the Autosizer and Multiprocessor Tests
- Set Boot Devices
- Record System Parameters
- Verify System Under Operating System

8.1 Console Load Devices

The system console load device can be either a CD server accessed over the Ethernet or a TF or TK tape drive. If your system does not have one of these load paths and cannot be booted from a VAXcluster, stop here and install one of the load paths.

Figure 8-1: Console Load Devices



Your system must have at least one of the console load devices. If the system has an in-cabinet tape drive, it is in the upper left front of the system cabinet. A TF857 tape loader in an SF2xx cabinet can be connected by the KFMSA adapter.

To locate an InfoServer compact disk server (with one or two CD drives), ask the system manager for the location of the nearest CD server. If no CD server is installed and the system does not have a tape drive, stop here and install one of these console load devices.

If you are using a CD server for verification, use the diagnostic CD-ROM with the following part number:

```
AG-PDWW*-RE - VAX 6000 CMPLT DIAG CD-ROM
      ^
      |
      +---- Revision letter in this position
             (initial revision=A)
```

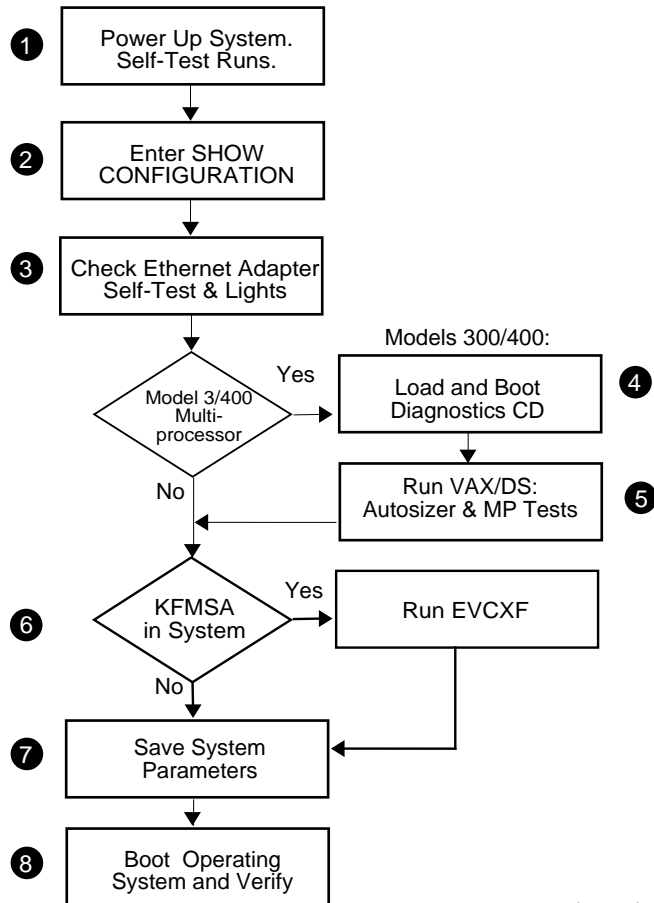
If you are using a TF or TK tape drive for verification, use the diagnostic tape with the following part number:

```
AQ-PDWX*-DE - VAX 6000 CMPLT DIAG TK50
      ^
      |
      +---- Revision letter in this position
             (initial revision=A)
```

8.2 Verification Overview

The verification process is similar for all console load devices. Additional tests are required for Model 300 and 400 systems. See Figure 8-2.

Figure 8-2: Verification Procedure



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- ❶ When the VAX 6000 powers up, self-test runs. The self-test for Models 500 and 600 includes a multiprocessor test. For Models 300 and 400, self-test does not include the multiprocessor test; it must be run in a separate step.
- ❷ Issue the SHOW CONFIGURATION command. For CD server booting, locate the Ethernet or FDDI adapter node address. For tape booting, locate the tape adapter node address. See Section 8.3.
- ❸ Check the console load device hardware. Check the Ethernet adapter by examining the self-test results and the green test light on the module, which reports the results of Ethernet loopback tests (see Section 8.4.1). For tape, run ROM-based diagnostics (see Section 8.4.2).

If you are installing a Model 500 or 600, go to step ❹. If you are installing a Model 300 or 400, do steps ❷ and ❸.

For Models 300 and 400:

- ❹ For CD server booting, load and boot the VAX 6000 diagnostic CD-ROM, part number AG-PDWW*-RE, labeled *VAX 6000 CMPLT DIAG CD-ROM* (see Section 8.6.1).

For booting from tape, load and boot the VAX 6000 diagnostic tape, part number AQ-PDWX*-DE, labeled *VAX 6000 CMPLT DIAG TK50* (see Section 8.6.3).
- ❺ Run VAX/DS, the autosizer, and multiprocessor tests.
- ❻ If the system has a KFMSA adapter, go to Section 3.4.1 and follow the directions to run EVCXF under VAX/DS at this point in the verification procedure.
- ❼ Set and store system parameters.¹ Record system parameters using:
For Models 500 and 600: SHOW ALL and SHOW FIELD
For Models 300 and 400: SHOW ALL
For TK systems only (not for TF tape): SAVE EEPROM
- ❽ Load and boot the operating system CD-ROM. Refer to operating system installation manuals. Verify the system under the installed operating system.

¹ Store printout in the maintenance envelope on the back door of the cabinet and in your *Site Management Guide*.

8.3 Run Self-Test and Show Configuration

Gather adapter self-test and address information using self-test results and SHOW CONFIGURATION printout.

Example 8-1: Self-Test and SHOW CONFIGURATION

```
>>> INIT ①
#123456789 0123456789 0123456789 0123456789 012345#
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
      A  A  .  .  .  M  M  M  M  .  P  P  P  P      TYP
      O  +  .  .  .  +  +  +  +  .  +  +  +  +      STF
      .  .  .  .  .  .  .  .  .  .  .  E  E  E  B      BPD
      .  .  .  .  .  .  .  .  .  .  .  +  +  +  +      ETF
      .  .  .  .  .  .  .  .  .  .  .  E  E  E  B      BPD
      .  .  .  .  .  .  .  .  .  +  .  +  .  +  +  .  XBI E + ②
      .  .  .  .  .  A4 A3 A2 A1  .  .  .  .  .  ILV
      .  .  .  .  .  64 64 64 64  .  .  .  .  .  256 Mb
Console = V1.00  RBDs = V1.00  EEPROM = 1.00/1.00  SN = SG01234567
>>>                               ! Prompt returns following self-test.
>>> SHOW CONFIGURATION ③
      Type                               Rev
1+  KA66A      (8087)  0001
2+  KA66A      (8087)  0001
3+  KA66A      (8087)  0001
4+  KA66A      (8087)  0001
6+  MS65A      (4001)  0084
7+  MS65A      (4001)  0084
8+  MS65A      (4001)  0084
9+  MS65A      (4001)  0084
D+  DEMNA      (0C03)  0600 ④
E+  DWMBB/A    (2002)  0001 ⑤
XBI E
1+  DWMBB/B    (2002)  0001
2+  CIBCA      (0108)  0001
4+  TBK70      (410B)  0001 ⑥
6+  DEBNI      (0118)  0300 ⑦
```

- ① Power up the system and check self-test results. Section 7.2 discusses details of self-test. Entering the INITIALIZE command at the console prompt also generates self-test, as shown in Example 8-1.

Check the STF line to see that all XMI modules passed self-test. Check the ETF line to see that all CPUs passed the extended test.

For Model 500 and 600 systems, the multiprocessor tests are run every time self-test is generated. The multiprocessor tests are not run for Models 300 and 400. So, for these systems, during installation verification, you must run the multiprocessor tests separately.

- ② Check the XBI line for self-test results for VAXBI modules, and note the DWMBB/A module's XMI node number. Example 8-1 shows the DWMBB/A in node E—see ② and ⑤. You need this information for the boot command.
- ③ Enter SHOW CONFIGURATION at the console prompt. This generates a more detailed listing of modules.
- ④ If you are booting using a CD server, find the DEMNA, DEBNI, or DEMFA node number. Example 8-1 shows both a DEMNA and DEBNI, for example only; this is an unlikely configuration. Here the DEMNA is XMI node D (④); the DEBNI is VAXBI node 6 (⑦).
- ⑤ Shows the position of the DWMBB/A module (see ② above for details).
- ⑥ Shows the position of the TBK70 adapter for the in-cabinet TK tape drive. In this example the TBK70 is VAXBI node 4.

For a TF tape, a KFMSA adapter on the XMI would support the in-cabinet tape drive or a TF857 in the SF2xx cabinet. When there is more than one KFMSA in a system, determine which KFMSA supports the TF in one of two ways: check the cabling from the XMI backplane to the TF drive, or run the level 3 diagnostic EVCXF and check the printout (see Section 3.6.3).

- ⑦ Shows the position of the DEBNI (see ④ above for details).

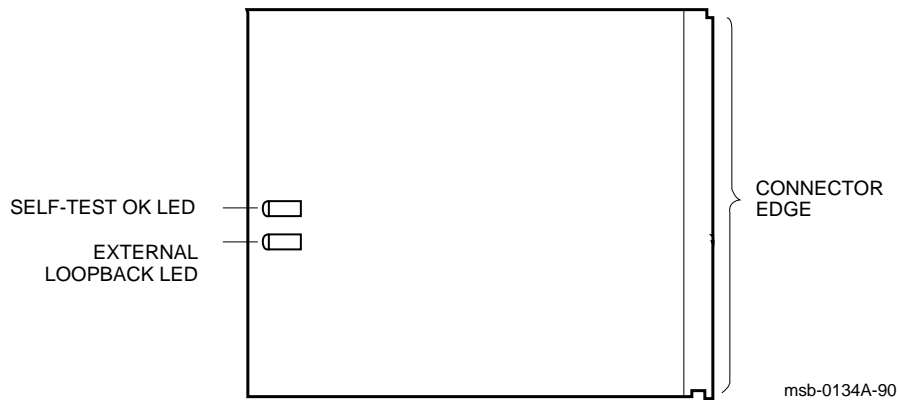
8.4 Verify Console Load Device Path

If your console load device is a CD server, check the Ethernet adapter's loopback path (see Section 8.4.1). If you are using a tape, use the Z command and run RBDs on the tape drive (see Section 8.4.2).

8.4.1 Verify Ethernet Adapter and Loopback

Check the Ethernet adapter's self-test results. Open the cabinet front door and check the green External Loopback LED.

Figure 8-3: DEBNI/DEMNA LEDs



Check the Ethernet adapter's self-test results. The SHOW CONFIGURATION printout is the most convenient display of the results. A "+" indicates the adapter passed self-test.

Independent of the module's internal self-test is an external loopback test. The loopback test runs independently at power-up and its results are not included in the self-test. That is, a DEBNI or DEMNA could pass self-test but fail the external loopback testing. The results of the external loopback testing are reported by the External Loopback LED on the module. It is a green LED below the yellow Self-Test OK LED.

Open the front cabinet door. Noting the adapter's card cage position from the SHOW CONFIGURATION printout, locate the module in the appropriate card cage and slot.

If the External Loopback LED is lit, the module passed the test. If this LED is not lit, the module failed.

For more troubleshooting of the Ethernet adapter, see the *DEC LANcontroller 200 Installation Guide (DEBNI)* or the *DEC LANcontroller 400 Installation Guide (DEMNA)*.

8.4.2 Run ROM-Based Diagnostics for the Tape

If you have a TF tape, verify the console load path to the TF in the system cabinet or the TF857 in the SF2xx cabinet using EVCXF (see Section 3.6). If you have a TK tape, use the Z command to "attach" to the TK controller. Run a ROM-based test to verify that the load path works properly. Return the console to the boot processor.

Example 8-2: TK ROM-Based Diagnostic

```
①
②>>> SHOW CONFIGURATION
      Type                Rev
1+ KA66A      (8087)    0001
2+ KA66A      (8087)    0001
3+ KA66A      (8087)    0001
4+ KA66A      (8087)    0001
6+ MS65A      (4001)    0084
7+ MS65A      (4001)    0084
8+ MS65A      (4001)    0084
9+ MS65A      (4001)    0084
D+ DEMNA      (0C03)    0600
E+ DWMBB/A    (2002)    0001 ②

XBI E
1+ DWMBB/B    (2002)    0001
2+ CIBCA      (0108)    41C1
4+ TBK70      (410B)    0307 ②

③>>> Z/BI:4 E
?0033 Z connection successfully started.

④ T/R
⑤RBD4> D2/TR/T=6/C
;T1035_TK    1.00
;T06
;          P⑥    6      410B 00000001
;00000000 00000000 00000000 00000000 00000000 00000000 00000000
⑦RBD4> QUIT
⑧^P
?0031 Z connection terminated by ^P
>>>
```

- ① Put a blank cartridge in the TK drive. Check that it is not write-protected. The blank tape is required for proper running of the RBDs. (If you are unfamiliar with the tape drives, see the *VAX 6000 Series Owner's Manual*.)
- ② In this example, the DWMBB adapter is **XMI node E**. The TK controller (TBK70) is **VAXBI node 4**.
- ③ Enter the Z command, using the /BI qualifier. The system console communicates with the module at VAXBI node 4 on the VAXBI whose adapter is at XMI node E. The system responds to the Z command with a message.
- ④ Enter the command T/R to invoke the module's ROM-based diagnostic monitor.
- ⑤ The diagnostic monitor prompt is RBD4>, where 4 is the VAXBI node number. Enter the command D2/TR/T=6/C. The diagnostic performs a read/write test.
- ⑥ The diagnostic prints out several lines of information. Check for a **P** in the first field of the diagnostic completion message, which indicates that the test passed.
- ⑦ Enter QUIT, which stops execution of the ROM diagnostic monitor and resets the controller.
- ⑧ Enter CTRL/P, which reattaches the console to the boot processor. The system responds to CTRL/P with a message.

8.5 Boot Commands for Verification

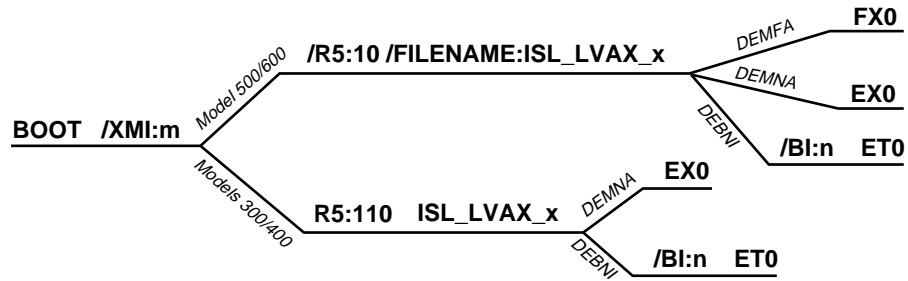
For TK or TF booting, use BOOT CSA1. For CD server booting, use the BOOT commands shown in Figure 8-4.

Table 8-1: BOOT Commands for VAX/DS

Adapter	Models 500 and 600	Models 300 and 400
TBK70	BOOT /R5:10 CSA1	BOOT /R5:10 CSA1
KFMSA (for TF)	BOOT /R5:10 CSA1	BOOT /R5:10 CSA1
DEMFA	BOOT /R5:10 /XMI:m /FILENAME:ISL_ LVAX_x FX0	BOOT /R5:110 /XMI:m FX0
DEMNA	BOOT /R5:10 /XMI:m /FILENAME:ISL_ LVAX_x EX0 ¹	BOOT /R5:110 /XMI:m EX0
DEBNI	BOOT /R5:10 /XMI:m /FILENAME:ISL_ LVAX_x/BI:n ET0 ¹	BOOT /R5:110 /XMI:m /BI:n ET0

¹Where *x* is the version letter.

Figure 8-4: CD Server BOOT Commands for VAX/DS

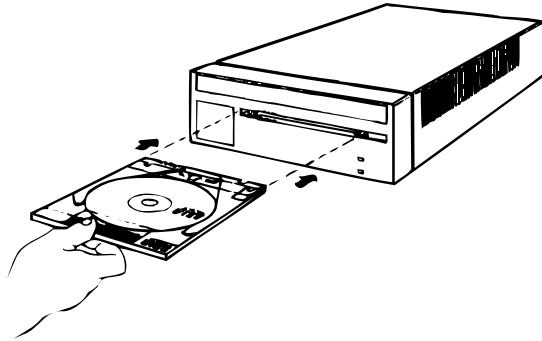


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Boot VAX/DS from a CD Server

Ask the system manager for the location of the closest CD server. Load the diagnostic compact disk into the CD drive, part number AG-PDWW*-RE, "VAX 6000 CMPLT DIAG CD-ROM" (see Figure 8-5). To boot a CD server, use the information gathered in Section 8.3 for the boot command qualifiers.

Figure 8-5: Loading a CD-ROM



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Boot VAX/DS from Tape Drive

To boot from a TK, load the diagnostic tape, part number AQ-PDWX*-DE, "VAX 6000 CMPLT DIAG TK50," into the tape drive, and at the console prompt enter the boot command:

```
BOOT /R5:10 CSA1
```

where R5:10 chooses the VAX Diagnostic Supervisor, VAX/DS. CSA1 is defined as the console load device, so the system will boot from the tape in the cabinet or a TF857 tape in an SF2xx storage cabinet.

8.6 Boot Diagnostics (for Models 300 and 400)

8.6.1 Boot VAX/DS from a CD Server

Models 500 and 600 and single-processor systems do not need this step; for these models, go to Section 8.8. After you enter the BOOT command string for your system from Table 8-1, you must connect to the CD server using menus to select your service.

Example 8-3: Boot VAX/DS from a CD Server

```
❶ >>> BOOT /XMI:E /BI:6 /R5:110 ET0
Initializing system
      [Self-test display prints]
Loading system software

FILENAME: ISL_LVAX_B ❷           ! where B is the revision level
                                ! of the CD you will boot from
* Initializing adapter
* Specified adapter initialized successfully
* "Request Program" MOP message sent - waiting for
      service from remote node
* Remote service link established
* Reading boot image from remote node
* Passing control to transfer address

Network Initial System Load Function
Version 1.1

FUNCTION      FUNCTION
  ID          -
  1           -   Display Menu
  2           -   Help
  3           -   Choose Service ❸
  4           -   Select Options
  5           -   Stop

Enter a function ID value: 3 ❸
```

- ① Use a BOOT command from Table 8–1. System responds with message *Initializing system* and displays self-test results.

In this example, we are using the configuration shown in Example 8–1, where the DWMBB/A is XMI node E and the DEBNI is VAXBI node 6.

- ② We are booting the file *ISL_LVAX_B*, where *B* is the revision level of the CD we are booting. The system loads software and displays the Ethernet function menu.
- ③ System prompts, *Enter a function ID value:* Enter 3 to choose service.

8.6.2 Select CD Server and Service

After you locate the servers, display loaded services (CD-ROMs), and select your service.

Example 8-4: Boot VAX/DS from a CD Server, continued

```
OPTION          OPTION
  ID            -
  1             -   Find Services
  2             -   Enter known Service Name

Enter an Option ID value: 1 ④

      Working

Servers found:: 6

Service Name Format:
      Service Number
      Service Name
      Server Name
      Ethernet ID

#1
VMSI054
ESS_08002B15FCE1
08-00-2B-15-FC-E1

#2
BOOKREADER_MAR91
ESS_08002B15FCE1
08-00-2B-16-07-C0

#3
6000_DIAG_A ⑤
ESS_0800XXCGH321
08-00-2B-16-04-D4

#4
CONS_DIAG_B ⑤
INFO1
08-00-2B-18-A9-75

Enter a Service Number or < CR > for more: 4 ⑥

      [Diagnostic Supervisor banner prints]
DS>
```

- 4 Enter *1* to select *Find Services*. Software locates available Ethernet services and displays them.

If you are certain of the diagnostic CD's name and revision number, you could choose *2* here (*Enter Known Service Name*). The system will prompt you for the service name (diagnostic CD volume label), and then boot. However, to display all available services, choose *1* and proceed with the following steps.

- 5 System prints out services loaded in the CD servers. One of the services will show the diagnostic CD-ROM you loaded in the CD drive.

This example shows two CD servers: one server with the name of ESS_0800XXCGH321 with Ethernet address 08-00-2B-16-04-D4 has service #3 with the diagnostic tape 6000_DIAG_A, at revision A; server with name INFO1 (a name set at InfoServer installation) with Ethernet address 08-00-2B-18-A9-75 has service #4 with the diagnostic tape CONS_DIAG_B, at revision B.

Enter the number of the service, which is the diagnostic CD-ROM. If more than one copy of the "VAX 6000 CMPLT DIAG CD-ROM" is shown as loaded in the CD drives, choose the drive where the revision letter is the highest in the service name. In this example, service #4 has the most recent diagnostic tape.

- 6 System prompts for service number. In this example, choose service #4 since it contains the most recent version of the diagnostic media.

8.6.3 Boot VAX/DS from Tape Drive

Model 500 and 600 systems and single-processor systems do not need this step; for these models, go to Section 8.8. The VAX Diagnostic Supervisor (VAX/DS) allows you to run level 2, 2R, and 3 diagnostics. You can boot VAX/DS from tape before loading and running the processor diagnostics.

Example 8-5: Booting the VAX Diagnostic Supervisor from Tape

```
①
②
③ >>> BOOT /R5:10 CSA1
③
#123456789 0123456789 0123456789 0123456789 012345#
F E D C B A 9 8 7 6 5 4 3 2 1 0 NODE #
  A A . . . M M M M . P P P P TYP
  O + . . . + + + + . + + + + STF
  . . . . . . . . . . E E E B BPD
  . . . . . . . . . . + + + + ETF
  . . . . . . . . . . E E E B BPD
. . . . . . . . + . + . + + . XBI E + ②
. . . . . A4 A3 A2 A1 . . . . ILV
. . . . . 64 64 64 64 . . . . 256 Mb
Console = V1.00 RBDs = V1.00 EEPROM = 1.00/1.00 SN = SG01234567
Loading system software.
VAX DIAGNOSTIC SOFTWARE ③
PROPERTY OF
DIGITAL EQUIPMENT CORPORATION
***CONFIDENTIAL AND PROPRIETARY***
Use Authorized Only Pursuant to a Valid Right-to-Use License
Copyright, Digital Equipment Corporation, 1991. All Rights Reserved.
DIAGNOSTIC SUPERVISOR. ZZ-ERSAA ④-XXX.XX-XXX 31-DEC-1991 09:44:40
DS> ③
```

- 1 If you are using tape for verification, use the diagnostic tape, part number:

```
AQ-PDWX*-DE - VAX 6000 CMPLT DIAG TK50
      ^
      |
      +---- Revision letter in this position
             (initial revision=A)
```

If you have more than one tape, use the one with the most recent revision level. Insert the diagnostic tape in the tape drive, write-protected.

- 2 Enter the BOOT command as shown in Example 8-5.

The /R5:10 qualifier selects the VAX Diagnostic Supervisor program.

CSA1 is a special boot specification for the console device (TF or TK). CSA1 is defined on all VAX 6000 systems to look first for a console load device in the cabinet and then for a TF857 tape in an SF2xx storage cabinet.

- 3 The self-test display and VAX Diagnostic Software banner appear, followed by the Diagnostic Supervisor banner. Then the VAX Diagnostic Supervisor runs and issues its prompt.
- 4 Different file names appear here, depending on the VAX 6000 model number.

Table 8-2: VAX/DS File Names

Model Number	File Name
Model 600	EXSAA
Model 500	EMSAA
Model 400	ERSAA
Model 300	ELSAA

8.7 Run the Autosizer and Multiprocessor Tests

Model 500 and 600 systems and single-processor systems do not need this step; for these models, go to Section 8.8. First run the standalone autosizer (EVSBA), which attaches all processors for the VAX Diagnostic Supervisor.

Example 8-6: Running the Multiprocessor Diagnostic

```
❶ DS> RUN EVSBA
.. Program: EVSBA - AUTOSIZER level 3 X6.6, revision 6.6, 3 tests,
   at 00:25:05.10.
.. End of run, 0 errors detected, pass count is 1,
   time is 31-DEC-1991 00:27:42.34

❷ DS> SET TRACE
❸ DS> SELECT ALL
❹ DS> RUN ERKMP
.. Program: ERKMP -- KA64A MP Exerciser, revision 1.0, 10 tests,
   at 00:29:19.81.
Testing:  __KA0__KA1

                Booting Secondary Processor #02

Test 1: Memory Interlock Test
Test 2: Interprocessor Interrupt Test
Test 3: Write Error Interrupt Test
Test 4: Cache Invalidate Test
Test 5: XMI Bus Arbitration Test
Test 6: XMI Bus Arbiter Collision Test
Test 7: XMI Lockout Test
       Only 2 CPU(s) selected for testing...
       XMI LOCKOUT can only be verified with 6 CPUs selected.
continuing...

Test 8: Cache Coherency Test
Test 9: XMI Suppress Test
       Only 2 CPU(s) selected for testing...
       XMI SUPPRESS can only be verified with 4 or more CPUs selected.
continuing...

Test 10: Multiprocessor Exerciser
.. End of run, 0 errors detected, pass count is 1,
   time is 31-DEC-1991 00:33:49.77
❺ DS> EXIT
>>>
```

- ① Run the standalone autosizer (EVSBA); then you do not need to attach each processor explicitly.
- ② Issuing a SET TRACE command generates a more detailed printout of the multiprocessor test.
- ③ Issue the SELECT ALL command to test all processors in the system.
- ④ Run the multiprocessor test which tests the interprocessor interrupts and cache functions for the model number of the system. You only have to run the multiprocessor test once; it's not necessary to change boot processors.
- ⑤ Exit VAX/DS.

Table 8–3: Multiprocessor File Names

Model Number ¹	File Name
Model 400	ERKMP
Model 300	ELKMP

¹Model 500 and 600 systems run the multiprocessor test as part of the system self-test; does not need to be separately invoked.

For additional information on these tests, see the *VAX 6000 Models 300 and 400 Service Manual*.

8.8 Set Boot Devices

Before you load the operating system, set the default boot devices. Set the lower key switch to Update when setting or changing EEPROM parameters. Use SET BOOT once to define the default boot device. Then you can boot from the default boot device by entering BOOT without qualifiers.

Example 8-7: Setting the Default Boot Device

```

①
②>>>SHOW CONFIGURATION
      Type                Rev
1+  KA66A      (8087)    0001
2+  KA66A      (8087)    0001
3+  KA66A      (8087)    0001
4+  KA66A      (8087)    0001
6+  MS65A      (4001)    0084
7+  MS65A      (4001)    0084
8+  MS65A      (4001)    0084
9+  MS65A      (4001)    0084
D+  DEMNA      (0C03)    0600
E+  DWMBB/A    (2002)    0001 ③

XBI E
1+  DWMBB/B    (2002)    0001
2+  CIBCA      (0108)    0001 ④
4+  KDB50      (010E)    0001
6+  DEBNI      (0118)    0300

>>>SET BOOT DEFAULT ⑤/XMI:E ⑥/BI:2 ⑦/NODE:0405 ⑧/R5:40000000 ⑨DU0
⑩>>>SET BOOT LOC /XMI:E /BI:4 DU1
```

- ① Set the lower key switch to Update.
- ② Enter the console command SHOW CONFIGURATION.
- ③ In this example the DWMBB/A adapter is **XMI node E**. The self-test display shows the VAXBI devices attached through node E.
- ④ The VAXcluster controller (CIBCA) is shown in the second column. The CIBCA device type is 0108. In this example the controller is **VAXBI node 2**, shown in the first column.
- ⑤ Qualifier /XMI specifies XMI node E.
- ⑥ Qualifier /BI specifies VAXBI node 2.
- ⑦ Qualifier /NODE specifies the CI node number of the HSC controller. In this example the system disk is dual-ported to two HSC controllers at nodes 04 and 05. A disk ported to only one HSC has a qualifier like /NODE:04. See Chapter 4, Connecting to a CI VAXcluster, for instructions on setting VAXcluster nodes and numbers.
- ⑧ Qualifier /R5 is used to load register R5 with the number of the root directory for the operating system. In this example the root is SYS4. Note that the root directory number must be in the high-order four bits.
- ⑨ In this example the system disk is unit number 0 on the HSC controller. You can now boot from the VAXcluster path by issuing the BOOT command.
- ⑩ The second SET command defines a path for booting from a local disk instead of from the VAXcluster. The boot name LOC is arbitrary. The path is disk unit number 1 on the disk controller whose VAXBI node number is 4. (Refer to the SHOW CONFIGURATION display; the KDB50 is node 4 of the VAXBI. The DWMBB/A adapter is node E on the XMI bus.)

You can now boot from the local disk by issuing the BOOT LOC command.

When you are finished setting EEPROM parameters, turn the lower key switch to Halt or Auto Start.

8.9 Record System Parameters

Using a hardcopy console printer (or TK tape if available), save system parameters. This step is especially important for single-processor systems.

Example 8-8: Record System Parameters

```
❶ >>> SHOW FIELD
Saved boot specifications:
  DEFAULT /R5:00000010 /XMI:E DU0

Console terminal parameters:
  /SCOPE      /SPEED: 9600 /NOBREAK

Console error message language mode:
  English

Memory configuration:
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
.  .  .  .  .  A1 .  .  .  .  .  .  .  .  .  ILV
.  .  .  .  .  64 .  .  .  .  .  .  .  .  .  64 Mb
/CONSOLE_LIMIT:00100000
/INTERLEAVE:DEFAULT

Power system: C

System serial number: SG01234567

❷ >>> SHOW ALL
[system prints parameters]

❸ >>> SAVE EEPROM

Proceed with save to tape? (Y or N) >>> Y
?006C EEPROM saved to tape successfully.
```

For future troubleshooting and maintenance, save system parameters. This step is especially important for single-processor systems. If the system does not have a TK tape drive, use hardcopy printout and save the printout in two places: the maintenance envelope attached to the back door of the cabinet and in your *Site Management Guide*. (You can save parameters to tape with the TK tape drive only; the TF tape drive reads media but does not record system parameters to tape.)

Table 8–4: Record System Parameters

System	Method
Models 500 and 600	SHOW FIELD command
Models 300 and 400	SHOW ALL command
Models with TK only (not TF)	SAVE EEPROM

❶ SHOW FIELD (Models 500 and 600)

Enter SHOW FIELD command at the console prompt. The system displays information, including system serial number, power system, and memory configuration.

❷ SHOW ALL (Models 300 and 400)

Enter SHOW ALL command at the console prompt. The system displays two pages of information. For details of this printout, see the *VAX 6000 Series Owner's Manual*, Chapter 5, Console.

❸ SAVE EEPROM (TK Tape only)

1. Put a blank cartridge in the tape drive, write-enabled. The cartridge is supplied with the system.
2. Enter the command SAVE EEPROM (see ❸). The console program queries you. Enter *Y* to save the EEPROM to tape. The console program then confirms that the save operation has completed successfully.
3. Label the cartridge and store on site. Leave the TK cartridge with the system manager, in case EEPROM contents become corrupted and must be restored.

NOTE: *Use this TK cartridge with this system only. TK tapes are not transferable.*

8.10 Verify System Under Operating System

After VMS is installed, run UETP (User Environment Test Package). First log in and check the devices. Then start the tests.

Example 8–9: Running UETP

```
❶ Username: SYSTEST
   Password:

❷ $ @UETP

❸      Welcome to VAX/VMS UETP Version V5.x

   Run "ALL" UETP phases or a "SUBSET" [ALL]?
   How many passes of UETP do you wish to run [ 1 ]?
   How many simulated user loads do you want [145]?
   Do you want Long or Short report format [Long]?

UETP starting at 31-DEC-1991 13:12:23.00 with parameters:
DEVICE LOAD DECNET CLUSTER  phases, 1 pass, 145 loads, long report.
```

- ❶ Enter SYSTEST as the username. Obtain the password from the system manager. After you log in, check all devices.
- ❷ Enter the command @UETP to start the program.
- ❸ The VAX/VMS UETP banner appears and UETP prompts you with questions. The default answer for each question is in square brackets. Press Return if you wish to enter the default answer. UETP testing begins when the final question is answered. For more information, refer to *VMS Upgrade and Installation Supplement: VAX 6000 Series*.

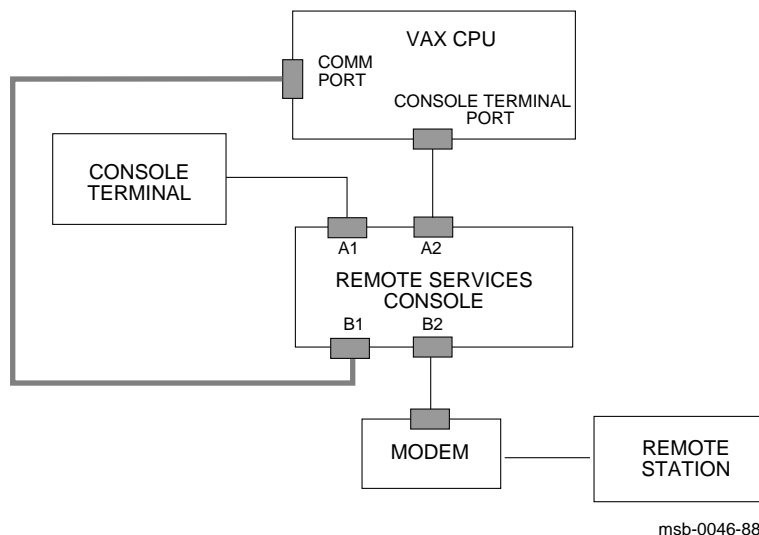
Appendix A

Digital Remote Services Console Installation

The Remote Services Console (RSC) allows customer services to troubleshoot VAX 6000 systems from a Digital Service Center. The system console terminal port (see Figure 2-6) is used to connect the RSC to a VAX 6000 system. If the system has a DMB32 or a DHB32 option, a port can be used to connect a telephone line to the RSC. See Figure A-1.

The Digital Service Center can run a series of diagnostics to verify the RSC connection to the system. For more information see the *Remote Services Console Field Service Manual*, the *Remote Services Console User's Guide*, and the *DF112 Modem Family User's Guide*.

Figure A-1: Remote Console Cable Connections



Appendix B

Module Handling

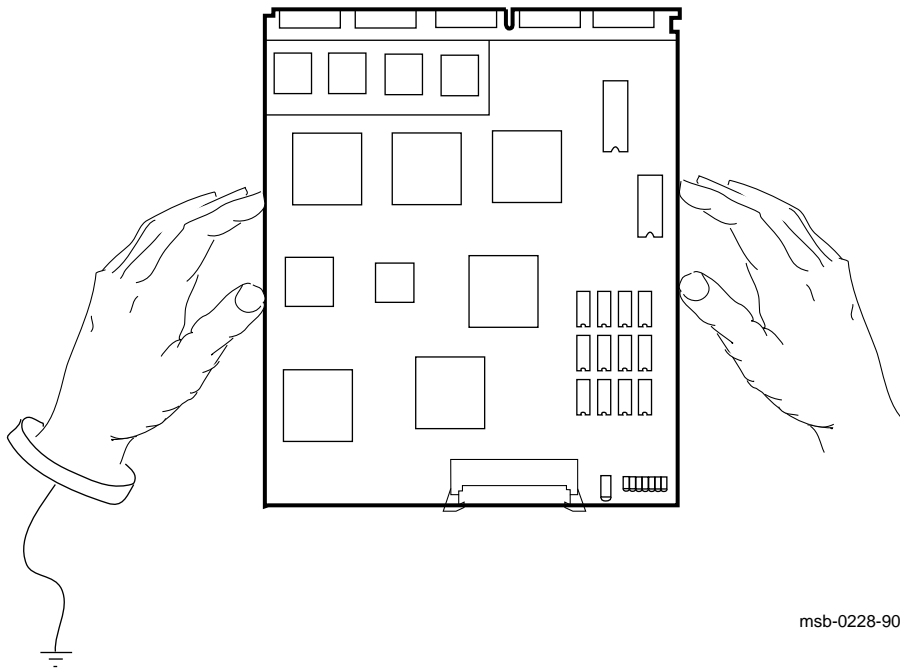
This appendix gives detailed instructions on handling scalar and vector processor modules for VAX 6000 systems. The sections include:

- Handling Modules
- Inserting Modules

B.1 Handling Modules

Handle the processor modules with care. The technology used on the 6000 series modules is more vulnerable to static than past technology. Also, these modules have 25 mil leads to the chips; these leads are very small, close together, and easily bent.

Figure B-1: Holding 6000 Series Processor Modules



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The 6000 series modules require careful handling. Prepare yourself and the work area before handling these modules. Roll up your sleeves and remove any jewelry. Figure B-1 shows the proper way to hold the module.

Follow these handling procedures to avoid damaging the processor modules:

1. Always wear an antistatic wrist strap.
2. Before removing the module from its ESD box, place the box on a clean, stable surface.

Be sure the box will not slide or fall. **Never** place the box on the floor. And be sure no tools, papers, manuals, or anything else that might damage the module is near it. Some components on this module can be damaged by a 600-volt static charge; paper, for example, can carry a charge of 1000 volts.

3. Hold the module only by the edges, as shown in Figure B-1.

Do not hold the module so that your fingers touch any 25 mil devices, leads, or XMI fingers. Be sure you do not bend the module as you are holding it.

4. Be sure nothing touches the module surface or any of its components.

If anything touches the module, components or leads can be damaged. This includes the antistatic wrist strap, clothing, jewelry, cables, components on other modules, and anything in the work area (such as tools, manuals, or loose papers).

B.2 Inserting Modules

Figure B-2: Inserting the Scalar Processor in an XMI Card Cage

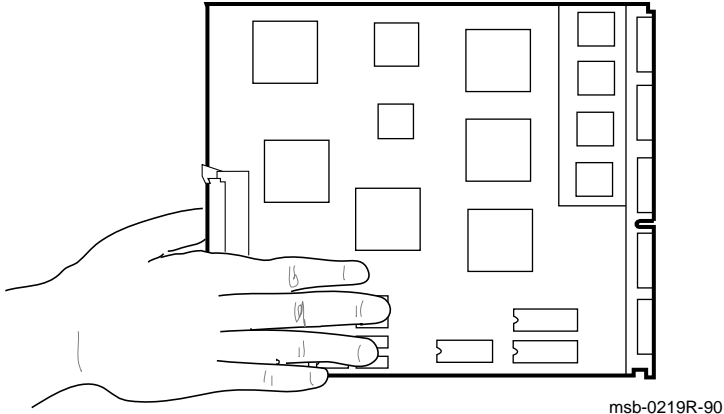
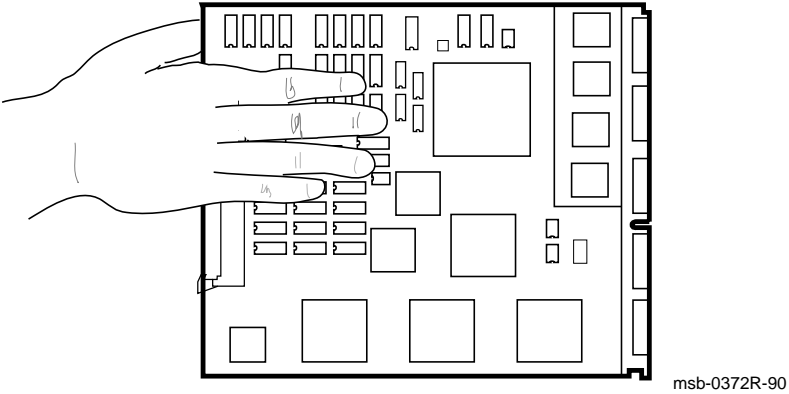


Figure B-3: Inserting the Vector Processor in an XMI Card Cage



You must take special precautions when moving the processor modules in or out of the XMI card cage.

1. Be sure, when inserting a module in or removing it from the XMI card cage, that no part of the module comes in contact with another module or a cable.
2. When you swap out a module, place it in an ESD box or on an ESD mat before you install the new module.

If you place the module on an ESD mat, make sure the mat is on a stable, uncluttered surface, with side 1 of the module facing up (the side with the heat sinks). Do not put it on the top of the system cabinet. And never slide the module across any surface. The leads on the components are fragile and can be damaged by contact with fingers or any surface.

3. Hold the XMI card cage handle while removing or inserting the module. If it is not held in place, the handle can spring down and damage the module.
4. When inserting a module in the card cage, grasp it as shown in Figure B-2 or in Figure B-3, being careful not to touch any 25 mil devices, and slide it slowly and gently into the slot.
5. **Do not attach the repair tag to the module.**

Place the repair tag in the plastic bag attached to the bottom of the ESD box. Allowing the repair tag to come in contact with the module can cause damage to a component.

Appendix C

Installing an Expander Cabinet

Expansion must be to the right of the system cabinet (as you view the cabinet from the front). See Figure 1–4 which shows a system, expander, disk, and tape cabinet configuration. First unpack the expander cabinet. Remove the system cabinet's side panel and top cover. Then bolt the expander and system cabinets together. Finally, install the DWMBB/A module (if required) and connect the interface cables according to the system configuration. For more information on the expander cabinet, see the *VAXBI Expander Cabinet Installation Guide* or the *H9657-EU Installation Guide*.

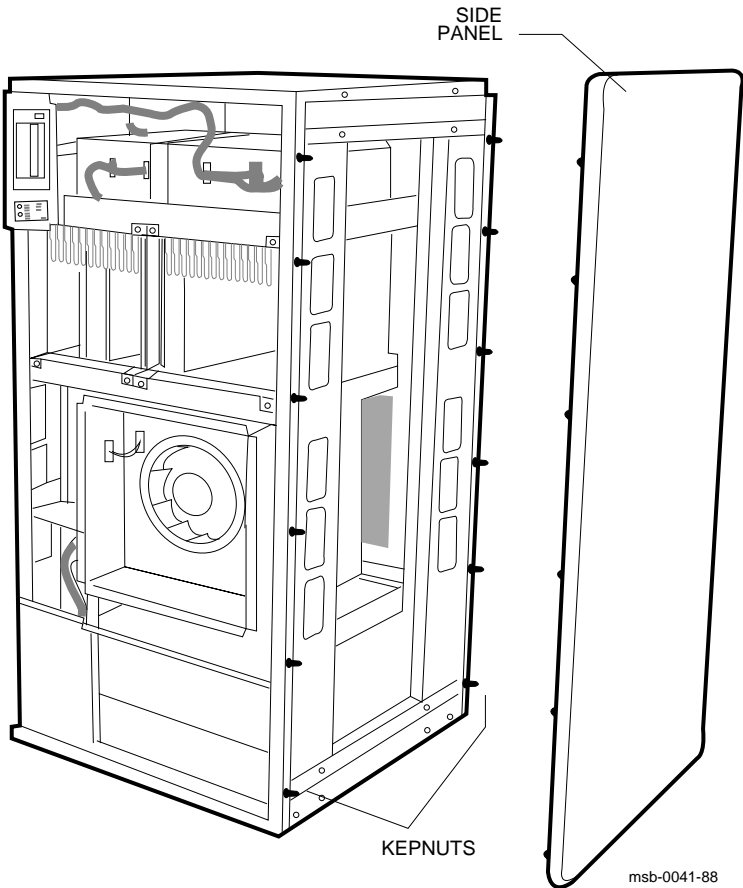
Sections in this appendix include:

- Prepare the Cabinets
- Join the Cabinets
- Install the DWMBB/A Module and Connect the XMI-to-VAXBI Adapter Cables
- Connect the DEC Power Bus Cable
- DWMBB Cabling

C.1 Prepare the Cabinets

First unpack the expander cabinet and position it next to the system cabinet. Then power down the system cabinet and remove the rear door, top cover, and side panel.

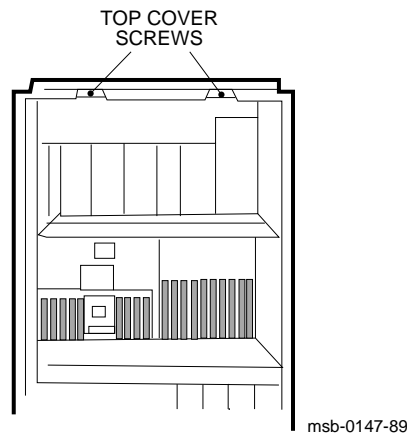
Figure C-1: System Side Panel Removal (Front View)



For all system configurations, expansion will be to the right of the system cabinet.

1. Refer to the *VAXBI Expander Cabinet Installation Guide* for unpacking instructions. Allow for adequate work space when you position the expander cabinet next to the system cabinet.
2. Perform an orderly shutdown of the system.
3. Turn the upper key switch on the front control panel to the Off position.
4. Pull the H405 circuit breaker to the Off position.
5. Open the front door.
6. Open the rear door. You can remove the door for easier access to the side panel bolts. Remove the ground strap from the rear door; use a 3/8 inch nutdriver to remove the strap from the door or a screwdriver to remove the strap from the cabinet. Remove the door by lifting it off the hinges.
7. Using a 7/16 inch socket wrench, remove the system cabinet's side panel by removing the 12 kepnuts from the bolts on the side panel studs (see Figure C-1).
8. Using a nutdriver or ratchet set, remove the two 5/16 inch bolts (see Figure C-2). Pull the top cover toward you and lift it off.

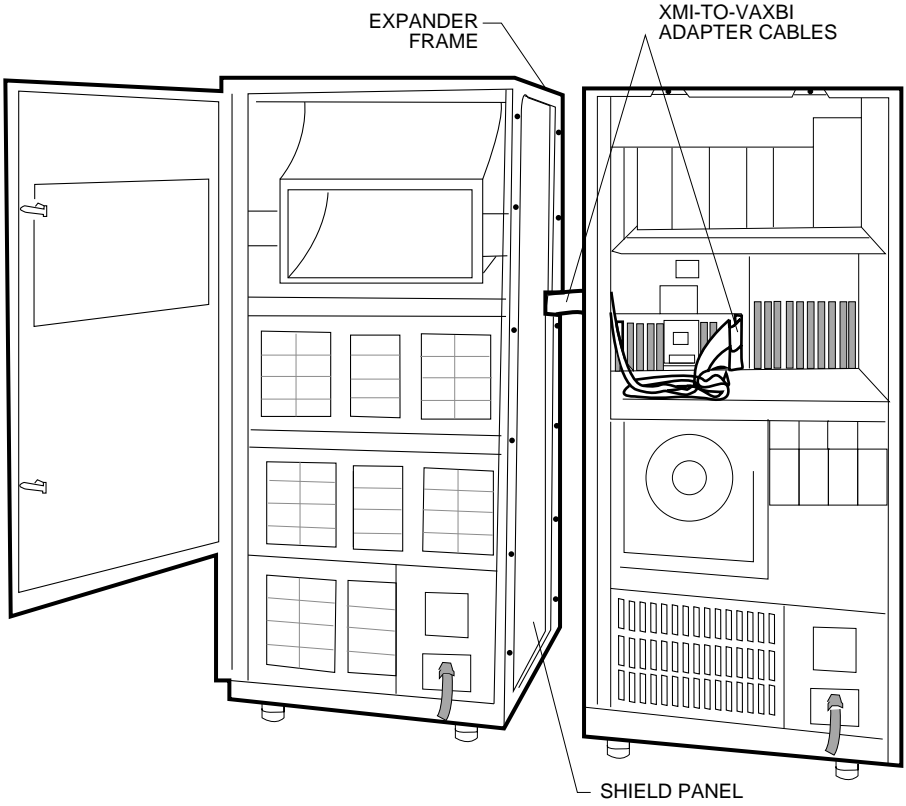
Figure C-2: Top Cover Removal (Rear View)



C.2 Join the Cabinets

Bolt the cabinets together and replace the system cabinet's top cover. Then install the side panel on the expander cabinet.

Figure C-3: Joining the Cabinets (Rear View)



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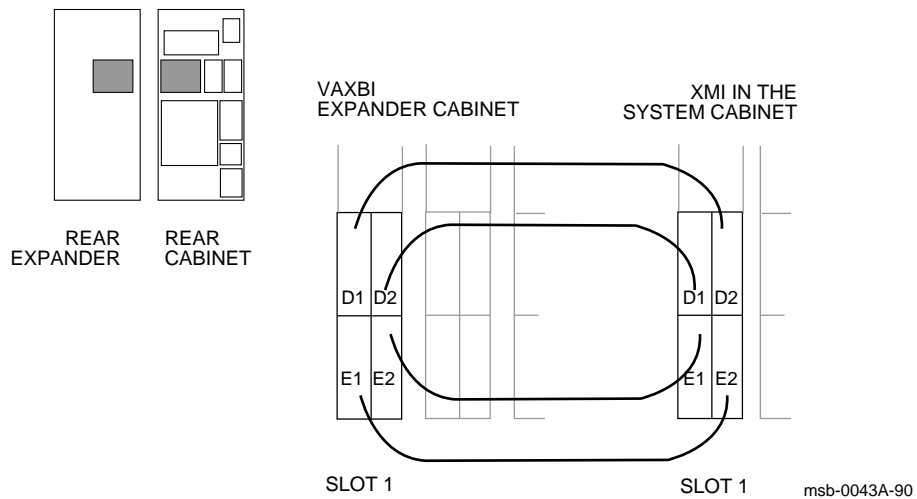
The RF shielding is shipped mounted to the H9657-EC cabinet by two bolts and kepnuts. Remove these bolts before aligning the cabinets.

1. Position the expander cabinet against the system cabinet. The four corner bolts require flat washers on both sides of the cabinets. Run the other eight bolts through the mounting holes on the system cabinet, expander frame, shield panel, and expander cabinet. These eight bolts do not require washers. Add a kepnut to each bolt but do not tighten.
2. If necessary, align the cabinets by adjusting the expander cabinet leveler feet. Use a 9/16 inch wrench or one of the shipping brackets. A bubble level can be used to check the alignment.
3. Using a 7/16 inch socket wrench, tighten each kepnut.
4. Check the RF seal between the expander frame and the two cabinets by inserting a strip of paper in each seam. If you can move the paper, the seam will not provide an effective RF seal. Adjust the seam until a proper seal is attained.
5. Replace the system cabinet's top cover.
6. Install the side panel (removed from the system cabinet) onto the open side of the expander cabinet.

C.3 Install the DWMBB/A Module and Connect the XMI-to-VAXBI Adapter Cables

You must install a DWMBB/A module when adding the expander option to a previously installed VAX 6000 series system. After you install the DWMBB/A module, connect the XMI to expander adapter cables.

Figure C-4: XMI-to-VAXBI Adapter Cable Connections



Typically, the DWMBB/A modules for an expansion cabinet are installed in slots 1 through 3 of the XMI card cage (although they can be placed in any slot except slots 6 through 9).

Two 15-foot cable assemblies (17-01897-01) are used to connect the DWMBB modules. Each cable assembly consists of two ribbon cables bundled together. See Section C.5 for DWMBB/A slot allocation in the XMI card cage. The cables connect to the expander card cage backplane at slot 1.

CAUTION: *You must wear the antistatic wrist strap attached to the cabinet when you handle any modules.*

1. Remove the clear plastic door in front of the XMI card cage and install the DWMBB/A module in slot 1. Replace the door.
2. Check to see that the AC OK/DC OK cable, 17-01920-01, is installed in the VAXBI backplane at slot 1, segment C1.
3. Lay the four cables out flat. Mark each end, as shown in Table C-1.

NOTE: *Install the cable so that the red stripe on each cable is up, away from the bottom of the card cage.*

4. At slot 1 of the expander cabinet backplane, connect the cables as you have marked them. Insert cables 1 and 2 into segments D2 and D1; insert cables 3 and 4 into segments E2 and E1, respectively (see Figure C-4).
5. Route the cables through the wave guide slot and into the system cabinet (see Figure C-3).
6. At the XMI backplane, connect the cables to segments D and E as you have marked them (see Table C-1 and step 3 above).

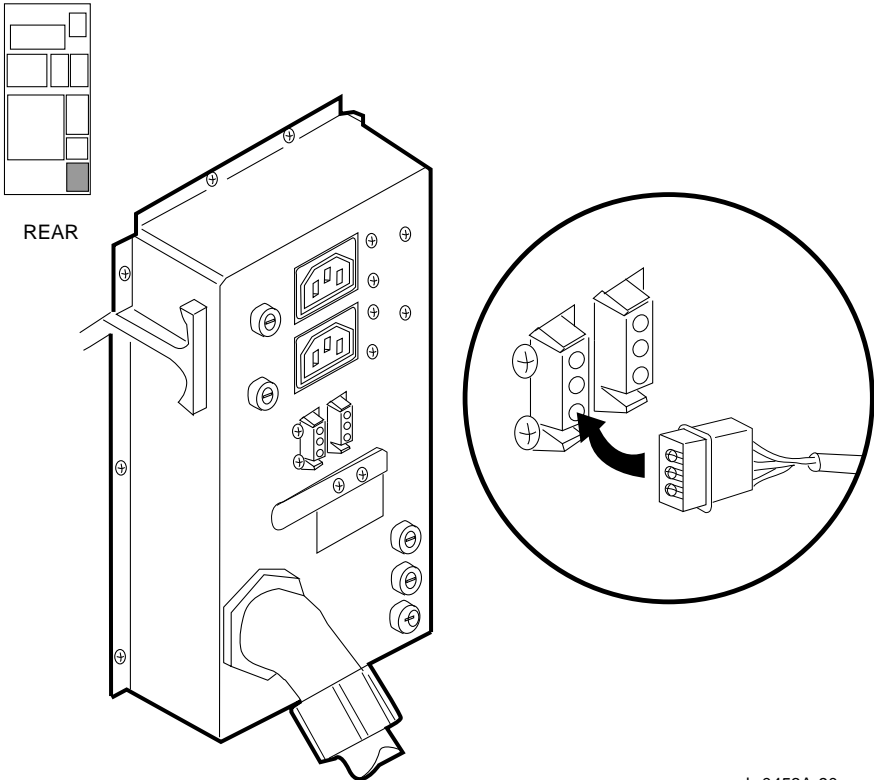
Table C-1: Cable Connections

Cable	From VAXBI Expander Connection	To XMI Connection
Cable 1	D1	D2
Cable 2	D2	D1
Cable 3	E1	E2
Cable 4	E2	E1

C.4 Connect the DEC Power Bus Cable

Connect the DEC power bus cable from the expander cabinet's H405 AC power input box to the system cabinet's H405 AC power controller.

Figure C-5: DEC Power Bus Cable Connections (Rear View)



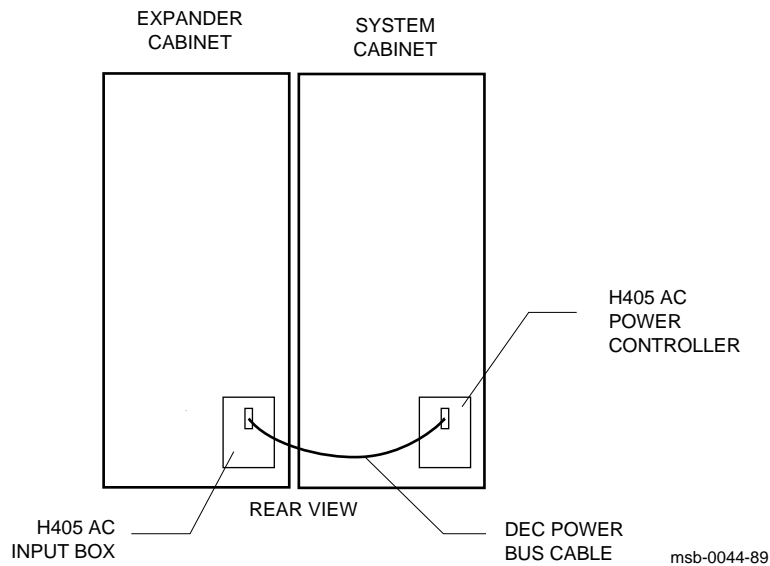
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1. Insert one cable connector into the power bus outlet located on the expander cabinet's H405 AC power input box (see Figure C-6).
2. Insert the other cable connector into the DEC power bus outlet located on the system cabinet's H405 AC power controller.

CAUTION: *For reliable operation, AC power should come from the same bulk distribution panel that supplies power to the system cabinet. This ensures that ground references for the VAXBI expander cabinet are at the same potential as the system cabinet.*

3. Plug in the AC power cable.
4. Replace the cabinet doors.
5. See the *VAXBI Expander Cabinet Installation Guide* for power-up instructions.

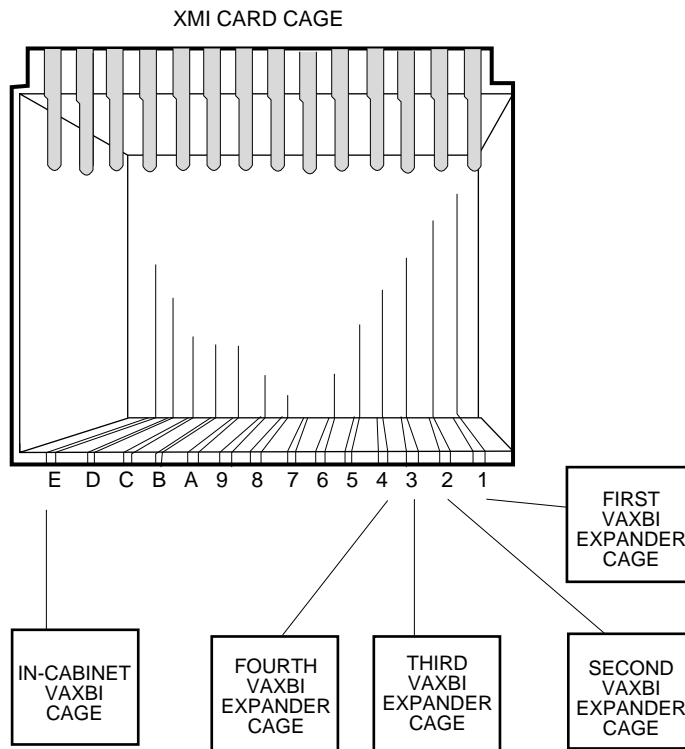
Figure C-6: DEC Power Bus Cabling



C.5 DWMBB Cabling

In the XMI card cage, slots 1 through 4 are allocated in that order for DWMBB/A modules cabled to DWMBB/B modules in the VAXBI expander cabinet.

Figure C-7: DWMBB/A Slots for Additional Card Cages



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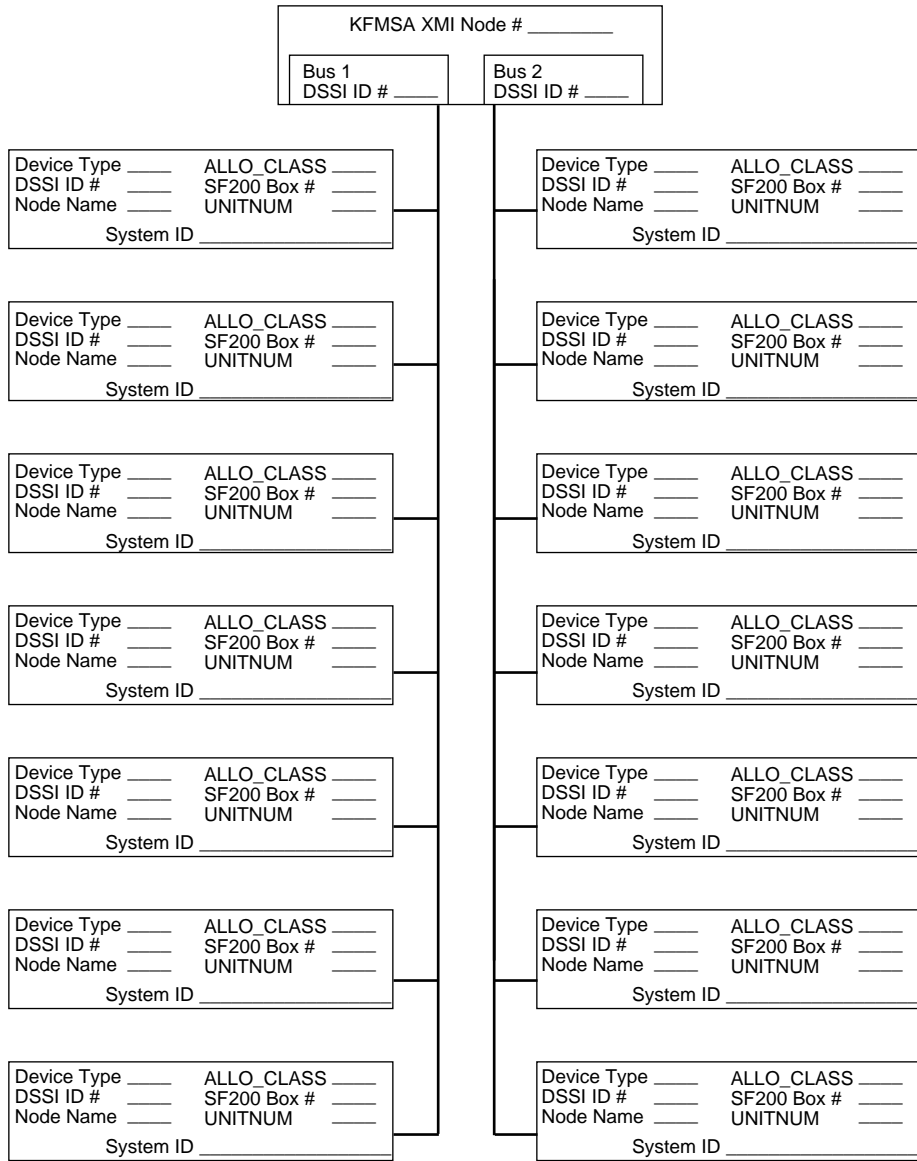
Appendix D

DSSI Configuration Sheets

Each component in the DSSI subsystem has an address. Part of the address is determined by the physical location of the component in the DSSI subsystem, and part of the address is set during the KFMSA module installation. Use a configuration sheet when you are setting parameters (see Chapter 3).

The next two figures are intended for your use as DSSI configuration sheets, in case you do not have one with your installation information from the integrated storage elements (ISE). Chapter 3 describes the procedures for using the configuration sheets.

Figure D-1: KFMSA/DSSI Single-Host Configuration Sheet



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Figure D-2: KFMSA/DSSI Dual-Host Configuration Sheet

KFMSA XMI Node # _____	
Bus 1 DSSI ID # _____	Bus 2 DSSI ID # _____
Device Type _____ ALLO_CLASS _____ DSSI ID # _____ SF200 Box # _____ Node Name _____ UNITNUM _____ System ID _____	Device Type _____ ALLO_CLASS _____ DSSI ID # _____ SF200 Box # _____ Node Name _____ UNITNUM _____ System ID _____
Device Type _____ ALLO_CLASS _____ DSSI ID # _____ SF200 Box # _____ Node Name _____ UNITNUM _____ System ID _____	Device Type _____ ALLO_CLASS _____ DSSI ID # _____ SF200 Box # _____ Node Name _____ UNITNUM _____ System ID _____
Device Type _____ ALLO_CLASS _____ DSSI ID # _____ SF200 Box # _____ Node Name _____ UNITNUM _____ System ID _____	Device Type _____ ALLO_CLASS _____ DSSI ID # _____ SF200 Box # _____ Node Name _____ UNITNUM _____ System ID _____
Device Type _____ ALLO_CLASS _____ DSSI ID # _____ SF200 Box # _____ Node Name _____ UNITNUM _____ System ID _____	Device Type _____ ALLO_CLASS _____ DSSI ID # _____ SF200 Box # _____ Node Name _____ UNITNUM _____ System ID _____
Device Type _____ ALLO_CLASS _____ DSSI ID # _____ SF200 Box # _____ Node Name _____ UNITNUM _____ System ID _____	Device Type _____ ALLO_CLASS _____ DSSI ID # _____ SF200 Box # _____ Node Name _____ UNITNUM _____ System ID _____
Bus 1 DSSI ID # _____ Bus 2 DSSI ID # _____ KFMSA XMI Node # _____	
Color Code on Cables _____	Color Code on Cables _____

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