
VAX 6000
SERIES

VAX 6000 Series Upgrade Manual

Order Number EK–600EB–UP–002

This manual is for Digital customer service representatives and self-maintenance customers installing upgrades to previously installed VAX 6000 series systems. The upgrades described here include the addition of processor modules and memory modules to all 6000 systems and the addition of vector processor modules to VAX 6000–400 systems.

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Contents

Chapter 4 Upgrading to a Vector System

Chapter 5 Verification

Appendix A VAX 6000 Model 400 Module Handling and Configuration Rules

Appendix B Self-Test

Appendix C ROM Replacement

Index

Examples

Figures

Tables

Preface

Intended Audience

This manual is for Digital customer service representatives and self-maintenance customers installing upgrades to previously installed VAX 6000 series systems.

Document Structure

The manuals in the VAX 6000 series documentation set are designed using structured documentation theory. Each topic has a boldface indented abstract, to help you use the manual as a reference tool. Other typical components of a topic include an illustration or example, a chart or list, and descriptive text.

This manual has five chapters and three appendixes:

- **Chapter 1, Upgrade Overview,** gives an overview of the upgrades described in the manual.
- **Chapter 2, Upgrading Within a Model,** describes the procedure for adding more processor and memory modules to upgrade within the same model number.
- **Chapter 3, Upgrading to Another Model,** describes the upgrade procedure to upgrade from one model to another model number. The procedure described also applies to converting from a VAXserver to a timeshare system.
- **Chapter 4, Upgrading to a Vector System,** describes how to install vector processor modules in a VAX 6000 Model 400 system.
- **Chapter 5, Verification,** describes acceptance procedures.
- **Appendix A, VAX 6000 Model 400 Module Handling and Configuration Rules,** details instructions for handling Model 400 processor modules and gives restrictions on module placement in the XMI card cage.
- **Appendix B, Self-Test,** describes how to interpret the console display for self-test and the LEDs on processor modules.

- **Appendix C, ROM Replacement,** describes how to change ROMs on the scalar processors.

VAX 6000 Series Documents

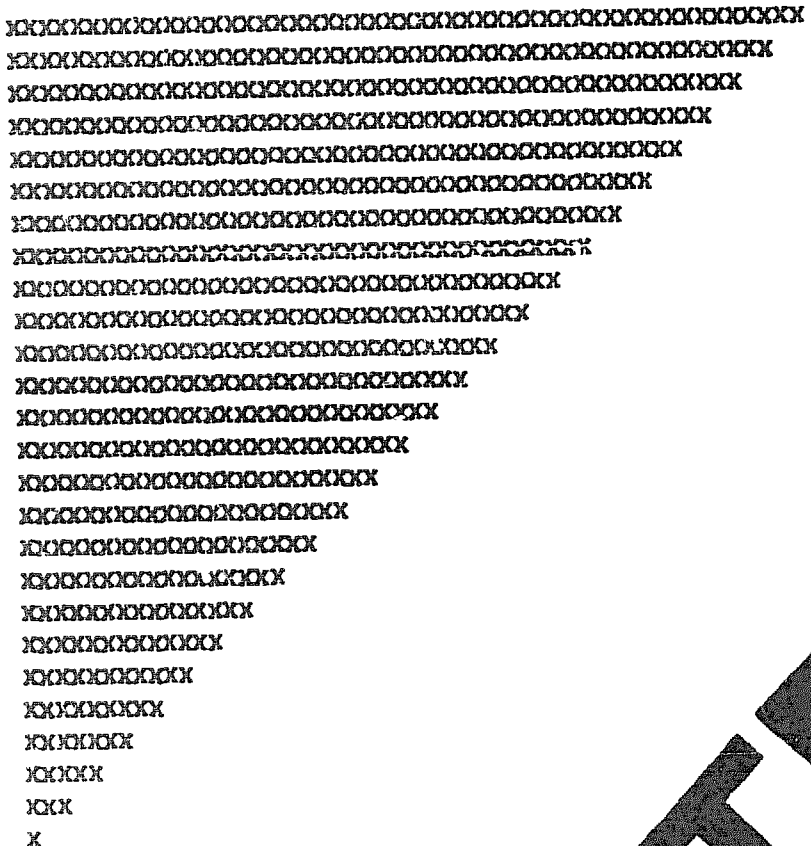
Title	Order Number	
	200/300 Models	**400 Models**
Installation Guide	EK–620AC–IN	EK–640EA–IN
Mini-Reference	EK–620AC–HR	EK–640EA–HR
Owner's Manual	EK–620AC–OM	EK–640EA–OM
System Technical User's Guide	EK–620AB–TM	EK–640EB–TM
Vector Processor Owner's Manual	—	EK–60VAA–OM
Vector Processor Programmer's Guide	—	EK–60VAA–PG
Options and Maintenance	EK–620AB–MG	EK–640EB–MG
Upgrade Manual	EK–600EB–UP	EK–600EB–UP

Associated Documents

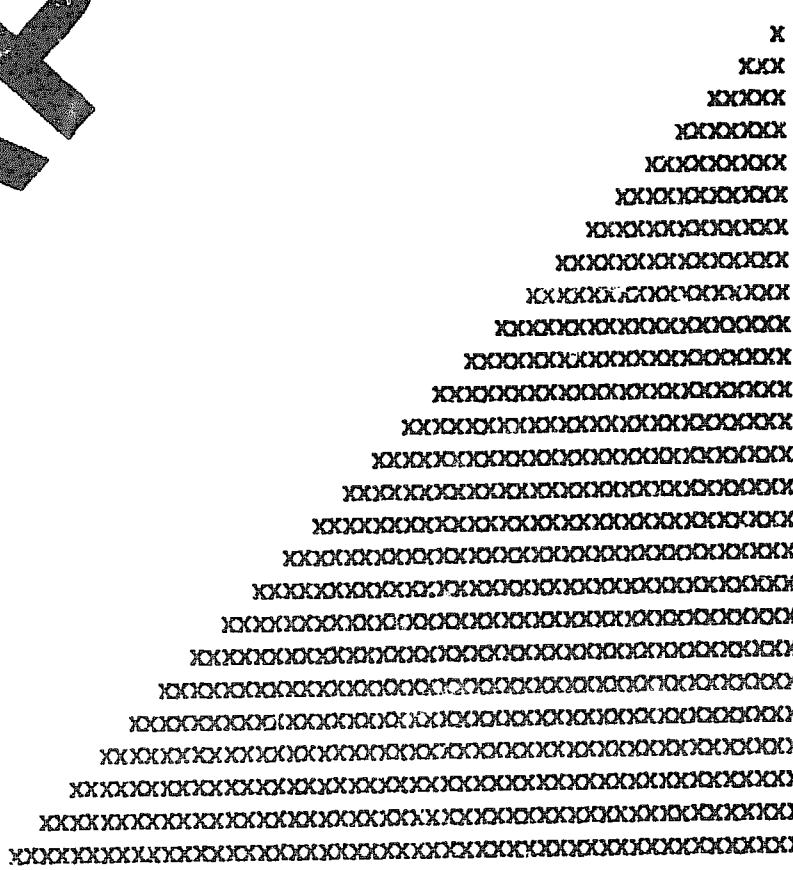
Other documents that you may find useful include:

Title	Order Number
CIBCA User Guide	EK–CIBCA–UG
DEBNI Installation Guide	EK–DEBNI–IN
Guide to Maintaining a VMS System	AA–LA34A–TE
Guide to Setting Up a VMS System	AA–LA25A–TE
HSC Installation Manual	EK–HSCMN–IN
H4000 DIGITAL Ethernet Transceiver Installation Manual	EK–H4000–IN
H7231 Battery Backup Unit User's Guide	EK–H7231–UG
Installing and Using the VT320 Video Terminal	EK–VT320–UG

Title	Order Number
Introduction to VMS System Management	AA–LA24A–TE
KDB50 Disk Controller User's Guide	EK–KDB50–UG
RA90 Disk Drive User Guide	EK–ORA90–UG
RV20 Optical Disk Owner's Manual	EK–ORV20–OM
SC008 Star Coupler User's Guide	EK–SC008–UG
TK70 Streaming Tape Drive Owner's Manual	EK–OTK70–OM
TU81/TA81 and TU81 PLUS Subsystem User's Guide	EK–TUA81–UG
ULTRIX–32 Guide to System Exercisers	AA–KS95B–TE
VAX Architecture Reference Manual	EY–3459E–DP
VAX Systems Hardware Handbook — VAXBI Systems	EB–31692–46
VAX Vector Processing Handbook	EC–H0419–46
VAXBI Expander Cabinet Installation Guide	EK–VBIEA–IN
VAXBI Options Handbook	EB–32255–46
VMS Installation and Operations: VAX 6000 Series	AA–LB36B–TE
VMS Networking Manual	AA–LA48A–TE
VMS System Manager's Manual	AA–LA00A–TE
VMS VAXcluster Manual	AA–LA27A–TE
VMS Version 5.4 New and Changed Features Manual	AA–MG29C–TE



CHAPTER 1



Chapter 1
Upgrade Overview

VAX 6000 series computer systems can be upgraded in several ways to provide more computing power. Upgrades can be done within a model number, and upgrades can be done from one model number to another. Also, a VAX 6000 Model 400 system can be upgraded to a vector processing system.

Sections in this chapter include:

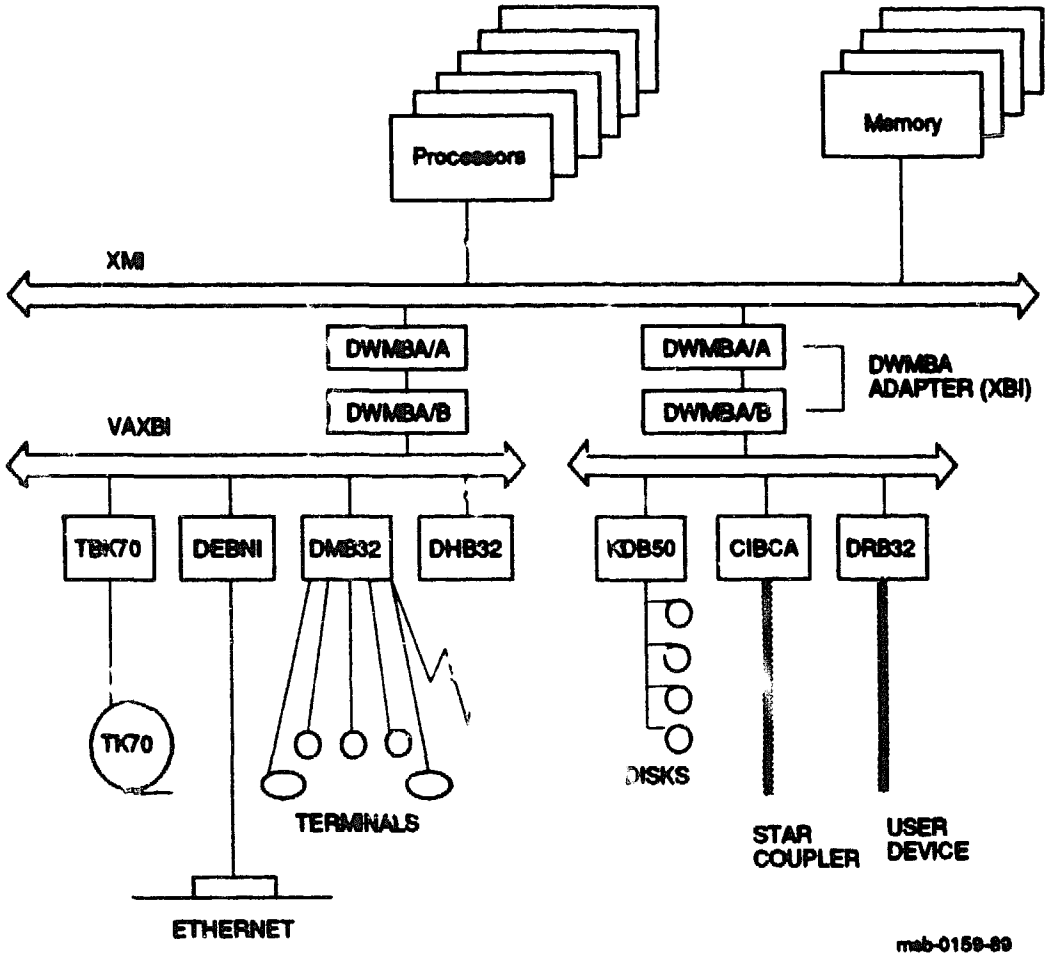
- VAX 6000 Series Platform
- Upgrading Within a Model
- Upgrading Across Models
- Upgrading to a Vector System

For all upgrades, see the restrictions on module placement given in Appendix A. Appendix A also details special handling procedures for scalar processor (KA64A) and vector processor (FV64A) modules.

1.1 VAX 6000 Series Platform

The VAX 6000 series uses a high-speed system bus, called the XMI bus, to interconnect processors and memory modules. The VAXBI bus is used for I/O, and the interface between the two buses is the DWMBA adapter. Each model of the VAX 6000 series has a unique processor design, and all models support multiprocessing.

Figure 1–1: Example of VAX 6000 Series Platform Architecture



All models of the VAX 6000 series share the same architecture. Each model has a unique processor, with distinct operating speed and capability. Model 400 also has an optional vector processor, the FV64A, for use with the KA64A scalar processor. Each processor is also available as a server.

Models 300 and 400 support up to six processors; Model 200, up to four. Model 400 supports one or two scalar/vector pairs. Table 1–1 shows the maximum number of scalar and vector processor modules allowed in a Model 400.

Table 1–1: Processor Module Combinations

Maximum CPUs	Maximum Vectors	Configuration (Slot 1 at Right)
6	0	P P P P P P
4	1	M V P P P P
2	2	M V P M V P

The XMI is the system bus; the VAXBI bus supports the I/O subsystem. The XMI is a 64-bit bus that interconnects the central processors, memory modules, and VAXBI I/O adapters.

Both the VAXBI and XMI buses use the concept of a **node**. A node is a single functional unit that consists of one or more modules. The XMI has three types of nodes: processor nodes, memory nodes, and I/O adapters.

A **processor node** can be a VAX scalar processor or a scalar/vector pair of processors. In a multiprocessing system one processor becomes the boot processor during power-up, and that boot processor loads the operating system and handles communication with the operator console. The VAX 6000 series supports symmetric multiprocessing, which allows a program to execute on any processor.

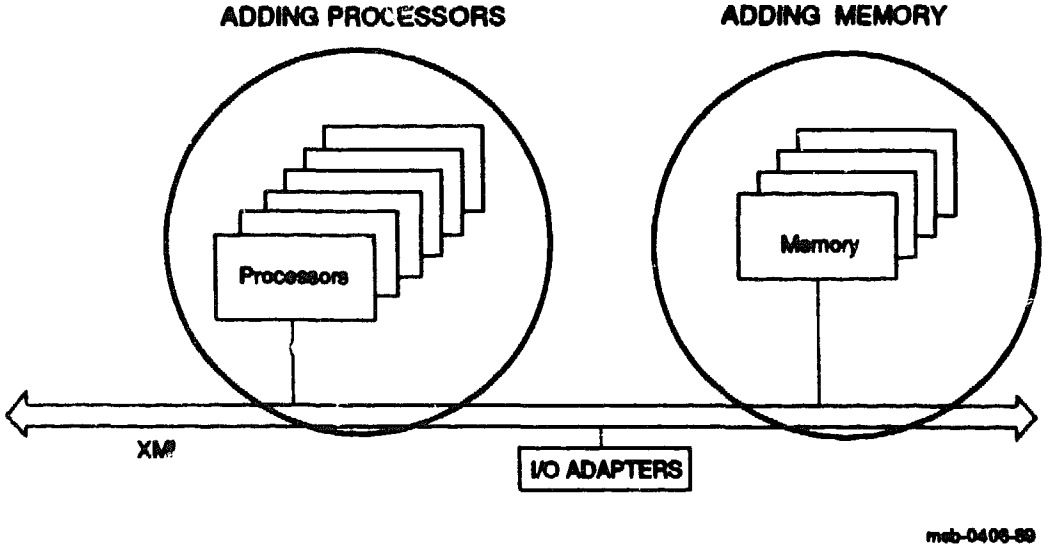
A **memory node** is an MS62A. Memory is a global resource equally accessible by all processors on the XMI. The memories are automatically interleaved or may be custom set by console command. An optional battery backup unit protects memory in case of power failure. Systems can support up to eight memories.

The DWMBA is an **I/O adapter**. It is a 2-board XMI-to-VAXBI adapter that maps data between the two buses. The DWMBA/A module is installed on the XMI bus; it communicates with the DWMBA/B module on the VAXBI. Every VAXBI on this system must have a DWMBA adapter.

1.2 Upgrading Within a Model

Within each of the VAX 6000 family models, you can add processors and memory to the system, increasing the system capacity. Table 1–2 lists the upgrade packages available for each model.

Figure 1–2: Upgrading Within a Model



VAX 6000–300 and 400 models can have up to six scalar processors; model 200 systems are limited to four. Model 400 supports up to two scalar/vector pairs. All systems support up to eight memory modules and six VAXBI channels. System configurations are constrained by the 14-slot limit of the XMI card cage.

For information on installing these model upgrades, see Chapters 2 and 4.

Table 1–2: Upgrades Within VAX 6000 Series Models

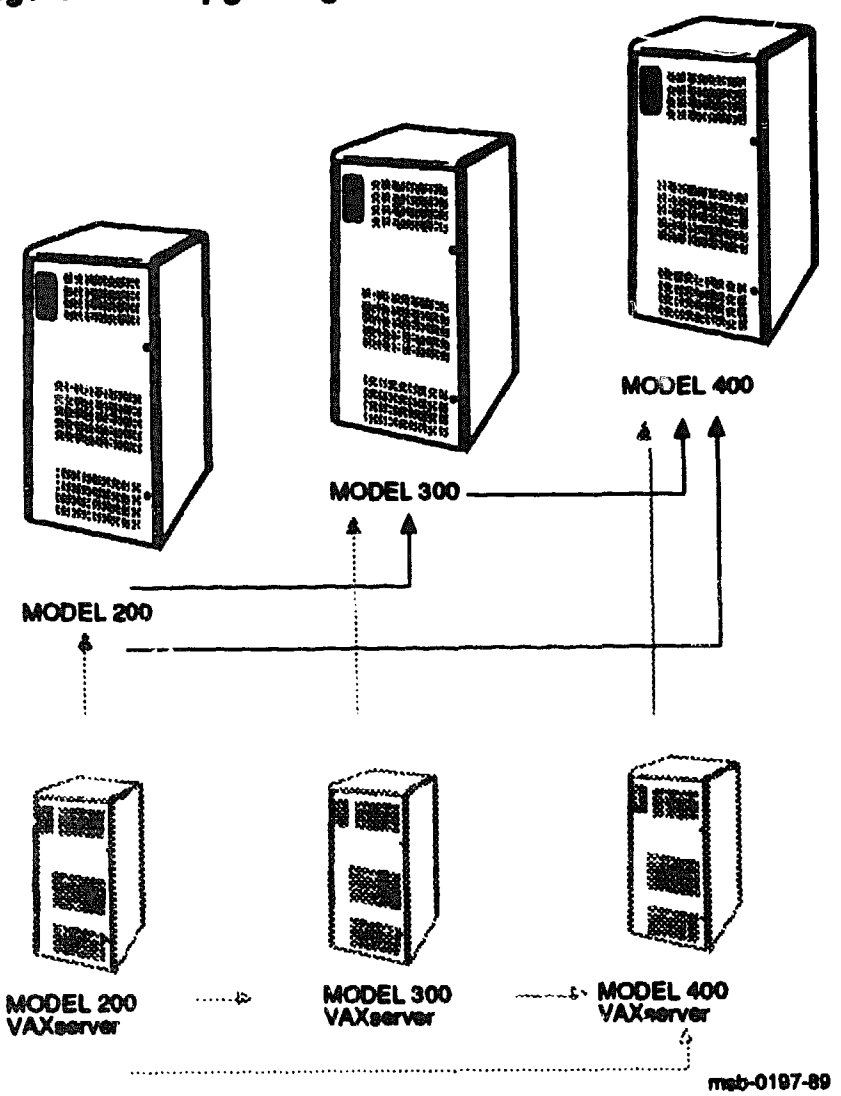
Part Number	Description
	200 Model Upgrades
62BUA	210 T/S* to 220 T/S
62CUA	220 T/S to 230 T/S
62DUB	230 T/S to 240 T/S
62BUC	210 SVR* to 220 SVR
	300 Model Upgrades
63BUA	310 T/S to 320 T/S
63CUA	320 T/S to 330 T/S
63DUA	330 T/S to 340 T/S
63EUA	340 T/S to 350 T/S
63FUA	350 T/S to 360 T/S
63BUN	310 SVR to 320 SVR
	400 Model Upgrades
64BUA	410 T/S to 420 T/S
64CUA	420 T/S to 430 T/S
64DUA	430 T/S to 440 T/S
64EUA	440 T/S to 450 T/S
64FUA	450 T/S to 460 T/S
64CUP	410 SVR to 420 SVR
	400 Model Vector Upgrades
FV64A	Addition of a vector processor

*T/S = timeshare system, SVR = server system

1.3 Upgrading Across Models

You can upgrade a VAX 6000 model from a lower model number to a higher model number, increasing system performance. You can also convert a VAXserver to a timeshare system. All processors are replaced in upgrades across models.

Figure 1–3: Upgrading Across Models



For the details on upgrading across models, see Chapter 3. If a vector module is to be added in an upgrade to a 400 model, see Chapter 4.

Table 1–3: Upgrades Across VAX 6000 Series Models

Part Number	Description
	200 Models to 400 Models
64AUB	210 T/S* to 410 T/S
64BUB	220 T/S to 420 T/S
64CUB	230 T/S to 430 T/S
64DUB	240 T/S to 440 T/S
	300 Models to 400 Models
64AUC	310 T/S to 410 T/S
64BUC	320 T/S to 420 T/S
64CUC	330 T/S to 430 T/S
64DUC	340 T/S to 440 T/S
64EUC	350 T/S to 450 T/S
64FUC	360 T/S to 460 T/S
64AUP	310 SVR* to 410 SVR
64BUP	320 SVR to 420 SVR
	200 Models to 300 Models
63AUD	210 T/S to 310 T/S
63BUD	210 T/S to 320 T/S
63CUB	220 T/S to 330 T/S
63DUC	230 T/S to 340 T/S
63EUB	240 T/S to 350 T/S
	Conversion Kits
62BUF	210 SVR to 210 T/S
62BUE	220 SVR to 220 T/S

*T/S = timeshare system, SVR = server system

Table 1–3 (Cont.): Upgrades Across VAX 6000 Series Models

Part Number	Description
	Conversion Kits
63AUC	310 SVR to 310 T/S
63BUC	320 SVR to 320 T/S
64AUD	410 SVR to 410 T/S
64BUD	420 SVR to 420 T/S

Table 1–4: Vector Upgrade

Part Number	Description
FV64A	Addition of a vector processor to Model 400

1.4 Upgrading to a Vector System

A system can be upgraded to a Model 400 that includes one to two vector processors paired with KA64A scalar processors.

Figure 1–4: Configurations for a Vector System

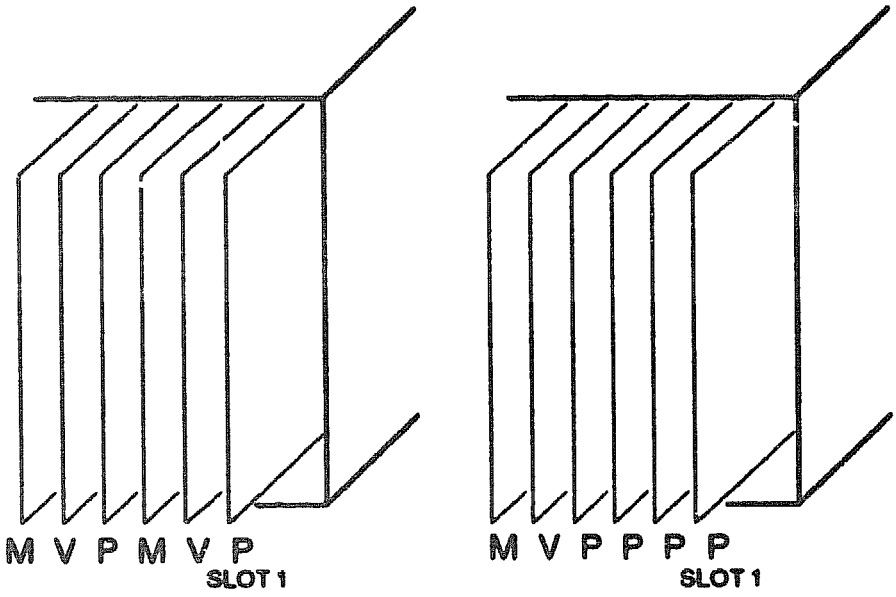


Table 1–5: Vector Upgrade

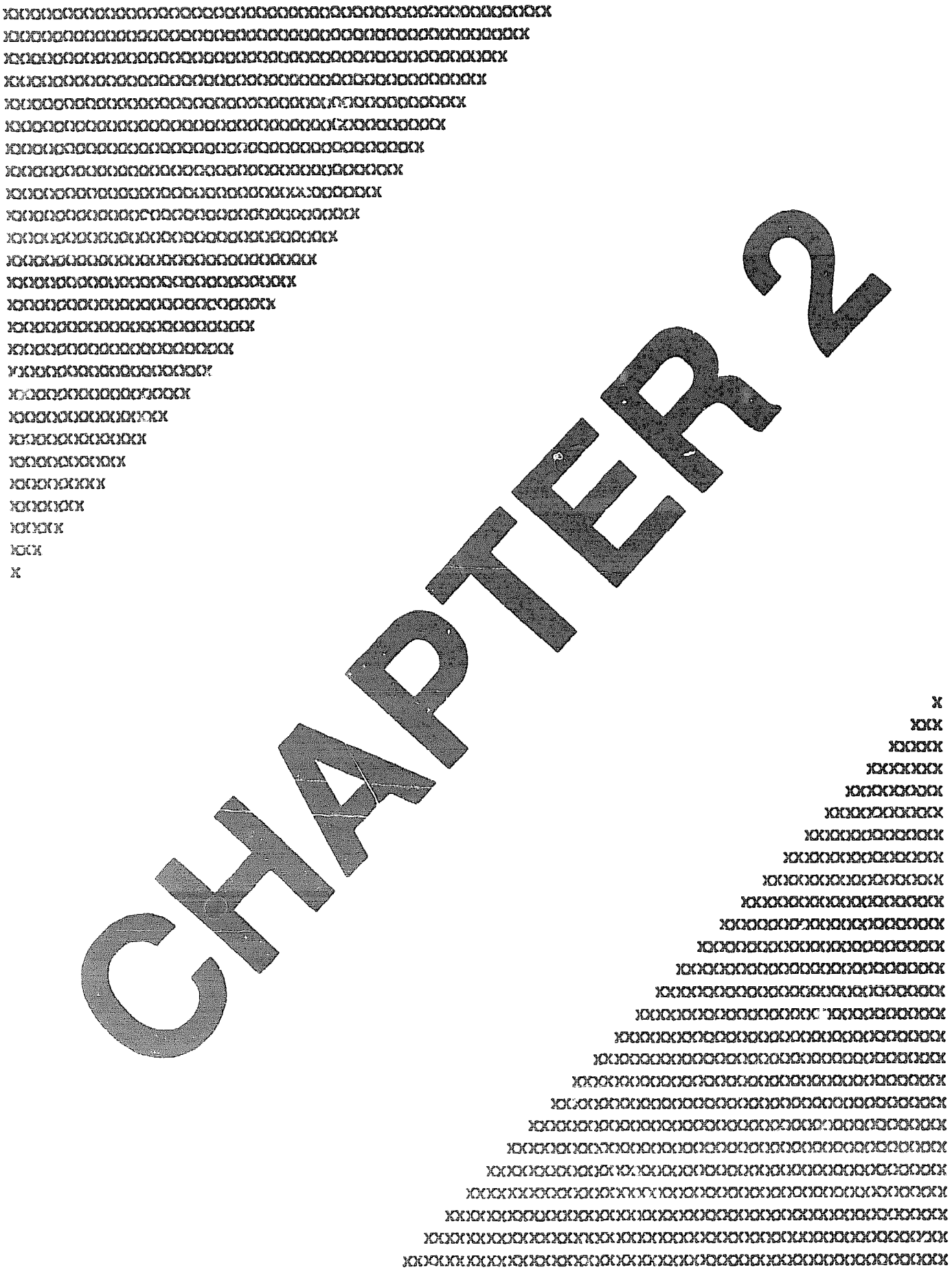
Part Number	Description
FV64A	Addition of a vector processor to Model 400

Figure 1–4 shows two configurations of modules in the XMI card cage. The diagram on the left shows two scalar/vector pairs with a memory in each slot next to the vector processor. The diagram on the right shows a system with one scalar/vector pair.

For performance reasons, the scalar processor of a scalar/vector pair should not be made the primary processor when other scalar processors are in the system.

NOTE: *Installation of an FV64A vector processor requires that the attached KA64A module (T2015) be at a minimum revision of K. In addition, the ROMs on any additional KA64A modules must be at a minimum revision of V2.0 (ROM 0 and ROM 1).*

Chapter 4 describes the installation of a vector module.


CHAPTER 2

Chapter 2
Upgrading Within a Model

Upgrades within a model, such as adding more processors and memory to a VAX 6000–400 system, involve the following steps:

- **Save EEPROM Contents to TK tape**
- **Install Processor Modules**
- **Install Memory Modules**
- **Clean Up Mismatches, Update the EEPROMs, and Run Verification**
- **Change the VAX Number Plate**

Upgrading within a model might require upgrading the ROMs.

CAUTION: ***Each model number (200, 300, 400) has a different processor module. Processor modules of different models CANNOT be mixed in a system.***

Model 400 processor modules are fragile and very static sensitive. Detailed instructions for handling are given in Appendix A.

	Timesharе Processor		Server Processor	
Model	**Part No.**	**Module No.**	**Part No.**	**Module No.**
VAX 6000–200	KA62A–AA	T2011	KA62A–AB	T2011
VAX 6000–300	KA62B–AA	T2011–YA	KA62B–AB	T2011
VAX 6000–400	KA64A–AA	T2015	KA64A–AB	T2015–YA
	FV64A–AA	T2017	—	—
	FV64A–AB	T2017	—	—

2.1 Step 1, Save EEPROM Contents to TK Tape

With a blank cartridge in the tape drive, copy the EEPROM contents of the boot processor to the TK tape. SAVE EEPROM overwrites whatever might be on the tape.

Example 2–1: SAVE EEPROM Command

```
    !  A blank TK tape is in the tape drive.  With the upper  (1)
    !  key switch at Enable and the lower key switch at Halt,
    !  press the Restart button.

0123456789 0123456789 0123456789 012345670  (2)

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 +

    .   .   .   .   B1  A1  .   .   .   .   .   .   .   .       ILV
    .   .   .   .   32  32  .   .   .   .   .   .   .   .       64 Mb

ROM0 = V1.00  ROM1 = V1.00  EEPROM = 1.00/1.00  (3)   SN = SG01234567

>>> SAVE EEPROM  (4)              ! Enter SAVE command.

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

Proceed with save to tape? (Y or N) >>>  Y  (5)

?6B EEPROM saved to tape successfully.  (6)
                                  ! System confirms SAVE is complete.
>>>                               (7)
```

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; 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 2–1 shows the steps to save the EEPROM contents:

4. 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. Appendix B summarizes self-test, or see Chapter 6 of the *Owner's Manual* for your system for a full explanation of self-test results.

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

6. 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.

7. 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, so be sure you have inserted an appropriate tape.

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

9. 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

10. 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.*

2.2 Step 2, Install New Processors

Add new processors in slots to the left of current processors. Memory modules CAN be installed at the same time before you power up the system. The installation examples shown here are separate steps to better illustrate the process. See Appendix A for configuration rules.

CAUTION: ***Model 400 processor 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.

Example 2–2: Adding Processors

```
$123456789 0123456789 0123456789 012345678$
F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #

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

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

    .   .   .   .   B1  A1  .   .   .   .   .   .   .   .       ILV
    .   .   .   .   32  32  .   .   .   .   .   .   .   .       64 Mb

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

?2D For Secondary Processor 3
?5A System serial number mismatch.  Secondary processor has 00000000.
?2D For Secondary Processor 4
?5A System serial number mismatch.  Secondary processor has 00000000.
```

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.
4. Open the front cabinet door.
5. Remove the clear plastic door in front of the XMI cage.

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

6. Insert the processor module(s) in the XMI card cage in a slot to the left of the other processor module(s). Hold the lever up until the module is in place and then press the lever down to close the connector.

   In the upgrade shown in this example, two new processors were installed in slots 3 and 4.

7. Replace the clear door.
8. Power up the system by turning the lower key switch to Halt and the upper key switch to Enable.
9. Check the self-test display for the two new processors, each indicated by a P on the TYP line (in Example 2–2 processors were added at slots 3 and 4). If the processors show a plus sign (+) on both lines STF and ETF, they passed self-test.
10. Check the error messages. ?2D and ?5A will always appear when you install new processors. These and any other messages that you might see are explained in Section 2.4.

2.3 Step 3, Install Memory Modules

Before adding memory modules, check the interleave set. If the default interleave is not being used, return the system to the default, so that new memory modules are seen by the system. Add new memory modules in appropriate slots and verify that the console program configures the additional memory into the system.

Example 2–3: Checking the Memory Interleave

```
>>> SHOW MEMORY                          ! Displays the memory lines from the
                                         ! system self-test
F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #

    .   .   .   .  B1  A1   .   .   .   .   .   .   .   .       ILV
    .   .   .   .  32  32   .   .   .   .   .   .   .   .       64 Mb
      /INTERLEAVE:(9, A)

>>> SET MEMORY /INTERLEAVE:DEFAULT ! Command to cancel any previous
                                   ! interleave instruction
```

Example 2–4: Adding Memory

```
@123456789 0123456789 0123456789 01234567@

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

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

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

    .   .   .   .  A4  A3  A2  A1   .   .   .   .   .   .       ILV  (R)
    .   .   .   .  32  32  32  32   .   .   .   .   .   .       128Mb

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

?2D For Secondary Processor 3  (S)
?5A System serial number mismatch.  Secondary processor has 00000000.
?2D For Secondary Processor 4
?5A System serial number mismatch.  Secondary processor has 00000000.
```

When you add memory modules to a system, check to see that the default interleave is in force (see Example 2–3). If the interleave is not set to default, record the current setting and then set to default. Otherwise, the console program will not configure new memory modules into the system.

In Example 2–4 two more memory modules were added in an upgrade from a VAX 6000 series Model 420 system to a Model 440 system. By convention, memory begins at slot A and expands to the right, so the two new modules were inserted in slots 7 and 8.

To add memory modules, perform the following steps:

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.
4. Open the front cabinet door.
5. Remove the clear plastic door in front of the XMI cage.

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

6. Install memory modules in slots adjacent to existing memory modules (see Figure A–4). Hold the lever up until the module is in place and then press the lever down to close the connectors.
7. Replace the clear door.
8. Power up the system by turning the lower key switch to Halt and the upper key switch to Enable.
9. Check the self-test display for the new memory modules, indicated by an M on the TYP line, as shown in Example 2–4. In this example all four memories passed self-test, as indicated by plus signs (+) on the STF line.
10. Check that all memories are represented on the ILV line; in this case all four are in one interleave set.
11. Check the error messages. These are discussed in Section 2.4.

2.4 Step 4, Clean Up Mismatches, Update the EEPROMs, and Run Verification

The system serial number mismatch message will always appear after you add new processor modules. If you encounter other problems, check to see that the ROMs and EEPROMs on all CPU modules are the same revision.

Example 2–5: System Serial Number Mismatch

```
$123456789 (  3456789 0123456789 01234567$
F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #

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

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

    .   .   .   .   A4  A3  A2  A1  .   .   .   .   .   .       ILV
    .   .   .   .   32  32  32  32  .   .   .   .   .   .      128Mb

ROM0 = V1.00  ROM1 = V1.00  EEPROM = 1.00/1.00    SN = SG01234567  (1)

?2D For Secondary Processor 3  (2)
?5A System serial number mismatch.  Secondary processor has 00000000.
?2D For Secondary Processor 4  (2)
?5A System serial number mismatch.  Secondary processor has 00000000.
>>> UPDATE ALL  (3)  !Lower key switch must be in the Update position.
>>> INIT        (4)
```

Example 2–6: Installation Error Messages

```
?2D For Secondary Processor n

?52 ROM revision mismatch.  Secondary processor has revision x.xx.

?54 EEPROM revision mismatch.  Secondary processor has revision x.xx/y.yy.

?5A System serial number mismatch.  Secondary processor has xxxxxxxxxx.
```

The system serial number mismatch error message (?5A) is shown in Example 2–5. New processor modules will not have the serial number of the system as is recorded in the EEPROM of the boot processor. In Example 2–5:

1. System serial number as seen by the boot processor.
2. Error messages for the new processors.
3. UPDATE ALL command updates the EEPROMs of the new processors. The lower key switch must be set to Update when you issue this console command. The system serial number will be written to the new CPU modules. The update operation takes approximately 4 minutes for each secondary processor.

   If the system being upgraded had a user-specified memory interleave set, use the SET MEMORY/INTERLEAVE command to change from the default interleave.
4. The updated EEPROM parameters are not in force until the system is reset. You can enter the INITIALIZE command, or you can press the Restart button.

Example 2–6 lists other error messages that might appear. If you see a message like the following, the EEPROMs of the processors are not of the same revision:

```
?2D For Secondary Processor n
?54 EEPROM revision mismatch.  Secondary processor has revision x.xx/y.yy.
```

To make all EEPROMs the same, select the CPU with the highest EEPROM revision (differing revision numbers for secondary processors are noted in the error messages). Using the SET CPU command, make the processor with the highest revision the primary processor and then issue the UPDATE ALL command.

If the CPU modules have different ROM versions, you will see ?2D and ?52. The ROM versions on all CPU modules should be the same. If you are upgrading a Model 400 system and the new processor (T2015) is a revision K or higher, you need to change the ROMs on the CPUs already in the system. Appendix C gives instructions on ROM replacement.

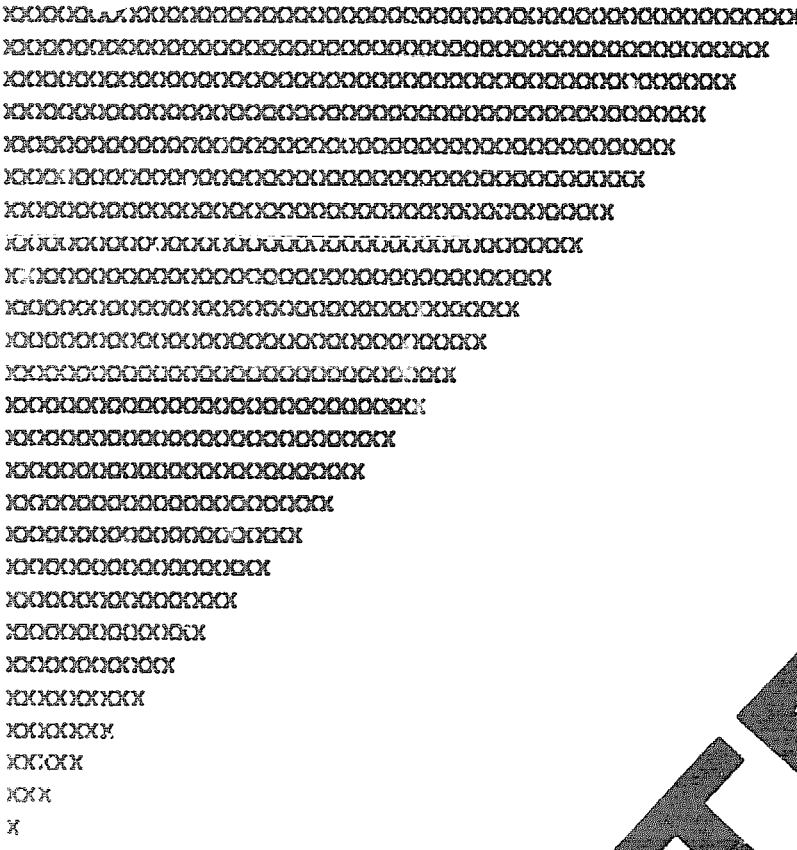
You can now verify the system operation. See Chapter 5 for verification procedures.

2.5 Step 5, Do Final Installation Steps

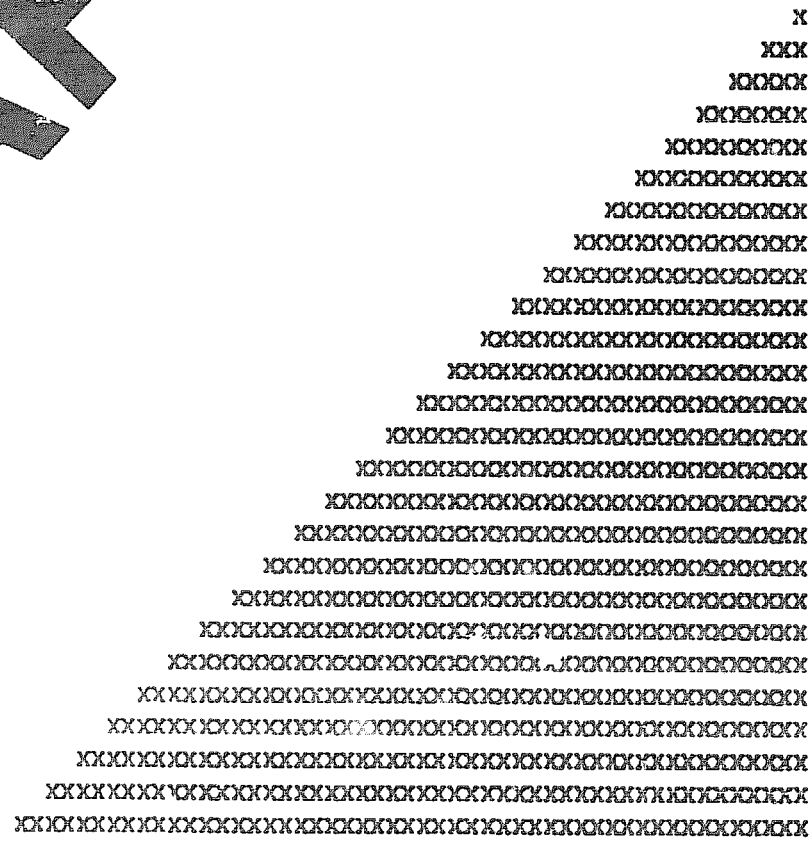
On the system cabinet front door, change the number plate to reflect the number of your system upgrade. Give the TK tape with an up-to-date EEPROM contents to the customer.

To change the VAX number plate, open the front cabinet door and from the rear push out the system numbers and install the number for your upgraded system.

If any ROMs were changed or console parameters set during the installation, the contents of the EEPROM should again be copied to tape (see Section 2.1). If no ROMs were changed or parameters set, you do not need to repeat the save operation.



CHAPTER 3



Chapter 3
Upgrading to Another Model

To upgrade from one model number within the VAX 6000 series to another model number or to convert from a VAXserver to a timeshare system, you perform the following steps:

- **Upgrade Software**
- **Record Console Parameters**
- **Replace the Processor Modules**
- **Add Memory Modules**
- **Set the System Serial Number and Run Verification**
- **Set Console Parameters and Save**
- **Change the VAX Number Plate**
- **Return the Old Processor Modules**

CAUTION: *Each model number (200, 300, 400) has a different processor module. Processor modules of different models CANNOT be mixed in a system.*

Model 400 processor modules are fragile and very static sensitive. Detailed instructions for handling are given in Appendix A.

	Timeshare Processor		Server Processor	
Model	**Part No.**	**Module No.**	**Part No.**	**Module No.**
VAX 6000–200	KA62A–AA	T2011	KA62A–AB	T2011
VAX 6000–300	KA62B–AA	T2011–YA	KA62B–AB	T2011
VAX 6000–400	KA64A–AA	T2015	KA64A–AB	T2015–YA
	FV64A–AA	T2017	—	—
	FV64A–AB	T2017	—	—

3.1 Step 1, Upgrade Software

Install the version of the operating system that supports the hardware upgrade BEFORE performing the hardware upgrade. If your system has a CIBCA-A CI adapter, make a new console tape that includes the CIBCA-A microcode.

Example 3–1: Making a New Console Tape

```
$ SET DEFAULT SYS$SYSTEM              ! Go to system directory
$ INIT MUB6: CONSOL                   ! Initialize tape
$ MOUNT/BLOCK=512 MUB6: CONSOL        ! Copy the following to tape:
$ COPY/LOG VMB.EXE MUB6:              !    boot files
$ COPY/LOG CIBCA.BIN MUB6:            !    CIBCA-A microcode
$ COPY/LOG DIAGBOOT.EXE MUB6:         !    secondary bootstrap for
                                      !      Diagnostic Supervisor
$ COPY/LOG ERSAA.EXE MUB6:            !    the Diagnostic Supervisor
                                      !
                .                     ! Copy any other diagnostic
                .                     ! files you need
                .
$ DISMOUNT MUB6:
```

The appropriate operating system software must be installed before you upgrade a VAX 6000 series to another model. Otherwise, the software will not recognize the newer model. See the appropriate Software Product Description for which software versions support the hardware.

The microcode for the CIBCA–A adapter was on the console tape for early VAX 6000 systems. The CIBCA–B adapter is used in later systems and a console tape is no longer necessary with CIBCA–B.

If you have a CIBCA–A adapter, you will need to make a new console tape. Example 3–1 shows in VMS how to make a new console tape.

1. First upgrade to the required software version.
2. Then make a new console tape with the CIBCA.BIN microcode and the newest VMB.

3.2 Step 2, Record Console Parameters

Before you bring the system down, issue INITIALIZE and SHOW ALL commands, with the output going to the hardcopy terminal, so that you have a record of the system serial number and system parameters.

Example 3–2: Recording Console Parameters

```
>>>INITIALIZE ❶

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

    A   A   .   .   M   M   .   .   .   .   .   .   P   P       TYP
    C   C   .   .   +   +   .   .   .   .   .   .   +   +       STT
    .   .   .   .   .   .   .   .   .   .   .   .   E   B       BPD
    .   .   .   .   .   .   .   .   .   .   .   .   +   +       ETT
    .   .   .   .   .   .   .   .   .   .   .   .   E   B       BPD

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

    .   .   .   .   A2  A1  .   .   .   .   .   .   .   .       ILV
    .   .   .   .   32  32  .   .   .   .   .   .   .   .       64 MB

ROM = 3.0     EEPROM = 2.00/3.00        SN = SG01234567 ❷

>>> SHOW ALL ❸
          Type                 Rev      ! Shows the system configuration
     1+   KA62A       (8001)  0002     ! for a VAX 6000 - 220 system
     2+   KA62A       (8001)  0002
     9+   MS62A       (4001)  0002
     A+   MS62A       (4001)  0002
     D+   DWMBA/A     (2001)  0002
     E+   DWMBA/A     (2001)  0002

     XBI D
     1+   DWMBA/B     (2107)  0007
     4+   KDB50       (010E)  0F1C
     6+   DEBNI       (0118)  0100

     XBI E
     1+   DWMBA/B     (2107)  0007
     4+   CIBCA       (0108)  41C1
     6+   TBK70       (410B)  0307
```

Example 3–2 Cont'd. on next page

Example 3–2 (Cont.): Recording Console Parameters

```
   Current Primary: 1                    ! Shows the status of CPUs
   /NOENABLED-
   /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  BI:6 08-00-2B-08-3D-64       ! Shows the Ethernet address
   DEFAULT /XMI:E /BI:4 DUO            ! Shows Boot specs saved
   DIAG    /R5:00000010 /XMI:E /BI:5 DU1
   MSC     /R5:40000000 /XMI:D /BI:2 /NODE:00000405 DU0
```

Example 3–2 shows the output of a VAX 6000–220 system.

Since you will be replacing all processors, the system will need to be set up to operate as it did before the upgrade.

- The INITIALIZE command displays the self-test results.
- The system serial number is displayed in the last line. The system serial number is also on the back of the system cabinet. The serial number must be stored in the EEPROM of each processor.
- The SHOW ALL command provides a summary of much of the information that is stored in the EEPROM on each processor. Keep a record of these system parameters by sending the output from SHOW ALL to a hardcopy printer.

3.3 Step 3, Replace Processors

Remove the older model processor modules from the XMI card cage. Carefully insert the new processor modules. See Appendix A for configuration rules.

CAUTION: ***Model 400 processor 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.

Example 3–3: Replacing Processors

```
0123456789 0123456789 0123456789 012345678  ❷
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0   NODE #

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

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

   .  .  .  .  B1 A1 .  .  .  .  .  .  .  .      ILV
   .  .  .  .  32 32 .  .  .  .  .  .  .  .      64 Mb

ROM0 = V1.00  ROM1 = V1.00  EEPRCM = 1.00/1.00    SN = SG00000000

?4F System serial number has not been initialized.  ❸
```

Example 3–3 shows the output of a VAX 6000–440 system. The following steps describe the installation of four KA64A processor modules.

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.
4. Open the front cabinet door.

5. Remove the clear plastic door in front of the XMI cage.

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

6. Remove the processors to be replaced. Take a new processor and insert it in slot 1; insert additional processors in slots to the left. Hold the lever up until the module is in place and then press the lever down to close the connector.

   In the upgrade shown in this example, four new processors were installed.

7. Replace the clear door.

8. Set the console terminal baud rate to 1200.

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

10. The first line of the self-test display indicates the progress of self-test; these numbers appear only for Model 400 systems.

11. Check the self-test display for the four new 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.

12. Check the error messages. The ?4F error message appears:

```
?4F System serial number has not been initialized.
```

    (Section 3.5 explains how to set the system serial number.)

NOTE: *To convert a server module to a timeshare module, you switch the console ROM on the processor module. For instructions on ROM replacement, see Appendix C.*

NOTE: *Installation of an FV64A vector processor requires that the attached KA64A module (T2015) be at a minimum revision of K. In addition, the ROMs on any additional KA64A modules must be at a minimum revision of V2.0 (ROM 0 and ROM 1).*

3.4 Step 4, Add Memory

You may add memory modules.

Example 3–4: Adding Memory

```
0123456789 0123456789 0123456789 012345670
F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #

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

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

    .   .   .   .   A4  A3  A2  A1  .   .   .   .   .   .       ILV
    .   .   .   .   32  32  32  32  .   .   .   .   .   .     128Mb

ROM0 = V1.00  ROM1 = V1.00  EEPROM = 1.00/1.00    SN = SG00000000

?4F System serial number has not been initialized.
```

In the example two more memory modules were added in an upgrade from a VAX 6000–220 system to a VAX 6000–440 system. By convention, memory begins at slot A and expands to the right, so the two new modules were inserted in slots 7 and 8.

To add memory modules, perform the following steps:

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 contoller to the Off position.
4. Open the front cabinet door.
5. Remove the clear plastic door in front of the XMI cage.

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

6. Install memory modules in slots adjacent to existing memory modules (see Figure A–4). Hold the lever up until the module is in place and then press the lever down to close the connector.
7. Replace the clear door.
8. Power up the system by turning the lower key switch to Halt and the upper key switch to Enable.
9. 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.
10. Check that all four memories are represented on the ILV line; all four are in one interleave set.
11. Check the error messages. The message ?4F appears. (Section 3.5 explains how to set the system serial number.)

3.5 Step 5, Set the System Serial Number and Run Verification

When you replace all processor modules in a system, you will get an error message saying the system serial number has not been initialized. If you encounter other problems, check to see that the ROMs and EEPROMs on all CPU modules are the same revision.

Example 3–5: Setting the System Serial Number

```
0123456789 0123456789 0123456789 012345670

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

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

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

    .   .   .   .   A4  A3  A2  A1  .   .   .   .   .   .       ILV
    .   .   .   .   32  32  32  32  .   .   .   .   .   .      128Mb

ROM0 = V1.00  ROM1 = V1.00  EEPROM = 1.00/1.00    SN = SG00000000

?4F System serial number has not been initialized.

>>> CTRL/U [ or ESC ] DEL SET SYSTEM SERIAL (1)

Enter system serial number? aannnnnnnn

UPDATE EEPROM? (Y or N) >>> Y

>>> UPDATE ALL (2)  !Lower key switch must be in the Update position.
>>> INIT       (3)
```

Example 3–5 shows the output of a VAX 6000–440 system. The ?4F message indicates that you must provide the system serial number.

The display in Example 3–5 shows what is recorded in the EEPROM of the boot processor.

You must store the system serial number in the EEPROM of each processor. You can do this in two ways: (1) Issue the SET SYSTEM SERIAL command once and then issue the UPDATE ALL command, which updates the EEPROMs of all the secondary processors. This method can take up to 4 minutes for each secondary processor. (2) You can also issue the SET SYSTEM SERIAL command directly to each processor after making it the primary by using the SET CPU *n* command.

1. To issue the SET SYSTEM SERIAL command, depending on your keyboard, you press one of the following:

```
>>> CTRL/3 DEL ! For VT200 video terminals and higher
>>> ESC DEL ! For VT100 and hardcopy terminals
```

   You then type SET SYSTEM SERIAL. At the prompt you give the serial number. Confirmation is requested. You type *Y*.

   CAUTION: *Make sure you have not mixed Model 200, 300, or 400 processor modules in the system before you perform the next step. Performing UPDATE ALL with mixed processors will corrupt the EEPROM making the module unusable.*

2. The UPDATE ALL command updates the EEPROMs of the new processors. The lower key switch must be set to Update when you issue this console command.

3. The updated EEPROM parameters are not in force until the system is reset. You can enter the INITIALIZE command, or you can press the Restart button.

See the *Options and Maintenance* manual for your system if any other error messages appear.

You can now verify the system operation. See Chapter 5 for verification procedures.

3.6 Step 6, Set Console Parameters and Save

Issue the commands needed to restore the defaults for the system. After you have set all parameters in the EEPROM, save the contents to a TK tape.

Example 3–6: SET Commands and SAVE EEPROM Contents

```
                    ! Set the lower key switch to Update.
>>> SET BOOT DEFAULT  /XMI:E /BI:4 DUO
>>> SET BOOT DIAG /XMI:E /BI:5 /R5:00000010  DU1
>>> SET BOOT LSC  /XMI:D /BI:2 /R5:40000000 /NODE:00000405 DUO (7)
>>> SET TERM/SPEED:9600 (8)
                    !
                    ! Put a blank TK tape in the tape drive. (9)
                    ! Lower key switch at Halt or Auto Start.
>>> SAVE EEPROM    (4)
Proceed with save to tape? (Y or N) >>>  Y  ! Enter a Y to continue.

?6B EEPROM saved to tape successfully.
                                    ! System confirms SAVE is complete.
>>>                                 (5)
```

Since you have added all new processors, you must store in the EEPROM any custom parameters that you found in the system before you shut it down.

1. Enter the Boot commands that were in use before the upgrade. The lower key switch should be set to Update.
2. Restore the console terminal baud rate and any other parameters that were in effect before the upgrade.

   NOTE: *Unlike the SET SYSTEM SERIAL command, the other SET commands immediately change the EEPROMs of each CPU when the lower key switch is at Update and all CPUs are in console mode.*
3. Put a blank cartridge in the TK drive, write-enabled.
4. Enter the SAVE EEPROM command. Type *Y* to indicate your intention to proceed. The save process takes less than a minute to complete.
5. 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.*

3.7 Step 7, Do Final Installation Steps

On the system cabinet front door, change the number plate to reflect the number of your system upgrade. Give the TK tape with an up-to-date EEPROM contents to the customer.

To change the VAX number plate, open the front cabinet door and from the rear push out the system numbers and install the number for your upgraded system.

3.8 Step 8, Return Modules

Processor modules removed from machines are to be returned to the Returns Sort Center.

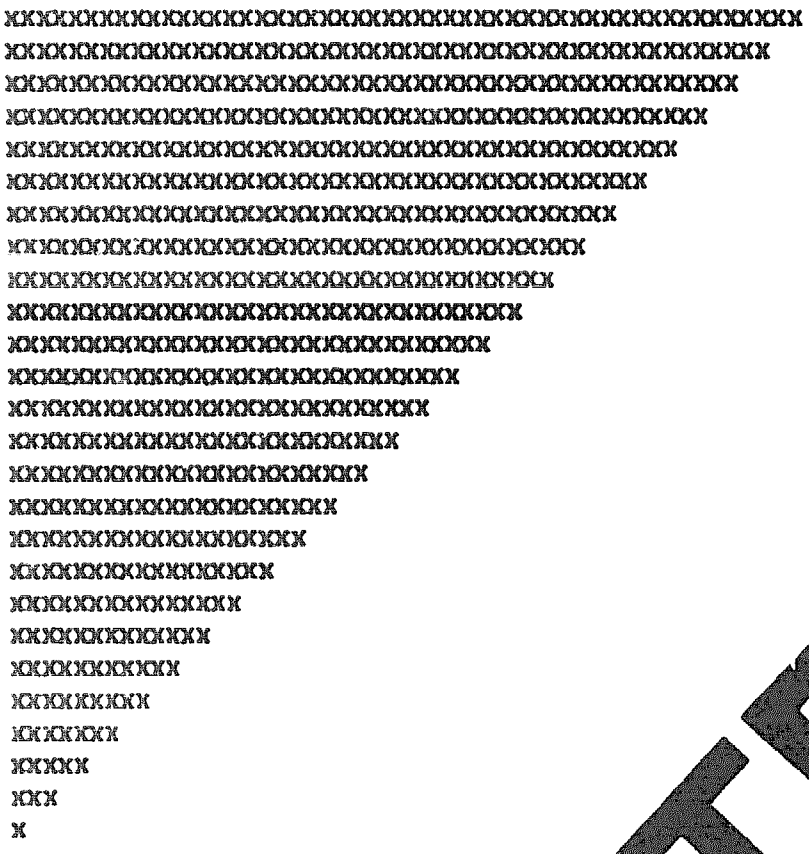
CAUTION: ***Use proper ESD procedures when handling these modules.***

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

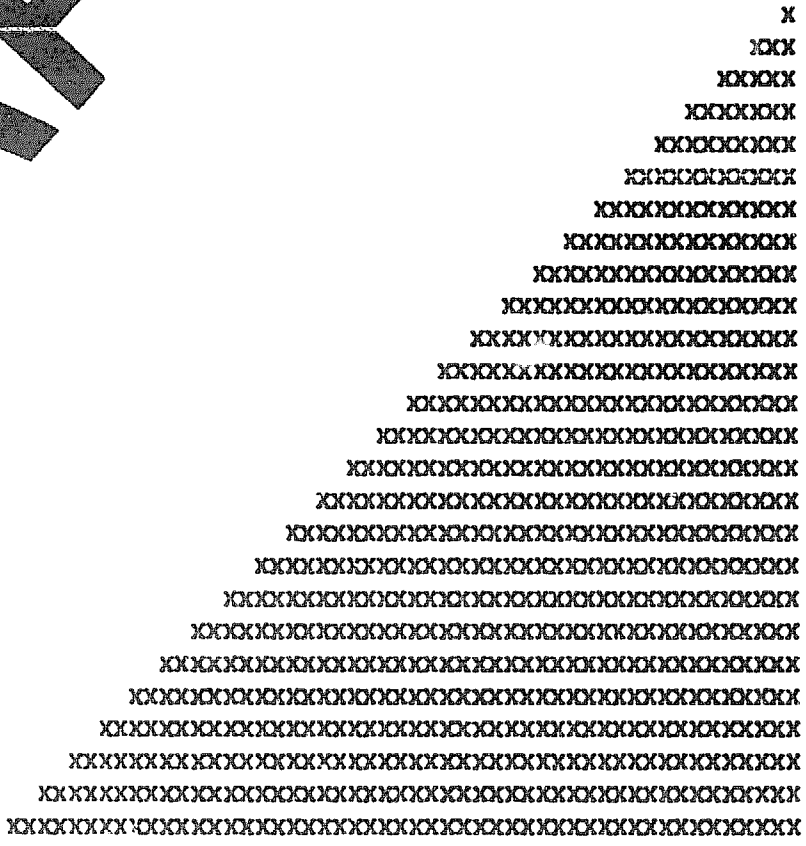
1. **Package the modules removed from the VAX systems in the same container(s) in which the upgrade option was shipped. Be sure to remove the return address label from inside the box prior to packing.**
2. **Seal the container securely with packing tape.**
3. **Attach the return address label. Be sure 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 not returned to Digital.**
7. **Send the package 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.)



CHAPTER 4



Chapter 4
Upgrading to a Vector System

Upgrades to make a VAX 6000 Model 400 system a vector processing system involve the following steps:

- Upgrade Software
- Record Console Parameters
- Replace the KA64A Modules If Necessary
- Install the Vector Module and Cable
- Add Memory Modules
- Set the System Serial Number and Run Verification
- Set Console Parameters and Save
- Return Revision H Processor Modules

	Timeshare Processor		Server Processor	
Model	Part No.	Module No.	Part No.	Module No.
VAX 6000–200	KA62A–AA	T2011	KA62A–AB	T2011
VAX 6000–300	KA62B–AA	T2011–YA	KA62B–AB	T2011
VAX 6000–400	KA64A–AA	T2015	KA64A–AB	T2015–YA
	FV64A–AA	T2017	—	—
	FV64A–AB	T2017	—	—

CAUTION: *Model 400 processor modules are fragile and very static sensitive and require careful handling. Vector modules must be handled differently from the scalar modules; see the handling instructions in Appendix A.*

4.1 Step 1, Upgrade Software

Install the version of the operating system that supports the hardware upgrade BEFORE performing the hardware upgrade. If your system has a CIBCA-A CI adapter, make a new console tape that includes the CIBCA-A microcode.

Example 4–1: Making a New Console Tape

```
$ SET DEFAULT SYS$SYSTEM              ! Go to system directory
$ INIT MUB6: CONSOL                   ! Initialize tape
$ MOUNT/BLOCK=512 MUB6: CONSOL        ! Copy the following to tape:
$ COPY/LOG VMB.EXE MUB6:              !    boot files
$ COPY/LOG CIBCA.BIN MUB6:            !    CIBCA-A microcode
$ COPY/LOG DIAGBOOT.EXE MUB6:         !    secondary bootstrap for
                                      !      Diagnostic Supervisor
$ COPY/LOG ERSAA.EXE MUB6:            !    the Diagnostic Supervisor
                .                     !
                .                     ! Copy any other diagnostic
                .                     ! files you need
$ DISMOUNT MUB6:
```

The appropriate operating system software must be installed before you perform a vector upgrade. Otherwise, the software will not recognize the vector module.

The microcode for the CIBCA–A adapter was on the console tape for early VAX 6000 systems. The CIBCA–B adapter is used in later systems and a console tape is no longer necessary with CIBCA–B.

If you have a CIBCA–A adapter, you will need to make a new console tape. Example 3–1 shows in VMS how to make a new console tape.

1. First upgrade to the required software version.
2. Then make a new console tape with the CIBCA.BIN microcode and the newest VMB.

4.2 Step 2, Record Console Parameters

Before you bring the system down, issue INITIALIZE and SHOW ALL commands, with the output going to the hardcopy terminal, so that you have a record of the system serial number and system parameters.

Example 4–2: Recording Console Parameters

```
>>>INITIALIZE ❶
0123456789 0123456789 0123456789 012345678 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   .   .   +   +   .   .   .   .   .   .   +   +       STP
    .   .   .   .   .   .   .   .   .   .   .   .   E   B       BPD
    .   .   .   .   .   .   .   .   .   .   .   .   +   +       ETP
    .   .   .   .   .   .   .   .   .   .   .   .   E   B       BPD

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

    .   .   .   .   B1  A1  .   .   .   .   .   .   .   .       ILV
    .   .   .   .   32  32  .   .   .   .   .   .   .   .       64 Mb

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

>>> SHOW ALL ❺
        Type                    Rev     ! Shows the system configuration
    1+  KA64A       (8082)      0007    ! for a VAX 6000 - 420 system
    2+  KA64A       (8082)      0007
    9+  MS62A       (4001)      0002
    A+  MS62A       (4001)      0002
    D+  DWMBA/A     (2001)      0002
    E+  DWMBA/A     (2001)      0002

    XBI D
    1+  DWMBA/B     (2107)      0007
    4+  KDB50       (010E)      0F1C
    6+  DEBNI       (0118)      0100

    XBI E
    1+  DWMBA/B     (2107)      0007
    4+  CIBCA       (0108)      41C1
    6+  TBK70       (410B)      0307
```

Example 4–2 Cont'd. on next page

Example 4–2 (Cont.): Recording Console Parameters

```
   Current Primary: 1                    ! Shows the status of CPUs
   /NOENABLED-
   /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 cha cteristics
   English                             ! Shows the language mode
   XMI:D  BI:6 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
```

Example 4–2 shows the output of a VAX 6000–420 system.

Since you will be replacing all processors, the system will need to be set up to operate as it did before the upgrade.

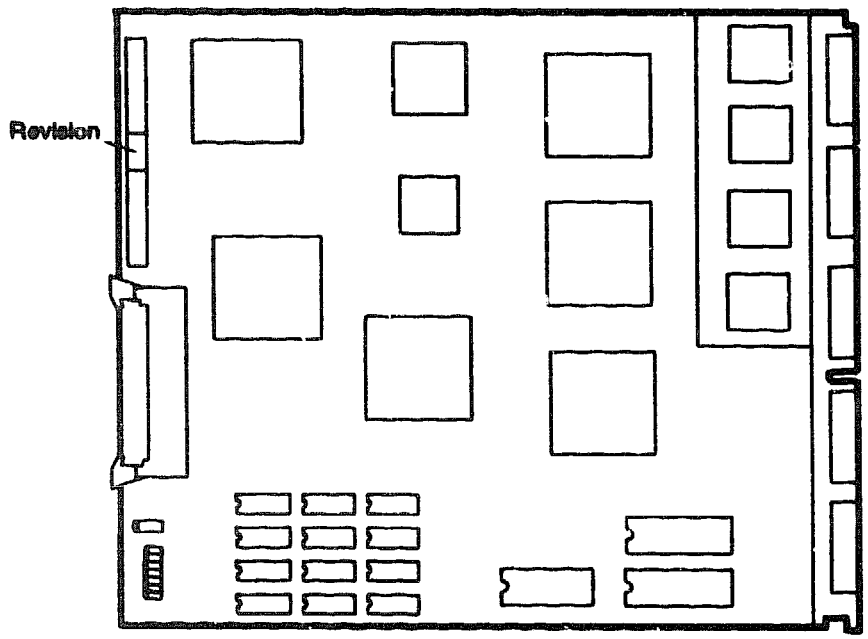
- The INITIALIZE command runs self-test and displays the results.
- The system serial number is displayed in the last line. The system serial number is also on the back door of the system cabinet. The serial number must be stored in the EEPROM of each processor.
- The SHOW ALL command provides a summary of much of the information that is stored in the EEPROM on each processor. Keep a record of these system parameters by sending the output from SHOW ALL to a hardcopy printer.

4.3 Step 3, Replace the KA64A Modules If Necessary

A KA64A module (T2015) attached to a vector module must be a minimum revision of K. Other KA64A modules can be revision J. Revision H modules can be upgraded to revision J modules by installing revision 2.0 console and diagnostic ROMs. Revision 2.0 (or greater) ROMs are required to support vector processing.

If the KA64A modules are the appropriate revision, you can proceed to the next step. Otherwise, you have to upgrade the ROMs (see Appendix C for ROM replacement instructions).

Figure 4–1: KA64A Revision Label



msb-0552-90

The KA64A processor that is attached to the vector module must be at a minimum revision of K. Check the revision number of all KA64A modules. The revision numbers of the KA64A modules can be found in the following ways:

- Check the revision label on the module (see Figure 4–1).
- Check the configuration display (see Example 4–3). In this example the 0007 in the revision field corresponds to revision H that would be seen in the label on the module.

If no K revision module is in the system, you can remove one of the modules and supply a K revision from the FV64A–AB kit. The other scalar modules can be revision J or K. Any H revision modules must have both ROMs upgraded to version 2, which converts an H module to a J module. See Appendix C for the location of the ROMs and instructions on changing ROMs.

Switch the KA64A ROMs if necessary. Then attach a new revision label to the upgraded module in the spot labeled in Figure 4–1.

Finally, if you upgraded the module to version 2 ROMs, you must also update the EEPROM. For this procedure, see Appendix C. Section 4.4 details the installation procedure of the vector module.

Example 4–3: Processor Revision in SHOW CONFIGURATION Display

```
>>> SHOW CONFIGURATION

        Type                    Rev
    1+  KA64A       (8082)      0007
    2+  KA64A       (8082)      0007
    9+  MS62A       (4001)      0002
    A+  MS62A       (4001)      0002
    D+  DWMBA/A     (2001)      0002
    E+  DWMBA/A     (2001)      0002

    XBI D
    1+  DWMBA/B     (2107)      0007
    4+  KDB50       (010E)      0F1C
    6+  DEBNI       (0118)      0100

    XBI E
    1+  DWMBA/B     (2107)      0007
    4+  CIBCA       (0108)      41C1
    6+  TBK70       (410B)      0307
```

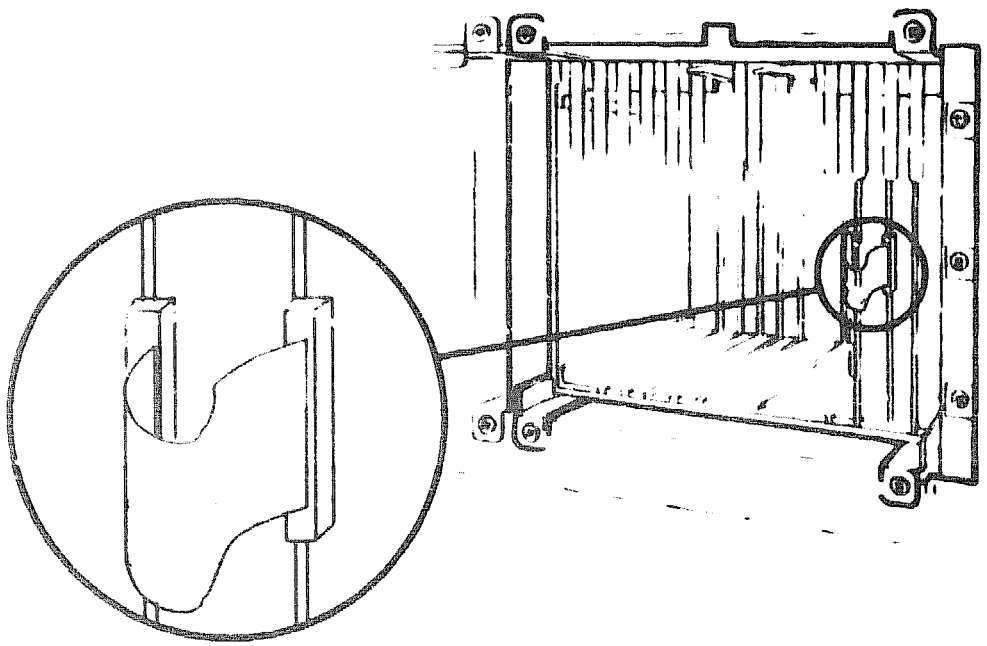
4.4 Step 4, Install the Vector Module and Cable

The vector module is installed to the left of its scalar processor. The two modules are connected by a cable, as shown in Figure 4–2. Decide on the slots in which the modules are to be installed, based on the information in Appendix A. For optimal performance, if other scalar processors are in the system, the scalar processor of a scalar/vector pair should not be the primary processor.

CAUTION: ***Model 400 processor 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 4–2: Installation of VIB Cable



msb-0407-90

See Section A.3 for configuration rules for vector processors. If the system has only one scalar/vector pair and additional scalar modules, the scalar processor of the pair should be prevented from being the boot processor.

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.
4. Open the front cabinet door.
5. Remove the clear plastic door in front of the XMI cage.

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

6. Select the slots for the scalar/vector pair based on the information in Section A.3. The slot to the left of the vector module can be used only for a memory module, or it must remain empty. Installing any other kind of module can damage the vector module.
7. Insert the vector module(s) in the XMI card cage in the slot to the left of the processor module(s) to which the vector module(s) will be attached.
8. Attach the connecting VIB (vector interface bus) cable (17-02240-03). The keyed end of the cable attaches to the vector module.
9. Press the lever down to close the connector.
10. Replace the clear door.
11. Power up the system by turning the lower key switch to Halt and the upper key switch to Enable.
12. Check the self-test display (see Example 4–4).

NOTE: *Installation of an FV64A vector processor requires that the attached KA64A module (T2015) be at a minimum revision of K. In addition, the ROMs on any additional KA64A modules must be at a minimum revision of V2.0 (ROM 0 and ROM 1).*

4.5 Step 5, Follow Steps 4 through 7 in Chapter 3

The next steps are described in Chapter 3.

- **Add memory modules (see Section 3.4).**
- **Set the system serial number (see Section 3.5) and run verification (see Chapter 5).**
- **Set console parameters and save (see Section 3.6).**
- **Do final installation steps (see Section 3.7).**

Example 4–4: Self-Test Results with a Vector Processor

```
0123456789 0123456789 0123456789 012345670

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

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

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

    .   .   .   .   A4  A3  A2  .   .   A1  .   .   .   .       ILV
    .   .   .   .   32  32  32  .   .   32  .   .   .   .       128Mb

ROM0 = V2.00  ROM1 = V2.00  EEPROM = 2.00/2.00  SN = SG01234567
>>>
```

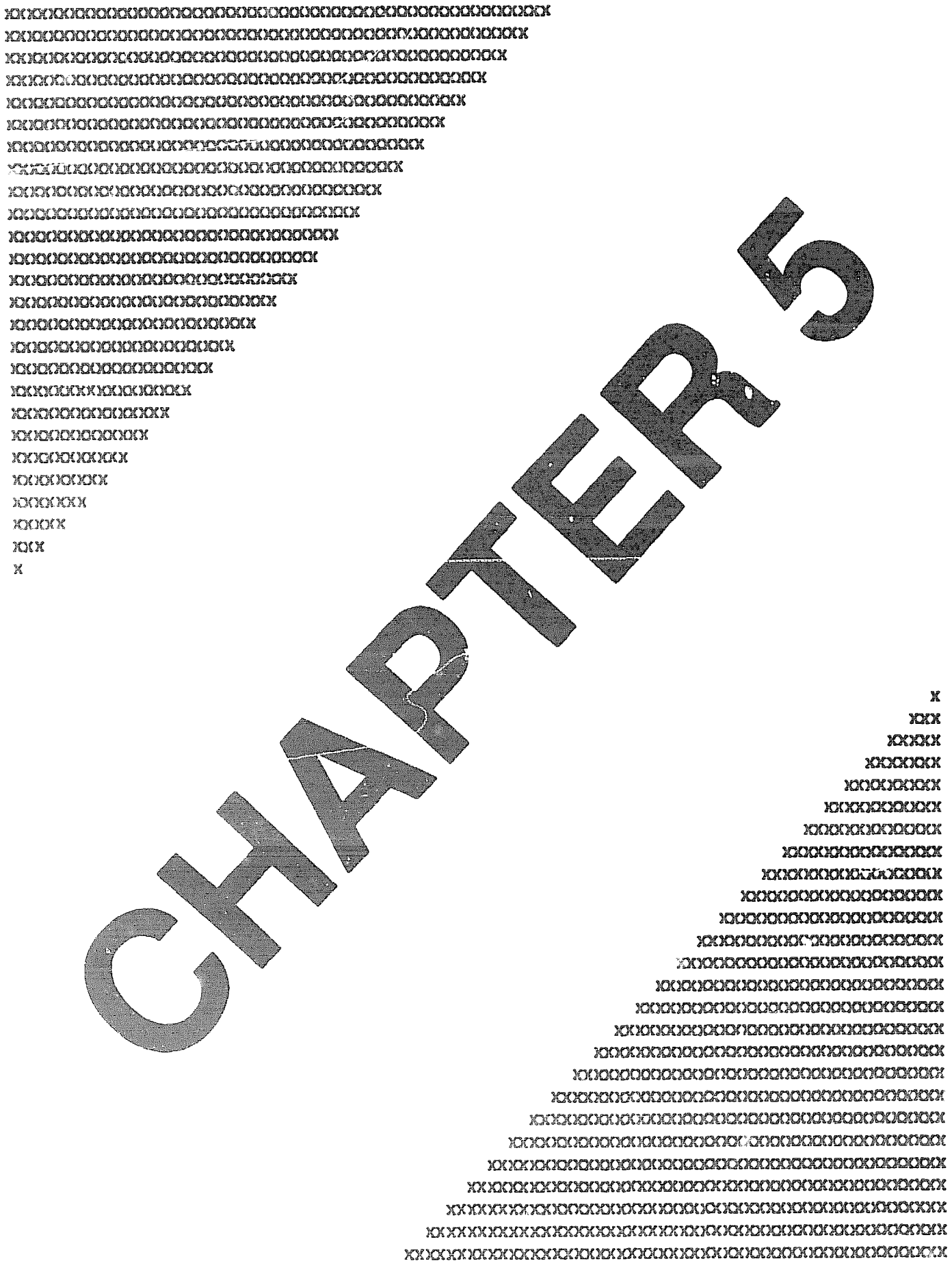
The self-test display in Example 4–4 shows a system where one vector processor has been added. Two additional memory modules were also added. For more details on the self-test display, see Appendix B.

After you have done steps 4 though 6 described in Chapter 3, give the TK tape with the up-to-date EEPROM contents to the customer.

4.6 Step 6, Return Revision H Processor Modules

Place any KA64A modules you removed from the system in the ESD boxes and return them to customer service logistics.

The revision H scalar processor modules that you removed should be returned to customer service logistics, so that they can be modified in accord with engineering change orders. Place the scalar modules in the correct ESD box.


CHAPTER 5

Chapter 5
Verification

The first step in verifying the correct operation of the upgraded system is self-test (see Appendix B). Results can be checked by examining the console display and by checking the module LEDs.

The next steps are described in this chapter:

- Run the VAX Diagnostic Supervisor
- Run the Multiprocessor Test, the VAX Vector Instruction Exerciser, and Boot

If you want to run ROM-based diagnostics, see Chapter 2 of the *Options and Maintenance* manual for your system for more information.

5.1 Boot the VAX Diagnostic Supervisor

Boot VAX/DS from the system maintenance account.

Example 5–1: Booting the VAX Diagnostic Supervisor

```
>>> BOOT /XMI:E/BI:4/R5:10 DUO (1)
   [self-test results print]
Loading system software.

                    VAX DIAGNOSTIC SOFTWARE
                          PROPERTY OF
                    DIGITAL EQUIPMENT CORPORATION

                ***CONFIDENTIAL AND PROPRIETARY***

Use Authorized Only Pursuant to a Valid Right-to-Use License
Copyright, Digital Equipment Corporation, 1989.  All Rights Reserved. (2)

DIAGNOSTIC SUPERVISOR.  ZZ-ERSAA-XX.X-XXX  31-DEC-1990  09:44:40
DS> (3)
```

Boot the Diagnostic Supervisor so that you can run the diagnostics to verify the installation of system upgrades.

1. Enter the BOOT command to access the VAX Diagnostic Supervisor (VAX/DS) from the system maintenance account (see Example 5–1).
2. The self-test display and the diagnostic software banner appear.
3. The VAX Diagnostic Supervisor then runs and issues its prompt.

5.2 Run the Multiprocessor Test

First run the standalone autosizer (EVSBA), which attaches all processors, including vector modules, for the VAX Diagnostic Supervisor (VAX/DS). Then run the multiprocessor test once; it's not necessary to change boot processors.

Example 5–2: Running the Multiprocessor Diagnostic

```
DS> RUN EVSBA  ❶

  Program: EVSBA - AUTOSIZER level 3, revision 6.11, 3 tests,
at  00:25:05.10.

  End of run, 0 errors detected, pass count is 1,
time is  1-JAN-1990  00:27:42.34

DS> SET TRACE  ❷

DS> SET EVENT 2  ❸      ! Sets event flag to suppress messages for
                        ! tests 7 and 9.
DS> SELECT ALL  ❹

DS> RUN ERKMP  ❺        ! ERKMP is the multiprocessor test for
                        ! VAX 6000 Model 400 systems; ELKMP is the
                        ! multiprocessor test for Models 200 and 300.

  Program:  ERKMP -- KA64A/FV64A MP Exerciser, revision 2.0, 13 tests,
at 00:29:19.81.
Testing:   KA0  KA1

                Booting Secondary Processor #02

Test 1: Memory Interlock Test
Test 2: Interprocessor Interrupt Test
Test 3: Write Error Interrupt Test
Test 4: Cache Invalidate Test
Test 5: XMI Bus Arbitration Test
Test 6: XMI Bus Arbiter Collision Test
Test 7: LOCKOUT Test
Test 8: Cache Coherency Test
Test 9: XMI Suppress Test
Test 10: Scalar Multiprocessor Exerciser
Test 11: Vector Cache Invalidate Under Load Test
Test 12: Vector "Don't Cache" Logic Test
Test 13: Vector Cache Coherency Test

  End of run, 0 errors detected, pass count is 1,
time is 1-MAR-1990  00:33:49.77

DS>
```

1. Run the standalone autosizer (EVSBA); then you do not need to attach each processor explicitly.
2. Issue the SET TRACE command to generate a more detailed printout of the multiprocessor test.
3. Issue SET EVENT 2 to suppress some messages.
4. Issue the SELECT ALL command to test all processors in the system.
5. Run the multiprocessor test (ERKMP for VAX 6000 Model 400 and ELKMP for VAX 6000 Model 200 and 300 systems), which tests interprocessor interrupts and cache functions. Version 2 of ERKMP supports vector processing.

Tests 1–10 test the scalar modules; tests 11–13 test the vector modules. Either section can be run alone with the START/SECTION command, as follows:

- START/SECTION:SCALAR
- START/SECTION:VECTOR

If the system has no vector processors, verification is complete. Exit from the VAX Diagnostic Supervisor. If there is a vector module, proceed to the next section.

5.3 Run the VAX Vector Instruction Exerciser

From the VAX Diagnostic Supervisor (VAX/DS) run the two-part vector diagnostic, EVKAG and EVKAH on each scalar/vector pair.

Example 5–3: Running the Vector Diagnostics

```
DS>
DS> SET QUICK (1)          ! Do quick version to take about 6 mins.

DS> DESELECT KA1 (2)

DS> RUN EVKAG (3)

.. Program: ZZ-EVKAG, VAX Vector Instr Exer Pt I, revision 1.0, 35 tests,
at 16:02:46.71.
Testing:  _KA0

Testing the vector unit attached to _KA0.
Test 1: VVADDL Instruction Test
Test 2: VSADDL Instruction Test

  [other subtests are displayed as testing proceeds]

DS> RUN EVKAH (4)
  [tests are displayed]

DS> BOOT 4 (5)                 ! Change the boot processor.
DS> DESELECT KA0 (6)
DS> SELECT KA1
DS> RUN EVKAG
  [tests are displayed]
DS> RUN EVKAH
  [tests are displayed]
DS> BOOT 1 (7)                 ! Restore original boot processor.
DS> EXIT (8)

>>>
```

Example 5–3 shows how to run the vector diagnostics from the VAX Diagnostic Supervisor. Assume that the VAX/DS session is a continuation from the session shown in Example 5–2.

(1) Issue the SET QUICK command to run the shorter version of the tests.

(2) Remove the second scalar/vector pair from the test sequence while KA0 is being tested.

❸ Run the EVKAG diagnostic. The VAX Vector Instruction Exerciser runs only on the scalar/vector pair from which VAX/DS was booted. The self-test display in Example 5–4 shows that the boot processor is at node 1; its attached vector module is being tested.

❹ Run the EVKAH diagnostic.

❺ From the self-test display (Example 5–4), determine the node number of any other scalar that has a vector module attached. Then issue the VAX/DS BOOT command specifying the node number of that scalar CPU. In Example 5–3 the VAX/DS BOOT command specifies that the CPU at node 4 is to become the boot processor.

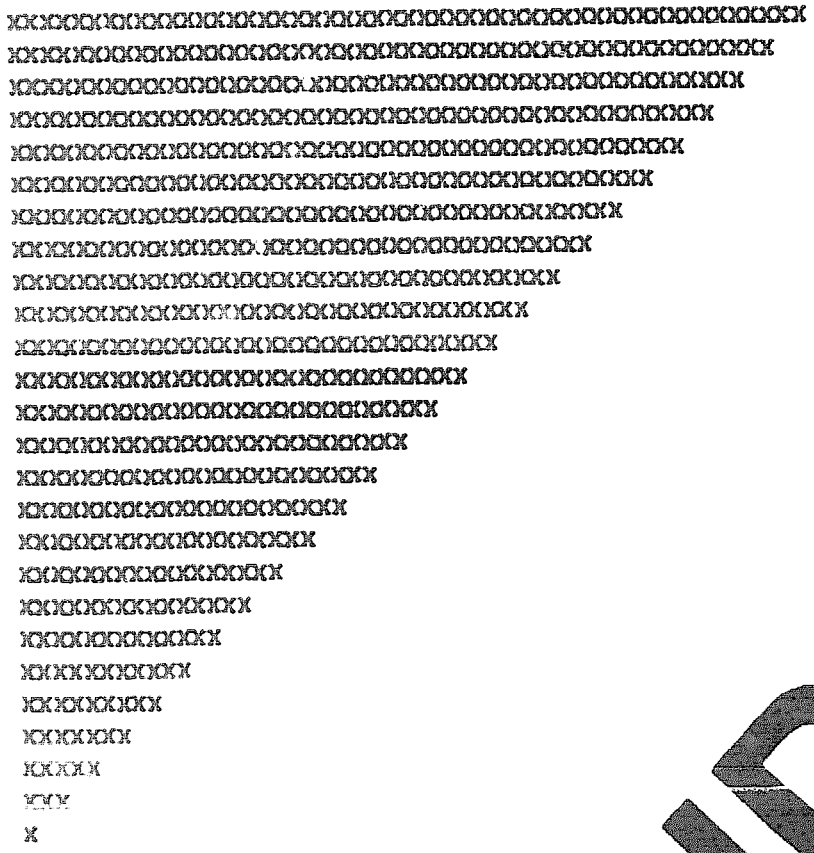
❻ Issue commands to deselect KA0, select KA1, and then run EVKAG and EVKAH on KA1.

❼ Issue the BOOT command to return the CPU at node 1 to boot processor.

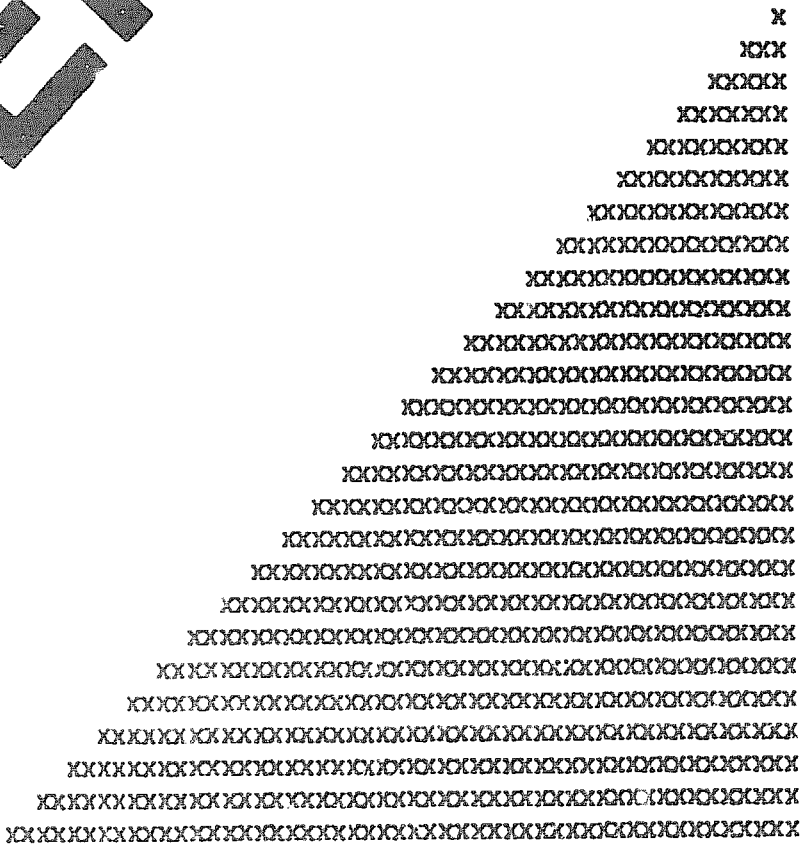
❽ Exit VAX/DS.

Example 5–4: Self-Test from System with Vector Processors

```
#123456789 0123456789 0123456789 0123456789 0123456789 #

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

    A   A   .   .   M   M   .   .   M   V-  -P  M   V-  -P      TYP
    O   O   .   .   +   +   .   .   +   +   +   +   +   +      STF
    .   .   .   .   .   .   .   .   .   E   E   .   E   B      BPD
    .   .   .   .   .   .   .   .   .   +   +   .   +   +      ETF
    .   .   .   .   .   .   .   .   .   E   E   .   E   B      BPD

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

    .   .   .   .   A4  A3  .   .   A2  .   .   A1  .   .      ILV
    .   .   .   .   32  32  .   .   32  .   .   32  .   .      128Mb

ROM0 = V2.00  ROM1 = V2.00  EEPROM = 2.00/2.00  SN = SG01234567
>>>
```



APPENDIX A



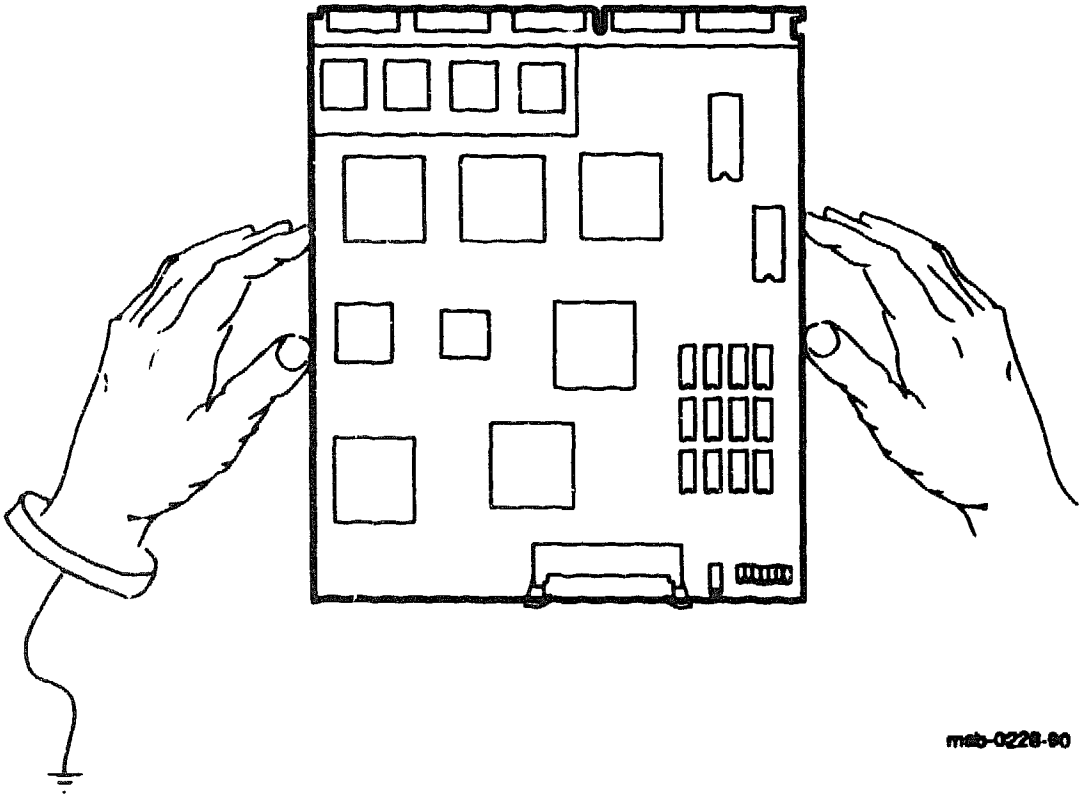
Appendix A
VAX 6000 Model 400 Module Handling and Configuration Rules

This appendix gives detailed instructions on handling scalar and vector processor modules for VAX 6000–400 systems. Configuration rules for the XMI card cage are also given.

A.1 Model 400 Handling Procedures

Handle the processor modules with care. The CMOS2 technology used on the later 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



The later 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).

Figure A–2: Inserting the KA64A Module in an XMI Card Cage

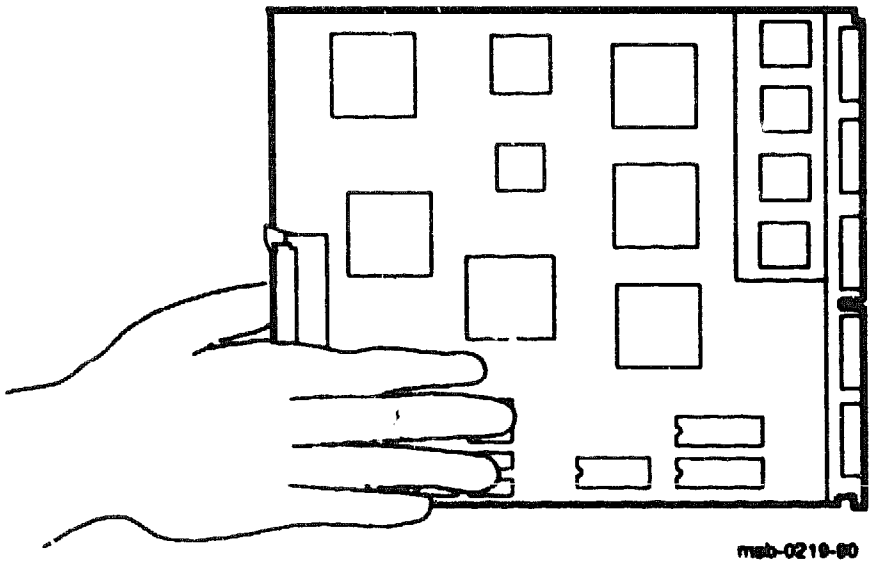
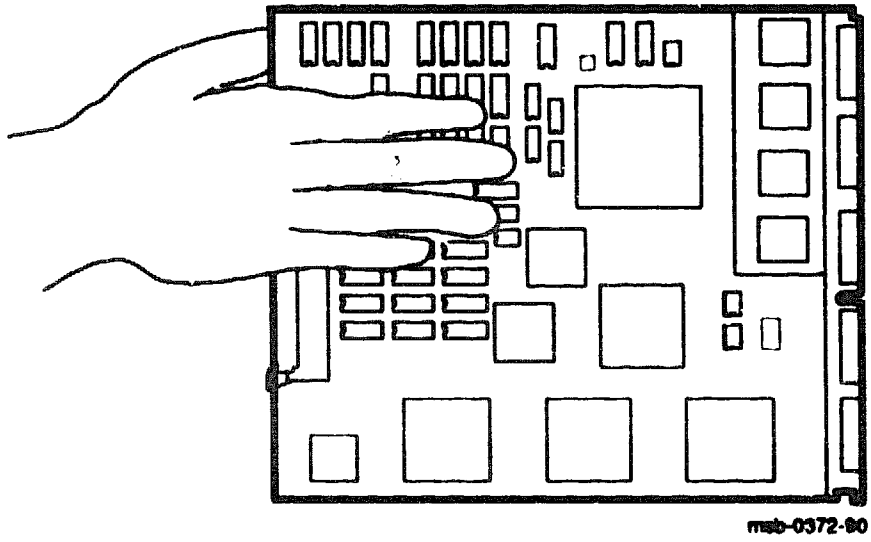


Figure A–3: Inserting the FV64A Module in an XMI Card Cage



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

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

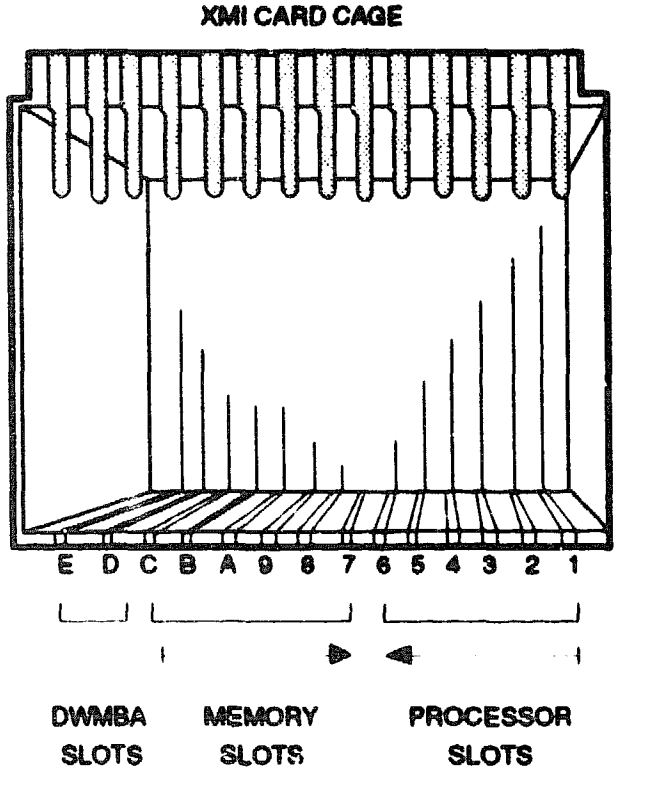
5. Do not attach the repair tag to the module.

   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.

A.2 Module Placement

Figure A–4 and Figure A–5 show how the XMI card cage should be configured. By convention, processors are placed in the right XMI slots, beginning with slot 1. Memories are usually placed in the middle slots, and VAXBI adapters occupy the slots at the left side of the card cage. No memory modules are permitted in slots 1 and E.

Figure A–4: Typical XMI Configuration



By convention, processors are placed in the right XMI slots, beginning with slot 1 and extending to slot 6. Memories are placed in the middle slots, from slot A to slot 5 and then slots B and C, and VAXBI adapters are installed in the left side of the card cage, beginning with slot E.

CAUTION: *A CPU or adapter module must be in the first or last slot. Do NOT install memory modules in XMI backplane slots 1 or E.*

Standard configurations include 1, 2, 4, or 8 memory modules. Systems will run with 3, 5, or 7 memory modules; however, system performance may decrease with an odd number of memory modules. Increasing from 1 to 2 or from 2 to 4 memory modules increases performance, but increasing from 4 to 5 memory modules may decrease performance.

Table A–1: Suggested Memory Configuration for XMI Backplane

XMI Slot Number	Contents
A	First memory module
9	Second memory module
8	Third memory module
7	Fourth memory module
6	Fifth memory module[1]
5	Sixth memory module[2]
B	Seventh memory module
C	Eighth memory module

[1]If a processor module is in this slot, install the fifth memory module in slot B.

[2]If a processor module is in this slot, install the sixth memory module in slot C.

NOTE: *Model 210 is shipped with two VAXBI card cages, with DWMBA cables going to each cage, even though there is only one set of DWMBA modules. XMI slot D cannot be used for a processor module unless the DWMBA cables are disconnected; it can be used for a memory without disconnecting the cables.*

A.3 Vector Module Configuration Rules

A vector processor must be installed to the left of its companion scalar processor. An intermodule cable connects the two modules. A memory module or an empty slot must be to the left of the vector processor. Any other configuration may damage the vector module.

Figure A–5: Scalar/Vector Configurations

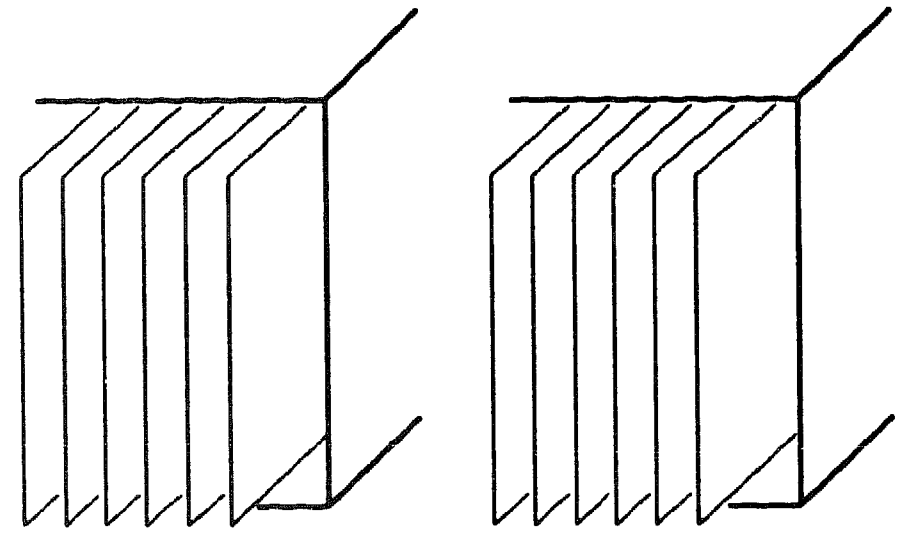


Table A–2 shows the number of scalar and vector processors supported in a VAX 6000 system.

Table A–2: Processor Module Combinations

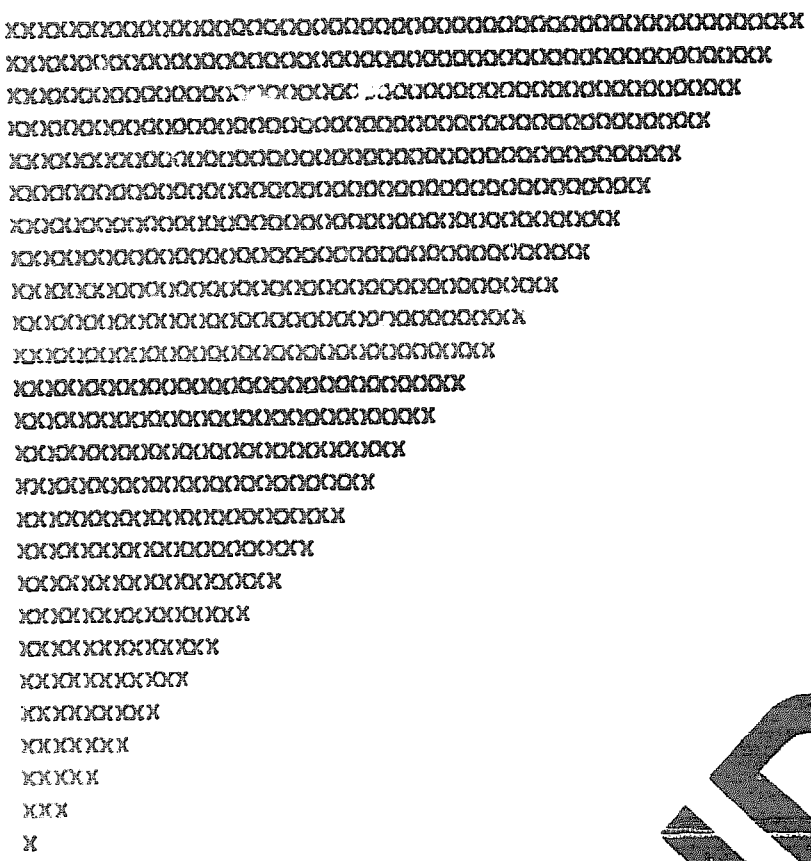
Maximum CPUs	Maximum Vectors	Configuration (Slot 1 at Right)
6	0	P P P P P P
4	1	M V P P P P
2	2	M V P M V P

Figure A–5 shows system configurations for a VAX 6000 Model 400 system with one or two vector processors. The diagram on the left indicates the configuration for two scalar/vector pairs (V- -P) with a memory module in the slot to the left of the vector processor. The diagram on the right shows a single scalar/vector pair with additional scalar processors.

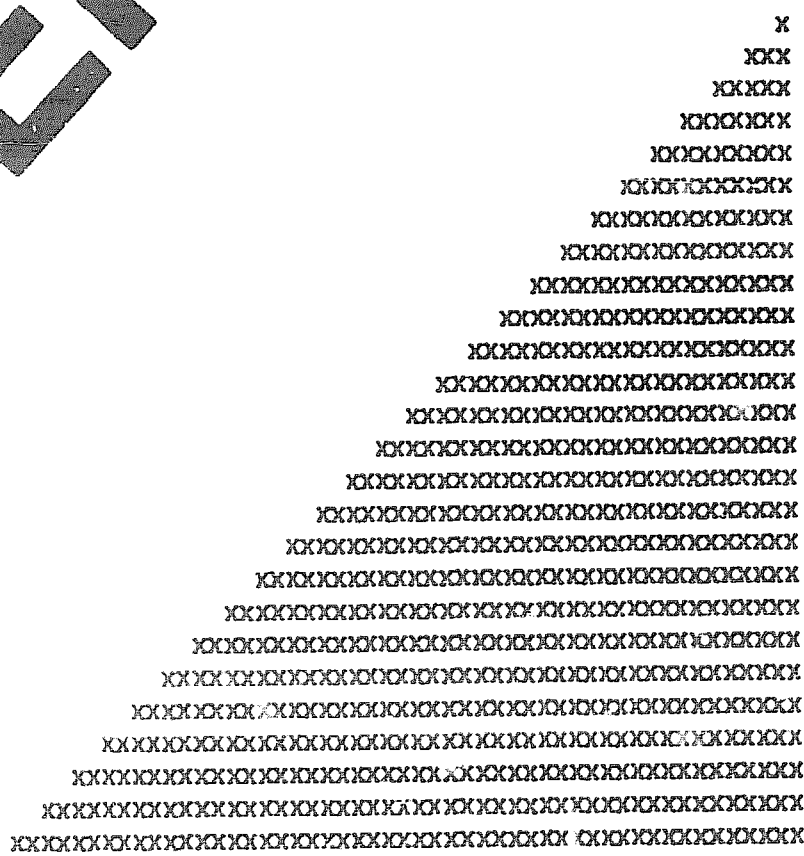
Typically, processors are placed in the right XMI slots, beginning with slot 1 and extending to slot 6. Memories are placed in the middle slots, from slot A to slot 5 and then slots B and C, and VAXBI adapters are installed in the left side of the card cage, beginning with slot E. However, in a system with a vector processor, the modules should be installed as shown in Figure A–5. These configurations must be followed to avoid damage to the modules and for performance reasons:

- Because the FV64A module has VLSI components with heat sinks protruding from both sides, only a memory module, with its low components, can be placed next to side 2 of the FV64A.
- In a system with one scalar/vector pair and one or more additional scalar processors, the scalar processor of the pair should be prevented from being the boot processor for performance reasons.

  If the scalar/vector pair are to the left of other scalar processors, then the processor of the scalar/vector pair will not become the boot processor unless other processors fail self-test or have been disabled with the SET CPU console command. Alternatively, you can issue the SET CPU/NOPRIMARY command and give the node number of the attached scalar processor that you do not want to be the boot processor.



APPENDIX B



Appendix B
Self-Test

Self-test results are displayed on the console terminal and are reported by module LEDs. Example B–1 is a sample self-test display for a VAX 6000–400 system; the example deliberately includes some failures to illustrate the type of information reported. Example B–2 shows a sample self-test for a Model 400 system with two vector processors.

Figure B–1 shows the KA64A LEDs after self-test, and Figure B–2 shows the LEDs for the KA62A and KA62B modules. If the KA64A has an attached vector module, the red LEDs on the KA64A are also used to find the failing test number for the vector module. The vector module has a yellow self-test LED that lights when that module passes self-test.

For a more detailed description of self-test, see your system *Owner's Manual* Chapter 6.

Example B–1: Sample Self-Test Results, Scalar Processors Only

```
01234567890 0123456789 0123456789 0123456789 01234567890  (1)

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

    A   A   .   .   M   M   M   M   .   .   P   P   P   P       TYP    (3)
    o   o   .   .   +   +   +   +   .   .   +   +   -   +       STF    (4)
    .   .   .   .   .   .   .   .   .   .   E   B   E   D       BPD    (5)
    .   .   .   .   .   .   .   .   .   .   +   -   -   +       ETF    (6)
    .   .   .   .   .   .   .   .   .   .   B   E   E   D       BPD    (7)

.   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   XBI D -  (8)
.   .   .   .   .   .   .   .   .   +   .   +   .   -   +   .   XBI E +

    .   .   .   .   B2  B1  A2  A1  .   .   .   .   .   .       ILV    (9)
    .   .   .   .   32  32  32  32  .   .   .   .   .   .       128Mb  (9)

ROM0 = V2.00  ROM1 = V2.00 (10)  EEPROM = 2.00/2.01 (11)  SN = SG01234567 (12)
>>>
```

(1) The progress trace. This line appears when slot 1 holds a KA64A module. The KA64A in slot 1 passed all 37 tests in self-test. (Note that the progress trace differs in a system when a vector processor is attached to the CPU in slot 1; see Example B–2.

(2) Identifies the node number (NODE #).

Lines 3 through 7 refer to XMI node numbers; the XBI lines refer to VAXBI node numbers.

(3) Identifies the module type (TYP).

P = processor
M = memory
A = adapter

(4) Gives self-test failure results (STF).

\+ = passed
– = failed
o = not tested as part of the initial power-up test

(5) Shows boot processor designation (BPD).

E = eligible to be boot processor
D = ineligible to be boot processor
B = designated as boot processor

⑯ Gives extended CPU/memory tests failure results (ETF). Same interpretation as STF.

⑰ Shows the second boot processor designation, which may be different from that on the first BPD line.

⑱ Shows DWMBA test results, node number, and self-test results of the VAXBI nodes (XBI). The + or – at the right means that the DWMBA passed or failed when tested by the boot processor. If the DWMBA passed, a + or – corresponding to each VAXBI node indicates whether that node passed or failed its own self-test.

⑲ Displays the memory array membership in interleave sets (ILV). Each letter denotes a different interleave set.

⑳ Gives each memory array size and the total working memory size (Mb).

㉑ Shows the version number of the boot processor's ROMs (ROM0 and ROM1).

㉒ Gives the version number and revision number of the boot processor's EEPROM. The first number is the base revision of the EEPROM, which rarely changes. The second number is the revision of console and diagnostic patches applied to the EEPROM. This number increments with every patch operation. For patch for base revision 1.00.

㉓ Lists the serial number of the system (SN).

The self-test display in Example B–2 shows a system with two vector processors.

Example B–2: Sample Self-Test Results with Vector Processors

```
0123456789 0123456789 0123456789 0123456789 0123456789 0    (1)

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

    A   A   .   .   M   M   .   .   M   V-  -P  M   V-  -P      TYP  (2)
    o   o   .   .   +   +   .   .   +   +   +   +   +   +      STF
    .   .   .   .   .   .   .   .   .   E   E   .   E   B      BPD  (3)
    .   .   .   .   .   .   .   .   .   +   +   .   +   +      ETF  (4)
    .   .   .   .   .   .   .   .   .   E   E   .   E   B      BPD  (5)

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

    .   .   .   .  A4   A3   .   .  A2   .   .  A1   .   .      ILV
    .   .   .   .  32   32   .   .  32   .   .  32   .   .      128Mb

ROM0 = V2.00  ROM1 = V2.00  EEPROM = 2.00/2.00  SN = SG01234567  (6)
>>>
```

(1) The progress trace indicates that the processor in slot 1 passed all 49 tests that comprise self-test for CPUs with vector processors. This progress trace differs from that shown in Example B–1. In a system where the CPU in slot 1 has no attached vector processor, self-test for that CPU consists of 37 tests.

(2) Vector processors (V) are in slots 2 and 5. The dashed lines indicate that they are attached to the scalar processors to their right.

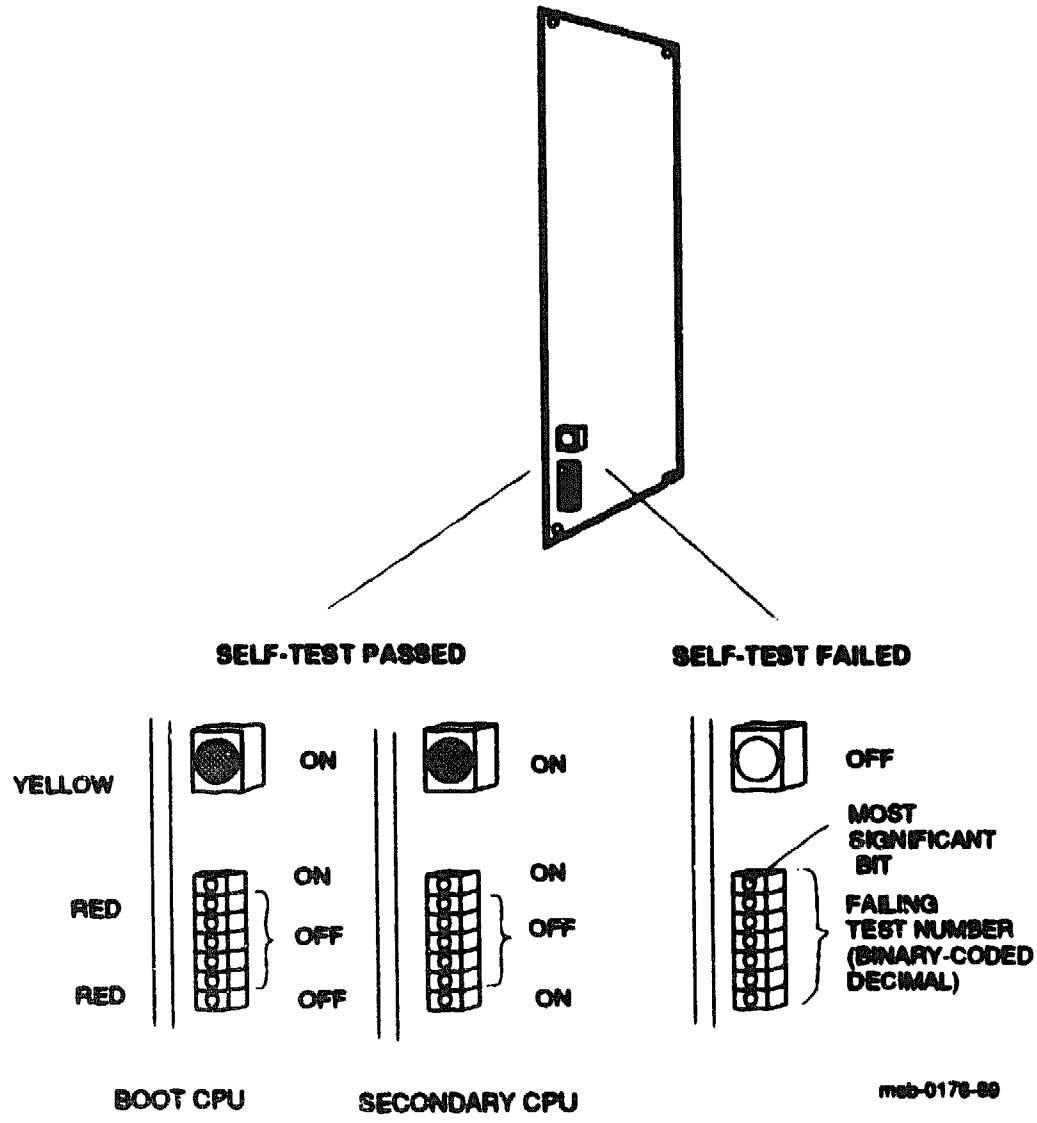
(3) The boot processor is determined and is indicated by B. The E for the other scalar processor indicates that it is eligible to be boot processor.

The E for the vector processor means that it is enabled. A vector processor can be disabled with the SET CPU *n* /NOVECTOR_ENABLED console command. If this command were issued, a D would be on the BPD lines to indicate that the specified vector processor has been disabled.

(4) All processors pass the extended test.

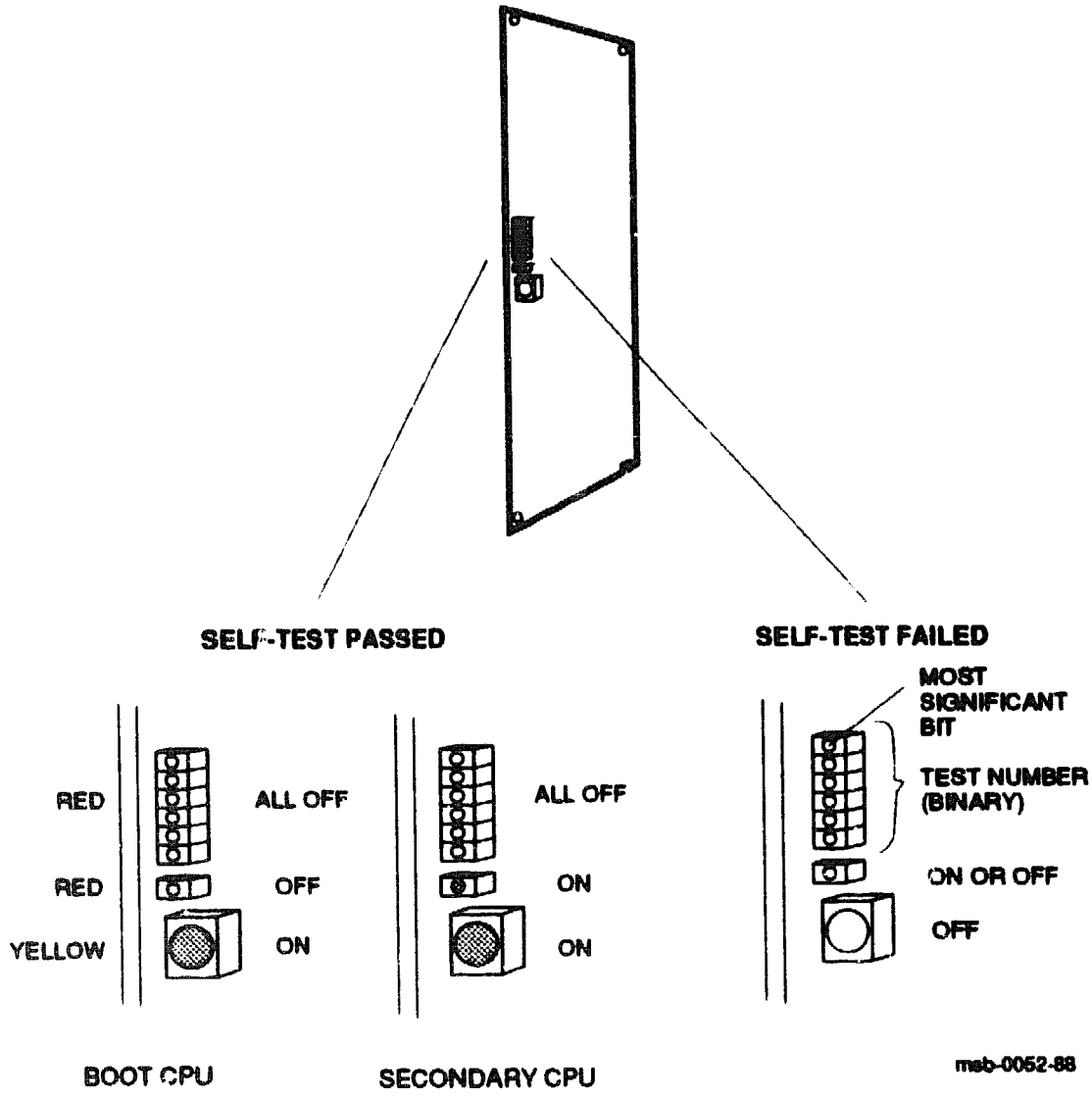
(5) Version 2.0 (or greater) ROMs and EEPROM are required for vector processing support.

Figure B–1: KA64A LEDs After Self-Test

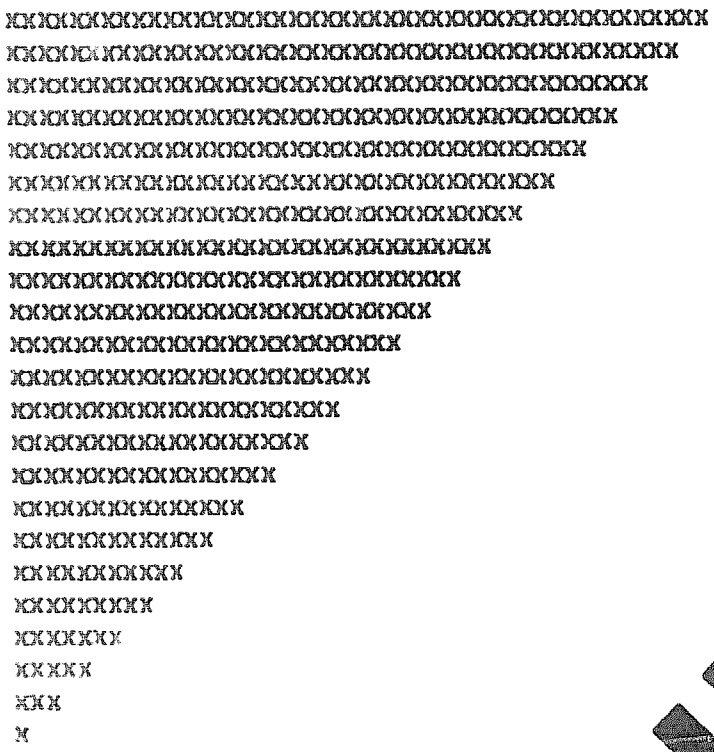


NOTE: *Interpretation of small red LEDs: ON is a zero, and OFF is a one.*

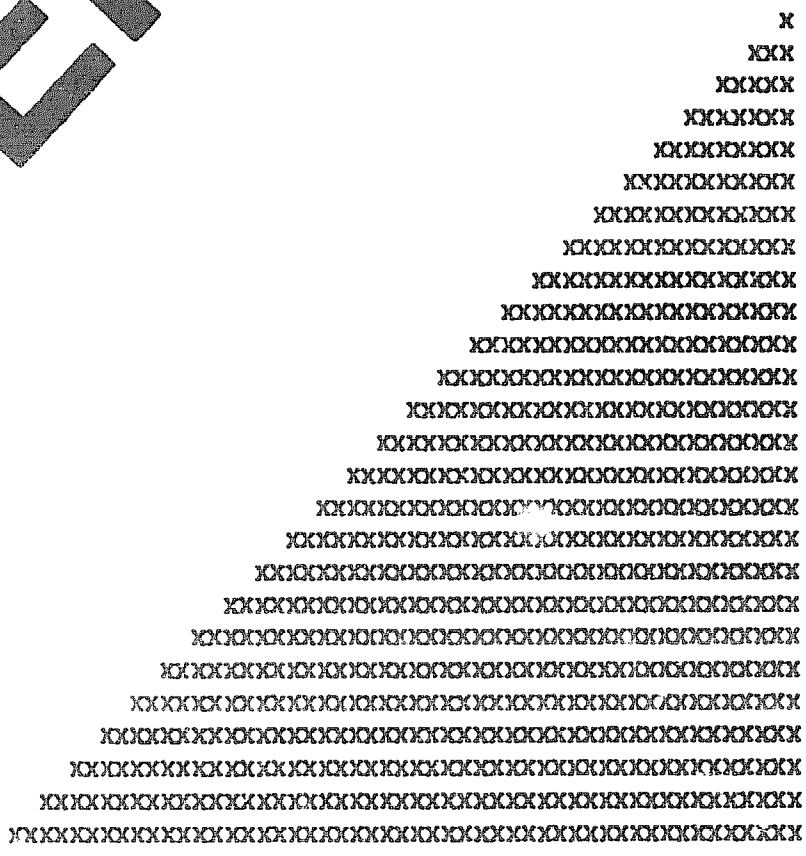
Figure B–2: KA62A and KA62B LEDs After Self-Test



NOTE: *Interpretation of small red LEDs: ON is a zero, and OFF is a one.*



APPENDIX C



Appendix C
ROM Replacement

This appendix describes ROM replacement on processor modules.

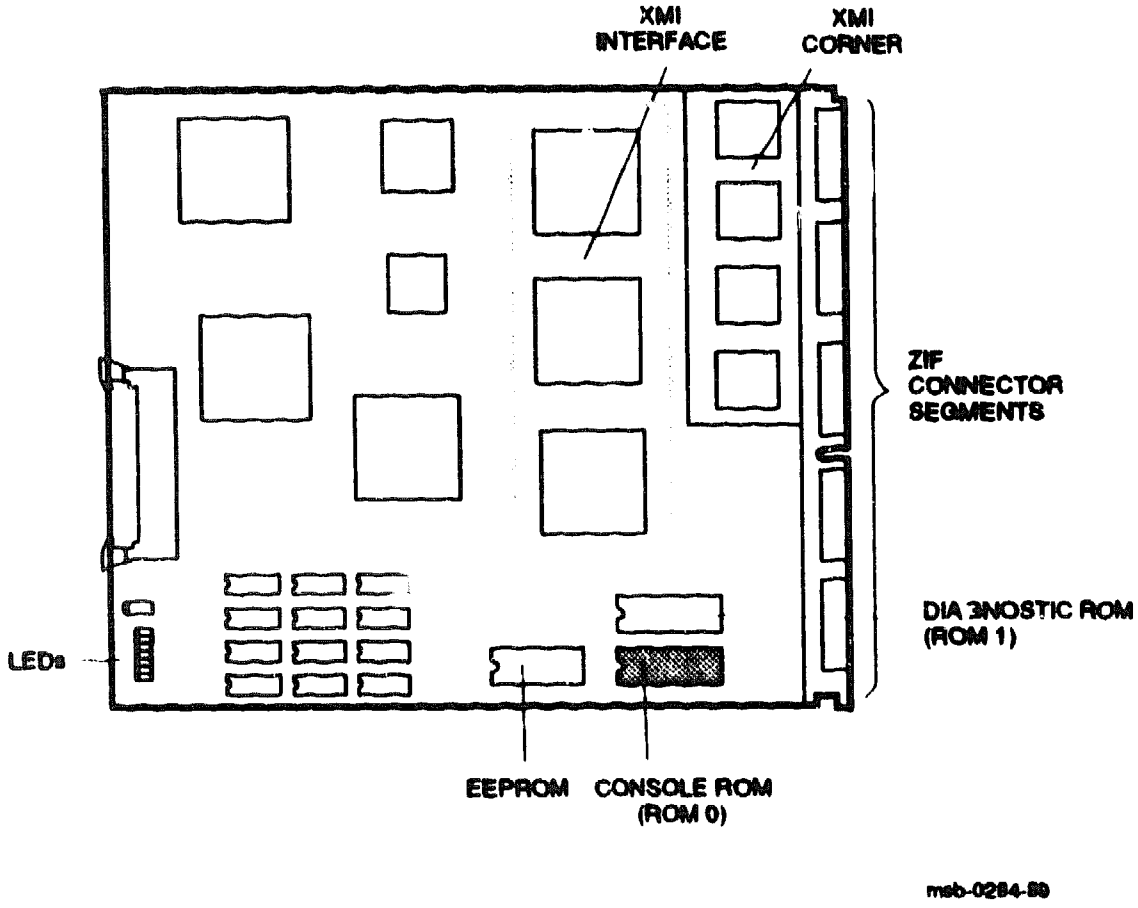
Table C–1: CPU Modules and Console ROMs

Module	Type	Part Number	ROM Part Number
KA64A–AA	Timeshare	T2015 (-00, -WA, -WB)	23-021E9-00
KA64A–AB	Server	T2015 (-YA, -YB)	23-023E9-00
KA62B–AA	Timeshare	T2011-YA	23-016E9-00
KA62B–AB	Server	T2011-YC	23-017E9-00
KA62A–AA	Timeshare	T2011-00	23-005E9-00
KA62A–AB	Server	T2011-YB	23-015E9-00

Table C–2: KA64A CPU Modules and ROMs

Module	Type	Part No.	Console ROM 0	Diagnostic ROM 1
KA64A–AA	Timeshare	T2015	23-027E9-00	23-026E9-00
KA64A–AB	Server	T2015–YA	23-025E9-00	23-024E9-00

Figure C–1: KA64A Processor Layout (T2015 Module)



To convert a server module to a timeshare module, you replace the server console ROM with a timeshare console ROM. Table C–1 gives the ROM part numbers, and Figure C–2 show the location of the console ROMs.

CAUTION: *Use extreme care when removing and installing the ROMs. Failure to do so could result in damaged chip leads. Always wear an antistatic wrist strap and work on an ESD pad.*

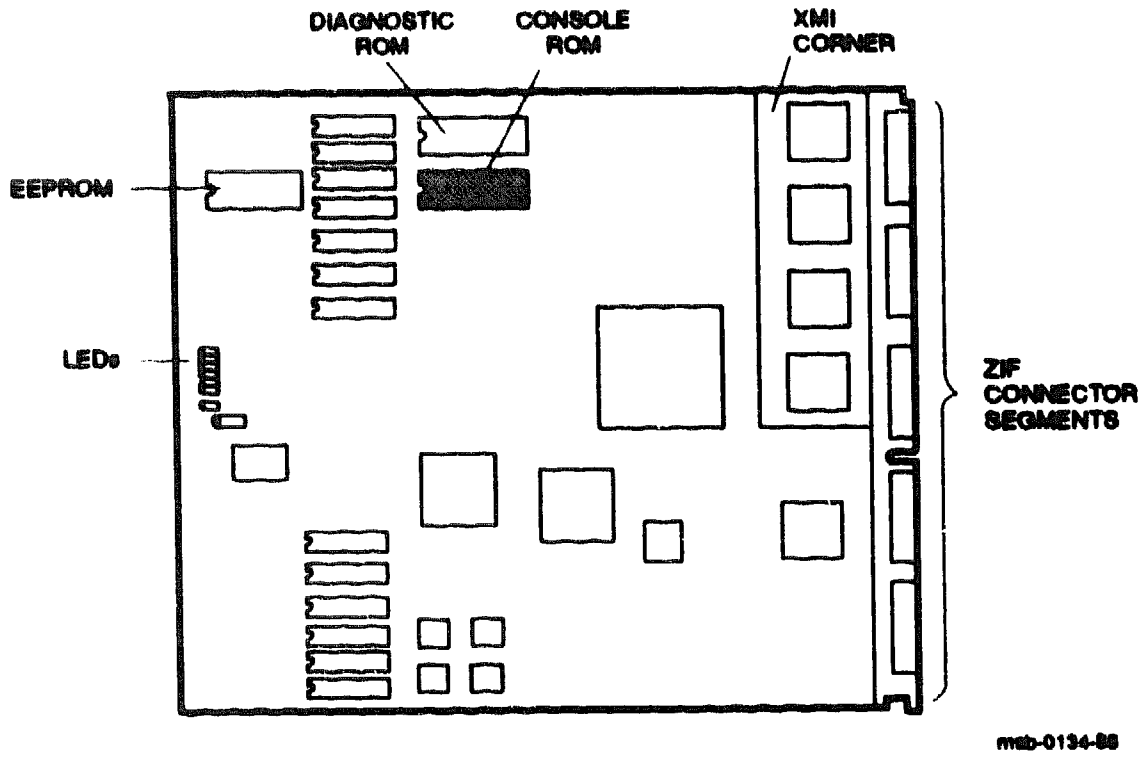
1. Using an extracter, remove the server console ROM from the module (see the figures for the location). Place the extracter under the ROM and pull up gently until the ROM is unseated.
2. Install the timeshare console ROM for the appropriate VAX model that you are upgrading to. Align the chip leads carefully when inserting the ROM into the module.
3. Place the new timeshare module label over the old Txxxx-xx server module label.

The server module has now been converted into a timeshare module.

To convert a T2015 module to one that supports vector processing, you remove version 1 of both the console and diagnostic ROMs and install version 2 ROMs. See Figure C–1 for the location of the ROMs. Follow the procedure described above.

You must now reconfigure the EEPROM. For this procedure, see "Upgrading T2015 Console and Diagnostic ROMs" (A2-01456-10). This part is shipped in kits and is also available from logistics.

Figure C–2: KA62A and KA62B Processor Layout (T2011 Module)




INDEX

Index