DEC 7000 AXP System
VAX 7000
Installation Guide

Order Number EK–700EB–IN.002

This guide is intended for use by Digital customer service engineers and self-maintenance customers installing a DEC 7000 AXP or VAX 7000 system.

Contents

Chapter 4 Making Console, Ethernet, and FDDI Connections

Chapter 5 Connecting to a DSSI Subsystem

Chapter 6 Connecting to a CI VMScluster

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Preface

Intended Audience

This manual is written for Digital customer service engineers and self-maintenance customers who require information on installing a DEC 7000 AXP system or a VAX 7000 system.

Document Structure

This manual uses a structured documentation design. Topics are organized into small sections for efficient on- line and printed 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 nine chapters and three appendixes, as follows:

- **Chapter 1, Installation Overview,** provides a flowchart which summarizes the installation process.

- **Chapter 2, Installing the System Cabinet,** shows how to unpack and install the system cabinet.

- **Chapter 3, Installing an Expander Cabinet,** explains how to install one or more expander cabinets, if present.

- **Chapter 4, Making Console, Ethernet, and FDDI Connections,** shows how to connect the console and Ethernet and FDDI devices if present to the system.

- **Chapter 5, Connecting to a DSSI Subsystem**, shows how to connect to a DSSI subsystem, if present.

- **Chapter 6, Connecting to a CI VMScluster,** shows how to connect to a CI VMScluster, if present.

- **Chapter 7, Powering Up the System**, explains how to start the system by applying main power.

- **Chapter 8, System Self-Test,** describes the system self- test and its results.

- **Chapter 9, Diagnostics and Utilities,** describes how to verify system operation using diagnostics and utilities.

- **Appendix A** contains an overview of storage architectures for the VAX 7000 system.

- **Appendix B** describes some generally important DSSI concepts.

- **Appendix C** explains how to connect the remote services console to the system.

Conventions Used in This Document

Terminology. Unless specified otherwise, the use of "system" refers to either a DEC 7000 AXP or VAX 7000 system. The DEC 7000 AXP systems use the Alpha AXP architecture. References in text use DEC 7000 to refer to DEC 7000 AXP systems.

When a discussion applies to only one system, an icon is used to highlight that system. Otherwise, the discussion applies to both systems. Thus, the abstract for a module that applies only to DEC 7000 systems would look like this:

DEC 7000   **This section shows a sample boot of OpenVMS Alpha AXP from the RRD42 CD drive for DEC 7000 systems. The first step is issuing the show device command to determine the location of the RRD42.**

Book titles. In text, if a book is cited without a product name, that book is part of the hardware documentation. It is listed in Table 1 along with its order number.

Icons. The icons shown below are used in illustrations for designating part placement in the system described. A shaded area in the icon shows the location of the component or part being discussed.
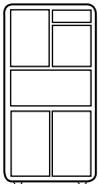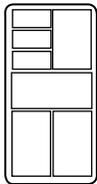
Front   Rear

Documentation Titles

Table 1 lists the books in the DEC 7000 and VAX 7000 documentation set. Table 2 lists other documents that you may find useful.

Table 1   DEC 7000/VAX 7000 Documentation

Title	Order Number
Installation Kit	EK–7000B–DK
Site Preparation Guide	EK–7000B–SP
Installation Guide	EK–700EB–IN
Hardware User Information Kit	EK–7001B–DK
Operations Manual	EK–7000B–OP
Basic Troubleshooting	EK–7000B–TS
Service Information Kit—VAX 7000	EK–7002A–DK
Platform Service Manual	EK–7000A–SV
System Service Manual	EK–7002A–SV
Pocket Service Guide	EK–7000A–PG
Advanced Troubleshooting	EK–7001A–TS
Service Information Kit—DEC 7000	EK–7002B–DK
Platform Service Manual	EK–7000A–SV
System Service Manual	EK–7002B–SV
Pocket Service Guide	EK–7700A–PG
Advanced Troubleshooting	EK–7701A–TS

Table 1 DEC 7000/VAX 7000 Documentation (Continued)

Title	Order Number
Reference Manuals	
Console Reference Manual	EK–70C0B–TM
KA7AA CPU Technical Manual	EK–KA7AA–TM
KN7AA CPU Technical Manual	EK–KN7AA–TM
MS7AA Memory Technical Manual	EK–MS7AA–TM
I/O System Technical Manual	EK–70I0A–TM
Platform Technical Manual	EK–7000A–TM
Upgrade Manuals	
KA7AA CPU Installation Guide	EK–KA7AA–IN
KN7AA CPU Installation Guide	EK–KN7AA–IN
MS7AA Memory Installation Guide	EK–MS7AA–IN
KZMSA Adapter Installation Guide	EK–KXMSX–IN
DWLMA XMI PIU Installation Guide	EK–DWLMA–IN
DWMBB VAXBI PIU Installation Guide	EK–DWMBB–IN
H7237 Battery PIU Installation Guide	EK–H7237–IN
H7263 Power Regulator Installation Guide	EK–H7263–IN
BA654 DSSI Disk PIU Installation Guide	EK–BA654–IN
BA655 SCSI Disk and Tape PIU Installation Guide	EK–BA655–IN
Removable Media Installation Guide	EK–TFRRD–IN

Table 2   Related Documents

Title	Order Number
General Site Preparation	
Site Environmental Preparation Guide	EK–CSEPG–MA
System I/O Options	
BA350 DECstor/me Modular Storage Shelf Subsystem Configuration Guide	EK–BA350–CG
BA350 DECstor/me Modular Storage Shelf Subsystem User's Guide	EK–BA350–UG
BA350-LA DECstor/me Modular Storage Shelf User's Guide	EK–350LA–UG
CIXCD Interface User Guide	EK–CIXCD–UG
DEC FDDIcontroller 400 Installation/Problem Solving	EK–DEMFA–IP
DEC LANcontroller 400 Installation Guide	EK–DEMNA–IN
DEC LANcontroller 400 Technical Manual	EK–DEMNA–TM
DSSI VAXcluster Installation and Troubleshooting Manual	EK–410AA–MG
InfoServer 150 Installation and Owner's Guide	EK–INFSV–OM
KDM70 Controller User Guide	EK–KDM70–UG
KFMSA Module Installation and User Manual	EK–KFMSA–IM
KFMSA Module Service Guide	EK–KFMSA–SV
RRD42 Disc Drive Owner's Manual	EK–RRD42–OM
RF Series Integrated Storage Element User Guide	EK–RF72D–UG
TF85 Cartridge Tape Subsystem Owner's Manual	EK–OTF85–OM
TLZ06 Cassette Tape Drive Owner's Manual	EK–TLZ06–OM

Table 2 Related Documents (Continued)

Title	Order Number
Operating System Manuals	
Alpha Architecture Reference Manual	EY–L520E–DP
DEC OSF/1 Guide to System Administration	AA–PJU7A–TE
DECnet for OpenVMS Network Management Utilities	AA–PQYAA–TK
Guide to Installing DEC OSF/1	AA–PS2DA–TE
OpenVMS Alpha Version 1.0 Upgrade and Installation Manual	AA–PQYSA–TE
VMS Upgrade and Installation Supplement: VAX 7000–600 and VAX 10000–600 Series	AA–PRAHA–TE
VMS Network Control Program Manual	AA–LA50A–TE
VMSclusters and Networking	
HSC Installation Manual	EK–HSCMN–IN
SC008 Star Coupler User's Guide	EK–SC008–UG
VAX Volume Shadowing Manual	AA–PBTVA–TE
Peripherals	
Installing and Using the VT420 Video Terminal	EK–VT420–UG
LA75 Companion Printer Installation and User Guide	EK–LA75X–UG

Chapter 1

Installation Overview

This chapter provides a quick overview of the installation procedure and relates the steps of the procedure with chapters in this manual. It consists of one section:

• Installation Flowchart

1.1 Installation Flowchart

In general, a system is installed as shown in Figure 1-1.

Figure 1-1   Installation Flowchart


```
┌────────────────────────┐
│ Install System Cabinet │  Chapter 2
└────────────────────────┘
            │
            ▼
        ╱Multiple╲        Yes    ┌──────────────────┐
       ╱ Cabinets ╲───────────── │ Install Expander │  Chapter 3
       ╲    ?     ╱              │   Cabinet(s)     │
        ╲        ╱               └──────────────────┘
            │ No
            ▼
┌──────────────────┐
│ Connect Console, │  Chapter 4
│  Ethernet, FDDI  │
└──────────────────┘
            │
            ▼                                        Chapter 6
        ╱ DSSI  ╲    No      ╱  CI   ╲   Yes    ┌──────────────┐
       ╱Subsystem╲────────── ╱VMScluster╲────── │  Install CI  │
       ╲    ?    ╱           ╲    ?    ╱        │  VMScluster  │
        ╲       ╱             ╲       ╱         └──────────────┘
            │ Yes                 │ No
            ▼                     ▼
┌──────────────┐      ┌──────────────────┐
│ Install DSSI │      │  Power Up System │  Chapter 7
└──────────────┘      └──────────────────┘
                                │
                      ┌──────────────────┐
                      │ System Self-Test │  Chapter 8
                      └──────────────────┘
                                │
                      ┌──────────────────┐
                      │   Verification   │  Chapter 9
                      │ (Diagnostics and │
                      │    Utilities)    │
                      └──────────────────┘
```

Chapter 5
Appendix A
Appendix B
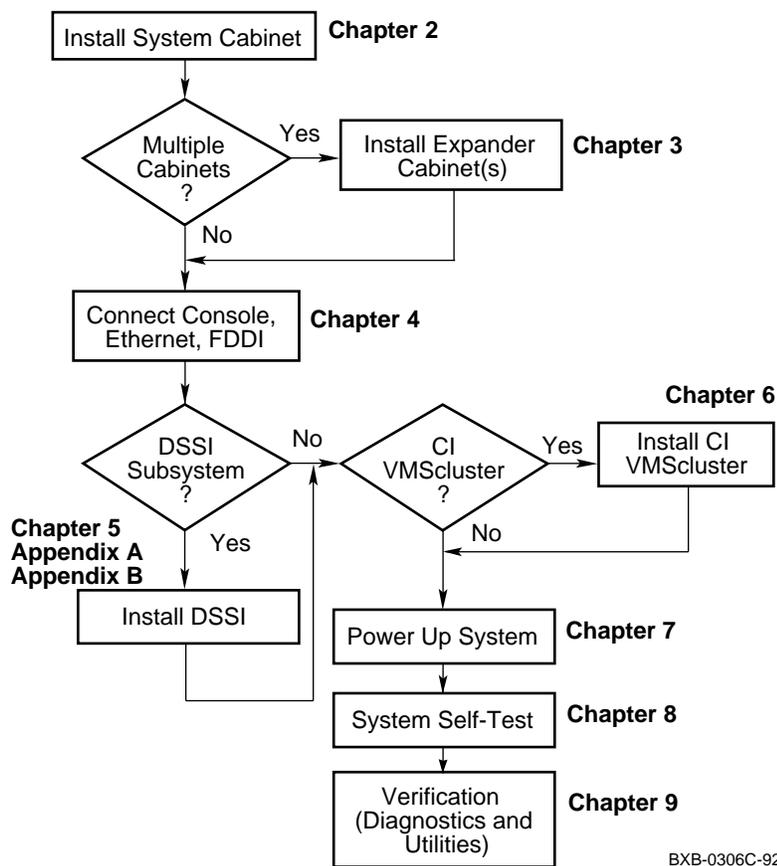
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In general, the procedure is as follows (Figure 1- 1):

1. Install the system cabinet as described in Chapter 2.

2. If the system has one or more expander cabinets, refer to Chapter 3 for installation instructions.

3. Connect the console, and, if appropriate, make the Ethernet and FDDI connections as described in Chapter 4.

4. If connecting to a DSSI subsystem (VAX 7000 systems only), refer to Chapter 5 for installation instructions and to Appendix A and Appendix B for background information.

5. If connecting to a CI VMScluster, refer to Chapter 6 for installation instructions.

6. Power up the system as described in Chapter 7.

7. Observe and consider the results of the system self- test as described in Chapter 8.

8. Verify system operation by running various diagnostics and utilities as described in Chapter 9.

Chapter 2

Installing the System Cabinet

This chapter describes how to install a system cabinet. The system cabinet contains the CPU, memory, and optional I/O, disk, or battery plug- in units (PIUs).

If your system has one or more expander cabinets, unpack the cabinet(s) and remove them from their pallet(s) as described in the first four sections of this chapter. Then skip to Chapter 3 for further instructions.

Sections in this chapter include:

- Inspect the Shipment
- Collect Tools and Resources
- Remove Carton and Packing Material
- Remove from the Pallet
- Level the Cabinet
- Assemble and Install Side Skirts
- Assemble and Install Front Skirt

2.1 Inspect the Shipment

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

Figure 2- 1   Inspection Flowchart
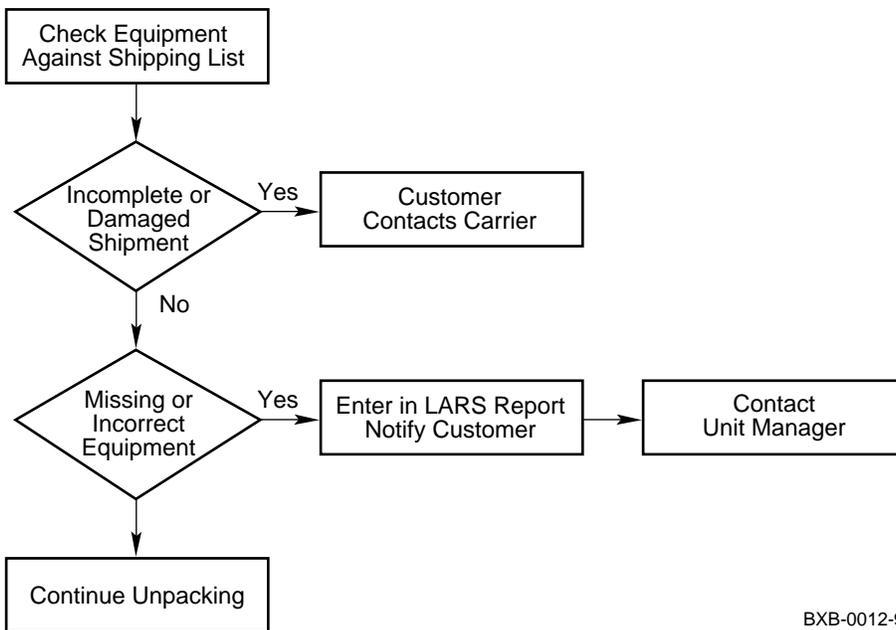
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NOTE: Physically inspect the system to be sure parts have not become loose during shipment.

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.

Compare items listed on the Product Delivery Document (in a slip envelope on the shipping box) with the packing slip contained in a plastic envelope on the shipping box. Items should be compared throughout the installation procedure as boxes are unpacked and cabinets are opened.

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
Product Delivery Document and packing slip	To verify that all hardware has been delivered
Utility knife	To remove straps from cabinet shipping boxes
Adjustable wrench	To remove pallet brackets and to adjust leveler feet
Level	To verify that the cabinet is properly leveled
Socket wrench set	To remove and install bolts
Digital voltmeter	To check AC and DC voltages
Table or bench	Work space for unpacking and installation

Review requirements such as power, environmental, and space requirements for the system.

NOTE: 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 also includes an expander cabinet, you will additionally need the tools listed in Table 2- 2 during installation.

Table 2- 2   Expander Cabinet Tools

Tool	Use
Large Phillips screwdriver	To remove and install screws and to remove the 1/4 turn skirt fasteners
Flathead screwdriver	For installation of IOP cable(s)

For more information:

Site Preparation Guide

2.3 Remove Carton and Packing Material

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

Figure 2‑2   Packing Material
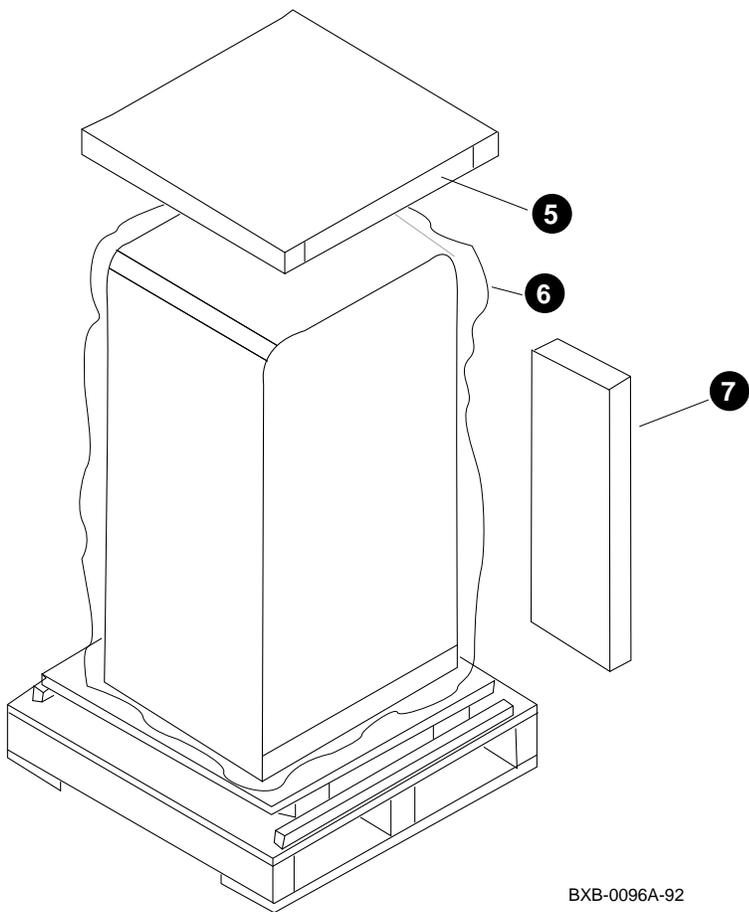
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Use the following procedure to unpack the system cabinet:

1. Position the carton so that the front faces an open space with enough clearance to allow the cabinet to be rolled down ramps.

2. Using a utility knife, cut the shipping straps from the carton.

3. Remove the outside top cardboard cover.

4. Remove the outside shipping box. This is typically done by using a 7/16" socket wrench to remove two bolts that hold the box together.

5. Remove the inside top cardboard cover.

6. Remove the protective plastic wrapping by slipping it up and over the cabinet.

7. Locate the box that contains the ramp kit and open it (see Figure 2- 2).

8. Locate and remove the two control panel keys. The keys are typically tie- wrapped to the cabinet's rear grill. Insert one key into the control panel and put the other key away in a safe place.

NOTE: It's a good idea to save all packing materials intact in case the system needs to be shipped in the future.

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
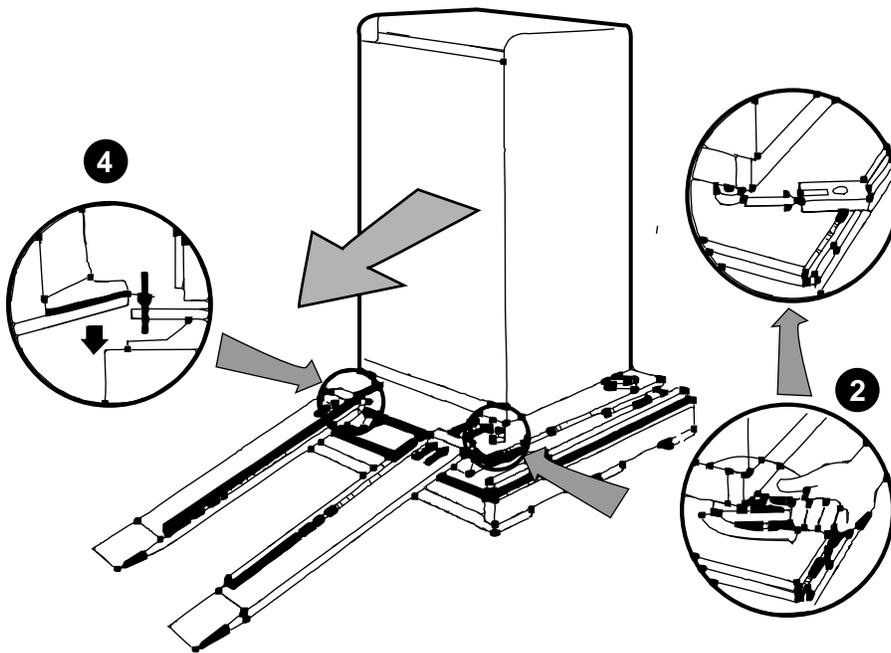
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WARNING: *Serious injury may result if the cabinet is improperly han-*
dled or proper safety conditions are not met. Check the
cabinet sides, top, and front and rear doors for damage. If
the cabinet is damaged, do the following:

  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 con-
      tinue.

1. Using an adjustable wrench, remove the four bolts and shipping
    brackets that hold the cabinet leveler feet to the pallet (see Figure
    2- 3).

2. Check the leveler feet. They should be in the uppermost position, away
    from the floor (see Section 2.5).

3. 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 Figure 2- 3).

4. The plastic grills on the front and back doors are fragile. If you want
    to remove the doors to avoid damage to the grills, refer to Section 3.4
    for more information.

5. With two people working together (one in front and one in back),
    slowly roll the cabinet off the pallet down the ramps. Move the cabinet
    into position. This should be done on a firm level floor, not on a car-
    pet.

NOTE: Make sure the space under the cabinet is clear of any debris or ex-
traneous materials.

2.5 Level the Cabinet

Inspect the rubber leveler feet to be sure they have not been damaged during shipping. To level the cabinet, adjust the feet and check the cabinet with a bubble level.

Figure 2-4   Leveler Foot Adjustment

Locknut

Leveler
Hexnut

Leveler
Foot

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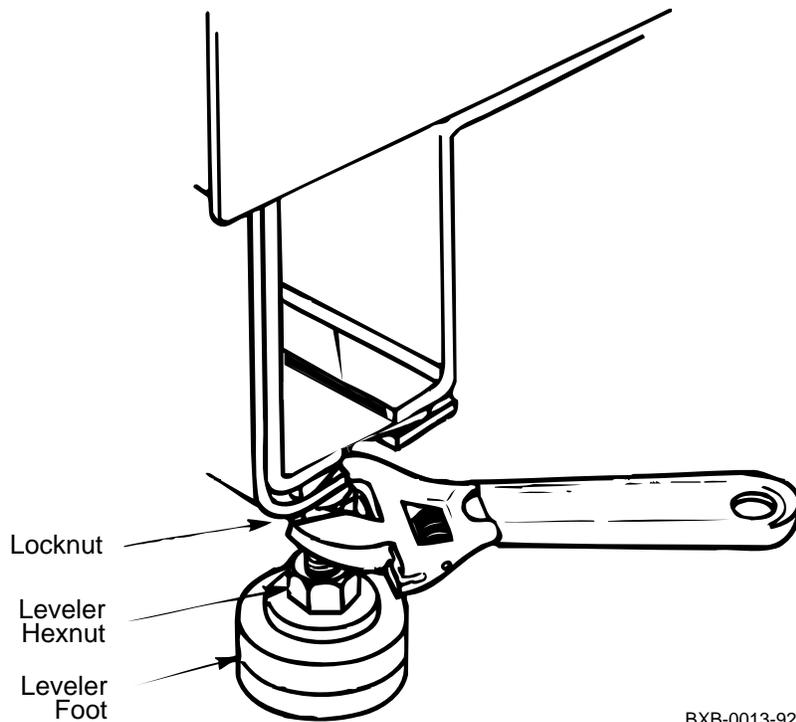
1. Using an adjustable wrench, lower and adjust the leveler feet. (A shipping bracket can also be used to lower the leveler feet. The bracket cutout and leveler feet hexnuts are the same size). In order for the cabinet skirts to be installed properly later, the leveler feet must now be lowered sufficiently for the cabinet wheels to be off the floor.

2. Using a bubble level, check to see that the cabinet is properly leveled (side to side and front to rear).

2.6 Assemble and Install Side Skirts

Assemble and install side skirts for the cabinet.

Figure 2-5   System Cabinet Side Skirt Assembly and Installation
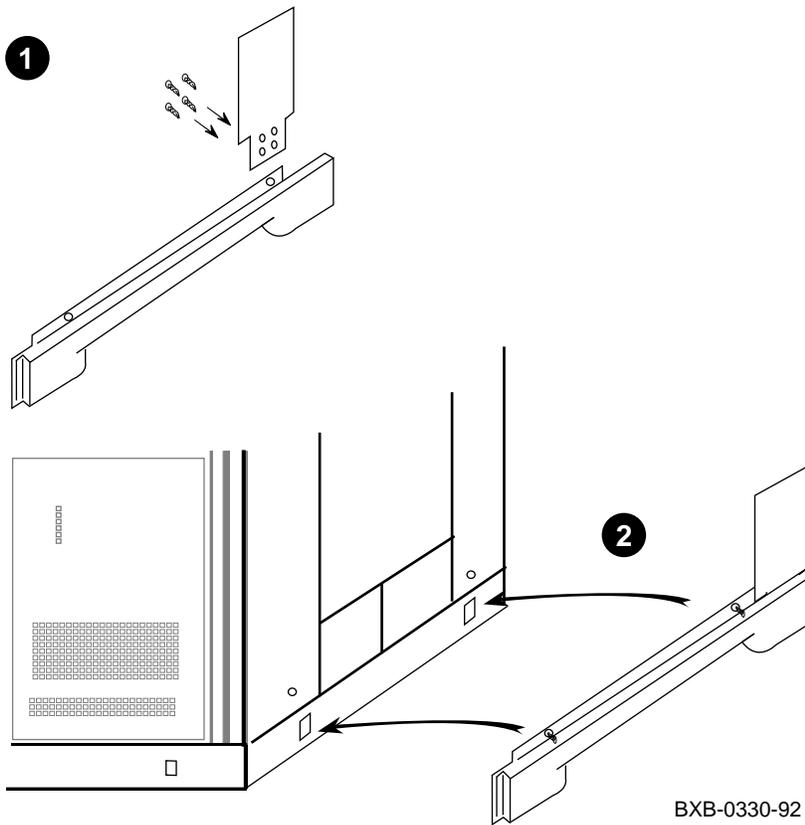
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1. Assemble a side skirt by attaching a side skirt "upper" to a side skirt "main" with four self- tapping screws (all assembly components are contained in the installation kit) as shown in Figure 2- 5.

2. Attach the side skirt to the outside base of the system cabinet (see Figure 2- 5). This is done by aligning the two 1/4 turn Phillips fasteners in the skirt with the matching holes in the cabinet base. Then simply push the fasteners into the holes.

3. Repeat 1 and 2 for the other side of the system cabinet.

2.7 Assemble and Install Front Skirt

Assemble and install the front skirt for the cabinet.

Figure 2-6   System Cabinet Front Skirt Assembly and Installation
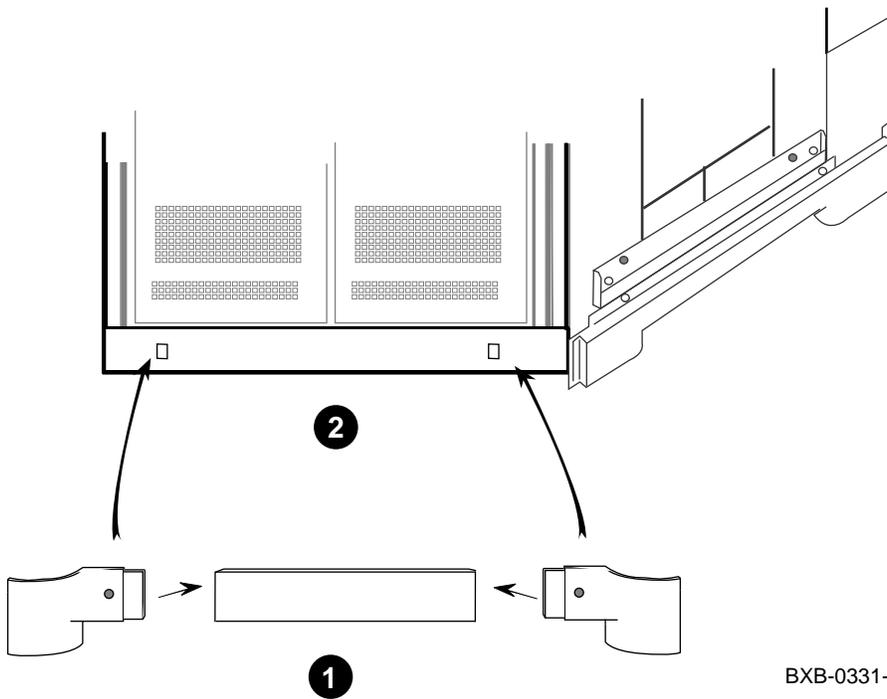
BXB-0331-92

1. Assemble a front skirt by inserting a left- hand endcap and a right-hand endcap into either end of a front center skirt piece (all assembly components are contained in the installation kit) as shown in Figure 2- 6.

2. Attach the front skirt to the outside base of the front of a cabinet by aligning the two 1/4 turn Phillips fasteners in the skirt assembly with the matching holes in the cabinet base (see Figure 2- 6). Then push the fasteners into the holes until they click and seat.

Chapter 3

Installing an Expander Cabinet

This chapter explains how to install one or more expander cabinets for the system. An expander cabinet provides room for I/O adapters, batteries, and optional storage capacity for the system. The system can have a maximum of two expander cabinets.

Both the upper and lower portions of the expander cabinet can have plug-in units (PIUs). The lower portion can have I/O, disk, or battery PIUs. The upper portion can have disk PIUs only.

Sections in this chapter include:

* Unpack the Cabinet
* Position the Cabinet
* Remove Cabinet Top Covers
* Remove Front and Rear Doors
* Remove System Cabinet Side
* Install Side Spacers
* Level All Cabinets
* Install Top Spacers
* Install Bottom Spacers
* Assemble and Install Side Skirts
* Assemble and Install Front Skirts
* Install End Panel on Expander Cabinet
* Connect the Power Control Cable
* Reinstall Cabinet Tops and Doors
* Connect the I/O Cable
* Connect the DSSI Cables

3.1 Unpack the Cabinet

Unpack the expander cabinet in the same way you unpacked the system cabinet in Chapter 2.

Figure 3-1   Expander Cabinet (Front View)

Front
Expander

Disk
PIU

Battery,
I/O, or
Disk PIUs
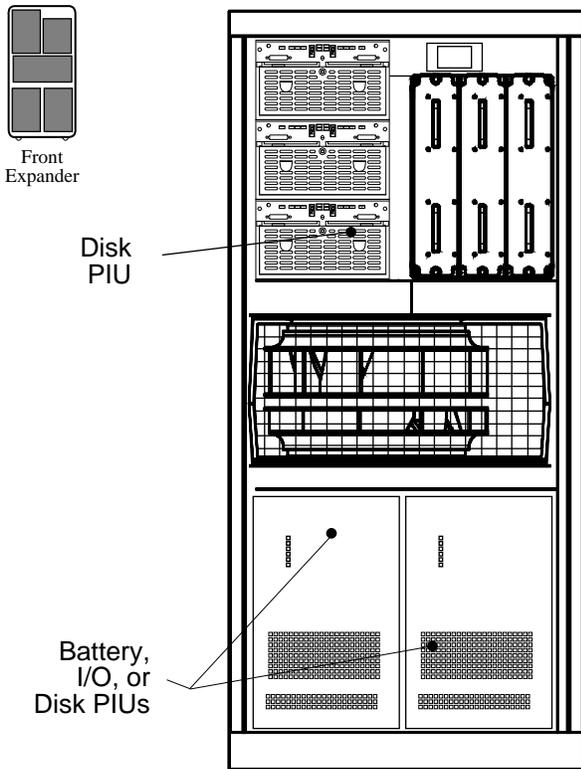
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1. Inspect the shipment for the expander cabinet as done for the system cabinet (see Section 2.1).

2. Collect the tools and resources needed to install the expander cabinet (see Section 2.2).

3. Remove the carton and packing material from the expander cabinet (see Section 2.3). Identify and put aside the components of the installation kit which includes the side, top, and bottom spacers, screws, bolts, and skirt(s). Some parts from the system cabinet will need to be removed and installed on the expander cabinet.

4. Remove the expander cabinet from the shipping pallet (see Section 2.4).

3.2 Position the Cabinet

Position the expander cabinet next to the system cabinet. The first expander cabinet is positioned to the right of the system cabinet, and the second to the left of the system cabinet (as viewed from the front).

Figure 3- 2   Expander Cabinet Positioning
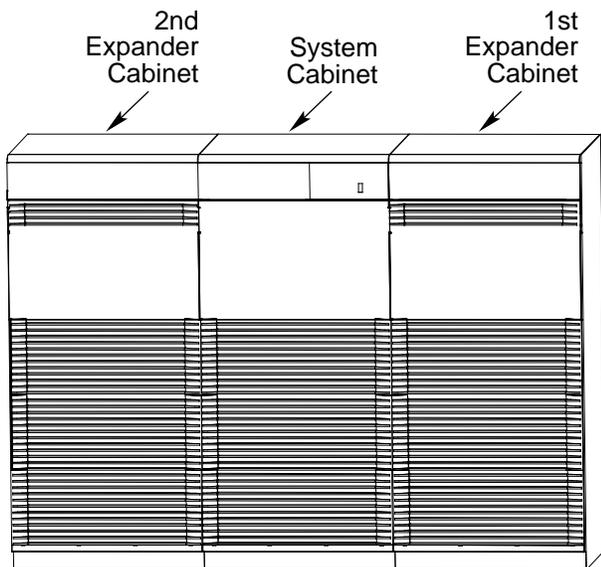
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1. As shown in Figure 3- 2, position the first expander cabinet to the right of the system cabinet as viewed from the front of the system. Position the second expander cabinet to the left of the system cabinet as viewed from the front. A system can have a maximum of two expander cabinets.

> **For more information:**
>
> *Site Preparation Guide*

3.3 Remove Cabinet Top Covers

Remove the top covers of the expander and system cabinets.

Figure 3- 3   Cabinet Top Cover Removal

Rear
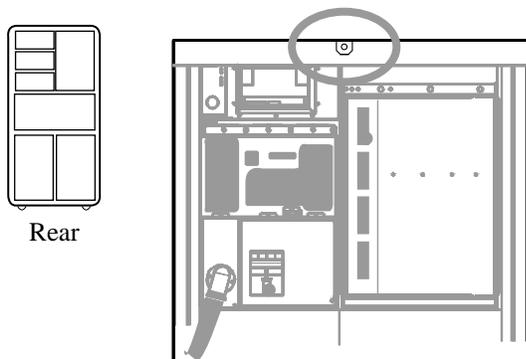
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1. Open the back door of a system or expander cabinet and locate a tab on the middle of the back underside of the top cover (see Figure 3- 3). There is a screw in this tab which secures the top cover to the cabinet body. Remove the screw with a Phillips screwdriver.

2. Lift off the cabinet top cover and place it aside for now.

3. Repeat 1 and 2 for all top covers in the system.

3.4 Remove Front and Rear Doors

Remove the front and rear doors of all cabinets by locating and depressing the cabinet door spring bolts.

Figure 3-4   Door Removal
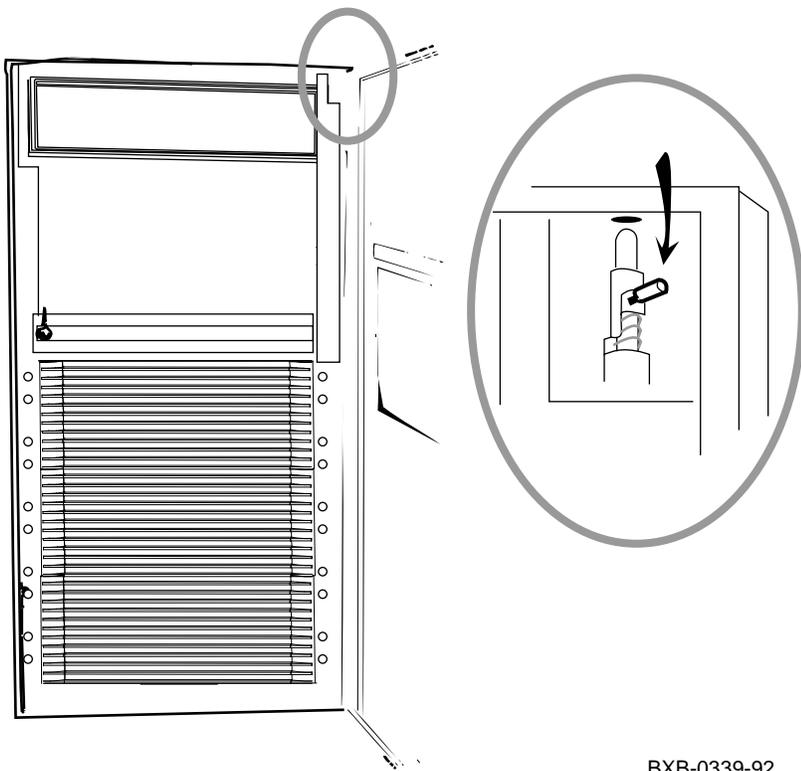
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1. To remove a door, pull it open and locate the spring bolt at the top inside corner of the door (Figure 3- 4).

2. Depress the spring bolt and the door can be easily tilted away and lifted from the cabinet.

3. Repeat 1 and 2 for all doors in the system.

3.5 Remove System Cabinet Side

Remove the end panel and brackets from the system cabinet. These will later be installed on the outer side of the expander cabinet.

Figure 3- 5   System Cabinet Side Removal

BXB-0335A-92
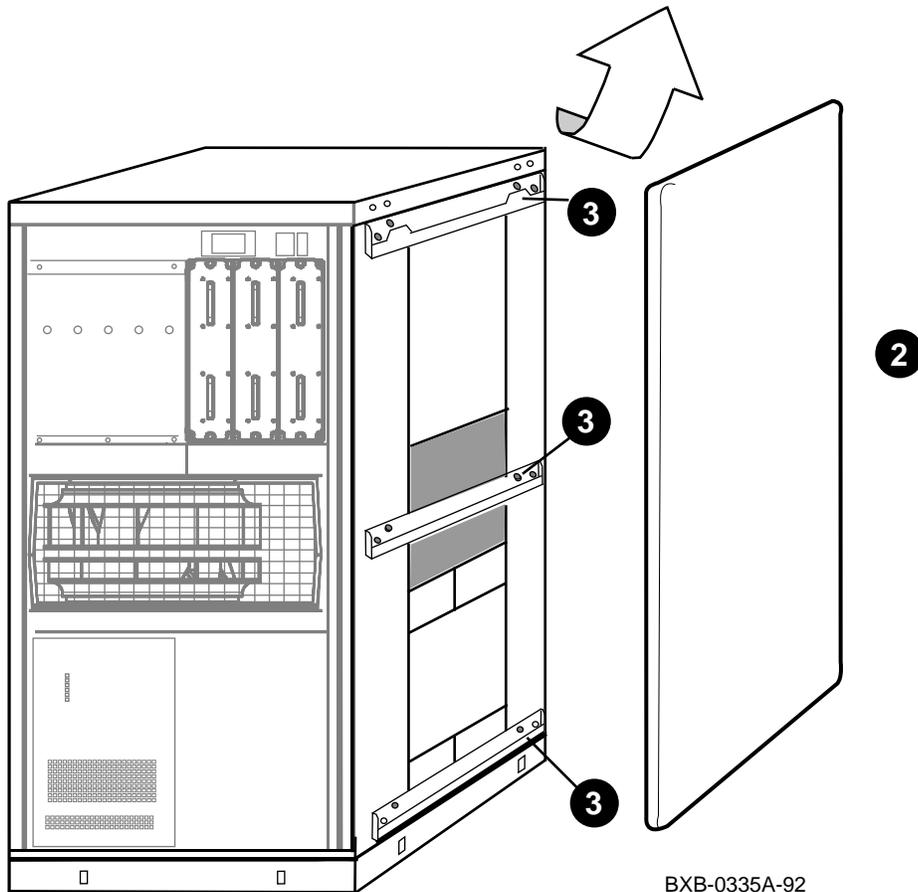
1. Using a 10 mm hex socket wrench, remove the two bolts on the inside top of the frame that attach the end panel to the cabinet.

2. Disengage the end panel from the mounting brackets on the frame by sliding the end panel upward. Then remove the end panel (see Figure 3- 5).

3. Remove the three mounting brackets which previously secured the end panel to the cabinet. The brackets are located at the top, middle, and bottom of the cabinet frame. Each bracket is held to the frame with two screws. Use a Phillips screwdriver to remove all screws.

4. Put the brackets, screws, and end panel aside until they are needed for installation onto the expander cabinet.

5. Repeat 1 through 4 for the other side of the system cabinet if a second expander cabinet is to be installed.

3.6 Install Side Spacers

Install one side spacer in the front and one side spacer in the back of adjoining cabinets.

Figure 3-6   Installing Side Spacers
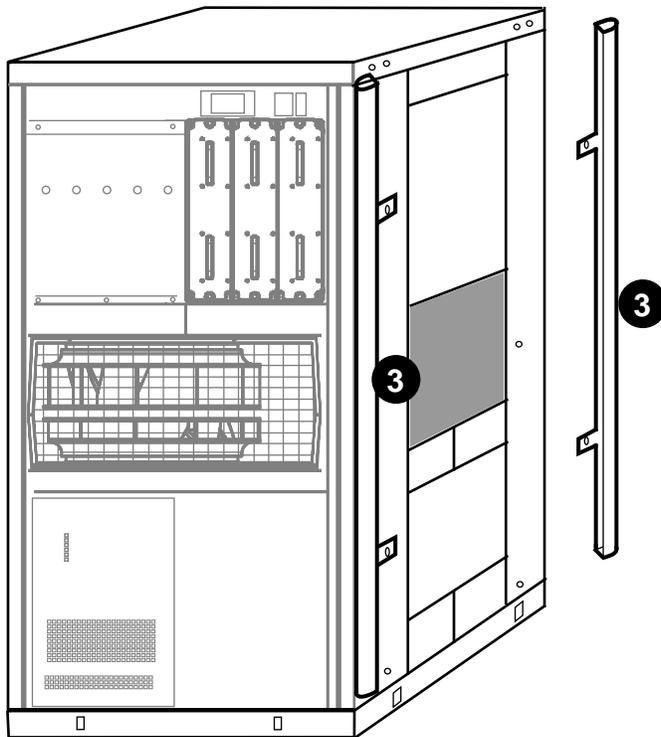
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1. Locate two side spacers in the installation kit. Side spacers are long aluminum brackets that are installed vertically between adjoining cabinets.

2. As shown in Figure 3- 6, align the holes in the side spacer tabs with the threaded inserts on a cabinet. For cosmetic purposes, make sure the finished side of the spacer faces the outside of the cabinet.

3. Use two screws from the installation kit to attach a spacer to a cabinet. Install one spacer in the front of the cabinet and one spacer in the rear of the cabinet (see Figure 3- 6).

4. Repeat 1 through 3 for each pair of adjoining cabinets.

3.7 Level All Cabinets

Level the cabinets by adjusting the rubber feet on all the cabinets and checking the cabinets with a bubble level. All holes intended for intercabinet bolts must be aligned.

Figure 3-7   Leveler Foot Adjustment

Locknut

Leveler
Hexnut
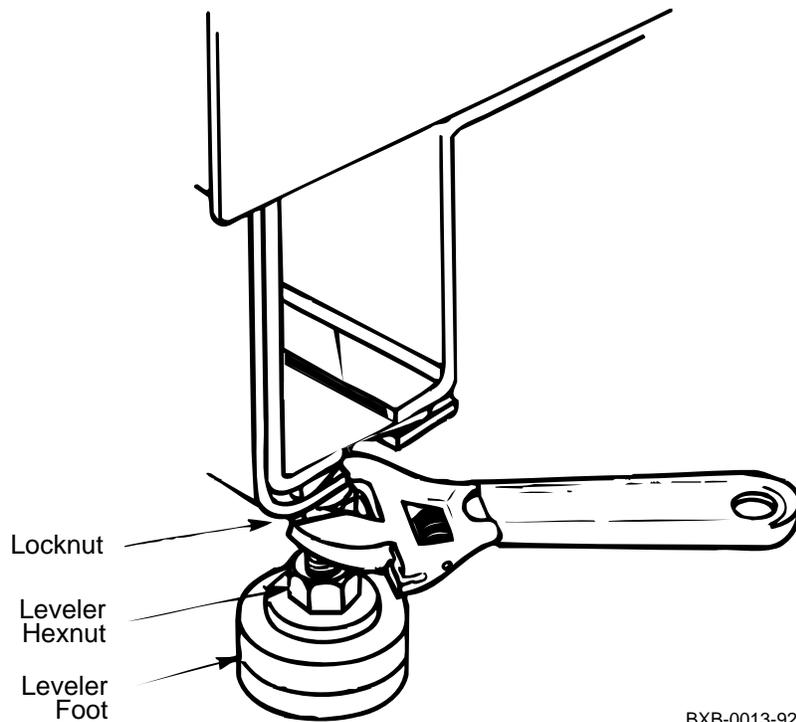
Leveler
Foot

BXB-0013-92

1. Use an adjustable wrench to lower and adjust the leveler feet. A shipping bracket can also be used to adjust the leveler feet, since the bracket cutout and leveler feet hexnuts are the same size.

2. Use a bubble level while adjusting the feet and make sure all cabinets are properly leveled in three dimensions (top to bottom, side to side, and front to rear). The operation is complete when all intercabinet bolt holes are aligned. Bolt holes are located at the tops of the cabinets and at the bottom door hinges of the cabinets.

3.8 Install Top Spacers

Insert top spacers and bolt the tops of the cabinets together.

Figure 3- 8   Installing Top Spacers
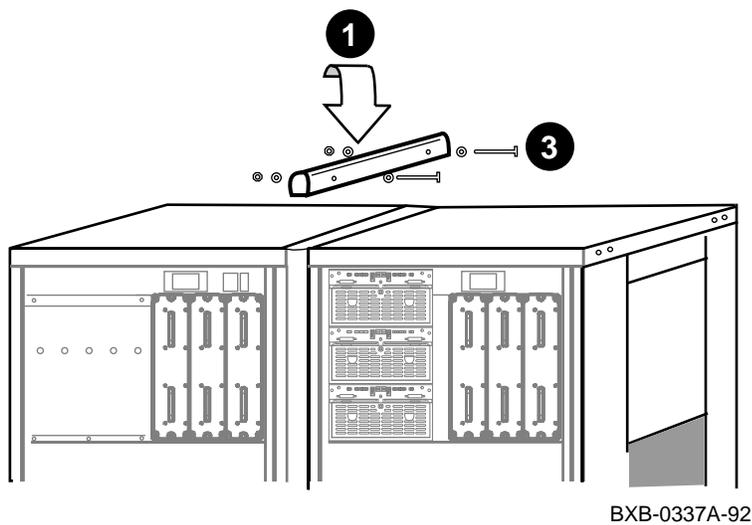
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1. Locate a top spacer in the installation kit. A top spacer is a short aluminum bracket that is installed horizontally between the tops of adjoining cabinets (see Figure 3- 8).

2. Align the two sets of holes in the top spacer with the two sets of holes in the tops of the frames of two adjoining cabinets.

3. Insert two 80 mm (3.15 in) long bolts from the installation kit (one bolt per set of holes), position accompanying washers properly, attach accompanying nuts, and tighten.

4. Repeat 1 through 3 for each pair of adjoining cabinets.

3.9 Install Bottom Spacers

Insert bottom spacers and bolt the bottoms of the cabinets together through the front and back bottom door hinges.

Figure 3-9   Installing Bottom Spacers
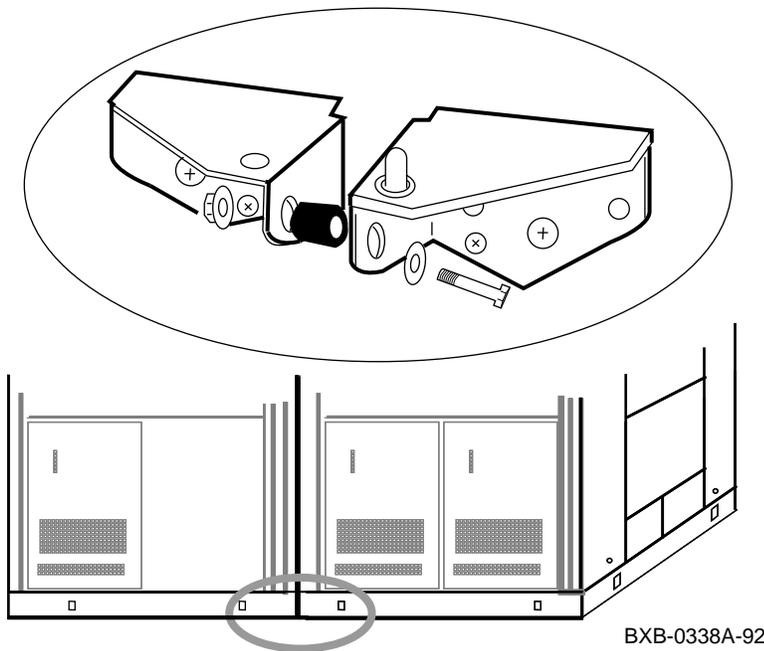
BXB-0338A-92

1. Locate two bottom spacers in the installation kit. Bottom spacers are small aluminum cylinders that are bolted between the two lower door hinges in the front and back of adjoining cabinets. In the kit, a bottom spacer is part of an assembly that includes the spacer, a 40 mm (1.6 in) long bolt, an accompanying nut, and washers.

2. Disassemble a bottom spacer assembly and insert the bolt through the holes in the lower door hinges in the front of the adjoining cabinets, making sure the bottom spacer and washers are positioned properly as you insert the bolt (see Figure 3- 9).

3. Install nut and tighten.

4. Repeat 1 through 3 for the bottom spacer in the rear of the adjoining cabinets.

5. Repeat 1 through 4 if a second expander cabinet is present.

3.10 Assemble and Install Side Skirts

Assemble and install side skirts for the cabinet assembly.

Figure 3- 10   Side Skirt Assembly and Installation
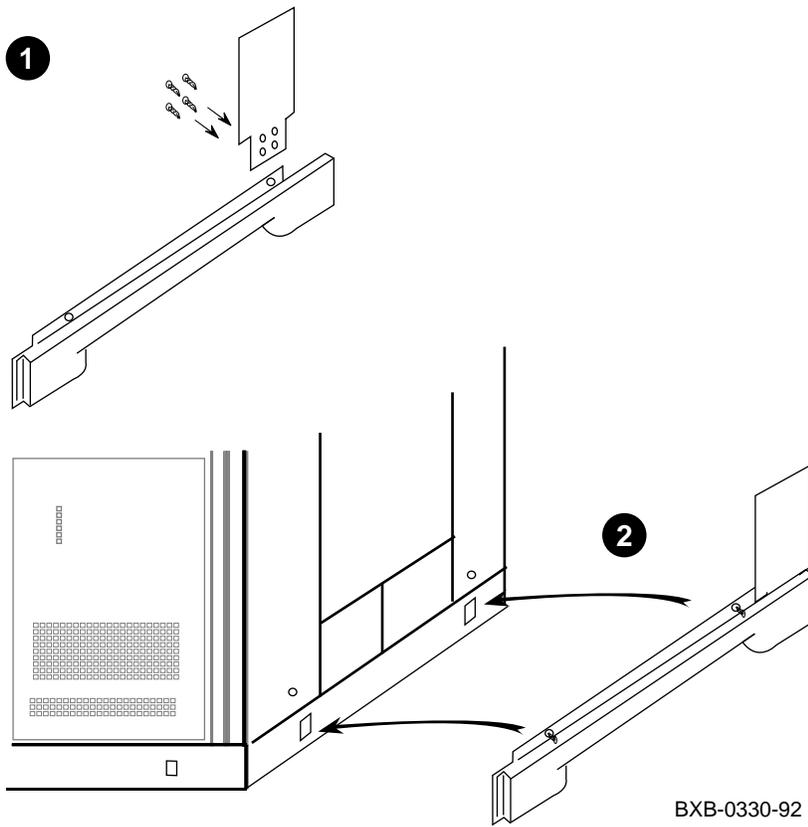
BXB-0330-92

1. Assemble a side skirt by attaching a side skirt "upper" to a side skirt "main" with four self- tapping screws (all assembly components are contained in the installation kit) as shown in Figure 3- 10.

2. Attach the side skirt to the outside base of the side of the cabinet assembly (see Figure 3- 10). This is done by aligning the two 1/4 turn Phillips fasteners in the skirt with the matching holes in the cabinet base. Then simply push the fasteners into the holes.

3. Repeat 1 and 2 for the other side of the cabinet assembly.

3.11 Assemble and Install Front Skirts

Assemble and install front skirts for all cabinets in the cabinet assembly.

Figure 3-11 Front Skirt Assembly and Installation
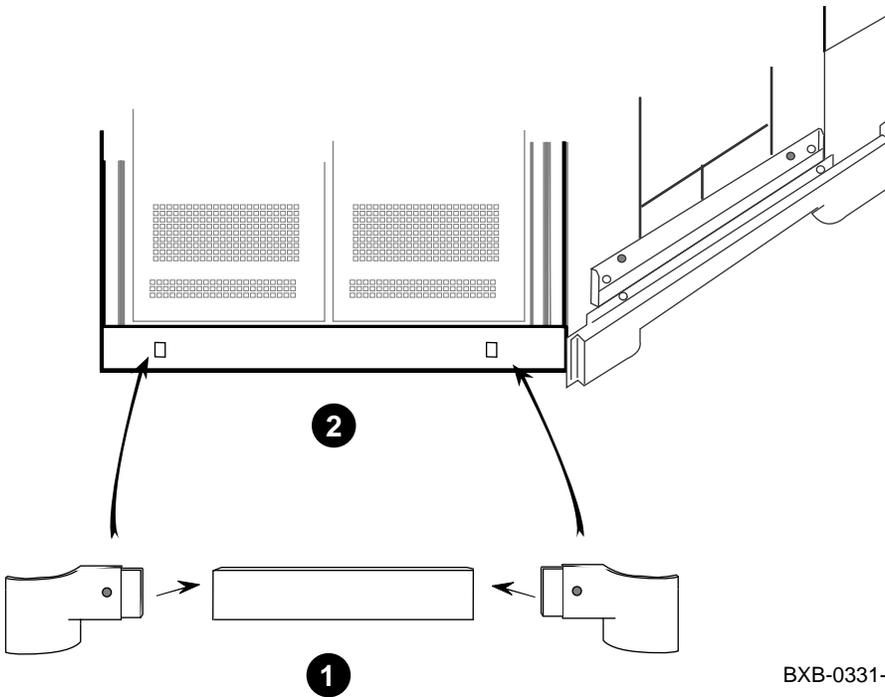
BXB-0331-92

1. Assemble a front skirt by inserting a left-hand endcap and a right-hand endcap into either end of a front center skirt piece (all assembly components are contained in the installation kit) as shown in Figure 3-11.

2. Attach the front skirt to the outside base of the front of a cabinet by aligning the two 1/4 turn Phillips fasteners in the skirt assembly with the matching holes in the cabinet base (see Figure 3-11). Then simply push the fasteners into the holes.

3. Repeat 1 and 2 for the fronts of all cabinets in the cabinet assembly.

3.12 Install End Panel on Expander Cabinet

Install the end panel and brackets removed from the system cabinet onto the expander cabinet.

Figure 3- 12 End Panel Installation

BXB-0328B-92
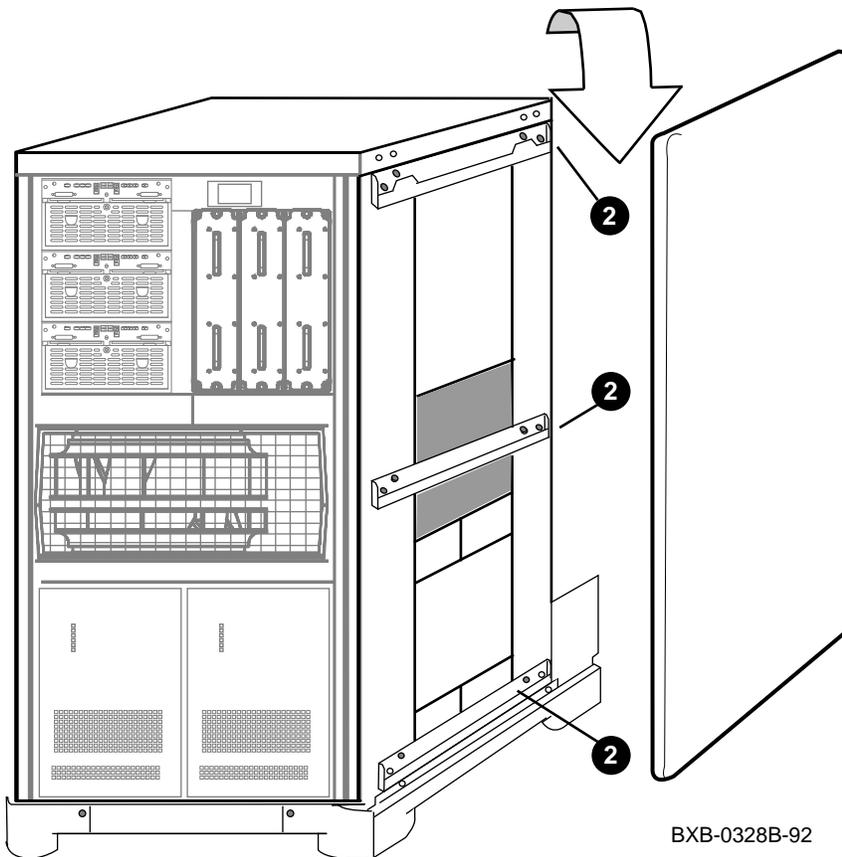
1. Locate the three end panel mounting brackets and associated screws you removed from the side of the system cabinet in Section 3.5.

2. Attach the three brackets to the expander cabinet frame exactly as they appeared on the system cabinet frame. That is, the wide bracket is at the top, and the other two are at the middle and bottom of the frame. Each bracket has a "lower lip" which should be facing upward to properly engage the end panel in the next step. Align the holes in each bracket with the corresponding threaded inserts in the frame. Then attach each bracket to the frame with two screws as illustrated in Figure 3- 12.

3. Locate the end panel and its two associated 40 mm (1.6 in) long bolts and washers you removed from the system cabinet in Section 3.5.

4. Position the end panel so that it is centered with respect to the front and back of the cabinet assembly.

5. Lift the end panel and lower it while doing the following three things simultaneously:

    a. Engage the tabs of the top bracket with the corresponding holes in the end panel;

    b. Engage the lip of the middle bracket with the corresponding groove in the end panel; and

    c. Engage the lip of the lower bracket with the corresponding groove in the end panel. When properly installed, the end panel should be tight and flush against the cabinet frame.

6. Insert the two bolts with washers from the inside of the frame through the holes in the cabinet frame and into the matching threaded inserts in the end panel.

7. Carefully tighten the bolts with a 10 mm hex socket wrench, preferably a torque wrench. Recommended maximum torque is 20 in- lbs. Do not overtighten the bolts or bumps on the end panel exterior will appear.

8. Repeat 1 through 7 for the other side of the cabinet assembly if an expander cabinet is installed.

3.13 Connect the Power Control Cable

Connect the power control cable from the control panel on the system cabinet to the cabinet control logic (CCL) module in the expander cabinet.

Figure 3- 13 Power Control Cable
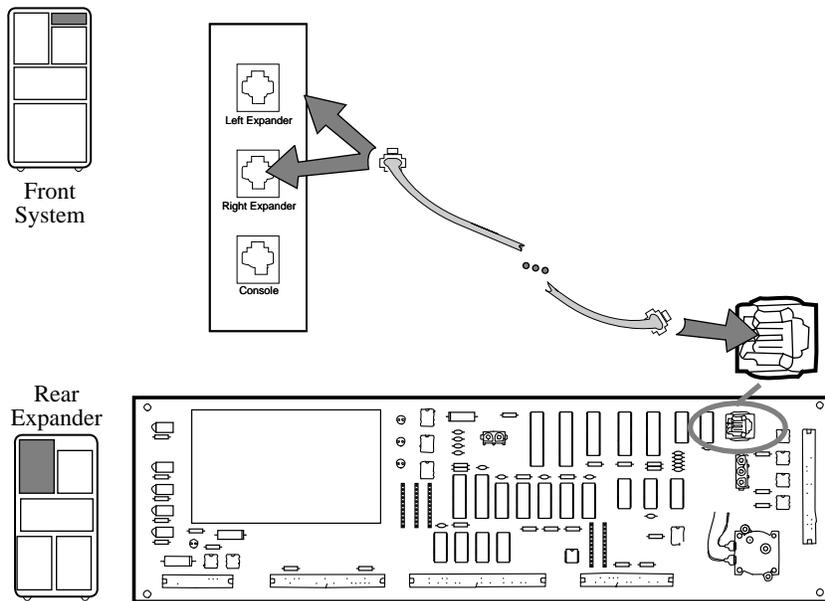
BXB-0044E-92

WARNING: *Before beginning this procedure, ensure that the system is powered off.*

1. Plug one end of the power control cable into the jack marked Right Expander located on the top right of the system cabinet as viewed from the front. If a second expander cabinet is being installed, plug another power control cable into the jack marked Left Expander.

2. Route each power control cable through the cable trough to the rear of the system cabinet and into the top of the expander cabinets.

3. Plug the other end of each power control cable into jack J2 located on the upper right of the CCL module (located in the top section of the expander cabinet).

3.14 Reinstall Cabinet Tops and Doors

Replace the tops and doors of all cabinets.

Figure 3- 14   Cabinet Tops and Doors
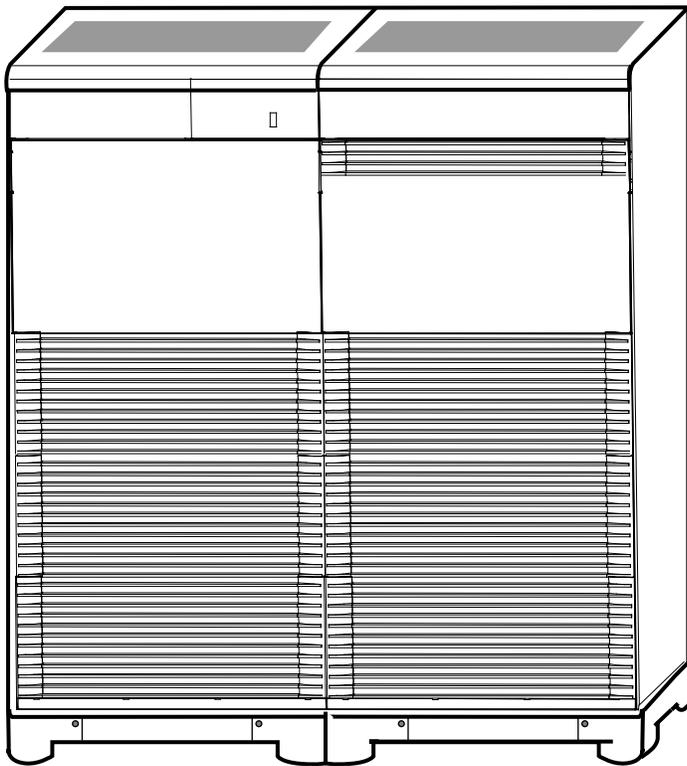
BXB-0341-92

1. Locate all front and rear doors you removed in Section 3.4.

2. To replace a door, first position the door so that the pin in the bottom hinge is inserted into the corresponding hole at the bottom of the door.

3. Lift and position the door while depressing the spring bolt until the bolt lines up with the hole in the top hinge.

4. Release the spring bolt to insert it into the top hinge.

5. Repeat 2 through 4 for all doors in the system.

6. Locate all cabinet tops and associated screws you removed in Section 3.3.

7. Replace a cabinet top by placing it on top of a cabinet so that the tab faces the rear of the cabinet; then press down.

8. Use the screw previously removed from a top to reattach the top to a cabinet frame.

9. Repeat 6 and 7 for all cabinet tops in the system. See Figure 3- 14.

3.15 Connect the I/O Cable

Connect the I/O cable(s) between the system and expander cabinets.

Figure 3-15 I/O Cable Connections

Rear
Expander
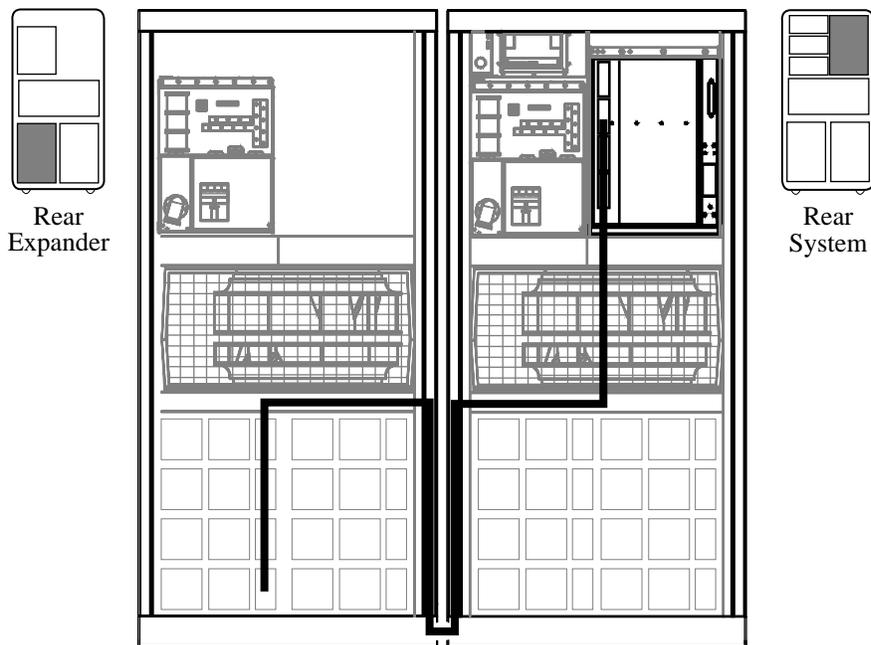
Rear
System

BXB-0032C-92

1. Open the rear doors of the system and expander cabinets.

2. Using a flathead screwdriver, install the unlabeled end of the I/O cable (DEC P/N 17- 03085- 02) to the topmost open IOP connector on the rear of the LSB card cage in the system cabinet (as shown in Figure 3- 15). Tighten the two thumbscrews to hold the I/O cable in place.

3. Bend the I/O cable 90° downward.

4. Route the I/O cable through the cable trough in the center of the blower to the expander cabinet as shown in Figure 3- 15.

5. Using a flathead screwdriver, install the end of the I/O cable labeled PIU to the XMI PIU bulkhead connector (located in lower PIU quadrant). Tighten the two thumbscrews to hold the I/O cable in place.

3.16 Connect the DSSI Cables

VAX 7000 **Connect the DSSI cable between the I/O bulkhead and the disk bricks. Connect the disk brick cables and terminators. The configuration shown here is only one of many possible configurations; the I/O bulkhead shown is in the bottom rear of the system cabinet and the disk bricks are in the upper front of the expander cabinet. The installation guidelines here, however, are generally applicable.**

Figure 3-16 DSSI Cable Connection

Rear
System

Front
Expander
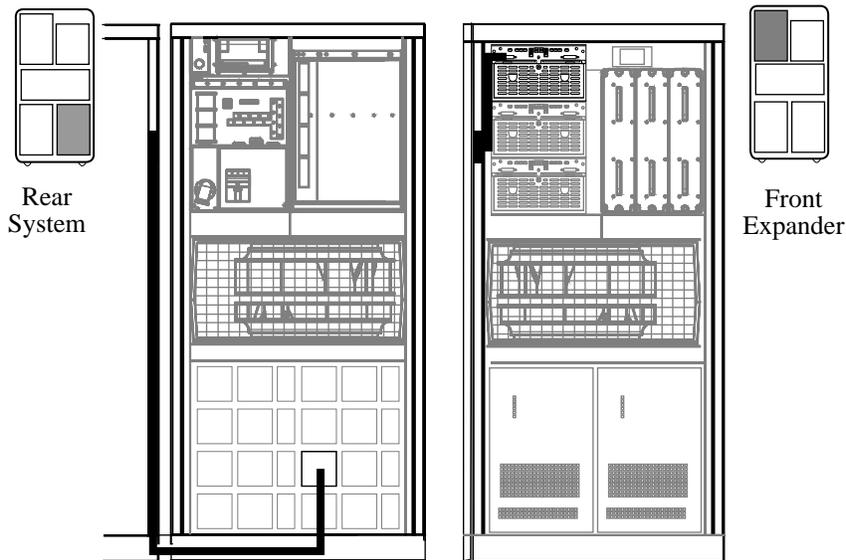
BXB-0032E-92

1. Attach one end of the DSSI cable (BC21Q-06 or BC21Q-09) to the XMI PIU bulkhead connector in the rear of the system cabinet (see Figure 3-16). If necessary, install a terminator plug to properly terminate this end of the DSSI cable.

2. Route the DSSI cable through the upper cable trough on the right rear of the system cabinet to the front of the expander cabinet. Now route the DSSI cable to the topmost disk brick.

3. Attach the end of the DSSI cable to the left hand connector of the disk brick in the top of the disk PIU. If only one disk brick is present, at-tach a terminator plug to the other connector (see Figure 3-17).

4. If two or more disk bricks are present, use short jumper cables (BC21Q-01) to daisy-chain the disk bricks (see Figure 3-17) on a single channel. Install the jumpers and terminator as shown in Figure 3-17.

Figure 3-17   Cabling and Terminating Disk Bricks
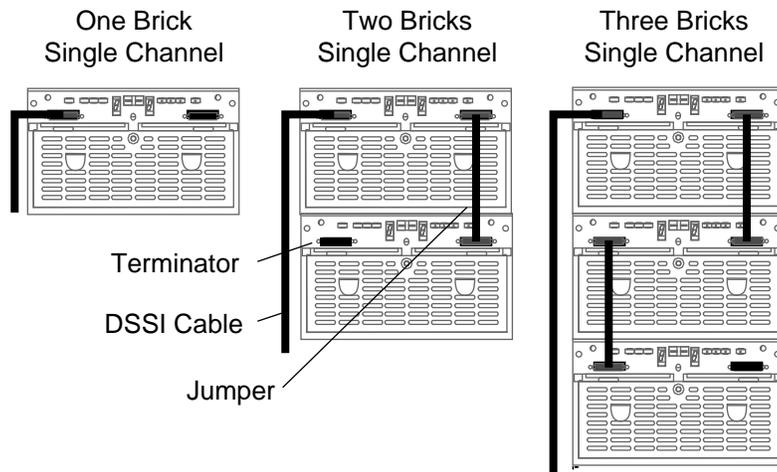
BXB-0342-92

For more information:

RF Series Integrated Storage Element User Guide

Chapter 4

Making Console, Ethernet, and FDDI Connections

This chapter describes how to connect a console terminal and how to make Ethernet and FDDI connections. It consists of the following sections:

- Connect the Console Terminal
- Connect the Ethernet Cable
- Connect the FDDI Cable

4.1 Connect the Console Terminal

Figure 4-1 shows a system cabinet with a console terminal. Connect the console terminal to the console terminal port in the system cabinet as shown in Figure 4-2.

Figure 4-1   System Cabinet, Console Terminal, and Printer
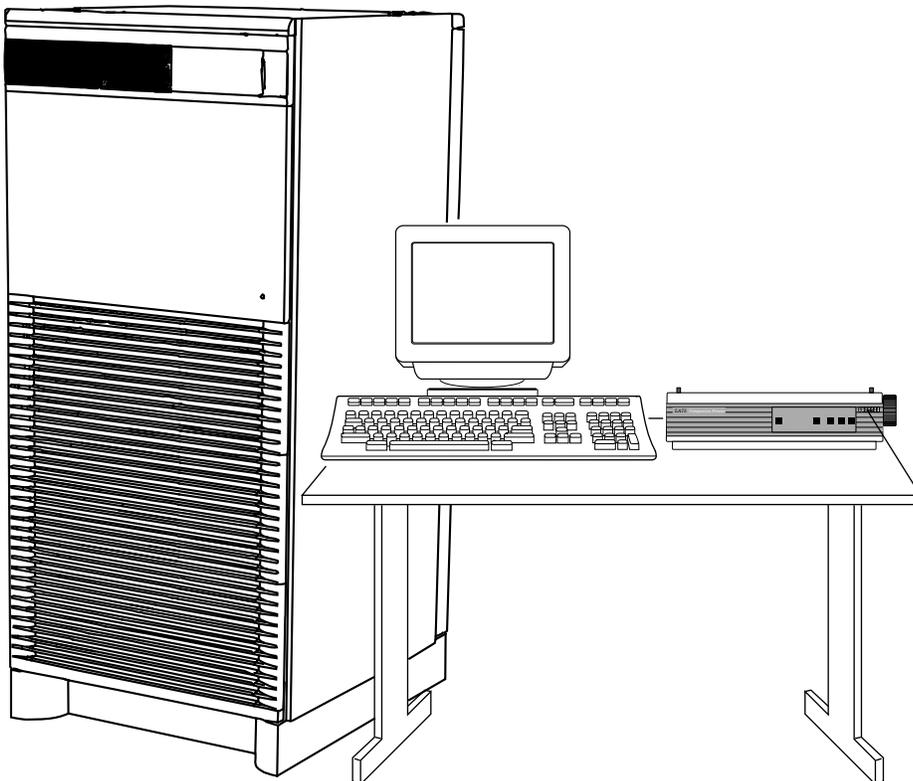
BXB-0023-92

CAUTION: The system cabinet, console terminal, and printer should all use the same power distribution source to ensure a common ground.

1. Unpack the VT420 console terminal. The console terminal signal cable is shipped in the loose piece box and consists of a 17- 01364- 02 cable and H8575- A adapter.

2. Connect one end of the 17- 01364- 02 cable to the connector to the right of the control panel. Connect one end of the cable ground wire to the cabinet grounding screw nearby (see Figure 4- 2). Connect the other end of the cable to the H8575- A, which connects to a 25- pin D-subminiature connector on the console terminal. Connect the other end of the cable ground wire to one of the screws on the H8575- A.

3. If an LA75 printer is not present, skip this step. Unpack the LA75 printer. Connect the BC16E- 25 signal cable to the printer and to the console terminal. Plug in the printer.

4. The following are the default terminal characteristics. If the terminal does not have these characteristics, they must be set accordingly:

•   Baud rate = 9600 (transmit = receive)

•   8 bits, no parity

•   1 Stop Bit

•   Xoff at 64

Figure 4- 2   Control Panel and Console Terminal Port

BXB-0015C-92
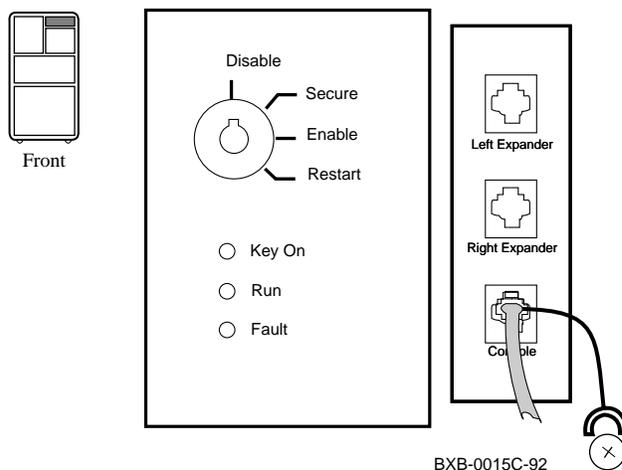
For more information:

Installing and Using the VT420 Video Terminal
LA75 Companion Printer Installation and User
Guide

4.2 Connect the Ethernet Cable

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

Figure 4- 3   I/O Panel–Ethernet Port

I/O Bulkhead

Ethernet
Port

Rear

BXB-0063-92
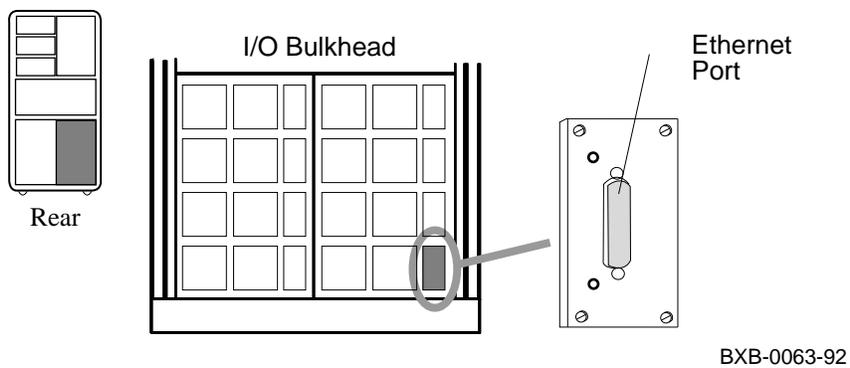
The DEC LANcontroller 400 (DEMNA) adapter connects to the Ethernet via a BN3x or BN4x transceiver cable.

1. Remove the rear panel shield and connect the transceiver cable (E0-BNE3H- 05) to the Ethernet port on the I/O bulkhead panel (see Figure 4- 3).

2. Connect the other end of the cable to an Ethernet transceiver. See the appropriate Ethernet transceiver manual for more information.

For more information:

DEC LANcontroller 400 Installation Guide

4.3 Connect the FDDI Cable

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

Figure 4- 4   I/O Panel–FDDI Port

I/O Bulkhead

FDDI
Port

Rear

BXB-0311-92
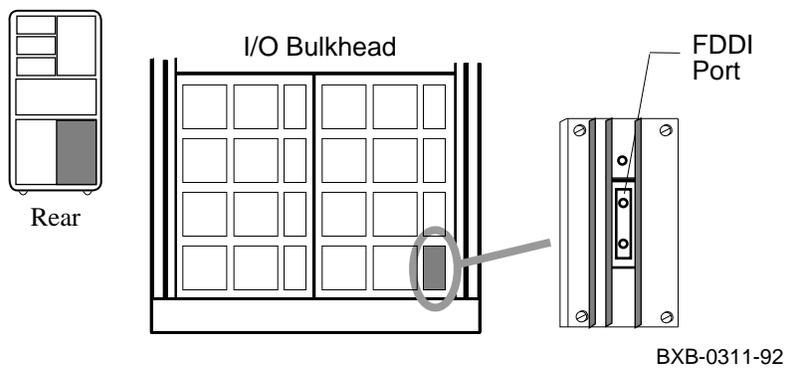
The XMI- to- FDDI controller (DEMFA) adapter connects to the FDDI ring via a BN24B- 10 transceiver cable.

1. Remove the rear panel shield and connect the transceiver cable to the FDDI port on the I/O bulkhead panel (see Figure 4- 4).

2. Connect the other end of the cable to the FDDI network. See the appropriate FDDI manual for details on how this is accomplished.

For more information:

DEC FDDIcontroller 400 Installation/Problem Solving

Chapter 5

Connecting to a DSSI Subsystem

> **VAX 7000** **This chapter provides installation procedures for installing TF tape and RF disk drives (known as integrated storage elements or ISEs) with the Digital Storage System Interconnect (DSSI) bus supported by the KFMSA-BA adapter. General information on DSSI topics is provided in Appendix A and Appendix B.**

Sections in this chapter include:

- DSSI Installation Overview
- Single-Host Systems
- KFMSA-BA Adapter
- Cables
- Install DSSI Cables to ISEs
- Set Node IDs

5.1 DSSI Installation Overview

This chapter provides guidelines for installation. Please refer to the manuals listed in Table 5-1 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 the ISEs as required (see Table 5-2).

Table 5-1   DSSI and Related Documentation

Title	Description
DSSI VAXcluster Installation and Troubleshooting Manual (EK-410AA-MG)	Multi-host mixed DSSI VMScluster systems. Includes configuration rules, supported ISEs, and detailed installation instructions.
KFMSA Module Installation and User Manual (EK-KFMSA-IM)	For installing KFMSA-BA adapters into existing systems. Describes setting termination and node IDs for the adapters.
KFMSA Module Service Guide (EK-KFMSA-SV)	Troubleshooting and module diagnostics for the KFMSA-BA adapter.
TF85 Cartridge Tape Subsystem Owner's Manual (EK-OTF85-OM)	Operating and user instructions for the TF85 tape drive.
TF85B Tape Subsystem Overview (EK-TF85B-OV)	Overview of the TF85 tape subsystem including configuration rules, booting, and field-replaceable units.
DEC 7000 AXP System VAX 7000 Console Reference Manual (EK-70C0B-TM)	Discusses the **cdp** and **set host –dup** commands for configuring DSSI subsystems and running resident DUP diagnostics.

Table 5-2 DSSI Installation

Location	Single-Host Configuration	DSSI VMScluster
Cable Installation		
ISE in VAX 7000	No change. All cables are factory installed.	Attach cables from disk PIU to additional host systems.
Bus Termination		
System and expander cabinet	Install termination on each unused connector as necessary.	
Node ID Settings		
KFMSA-BA	No change. Leave at factory setting of node ID 7.	Set second host node ID to 6, a third host to 5, and a fourth host to 4.
ISEs	No change. Should be set correctly at factory. Tapes are set to node ID 0; through-bus configuration node IDs are 1 to 4; split-bus configuration node IDs are 5 and 6.	
ISE Parameter Changes		
ISEs	See *KFMSA Module Installation and User Manual* for directions on changing parameters.	
Adding Hosts to Existing DSSI Subsystems		
New and original hosts	Reconfigure DSSI storage bus, setting node IDs, termination, and possibly changing split-bus.	

For more information:

Appendix A and Appendix B of this manual

KFMSA Module Installation and User Manual

5.2 Single-Host Systems

A single-host configuration consists of a VAX 7000 system connected to ISEs on the DSSI bus. The ISEs can be in the system cabinet or in expander cabinets.

Figure 5-1   Single-Host System

BXB-0072A-92
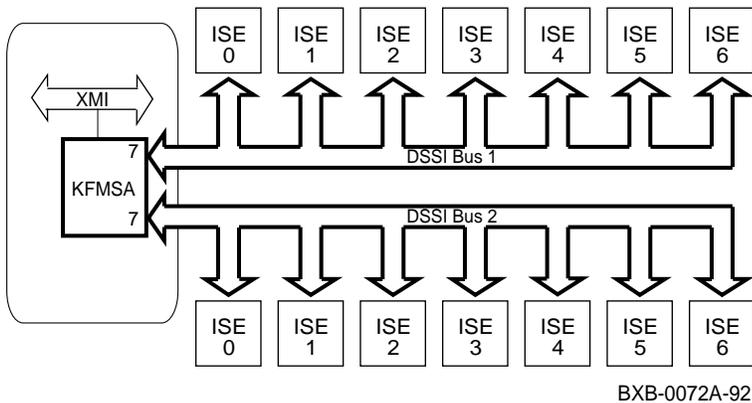
A VAX 7000 system can have a maximum of 84 RF drives and a TF tape drive in the system cabinet and expander cabinets. The system cabinet can hold up to 12 RF drives and each expander cabinet can contain 36 RF drives. Up to 12 KFMSA-BA adapter modules are supported on the system.

On single-host systems, disk PIUs in expander cabinets are cabled as through-bus.

For more information:

KFMSA Module Installation and User Manual

KFMSA Module Service Guide

5.3 KFMSA- BA Adapter

**VAX 7000 systems support DSSI using the KFMSA- BA adapter in-
stalled in the XMI card cage. Each KFMSA- BA supports or has two
DSSI buses. The KFMSA- BA has diagnostic LEDs and reports
status to the system self- test display.**

Figure 5- 2   KFMSA- BA LEDs

BXB-0071-92
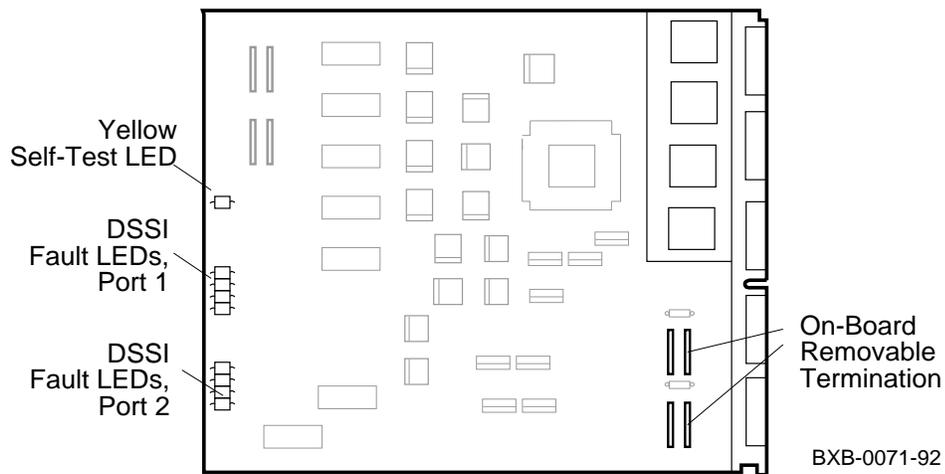
The KFMSA- BA runs a self- test during power- up and the console displays results on the system self- test display. The yellow LED on the KFMSA- BA lights to indicate that self- test passed.

If a KFMSA- BA fails self- test, check the diagnostic LEDs on the module. Two sets of four red LEDs report status for each of the logical ports associated with the two physical buses.

The KFMSA- BA adapter has removable termination; with the termination present on the module, it supports single- and dual- host subsystems, and with the termination removed supports tri- and quad- host subsystems.

Of the eight nodes configured between any two terminators on KFMSA- BA adapters, one to three nodes can be KFMSA- BA adapters. The remaining nodes can be RF disk or TF tape integrated storage elements (ISEs).

For more information:

KFMSA Module Installation and User Manual

KFMSA Module Service Guide

5.4 Cables

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

Figure 5- 3   I/O Ports for DSSI Cables

I/O Panel

BXB-0073C-92
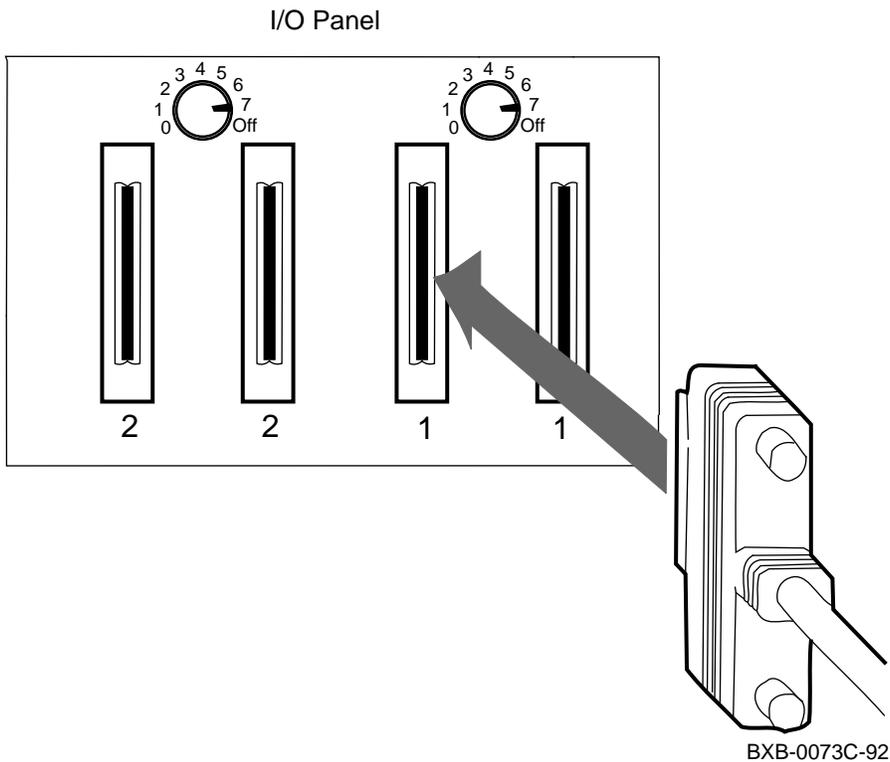
*NOTE: For standalone systems with DSSI PIUs, node ID settings are fac-
tory set to 7 and require no change. For multi- hosts, reset node ID
settings as required.*

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

The overall physical bus length is limited to 24 m (80 ft). 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 expander cabinet.

Removable terminators must be properly installed. See the *DSSI VAXcluster Installation and Troubleshooting Manual* and the *KFMSA Module Installation and User Manual* for specific instructions on where and how to install the terminator(s).

Table 5-3 DSSI Cable Kits

P/N	Qty—Length	Function
CK-SF200-LM	1 108 in (2.7 m) 1 70 in (1.8 m)	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 in (1.2 m)	Internal cable set, connecting XMI backplane at KFMSA adapter to XMI I/O bulkhead on the VAX 6000 system. Used when the VAX 6000 is the end node of a DSSI subsystem.
CK-KFMSA-LN	2 48 in (1.2 m)	Internal cable set, connecting XMI backplane at KFMSA adapter to XMI I/O bulkhead on VAX 7000/10000 systems. Used when the VAX 7000/10000 is not an end node of a DSSI subsystem.

> **For more information:**
>
> *DSSI VAXcluster Installation and Troubleshooting Manual*
> *KFMSA Module Installation and User Manual*

5.5 Install DSSI Cables to ISEs

**Each KFMSA- BA module has two separate DSSI buses (ports). At-
tach ISEs to the DSSI bus by cabling them to the XMI I/O bulkhead
at the appropriate DSSI connector. Record bus and node ID on
configuration sheets. See Figure 5- 4.**

Figure 5- 4   DSSI Cable Installation

KFMSA Node ID Select Knob

BXB-0073A-92
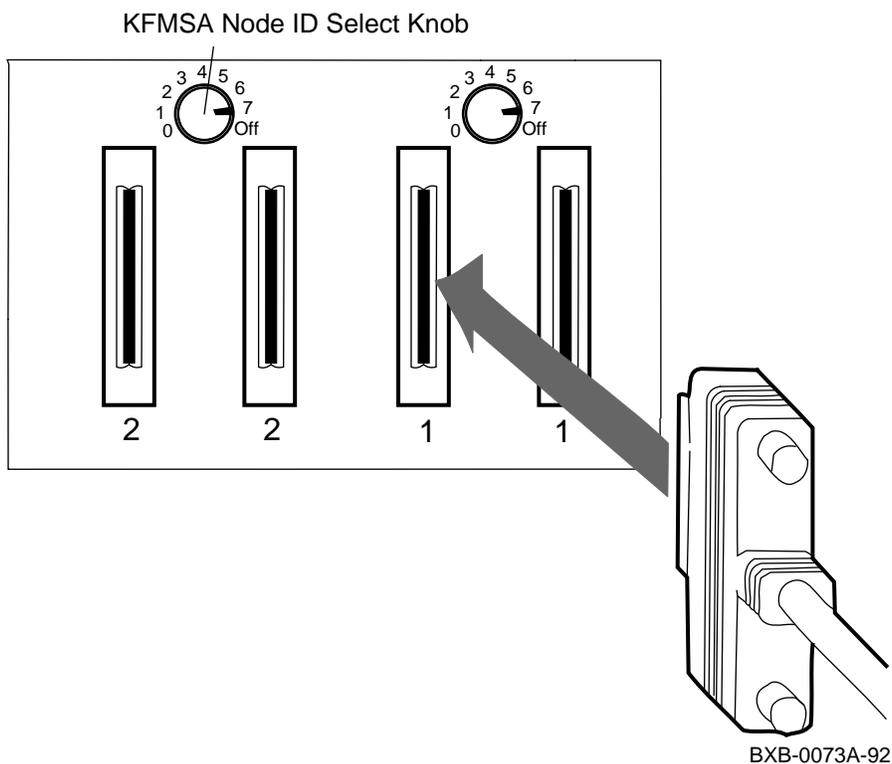
1. **XMI Node Number**
   Locate the XMI slot of the KFMSA- BA by looking in the XMI card cage. The XMI node number and physical slot number are the same.

2. **DSSI Bus Number**
   Each KFMSA- BA module has two separate DSSI buses (ports) cabled from XMI backplane sections D and E. The cable from section D (up per 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. Note that for communication to occur, the host software must identify which DSSI bus is attached to which ISE. Use the color- coded labels (from the *KFMSA Module Installation and User Manual*) at each connector end of a cable to make maintenance easier. Record the label colors on the configuration sheet, also found in the manual.

When attaching the cables to a disk PIU:

1. Open the cabinet door.

2. For each populated bus, install one external cable to one of the KFMSA- BA disk controller ports. Tighten the two screws that secure each cable to the XMI I/O bulkhead.

3. If the system has more than one KFMSA- BA adapter, install additional DSSI cables to the XMI I/O bulkhead, as above.

4. Install terminators where needed.

For more information:

KFMSA Module Installation and User Manual

5.6 Set Node IDs

Node IDs are factory set and usually do not require changing. If required, set the KFMSA- BA node ID on the XMI I/O bulkhead. Set the DSSI node IDs for the ISEs using the switches on the disk PIU. Record the IDs on the configuration sheet.

Figure 5- 5   Setting the KFMSA- BA Node ID on the I/O Panel

KFMSA Node ID Select Knob
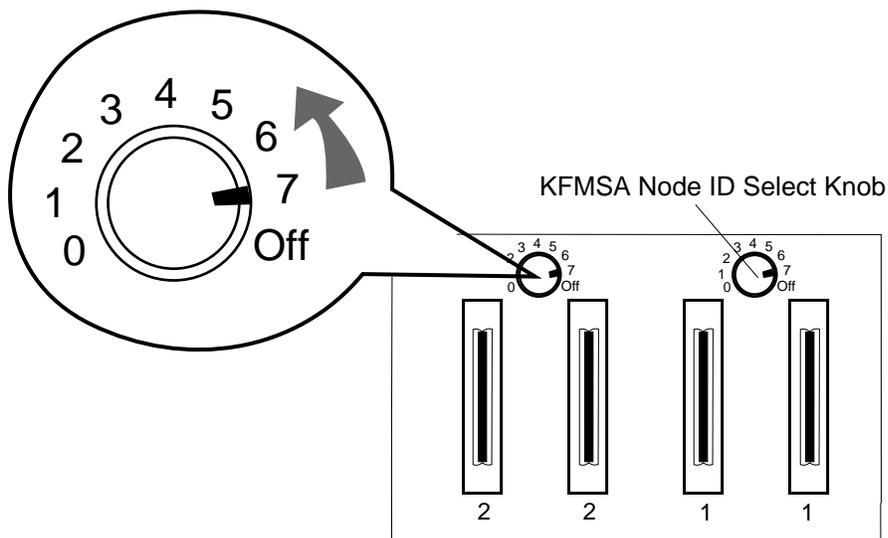
BXB-0073B-92

The node IDs for KFMSA- BA modules are factory set with both ports having the node ID of 7. KFMSA- BA node IDs for single- host systems do not have to be changed. For a dual- host system, the second host system's KFMSA- BA node ID must be set to 6. On a tri- host system, the third host system's KFMSA- BA node ID must be set to 5. On a quad- host system, the fourth host system's KFMSA- BA node ID must be set to 4.

If the second and third hosts have multi- host I/O panels (as shown in Figure 5- 5), use the KFMSA- BA select knob to change the KFMSA- BA node ID.

If required, set the DSSI node IDs for the ISEs using the switches on the disk PIU.

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.*

In addition to the physical space 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.

For more information:

KFMSA Module Installation and User Manual

Chapter 6

Connecting to a CI VMScluster

VAX 7000 | **VAX 7000 systems interface with various devices and systems through XMI bus adapters. The CIXCD adapter connects the VAX 7000 system through the XMI bus to a VMScluster. If your system connects to a DSSI subsystem, this installation must be done before the CI connections (see Chapter 5).**

Sections in this chapter include:

- CIXCD Installation Configuration Rules
- Setting CIXCD Parameters
    - Setting the VMScluster Node Address (Mandatory)
    - Verifying Quiet Slot DELTA Time = 10 (Mandatory)
    - Setting Boot Time (Optional)
    - Setting Extend Header, Extend ACK Timeout, and Disable Arbitration (Optional)
    - Setting Cluster Size (Optional)
- Cabling the System to a Star Coupler

6.1 CIXCD Installation Configuration Rules

Follow these rules to install a CIXCD adapter for the HSC, adapters on other CI nodes, and the CIXCD itself. The key parameter to be set is the 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 6-1   CIXCD Jumper to Set Quiet Slot DELTA Time
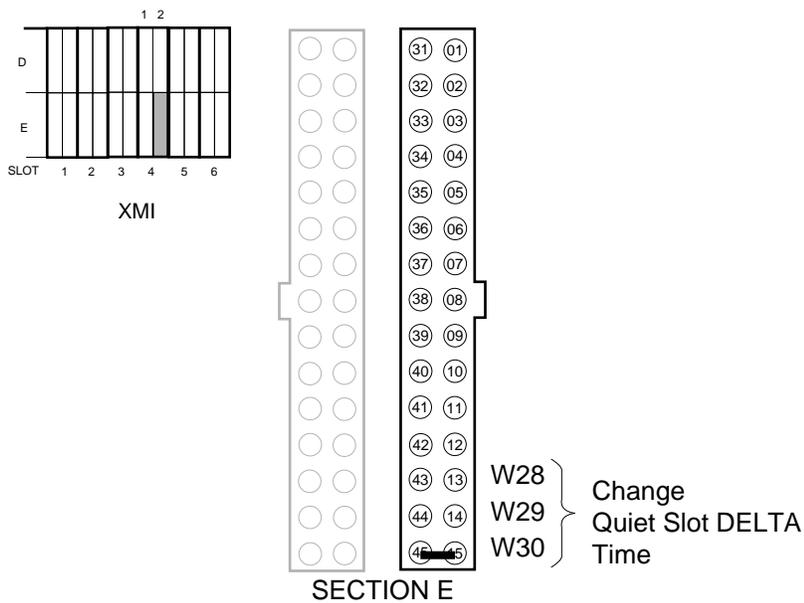
BXB-0036-92

To install a system with a CIXCD adapter into an existing cluster, there are mandatory steps. The first four steps apply to the VMScluster 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 Manual* for details.

2. Set the Quiet Slot DELTA Time to 10 on all nodes installed on the cluster. Every CI node must have Quiet Slot DELTA Time set to 10.

3. Check that the OpenVMS version running on all nodes is compatible with the new version of OpenVMS being installed. This is done by checking the OpenVMS versions against the Software Product Description or the required OpenVMS version for your system.

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

You cannot leave a **default** configuration. You must **change** the Quiet Slot DELTA Time to 10. The default configuration for a system without jumpers installed is:

- CI Node Address = 0
- Quiet Slot DELTA Time = 7 **(must be set to 10)**
- Boot Time = 1500 seconds
- Normal CI Arbitration
- Normal Header systems in the cluster
- Cluster Size = 16
- Short ACK Timeout

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

> **For more information:**
>
> ***HSC Installation Manual***

6.2 Setting CIXCD Parameters

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

Figure 6‑2   XMI Backplane Segments D and E
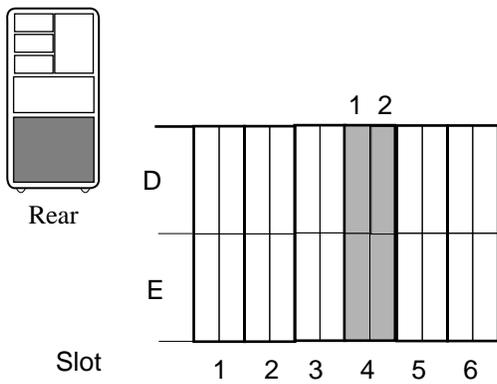
BXB-0038-92

Refer to Figure 6- 2 to determine which jumper corresponds to which back-plane pin. The XMI backplane contains 29 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 can be modified by jumper placement are the following:

- Set CI port address (mandatory)
- Set Quiet Slot DELTA Time to 10 (mandatory)
- 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 and the I/O bulkhead door. Use a flash-light for best visibility.

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. Install jumpers between backplane pins to set the desired module pa-rameters.

4. Close the I/O bulkhead door and the cabinet door.

For more information:

CIXCD Interface User Guide

6.2.1 Setting the VMScluster 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 6-1 and Table 6-2.

Figure 6-3   Jumper Locations for CI Port Address
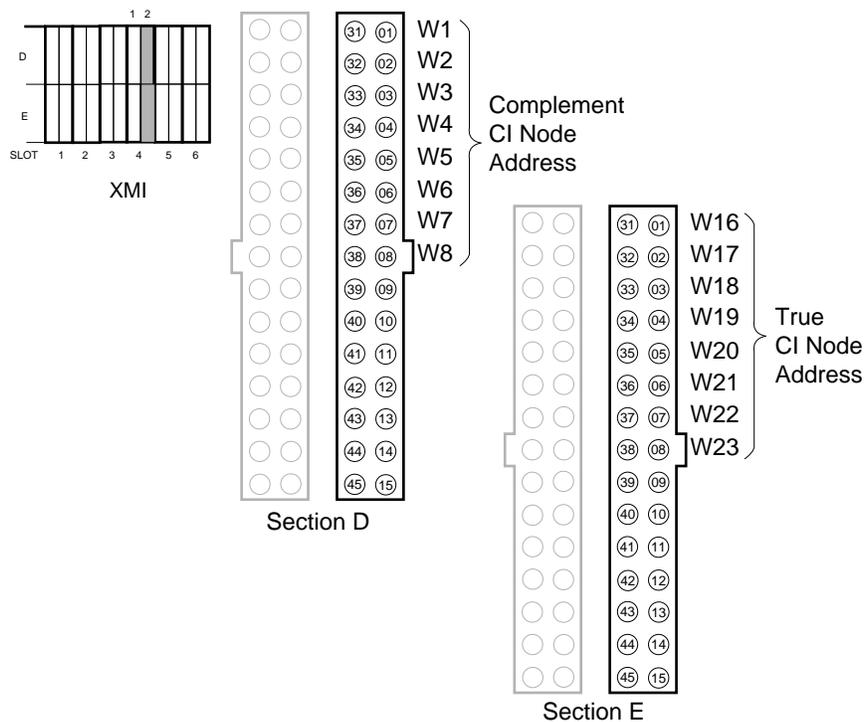
BXB-0037-92

Table 6- 1   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 6- 2   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 D8/38
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 224–255 are reserved for Digital.

6.2.2 Verifying 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 Quiet Slot DELTA Time. See Table 6-3.

Figure 6-4   Set Quiet Slot DELTA Time Jumpers
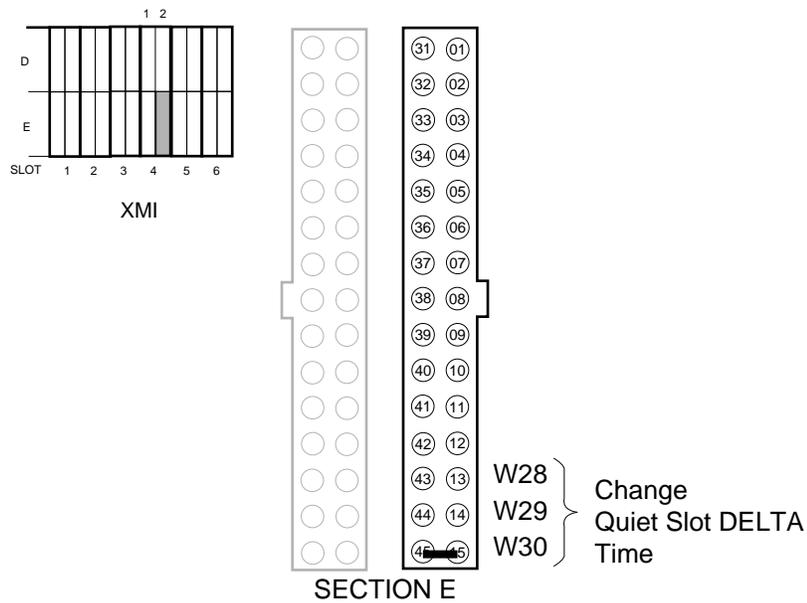
BXB-0036-92

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.

For new systems just being installed, manufacturing should have jumpered pins E45 and E15 (see Figure 6-4). Check the backplane at segment E. Jumper these pins if they are not already jumpered.

Table 6-3 Quiet Slot DELTA 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

6.2.3 Setting Boot Time (Optional)

Boot time is the length of time the port waits after power-up to exit the UNINIT state. See Table 6-4. The default setting has all jumpers set to out, with 1500 seconds as the boot time.

Figure 6-5   Jumper Locations for Boot Time
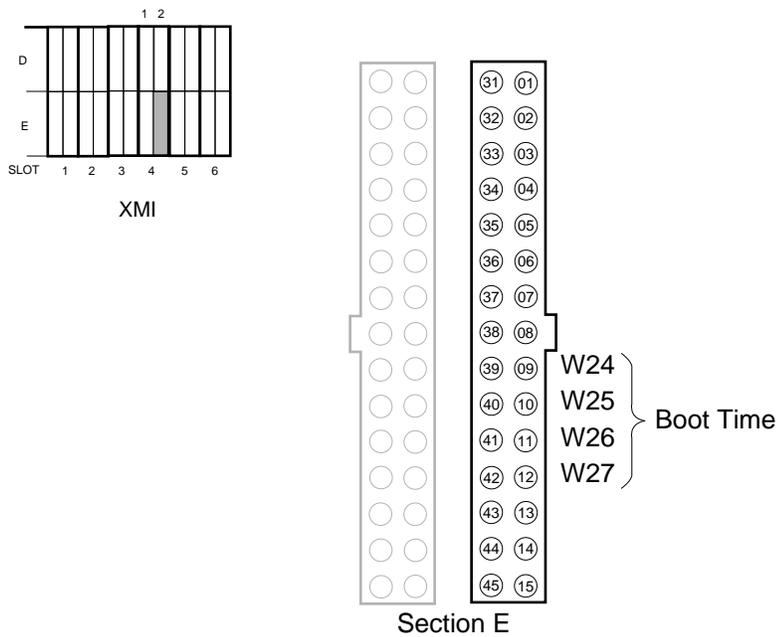
BXB-0080-92

Table 6-4   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

For more information:

HSC Installation Manual

6.2.4 Setting Extend Header, Extend 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 6-6   Jumper Pins for Extend Header, Extend ACK Timeout, and Disable Arbitration

W10 Disable ARB
W11 Extend Header
W12 Extend ACK TO
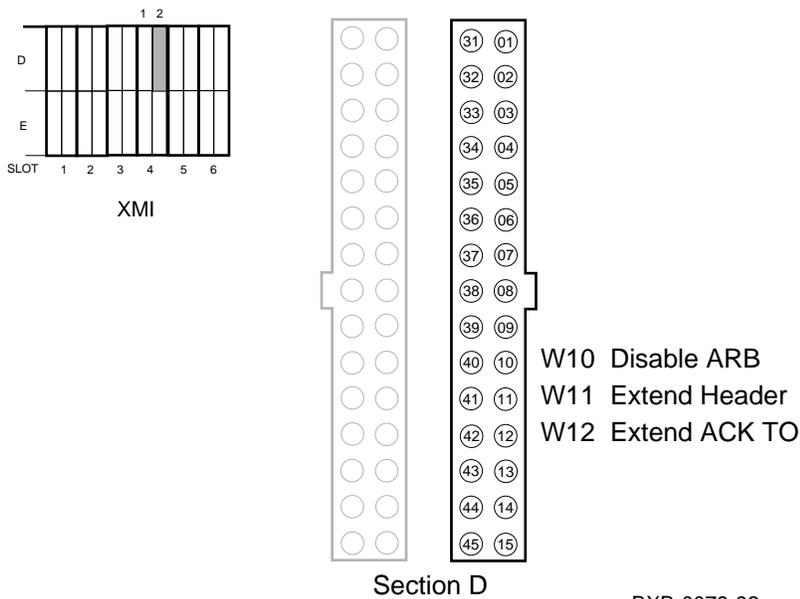
Section D

BXB-0079-92

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 time-out 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 selection 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   =   Normal CI arbitration (default)
Jumper IN   =   Disable normal CI arbitration

For more information:

HSC Installation Manual

6.2.5 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 6-5.

Figure 6-7   Cluster Size Jumpers

Section D
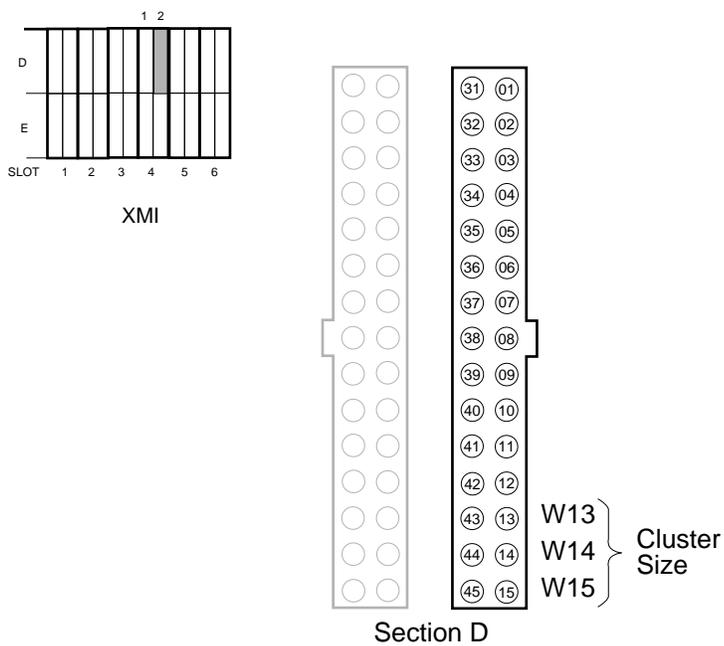
BXB-0081-92

Table 6-5 Cluster Size Backplane Jumpers

Node Count (decimal)	W13 E13/43	W14 E14/44	W15 E15/45
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

For more information:

HSC Installation Manual

6.3 Cabling the System to a Star Coupler

Attach two pairs of BNCIA cables to the XMI I/O panel for the VMScluster connection. Figure 6-8 shows the connectors on the VMScluster port.

Figure 6-8   VMScluster Port Connectors

BXB-0039A-92
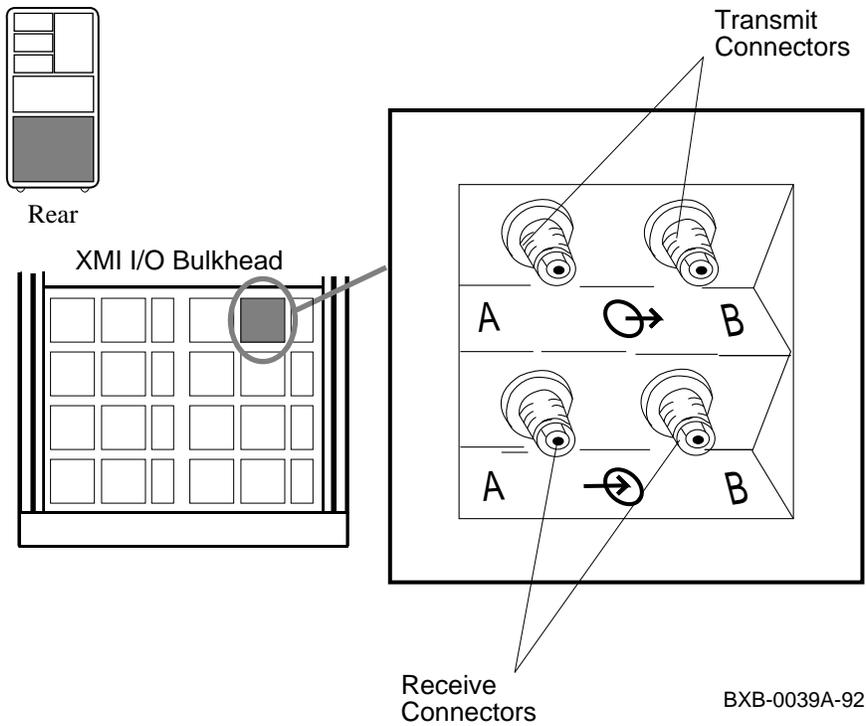
At the rear of the system cabinet:

1. Open the door.
2. Attach the cables to the VMScluster port by hand. Screw the TNC type connectors into the receptacles and label the cables.
3. Route the cables to the SC008.

BNCIA cables can be ordered in these lengths:

- BNCIA-10 10 m (32 ft)
- BNCIA-20 20 m (65 ft)
- BNCIA-45 45 m (145 ft)

For more information:

SC008 Star Coupler User's Guide

Chapter 7

Powering Up the System

This chapter provides an overview of the power- up procedure for the system.

Sections include:

- Prepare to Check the AC Power
- Measure the AC Power
- Turn the Power On and Check Indicators

7.1 Prepare to Check the AC Power

As a preliminary step before checking the AC power, make sure that the power cable is not plugged in and that the breaker switch is off.

Figure 7-1 Circuit Breaker

A - Regulator slot A
B - Regulator slot B
C - Regulator slot C
S - Sensor circuit

Rear

Front

Power
Regulators

C B A S

Breaker
Indicator

BXB-0049C-92
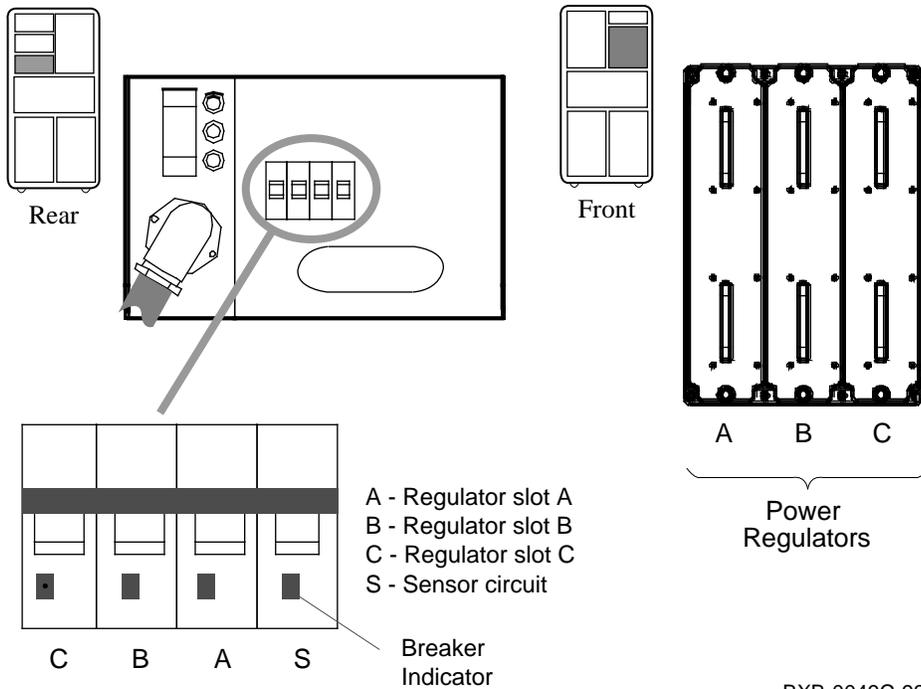
1. At this point, the AC power cord should still be unplugged.
2. Pull down the circuit breaker handle on the AC input box (see Figure 7- 1).
3. At the control panel, make sure the keyswitch is in the Disable position.

The circuit breaker controls power to the system. For normal operation, the circuit breaker must be in the on position, in which the handle is pushed up. To shut the circuit breaker off, push the handle down.

Current overload causes the circuit breaker to trip to the off position, so that power to the system is turned off.

7.2 Measure the AC Power

With a digital multimeter, check the AC power supplied at the receptacle at the installation site.

Figure 7- 2   Measuring System Power
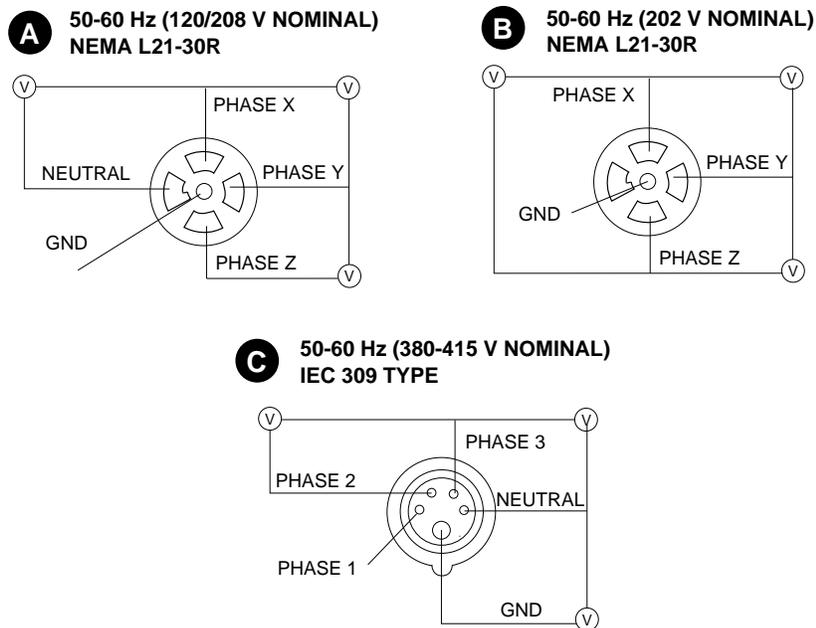
BXB-0040-92

1. Check that the receptacle provided is correct. This should have been done during site preparation.

2. Using a voltmeter, measure the voltages between all three phases and each phase to neutral (see Figure 7-2). Verify that the voltages are within the range specified in Table 7-1. If the voltages are out of range, contact an electrician.

3. Plug the power cord into the receptacle.

Table 7-1   AC Input Voltage Specifications

Voltage Measurement	208V Ⓐ Nominal	202V Ⓑ Nominal	380V Ⓒ Nominal	415V Ⓒ Nominal
phase–phase	180–220V	180–220V	331–407V	360–443V
phase–neutral	104–128V	None	190–235V	208–256V

NOTE: In some installations, power regulators must be balanced so the AC power distribution system will not be overloaded. Balancing means connecting AC power so that the loads from the regulators are evenly distributed among the AC phases. This ensures that any one phase does not draw excessive power. Power regulators may be moved to different slots to balance the load among AC phases.

For more information:

Site Preparation Guide

7.3 Turn the Power On and Check Indicators

**Power up the system by pushing up the circuit breaker handle on
the AC input box. Place the keyswitch in the Enable position; then
monitor the state of the system as it is powering up.**

Figure 7- 3   CCL and Control Panel LEDs
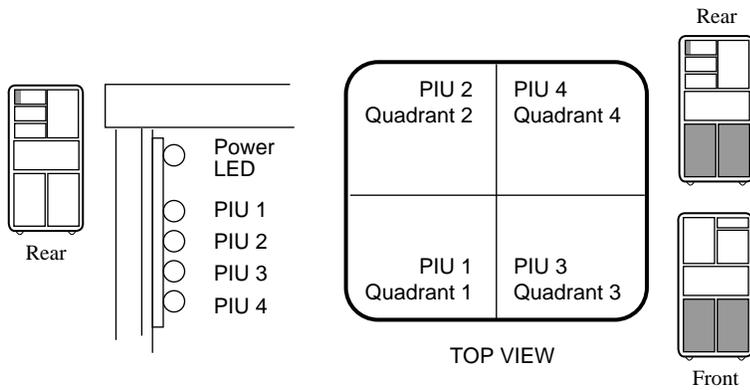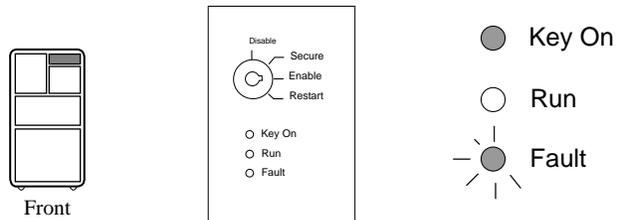
BXB-0044F-92

1. Turn the power on by pushing the circuit breaker handle up.

2. Go to the front of the cabinet and check that the green power regulator LED(s) are blinking.

3. Place the control panel keyswitch in the Enable position. The following should occur (see Figure 7- 3):

   a. The yellow Fault indicator on the control panel blinks indicating power sequencing is taking place.

   b. The blower turns on.

   c. The yellow Fault indicator stays on continuously for a short time indicating self- test is taking place. Module self- test LEDs light as described in Section 8.1 and a self- test console display appears on the console terminal as described in Section 8.2. The console prompt appears at the end of a successful self- test display. The yellow Fault indicator goes out when self- test passes for all modules in the system.

Go to the rear of the cabinet and check the CCL LEDs (see Figure 7- 3).

The cabinet control logic (CCL) module has four LEDs that are visible through a shield slot when the rear door is opened. These LEDs verify that the enable signals have been sent to the four PIU power regulators. The LEDs are numbered one to four.

The LEDs are lit if a PIU is present and power sequencing has been completed. If a LED is not lit, the PIU is not present, the PIU is not cabled correctly, or the CCL module has not enabled the PIU. Turn on the power switches on the individual PIUs as needed.

The CCL module also has a power LED that lights when the circuit breaker is turned on; the LED indicates that 5 VDC is present on the CCL module.

For more information:

Basic Troubleshooting

Chapter 8

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.

Sections in this chapter include:

- Check Module Status LEDs
- Check the Self-Test Display

8.1 Check Module Status LEDs

Check the system module status LEDs for self- test success. If the LEDs indicate failure, refer to th*e Basic Troubleshooting* manual for more information.

Figure 8- 1   Powering Up and Checking the LEDs

Rear   Front
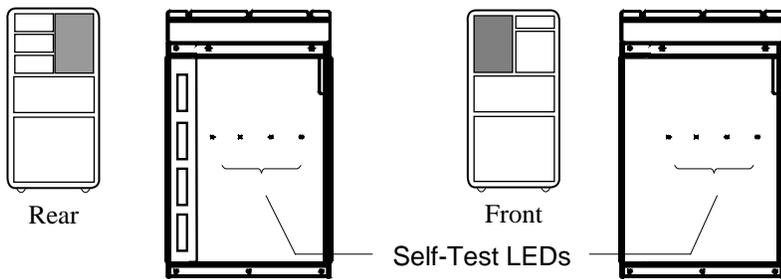
Self-Test LEDs

BXB-0348A-92

Processor and memory modules have a green LED that lights when the module passes or completes self- test. These LEDs can be viewed through holes in the shield of the module enclosure from the front and rear of the cabinet when the doors are open (see Figure 8- 1). I/O modules have a yellow LED that lights when the module passes self- test. The I/O module LEDs can also be seen through holes in the PIU enclosure shield. The DWLMA has a yellow self- test LED and four others which after successful start- up are lit as shown in Table 8- 1.

Table 8- 1   LEDs After Self- Test

Module	Self- Test Passed	Self- Test Failed
Processor	Green ON	Green OFF
Memory	Green ON	Green OFF or ON[1]
I/O	Yellow ON	Yellow OFF
DWLMA	Yellow ON Green ON Green ON Red OFF Red OFF	Yellow OFF

[1]The green LED on the memory module indicates that self- test completed, not passed.

For more information:

Basic Troubleshooting

8.2 Check the Self-Test Display

Self-test results are displayed on the console terminal. The pass (+) or fail (-) status of each module is indicated.

Example 8-1   Self-Test Results

```
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0   NODE #    1
                        A  M  .  .  .  .  .  P  P   TYP       2
                        o  +  .  .  .  .  .  +  +   ST1       3
                        .  .  .  .  .  .  .  E  B   BPD       4
                        o  +  .  .  .  .  .  +  +   ST2       3
                        .  .  .  .  .  .  .  E  B   BPD
                        +  +  .  .  .  .  .  +  +   ST3       3
                        .  .  .  .  .  .  .  E  B   BPD

      .  .  .  .  .  .  +  .  .  .  .  +  +  +   C0 XMI +     5
      .  .  .  .  .  .  .  .  .  .  .  .  .  .   C1
      .  .  .  .  .  .  .  .  .  .  .  .  .  .   C2
      .  .  .  .  .  .  .  .  .  .  .  .  .  .   C3

                  .  A0  .  .  .  .  .  .  .   ILV
                  .128  .  .  .  .  .  .  .   128Mb
Firmware Rev = V1.0-1625   SROM Rev = V1.0-0   SN=GA01234567
```

1 The NODE # line lists the (hexadecimal) node numbers on the LSB and XMI buses. Node numbers and slot numbers are identical. Nodes 0 through 3 reflect the right- to- left position of the LSB slots as viewed from the front of the cabinet. Nodes 4 through 8 reflect the right- to- left position of the LSB slots as viewed from the rear of the cabinet. XMI entries use nodes 1 through E.

2 The TYP line indicates the type of module at each LSB node:

- An adapter: the I/O port module (A)

- A memory module (M)

- A processor (P)

A period (.) indicates that the slot is not populated or that the module is not reporting.

3 The ST1–ST3 lines show the results of the testing. This information is taken from the self- test bit in the LCNR register of each module. The entries are:

- + (pass)

- – (fail)

- o (does not apply). In this example, the I/O port module has "o" because there is no module- resident self- test.

4 The BPD line indicates boot processor designation. The results on this line indicate:

- The boot processor (B)

- Processors eligible to become the boot processor (E)

- Processors ineligible to become the boot processor (D)

The BPD line is printed three times. After the first determination of the boot processor, the processors go through two more rounds of testing. Since it is possible for a processor to pass self- test at line ST1 and fail ST2 or ST3 testing, the processors again determine the boot processor following each round of tests.

5 The I/O channel lines C0 through C3 indicate the I/O channel that connects the XMI I/O bus to the system bus and indicates self- test results for the DWLMA and all XMI adapters. In this example, self- test passed on XMI nodes 1, 2, 3, and 8.

For more information:

Basic Troubleshooting

Chapter 9

Diagnostics and Utilities

After the system passes self-test, you must verify proper system operation. First verify the presence of SCSI devices, then verify the boot device load path. After the path is verified, you can boot the operating system and use operating system-based test programs (such as UETP) to complete system verification.

All functions previously provided by off-line loadable diagnostics and utilities are now provided by the console (ROM-based) or not supported at all. The Loadable Firmware Update (LFU) Utility is currently the only supported off-line loadable program. It is used to update firmware on any module residing on the LSB or XMI bus.

Sections in this chapter include:

- Console Load Devices
- Verification Overview
- Power-Up Diagnostics Overview
- Run System Self-Test
- Show Commands for Installation
- Verify SCSI Devices
- Verify Console Load Device Path
- Booting OpenVMS Alpha AXP from an RRD42
- Booting OSF/1 from an RRD42
- Booting OpenVMS VAX from an InfoServer
- Selecting an Ethernet Service
- Set Commands for Booting
- Booting LFU with an RRD42
- Running LFU on a VAX 7000 System
- Booting the Standalone Backup
- Running UETP

9.1 Console Load Devices

The RRD42 compact disk (CD) drive is the in- cabinet console load device for DEC 7000 systems. The InfoServer is the console load device for VAX 7000 systems. During system installation the console load device is used to boot standalone backup. It is also used to boot the Loadable Firmware Update (LFU) Utility.

Figure 9- 1   Accessing the Console Load Device
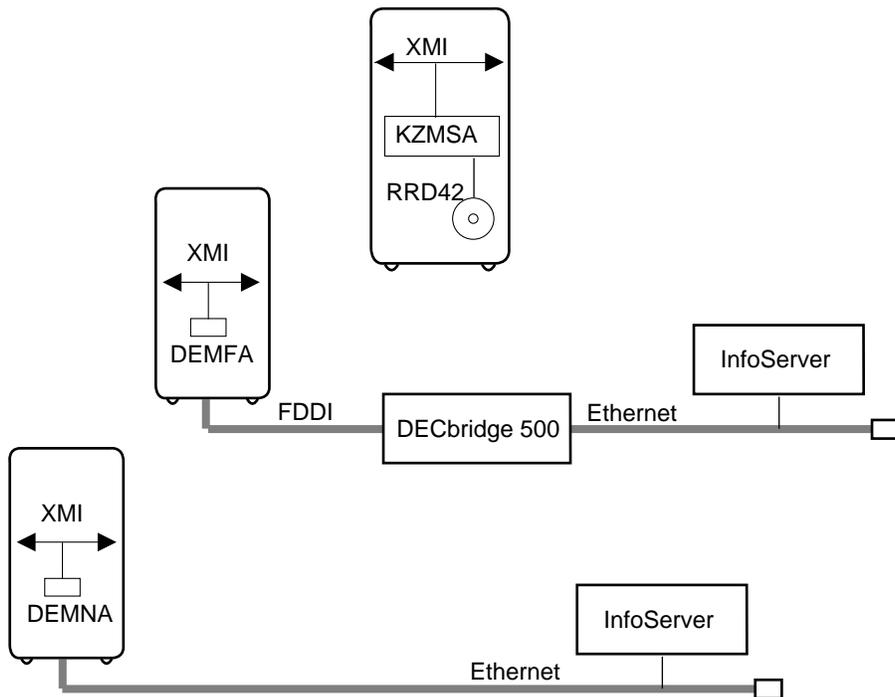
BXB-0005E-92

The console load device is used for:

- Installing or updating software
- Loading the standalone backup program
- Interchanging user data
- Updating module firmware

DEC 7000 The RRD42 compact disk (CD) drive is the console load device for DEC 7000 systems. It is installed in the system cabinet and used to access software and on- line documentation. The KZMSA adapter is installed in the XMI card cage and allows access to the RRD42 drive.

VAX 7000 The InfoServer is the console load device for VAX 7000 systems. It is an Ethernet- based compact disk (CD) drive, which is part of a local area network. The InfoServer is used to access CD- ROMs for software installation and for on- line documentation on VAX 7000 systems.

For more information:

RRD42 Disc Drive Owner's Manual
InfoServer 150 Installation and Owner's Guide

9.2 Verification Overview

The following process is used to verify the system after installation.

Figure 9-2   Verification Procedure

1. Power Up System. Self-Test Runs.

2. Enter **show configuration** to get booting mnemonics

3. Check console load device hardware

4. Use **show network** command (for VAX 7000) or **show device** command (for DEC 7000) to get target device name

5. Boot Operating System

6. Verify System Under Operating System
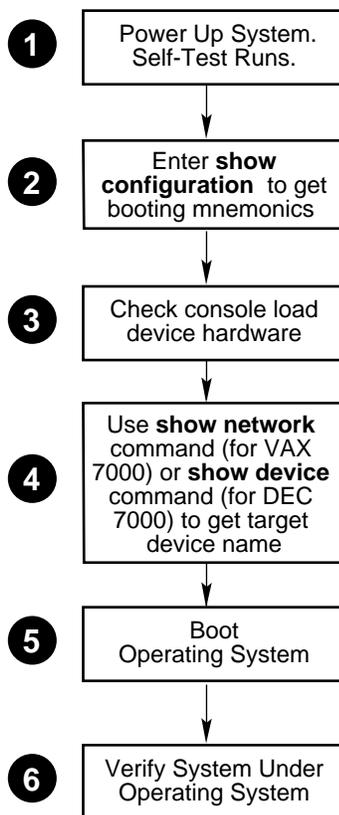
BXB-0041B-92

❶ When the system powers up, self-test runs. Verify that all tests have passed by checking the results in the self-test display.

❷ Use the **show configuration** command to determine the self-test status for the I/O adapter through which loading will be performed. For RRD42 CD drive booting, check the status of the KZMSA I/O adapter. For InfoServer booting, check the status of the DEMNA or DEMFA I/O adapter. Determine the mnemonic assigned to the I/O adapter associated with the target boot device.

❸ Check the console load device hardware. For VAX 7000 systems, check the Ethernet adapter by examining the self-test results and the green test light on the module, which reports the results of the Ethernet loopback test.

❹ Using the mnemonic in step 2, use the **show network** command (such as **show network demna**0) to obtain the assigned name of the target device.

❺ Load and run the operating system.

❻ Verify the system under the installed operating system.

For more information:

Console Reference Manual

9.3 Power- Up Diagnostics Overview

Self- test, additional ROM- based diagnostics, and console- based exercisers are run during power- up. The User Environment Test Package (UETP) is run under the operating system.

Figure 9- 3   Diagnostic Overview

```
                        ┌──────────────────────┐
                        │      Self-Test        │
                 ┌──────┴──────────────────────┴──────┐
ROM-Based        │    Additional Power-Up Tests        │
Diagnostics  ┌───┴─────────────────────────────────────┴───┐
(RBDs)       │         Standalone Exercisers               │
             └─────────────────────────────────────────────┘

             ┌─────────────────────────────────────────────┐
On-Line      │   User Environment Test Package (UETP)       │
             └─────────────────────────────────────────────┘
```
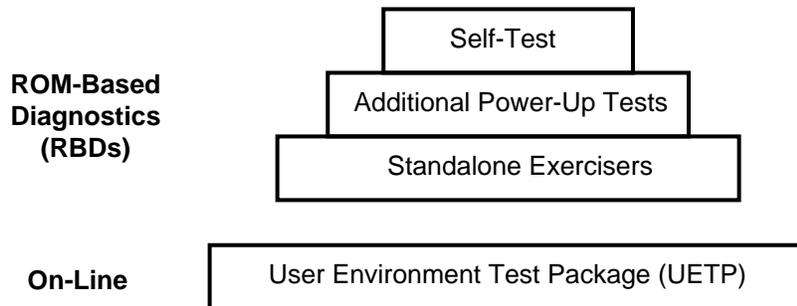
BXB-0065-92

The tests summarized in Table 9-1 run when the system is powered up.

Table 9-1   Power-Up Diagnostics

Test Name	Test Group
CPU Self-Test	Self-Test
Memory Array Self-Test	Self-Test
XMI Device Adapter Self-Test	Self-Test
Device Peripheral Self-Test	Self-Test
Power Subassembly Self-Test	Self-Test
CPU/Memory Interaction Tests	Additional Power-up Tests
Multiprocessor Tests	Additional Power-up Tests
IOP Tests	Additional Power-up Tests
DWLMA Tests	Additional Power-up Tests
Cache/Memory Exerciser	Console-based Exerciser
Disk Exerciser[1]	Console-based Exerciser
Floating-Point Exerciser	Console-based Exerciser
Network Exerciser[1]	Console-based Exerciser

[1]Run in internal loopback (at I/O adapter) mode only.

*NOTE: Refer to the Advanced Troubleshooting manual for information on running console-based diagnostics and utilities using the **cdp**, **set host**, and **test** commands.*

9.4 Run System Self-Test

Gather adapter self-test and address information using self-test results as shown in Example 9-1.

Example 9-1   Self-Test Display

```
F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #
                        A   M   .   .   .   .   .   P   P   TYP
                        o   +   .   .   .   .   .   +   +   ST1  ❶
                        .   .   .   .   .   .   .   E   B   BPD
                        o   +   .   .   .   .   .   +   +   ST2  ❷
                        .   .   .   .   .   .   .   E   B   BPD
                        +   +   .   .   .   .   .   +   +   ST3  ❷
                        .   .   .   .   .   .   .   E   B   BPD

    .   .   .   .   .   .   +   .   .   .   .   +   +   +   C0  XMI +❸
    .   .   .   .   .   .   .   .   .   .   .   .   .   .   C1
    .   .   .   .   .   .   .   .   .   .   .   .   .   .   C2
    .   .   .   .   .   .   .   .   .   .   .   .   .   .   C3

                    .   A0  .   .   .   .   .   .   .   ILV
                    .128    .   .   .   .   .   .   .   128Mb
Firmware Rev = V1.0-1625   SROM Rev = V1.0-0   SN = GAO1234567
```

❶ Check the ST1 line in the self-test results to see that all CPU and memory modules passed self-test. Note that on a system with more than one processor, failing processors are disabled and do not appear in the ST1 line.

❷ Check the ST2 and ST3 lines to see that all modules on the LSB and the IOP module passed the first and second tests.

❸ Check the C0 XMI line to determine which modules on the XMI bus passed self-test.

> **For more information:**
>
> *Basic Troubleshooting*

9.5 Show Commands for Installation

Use show commands to obtain information on the system configu-
ration, devices used for booting and the Ethernet controllers.

Example 9-2   Show Configuration

```
>>> show configuration ❶
      Name    Type    Rev   Mnemonic
   LSB
   0+  KN7AA  (8001)  0000  kn7aa0
   1+  KN7AA  (8001)  0000  kn7aa1
   7+  MS7AA  (4000)  0000  ms7aa0
   8+  IOP    (2000)  0001  iop0

   C0 XMI                   xmi0
   1+  KFMSA  (0810)  A5A6  kfmsa0
   2+  KZMSA  (0C36)  003E  kzmsa0
   3+  DEMNA  (0C03)  060B  demna0
   8+  DWLMA  (102A)  0104  dwlma0

   C1 XMI                   xmi1
   1+  KFMSA  (0810)  A5A6  kfmsa1
   2+  KZMSA  (0C36)  003E  kzmsa1
   3+  DEMNA  (0C03)  060B  demna1
   8+  DWLMA  (102A)  0104  dwlma1
```

Example 9-3   Show Device

```
>>> show device ❷
polling for units on kfmsa0, slot 1, xmi0...
dua2.2.0.1.0      R2TDYC$DIA2   RF73
dua3.3.0.1.0      R2TDYC$DIA3   RF73
polling for units on kzmsa0, slot 2, xmi0...
dka100.1.0.1.0    DKA100        RRD42
```

Example 9-4   Show Network

```
>>> show net ❸
polling for units on demna0, slot 3, xmi0...
exa0.0.0.3.0  08-00-2B-0B-BB-ED
```

❶ Use the **show configuration** command to see a listing of the modules in the system. This command shows the module LSB and XMI slot number, module name, module type, revision, mnemonic, and if self- test passed.

❷ The **show device** command displays information about each I/O device. Polling checks the XMI bus for device configurations. The next line contains the console device name, the name of the device given by the device controller, and the device type.

❸ **Show network** displays information about Ethernet and FDDI controllers for VAX 7000 systems. Polling checks the XMI bus for device configurations. **Show net** includes information such as the console device name of the network device with path information and the network controller's hardware address in hex.

For more information:

Basic Troubleshooting
Operations Manual
Console Reference Manual

9.6 Verify SCSI Devices

9.6.1 Check SCSI Devices Using Console Commands

DEC 7000 To verify SCSI devices, issue the console command show device. Check the output against the physical SBBs (storage building blocks). Nodes are set by the physical position of the SBB and do not have to be set.

Example 9-5   Checking SCSI Devices

```
Initializing...                    ❶

F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #
                            A   M   .   .   .   .   .   .   P   TYP
                            o   +   .   .   .   .   .   .   +   ST1
                            .   .   .   .   .   .   .   .   B   BPD
                            o   +   .   .   .   .   .   .   +   ST2
                            .   .   .   .   .   .   .   .   B   BPD
                            +   +   .   .   .   .   .   .   +   ST3
                            .   .   .   .   .   .   .   .   B   BPD

    .   +   .   .   .   .   +   .   .   .   .   .   .   +   C0  XMI +
    .   .   .   .   .   .   .   .   .   .   .   .   .   .   C1
    .   .   .   .   .   .   .   .   .   .   .   .   .   .   C2
    .   .   .   .   .   .   .   .   .   .   .   .   .   .   C3

                        .   A0  .   .   .   .   .   .   .   ILV
                        .   64  .   .   .   .   .   .   .   64MB
Firmware Rev = V1.0-2216     SROM Rev = V1.0-1     SYS SN = GAO1234567

>>> show device
polling for units on kzmsa0, slot 13, xmi0...
dka0.0.0.13.0      DKA0      ❷                RZ26  ❸
dka100.1.0.13.0    DKA100                     RZ26
dka200.2.0.13.0    DKA200                     RZ26
dka300.3.0.13.0    DKA300                     RZ26
dka400.4.0.13.0    DKA400                     RZ26
dka500.5.0.13.0    DKA500                     RZ26
dka600.6.0.13.0    DKA600                     RZ26
dkb0.0.1.13.0      DKB0      ❷                RZ26
dkb100.1.1.13.0    DKB100                     RZ26
dkb200.2.1.13.0    DKB200                     RZ26
dkb300.3.1.13.0    DKB300                     RZ26
dkb400.4.1.13.0    DKB400                     RZ26
dkb500.5.1.13.0    DKB500                     RZ26
dkb600.6.1.13.0    DKB600                     RZ26  ❸
```

Basics:

- An XMI PIU is required to house the KZMSA adapter.

- Each KZMSA has two ports. Each port has a maximum of eight nodes per bus, including the initiator (the KZMSA adapter).

- Each SCSI (BA655) PIU can have one or two shelves; each modular storage shelf (BA350 DECstor/me) has a power supply and can hold seven 3.5" SBBs (such as RZ26s or TLZ06s), two 5.25" SBBs (such as the RZ73 drives), or a combination of these.

- The two shelves in a SCSI PIU can each be on their own bus or can be daisy- chained together, provided there are no conflicting SCSI nodes.

- The system cabinet can house a maximum of two BA655 SCSI PIUs.

- SCSI configurations are discrete within a cabinet; that is, the bus and all nodes reside within one cabinet, either the system cabinet or the expander cabinet.

For installation, all cabling and node setting has been completed prior to shipping. To check the configuration, check self- test and issue a **show device** console command:

❶ The system goes through self- test. Check that the KZMSA adapter passed self- test.

❷ Issue a **show device** command. In this example, the KZMSA is in slot 13 (slot D) of the XMI that is channel 0. There are two ports off this KZMSA (see ❷). The devices from port 1 are listed first, followed by the devices from port 2.

❸ Each port connects to a shelf housing seven RZ26's on one bus. All devices in this example are reporting to the console and are working.

9.6.2 Check Console Output Against Physical Devices

DEC 7000 **Next check the output from the show device command against the physical SBBs in the SCSI PIUs.**

Figure 9- 4   SCSI PIU with SBBs
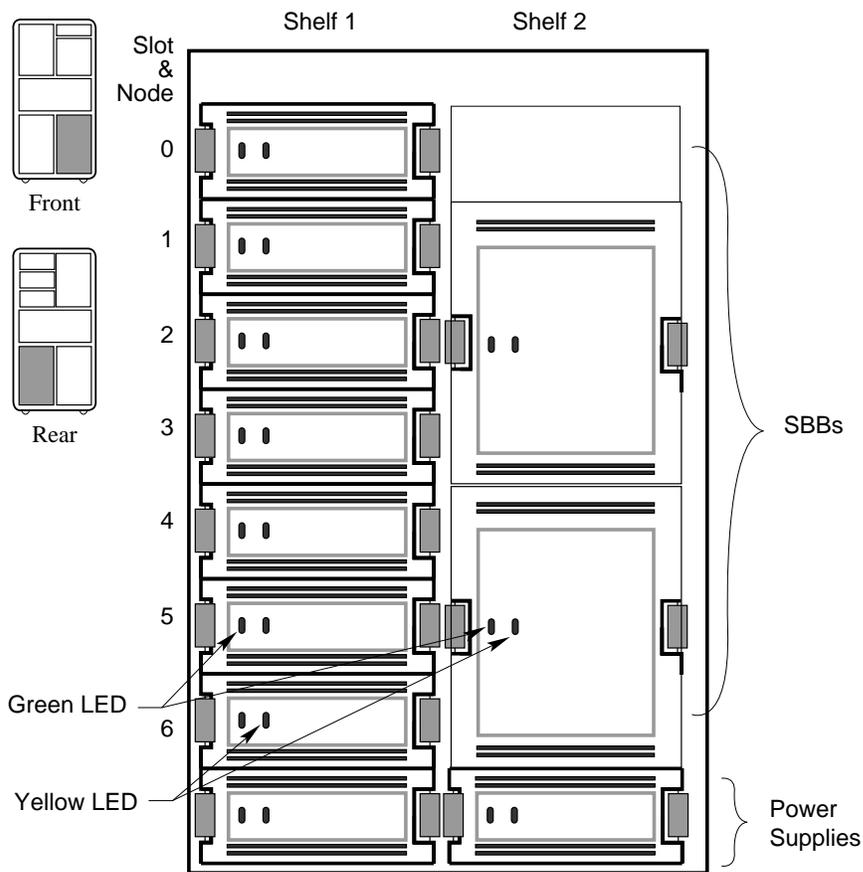
BXB-0362-92

Check the output from the **show device** command against the physical SBBs in the SCSI PIU. There should be a one- to- one correspondence between SBBs reporting to the console and physical devices mounted in the PIU. Note that the node number reported by the console corresponds to the physical position of an SBB within a shelf; the slots and nodes are numbered 0 to 6, from top to bottom (see Figure 9- 4).

Each SBB has two LEDs. The green LED on the left lights when the SBB is mounted and being accessed.

Table 9- 2 SCSI SBB LED Functions

SBB	LED Condition	Green LED	Yellow LED
Disk or tape	Off	No activity	Normal
	Flashing	Activity	Spinning up or down
	On	Activity	Not used
Power supply	Off	Shelf fault	Power fault
	On	Shelf okay	Power okay

If you encounter any problems, reseat the SBBs and reissue **show device.** If you need further testing, use the **test** command. Refer to BA350 documentation if you need to reconfigure the buses.

> **For more information:**
> *Console Reference Manual*
> *Advanced Troubleshooting*
> *BA350 DECstor/me Modular Storage Shelf Subsystem Configuration Guide or User's Guide*

9.7 Verify Console Load Device Path

VAX 7000 **If your console load device is an InfoServer, check the Ethernet adapter's power-up loopback test results.**

Figure 9-5 DEMNA LEDs

Self-Test OK LED

External
Loopback LED

Connector
Edge
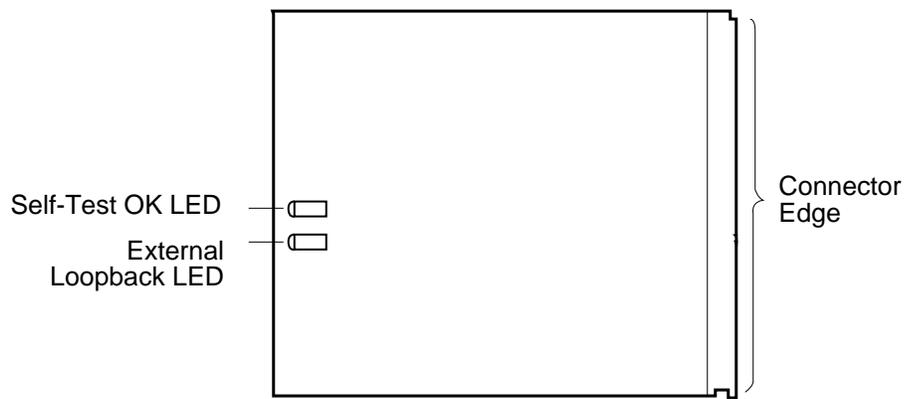
BXB-0042-92

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 DEMNA could pass self- test but fail the external loopback test. 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 not lit, the module may have passed self- test, but may not be able to send or receive commands.

For more information:

DEC LANcontroller 400 Installation Guide

9.8 Booting OpenVMS Alpha AXP from an RRD42

⌒DEC⌒
⎝7000⎠ **This section shows a sample boot of OpenVMS Alpha AXP from the RRD42 CD drive for DEC 7000 systems. The first step is issuing the show device command to determine the location of the RRD42.**

Example 9-6 CD-ROM OpenVMS Alpha AXP Boot

```
>>> show device                         ❶
polling for units on kdm700, slot 1, xmi0...
dua2.2.0.1.0      R2TDYC$DIA2   RF73
dua3.3.0.1.0      R2TDYC$DIA3   RF73
polling for units on kzmsa0, slot 2, xmi0...
dka100.1.0.1.0      dka100          RRD42
>>> boot -flags 0,0 dka100.1.0.1.0   ❷

Booting...                               ❸
Connecting to boot device dka100
initializing HWRPB at 2000
initializing page table at 1ee000
initializing machine state
jumping to bootstrap at 1fa000

OpenVMS AXP (TM) Operating System, Version V1.0   ❹
```

❶ **Show device** displays information about each I/O device. Polling checks the XMI bus for device configurations. The next line contains three columns. The first column contains the device type and unit number, node number, device channel number, XMI node number, and I/O channel number, separated by periods. The second column displays the name of the device given by the device controller. The third column shows the device type.

❷ In the **boot** command, **- flags** indicates that additional command parameters follow, **0** is the system root of the boot device, **0** is the bootstrap option, **dk** is the device code of the boot device, **a** is the boot device controller designation, and **1** specifies the hexadecimal unit number of the boot device. The **1** is the node number, **0** is the channel number, **1** is the XMI node number, and **0** is the I/O channel number.

❸ The system boots standalone backup from the RRD42.

❹ The operating system banner appears.

For more information:

OpenVMS Alpha Version 1.0 Upgrade and Installation Manual

9.9 Booting OSF/1 from an RRD42

DEC 7000 — **This section shows a sample boot of OSF/1 from the RRD42 CD drive for DEC 7000 systems. The first step is issuing the show device command to determine the location of the RRD42.**

Example 9- 7   CD- ROM OSF/1 Boot

```
>>> show device                        ❶
polling for units on kdm700, slot 1, xmi0...
dua2.2.0.1.0      R2TDYC$DIA2    RF73
dua3.3.0.1.0      R2TDYC$DIA3    RF73
polling for units on kzmsa0, slot 2, xmi0...
dka100.1.0.2.0      dka100          RRD42
>>> boot dka100.1.0.2.0                 ❷

Booting...                              ❸
Connecting to boot device dka100
initializing HWRPB at 2000
initializing page table at 1ee000
initializing machine state
jumping to bootstrap at 1fa000


AXPboot - Wed Aug 19 10:18:32 EDT 1992
OSF boot - Wed Aug 19 10:18:40 EDT 1992
The system is ready.
DEC OSF/1 X2.0A-7 (Rev 6); Wed Aug 19 10:22:40 EDT 1992 ❹
```

❶ **Show device** displays information about each I/O device. Polling checks the XMI bus for device configurations. The next line contains three columns. The first column contains the console device name. The second column displays the name of the device given by the device controller. The third column shows the device type.

❷ In the **boot** command, **dk** is the device code of the boot device, **a** is the boot device controller designation, and **100** specifies the hexadecimal unit number of the boot device. The **1** is the node number, **0** is the channel number, **2** is the XMI node number, and **0** is the I/O channel number.

❸ The system boots from the RRD42.

❹ The operating system banner appears.

For more information:

DEC OSF/1 Guide to System Administration

9.10 Booting OpenVMS VAX from an InfoServer

VAX 7000 This section shows a sample OpenVMS VAX boot from an InfoServer using the Ethernet. The first step is issuing the **show network** command.

Example 9-8 Sample InfoServer Boot

```
>>> show network ❶
polling for units on demna0, slot 3, xmi0...
exa0.0.0.3.0  08-00-2B-0B-BB-ED
>>> boot exa0 -file ISL_LVAX_BL10 ❷

Initializing...
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0   NODE # ❸
                        A  M  .  .  .  .  .  P  P   TYP
                        o  +  .  .  .  .  .  +  +   ST1
                        .  .  .  .  .  .  .  E  B   BPD
                        o  +  .  .  .  .  .  +  +   ST2
                        .  .  .  .  .  .  .  E  B   BPD
                        +  +  .  .  .  .  .  +  +   ST3
                        .  .  .  .  .  .  .  E  B   BPD

   .  .  .  .  +  .  +  .  .  .  .  +  .  +   C0  XMI +
   .  .  .  .  .  .  .  .  .  .  .  .  .  .   C1
   .  .  .  .  .  .  .  .  .  .  .  .  .  .   C2
   .  .  .  .  .  .  .  .  .  .  .  .  .  .   C3

                  .  A0  .  .  .  .  .  .  .   ILV
                  .128  .  .  .  .  .  .  .   128Mb
Firmware Rev = V1.0-1625 SROM Rev = V1.0-0 SYS SN = GAO1234567
Booting...
Connecting to boot device exa0 -file ISL_LVAX_BL10
Created boot device: exa0.0.0.3.0
Resulting file is mopdl:ISL_LVAX_BL10/exa0.0.0.3.0
.....
Load complete !
```

❶ **Show network** displays information about network controllers. Polling checks the XMI bus for device configurations. **Show net** includes information such as the console device name of the network device with path information (exa0.0.0.3.0) and the Ethernet controller's hardware address in hex (08- 00- 2B- 0B- BB- ED).

❷ Boot standalone backup across the Ethernet by specifying the console device name of the network device with path information **exa0** followed by the Initial System Load (ISL) file name **ISL_LVAX_** and its version number **BL10**. To boot over the FDDI, the device mnemonic is **fx** rather than **ex**.

❸ System self- test results are displayed if the environment variable **boot_reset** is set **on**.

NOTE: The ISL file name must be specified in uppercase letters.

> **For more information:**
> *Console Reference Manual*
>
> *VMS Upgrade and Installation Supplement:*
> *VAX 7000-600 and VAX 10000-600 Series*

9.11 Selecting an Ethernet Service

> **VAX 7000** The second step of booting over the Ethernet with an Info-Server is selecting the service that boots standalone backup OpenVMS VAX.

Example 9-9   Selecting an Ethernet Service

```
Network Initial System Load Function      ❶
Version 1.1

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

Enter a function ID value: 3   ❷

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

Enter an Option ID value: 1     ❸

Working

Servers found: 2    ❹

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

#1

VMS054
ESS_08002B0BBBED
08-00-2B-0B-BB-ED

#2
CD_BIN_83371
ESS_08002B0BBBED
08-00-2B-0B-BB-ED
```

```
#3
INFO3$RZ57
INFO3
08-00-2B-26-A6-98
#4
CD_DOC_0050
INFO3
08-00-2B-16-04-98
Enter a Service number or <CR> for more: 1   ❺
```

❶   The Network Initial System Load Function menu is displayed.

❷   The system prompts you for a function ID value. Enter a 3 to select the
Choose Service function.

❸   The Service options menu is displayed. Enter 1 to display the avail-
able Ethernet servers and services. In this example two servers are
found on the Ethernet.

❹   Each server has two services, 1 and 2. The service names are listed
(such as INFO3$RZ57) followed by the InfoServer names (such as
INFO3), and the Ethernet ID (such as 08- 00- 2B- 26- A6- 98). In this ex-
ample, service #1 of server #1 VMS054, is used to boot OpenVMS
VAX.

❺   Enter 1 to select service #1.

For more information:
InfoServer 150 Installation and Owner's Guide

VMS Upgrade and Installation Supplement:
VAX 7000- 600 and VAX 10000- 600 Series

9.12 Set Commands for Booting

Use the set command to define a default boot device or issue a nickname as shown in Example 9-10.

Example 9-10 Set Boot Commands

```
>>> set boot_reset on ❶
>>> set bootdef_dev dua2.4.0.2.0 ❷
>>> set boot_osflags "0,6,7" ❸
>>> boot ❹

 [the system now initializes and boots]

>>> create -nv work ❺

>>> set work "-flags 0,6,7 dua6.14.0.12.1" ❻
>>> set auto_action restart  ❼
>>> boot work ❽

 [the system now initializes and boots]
```

❶ **Set boot_reset on** to initialize the system before booting.

❷ If you boot from the same boot device each time, you can store the disk name by defining the default boot device. This is done by using the **set bootdef_ dev** command. The default boot device is used for booting during power- up and auto restarts.

❸ Use **set boot_osflags** to define the boot command flag parameters of 0, 6, and 7. The flags can also be specified as done in step 6.

❹ Booting can now be done from that device by typing **boot** or just **b**.

❺ Use the **create** command to create the environment variable **work**. The **- nv** parameter stores the environment variable **work**.

❻ This is an example of booting from a system that is part of a VMScluster. To boot from the cluster system disk, a nickname is created by equating the boot parameters to an environment variable as shown. A nickname is used so boot parameters do not have to be entered when the system boots, and it stores **boot command** qualifiers.

❼ Used to set the **auto_action** environment variable so the system will restart after an error halt.

❽ Booting can now be done from that device by typing **boot work**.

*NOTE: Refer to the Console Reference Manual for more information on **set** commands and environment variables.*

For more information:
Console Reference Manual

VMS Upgrade and Installation Supplement:
VAX 7000- 600 and VAX 10000- 600 Series

9.13 Booting LFU with an RRD42

NOTE:

DEC 7000
The Loadable Firmware Update (LFU) is supplied on the DEC 7000/10000 AXP Console CD-ROM (Part Number AG-PQW3*-RE, where * is the letter that denotes the disk revision). Make sure this CD-ROM is mounted in the RRD42 in-cabinet CD drive. Boot LFU from the CD-ROM.

Example 9-11 DEC 7000 LFU Booting

```
>>> show device                          ❶

polling for units on kdm700, slot 1, xmi0...
dua2.2.0.1.0      R2TDYC$DIA2    RF73
dua3.3.0.1.0      R2TDYC$DIA3    RF73
polling for units on kzmsa0, slot 2, xmi0...
dka100.1.0.2.0      dka100              RRD42


>>> boot dka100                          ❷
Booting...
                 Copyright Digital Equipment Corporation

                              1992
                        All Rights Reserved.
      Loadable Environment Rev: V1.0-1625    Jul 12 1992  10:50:56


             ***** Loadable Firmware Update Utility *****
               Version 2.01                   16-jun-1992


-------------------------------------------------------------------
     Function     Description

-------------------------------------------------------------------

     Display      Displays the system's configuration table.
     Exit         Return to loadable offline operating environment.
     List         Lists the device types and firmware revisions
                  supported by this revision of LFU.
     Modify       Modifies port parameters and device attributes.
     Show         Displays device mnemonic, hardware and firmware
                  revisions.
     Update       Replaces current firmware with loadable data
                  image.
     Verify       Compares loadable and device images.
     ? or Help    Scrolls the function table.
-------------------------------------------------------------------

Function?            ❸
```

❶ Use the **show device** command to find the name of the RRD42 CD drive.

❷ Enter the **boot** command to boot from the RRD42. The RRD42 has a device name of dka100.

❸ LFU starts, displays a summary of its commands, and issues its prompt (Function?).

9.14 Running LFU on a VAX 7000 System

<div style="border: 1px solid; padding: 10px;">

VAX 7000 LFU is used to update firmware on any module in the system. LFU is supplied on the VAX 7000/10000 Console CD-ROM (Part Number AG-PQW1*-RE, where * is the letter that denotes the disk revision). Make sure this CD-ROM is mounted in one of the system's InfoServers. Boot the Initial System Load (ISL) program, and select the service corresponding to the console CD-ROM.

</div>

Example 9-12 VAX 7000 LFU Booting

```
>>> boot exa0 -file ISL_LVAX_V01              ❶
Resulting file is mopdl:ISL_LVAX_V01/exa0
 ...... Load complete!
      [boot information]
Network Initial System Load Function
Version 1.1
FUNCTION    FUNCTION
ID
1     -           Display Menu
2     -           Help
3     -           Choose Service
4     -           Select Options
5     -           Stop
Enter a function ID value: 3                  ❷
OPTION              OPTION
ID
1     -           Find Services
2     -           Enter known Service Name
Enter an Option ID value: 1                   ❸

Working
Servers found:: 3
Service Name Format:
Service Number
Service Name
Server Name
Ethernet ID
#1
INFO4$RZ57
INFO4
08-00-2B-26-A6-98

#2
6000_DIAG_H
INFO3
08-00-2B-16-04-D4
#3
VAX7000_V01
OPUS_ESS
08-00-2B-18-A9-75
Enter a Service Number or <CR> for more: 3    ❹
```

```
                Copyright Digital Equipment Corporation
                                 1992
                          All Rights Reserved.
        Loadable Environment Rev: V1.0-1625    Jul 12 1992  10:50:56


                 ***** Loadable Firmware Update Utility *****
                  Version 2.01                    16-jun-1992


   -----------------------------------------------------------------
      Function       Description

   -----------------------------------------------------------------

      Display       Displays the system's configuration table.
      Exit          Return to loadable offline operating environment.
      List          Lists the device types and firmware revisions
                    supported by this revision of LFU.
      Modify        Modifies port parameters and device attributes.
      Show          Displays device mnemonic, hardware and firmware
                    revisions.
      Update        Replaces current firmware with loadable data
                    image.
      Verify        Compares loadable and device images.
      ? or Help     Scrolls the function table.
   -----------------------------------------------------------------

   Function?          ❺
```

❶ Enter the **boot** command as shown. Note that the ISL file name must
    be typed in upper case. The final two characters are the ISL file ver-
    sion, which you can read from the last two characters of the volume la-
    bel printed on the CD- ROM.

❷ Enter 3, to select Choose Service from the Function menu.

❸ Enter 1 to select Find Services from the Option menu.

❹ Enter the number of the service named VAX7000_Vnn. This service
    name is the volume label printed on the CD- ROM. In this example,
    service number 3 supplies the console CD- ROM.

❺ LFU starts, displays a summary of its commands, and issues its
    prompt (Function?).

+---+
| |
| **For more information:** |
| |
| *System Service Manual* |
| |
| |
| |
+---+

9.15 Booting the Standalone Backup

After you have booted the standalone backup using the RRD42 CD drive or the InfoServer on the Ethernet, the OpenVMS operating system banner appears.

Example 9-13   Booting OpenVMS Alpha AXP on a DEC 7000 System with an RRD42

```
>>> boot dka0 ❶
OpenVMS Alpha AXP Version V5.5-2 Major Version id = 1 Minor
Version ID = 1 ❷
PLEASE ENTER DATE AND TIME (DD-MMM-YYY HH::MM) 14-APR-1992 14:40
Configuring devices... ❸
Available device   DUA2       device type RF73
Available device   DUA3       device type RF73
Available device   DUC1       device type RA92
          .
          .
Enter "YES" when all needed devices are available.
%BACKUP-I-IDENT, Stand-alone BACKUP V5.5-2; the date\
is 14-APR-1992 14:40 ❹
$ ❺
```

Example 9-14   Booting OpenVMS VAX on a VAX 7000 with an InfoServer

```
>>> boot exa0 -file ISL_LVAX_BL10 ❻
VAX/VMS Version V5.5-2 Major Version id = 1 Minor Version ID = 0
                                                              ❼
PLEASE ENTER DATE AND TIME (DD-MMM-YYY HH::MM) 14-APR-1992 14:40
Configuring devices... ❽
Available device   DUA2       device type RF73
Available device   DUA3       device type RF73
Available device   DUC1       device type RA92
          .
          .
Enter "YES" when all needed devices are available.
%BACKUP-I-IDENT, Stand-alone BACKUP V5.5-2; the date\
is 14-APR-1992 14:40 ❾
$ ❿
```

❶ Boot the standalone backup from the RRD42 by specifying the console name of the device as shown in Section 9.8.

❷ The OpenVMS Alpha AXP banner appears and the procedure asks for the date and time.

❸ The procedure displays a list of local devices on the system. Enter **YES** when all needed devices are available.

❹ When booting is completed, it displays an identification message.

❺ The OpenVMS Alpha AXP prompt appears. Refer to the *OpenVMS Alpha Version 1.0 Upgrade and Installation Manual* to build the system disk.

❻ Boot standalone backup across the Ethernet by specifying the console device name of the network device as shown in Section 9.10.

❼ The OpenVMS banner appears and the procedure asks for the date and time.

❽ The procedure displays a list of local devices on the system. Enter **YES** when all needed devices are available.

❾ When booting is completed, it displays an identification message.

❿ The OpenVMS prompt appears. Refer to th*e VMS Upgrade and Installation Supplement* to build the system disk.

For more information:

VMS Upgrade and Installation Supplement:
VAX 7000- 600 and VAX 10000- 600 Series

9.16 Running UETP

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

Example 9-15   Running UETP

```
Username: SYSTEST ❶
Password:

$ @UETP ❷

      Welcome to OpenVMS VAX UETP Version V5.5-2 ❸

%UETP-I-ABORTC, UUETINITOO to abort this test, type ^C

You are running on a VAX 7000 CPU with yyyyy pages of
memory
The system was booted from _xxxx:[SYS0]

Run "ALL" UETP phases or a "SUBSET" [ALL] ? ALL     ❹
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 14-NOV-1991 13:12:23.00 with parameters:
DEVICE LOAD DECNET CLUSTER phases, 1 pass, 145 loads, long
report.        ❹
```

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 UETP banner appears, and the program prompts you with questions. The default answer for each question is in brackets. Press Return if you wish to enter the default answer. UETP testing begins when the final question is answered.

❹ DEVICE, CLUSTER, and DECNET phases require additional setup to be tested. See the *VMS Upgrade and Installation Supplement* and related OpenVMS VAX documentation.

For more information:

VMS Upgrade and Installation Supplement: VAX 7000- 600 and VAX 10000- 600 Series

Appendix A

Storage Architecture Overview

VAX 7000 **VAX 7000 systems can connect to disk and tape drives in several different ways. This appendix provides some general information on the various alternatives.**

Sections in this chapter include:

- Storage Architecture and Options
- DSSI and VMSclusters Compared

A.1 Storage Architecture and Options

A VAX 7000 system can connect disks and tapes on the XMI bus via the VAX 7000 to XMI adapter (DWLMA) using KDM70 and KFMSA-BA adapters. VAX 7000 systems also have multiple paths for CI, DSSI, and Ethernet connections.

Figure A‑1   VAX 7000 Architecture
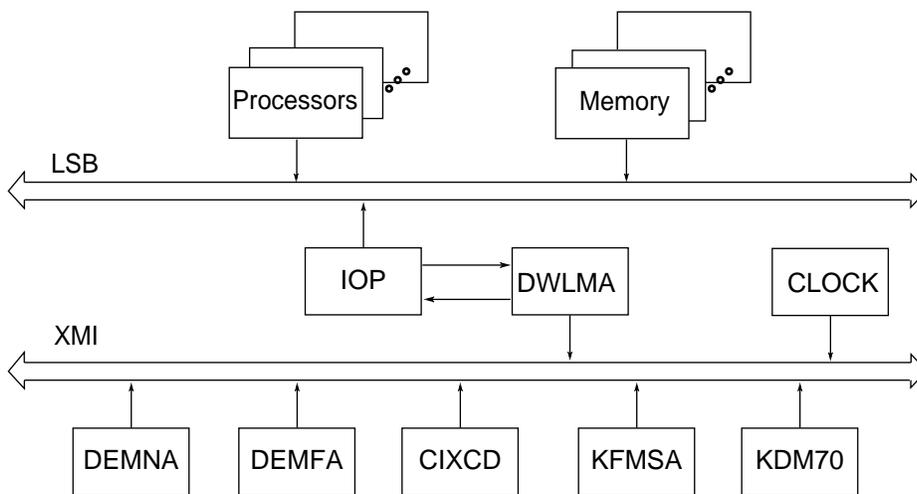
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VAX 7000 systems have several choices of VMScluster adapters and communication interconnects. Figure A‑1 shows a system architecture, and Table A‑1 lists the adapters and configuration limits.

Table A-1   VAX 7000 System I/O Adapters

Adapter	Maximum Configuration	
	Per XMI	Per System
CIXCD	6	10
DEMFA	4	8
DEMNA	4	16^1
KDM70	3	12
KFMSA	6	12^2

[1] The system can deliver transceiver power for 4 DEMNAs per PIU.
[2] The maximum number of KFMSAs is derived as follows: (25 minus the number of CIX-CDs) divided by two.

For more information:

DSSI VAXcluster Installation Guide

A.2 DSSI and CI VMSclusters Compared

(VAX 7000) **The Digital Storage System Interconnect (DSSI) bus is supported on VAX 7000 systems using the KFMSA-BA 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 A-2).**

Figure A-2   CI and DSSI Compared
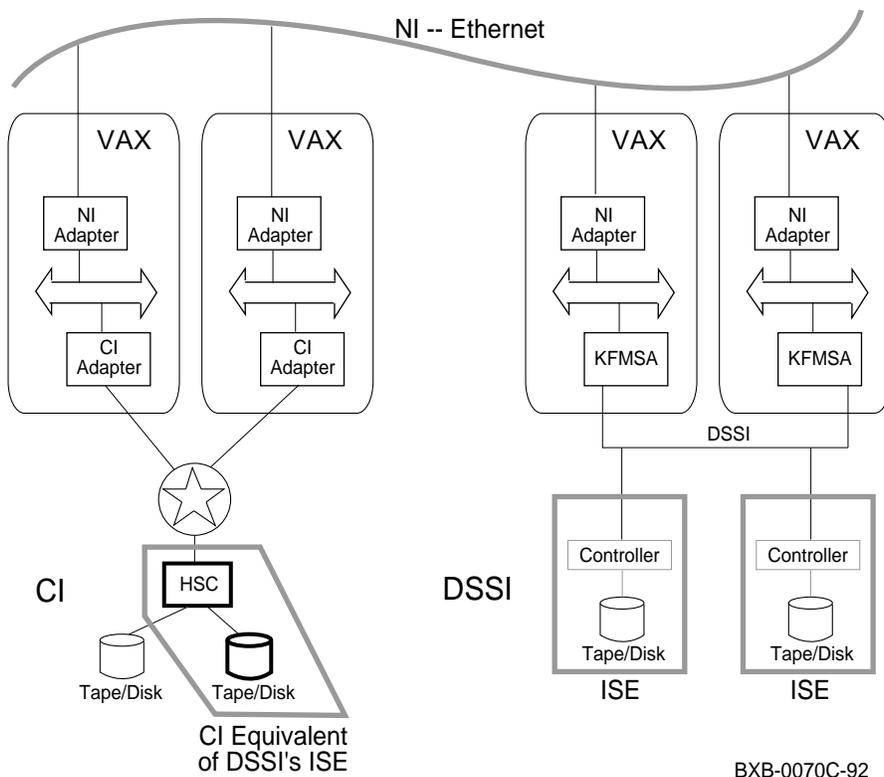
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On both CI and DSSI, all nodes directly connect to each other. The DSSI bus requires electrical terminators at both ends to ensure signal integrity because it is DC- coupled (the CI bus does not require physical termination).

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 7000 hosts on the 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- or multi- host mode. In single- host, one system has access to integrated storage elements (ISEs) across the DSSI storage bus. In multi- host configurations, the systems remain functionally independent while their common DSSI storage bus, together with VMScluster software, makes ISEs available to each system, providing multiple data paths for access to ISEs.

For more information:

KFMSA Module Installation and User Manual

Appendix B

DSSI Concepts

VAX 7000 **This chapter gives an overview of the Digital Storage System Interconnect (DSSI) bus supported by the KFMSA-BA adapter. Installation instructions appear in Chapter 3.**

Sections in this chapter include:

• DSSI Basics

• Integrated Storage Elements (ISEs)

• Dual-, Tri-, and Quad- Host Systems

B.1 DSSI Basics

Table B- 1 summarizes DSSI terminology and concepts. The indicated references provide more information.

- VAX 7000 systems support DSSI subsystems in single- , dual- , tri- , or quad- host configurations using the KFMSA- BA adapter.
- Each KFMSA- BA adapter has two buses, each of which can attach seven additional nodes (ISEs or another KFMSA- BA adapter).
- ISEs can be RF disk or TF tape drives.
- RF ISEs are housed in disk PIUs in the system or expander cabinets.
- TF85 ISEs are housed in the system cabinet.

Table B- 1   DSSI Concepts

Term	Reference	Definition
Control panel	*DSSI VAXcluster Installation Guide*	An enclosure interface that allows remote control of DSSI node ID selection and ISE operating status.
DSSI	*DSSI VAXcluster Installation Guide*	Digital Storage System Interconnect. A DSA- based storage interconnect used by the KFMSA- BA adapter and the RF and TF series integrated storage elements to transfer data and to communicate with each other.
Dual- host	Section B.3	Storage configuration where ISEs are shared between two DSSI adapters on a DSSI subsystem with two host systems.
ISE	Section B.2	Integrated storage element. On the DSSI storage bus, all RF and TF storage devices are ISEs.

Table B-2   DSSI Concepts (Continued)

Term	Reference	Definition
KFMSA-BA	Section 5.3	XMI adapter for RF disks and TF tapes; enables connection to these devices.
MSCP	Section B.2	Mass storage control protocol. An application layer protocol used by the host to perform disk I/O operations and I/O control functions.
Node name	*DSSI VAXcluster Installation Guide*	A 6-character (maximum) value assigned to each ISE. The node name of each ISE must be unique across the system topology.
Quad-host	Section B.3	Four host systems sharing ISEs on the DSSI storage bus.
Single-host	Section 5.2	Storage configuration where ISEs are connected to only one host system.
Split-bus	*DSSI VAXcluster Installation Guide*	A mode of operation where the bus servicing the ISEs in the system cabinet is different from the bus servicing the ICSs in the expander cabinets.
Through-bus	*DSSI VAXcluster Installation Guide*	A mode of operation where all ISEs are on the same DSSI bus.
Tri-host	Section B.3	Three host systems sharing ISEs on the DSSI storage bus.

B.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- BA adapters, the rest ISEs. ISEs are 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 B- 1   ISEs for the DSSI Storage Bus

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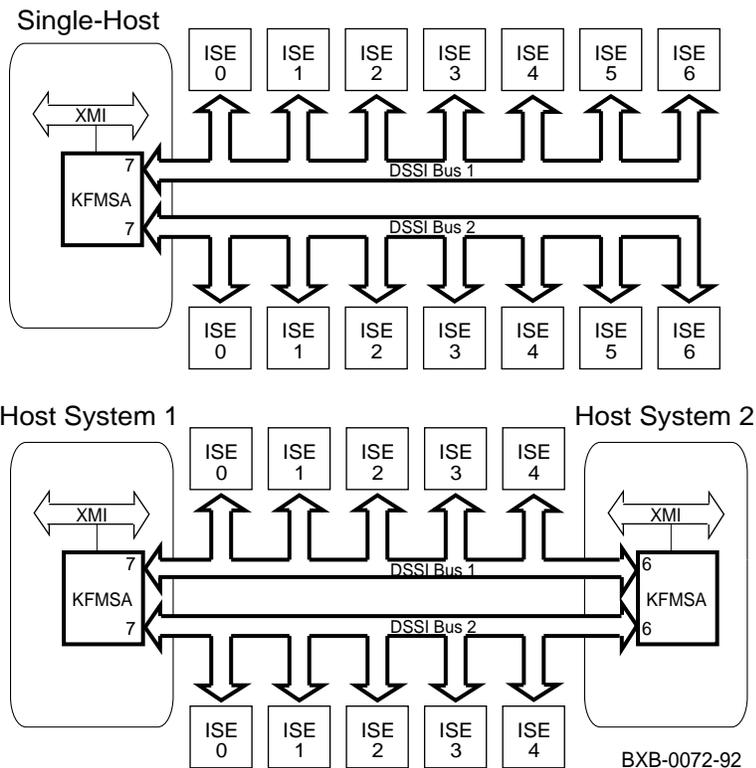
Each DSSI bus has a limit of eight physical addresses: one, two, or three adapters (KFMSA- BAs) and from one to seven ISEs (RF disks or TF tapes). Each ISE has a controller in the physical (tape or disk) drive which uses the mass storage protocol (MSCP) or tape MSCP.

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.

B.3 Dual-, Tri-, and Quad-Host Systems

The DSSI can connect dual-host, tri-host, and quad-host systems and ISEs.

Figure B-2   Examples of Dual-Host Configurations

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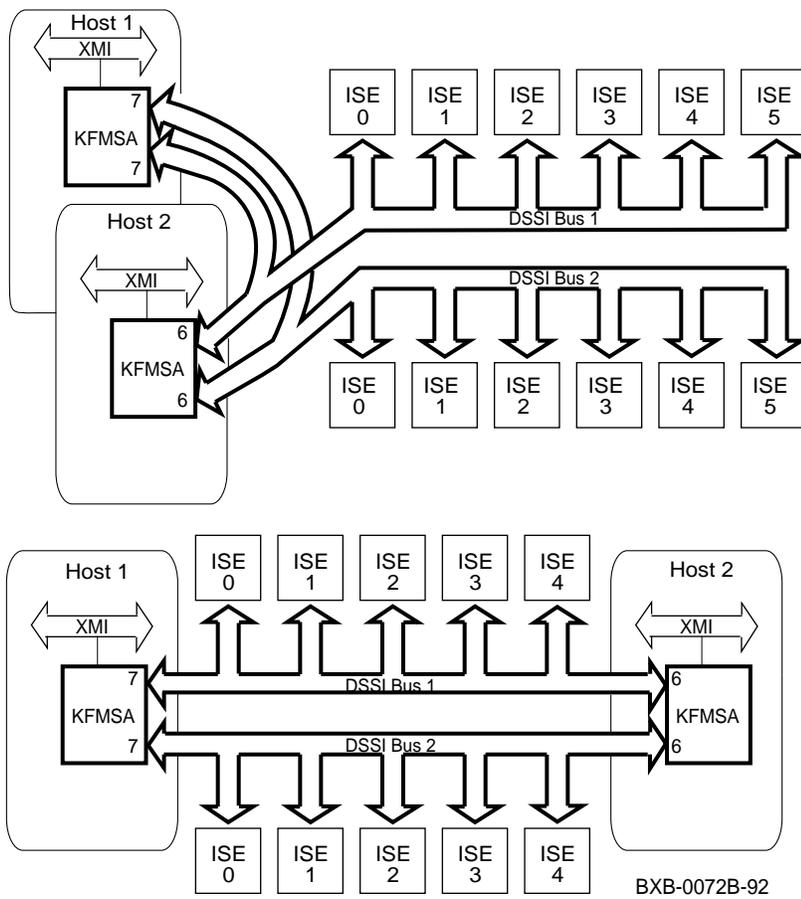
Figure B-2 shows a dual-host configuration with one KFMSA in each system. For DSSI VMSclusters, each system can have up to six KFMSA-BA adapters.

The ISEs can be in either the system cabinet or the expander cabinets. Dual-, tri-, and quad-host systems must have:

- Two or more VAX 7000 or other VAX systems
- Software licenses of

First System	Additional Systems
OpenVMS	OpenVMS[1]
VMScluster	VMScluster
DECnet full-function	DECnet end-node
[1]On any cluster, the maximum difference in OpenVMS revision levels between any two systems cannot be greater than one.	

- DSSI adapters (KFMSA-BA adapters for VAX 7000 systems)
- Ethernet hardware
- No more than six ISEs on each DSSI bus

For more information:

KFMSA Module Installation and User Manual
DSSI VAXcluster Installation and Troubleshooting Manual

Appendix C

Digital Remote Services Console Installation

The Remote Services Console (RSC) allows customer services to trouble-shoot systems from a Digital Service Center. The system console terminal port is used to connect the RSC to a 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 C-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 C-1   Remote Console Cable Connections

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