# VAXBI

# VAXBI Expander Cabinet Installation Guide

Order Number   EK-VBIEA-IN-003

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# CHAPTER 1

# 1
# INTRODUCTION

## 1.1 SCOPE

This manual provides general guidelines and procedures for the mechanical and electrical installation of an H9657-E VAXBI expander cabinet on a Digital Equipment Corporation VAXBI-based system.

## 1.2 MAINTENANCE DOCUMENTS

The following Field Service maintenance print sets are available:

* *VAXBI Expander Cabinet* (MP 01843-01)

* *H9657-EU Upgrade Kit* (MP 01844-01)

## 1.3 VAXBI EXPANDER CABINET

The VAXBI expander cabinet is designed for installation on VAX systems housed in 60-inch high corporate cabinets. Two basic variations operate on 47 to 63 Hz power in the three-phase Wye configuration:

* Domestic — The domestic VAXBI cabinet operates on 120/208 Vac nominal (phase-to-neutral/phase-to-phase) and uses the H405-A power input box.

* Non-domestic — The non-domestic VAXBI cabinet operates on 240/416 Vac nominal (phase-to-neutral/phase-to-phase) and uses the H405-B power input box with a step-down transformer. (The cabinet may be set for other nominal voltage ranges by changing the transformer taps.)

CAUTION
The power source in the computer facility must be five-wire, three-phase Wye. Both the neutral and ground lines must be connected to supply single-phase loads inside the cabinet. Otherwise, damage to power system components may result.

The standard VAXBI cabinet provides six slots for VAXBI options. (One slot is used by the VAXBI channel adapter.) Table 1-1 lists and describes eight VAXBI expander cabinet configurations.

**Table 1-1 VAXBI Expander Cabinet Configurations**

| Cabinet | Description |
|---------|-------------|
| H9657-EA | VAXBI expander cabinet with one 6-slot VAXBI card cage — 120 V |
| H9657-EB | VAXBI expander cabinet with one 6-slot VAXBI card cage — 240 V |
| H9657-EC | Same as H9657-EA except used for VAX 6000 series |
| H9657-ED | Same as H9657-EB except used for VAX 6000 series |
| H9657-EE | Same as H9657-EA except used for VAX 9200 series |
| H9657-EF | Same as H9657-EB except used for VAX 9200 series |
| H9657-EH | Same as H9657-EA except used for VAX 9400 series |
| H9657-EJ | Same as H9657-EB except used for VAX 9400 series |

The following options are available as add-ons to an existing VAXBI cabinet:

- VAXBI channel adapter — The channel adapter adds one VAXBI channel. A minimum of one is required for installation on a VAX system. (Refer to the VAX system documentation for further details.)

- H9657-EU VAXBI upgrade kit — The VAXBI upgrade kit adds one 6-slot VAXBI card cage and one modular power supply (MPS) regulator. Up to three are optional.

For information on the VAXBI options, refer to the documentation that applies to each specific option.

## 1.4 ELECTROSTATIC DISCHARGE, SAFETY, AND POWER PRECAUTIONS

Observe all necessary precautions when working around or inside a VAX system cabinet or when servicing, replacing, or installing logic modules.

**WARNING**

Only qualified personnel familiar with electrostatic discharge (ESD) procedures, safety procedures for electrical equipment, and the specific VAX system should have access to the inside of the system cabinets.

Two or more persons are required to remove the VAXBI cabinet from the skid or to move the system cabinets. If not handled properly, moving these cabinets may cause personal injury or property damage.

MPS regulator outputs can be switched off separately. Use caution if you turn off an MPS regulator for any reason since 300 Vdc remains on the bus bars to the regulators.

Remove all power to the cabinet before removing or inserting any MPS regulator. All MPS and power indicators must be OFF to ensure that power has fully discharged.

### 1.4.1 ESD Procedures

Modules that are removed from or added to a VAX system cabinet may be damaged by electrostatic discharges.

**CAUTION**
**STATIC SENSITIVE DEVICES — ESD grounding cords attached to the cabinet frame are located behind the cabinet doors. ESD wrist straps must be worn and the clip must be attached to the conductive module case before servicing, replacing, or installing any logic or power modules.**

### 1.4.2 Safety Precautions

Observe the following precautions when working around or inside any system cabinet:

* Do not move cabinets that are connected together.

* Do not extend expander boxes from any cabinet that is not bolted to the system. Extend the safety foot if the system is so equipped.

* Remove watches and jewelry when working inside a cabinet. Keep fingers and tools away from high voltage areas (300 Vdc bus bars).

* Avoid contact with the rotating blowers. Do not place your hands or arms into the blower inlet area above the MPS regulator modules. This area is accessible when an MPS regulator module is removed.

* Replace fuses or circuit breakers with a Digital part of the same type and current rating to prevent damage to the power system or computer logic.

### 1.4.3 Power Procedures

Use the following procedures when shutting down or preparing a VAX system for service or installation.

**WARNING**
**Some VAX systems store a high-voltage charge for a period of time after the primary power is disconnected. These procedures are recommended to avoid module damage or contact with stored high voltages.**

1. Do an orderly system shutdown at the console and then power down the system using the correct procedures (enter the POWER OFF command).

2. In VAX systems with a battery backup unit (BBU), switch off the main system circuit breaker to inhibit BBU operation. Otherwise, 300 Vdc may still be present on the bus bars, even during loss of utility power or when the main power cable is disconnected.

3. Before working in the lower portion of any VAX system cabinet, disconnect the power cable to the cabinet. Live voltages are present on circuit breaker terminals even with the circuit breaker in the OFF position.

4. Before working inside a VAXBI cabinet, switch off the circuit breakers on the H7176 power bulk box and the H405 power input box. As an additional precaution, unplug the power cable.

   Wait at least 5 minutes for capacitor-stored voltages to decay, then check that all MPS regulator indicators are off. In the VAXBI cabinet and some VAX systems (VAX 8500/8530/8550), a high dc potential exists between the MPS power bus bar(s) and chassis ground when the H7176 circuit breaker is on.

**CAUTION**
**The MPS regulator outputs can be separately switched off from the H7066 system logic module (SLM). Before removing or inserting any MPS regulator, remove all cabinet power and ensure that all power indicators are off to ensure that power has fully discharged. Otherwise, high surge currents may cause damage to the MPS regulator components.**

## 1.5 PHYSICAL DIMENSIONS

Table 1-2 lists the physical dimensions of the VAXBI cabinet.

**Table 1-2 Physical Dimensions**

| Specification | Description |
|---|---|
| Unskidded Dimensions: | |
| Height | 153.7 cm (60.5 in) |
| Width | 76.2 cm (30.0 in) |
| Depth | 76.2 cm (30.0 in) |
| Unskidded Weights: | |
| Domestic cabinet | 245 kg (540 lb) |
| Non-domestic cabinet | 308 kg (680 lb) |
| Skidded Dimensions: | |
| Height | `3.0 cm (76.0 in) |
| Width | 93.5 cm (36.8 in) |
| Depth | 113.0 cm (44.5 in) |

# 1.6  ENVIRONMENTAL LIMITS

Table 1-3 lists the environmental limits of a fully-populated VAXBI cabinet.

Table 1-3  Environmental Limits

| Characteristic | Value |
|---|---|
| Specification | Digital Class B Standard |
| Temperature: | |
| Operating | 10° to 40° C (50° to 104° F) |
| Storage | -40° to 66° C (-40° to 151° F) |
| Thermal dissipation | 6.5K Btu per hour |
| Relative Humidity: | |
| Operating | 10% to 90% (noncondensing) |
| Storage | 10% to 95% (noncondensing) |
| Maximum wet-bulb temperature | 28° C (82° F) |
| Minimum dewpoint | 2° C (36° F) |
| Shock: | |
| Operating | 10 g vertical |
| Storage | 20 g vertical |
| Vibration: | |
| Operating | 0.254 mm (0.010 in) double amplitude at 5 to 20 Hz; 0.25 g at 21 to 500 Hz |
| Storage | 1.4 g RMS at 10 to 300 Hz vertical; 0.687 g RMS at 10 to 200 Hz horizontal and lateral |
| Operating Altitude [1] | Sea level to 2.4 km (8,000 ft) |

**NOTE**
The above specifications include the broad range of conditions under which Digital Equipment Corporation devices are tested and are not to be construed as the recommended operating or storage environments.

[1] If altitude operation is above 2.4 km, decrease the operating temperature by 1.8° C (1° F) per additional 1000 ft above sea level.

# 1.7  ELECTRICAL REQUIREMENTS

## 1.7.1  AC Power Requirements

Table 1-4 lists the ac power requirements of the VAXBI expander cabinet.

**Table 1-4  AC Power Requirements**

| Specification | Description |
|---|---|
| EMI/RFI | Meets FCC regulations for Digital Class A products |
| Domestic Cabinet: | |
| Voltage [1] | 120/208 Vac +10%/-25% |
| Frequency | 47 to 63 Hz |
| Phase type [2] | Three-phase Wye/five-wire |
| Power input box | H405-A |
| Power dissipation | 2000 W maximum |
| Steady state current | 8.5 A (RMS) per phase |
| Non-Domestic Cabinet: | |
| Voltage [1,3] | 240/416 Vac +16%/-21% |
| Frequency | 47 to 63 Hz |
| Phase type [2] | Three-phase Wye/five-wire |
| Power input box | H405-B |
| Power dissipation | 2000 W maximum |
| Steady state current | 4.3 A (RMS) per phase |
| Power Cable: | |
| Length | 4.6 m (15.0 ft) |
| Wires [2] | Five  12 AWG (three phase-leads plus neutral and ground) |
| Plug type | NEMA or IEC 309 standard (see Figure 1-1) |

[1] Phase-to-neutral/phase-to-phase voltages.

[2] CAUTION: Both the neutral (W/X) and the ground (G) lines must be connected from the bulk three-phase power bus to complete the Wye configuration. Otherwise, damage to power system components may result. Power should come from the same distribution panel supplying the host CPU. This ensures that ground references for the VAXBI cabinet are at the same potential as the host CPU.

[3] Range selectable for 220 or 240 Vac nominal according to a jumper table on the step-down transformer.

## 1.7.2 AC Power Connectors

A dedicated power receptacle and circuit breaker should be installed by a licensed electrician prior to the arrival of the VAXBI expander cabinet.

Figure 1-1 shows the three-phase plug and receptacle configurations for the plug supplied with the VAXBI cabinet. It also shows the "ABC" or "XYZ" phase reference markings.
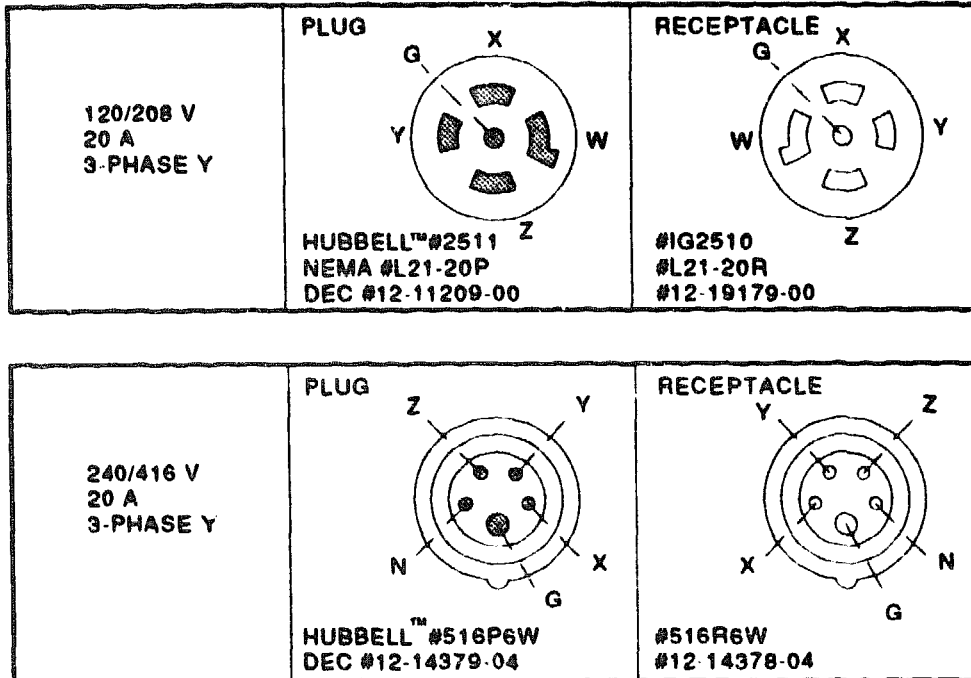


NOTE: PHASE ROTATION REFERENCE MARKINGS THAT MAY BE FOUND ON IEC 309 CONNECTORS ARE:

| A | B | C | |
|---|---|---|---|
| 1 | 2 | 3. | |
| X | Y | Z. | |
| R1 | S2 | T3, | ETC. |

GSF-RC1042-09-MPS

Figure 1-1  Power Connectors (ac)

CAUTION
Both the neutral (W/X) and the ground (G) lines must be connected from the bulk three-phase power to complete the Wye configuration and to supply single-phase loads inside the cabinet. Otherwise, damage to power system components may result.

AC power should come from the same bulk distribution panel supplying the host CPU. This ensures reliable operation and ensures that ground references for the VAXBI cabinet are at the same potential as the host CPU.

### 1.7.3 Feed Line Capacity/Circuit Breaker Size

The VAXBI cabinet must receive three-phase power through a separate, dedicated ac power receptacle and circuit breaker of the recommended value.

No other loads or equipment may be connected through the circuit breaker. Do not connect electric motors, air conditioners, office copiers, or convenience outlets to the same circuits or panels that the VAX system cabinets are connected to. If power disturbances cannot be avoided, it may be necessary to install power conditioning equipment.

The feed line to the VAXBI cabinet must be able to supply the following currents through a ganged-trip circuit breaker of the same rating:

• Domestic cabinet (120/208 Vac) — 20 A per pole (ganged-trip breaker)

• Non-domestic cabinet (240/416 Vac) — 15 A per pole (ganged-trip breaker)

Table 1–5 may be used as a guideline in selecting a circuit breaker to allow for power-up surge and stabilization.

Table 1–5  Recommended Circuit Breaker Trip Delay Times

| Percent of Rated Current | Minimum Time to Trip (Seconds) |
|---|---|
| 125 | 13.0 |
| 150 | 6.0 |
| 200 | 2.1 |
| 400 | 0.46 |
| 600 | 0.03 |
| 800 | 0.013 |
| 1000 | 0.01 |

# CHAPTER 2

# 2
# UNPACKING AND INSPECTING

## 2.1 INITIAL INSPECTION

See Figure 2-1. Make the following checks before unpacking the VAXBI expander cabinet.

**CHECK FOR EXTERNAL DAMAGE**

Check the shipping carton for external damage (dents, holes, crushed corners, and water marks).

**CHECK THE SHIPMENT**

Check that the shipment is complete and correct. Inventory the shipment against the carrier's bill of lading.

**IF THERE IS A PROBLEM**

If there is a shipping problem or visible damage, list the information on the Labor Activity Reporting System (LARS) form. Include a note to clarify the extent of the damage and notify the customer and responsible Field Service manager.

**NOTE**
Do not unpack the cabinet until the customer notifies the insurance company and gives you permission to continue the installation.

## 2.2 UNPACKING AND INSPECTING

Unpack the VAXBI expander cabinet using the following procedure.

**CAUTION**
The cabinet rests on four casters (two of which swivel) and requires two people to remove it from the skid. If not handled properly, the cabinet may cause personal injury or property damage.

**REMOVE SHIPPING CARTON**

See Figure 2-1. Unpack the cabinet by first removing the shipping straps and outer shipping cap. Then, remove the machine screws and metal closures that secure the shipping carton.

See Figure 2-2. Remove the packing list, ramp kit, inner shipping cap, packing material, and plastic bag. DO NOT REMOVE any shipping brackets.

OUTER
SHIPPING
CAP

SHIPPING
STRAPS

METAL
CLOSURES
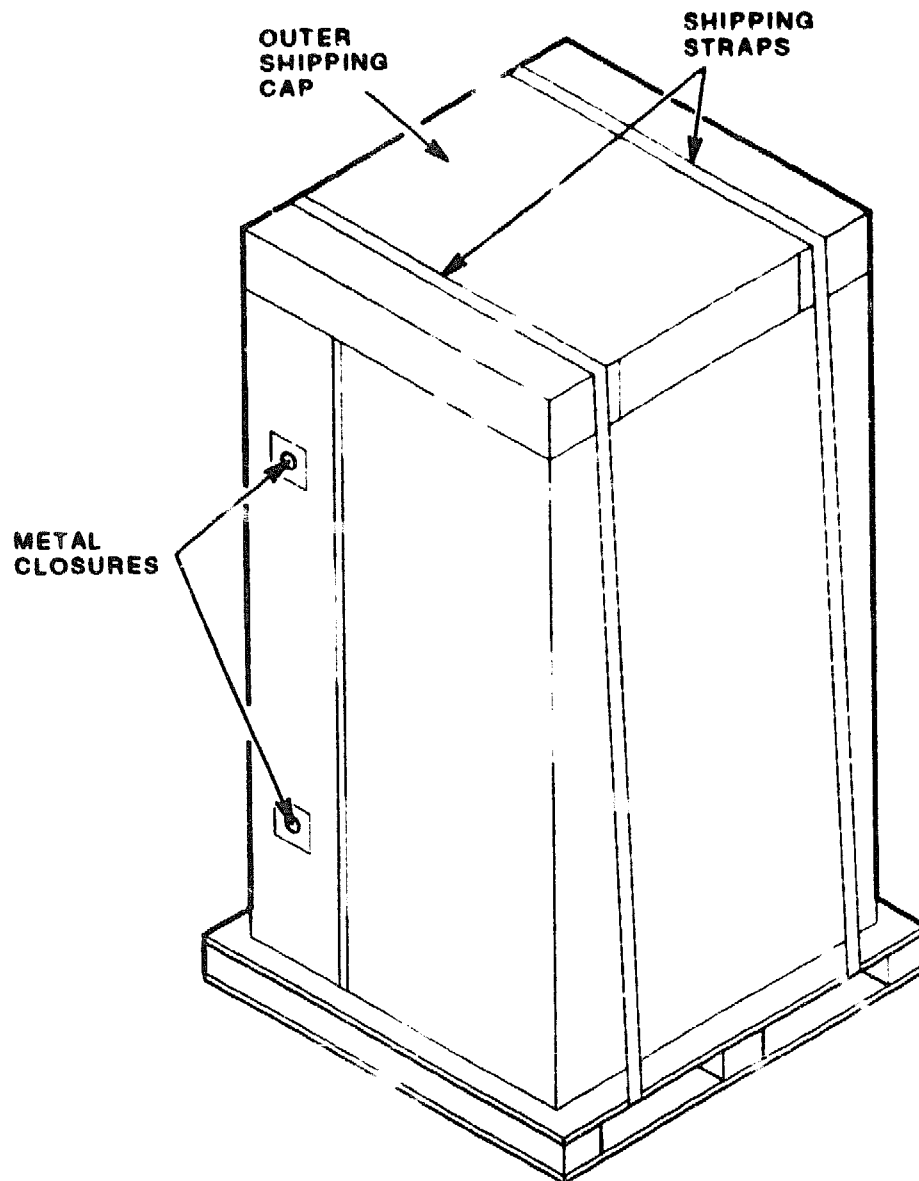
GSF-RC1042-10-DG

**Figure 2-1   Packaged VAXBI Expander Cabinet**

## CHECK SHIPPING CARTON CONTENTS

Inventory the contents of the carton against the packing list.

## CHECK FOR CONCEALED DAMAGE

Check the cabinet top, sides, and front and rear doors for concealed damage.  Unpack and check the expander frame and place it away from the work area.

## CHECK RAMP KIT CONTENTS

See Figure 2-2.  Open the ramp kit shipped with the cabinet.  It should contain two ramps with attached brackets.

RAMP KIT

INNER
SHIPPING
CAP

ACCESSORIES
OR PACKING
MATERIAL

EXPANDER
FRAME

PACKING
MATERIAL

TWO (2)
SWIVEL CASTERS,
TWO (2)
FIXED CASTERS

FRONT
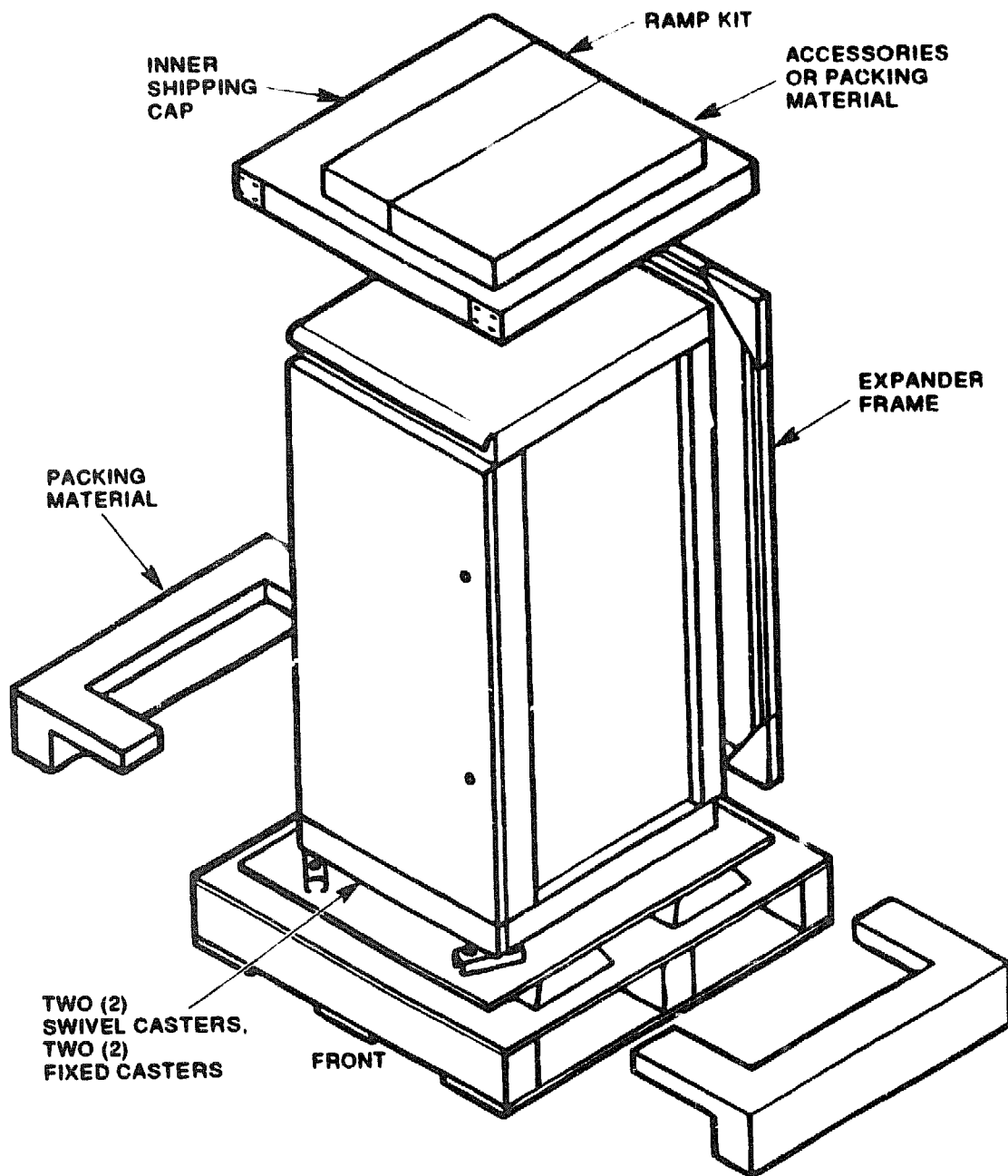
GSF-RC1042-11-MPS

Figure 2–2   Unpacking the Cabinet

**IF THERE IS A PROBLEM**

If there is a shipping problem or concealed damage, list the information on the LARS form. Include a note to clarify the extent of any damage and notify the customer and responsible Field Service manager.

**NOTE**
Stop unpacking until the customer notifies the insurance company and gives you permission to continue the installation. Save the carton and packing material in case it is necessary to return the cabinet.

## 2.3   REMOVING THE CABINET FROM THE SKID

Remove the VAXBI expander cabinet from the skid using the following procedures.

**CAUTION**
THE CABINET RESTS ON FOUR CASTERS (TWO OF WHICH SWIVEL) AND REQUIRES TWO PEOPLE TO REMOVE IT FROM THE SKID.

Use care that the cabinet does not roll off either side of the skid or uncontrolled down the ramps. Ensure that all four leveling feet are fully raised before moving the cabinet down the ramps. Otherwise, they may catch on the rails.

**REMOVE FRONT SHIPPING BRACKETS**

See Figure 2-3 (A). With another person holding the cabinet, remove the two shipping brackets from the front (full-length door) of the cabinet.

**ATTACH THE RAMPS**

See Figure 2-3 (B). One ramp has a single arrow. The other ramp has double arrows. The ramp arrows must agree with the skid to properly locate the ramp rails.

Attach the ramps by placing the prongs of the brackets in the holes in the skid. If the fit is snug, stand on the brackets to force them into place.

**REMOVE REAR SHIPPING BRACKETS**

See Figure 2-3 (C). With another person holding the cabinet, remove the two shipping brackets from the rear of the cabinet. Save the brackets for adjusting the leveling feet.

**CHECK LEVELING FEET**

See Figure 2-3 (A) and (C). Ensure that the four leveling feet are raised all the way up and into the base of the cabinet. (Use one of the shipping brackets or a 9/16-inch wrench.)

**REMOVE THE CABINET FROM THE SKID**

See Figure 2-3 (D). With the help of at least one other person, carefully guide the cabinet down the ramps and off the skid.

(A) REMOVE FRONT SHIPPING BRACKETS

(C) REMOVE REAR SHIPPING BRACKETS

(B) ATTACHED RAMP ASSEMBLIES

(D) ROLL CABINET OFF SKID (NOT SHWON) REQUIRES TWO PEOPLE
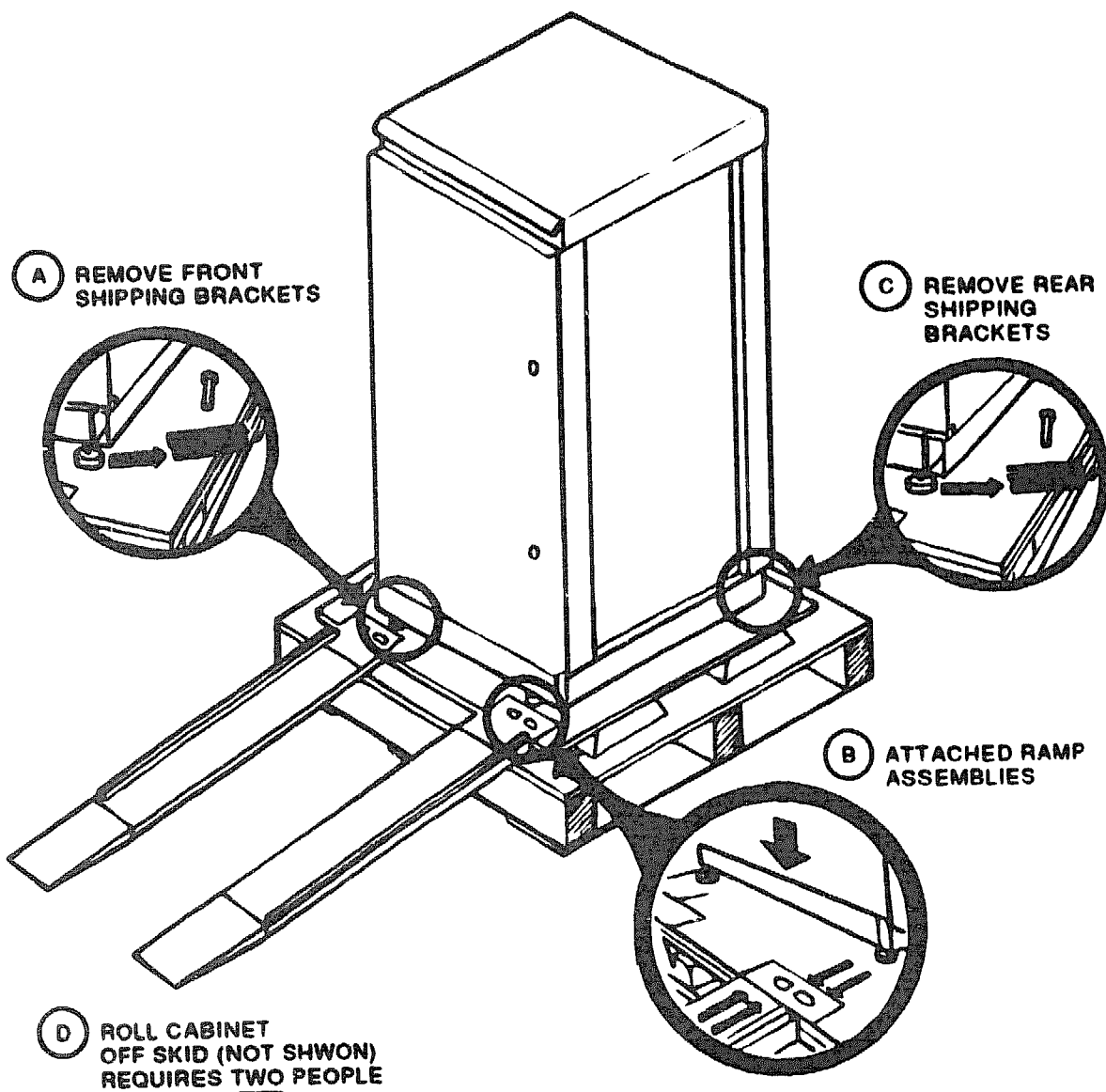
GSF-RC1042-12-MPS

Figure 2-3   Removing the Cabinet from the Skid

# CHAPTER 3

# 3
# INSTALLATION PROCEDURES

## 3.1 PREINSTALLATION

Review the precautions listed in Chapter 1 before performing any installation steps. Refer to the document set for the host system (the VAX system on which you are installing the VAXBI cabinet) for further details on installation and cabling.

It is recommended that two people perform this installation to save time if installation problems are encountered.

## 3.2 BRINGING DOWN THE SYSTEM

Bring down the system when you are ready to begin installation. Starting at the console:

1. Do an orderly shutdown of the VMS operating system.

2. Power down the system.

3. Switch off the main system circuit breaker.

**WARNING**
**With the system turned off, the 300 Vdc memory power bus in the CPU cabinet may still carry live power unless correct procedures are observed.**

**Only qualified personnel familiar with the safety procedures for electrical equipment and the VAX system should have access to the inside of the system cabinets.**

## 3.3 CABINET PREPARATION

The VAXBI cabinet and system end cabinet must be partially opened before they can be connected. Depending on the existing system configuration, the end cabinet may be the CPU cabinet.

**POSITION THE VAXBI CABINET**

Place the VAXBI cabinet next to the system end cabinet where it is to be installed, leaving sufficient work space between the cabinets.

**OPEN THE CABINETS**

Open the VAXBI cabinet and the system end cabinet that will be connected to the VAXBI cabinet.

**NOTE**
Figures Figure 3-1 through Figure 3-3 show examples of a typical end cabinet for system expansion to the right. For systems expanding to the left, use the same procedures from the left end of the system.

Use the following procedure on both cabinets:

1. Open the front and back doors, using a 1/4-inch hex key wrench (P/N 12-26339-01). The key wrench is attached to the top of the front right vertical rail.

   **NOTE**
   To provide ease of access for the installer, it is recommended that you remove the cabinet doors.

2. To remove the doors, disconnect one end of the ground line from each cabinet door. Leave all grounding wrist straps attached to the cabinet frame.

3. Lift the doors off their hinges. Place them away from the work area where the finish will not be damaged.

4. Remove the red shipping bracket across the front of the MPS regulators (front of the VAXBI expander cabinet; not shown).

5. See Figure 3-1 (A). Remove the two screws holding the rear of the top cover. Carefully lift the rear of the cover and move it towards the rear. Place it away from the work area (only if required).

6. See Figure 3-1 (B). On some systems it may also be necessary to remove the front bezel. Remove the four screws holding the front bezel and place it away from the work area.

7. See Figure 3-2. Remove all 12 kepnuts holding the system end panel. Carefully lift the panel while removing it so as not to damage the threaded studs. Place it away from the work area (only if required).

## CHECK THE RF SHIELDING

On both cabinets, check that the braided RFI shielding or securing clips are not damaged or missing.
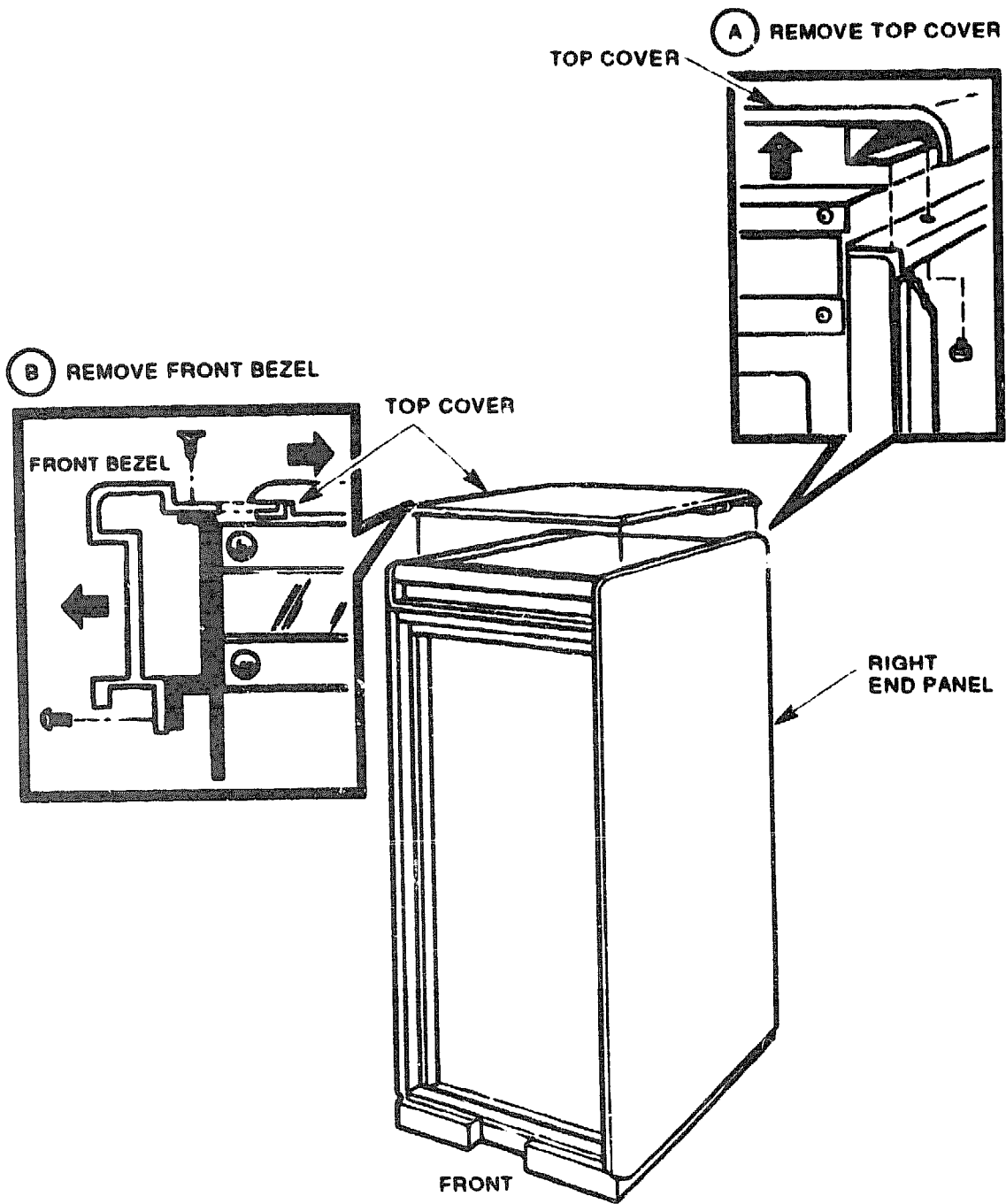
NOTE: RIGHT SYSTEM END CABINET SHOWN

GSF-RC1042-13-MPS

Figure 3–1   Top Cover and Front Bezel Removal (Typical)

RIGHT END
PANEL

KEPNUTS

FRONT
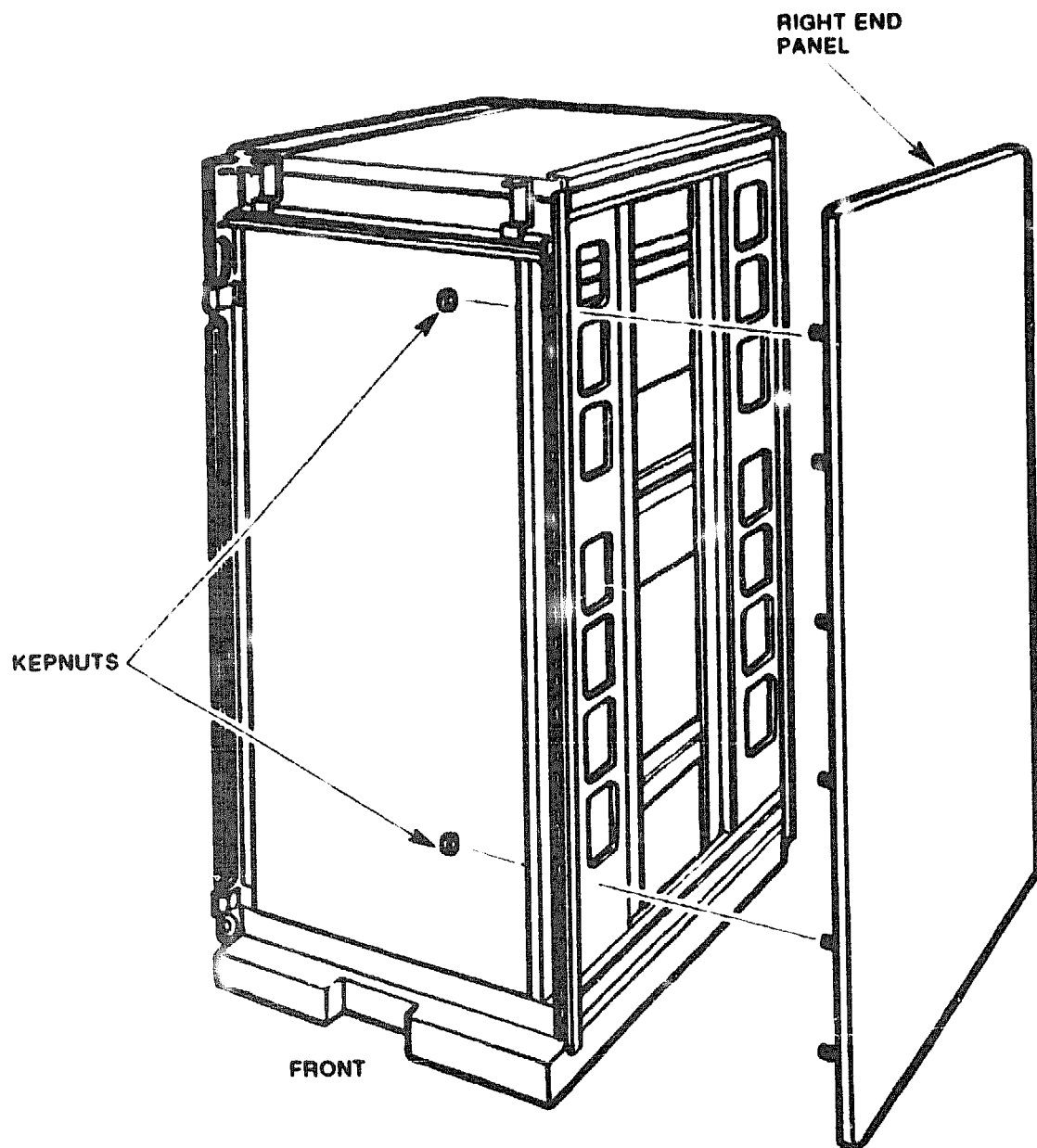
NOTE:  RIGHT SYSTEM END CABINET SHOWN

GSF-RC1042-14-MPS

Figure 3–2   End Panel Removal (VAX System)

## 3.4 MOUNTING THE VAXBI CABINET

### 3.4.1 Mounting to the VAX 6XXX and 8XXX Series Systems

Align and mount the VAXBI cabinet on the system end cabinet as follows:

1. Locate the mounting hardware (bolts, kepnuts, and washers which are located in the loose-piece box) supplied with the expander frame.

2. See Figure 3-3. Place the expander frame on the open end of the system end cabinet. Fit the keyed corner into the top, front corner of the cabinet.
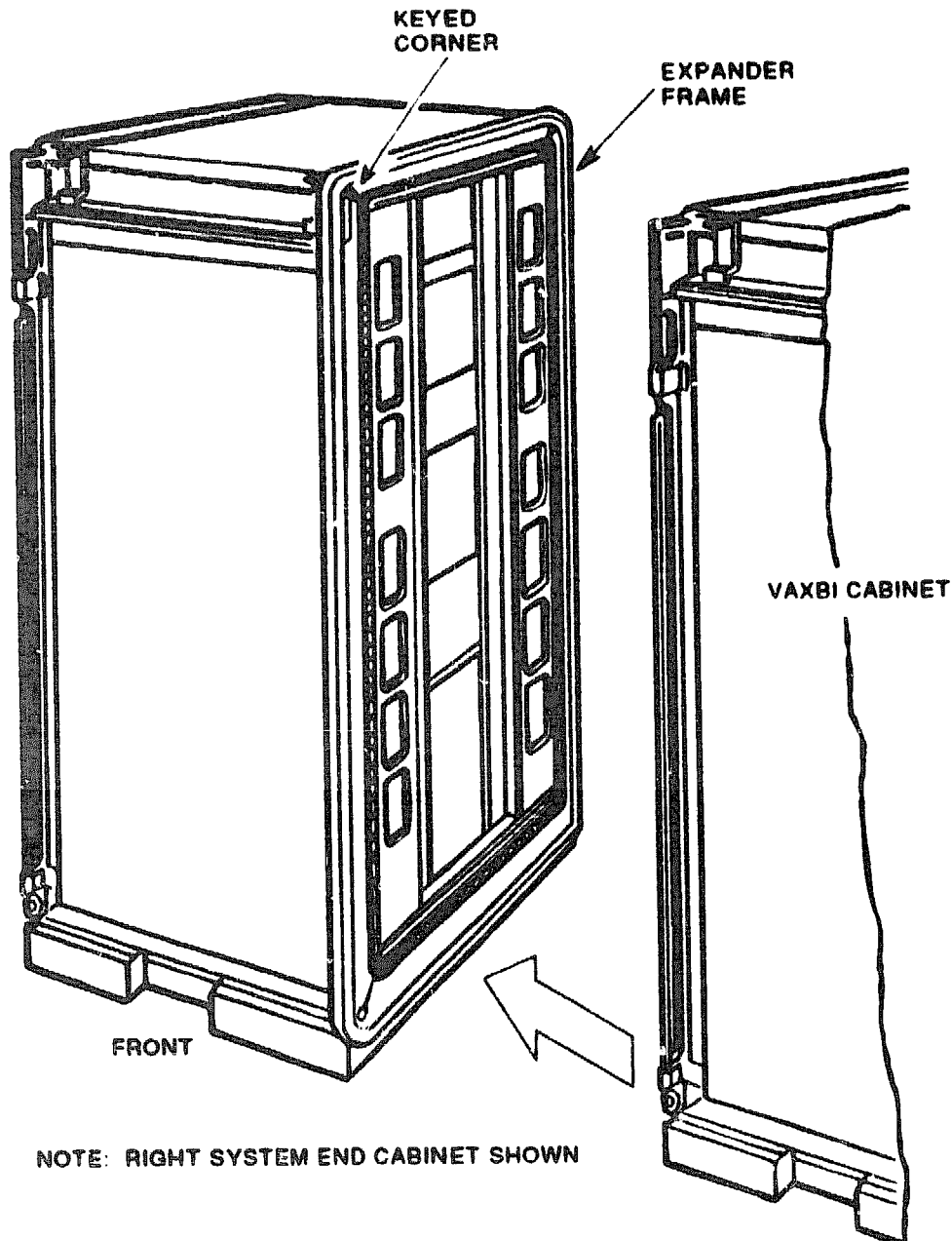
GSF-RC1042-15-MPS

Figure 3-3 Expander Frame Placement (On VAX System)

3.  Move the VAXBI cabinet next to the system. Align it with the system by adjusting the leveling feet (use one of the shipping brackets or a 9/16-inch wrench).

    **NOTE**
    A flat washer is required on both sides at the four corners; the other eight locations DO NOT require flat washers.

4.  Add a flat washer and insert a bolt through each of the mounting holes in the VAXBI cabinet, expander frame, and system end cabinet. Add a flat washer and kepnut to each bolt but do not tighten.

5.  Check the VAXBI cabinet alignment with the system and make any necessary adjustments to the leveling feet. (A spirit level may be used as an overall check on the system alignment.)

6.  Tighten the kepnuts on all bolts.

## 3.4.2  Mounting to the VAX 92XX and 94XX Series Systems

Refer to the appropriate field maintenance print set for installation information.

-   VAXBI upgrade for a VAX 92XX without a VAXBI cabinet — MP 03072-01 for kit DWMBB-FA

-   VAXBI upgrade for a VAX 94XX without a VAXBI cabinet — MP 03073-01 for kit DWMBB-GA

-   VAXBI expander cabinet for a VAX 94XX (first VAXBI cab) — MP 03074-01 for kit DWMBB-HA

-   VAXBI expander cabinet for a VAX 92XX and 94XX (second cabinet) — MP 03075-01 for kit DWMBB-JA

**NOTE**
The VAX 94XX series cabinet is 1.8 m (6.0 ft) high and the VAXBI expansion cabinet is 1.5 m (5.0 ft) high.

**CHECK THE RF SEALS**

Check the RF seal between the expander frame and both cabinets. Insert a strip of paper in each of the seams and check for resistance as you move the paper along the seam. If there is no resistance, the seam will not provide an effective RF seal. The seam material must be adjusted until a proper seal is attained.

## DEC POWER BUS CABLE

The VAXBI expander cabinet is equipped with a modified DEC power bus cable (remote sense cable) (P/N 17-01994-01). The cable incorporates both a male and female connector at each end of the cable in a "Y-style" wiring harness. Cable ends are located in the rear of the cabinet, on both the lower right and left-hand sides of the cabinet. This facilitates all cabling possibilities in the several VAXBI system configurations that support the cabinet. Cable plug "P" designations are marked and located as follows:

- P2 is connected to MPS backplane jack J21.

- P1 and P5 are located on the rear-lower, left-hand side of the cabinet. They are the same electrical connection points, with the difference being that one plug is male and one is female.

- P3 and P4 are located on the rear-lower, right-hand side of the cabinet, and have the same connection design as P1 and P5.

The VAXBI expander cabinet can be installed in many different configurations with other types of cabinets and equipment. DEC power bus cables can be installed in several ways, most of which are listed below:

- H9657 to H9657 cabinets.

- H9657 to kernel system cabinets.

- H9657 to H9652 cabinets.

- H9657 to H9642 cabinets.

- H9657 to any other DEC power bus compatible equipment.

Use the following guidelines to complete the DEC power bus connection:

1. In the first example above, connect one plug of the Y-style cable in one cabinet to the Y-style cable in the other cabinet.

2. In all the other examples, connection is usually facilitated using a DEC power bus extension cable (P/N 70-08288-XX or equivalent). The extension cable should be packaged with the equipment that the VAXBI expander cabinet is being connected to, or separately ordered, to complete the installation.

   **NOTE**
   The H9657-EC and -ED variations include the 17-02159-01 [3 m (10 ft)] DEC power bus cable, which is used to complete connection to systems that support these variations.

   The H9657-EE thru -EJ variations include the 17-02159-02 [6 m (20 ft)] DEC power bus cable, which is used to complete connection to systems that support these variations.

3. At the completion of the DEC power bus installation, each Y-style cable end will usually have one plug open (that is, not connected).

4. If the VAXBI expander cabinet is the last cabinet in the configuration, only one Y-style end on one side of the cabinet will be connected. The connected end would be to the rear of the 405 power controller.

## 3.5 VAXBI BUS CABLE INSTALLATION

Figure 3-4 shows a rear view of the cabinet layout. It identifies the I/O bulkhead connector panels and the H405 power input box (PIB). For further information on the VAXBI options, refer to the appropriate documentation for each option.
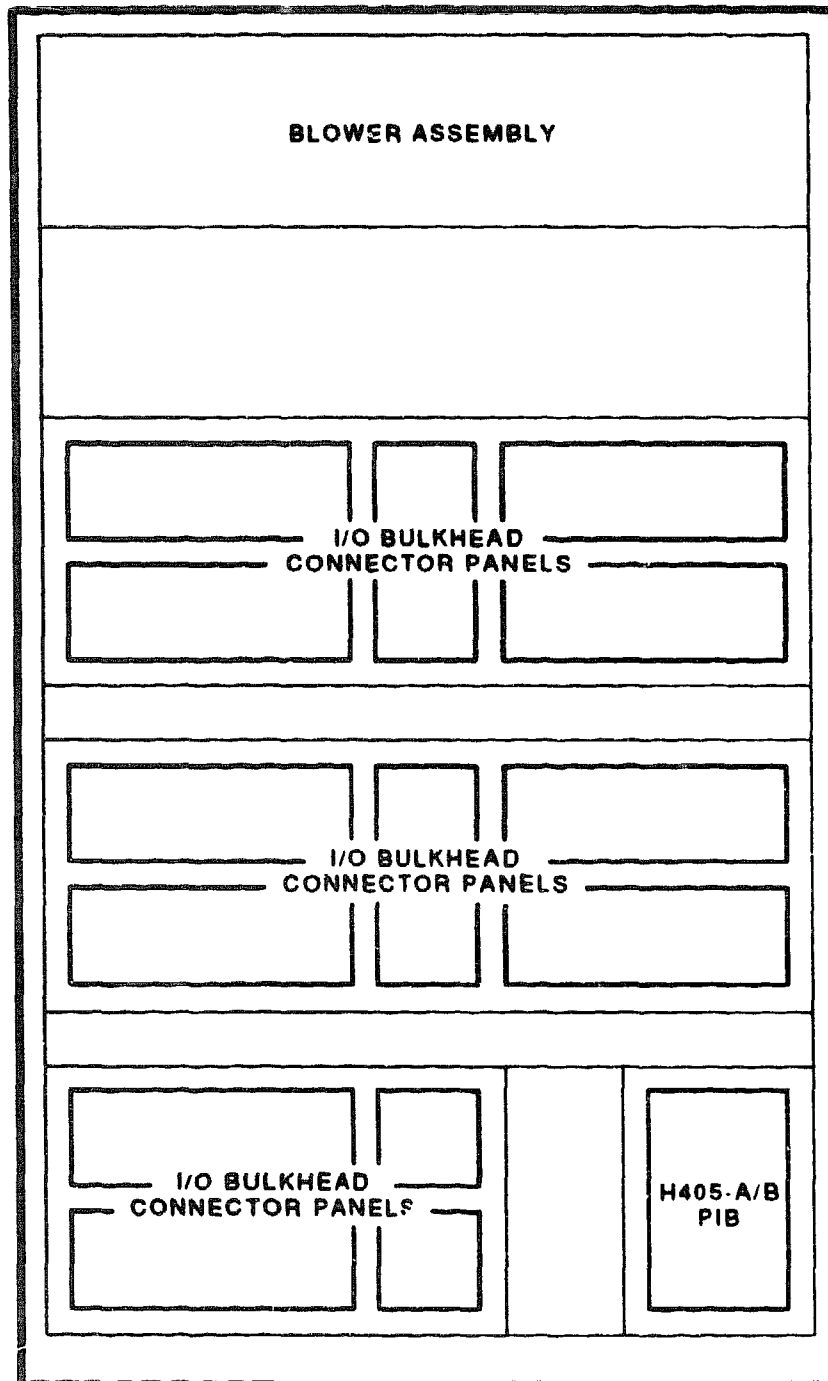


GSF-RC1042-16-DG

**Figure 3-4   VAXBI Expander Cabinet Layout (Rear View)**

Figure 3–5 shows a front view of the cabinet layout and identifies the H9400 VAXBI card cages, the H7189-A modular power supply (MPS) regulators, and the H7066-A system logic module (SLM). It also identifies the modules mounted in the system power control (SPC) backplane assembly: H7176-A power bulk box (PBB), H7060-A control/startup power module (CSP), and H7061-A interconnect logic module (ILM).
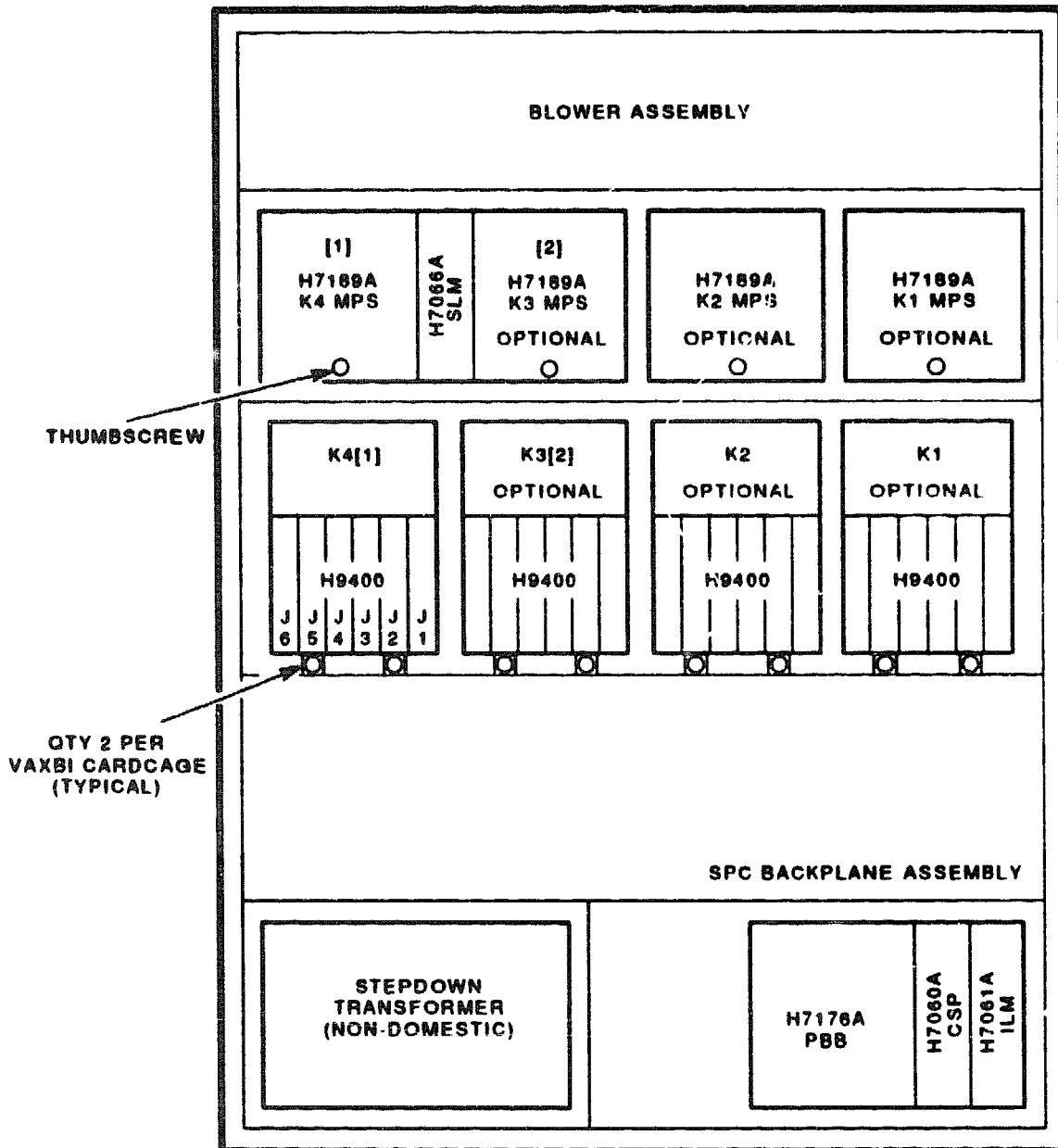


[1] H9657-E CABINET IS AVAILABLE WITH ONE STANDARD BACKPLANE AND MPS REGULATOR.

[2] H9657-EU BI CARD CAGE REGULATOR UPGRADE. UP TO THREE ARE OPTIONAL.

[3] VAXBI CHANNEL ADAPTER. UP TO FOUR ARE OPTIONAL. ONE, MINIMUM, IS REQUIRED FOR INSTALLATION ON A VAX SYSTEM.

GSF-RC1042-01-DG

Figure 3–5   VAXBI Expander Cabinet Layout (Front View)

## VAXBI BUS CABLE CONNECTORS

Figure 3-6 shows typical VAXBI card cage connections for the VAXBI bus cables from the system. Connect one set of cables for each VAXBI channel according to the chart provided in the installation or maintenance guide for the VAX system, or refer to Appendix B.

| VAXBI BUS CABLE FROM SYSTEM | NBIB CABLE CONNECTION |
|---|---|
| P1 | E2 |
| P2 | C1 |
| P3 | D1 |
| P4 | E1 |
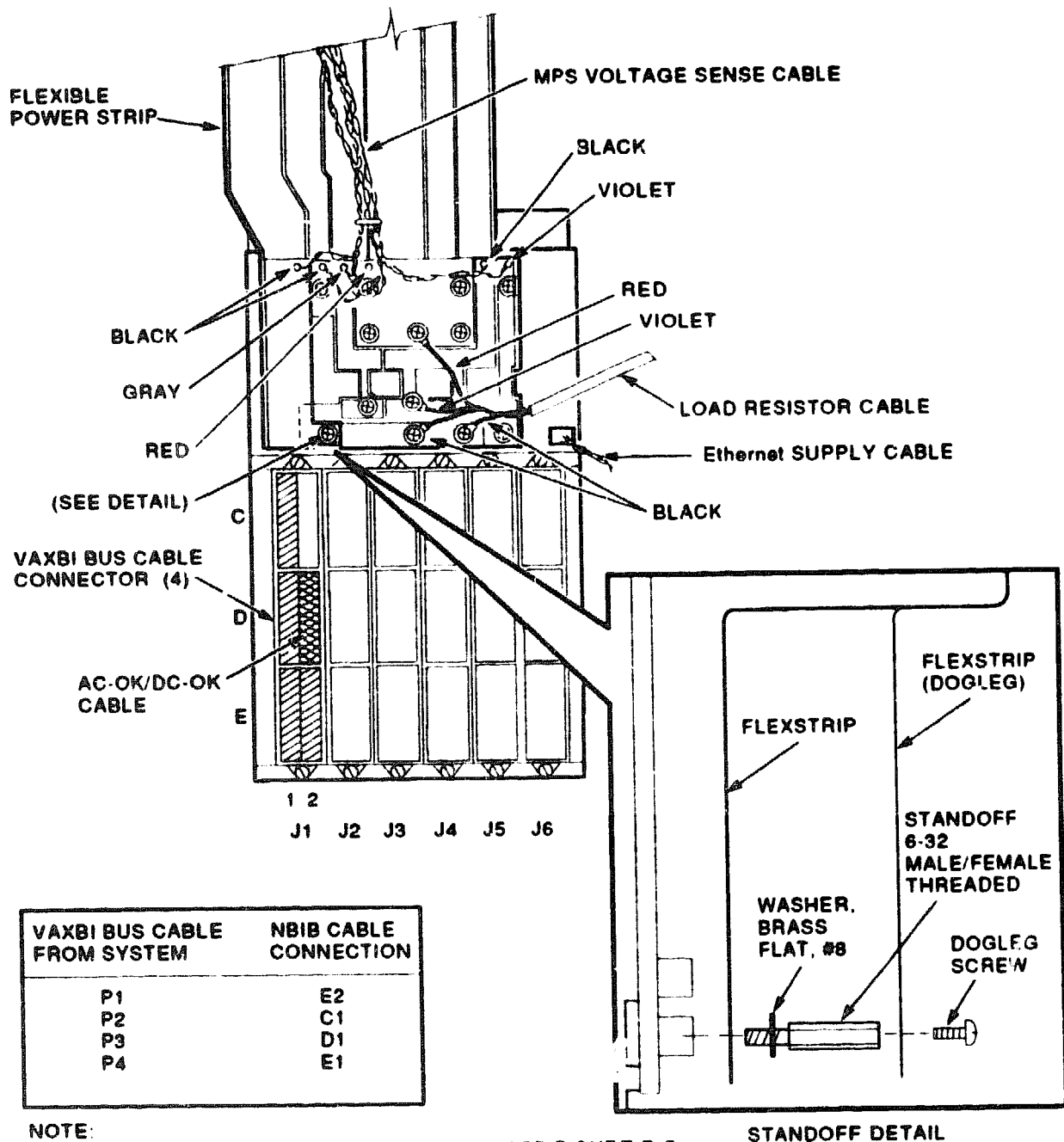
NOTE:
FOR VAX 6000 SERIES VAXBI CONNECTIONS SEE FIGURE B-5.
FOR VAX 9000 SERIES VAXBI CONNECTIONS SEE FIGURE B-6.

GSF-RC1042-17-MPS

Figure 3-6    Typical VAXBI Card Cage Backplane Connections (Rear View)

**VAXBI CARD CAGE CONFIGURATION SWITCHES**

Ensure that any flexible backplane extender (FBE) cables are in place and that the backplane configuration switches on the SLM module are set as described in Section 3.6.

# 3.6   SYSTEM INDICATORS AND SWITCH SETTINGS

## 3.6.1   System Logic Module (SLM)

Figu   -7 describes the switch and indicator functions on the SLM front panel. The switches must be set to the center (OFF) position for normal operation.
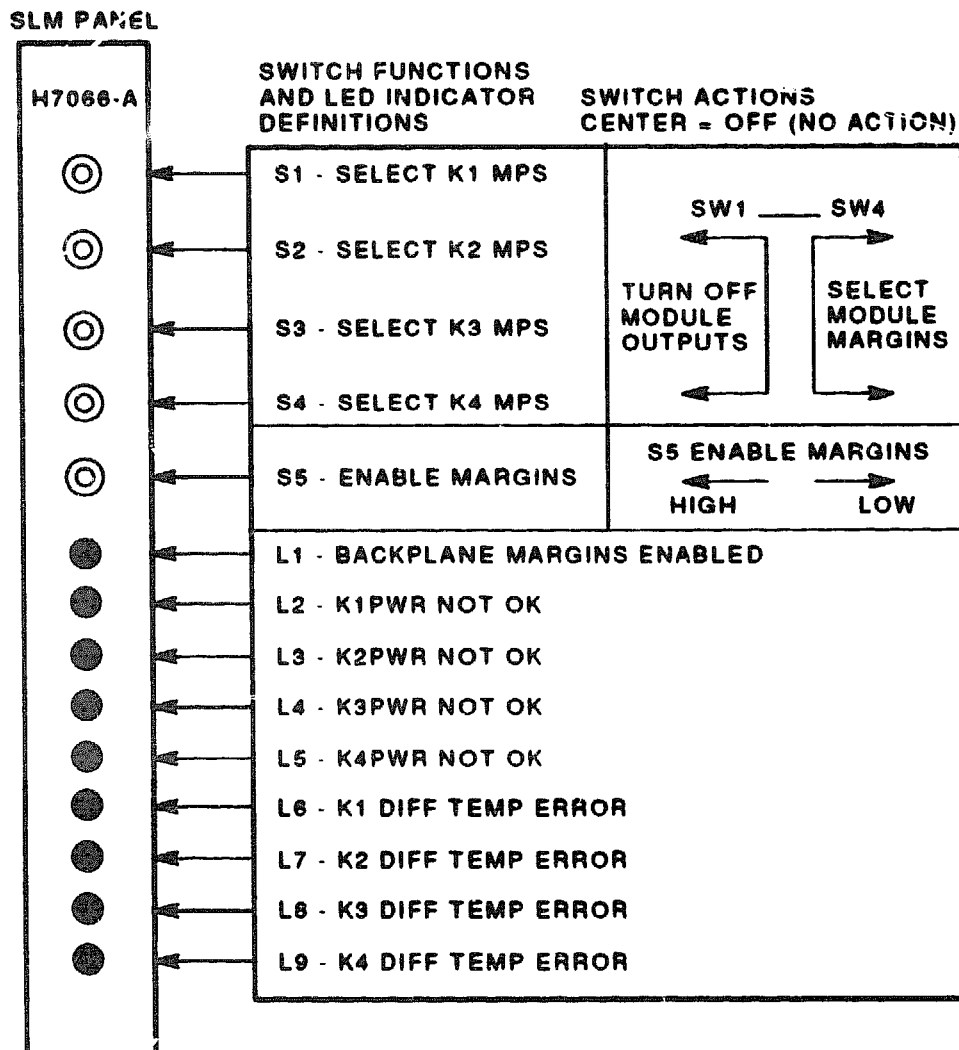


Figure 3-7   SLM Panel Switches and Indicators

## 3.6.2 SLM Backplane Configuration Switches

Figure 3-8 shows the possible backplane configuration switch settings on the SLM circuit board. (The SLM module must be removed to check the switches.) The backplane configuration switches must be set according to the configuration of the VAXBI backplanes in the cabinet (see Figure 3-5).

BACKPLANE CONFIGURATION SWITCHPACK
(USED FOR POWER-UP SEQUENCING CONTROL)

OFF    ON

1
2
3

SLM MODULE BACKPLANE
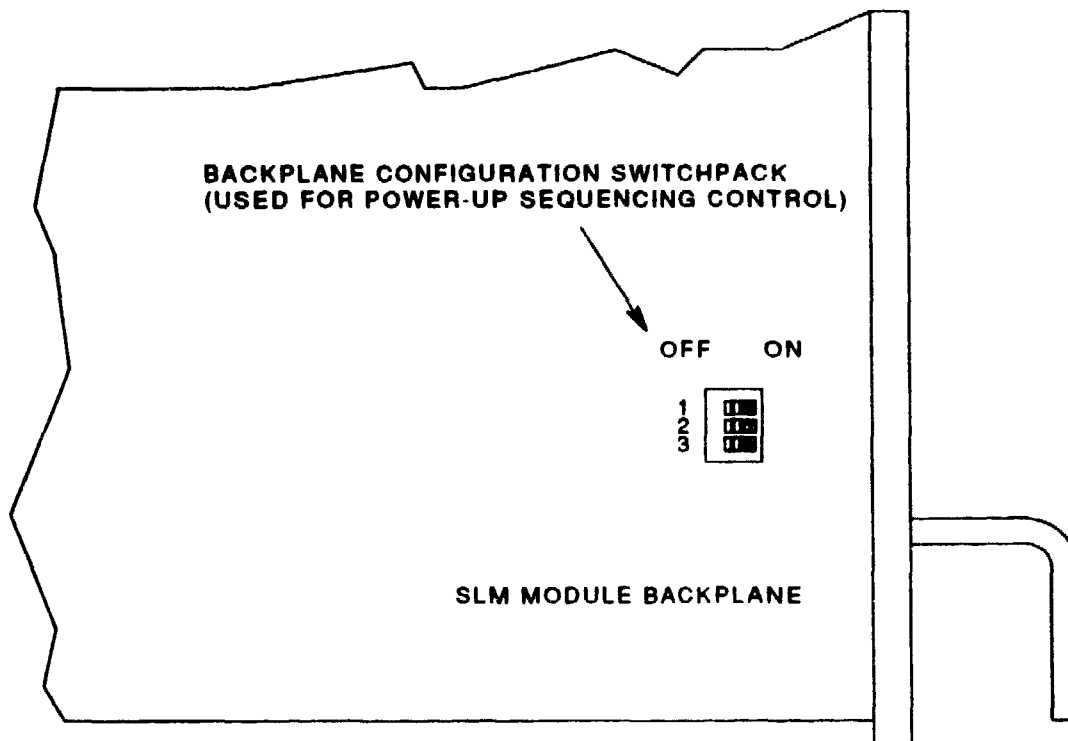
| SWITCH NUMBER 1 2 3 | BACKPLANE CONFIGURATION | CONFIGURATION TYPE |
|---|---|---|
| 0 0 0 | FOUR, 6-SLOT VAXBI CHANNELS | A (4-PACK) |
| 0 0 1 | ONE, 12-SLOT VAXBI CHANNEL (K4-K3) AND TWO, 6-SLOT VAXBI CHANNELS (K2-K1) | C (3-PACK) |
| 0 1 0 | TWO, 12-SLOT V/ XBI CHANNELS 'K4-K3 AND K2-K1) | B (2-PACK) |
| 0 1 1 | ONE, 24-SLOT VAXBI CHANNEL (K4-K1) | E (1-PACK) |
| 1 X X | ONE, 18-SLOT VAXBI CHANNEL (K4-K2) AND ONE, 6-SLOT VAXBI CHANNEL (K1) | D (B-PACK) |

NOTE: 0 = ON (CLOSED/GND,. 1 = OFF (OPEN/HIGH) X = DON'T CARE

GSF-RC1042-08-DG

Figure 3-8    SLM Backplane Configuration Switches

## 3.6.3  Interconnect Logic Module

Figure 3-9 describes the switch and indicator functions on the ILM front panel.

ILM PANEL                          PANEL ELEMENT FUNCTIONS

H7061-A

S1 - ILM RESET SWITCH

D1 - LED (NOT USED)

SINGLE DIGIT LED DISPLAY:

S 1   ◎

D 1   ●

| E1 DIGIT | STATUS CODE DEFINITION |
|----------|------------------------|
| 0 | OKAY |
| 1 | MOD J FAULT (PCM A FAILED) |
| 5 | ILM INTERNAL CLOCK FAIL |
| 8 | ILM IN MANUAL RESET MODE |
| — | ALL OTHER CODES NOT USED |

E 1

MAGNETIC LATCHES (DARK = 0, LIGHT = 1):

| I1 | I2 | I3 | STATUS CODE DEFINITION |
|----|----|----|------------------------|
| 0 | 0 | 0 | OKAY |
| 1 | 0 | 0 | MANUAL INTERVENTION |
| 1 | 0 | 1 | CSP OVERTEMP |
| 1 | 1 | 1 | CABINET OVERTEMP |
| — | — | — | ALL OTHER CODES NOT USED |

I 1

I 2

I 3

GSF-RC1042-19-DG

Figure 3-9   ILM Panel Switches and Indicators

## 3.7  CLOSING UP THE SYSTEM

### CLOSE THE CABINETS

Reassemble the cabinets as follows:

1. See Figure 3-1. Hold the front bezel in place and mount using the original four screws.

2. Carefully move the top cover slot over the bezel until it is seated and secure the rear of the cover using the original two screws.

3. See Figure 3-2. Carefully lift the end panel into place in the open end of the VAXBI cabinet. Use care not to damage the threaded studs. Add all kepnuts and tighten.

### CHECK THE RF SEAL

Check the RF seal between the VAXBI cabinet and the end panel. Insert a strip of paper in each of the seams and check for resistance as you move the paper along the seam. If there is no resistance, the seam will not provide an effective RF seal. The seam material must be adjusted until a proper seal is attained.

### H7176 CIRCUIT BREAKER

In the lower, right front corner of the cabinet, check that the circuit breaker on the H7176 dc power bulk box is in the engaged (UP) position.

### H405 CIRCUIT BREAKER

In the lower, right rear corner of the cabinet, check that the circuit breaker T-handle on the H405 power input box is in the engaged (IN) position.

### REINSTALL THE DOORS

Reinstall the front and rear doors on the cabinets:

1. Lift and carefully lower each door onto its hinges.

2. Reconnect the ground line from the cabinet to each door.

3. Close the doors and lock with a 1/4-inch hex wrench.

## 3.8  APPLYING CABINET POWER

### THE POWER SOURCE

A dedicated ac power receptacle and circuit breaker should be installed and checked by a licensed electrician prior to the arrival of the cabinet (see Figure 1-1). The power receptacle should conform with the following nominal circuit conditions:

- 120 (or 240) Vac between each phase and neutral.

- 120 (or 240) Vac between each phase and ground.

- 208 (or 416) Vac between all phases.

**CAUTION**
**Both the neutral (W/X) and the ground (G) lines must be connected from the bulk three-phase power source to complete the Wye configuration. Otherwise, damage to the power system components may result.**

**To ensure reliable operation, the ac power source should come from the same bulk distribution panel supplying the host CPU. This also ensures that all ground references for the VAXBI cabinet are at the same potential as the host CPU cabinets.**

### PLUG IN THE POWER CABLE

When the power source is correct and the circuit breakers are in the correct positions, plug in the power cable.

## 3.9  BRINGING UP THE SYSTEM

Bring up the system by performing the following steps:

1.  Initiate the power-up sequence from the console.

2.  Check the states of the SLM and ILM indicators as described in Section 3.

3.  Initialize the system and boot the operating system.

4.  Install and run the diagnostic and application software for all new VAXBI options.

5.  Perform any other system installation/acceptance requirements and return the system to service.

# FIELD REPLACEABLE UNITS

Table A–1 is a list of the major field replaceable unit (FRU) assemblies in the H9657-E cabinet. See Figure 3–5 for a front view of assembly locations.

**Table A–1  Field Replaceable Units**

| Part Number | Description |
|---|---|
| H9400-AA | Six-slot VAXBI backplane/card cage assembly |
| H7189-A | Modular power supply (MPS) regulator |
| H7066-A | System logic module (SLM) |
| H7060-A | Control/startup power module (CSP) |
| H7061-A | Interconnect logic module (ILM) |
| H7176-A | DC power bulk box (PBB) |
| H405-A | Power input box (PIB), 120/208 Vac (domestic) |
| H405-B | Power input box (PIB), 240/416 Vac (non-domestic) |
| 12-19526-02 | Thermal sensor |
| 12-23034-05 | Air filter |
| 12-24023-01 | Wrist strap/cable assembly |
| 12-24625-01 | Air blower |
| 12-25024-14 | Airflow sensor |
| 12-26339-01 | Cabinet door key |
| 12-23701-16 | Node ID plug kit (number 0) |
| 12-23701-17 | Node ID plug kit (number 1–16) |
| 16-24764-01 | Step-down transformer (non-domestic) |
| 17-01038-01 | Flexible backplane extender (FBE)[1] |
| 17-01148-02 | Cable assembly |
| 17-01791-01 | Flexible power strip [1] |
| 17-01899-01 | Flexible power strip (K4 only — see Figure 3–5) |
| 17-02159-01 | Harness power bus [3 m (10 ft)] |
| 17-02159-02 | Harness power bus [6 m (20 ft)] |
| 20-24486-01 | GIF VAXBI bus terminator |

[1]Used with the H9657-EU backplane upgrade.

**Table A–1 (Cont.)  Field Replaceable Units**

| Part Number | Description |
| --- | --- |
| 20-24487-01 | GOM VAXBI bus terminator |
| 54-17961-01 | D-card for VAXBI monitor |
| 54-18572-01 | MPS backplane assembly (Rev B) |
| 70-22873-01 | SPC backplane assembly |

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# B
# CABINET INTERCONNECTIONS

This appendix provides generic information for the point-to-point connection of the H9657-E VAXBI expander cabinet to any of the VAXBI systems that support it. The information covers new system installation and installed base cabinet upgrade, and can be used as a troubleshooting guide.

**NOTE**
The information contained herein is particularly necessary for installed-base installation of the DB88-AC/AD/BC and/or H9657-EU options.
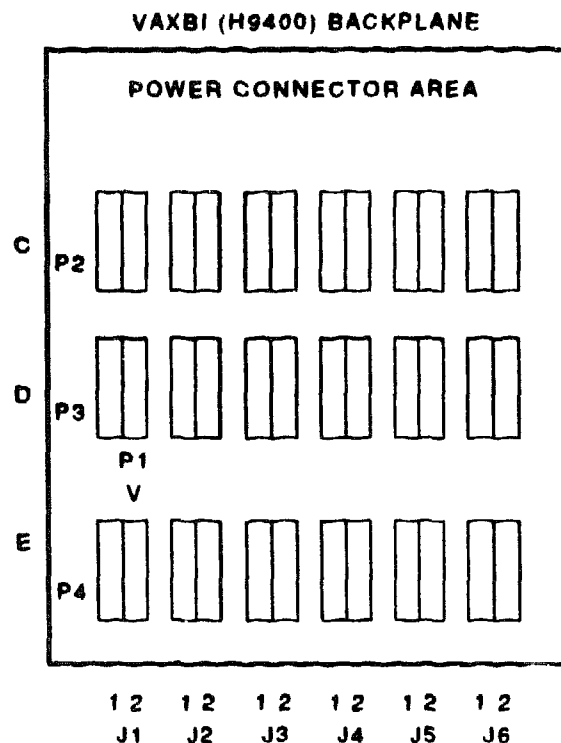
Figure B-1 illustrates and describes NBIB cable connections made to the VAX 8000 series VAXBI (H9400) backplane.

Figures B-2 through B-4, respectively, illustrate and describe backplane cable connections made to the following kernel systems:

* VAX 8820/8830/8840

* VAX 8700/8800/8810/8820-N

* VAX 8500/8530/8550

* VAX 9200/9400

Figure B-5 illustrates and describes XMI-to-XBIB backplane cable connections made to the VAX 6000 series system.

Figure B-6 illustrates and describes XBIA+-to-XBIB backplane cable connections made to the VAX 9000 series system.

VAXBI (H9400) BACKPLANE

POWER CONNECTOR AREA

C  P2

D  P3

P1

V

E  P4

```
1 2   1 2   1 2   1 2   1 2   1 2
J1    J2    J3    J4    J5    J6
```
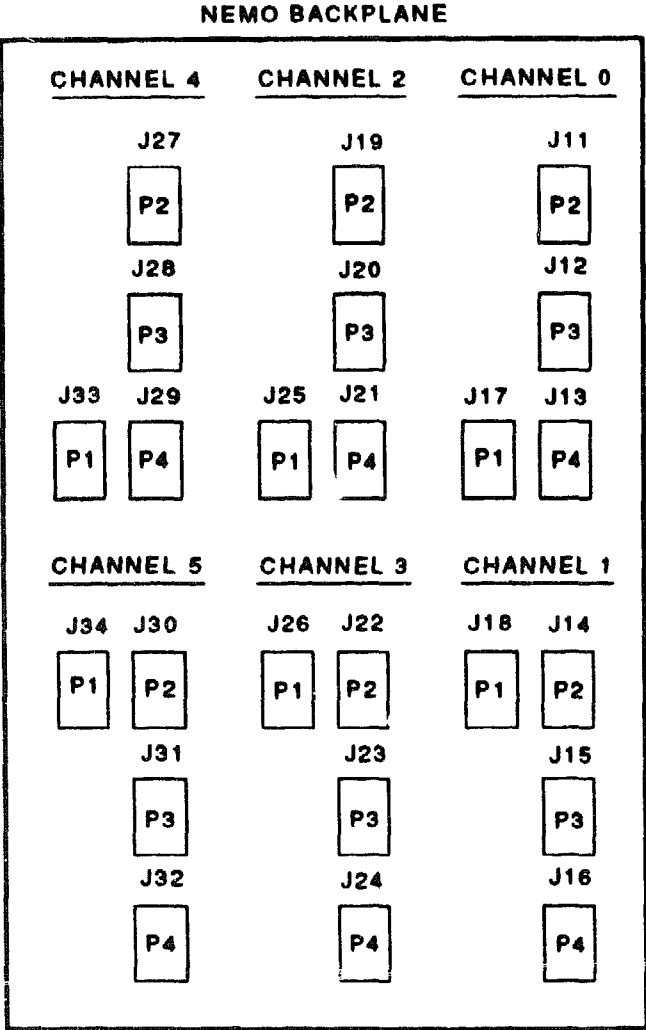
CAUTION:
CARE MUST BE TAKEN WHEN INSTALLING
THE CABLE PLUGS TO THE H9400
BACKPLANE JACKS. IT IS POSSIBLE
TO OFFSET THE PLUG BY ONE ROW
OF PINS, THEREBY, NOT MAKING PROPER
CONNECTION.

NOTES:
VAXBI SLOT J1 SHOULD CONTAIN THE
XBIB (T1043 OR EQUIVALENT) MODULE.
THE NBIA OR PBIA MODULE (F1011 OR
F103 OR EQUIVALENTS) MUST BE
PRESENT IN THE APPROPRIATE KERNEL
SYSTEM SLOT.
AC OK/DC OK CABLE TYPICALLY CONNECTS
TO BI BACKPLANE J1-D2.

| VAXBI BUS CABLE FROM 8000 SERIES KERNEL | VAXBI BACKPLANE NBIB CABLE CONNECTION |
|---|---|
| P1 | J1E2 |
| P2 | J1C1 |
| P3 | J1D1 |
| P4 | J1E1 |

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Figure B-1   VAX 8000 Series System — VAXBI (H9400) Backplane NBIB Cable
Connections

NEMO BACKPLANE

| | | | | |
| CHANNEL 4 | | CHANNEL 2 | | CHANNEL 0 |

J27 — P2
J19 — P2
J11 — P2

J28 — P3
J20 — P3
J12 — P3

J33 P1   J29 P4
J25 P1   J21 P4
J17 P1   J13 P4

CHANNEL 5   CHANNEL 3   CHANNEL 1

J34 P1   J30 P2
J26 P1   J22 P2
J18 P1   J14 P2

J31 — P3
J23 — P3
J15 — P3

J32 — P4
J24 — P4
J16 — P4

POINT-TO-POINT PBIA/NBIB CABLING CHART

| DB68-AD CABLE | VAXBI BACKPLANE | NEMO BACKPLANE VAXBI CHANNEL | | | | | |
|---|---|---|---|---|---|---|---|
| | | CH. 0 | CH. 1 | CH. 2 | CH. 3 | CH. 4 | CH. 5 |
| P1 | J1E2 | J17 | J18 | J25 | J26 | J33 | J34 |
| P2 | J1C1 | J11 | J14 | J19 | J22 | J27 | J30 |
| P3 | J1D1 | J12 | J15 | J20 | J23 | J28 | J31 |
| P4 | J1E1 | J13 | J16 | J21 | J24 | J29 | J32 |

NOTE:
AC OK/DC OK CABLE TYPICALLY CONNECTS TO BI BACKPLANE J1-D2.

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Figure B-2    VAX 8820/8830/8840 Kernel Systems — H9657-E(X) Cable Backplane Connections
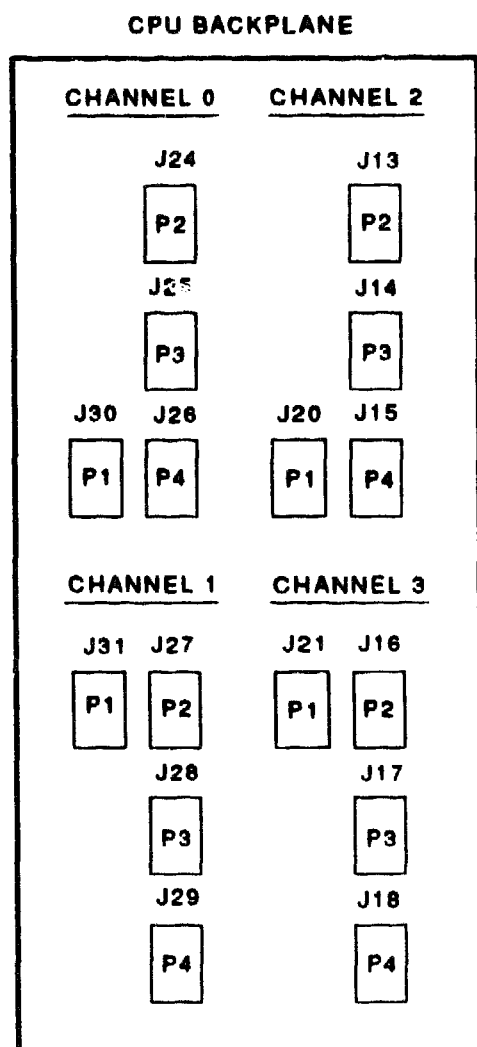
**CPU BACKPLANE**

| CHANNEL 0 | CHANNEL 2 |
|---|---|
| J24 [P2] | J13 [P2] |
| J25 [P3] | J14 [P3] |
| J30 [P1]  J26 [P4] | J20 [P1]  J15 [P4] |

| CHANNEL 1 | CHANNEL 3 |
|---|---|
| J31 [P1]  J27 [P2] | J21 [P1]  J16 [P2] |
| J28 [P3] | J17 [P3] |
| J29 [P4] | J18 [P4] |

**POINT-TO-POINT NBIA/NBIB CABLING CHART**

| DB88-AD CABLE | VAXBI BACKPLANE | CPU BACKPLANE VAXBI CHANNEL | | | |
|---|---|---|---|---|---|
|  |  | CH. 0 | CH. 1 | CH. 2 | CH. 3 |
| P1 | J1E2 | J30 | J31 | J20 | J21 |
| P2 | J1C1 | J24 | J27 | J13 | J16 |
| P3 | J1D1 | J25 | J28 | J14 | J17 |
| P4 | J1E1 | J26 | J29 | J15 | J18 |

NOTE:
AC OK/DC OK CABLE TYPICALLY CONNECTS TO BI BACKPLANE J1-D2.

GSF_0152_89.DG

**Figure B-3  VAX 8700/8800/8810/8820-N Kernel Systems — H9657-E(X) Cable Backplane Connections**
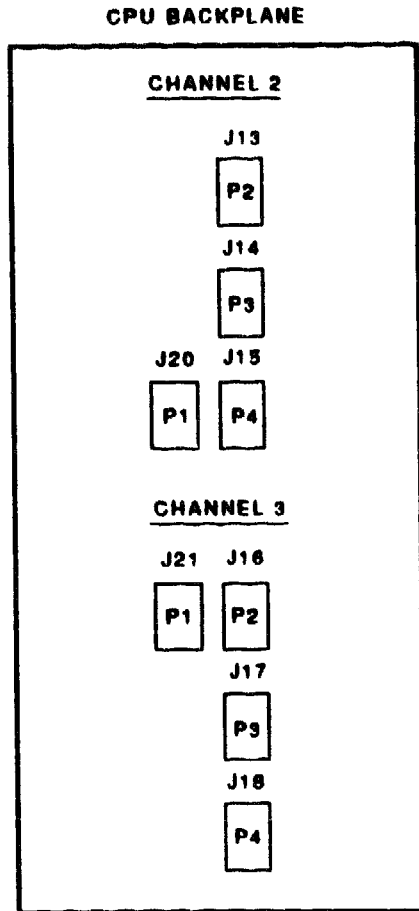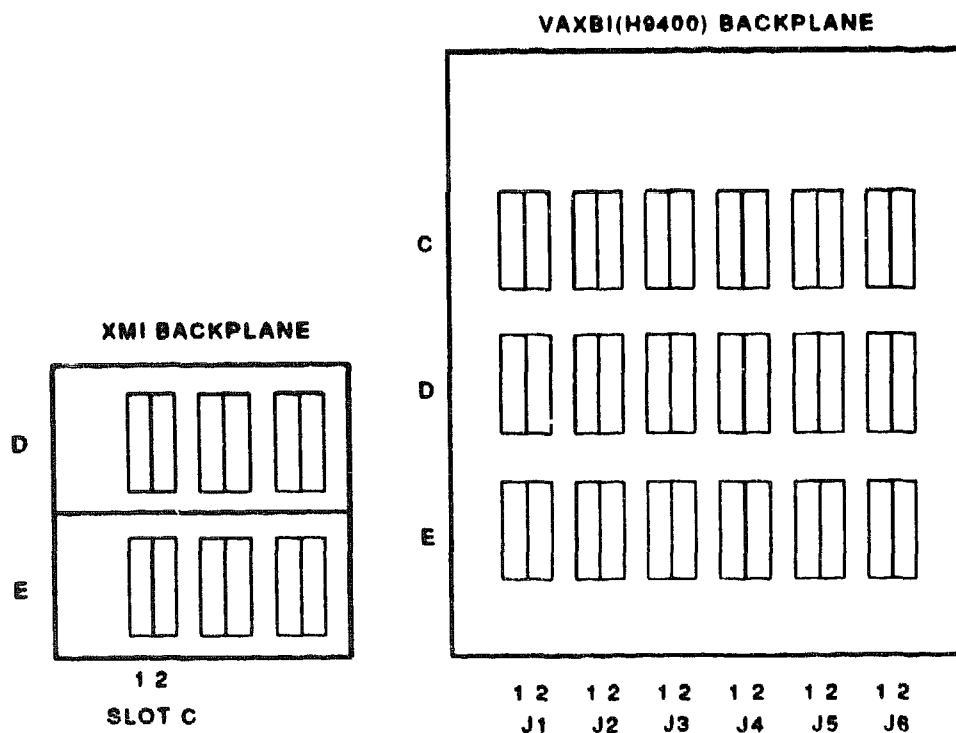
CPU BACKPLANE

CHANNEL 2

J13
P2

J14
P3

J20   J15
P1    P4

CHANNEL 3

J21   J16
P1    P2

J17
P3

J18
P4

POINT-TO-POINT NBIA/NBIB CABLING CHART

| DB88-AD CABLE | VAXBI BACKPLANE | CPU BACKPLANE VAXBI CHANNEL | |
| --- | --- | --- | --- |
| | | CH. 2 | CH. 3 |
| P1 | J1E2 | J20 | J21 |
| P2 | J1C1 | J13 | J16 |
| P3 | J1D1 | J14 | J17 |
| P4 | J1E1 | J15 | J18 |

NOTE:
THERE ARE NO CHANNELS
0 AND 1 IN THE 85X0
SERIES SYSTEMS.

NOTE:
AC OK/DC OK CABLE TYPICALLY CONNECTS TO BI BACKPLANE J1-D2.

GSF_0153_89 DG

**Figure B–4   VAX 8500/8530/8550 Kernel Systems — H9657-E(X) Cable Backplane Connections**

VAXBI(H9400) BACKPLANE

XMI BACKPLANE

SLOT C

1 2

J1 J2 J3 J4 J5 J6

1 2  1 2  1 2  1 2  1 2  1 2

NOTES:

VAXBI SLOT J1 SHOULD CONTAIN THE
XBIB (T1043 OR EQUIVALENT) MODULE.
THE XBIA MODULE (T2012 OR EQUIVALENT)
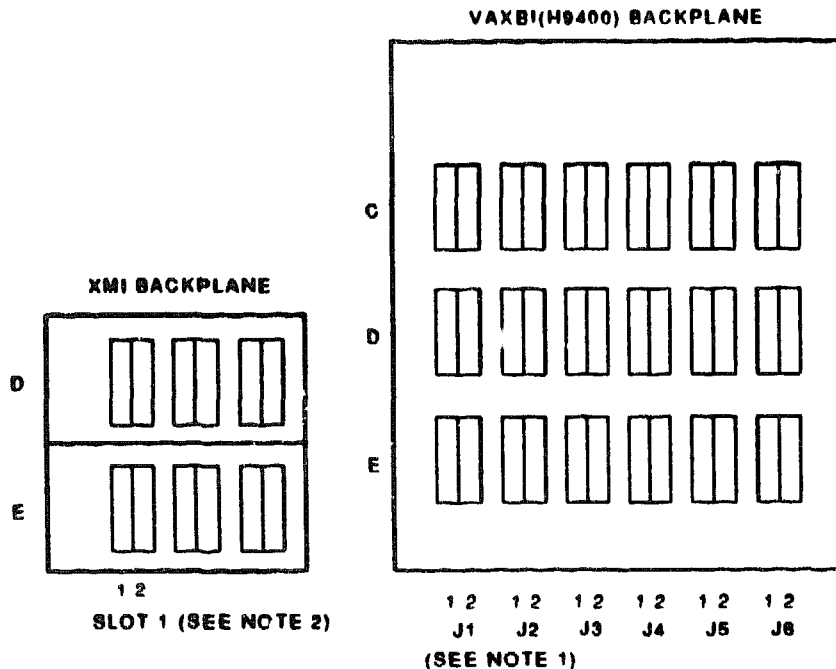MUST BE PRESENT IN THE APPROPRIATE
XMI SLOT.

DWMBA CABLE CONNECTIONS

| XMI BACKPLANE (XBIB CABLE FROM KERNEL) | VAXBI BACKPLANE (XBIB CABLE TO H9400) |
|---|---|
| D1 | J1D2 |
| D2 | J1D1 |
| E1 | J1E2 |
| E2 | J1E1 |

NOTE:
AC OK/DC OK CABLE TYPICALLY CONNECTS
TO BI BACKPLANE J1-C1.

GSF_0154_89 DG

Figure B-5    VAX 6000 Series Systems — XMI-to-XBIB Cable Connections

VAXBI(H9400) BACKPLANE

XMI BACKPLANE

D

E

1 2

SLOT 1 (SEE NOTE 2)

C

D

E

1 2   1 2   1 2   1 2   1 2   1 2
J1    J2    J3    J4    J5    J6

(SEE NOTE 1)

NOTES:

1. VAXBI SLOT J1 SHOULD CONTAIN THE
   XBIB (T1043 OR EQUIVALENT) MODULE.
   THE XBIA+ MODULE (T2018 OR EQUIVALENT)
   MUST BE PRESENT IN THE APPROPRIATE
   XMI SLOT.

2. XMI SLOT 1 IS USED IF BI EXPANDS TO
   THE RIGHT AND SLOT 14 IS USED IF BI EXPANDS
   TO THE LEFT (OR USE THE NEXT AVAILABLE
   SLOT TO THE RULE STATED ABOVE IF NUMBERED
   SLOT IS ALREADY IN USE.
   (REF: SEE XCON RULES AND CONFIGURATIONS.)

DWMBB CABLE CONNECTIONS

| XMI BACKPLANE (XBIB+ CABLE FROM KERNEL) | VAXBI BACKPLANE (XBIB CABLE TO H9400) |
|---|---|
| D1 | J1D2 |
| D2 | J1D1 |
| E1 | J1E2 |
| E2 | J1E1 |

NOTE:
AC OK/DC OK CABLE TYPICALLY CONNECTS
TO VAXBI BACKPLANE J1-C1.

GSF-RC1042-20-DG

Figure B-6    VAX 9200/9400 Series Systems — XMI+-to-VAXBI Cable Connections

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# Index