VAX 6000 XMI Conversion Manual

Order Number EK–650EB–UP–002

This manual details the procedure for the full power and packaging upgrade from a VAX 6000 Model 200, 300, or 400 system with an XMI-1 card cage to a system with an XMI-2 card cage.

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Preface

Intended Audience

This manual is written for the Digital customer service engineer who is upgrading a VAX 6000 Model 200, 300, or 400 system with a +5V XMI-1 card cage to a +3.3V XMI-2 card cage.

Document Structure

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

This manual has three chapters and two appendixes, as follows:

- **Chapter 1, Specifications and Preparation**, gives an overview of the power upgrade and conversion described in this manual.

- **Chapter 2, XMI-1 to XMI-2 Conversion**, gives the details of the XMI and power upgrade.

- **Chapter 3, Wrap-Up and Troubleshooting**, explains how to verify the system and what to do if something goes wrong.

- **Appendix A** describes the proper handling of modules.

- **Appendix B** describes power-up troubleshooting procedures.

Conventions Used in This Document

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

FRONT   REAR
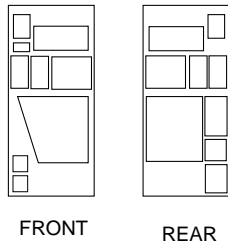
VAX 6000 Series Documents

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

Table 1:   VAX 6000 Series Documentation

Title	Order Number
Operation	
VAX 6000 Series Owner's Manual	EK–600EA–OM
VAX 6000 Series Vector Processor Owner's Manual	EK–60VAA–OM
VAX 6000 Vector Processor Programmer's Guide	EK–60VAA–PG
Service and Installation	
VAX 6000 Platform Technical User's Guide	EK–600EA–TM
VAX 6000 Series Installation Guide	EK–600EA–IN
VAX 6000 Installationsanleitung	EK–600GA–IN
VAX 6000 Guide d'installation	EK–600FA–IN
VAX 6000 Guia de instalacion	EK–600SA–IN

Table 1 (Cont.): VAX 6000 Series Documentation

Title	Order Number
Service and Installation	
VAX 6000 Platform Service Manual	EK–600EA–MG
Options and Upgrades	
VAX 6000: XMI Conversion Manual	EK–650EB–UP
VAX 6000: Installing MS65A Memories	EK–MS65A–UP
VAX 6000: Installing the H7236-A Battery Backup Option	EK–60BBA–IN
VAX 6000: Installing the FV64A Vector Option	EK–60VEA–IN
VAX 6000: Installing the VAXBI Option	EK–60BIA–IN

Manuals specific to models are listed in Table 2.

Table 2: VAX 6000 Model Level Documentation

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

Associated Documents

Table 3 lists other documents that you may find useful.

Table 3: Associated Documents

Title	Order Number
System Hardware Options	
VAXBI Expander Cabinet Installation Guide	EK–VBIEA–IN
VAXBI Options Handbook	EB–32255–46
System I/O Options	
CIBCA User Guide	EK–CIBCA–UG
CIXCD Interface User Guide	EK–CIXCD–UG
DEC LANcontroller 200 Installation Guide	EK–DEBNI–IN
DEC LANcontroller 400 Installation Guide	EK–DEMNA–IN
InfoServer 100 Installation and Owners Guide	EK–DIS1K–IN
KDB50 Disk Controller User's Guide	EK–KDB50–UG
KDM70 Controller User Guide	EK–KDM70–UG
RRD40 Disc Drive Owner's Manual	EK–RRD40–OM
RA90/RA92 Disk Drive User Guide	EK–ORA90–UG
SA70 Enclosure User Guide	EK–SA70E–UG
Operating System Manuals	
Guide to Maintaining a VMS System	AA–LA34A–TE
Guide to Setting Up a VMS System	AA–LA25A–TE
Introduction to VMS System Management	AA–LA24A–TE
ULTRIX–32 Guide to System Exercisers	AA–KS95B–TE
VMS Upgrade and Installation Supplement: VAX 6000 Series	AA–LB36C–TE
VMS Networking Manual	AA–LA48A–TE
VMS System Manager's Manual	AA–LA00A–TE
VMS VAXcluster Manual	AA–LA27B–TE

Table 3 (Cont.): Associated Documents

Title	Order Number
Peripherals	
HSC Installation Manual	EK–HSCMN–IN
H4000 DIGITAL Ethernet Transceiver Installation Manual	EK–H4000–IN
Installing and Using the VT320 Video Terminal	EK–VT320–UG
RV20 Optical Disk Owner's Manual	EK–ORV20–OM
SC008 Star Coupler User's Guide	EK–SC008–UG
TA78 Magnetic Tape Drive User's Guide	EK–OTA78–UG
TA90 Magnetic Tape Subsystem Owner's Manual	EK–OTA90–OM
TK70 Streaming Tape Drive Owner's Manual	EK–OTK70–OM
TU81/TA81 and TU/81 PLUS Subsystem User's Guide	EK–TUA81–UG
VAX Manuals	
VAX Architecture Reference Manual	EY–3459E–DP
VAX Systems Hardware Handbook — VAXBI Systems	EB–31692–46
VAX Vector Processing Handbook	EC–H0739–46

Chapter 1
Specifications and Preparation

This chapter describes the preliminary steps to be performed in upgrading a VAX 6000 XMI-1 platform to an XMI-2 platform. This upgrade converts an older Model 200, 300, or 400 system to a Model 500.

If the Model 500 does not need more than four processors, more than 12 XMI slots, or require battery backup, a simpler upgrade is possible as described in the *VAX 6000: Installing Model 500 Processors* manual.

Sections in this chapter include:

- Upgrade Kit Overview
- Battery Backup Kit Specifications
- Save EEPROM Contents to TK Tape
- Record System Parameters
- Prepare Area, Kits, and Tools
- Unpacking Checklist

1.1 Upgrade Kit Overview

Upgrade order number H9657–CU takes a VAX 6000 Model 200, 300, or 400 system with an XMI-1 power system and upgrades it to a VAX 6000 Model 500 with an XMI-2 power system. The upgrade adds +3.3 volt power, an XMI-2 backplane preassembled with bus bars and cables, and an H7206-B power and logic unit.

Figure 1–1: Overview of Full Upgrade

REAR

POSSIBLE
UPGRADE TO
H7214

REPLACE H7214
WITH AN H7242

REPLACE XTC
POWER SEQUENCER
MODULE

REPLACE XMI
CARD CAGE
ASSEMBLY

REPLACE H7206
POWER AND LOGIC
UNIT

REMOVE H7231
BATTERY BACKUP
UNIT

msb-0379-90
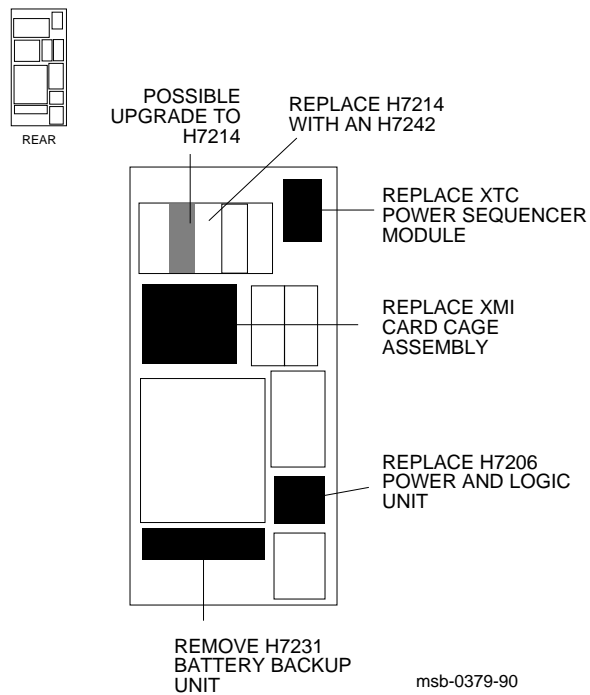
Table 1–1 lists the components you will remove. See Table 1–4 for the listing of components in the upgrade kit. See Chapter 2 for the full upgrade procedures.

NOTE: *Before you start, make sure you have enough ESD boxes for all processor, DWMBA, and memory modules from the system you are upgrading.*

Table 1–1: Components to Be Replaced

Part Number	Description
H7206-A	Power and logic unit
70-24902-01	XMI-1 card cage assembly
H7214	+5V regulator, located in position 3
H7214	The second XMI +5V regulator, if at A or B revision level
20-29176-01	XTC power sequencer module
17-01833-01	H405 fail safe enable cable
KA64A/KA62A/KA62B	Processors
MS62A	Memories
74-39700-XX	Old system name plate mounted on the door
17-01549-01	H7206 to H405 DEC power bus cable
H7231-N	Battery backup unit, if present

1.2 Battery Backup Kit Specifications

If the VAX 6000 system that you are upgrading has or requires battery backup, you must install the battery backup option kit order number H7236-A.

Figure 1–2: Battery Backup Installation

REPLACE THE H405
AC POWER CONTROLLER,
IF NECESSARY

INSTALL BATTERY
BACKUP UNIT

REAR

msb-0380-90
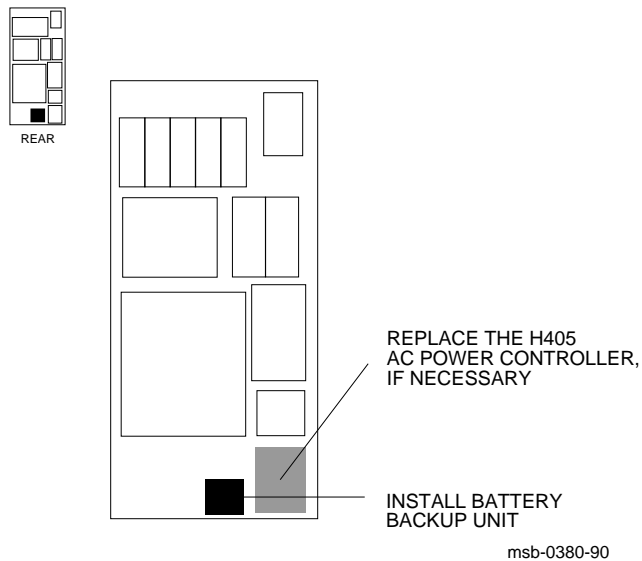
See *VAX 6000: Installing the H7236-A Battery Backup Option*, which ships with the battery backup unit (BBU), for a description of the BBU installation procedures. Table 1–2 lists the major components in the BBU kit.

Table 1–2: Battery Backup Kit H7236-A

Part Number	Description
30-31264-01	Battery backup unit
17-02975-01	Battery backup signal cable
17-02485-01	Battery backup DC power cable
17-00442-27	Battery backup AC power cable

If the H405-E AC power controller is below revision level F, it must be replaced. If an H405-F AC power controller is below revision level H, it must be replaced when an H7236-A battery backup unit is installed.

1.3 Save EEPROM Contents to TK Tape

Begin preparation for the upgrade by saving the EEPROM contents to a TK tape. With a blank cartridge in the tape drive, use the SAVE EEPROM command to copy the contents of the boot processor's EEPROM to tape.

Example 1–1:   SAVE EEPROM Command

```
    !  A blank TK tape is in the tape drive.  With the upper  ❶
    !  key switch at Enable and the lower key switch at Halt,
    !  press the Restart button.

#123456789 0123456789 0123456789 01234567#  ❷

F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #

    A   A   .   .   M   M   .   .   .   .   .   .   P   P       TYP
    o   o   .   .   +   +   .   .   .   .   .   .   +   +       STF
    .   .   .   .   .   .   .   .   .   .   .   .   E   B       BPD
    .   .   .   .   .   .   .   .   .   .   .   .   +   +       ETF
    .   .   .   .   .   .   .   .   .   .   .   .   E   B       BPD

.   .   .   .   .   .   .   .   .   +   .   +   .   .   +   .   XBI D +
.   .   .   .   .   .   .   .   .   +   .   +   .   .   +   .   XBI E +

    .   .   .   .   A2  A1  .   .   .   .   .   .   .   .       ILV
    .   .   .   .   32  32  .   .   .   .   .   .   .   .       64 Mb

ROM0 = V1.00  ROM1 = V1.00  EEPROM = 1.00/1.00 ❸   SN = SG01234567

>>> SAVE EEPROM  ❹                 ! Enter SAVE command.

                                   ! System prompts user to proceed.
                                   ! Enter a Y to continue.

Proceed with save to tape? (Y or N) >>>  Y  ❺

?6B EEPROM saved to tape successfully.  ❻
                                   ! System confirms SAVE is complete.
>>>  ❼
```

Before doing an upgrade you should save the contents of the boot processor's EEPROM by copying the image to a TK cartridge. Earlier VAX 6000 systems have TK50 tape drives; later models have TK70 tape drives. The operation of the TK50 differs slightly from the TK70. See Appendix A of the *Owner's Manual* for your system for more information on the TK tape drive.

Example 1–1 shows the steps to save the EEPROM contents:

❶ Put a blank TK cartridge in the tape drive. Put the control panel's upper key switch in the Enable position and the lower key switch in the Halt position, and then press the Restart button to generate self-test results. See the *Owner's Manual* for your system for a full explanation of self-test results.

❷ These numbers appear for Model 400 systems and indicate the progress of self-test. The progress trace line is displayed by the processor in slot 1.

❸ Note the values here for the EEPROM. The second number indicates if any patches have been installed. Whenever you do an upgrade, make sure that the boot processor has the latest patches installed on its EEPROM before you perform the save operation.

❹ Following self-test, the console prompt appears. At the prompt, enter SAVE EEPROM. This operation saves the information from the boot processor and overwrites any existing information on the TK cartridge.

❺ The console program queries you, requiring your confirmation to proceed with the SAVE EEPROM operation. Enter *Y*. The save process takes less than a minute to complete.

❻ The console program confirms that the save operation has completed successfully. When the console prompt returns, the save operation is complete. Saved information includes:

> System serial number
> Systemwide console parameters (baud rate, interleave, terminal characteristics)
> Saved boot specifications
> Diagnostic patches
> Console patches
> Boot primitives

❼ Rewind the tape and remove the cartridge from the drive. Label and write-protect the tape.

NOTE: *This tape should be used only on this system. Each system has its own identifying information stored in the processor EEPROMs. Furthermore, tapes written by a TK50 tape drive are formatted differently from those written by a TK70 tape drive. The TK70 can read data from a tape written by a TK50, but it cannot overwrite a tape originally written by a TK50. A TK50, however, cannot read data from a tape written by a TK70.*

1.4 Record System Parameters

Save a printout of the system parameters, which you'll want to restore after the power conversion and installation of the KA65A modules.

Example 1–2: Show All System Parameters

```
>>> SHOW ALL        ❶
      Type            Rev       ! Lists all system parameters,
   1+  KA64A   (8082)  0006      ! beginning with the system
   2+  KA64A   (8082)  0006      ! configuration
   9+  MS62A   (4001)  0002
   A+  MS62A   (4001)  0002
   D+  DWMBA/A (2001)  0002
   E+  DWMBA/A (2001)  0002

   XBI D
   1+  DWMBA/B (2017)  0007
   4+  KDB50   (010E)  0F1C
   6+  DEBNI   (0118)  0100

   XBI E
   1+  DWMBA/A (2017)  0007
   4+  CIBCA   (0108)  41C1
   6+  TBK70   (410B)  0307

   Current Primary: 1            ! Shows the status of CPUs
   /NOENABLED-
   /NOVECTOR_ENABLED-
   /NOPRIMARY- 2
                                 ! Shows the memory interleave
  F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #

      .   .   .   .   A2  A1  .   .   .   .   .   .   .   .       ILV
      .   .   .   .   32  32  .   .   .   .   .   .   .   .       64 Mb
   /INTERLEAVE:DEFAULT
   /SCOPE  /SPEED: 1200 /BREAK     ! Shows the terminal characteristics
   English                        ! Shows the language mode
   XMI:D  08-00-2B-08-3D-64        ! Shows the Ethernet address
   DEFAULT /XMI:E  /BI:4  DU0      ! Shows Boot specs saved
   DIAG    /R5:00000010  XMI:E  /BI:5 DU1
   HSC     /R5:40000000  XMI:D  /BI:2  /NODE:00000405 DU0
>>>        ❷                      ! Print the console display for reference.
```

To direct the console terminal output to a printer, use the Print Screen key (the second key at the top left of the keyboard) on the VT320 terminal, or you can select from four printing modes. See *Installing and Using the VT320 Video Terminal*. Initialize to reset the entire system. The self-test results are displayed. These should also be saved as they show the processor and memory configurations, adapters installed, and other important information.

Example 1–2 shows the steps to produce a record of the system parameters.

❶ Following self-test, the console prompt appears. At the prompt, enter SHOW ALL.

❷ If you have not selected one of the printing modes, use the Print Screen key to print this screen.

NOTE: *Store these two printouts in the Site Management Guide for later reference.*

1.5 Prepare Area, Kits, and Tools

Set up a work space near the system where you can store components, upgrade kits, and modules while you work on the system upgrade. Prepare the system for shutdown.

Figure 1–3:   System Space Requirements

H9657-CU
UPGRADE KIT

46.2 CM (18.5 IN)

68.8 CM (27.5 IN)

70 CM (28.0 IN)

REAR
CLEARANCE
1 M (39 IN)

TAPE
CABINET

SYSTEM
CABINET

DISK
CABINET

.9 M
(36 IN)

DEPTH
2.9 M (114 IN)

WIDTH
1.9 M (74 IN)

FRONT
CLEARANCE
1 M (39 IN)
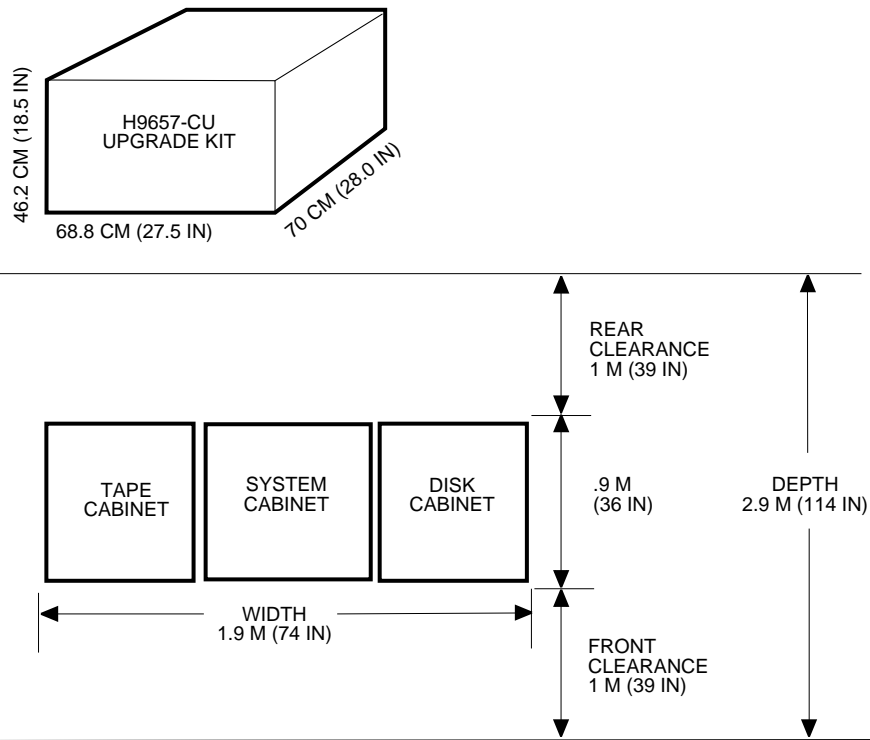
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1. Prepare an area near the system where you can place system components during the upgrade.

2. Perform an orderly shutdown of the system.

3. Turn the upper key switch on the front control panel to the Off (0) position.

4. Pull the circuit breaker on the AC power controller to the Off position. The AC power controller is at the bottom rear of the cabinet.

5. Unplug system power cord; wait 2 minutes for capacitors to discharge.

6. Using a Phillips screwdriver, remove the ground straps from the doors. Remove the doors from the cabinet and set them aside.

7. Remove the screws and drop the I/O bulkhead tray to expose the card cages.

8. As you work, save all screws that you remove.

Table 1–3: Tools and Supplies Required

Item	Description
VAXBI tool kit A2-M1094-10	Torque screwdriver, 11/32" nutdriver, large Phillips and flat screwdrivers, small Phillips screwdriver with magnetic tip
Other tools	3/8", 5/16", and 11/32" nutdrivers, pliers, 7/16" socket wrench, flashlight
ESD boxes	Antistatic boxes; correct box for each module to be removed from the XMI-1 card cage

1.6 Unpacking Checklist

Carefully unpack the full power and packaging upgrade kit (H9657-CU). Check the contents against Table 1–4. If any components are missing, note items on the bill of lading and do not start installation until you receive all components.

Table 1–4: H9657-CU Platform Upgrade Components

Part Number	Description
70-24902-02	14-slot XMI-2 card cage assembly
H7242-00	+3V regulator
H7206-B	Power and logic unit
DWMBB-AB	XMI-2 adapters for VAXBI; 2 required
20-29176-02	XTC module
17-02500-01	Power supply enable cable
17-02521-01	XMI-2 card cage to H405 cable
74-40932-01	Mounting plate for H7206 power and logic unit
12-28686-07	Shield, RFI (BeCU spring clips)
12-28686-10	Shield, RFI (BeCU spring clips)
12-28686-11	Shield, RFI (BeCU spring clips)
36-33598-01	XMI module utilization label
17-02522-01	H7242 inhibit cable
36-15946-01	Product change label
17-02759-01	Fail safe enable cable

Chapter 2

XMI-1 to XMI-2 Conversion

This chapter describes how to upgrade a VAX 6000 XMI-1 platform to a VAX 6000 XMI-2 platform.
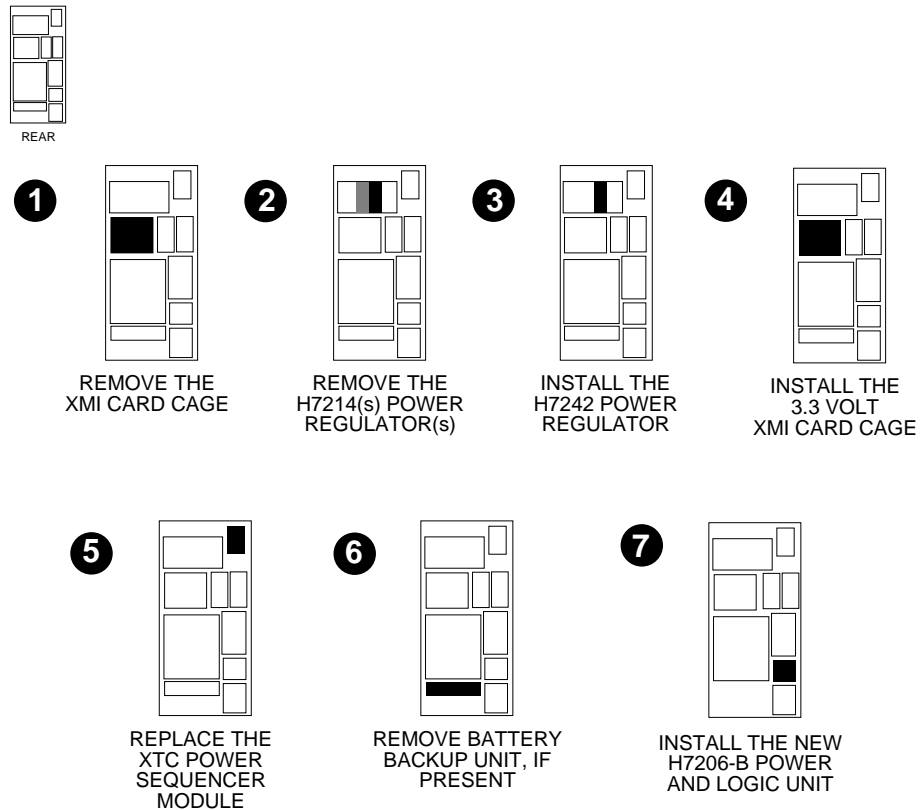
Sections include:

- Full Upgrade Procedure Overview

- Step 1, Remove the XMI-1 Card Cage

    Prepare for Removal
    Remove the XMI-1 Card Cage from the Cabinet

- Step 2, Remove the H7214 Power Regulator(s)

    Replace the H7214 in Position 2, if Necessary
    Remove the H7214 in Position 3

- Step 3, Install the H7242 Power Regulator

- Step 4, Install the XMI-2 Card Cage

    Attach the Daughter Card and Install the Card Cage
    Attach the XMI-2 Card Cage Cables
    Complete XMI Cabling

- Step 5, Replace the XTC Power Sequencer

- Step 6, Remove the H7231-N Battery Backup Unit

- Step 7, Replace the Power and Logic Unit

    Remove the H7206-A Power and Logic Unit
    Replace the Power and Logic Unit Mounting Plate
    Install the H7206-B Power and Logic Unit
    Apply Power to Check Conversion

2.1 Full Upgrade Procedure Overview

Figure 2–1 shows the order of the upgrade procedure. Detailed instructions follow.

Figure 2–1: Upgrade Overview

REAR

❶ REMOVE THE
XMI CARD CAGE

❷ REMOVE THE
H7214(s) POWER
REGULATOR(s)

❸ INSTALL THE
H7242 POWER
REGULATOR

❹ INSTALL THE
3.3 VOLT
XMI CARD CAGE

❺ REPLACE THE
XTC POWER
SEQUENCER
MODULE

❻ REMOVE BATTERY
BACKUP UNIT, IF
PRESENT

❼ INSTALL THE NEW
H7206-B POWER
AND LOGIC UNIT

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Figure 2–1 shows the optimal order for the full upgrade. The steps include:

❶ The XMI-1 card cage must be removed first. This step requires two people to guide the unit from the front and the back at the same time. The daughter card from the XMI-1 card cage will be used on the XMI-2 card cage.

❷ The H7214 power regulator above and to the right of the XMI card cage is removed next. If the other XMI H7214 regulator is at A or B revision level (120 amps), you also need to exchange this H7214 with a C revision level or above (130 amps).

❸ Install the H7242 +3.3V power regulator.

❹ Install the XMI-2 card cage, after the daughter card from the XMI-1 card cage has been attached. This unit comes with preassembled bus bars.

❺ Replace the XTC power sequencer module, which is mounted on the back of the system control assembly.

❻ Remove the battery backup unit, if the system has one. To replace the battery backup unit, follow the procedures described in *VAX 6000: Installing the H7236-A Battery Backup Option*.

❼ Replace the H7206-A power and logic unit with an H7206-B unit.

Three new cables are installed in the steps above. For cable information, see Section 1.6.

2.2 Step 1, Remove the XMI-1 Card Cage

The XMI-1 card cage is removed from the front of the cabinet after you disconnect cables from the backplane.

2.2.1 Prepare for Removal

Prepare the system for shutdown. Set up a work space nearby where you can store the modules and work on the XMI-1 card cage. Label and disconnect the signal and power connections.

Figure 2–2: XMI-1 Backplane Cables and Power Connections
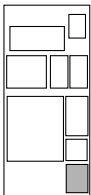
REAR

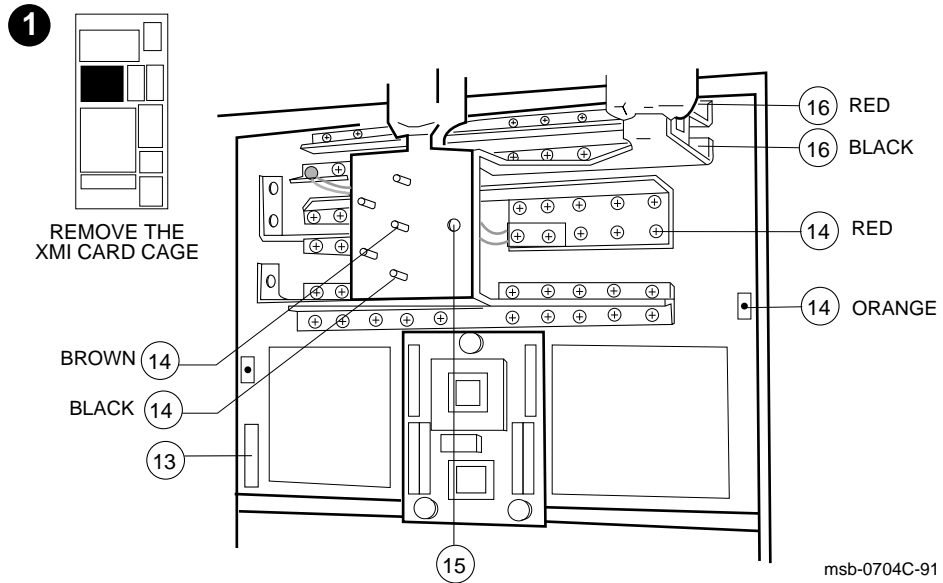| Product Conversion	DEC
From:	
To: H9657-CU	
By: Date:	36-15946-06-A01

msb-0686B-91

1. Perform an orderly shutdown of the system.

2. Turn the upper key switch on the front control panel to the Off position.

3. Pull the circuit breaker on the AC power controller to the Off position. The AC power controller is at the bottom rear of the cabinet.

4. Unplug the system.

5. Open the rear cabinet door.

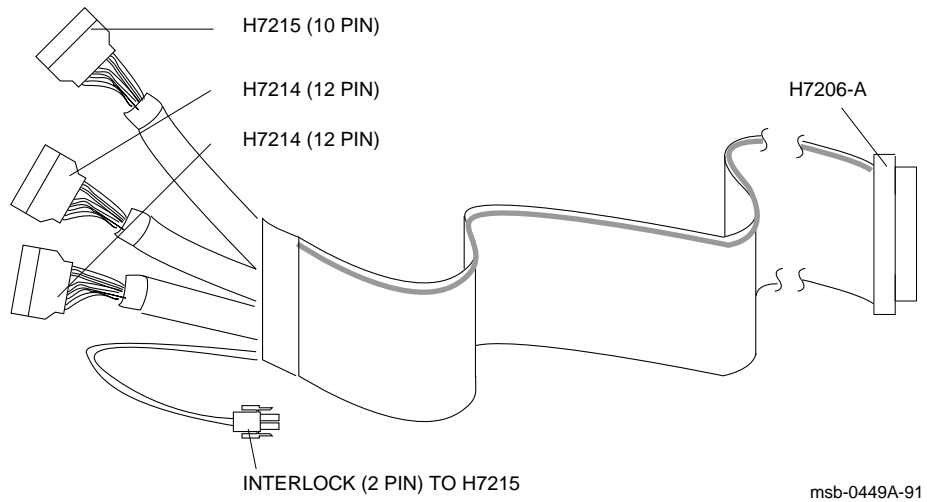6. Remove the screws and drop the I/O bulkhead tray to expose the card cages.

   NOTE: *Figure 2–2 shows the end to disconnect for each of the following cables.*

7. Disconnect all I/O adapter cables from the XMI-1 card cage. See ❼ in Figure 2–2.

8. Loosen the 5/16 inch nut on the H7215 cable retainer bracket. Swing the bracket to one side.

9. Disconnect the power supply cable (17-01566-01) from J3 of the H7215 power regulator. See ❾.

10. If present, remove the plastic covers over the power connections on the H7214 power regulators. To do this, remove the three 5/16 inch nuts that connect each cover to the back of a regulator.

11. Disconnect the power connections from the H7214 power regulators. (On each regulator, remove the four screws from the leads.) See ⓫.

12. Disconnect the remote sense wires (17-01525-01) from the H7214 power regulators. (Remove connector J4 from the regulator.) See ⓬.

Figure 2–3: XMI-1 Backplane Diagram

REMOVE THE
XMI CARD CAGE

16 RED
16 BLACK
14 RED
14 ORANGE

BROWN 14
BLACK 14
13
15

msb-0704C-91

Figure 2–4: Power Control/Status Cable

H7215 (10 PIN)

H7214 (12 PIN)

H7214 (12 PIN)

H7206-A

INTERLOCK (2 PIN) TO H7215

msb-0449A-91

13. Disconnect the cable (17-01568-02) to the XTC power sequencer from J1 at the lower left corner of the card cage. See ⓭ in Figure 2–3.

14. Disconnect four wires from the bus bars that go to the system control assembly: +5V (red); +12V (orange); and two ground connections (brown and black). Use an 11/32 inch nutdriver. See ⓮.

15. Disconnect the ground strap (17-01662-01) from the chassis. Remove the screw from the bus bar with a large Phillips screwdriver. See ⓯.

16. Disconnect the red and black fail safe enable cable (17-01833-01) connections to the +5V bus bar and to ground. See ⓰.

17. Working from the front of the cabinet, disconnect the red and black portion of the fail safe enable cable from J7 of the H405 and the orange and blue portion from J6. If the system does not have a battery backup unit (BBU), the orange and blue portion will have been left unconnected. If the system does have a BBU, disconnect the orange and blue portion of the fail safe enable cable (17-01833-01) from J20 on the BBU (see Figure 2-17) and set the complete cable aside to be discarded.

18. Working from the rear of the cabinet, disconnect the power control/status cable (17-01497-02) from the regulators at the interlock and J2 on the H7215 and at J1 on the two H7214s. See Figure 2–4.

2.2.2 Remove the XMI-1 Card Cage from the Cabinet

Remove all modules from the cage and set them aside, and then remove the cage from the cabinet.

Figure 2–5: XMI-1 Card Cage

msb-0705B-91
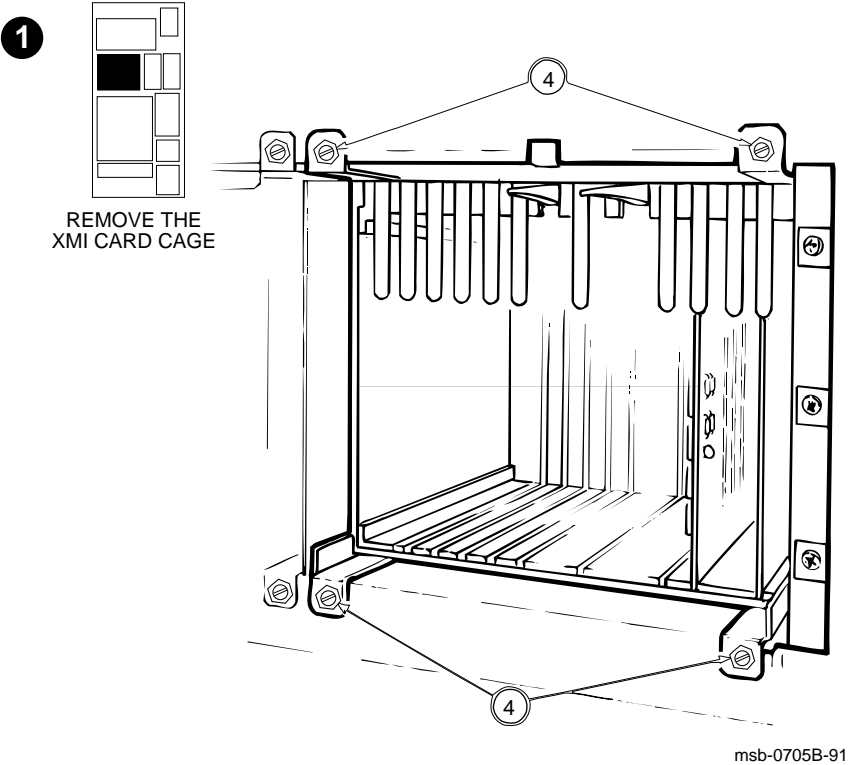
1. Open the front cabinet door.

2. Remove the clear plastic door in front of the XMI-1 cage.

   CAUTION: *You must wear an antistatic wrist strap attached to the cabinet when you handle any modules. See Appendix A for processor module handling instructions.*

3. Lift up the levers and hold. Remove modules from the cage. Put them in ESD boxes and note which slots they had been in.

4. Using a 1/4 inch nutdriver or a large flat screwdriver, remove and save the four mounting screws (1/4 inch hex head) that fasten the XMI-1 cage assembly to the chassis. See ❹ in Figure 2–5.

5. Pull the cage out of the system cabinet carefully so that you do not damage the power harnesses or bus bars. Push from the back to ease the cage out toward the front of the cabinet. This step requires two people.

2.3 Step 2, Remove the H7214 Power Regulator(s)

You will remove the H7214 power regulator in position 3.
Remove the H7214 power regulator in position 2 if it is at
revision A or B; otherwise, do not remove.

Figure 2–6:   Remove the H7214 Power Regulator(s)
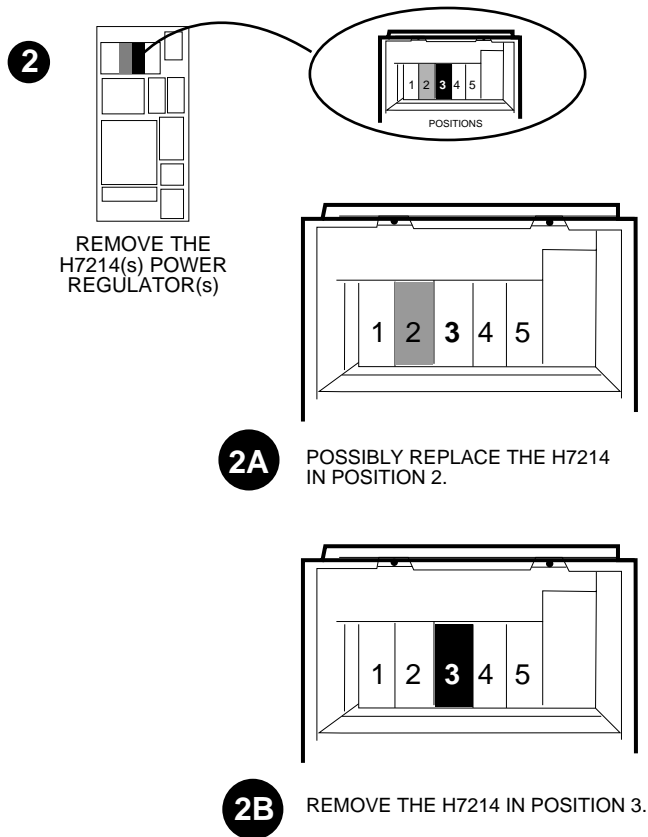
msb-0383-90

OVERVIEW

There are five power regulators. Working from the rear of the cabinet, imagine the regulators numbered 1 to 5, from left to right, as shown in Figure 2–6.

Check the revision level of the H7214 power regulator in position 2. The three-segment oblong bar-coded label has the revision level information on the middle segment. If the revision level is at A or B, you will replace the power regulator with a newer H7214 of revision C or above. See Section 2.3.1.

If the H7214 regulator in position 2 is already at revision level C or above, do not remove it. Skip Section 2.3.1 and proceed to Section 2.3.2.

You must remove the H7214 power regulator in position 3, no matter what its revision level. A new H7242 power regulator goes in this position; see Step 3, Section 2.4.

2.3.1 Replace the H7214 in Position 2, if Necessary

Check the revision level of the power regulator in position 2. If the revision level is A or B, you must replace it with an H7214 power regulator of revision C or above.
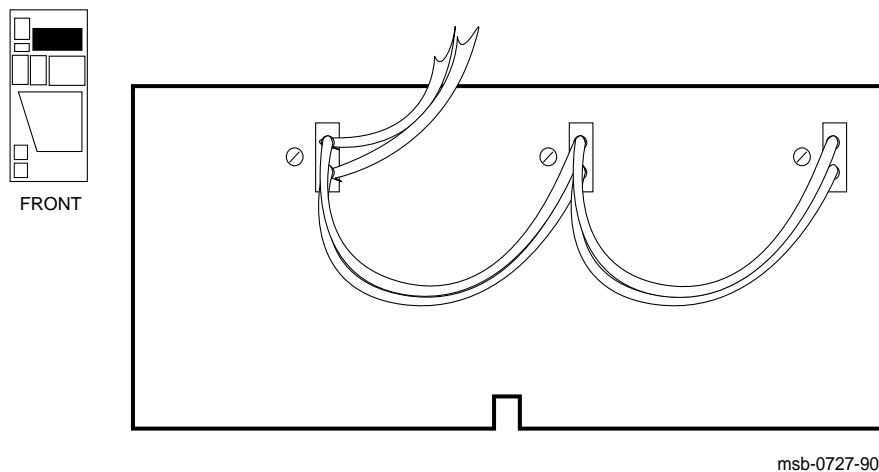
Figure 2–7:   Replace the H7214 in Position 2
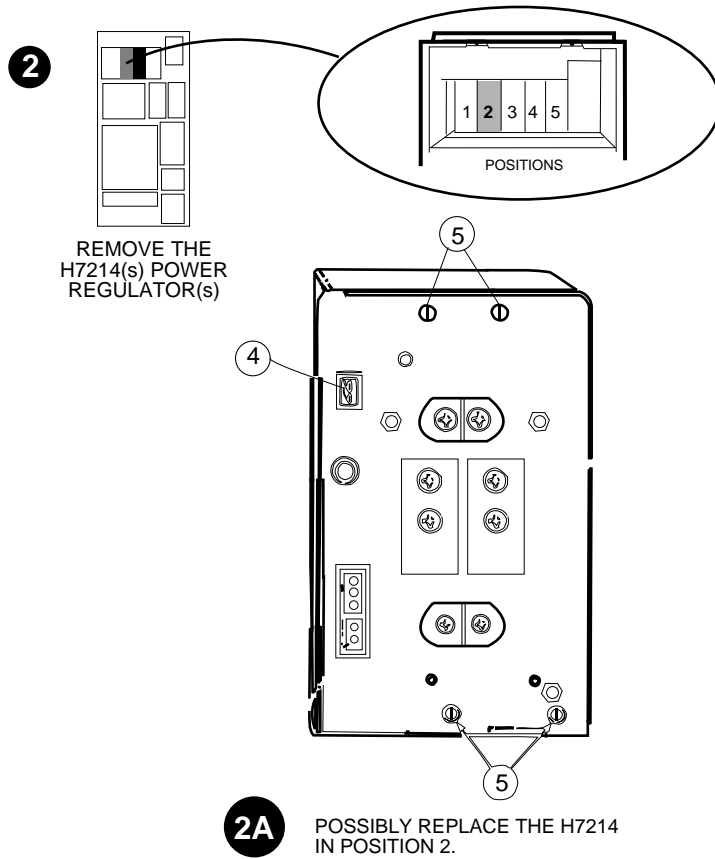
msb-0383A-90

1. At the rear of the cabinet, check the revision level of the H7214 power regulator in position 2. The three-segment oblong bar-coded label has the revision level information on the middle segment. If this power regulator is at level C or above, you do not need to remove it. If this regulator is at revision level A or B, remove it and replace it with a new H7214.

2. At the front of the cabinet, disconnect the +300V bulk power cable (17-01446-01) by pinching the locking tabs on the connector and pulling the connector free. See Figure 2–8.

3. Loosen the captive screw securing regulator 2.

4. At the rear of the cabinet, disconnect the Ethernet power cable (17-01496-01) at J2 on the H7214 that goes to your Ethernet module. See ❹ in Figure 2–7. Push the Ethernet power cable below the sheet metal assembly.

5. At the rear of the cabinet, using a flat screwdriver, loosen the four captive screws. See ❺. Grasp the tab on the lower left of the H7214 and support the bottom as you pull it from the back of the cabinet.
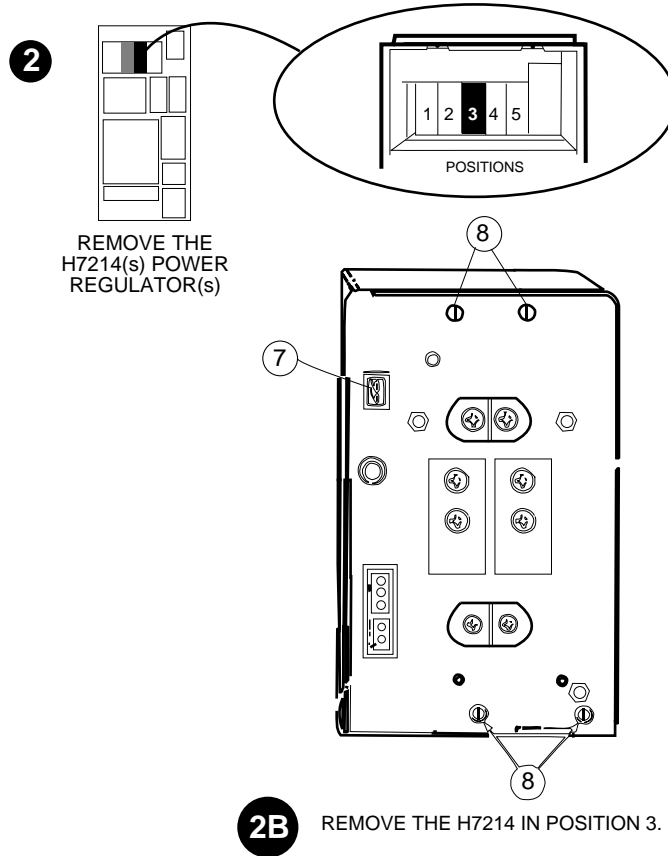
Figure 2–8: Bulk Power Cable to Power Regulators

FRONT

msb-0727-90

2.3.2 Remove the H7214 in Position 3

You must remove the H7214 power regulator located in position 3. You will install a new H7242 power regulator in Step 3, described in Section 2.4.

Figure 2–9:   Remove the H7214 in Position 3

1 2 **3** 4 5

POSITIONS

2 REMOVE THE H7214(s) POWER REGULATOR(s)

2B REMOVE THE H7214 IN POSITION 3.

msb-0383B-90

Remove the H7214 power regulator in position 3 (see Figure 2–9) and replace it with an H7242 in Step 3, described in Section 2.4.

5. At the front of the cabinet, disconnect the +300V bulk power cord (17-01446-01) by pinching the locking tabs on the connector and pulling the connector free. See Figure 2–8.

6. At the front of the cabinet, loosen the captive screw securing regulator 3.

7. At the rear of the cabinet, disconnect the Ethernet power cable (17-01496-01) at J2 on the H7214 that goes to your Ethernet module. See ❼ in Figure 2–9. Push the Ethernet power cable below the sheet metal assembly.

8. Using a flat screwdriver, loosen the four captive screws. See ❽.

9. Grasp the tab on the lower left of the H7214 and support the bottom as you pull it from the cabinet.

2.4 Step 3, Install the H7242 Power Regulator

Install the +3.3V H7242 power regulator above the XMI in position 3.

Figure 2–10: H7242 Power Regulator Installation

msb-0384-90
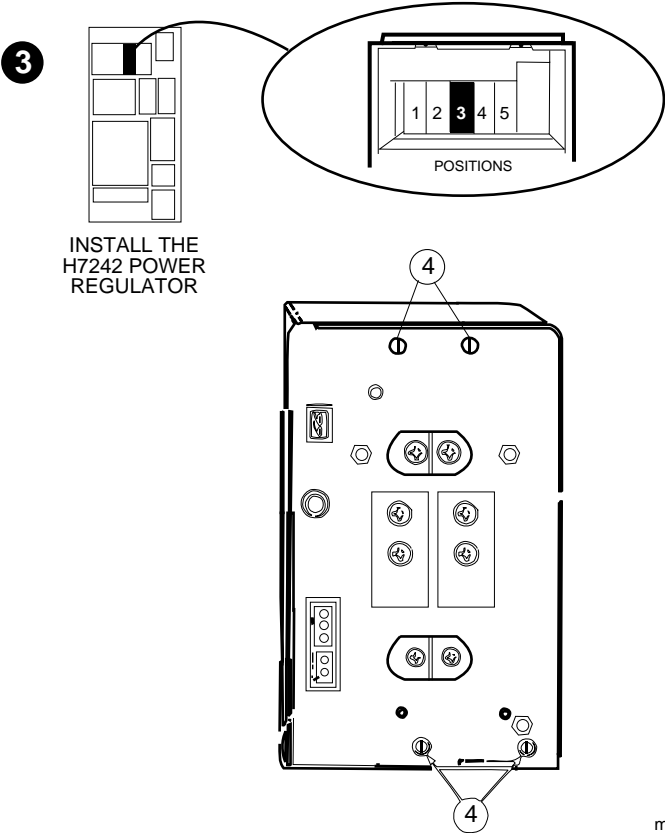
1. Unpack the H7242 power regulator. Working from the rear of the cabinet, slide the unit into position 3 shown in Figure 2–10. Move to the front of the cabinet and guide the regulator into the tracks of the assembly, aligning the unit from underneath.

2. Align the H7242 with the captive screw at the front of the cabinet and secure the screw. See Figure 2–8.

3. Attach the +300V bulk power cable (17-01446-01) at the front of the cabinet.

4. At the rear of the cabinet, tighten the four captive screws. Before you tighten the screws, start all four screws. See ❹ in Figure 2–10.

2.5 Step 4, Install the XMI-2 Card Cage

Next install the new XMI-2 card cage (70-24902-02) into the area where the XMI-1 card cage had been. Attach all connections on the backplane and install the screws attaching the cage to the chassis.

Figure 2–11:   XMI Backplane and Daughter Card

INSTALL THE
3.3 VOLT
XMI CARD CAGE

msb-0418A-91
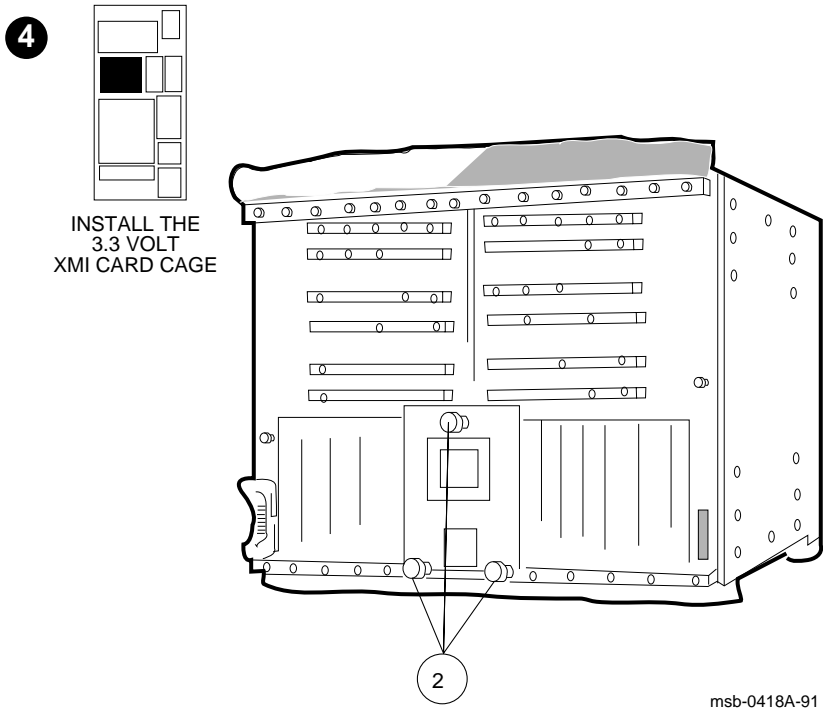
2.5.1 Attach the Daughter Card and Install the Card Cage

Remove the daughter card from the XMI-1 card cage and attach it to the XMI-2 card cage.

CAUTION: *The daughter card is static sensitive. You must wear an antistatic wrist strap attached to the cabinet when you handle this module.*

1. Unpack the XMI-2 card cage (70-24902-02). Set it aside so that you can mount the daughter card on it.

2. Three large thumbscrews hold the daughter card to the backplane (see ❷ in Figure 2–11).

   - Unscrew these three screws, working the daughter card out by unscrewing each screw a little at a time.

   - Pull the daughter card away from the backplane.

   - Attach the daughter card to the XMI-2 card cage.

3. Bend back the power harnesses, and slide the XMI-2 card cage into the cabinet. Push from the front and pull from the rear. This step requires two people.

4. Use a nutdriver to tighten the four mounting nuts that secure the XMI-2 card cage to the front of the cabinet.

2.5.2 Attach XMI-2 Card Cage Cables

Reconnect the remote sense wires, the power harnesses, and the power control/status cable to the new XMI-2 card cage.

Figure 2–12: XMI-2 Card Cage

INSTALL THE
3.3 VOLT
XMI CARD CAGE

msb-0386F-91
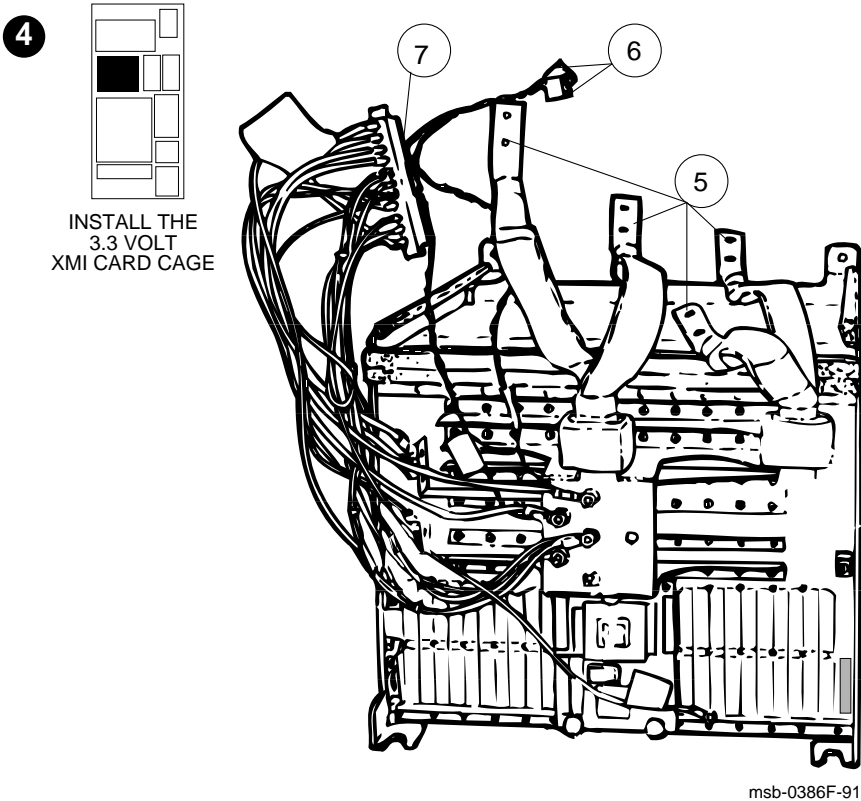
5. Reattach the power connections. See ❺ in Figure 2–12. On the H7214 and H7242 regulators in positions 2 and 3, torque the screws to 27 (+/-5) inch-pounds. Replace the plastic covers that shield the power connections on the regulators.

    CAUTION: *Use the 5/16 inch screws to attach the power connections. If you use the longer 7/16 inch screws, the power regulators may short out.*

6. Attach the two remote sense wires (17-01525-01) going to the H7214 and H7242 regulators (positions 2 and 3) at J4. The wire from the +3.3V bus bar connects to the H7242; the wire from the +5V bus bar connects to the H7214. See ❻. Figure 2–13 shows the bus bar voltages.

7. Attach the power distribution cable (17-01566-01) going to the H7215 regulator (position 1) at J3. At the top of J3, there is a cable retainer. Loosen the nut that holds the cable retainer to move it up out of the way, and then turn it to hold the power distribution cable. Tighten the nut. See ❼.

Figure 2–13:   XMI-2 Bus Bars

msb-0415A-91
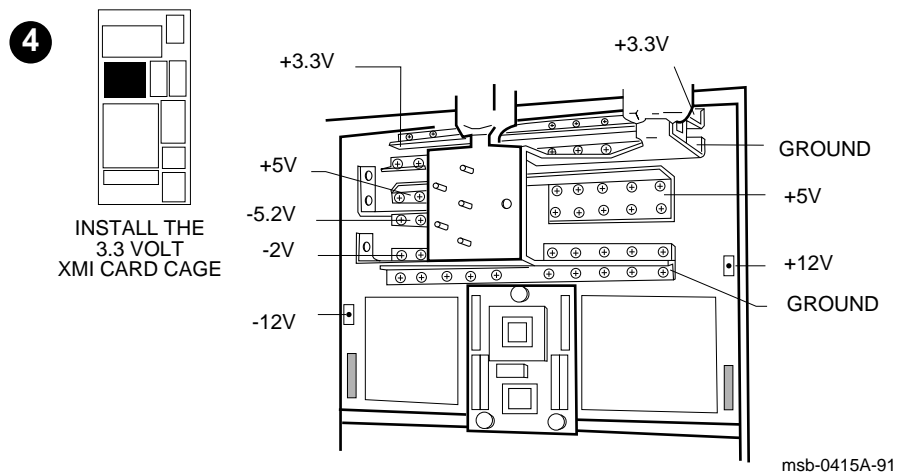
Figure 2–14: Power Control/Status Cable

INSTALL THE
3.3 VOLT
XMI CARD CAGE

H7215 (10 PIN)

H7214 (12 PIN)

H7242 (12 PIN)

H7206-B

INTERLOCK (2 PIN) TO H7215

msb-0449E-91
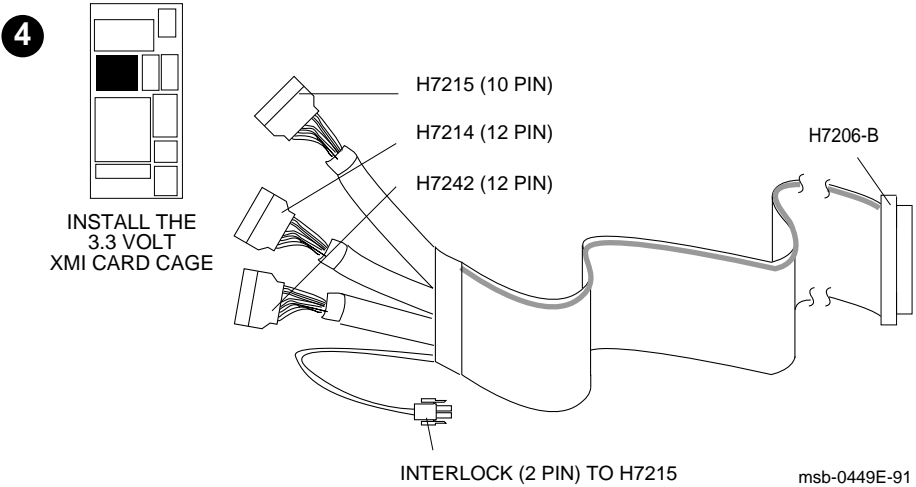
8. Feed the power control/status cable (17-01497-02) up through the slot in the sheet metal assembly and plug in to the regulators at the interlock and J2 (H7215), J1 (H7214), and J1 (H7242). See Figure 2–14. The dot on the connector should be up and to the right.

9. Feed the Ethernet power cables (17-01496-01) up through the slot in the sheet metal assembly and plug in to J2 on the H7214 and H7215. See Figure 2-9.

2.5.3 Complete XMI-2 Cabling

Attach the 17-02521-01 cable, provided in the upgrade kit, to the XMI-2 card cage and H405. Attach all other cables connecting to the XMI card cage as shown in Figure 2–15.

Figure 2–15: Complete XMI-2 Cabling

msb-0417-90
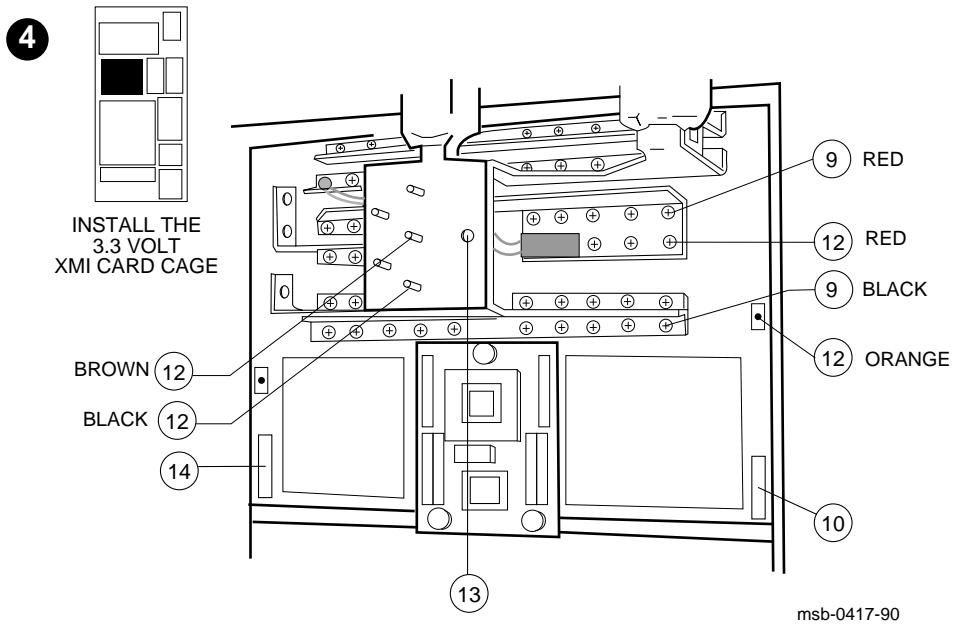
9. Attach the red and black leads of the 17-02521-01 +5V feed cable to the bus bars. This is a new cable provided in the upgrade kit. See ❾ in Figure 2–15.

    CAUTION: *Attach the black lead to ground and the red lead to the +5V bus bar.*

10. Install the large end of the power supply enable cable (17-02500-01) into J8 at the lower righthand corner of the XMI-2 card cage. This cable is also new. See ❿.

11. Route the 17-02521-01 and 17-02500-01 cables through the plastic clips attached to the underside of the sheet metal assembly. Then coil the cables in the VAXBI backplane area. Later you will route the cables down through the cable tray to the H405 area when you install the new H7206 power and logic unit (see Section 2.8.3).

12. Reattach the four wires (17-01812-01) on the bus bars that go to the system control assembly. Use a Phillips screwdriver to attach the +5V (red) and +12V (orange) wires (see Figure 2–13); use an 11/32 inch nutdriver to attach the two ground connections (brown and black). See ⓬. When attaching the brown wire, make certain to leave clearance for the ground strap. Use the nut and washers that you saved for the ground connections.

13. Reattach the ground strap to the chassis (17-01662-01) using the screw you saved. Use a large Phillips screwdriver. See ⓭.

14. Attach the XTC power sequencer cable (17-01568-02) to J1. See ⓮.

15. Attach the cables (17-01897-02 and -03) between where the DWMBB/A modules will be placed (in the XMI-2 card cage) and where the DWMBB/B modules will be placed (in the VAXBI card cage). If you have an expander cabinet, attach the DWMBB cables to the expander. You will install the DWMBB modules later (see Section 3.2).

2.6 Step 5, Replace the XTC Power Sequencer

Remove the XTC power sequencer module and install the new XTC.

Figure 2–16:   Replace the XTC Power Sequencer Module
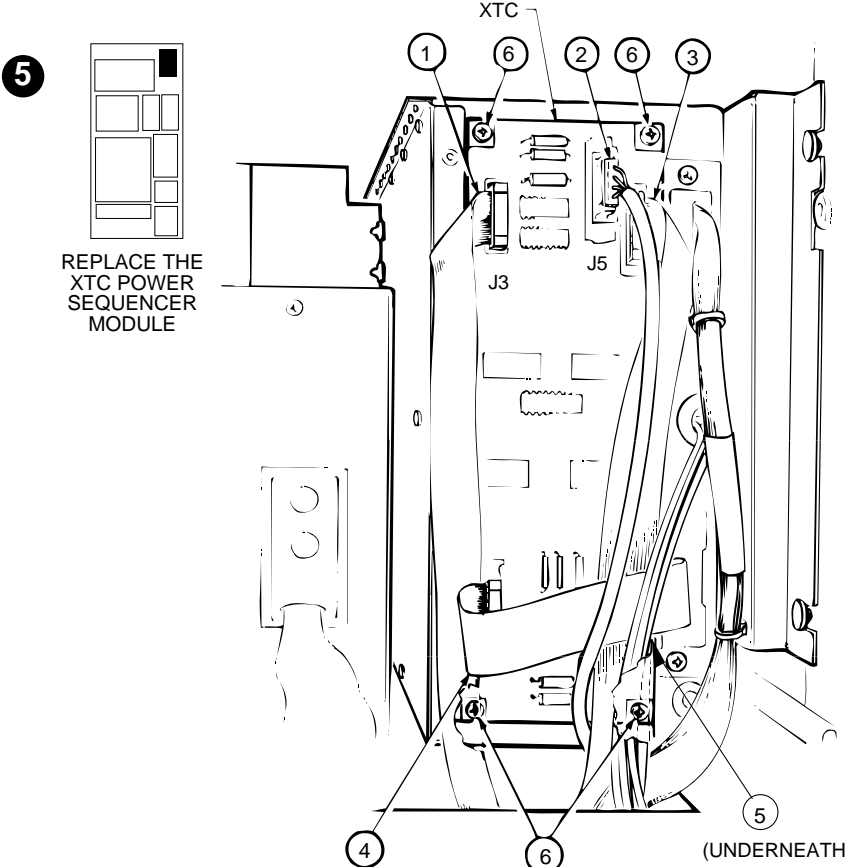
msb-0414-90

REMOVAL OF 54-17243-01 XTC

1. Disconnect the 17-01498-01 ribbon cable at J3 which is a 14-pin connector cable leading to the H7206 power and logic unit. See ❶ in Figure 2–16.

2. Disconnect the 17-01567-01 ribbon cable at J5, which is a 10-pin connector cable leading to the console port. See ❷.

3. Disconnect the 17-01568-02 ribbon cable at J4, which is a 20-pin connector cable leading to the XMI. See ❸.

4. Disconnect the 17-01816-01 ribbon cable at J2, which leads to the control panel on the system control assembly. See ❹.

5. Disconnect the 12-19245-02 lead with a red plug end at the J1 connector; the cable leads to the TOY clock battery in the system control assembly. See ❺.

6. Use a large Phillips screwdriver to remove the four #6-32 screws located on each corner of the XTC power sequencer. See ❻.

7. Pull the XTC toward you and remove.

INSTALLATION OF 20-29176-02 XTC

• Reverse the steps in the Removal section above. When positioning the module, note that J3 is in the upper lefthand corner.

2.7 Step 6, Remove the H7231-N Battery Backup Unit

NOTE: *If your system does not have a battery backup unit, go to Step 7.*

Remove the H7231-N battery backup unit using a flat screwdriver. The assembly has two screws and four cables.

Figure 2–17:   H7231-N Battery Backup Unit Removal

msb-0387A-91
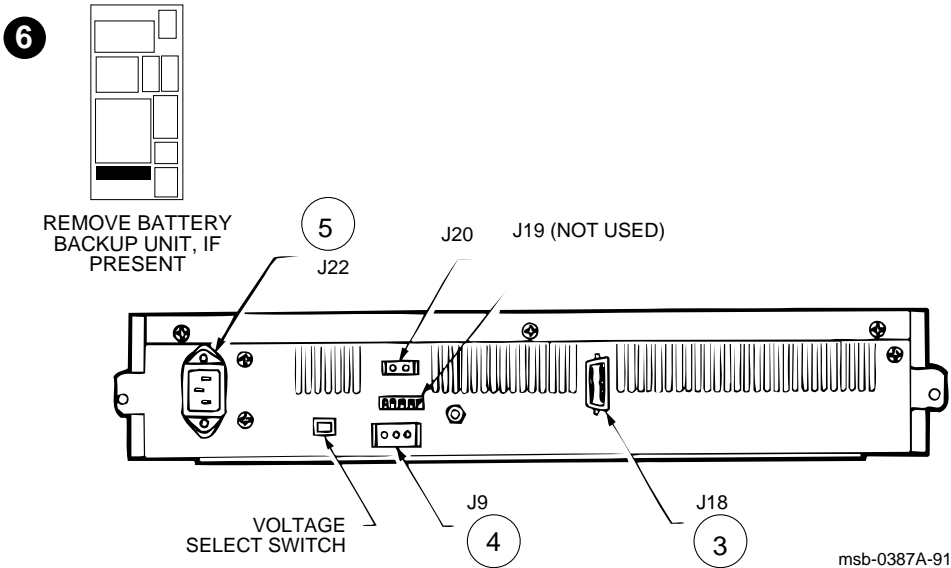
WARNING: *The H7231-N battery backup unit is heavy. Exercise caution when lifting or moving this unit.*

1. At the front of the cabinet, use a 3/8 inch nutdriver to remove the two nuts that secure the battery backup unit in its mounting bracket.

2. Slide the BBU toward you so you can access the cables at the back. Be careful not to slide it too far forward.

3. At the rear of the cabinet, use a flat screwdriver to remove the two screws that attach the BBU control/status cable (17-00962-01) to J18. See ❸ in Figure 2–17.

4. Disconnect the BBU power cable (70-20396-2F) from J9. See ❹. Using a 3/8 inch nutdriver, disconnect the ground strap and discard.

5. Disconnect the BBU AC line cable (17-00365-03) from J5 on the H405 power controller and J22 and remove. See ❺.

6. Lift the BBU out of the mounting bracket. Remove mounting unit from system.

To install the new battery backup unit, follow the procedures described in *VAX 6000: Installing the H7236-A Battery Backup Option*.

2.8 Step 7, Replace the Power and Logic Unit

Remove the H7206-A power and logic unit and replace it with the new H7206-B power and logic unit.

Figure 2–18: H7206-A Power and Logic Unit Removal (Top View)

INSTALL THE NEW
H7206-B POWER
AND LOGIC UNIT

msb-0388-90
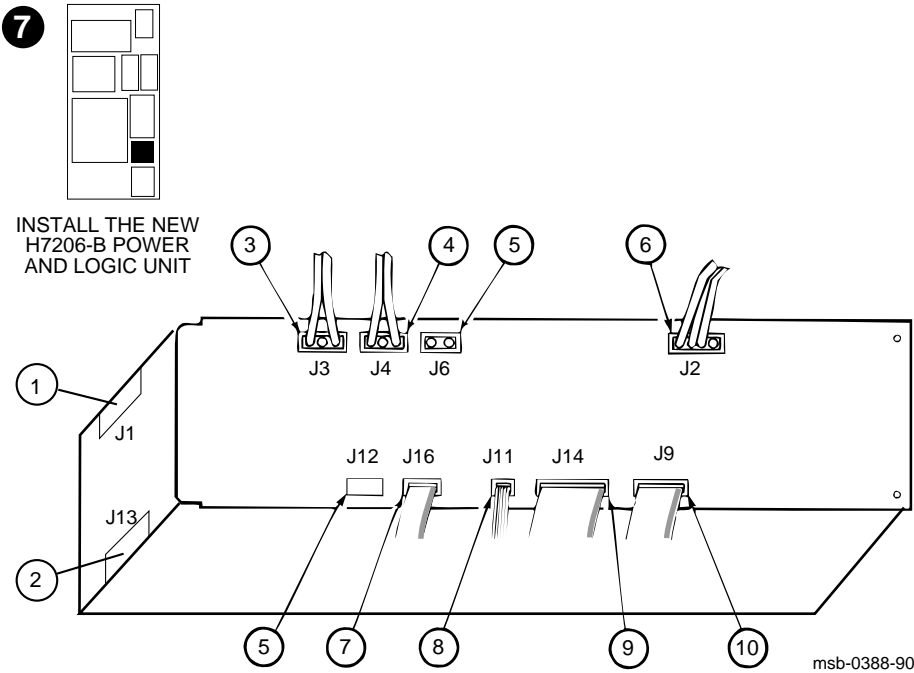
2.8.1 Remove the H7206-A Power and Logic Unit

Remove the H7206-A power and logic unit, held in place by six screws. There are 11 cables. Mark the cables as you remove them to simplify reconnection. If you cannot disconnect some cables from the front of the machine, remove the plenum at the rear of the cabinet to access the connectors.

REMOVAL

1. Working from the front of the cabinet, disconnect the 17-01501-01 AC input cable from J1. See ❶ in Figure 2–18.

2. Disconnect the 17-01549-01 DEC power bus cable from J13 on the H7206-A and from J1 on the H405 and discard. See ❷.

3. Disconnect the 17-01447-01 +300V bulk power cable from J3. See ❸.

4. Disconnect the 17-01446-01 +300V bulk power cable from J4. See ❹.

5. If the system had an H7231-N battery backup unit, disconnect the 70-20396-2F cable from J6 and the 17-00962-01 cable from J12. See ❺.

6. Disconnect the 17-01570-01 blower cable from J2. See ❻.

7. Disconnect the 17-01498-01 XTC cable from J16. See ❼.

8. Disconnect the 17-01569-01 AC/DC OK cable from J11. See ❽.

9. Disconnect the 17-01497-02 power control/status cable from J14. See ❾.

10. Disconnect the 17-01666-01 control/status cable from J9. See ❿.

11. Working from the rear of the cabinet, use a flat screwdriver or a 1/4 inch nutdriver to remove the six screws securing the H7206-A.

12. Remove the four #10 screws that hold the cable bracket (70-25525-01) in place. Save these screws.

13. Slide the unit out of the cabinet.

2.8.2 Replace the Power and Logic Unit Mounting Plate

Remove the old mounting plate. Attach the shielding spring clips to the new mounting plate and then install the mounting plate using the four screws saved when the old mounting plate was removed.

Figure 2–19: Attaching BeCu Clips to New Mounting Plate
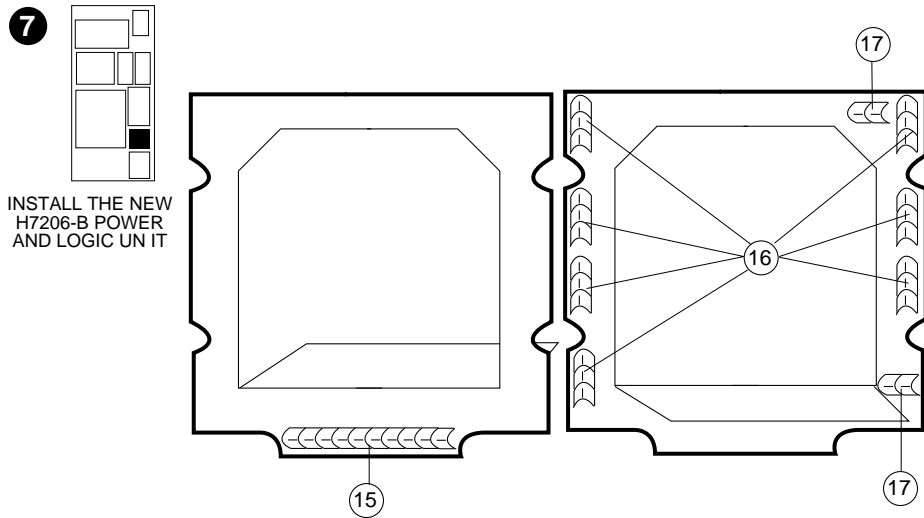
mab-0725-91

14. Remove and save the four #10 Phillips screws that secure the 74-34982 mounting plate. Tip the top of the mounting plate forward to remove it and set it aside to be discarded.

15. Attach one beryllium copper (BeCu) spring clip (12-28682-07) along the lower front edge of the new mounting plate (74-40932-01). See **⓯**.

16. Attach seven BeCu spring clips (12-28686-10) along the rear of the new mounting plate (see **⓰**).

17. Attach two BeCu spring clips (12-28282-11) along the rear of the new mounting plate (see **⓱**). Peel the adhesive strip off the back of the clips and adhere them to the mounting plate.

18. Install the new mounting plate, using the four Phillips screws that you saved. Tighten the screws to hold the plate in place.

2.8.3 Install the H7206-B Power and Logic Unit

Install the H7206-B power and logic unit using a flat screwdriver. The assembly is held in place by six screws.

Figure 2–20:   H7206-B Power and Logic Unit (Top View)

7

INSTALL THE NEW
H7206-B POWER
AND LOGIC UNIT

TOWARD FRONT
OF CABINET

msb-0392-90
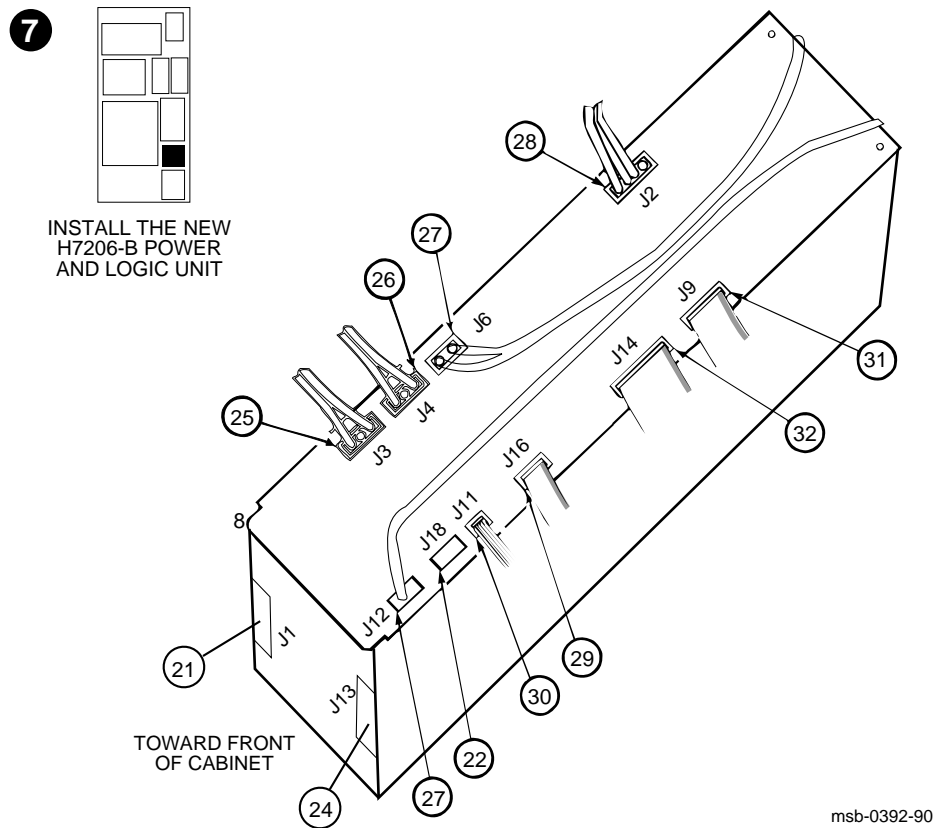
19. Slide the H7206-B into the cavity where the old unit was; make sure the locating tang on the front end of the unit engages the locating stud on the front shelf. Secure with the six screws that you saved.

20. Reattach the cable bracket (70-25525-01) using the screws saved when it was removed (route the Ethernet and CI cables through it).

21. Working from the front, connect the 17-01501-01 AC input cable from the H405 to J1. See ㉑ in Figure 2–20.

22. Route the 17-02500-01 power supply enable cable from the XMI-2 card cage along the rear left vertical cable tray to the H7206-B and plug it into connector J18. See ㉒.

23. Route the 17-02521-01 (XMI-2 card cage to H405) cable from the XMI-2 card cage along the rear left vertical cable tray to the H405 and plug into connector J7 on the H405 (below the H7206-B).

24. Connect the 17-02759-01 coupled fail safe enable cable at J13 of the power and logic unit and to J1 and J6 on the H405. See ㉔.

25. Connect the 17-01447-01 +300V bulk power cable at J3 which leads to the VAXBI. See ㉕.

26. Connect the 17-01446-01 +300V bulk power cable at J4 which leads to the XMI. See ㉖.

27. Check the connections of the 17-02475-01 cable at J6 and the 17-02494-01 cable at J12. These wires are connected at the factory, but may have been loosened during shipment. See ㉗.

28. Connect the 17-01570-01 blower cable at J2. See ㉘.

29. Connect the 17-01498-01 XTC cable at J16. See ㉙.

30. Connect the 17-01569-01 AC/DC OK cable at J11. See ㉚.

31. Connect the 17-01666-01 control/status cable at J9. See ㉛.

32. Connect the 17-01497-02 power control/status cable at J14. See ㉜.

2.8.4 Apply Power to Check Conversion

**If you wish to test the conversion to this point, without
risking the new modules, you can use the old modules in
the new card cage by using the H7242 inhibit cable. To do
this, add the inhibit cable, insert the XMI-1 modules into the
XMI-2 card cage, and apply power.**

Figure 2–21:   H7242 Inhibit Cable

INSTALL THE NEW
H7206-B POWER
AND LOGIC UNIT

H7242 Inhibit Cable

H7215 (10 PIN)

H7214 (12 PIN)

H7242 (12 PIN)

H7206-B

INTERLOCK (2 PIN)
TO H7215

msb-0449F-91
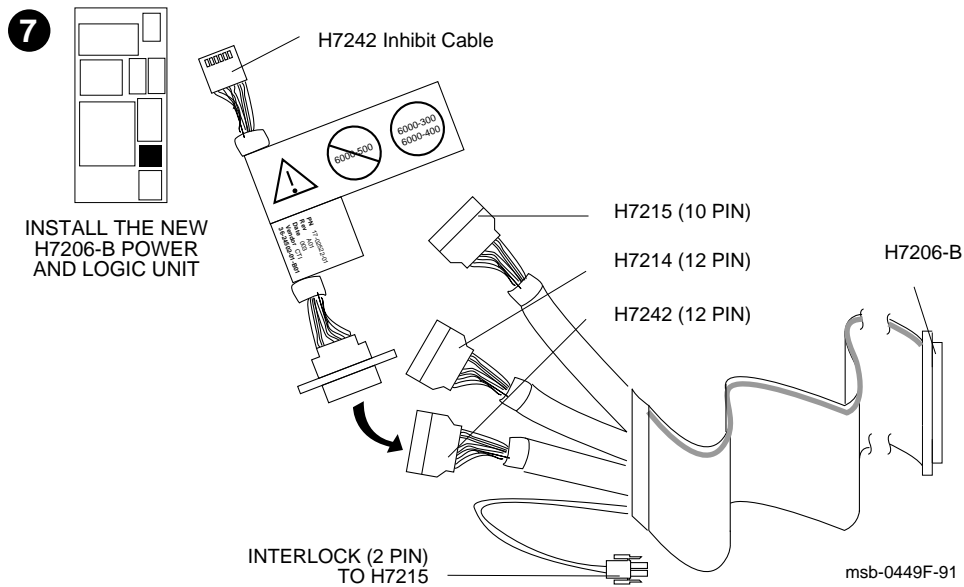
33. Unplug the J1 (H7242) connector of the power control/status cable (17-01497-02) from the +3.3V H7242 power regulator above the XMI. See Figure 2–21.

34. Attach one end of the H7242 inhibit cable (17-02522-01) to the 12-pin J1 (H7242) connector of the power control/status cable and the other end to the +3.3V H7242 power regulator. See Figure 2–21.

35. Remove the CPU and memory modules from the XMI-1 card cage and insert them into the XMI-2 card cage. See Appendix A for instructions on handling modules.

36. Apply power to the system as described in Section 3.4. Refer to Section 3.5 for a description of the power and logic unit's diagnostic LEDs and Appendix B for what to check if the system does not power up.

CAUTION: *The H7242 inhibit cable must be removed before installing the KA65A (Model 500) processors. This cable is used only with the VAX 6000 Model 200, 300, or 400 processors.*

After you have verified that the system powers up, remove power from the system as described in Section 1.5 before proceeding with the troubleshooting procedures described in Chapter 3.

Chapter 3

Wrap-Up and Troubleshooting

This chapter details the wrap-up and troubleshooting procedures for a VAX 6000 system that has been upgraded to an XMI-2 platform.

Sections include:

- Insert XMI Modules
- Install DWMBB Adapters
- Reattach Doors, Change System Number, and Attach Product Conversion Label
- Restore Power to System
- H7206-B Diagnostic LEDs
- H7206-B LEDs During Normal Power-Up
- Sample Self-Test Failures
- Pack Up and Return Replaced Items

3.1 Insert XMI Modules

Carefully insert the new processor and memory modules into the XMI-2 card cage. See Appendix A for module handling instructions. If there is friction as you insert a module in the slot, check the alignment of the module and re-insert.

CAUTION: *Model 500 modules are fragile and very static sensitive. Detailed instructions for handling are given in Appendix A. While removing or inserting a module in the XMI card cage, you must hold the XMI card cage lever. Failure to do so may result in damage to the module.*

Figure 3–1: Module Utilization Label
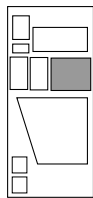
FRONT

XMI

14	13	12	11	10	9	8	7	6	5	4	3	2	1

msb-0686F-91

The following steps describe the installation of two KA65A processor modules and four memory modules.

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

1. Take the first KA65A processor and insert it in slot 1; insert the second processor in the slot to the left. Hold the lever up until the module is in place and then press the lever down to close the connector.

   By convention, in a Model 500 system memory begins at slot 9 and expands to the right, so the four MS65A memory modules are inserted in slots 9, 8, 7, and 6.

2. Place the XMI card cage module utilization label (36-33598-01) on the bottom of the XMI card cage door. Record the position of all modules on the label (see Figure 3–1).

3. Replace the clear door.

3.2 Install DWMBB Adapters

After you have installed the processor and memory modules in the XMI-2, install the DWMBB adapters.

Figure 3–2:   VAX 6000 Series Slot Numbers

msb-0158-91
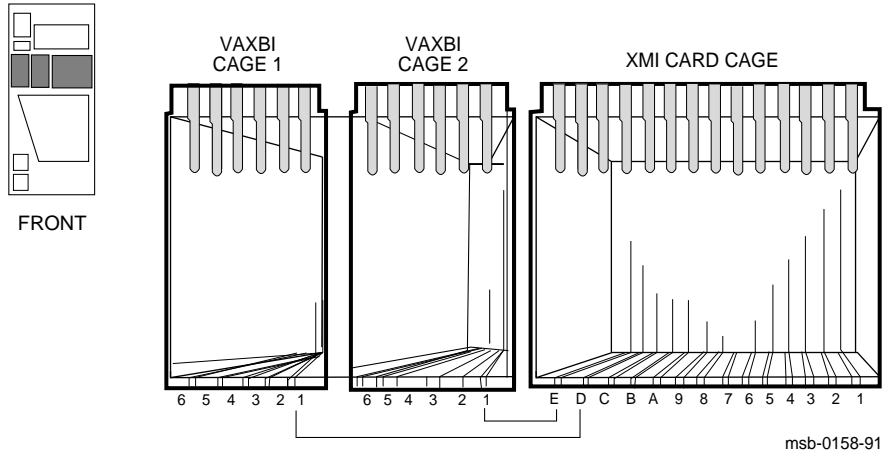
1. Insert the two DWMBB/A (T2018) modules in XMI slots D and E.

2. Insert the two DWMBB/B (T1043) modules in the rightmost slots of the VAXBI card cages (slots 1 in Figure 3–2).

3. Record the position of all modules on the VAXBI card cage module utilization label.

4. Replace the clear door.

3.3 Reattach Doors, Change System Number, and Attach Product Conversion Label

Reattach front and rear cabinet doors. On the system cabinet front door, change the name plate to reflect the number of your system upgrade. Attach the product conversion label to the rear cabinet base.

Figure 3–3: Front Door (Inside View)

msb-0092-89
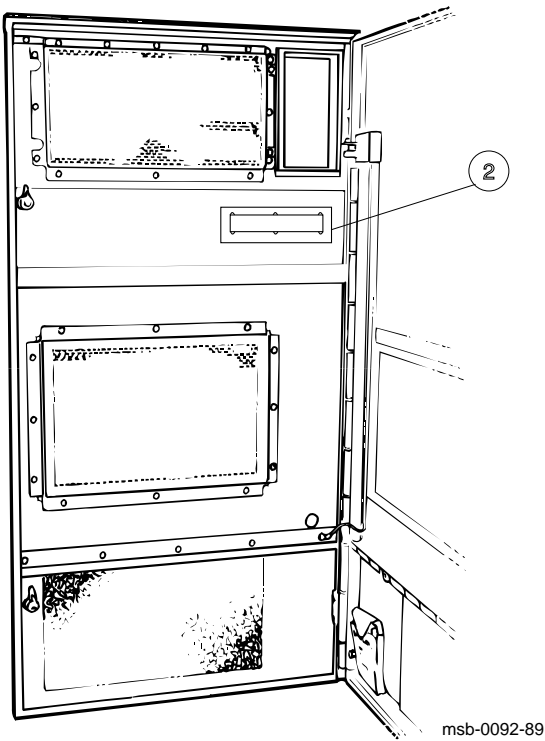
1. Using a Phillips screwdriver, reattach the ground strap to the front and rear cabinet doors and then reattach the doors to the system cabinet.

2. To change the VAX name plate, working from the inside of the front cabinet door, remove the retainer and push out the system numbers. See ❷. Install the new number (74-39700-XX) for your upgraded system.

3. Place the product coversion label (36-15946-06) on the rear cabinet base and record the requested information (see Figure 3–4). This will allow the customer to identify the system as a full power and packaging upgrade system without having to open the cabinet doors. This information will be useful when the customer calls for repairs and maintenance.

Figure 3–4: Product Conversion Label
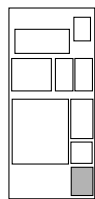
REAR

Product Conversion	DEC
From:	
To: H9657-CU	
By: Date:	36-15946-06-A01

msb-0686B-91

3.4 Restore Power to System

Close cabinet doors and restore power systematically before turning the key switch to the Enable position.

Figure 3–5:   AC Power Controller Circuit Breaker

REAR

ON

OFF
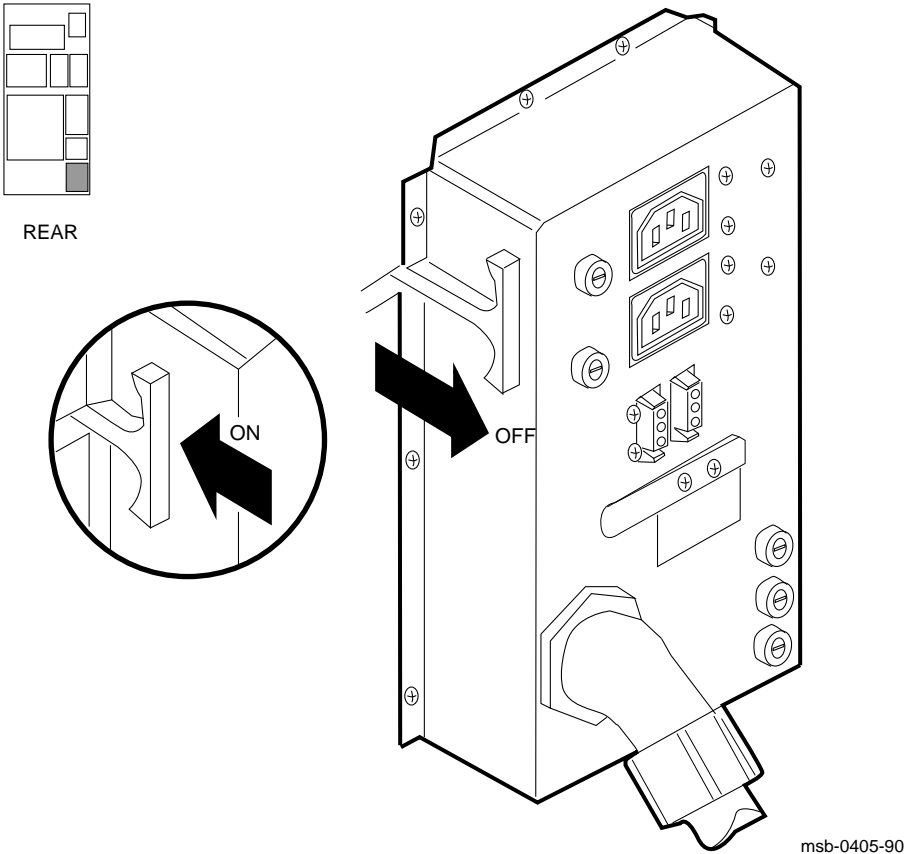
msb-0405-90

1. Close the I/O bulkhead tray to cover the card cages.

2. Plug in the system power cord.

3. Push the circuit breaker on the AC power controller to the On position. The AC power controller is at the bottom rear of the cabinet. See Figure 3–5.

4. Turn the upper key switch on the front control panel to the Enable position; the system should power up and run self-test, as shown in Figure 3–6.

5. If the system does not power up, see Appendix B. If the self-test results print, but you have self-test failures, see Section 3.7.

Figure 3–6:   Power-Up Troubleshooting Flowchart
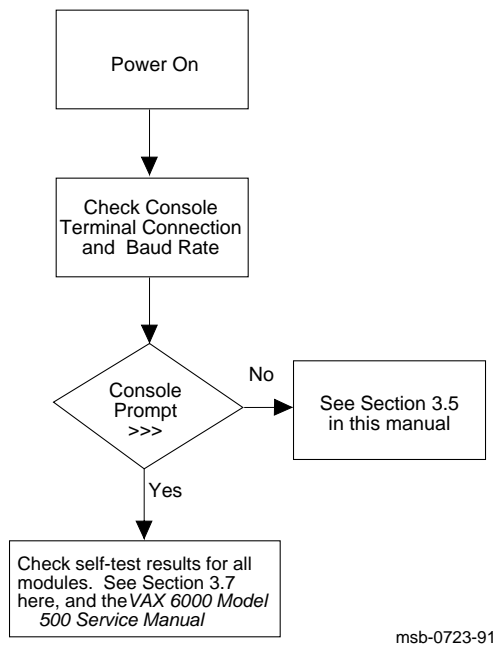
3.5 H7206-B Diagnostic LEDs

The H7206-B power and logic unit has one green and eight red LEDs in the upper righthand corner and a larger green LED in the lower lefthand corner.

Figure 3–7:   H7206-B Diagnostic LEDs
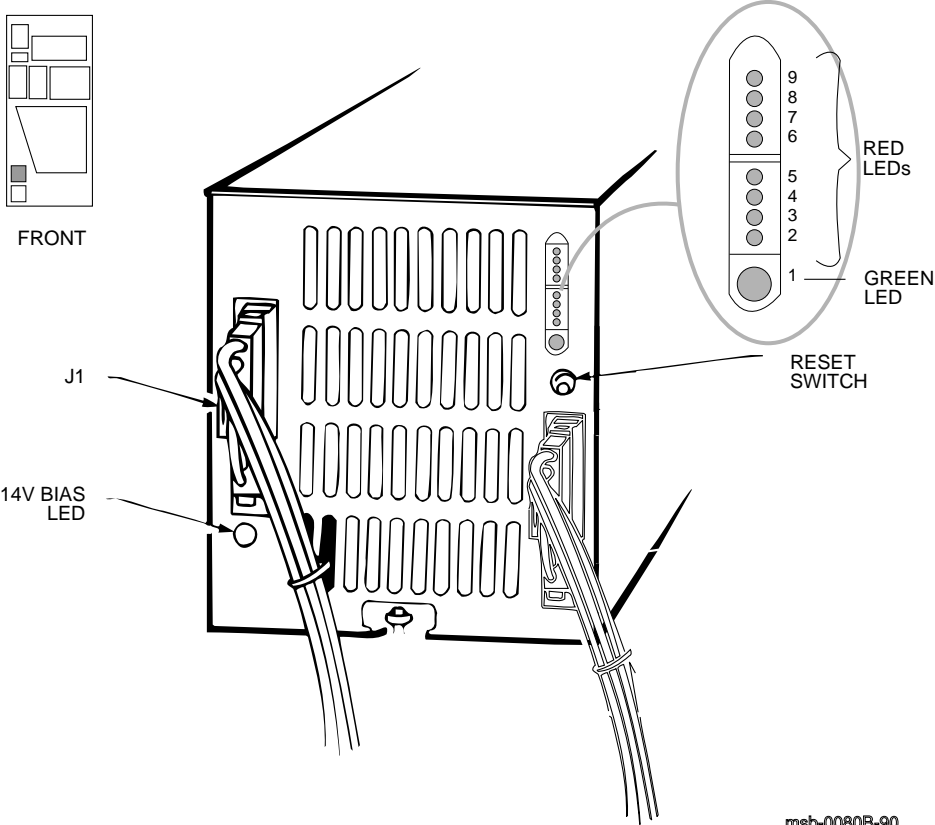
msb-0080B-90

The H7206-B power and logic unit consists of an AC to DC rectifier and filter, a fan/power module, and a logic module. The unit has 10 indicator LEDs and one reset switch.

The green +14V bias LED in the lower lefthand corner is lit when the bias supply on the fan/power module is working.

WARNING: *When the +14V bias LED is off, do not assume the +300V bulk supply is deenergized. This LED does not indicate the presence or absence of the +300V bulk supply.*

The green LED (L1) in the upper righthand corner of the H7206-B indicates that the +14V bias on the logic module is working and that the unit has passed self-test. The eight red LEDs provide fault indications for the power regulators and for certain other faults such as overtemperature.

Section 3.6 shows passing LED patterns. See Appendix B for a description of each of the diagnostic LEDs and for troubleshooting instructions.

3.6 H7206-B LEDs During Normal Power-Up

The power and logic unit LEDs indicate normal operation during power-up with the inhibit cable installed and with XMI-1 modules in the XMI-2 card cage or without the inhibit cable and with XMI-2 modules installed.

Figure 3–8: H7206-B LEDs During Normal Power-Up

msb-0724-90
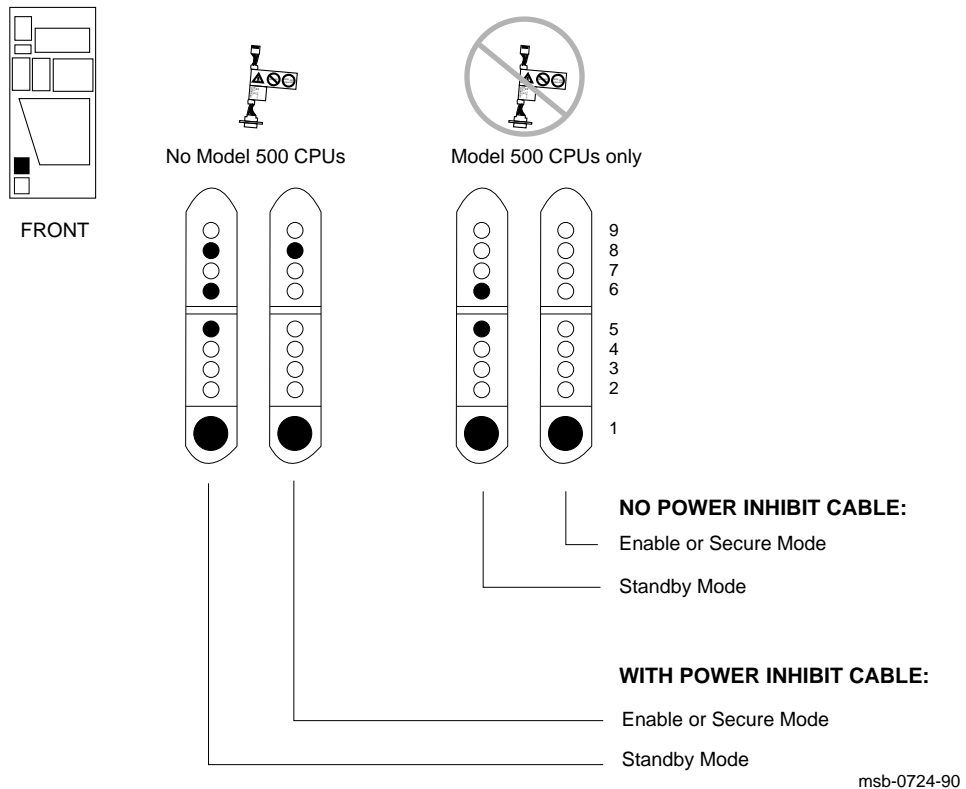
Figure 3–8 shows passing patterns for the H7206-B LEDs. To power up the system and generate the LED results, turn the key switch from Off to Standby:

1. Listen for the click from the H405 power controller. This ensures that the control panel is connected to the H7206-B and that the H7206-B is connected to the H405. The STANDBY CMD L signal is sent from the control panel, through the H7206-B and down to the H405 where it causes an AC contactor to close, providing AC input power to the H7206-B.

2. Look for the green bias LED (L1) lit on the H7206-B (see Figure 3–8). This indicates that the internal bias power supply in the H7206-B is active (delivering +14V). You should also notice the system fans (including the small fan in the H7206) spin up. If they start and then shut down about 30 seconds later, check the 24V power and airflow sense cable. A 30 second delayed shutdown will only occur on detection of insufficient airflow.

3. The red L5 (VAXBI H7215) and L6 (VAXBI H7214) LEDs are lit.

   NOTE: *With the H7242 inhibit cable installed and with XMI-1 modules installed in the XMI-2 card cage, the red L8 (XMI-1 module in XMI-2) LED is lit. L8 is not lit when the inhibit cable is not installed and no XMI-1 modules are in the XMI-2 card cage.*

Turn the key switch from Standby to Enable/Secure:

1. The XMI side remains as is.

2. The VAXBI side now comes up. LED L5 (VAXBI H7215) and LED L6 (VAXBI H7214) on the H7206-B now go out.

   NOTE: *With the H7242 inhibit cable installed and with XMI-1 modules installed in the XMI-2 card cage, the red L8 (XMI-1 module in XMI-2) LED remains lit. L8 is not lit when the inhibit cable is not installed and no XMI-1 modules are in the XMI-2 card cage.*

If the system does not power up or if you see any other combination of LEDs lit, refer to Appendix B.

3.7 Sample Self-Test Failures

Your system may power up but show module failures in the self-test results. Example 3–1 shows a VAXBI module in slot E failing self-test and a module failing in the VAXBI connected in slot D.

Example 3–1: Sample Self-Test Failures

```
#123456789 0123456789 0123456789 0123456789 12345#

F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #

    A   A   .   .   .   M   M   M   M   .   .   .   P   P       TYP
    o   o   .   .   .   +   +   +   +   .   .   .   +   +       STF
    .   .   .   .   .   .   .   .   .   .   .   .   E   B       BPD
    .   .   .   .   .   .   .   .   .   .   .   .   +   +       ETF
    .   .   .   .   .   .   .   .   .   .   .   .   E   B       BPD

.   .   .   .   .   .   .   .   .   +   +   -   .   .   +   .   XBI D +❶
.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   XBI E -❷

    .   .   .   .   .   A4  A3  A2  A1  .   .   .   .   .       ILV
    .   .   .   .   .   64  64  64  64  .   .   .   .   .       256 Mb

Console = V1.00  RBDs = V1.00  EEPROM = 1.00/1.00    SN = SG00000000

?004F System serial number has not been initialized.❸
```

1. Power up the system by turning the lower key switch to Halt and the upper key switch to Enable.

2. Check the self-test display for the two processors, each indicated by a P on the TYP line in the example. If the processors show a plus sign (+) on both lines STF and ETF, they passed self-test.

3. Check the self-test display for the new memory modules, indicated by an M on the TYP line, as shown in the example. All four memories passed self-test, as indicated by plus signs (+) on the STF line.

In Example 3–1, ❶ is showing a module failure at node 4 in the VAXBI card cage attached by the DWMBB module in slot D of the XMI. The failure at ❷ is showing a failure of the DWMBB attached through node E on the XMI.

In this particular example, the failure at ❶ was caused by a DMB32 module. This module was not properly cabled. If you receive failures within a VAXBI cage, then run diagnostics for the respective modules, if needed.

If you have a DWMBB failure, check the cabling on the backplane connecting the DWMBB/A and the DWMBB/B modules.

Check the error messages. The message ?004F appears (see ❸). See the *VAX 6000: Installing Model 500 Processors* manual for instructions on how to set the system serial number and how to set power to the proper value. For additional information on self-test, refer to the *VAX 6000 Model 500 Service Manual*.

3.8 Pack Up and Return Replaced Items

Processor modules and other parts removed from the system are to be returned to the Returns Sort Center.

CAUTION: *Use proper ESD procedures when handling these modules.*

The following instructions for the return of modules and parts apply to the U.S. area only. Those installing upgrades in other areas should follow procedures for those countries.

1. Package the modules and parts removed from the system in the same container(s) in which the upgrade option was shipped. Be sure to remove the return address label from inside the box prior to packing.

2. Seal each container securely with packing tape.

3. Attach the return address label. Be sure to cover all previous shipping information with the label and/or packing tape.

4. Contact your district Customer Administration Services (CAS) representative for a Return Authorization Number (RA#). CAS will need the Digital order number and customer name. CAS will arrange for pickup of this material. (If you do not know the district CAS representative, contact the district sales office for instructions.)

5. Write the RA# on the return address label. Please be sure this is legible.

6. Customers should be advised that they will be billed for modules and parts not returned to Digital.

7. Send the packages to the customer shipping area for pickup.

8. Digital customer service must fill out the LARS form as follows:

System/Processor Type:	6XXX
Activity:	N
Call Type:	I
Module/Fail Area:	63XUX–XX RA# _ _ _ _

    (Fill in "X" with information from shipping paperwork and give the RA number.)

Appendix A
Module Handling

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

- Handling Modules
- Inserting Modules

A.1 Handling Modules

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

Figure A–1:   Holding 6000 Series Processor Modules

msb-0228-90
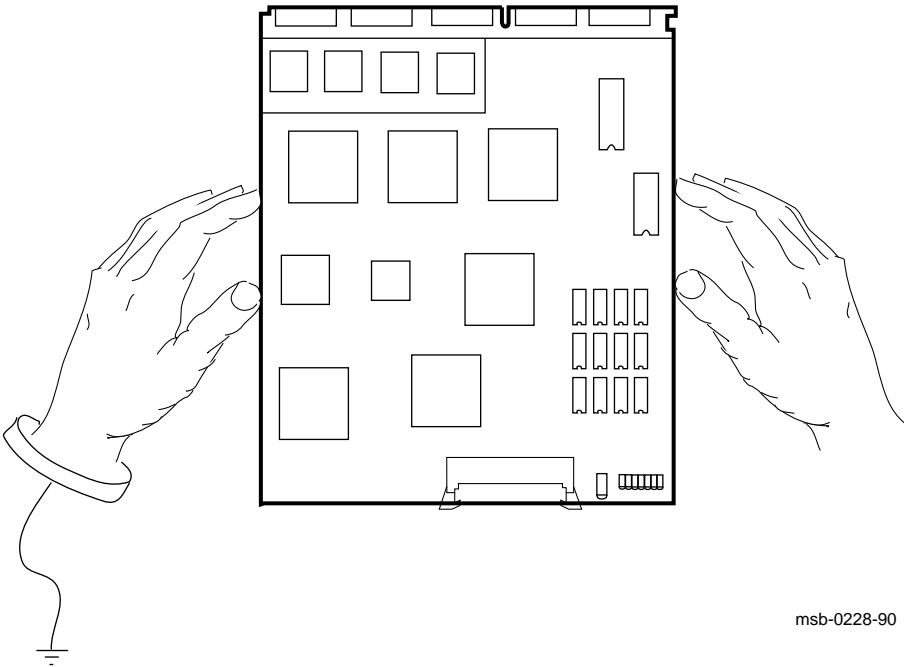
The 6000 series modules require careful handling. Prepare yourself and the work area before handling these modules. Roll up your sleeves and remove any jewelry. Figure A–1 shows the proper way to hold the module.

Follow these handling procedures to avoid damaging the processor modules:

1. Always wear an antistatic wrist strap.

2. Before removing the module from its ESD box, place the box on a clean, stable surface.

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

3. Hold the module only by the edges, as shown in Figure A–1.

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

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

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

A.2 Inserting Modules

Figure A–2: Inserting the Scalar Processor in an XMI Card Cage

msb-0219R-90
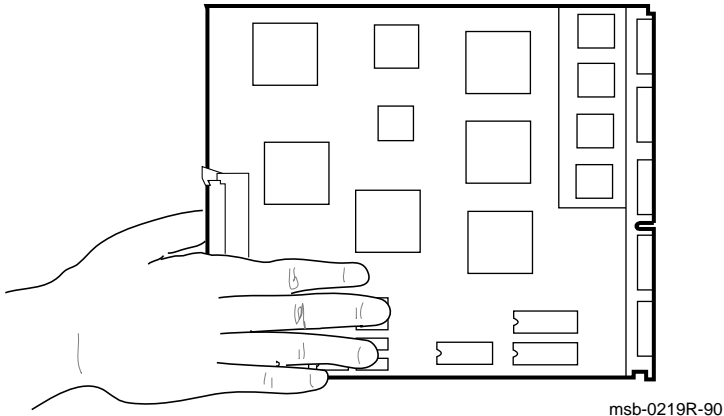
Figure A–3: Inserting the Vector Processor in an XMI Card Cage

msb-0372R-90
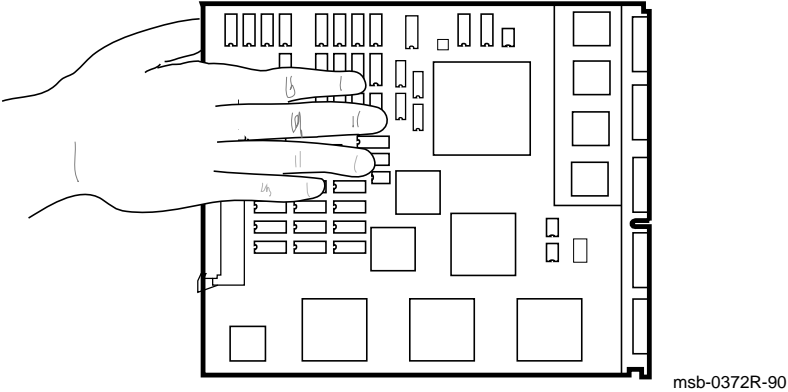
You must take special precautions when moving the processor modules in or out of the XMI card cage.

1. Be sure, when inserting a module in or removing it from the XMI card cage, that no part of the module comes in contact with another module or a cable.

2. When you swap out a module, place it in an ESD box or on an ESD mat before you install the new module.

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

3. Hold the XMI card cage handle while removing or inserting the module. If it is not held in place, the handle can spring down and damage the module.

4. When inserting a module in the card cage, grasp it as shown in Figure A–2 or in Figure A–3, being careful not to touch any 25 mil devices, and slide it slowly and gently into the slot.

5. **Do not attach the repair tag to the module.**

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

Power-Up Troubleshooting Procedures

This appendix gives detailed power-up troubleshooting procedures.

The H7206-B diagnostic LEDs can help you troubleshoot the system. Table B–1 lists the meaning of each LED.

Table B–1: H7206-B Diagnostic LEDs

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

NOTE: *LEDs 5 and 6 will always be lit in Standby mode since the VAXBI side is off in this key position. The H7206-B diagnostic LEDs may not indicate problems with regulators if the status cables are not correctly seated.*

B.1 Power-Up with Inhibit Cable and XMI-1 Modules Installed

When the key switch is turned from Off to Standby with the H7242 inhibit cable installed and with no Model 500 CPUs, the following H7206-B LEDs are lit:

- L1 (green) - +14V bias present

- L5 (red) - VAXBI H7215 fault

- L6 (red) - VAXBI H7214 fault

- L8 (red) - XMI-1 module in XMI-2 card cage

The green LED on the XMI-side H7214 power regulator should be lit. The green LED on the H7242 power regulator should be off; it will always be off with the H7242 inhibit cable installed. If the power control/status cable is installed upside down, the XMI side will shut down almost immediately. The green LEDs on both VAXBI power regulators will be off.

When the key switch is turned from Standby to Enable or Secure, L5 and L6 on the H7206-B should go out (see Figure 3–8), and the green LEDs on each VAXBI power regulator will light. L8 will remain on, since XMI-1 modules are installed in the XMI-2.

If L5 and L6 do not go out, check that the control/status cable (17-01666-01) for the VAXBI side is installed correctly. If it is not connected, LEDs L5 and L6 (VAXBI H7215 and H7214 failure) on the power and logic unit will be off, since the active pulldown to turn the LEDs off comes from the regulators.

Check that the +300V bulk power cable to the VAXBI side is connected at the regulators and at the H7206-B (connector J3).

WARNING: *Never make or break +300V connections with power applied. Disconnect input power and wait 2 minutes to allow the filter capacitors to discharge (bleed down) to zero volts before making or breaking any connections.*

If L9 is lit, indicating a fault, and the XMI side is okay, check the interlock 2-pin Mate-N-Lok connector under the H7215 and recheck the VAXBI door (listen for the faint click of the microswitch). Correcting the door or interlock switch connection should automatically clear the fault without your having to recycle power at the key switch or having to press the H7206-B reset switch.

B.2 Normal Operation with Model 500 CPUs and No Inhibit Cable

Normal system operation is with Model 500 CPUs and MS65A memory modules installed, no H7242 inhibit cable, and no XMI-1 modules. When power is supplied to the system under these conditions and the key switch turned to Standby, the following H7206-B LEDs are lit:

- L1 (green) - +14V bias present

- L5 (red) - VAXBI H7215 fault

- L6 (red) - VAXBI H7214 fault

The green LEDs on the XMI-side H7214 and H7242 power regulators should be lit. The green LEDs on both VAXBI power regulators will be off. When the key switch is turned from Standby to Enable or Secure, L5 and L6 on the H7206-B should go out and the green LEDs on each VAXBI power regulator will light.

If L5 and L6 do not go out, check that the control/status cable (17-01666-01) for the VAXBI side is installed correctly. If it is not connected, LEDs L5 and L6 (VAXBI H7215 and H7214 failure) on the power and logic unit will be off, since the active pulldown to set the LEDs off comes from the regulators.

Check that the +300V bulk power cable to the VAXBI side is connected at the regulators and at the H7206-B (connector J3).

WARNING: *Never make or break +300V connections with power applied. Disconnect input power and wait 2 minutes to allow the filter capacitors to discharge (bleed down) to zero volts before making or breaking any connections.*

If L9 is lit, indicating a fault, and the XMI side is okay, check the interlock 2-pin Mate-N-Lok connector under the H7215 and recheck the VAXBI door (listen for the faint click of the microswitch). Correcting the door or interlock switch connection should automatically clear the fault without your having to recycle power at the key switch or having to press the H7206-B reset switch.

Since everything but the H7242 has been checked out, check the H7242, its connection to the H7206, and any sequencing activity between the H7242 and H7214. Check the control/status cable to the H7242 and reseat if necessary. Check that the +300V bulk power cable is attached to the H7242. If the H7242 connection is not properly made, no other regulators on the XMI side should run since the +300V is daisy chained through etch on the H7214 and H7242 at the +300V input connector (that is, if the H7242 is

not connected, then the other two regulators will also be disconnected even if their cables are properly attached).

If one power regulator fails to power up, the other one will shut down also. Check the XMI H7214 and XMI H7242 red LEDs (L3 and L4) to determine if the H7214 led to the shutdown of the H7242.

Note that the XMI AC LO L, XMI DC LO L, and XMI RESET L signals are sent to the XMI backplane by way of the XTC module. The H7206 delivers the AC BULK SENSE and DC OK H signals to the XTC through cable 17-01498-01. If this cable is not in place, the H7206-B should not be able to respond to key switch action (should never power up the H405 contactor or deliver output voltages (+24V bias or bulk +300V).

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