

VAX 6000: Installing Model 200/300/400 Processors

Order Number EK-6234A-UP-001

This manual is for Digital customer service engineers and self-maintenance customers installing Model 200, 300, and 400 processors in previously installed VAX 6000 systems.

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maynard, massachusetts**

First Printing, February 1991

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Preface

Intended Audience

This manual is for Digital customer service engineers and self-maintenance customers installing Model 200, 300, and 400 processors in previously installed VAX 6000 systems.

Document Structure

The manuals in the VAX 6000 series documentation set are designed using structured documentation theory. Each topic has a boldface abstract, to help you use the manual as a reference tool.

This manual has four chapters and four appendixes:

- **Chapter 1, Upgrade Overview**, gives an overview of the upgrades described in this manual.
- **Chapter 2, Upgrading Within a Model**, describes adding processor modules to a system.
- **Chapter 3, Upgrading to Another Model**, describes the procedure to upgrade from one model to another model.
- **Chapter 4, Verifying the System**, describes acceptance procedures.
- **Appendix A, Module Handling**, details how to handle modules.
- **Appendix B, XMI Configuration Rules**, gives configuration rules for the XMI card cage.
- **Appendix C, Self-Test**, describes how to interpret the console display for self-test and the LEDs on processor modules.
- **Appendix D, ROM Replacement**, describes how to convert a server module to a timeshare module by changing the ROMs.

VAX 6000 Series Documents

Some manuals apply to all VAX 6000 series systems, and some manuals are specific to one VAX 6000 model. Table 1 lists the manuals in the VAX 6000 series documentation set.

Table 1: VAX 6000 Series Documentation

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

Manuals specific to models are listed in Table 2.

Table 2: VAX 6000 Model Level Documentation

Title	Order Number
Models 200/300/400	
<i>VAX 6000 Model 300 and 400 Service Manual</i>	EK-624EA-MG
<i>VAX 6000: Installing Model 200/300/400 Processors</i>	EK-6234A-UP
<i>VAX 6000 Model 200/300/400 Processor Console and Diagnostic ROM Upgrade Instructions</i>	EK-60ROM-UP
<i>VAX 6000-400 Options and Maintenance</i>	EK-640EB-MG
<i>VAX 6000-400 System Technical User's Guide</i>	EK-640EB-TM
<i>VAX 6200/6300 Options and Maintenance</i>	EK-620AB-MG
<i>VAX 6200/6300 System Technical User's Guide</i>	EK-620AB-TM
Model 500	
<i>VAX 6000 Model 500 Mini-Reference</i>	EK-650EA-HR
<i>VAX 6000 Model 500 Service Manual</i>	EK-650EA-MG
<i>VAX 6000 Model 500 System Technical User's Guide</i>	EK-650EA-TM
<i>VAX 6000: Installing Model 500 Processors</i>	EK-KA65A-UP

Associated Documents

Table 3 lists other documents that you may find useful.

Table 3: Associated Documents

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

Table 3 (Cont.): Associated Documents

Title	Order Number
System I/O Options	
<i>CIBCA User Guide</i>	EK-CIBCA-UG
<i>CIXCD Interface User Guide</i>	EK-CIXCD-UG
<i>DEC LANcontroller 200 Installation Guide</i>	EK-DEBNI-IN
<i>DEC LANcontroller 400 Installation Guide</i>	EK-DEMNA-IN
<i>InfoServer 100 Installation and Owners Guide</i>	EK-DIS1K-IN
<i>KDB50 Disk Controller User's Guide</i>	EK-KDB50-UG
<i>KDM70 Controller User Guide</i>	EK-KDM70-UG
<i>RRD40 Disc Drive Owner's Manual</i>	EK-RRD40-OM
<i>RA90/RA92 Disk Drive User Guide</i>	EK-ORA90-UG
<i>SA70 Enclosure User Guide</i>	EK-SA70E-UG
Operating System Manuals	
<i>Guide to Maintaining a VMS System</i>	AA-LA34A-TE
<i>Guide to Setting Up a VMS System</i>	AA-LA25A-TE
<i>Introduction to VMS System Management</i>	AA-LA24A-TE
<i>ULTRIX-32 Guide to System Exercisers</i>	AA-ME96B-TE
<i>VMS Upgrade and Installation Supplement: VAX 6000 Series</i>	AA-LB36C-TE
<i>VMS Networking Manual</i>	AA-LA48A-TE
<i>VMS System Manager's Manual</i>	AA-LA00A-TE
<i>VMS VAXcluster Manual</i>	AA-LA27B-TE
Peripherals	
<i>HSC Installation Manual</i>	EK-HSCMN-IN
<i>H4000 DIGITAL Ethernet Transceiver Installation Manual</i>	EK-H4000-IN
<i>Installing and Using the VT320 Video Terminal</i>	EK-VT320-UG
<i>RV20 Optical Disk Owner's Manual</i>	EK-ORV20-OM

Table 3 (Cont.): Associated Documents

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

Chapter 1

Upgrade Overview

This manual describes two types of upgrades: upgrades within a model and upgrades from one model to another.

Sections in this chapter include:

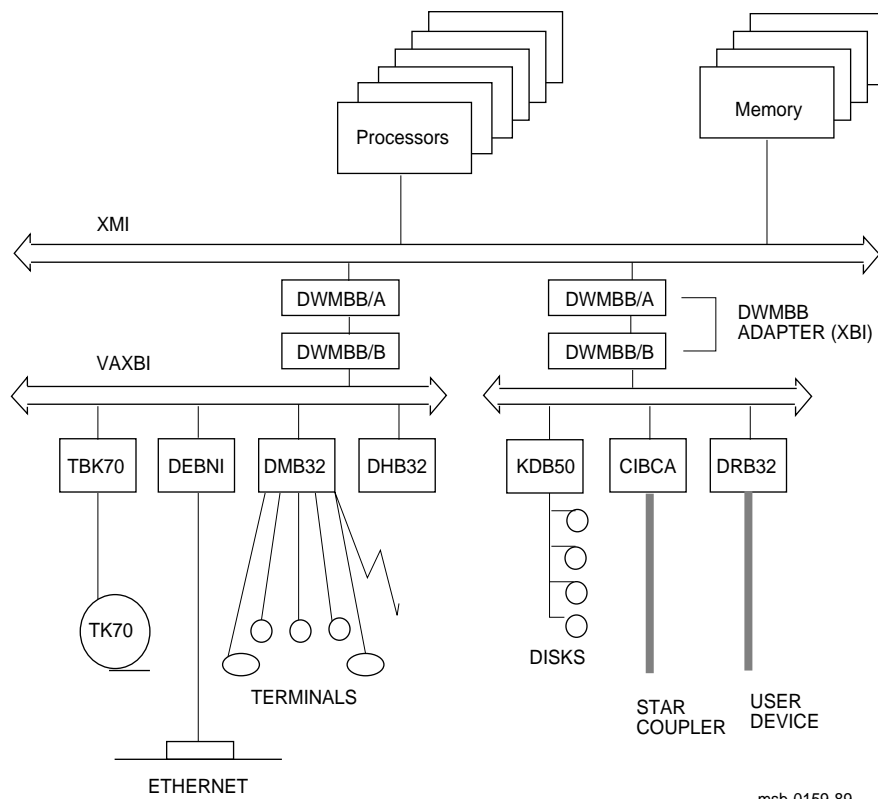
- VAX 6000 Series Platform
- Upgrading Within a Model
- Upgrading to Another Model

For all upgrades, see the restrictions on module placement given in Appendix B. Appendix A details special handling procedures for processor modules.

1.1 VAX 6000 Series Platform

The VAX 6000 series uses a high-speed system bus, the XMI bus, to interconnect processors and memory modules. I/O devices may be connected either to the XMI bus or to a VAXBI bus. Each model of the VAX 6000 series has a unique processor design, and each supports multiprocessing.

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



msb-0159-89

1-2 VAX 6000: Installing Model 200/300/400 Processors

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

The XMI system bus supports processors, memory, and I/O devices. The optional VAXBI bus supports I/O.

The VAXBI and the XMI share 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 adapter nodes.

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 other processors become secondary processors and receive system information from the boot processor. The VAX 6000 series supports symmetric multiprocessing, which allows a program to execute on any processor. Models 300 and 400 support up to six processors; Model 200, up to four.

A **memory node** can be either an MS62A or an MS65A. Memory is a global resource equally accessible by all processors on the XMI. Memory nodes vary in size from 32 Mbytes to 128 Mbytes. 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 XMI **I/O adapters** include the DEMNA, the CIXCD, and the KDM70. An optional XMI-to-VAXBI adapter, called a DWMBA or DWMBB depending upon which power and packaging platform the system has, maps data between these two buses.

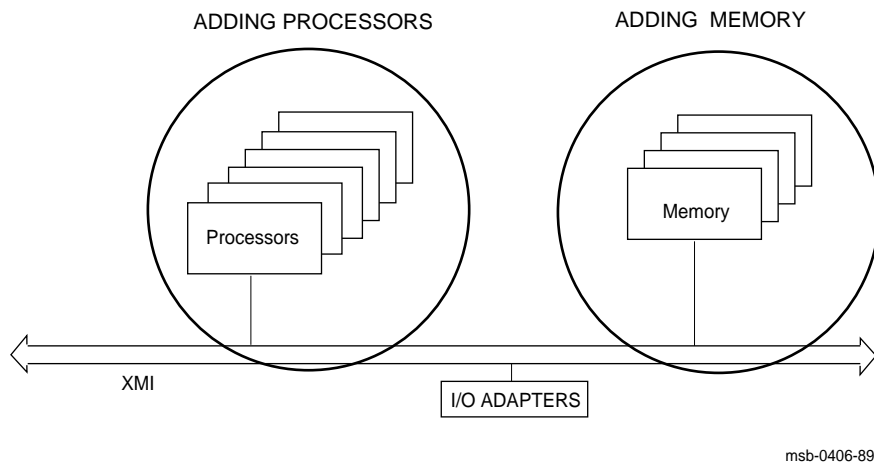
There are two slightly different power and packaging cabinets, but the difference does not affect the procedures in this manual. See the *VAX 6000 Models 300 and 400 Service Manual* for information on the differences.

For more information on the systems, see the *VAX 6000 Series Owner's Manual*, *VAX 6000 Models 300 and 400 Service Manual*, *VAX 6200/6300 System Technical User's Guide* or the *VAX 6000-400 System Technical User's Guide*, and the *VAX 6000 Platform Technical User's Guide*.

1.2 Upgrading Within a Model

Within each of the VAX 6000 family models, you can increase system performance by adding processors and memory and other options. Here, by adding CPUs, we are increasing compute power.

Figure 1-2: Upgrading Within a Model



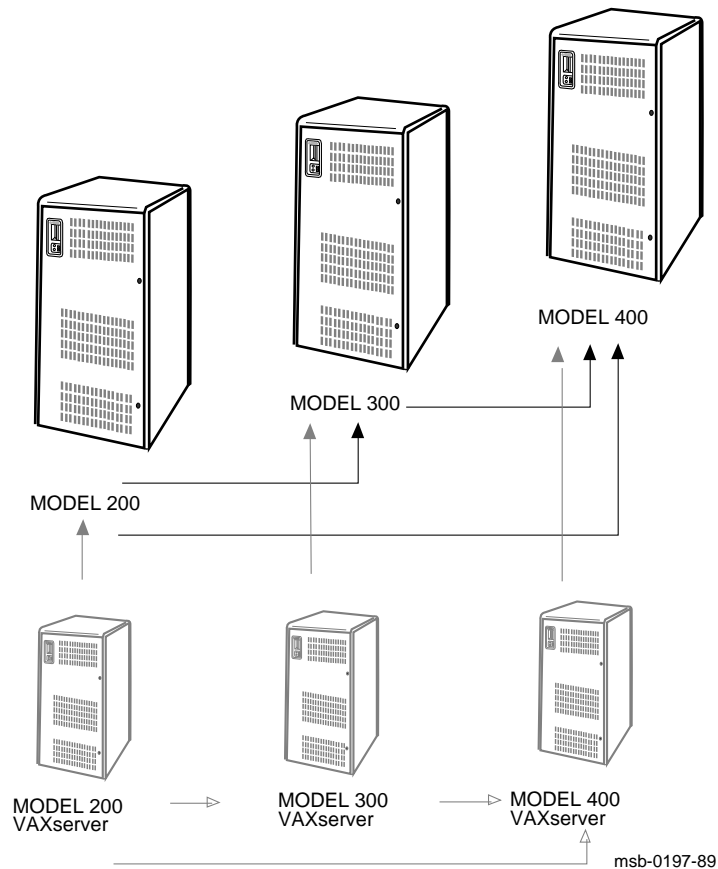
Models 300 and 400 can have up to six processors; Model 200 systems are limited to four. All systems support up to eight memory modules and five or six VAXBI channels depending upon whether there is a single 12-slot or two 6-slot VAXBIs in the system cabinet. System configurations are constrained by the 14-slot limit of the XMI card cage. Systems may be upgraded when XMI slots are available.

Installing upgrades within the same model is described in Chapter 2.

1.3 Upgrading to Another Model

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 from one model to another.

Figure 1-3: Upgrading Across Models



For details on upgrading from one model to another, see Chapter 3.

A Model 200 can be upgraded to a Model 300 or 400.

A Model 300 can be upgraded to a Model 400.

To upgrade any of these models to a Model 500, see the *VAX 6000: Installing Model 500 Processors*.

You can also convert VAXserver systems to timeshare systems. In most cases this conversion is done by module swaps, but sometimes it must be done by replacing ROMs on CPUs. For instructions on ROM replacement, see Appendix C.

Chapter 2

Upgrading Within a Model

Upgrades within a model, done by adding more processors to a VAX 6000 Model 200, 300, or 400 system, involve the following steps:

- Record EEPROM Parameters
- Install New Processors

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

The following table lists only the processors covered by this manual.

VAX 6000	Timeshare Processor		Server Processor	
	Part No.	Module No.	Part No.	Module No.
Model 200	KA62A-AA	T2011	KA62A-AB	T2011-YC
Model 300	KA62B-AA	T2011-YA	KA62B-AB	T2011-YB
Model 400	KA64A-AA	T2015	KA64A-AB	T2015-YA

2.1 Record EEPROM Parameters

To make a record of the system parameters deposited in the EEPROM, use the console INITIALIZE and SHOW ALL commands. If a record already exists, you can ignore this step.

Example 2-1: Retrieving EEPROM Information

```
>>> INITIALIZE ❶
#123456789 0123456789 0123456789 01234567#
F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #
      A   A   .   A   M   M   .   .   .   .   .   .   P   P           TYP
      +   +   .   +   +   +   .   .   .   .   .   .   +   +           STF
      .   .   .   .   .   .   .   .   .   .   .   .   E   B           BPD
      .   .   .   .   .   .   .   .   .   .   .   .   +   +           ETF
      .   .   .   .   .   .   .   .   .   .   .   .   E   B           BPD

      .   .   .   .   A2  A1   .   .   .   .   .   .   .   .           ILV
      .   .   .   .   64  64   .   .   .   .   .   .   .   .           128 Mb

ROM0 = V3.00  ROM1 = V3.00  EEPROM = 2.03/3.00      SN = SG01234567

>>> SHOW ALL ❷

      Type      Rev
1+  KA64A      (8082) 0007
2+  KA64A      (8082) 0007
9+  MS65A      (4001) 0084
A+  MS65A      (4001) 0084
B+  KDM70      (0C22) 1811
D+  CIXCD      (0C05) 1652
E+  DEMNA      (0C03) 0601

Current Primary: 1
/NOENABLED-
/NOVECTOR_ENABLED-
/NOPRIMARY- 2

F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #
      .   .   .   .   A2  A1   .   .   .   .   .   .   .   .           ILV
      .   .   .   .   64  64   .   .   .   .   .   .   .   .           128 Mb
```

Example 2-1 Cont'd on next page

Example 2–1 (Cont.): Retrieving EEPROM Information

```
/INTERLEAVE: DEFAULT          !default
/SCOPE /SPEED: 9600 /BREAK     !result of SET TERMINAL
English                       !default
XMI:E 08-00-2B-08-3D-64       !nothing to set
DEFAULT /XMI:B DU0            !result of SET BOOT
DIAG /R5:00000010 /XMI:B DU0  !result of SET BOOT
```

The *Site Management Guide* may have a copy of the current EEPROM settings or you may already have a current TK tape. If this is the case, you can skip this step. Example 2–1 shows how to record stored parameters using the INITIALIZE and SHOW commands.

- ❶ Find the system serial number by entering the INITIALIZE command. On the last line of the self-test display note the system serial number.
- ❷ Use the SHOW ALL command to get the customized boot parameters, interleave characteristics, terminal setup, and any other parameters. You will need this information to customize the EEPROMs on the new processors you are adding to the system.

2.2 Install New Processors

Add new processors in slots to the left of current processors. If other options are being installed, now is the time to put them in the system. See Appendix B for configuration rules.

CAUTION: *Model 400 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, hold the XMI card cage lever up. Failure to do so may result in damage to the module.

Example 2-2: Adding Processors

```
#123456789 0123456789 0123456789 01234567#
F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #
      A   .   A   A   M   M   .   .   .   .   P   P   P   P           TYP  ⑧
      +   .   +   +   +   +   .   .   .   .   +   +   +   +           STF
      .   .   .   .   .   .   .   .   .   .   E   E   E   B           BPD
      .   .   .   .   .   .   .   .   .   .   +   +   +   +           ETF
      .   .   .   .   .   .   .   .   .   .   E   E   E   B           BPD

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

ROM0 = V3.00  ROM1 = V3.00  EEPROM = 2.03/3.00      SN = SG01234567

?2D For Secondary Processor 3  ⑨
?5A System serial number mismatch.  Secondary processor has 00000000.
?2D For Secondary Processor 4
?5A System serial number mismatch.  Secondary processor has 00000000.
```

NOTE: *You may also see ROM mismatch messages. Some mismatched console ROMs will work together; others will not.*

- *Model 400 revision 2.x ROMs work with revision 3.x ROMs. Revision 1.x ROMs are incompatible with other ROM revisions.*
- *Model 300 revision 4.x ROMs work with revision 6.x ROMs.*
- *Model 200 revision 3.x ROMs work with revision 5.x ROMs.*

2-4 VAX 6000: Installing Model 200/300/400 Processors

1. Perform an orderly shutdown of the system.
2. Turn the upper key switch on the front control panel to the Off position.
3. Open the front cabinet door.
4. 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.*

5. 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.

6. Replace the clear door.
7. Power up the system by turning the lower key switch to Halt and the upper key switch to Enable.
8. Check the self-test display for the two new processors, each indicated by a P on the TYP line (in Example 2-2 two processors were added in slots 3 and 4; see ③). If the processors show a plus sign (+) on both lines STF and ETF, they passed self-test.
9. Check the error messages. Messages ?2D and ?5A appear when new processors are installed on a Model 400 (see ⑨). (?2D and ?59 appear for Models 200 and 300.) These messages are cleared when parameters are set (see Section 4.3).

The text of the console error messages for Models 200, 300, and 400 is the same. However, the message code numbers may differ between the Model 400 and the other two models.

You can now move on to complete the installation and verify the system operation. See Chapter 4 for verification procedures.

Chapter 3

Upgrading to Another Model

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

- Upgrade Software
- Record EEPROM Parameters
- Replace Processors

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

VAX 6000 modules are fragile and very static sensitive. Detailed instructions for handling are given in Appendix A.

The following table lists only the processors covered by this manual that can be upgraded to another higher model. To upgrade to a higher model, see the appropriate installation guide.

VAX 6000	Timeshare Processor		Server Processor	
	Part No.	Module No.	Part No.	Module No.
Model 200	KA62A-AA	T2011	KA62A-AB	T2011-YC
Model 300	KA62B-AA	T2011-YA	KA62B-AB	T2011-YB
Model 400	KA64A-AA	T2015	KA64A-AB	T2015-YA

3.1 Upgrade Software

Make sure that the operating system currently installed supports the new hardware. If the operating system is below the minimum revision, install newer software before performing the hardware upgrade. If your system has a CIBCA-A CI adapter, make a new console tape that includes the appropriate VMB and the CIBCA-A microcode.

Table 3–1: Operating System Minimum Revisions

VAX 6000	VMS	ULTRIX with ASMP	ULTRIX with SMP
Model 200	5.0	3.0	4.0
Model 300	5.1	3.1A	4.0
Model 400	5.2	3.1B	4.0
Model 400 with Vector	5.4	4.2	4.2

Example 3–1: Making a New Console Tape

```
$ 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:
```

3–2 VAX 6000: Installing Model 200/300/400 Processors

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 hardware.

Table 3-1 shows the minimum revisions of VMS and ULTRIX for the given hardware model. Install newer software before upgrading the hardware, if the operating system is below minimum. If the operating system is at the appropriate level, move on to the next step.

To determine the revision of the operating system, use the following commands:

- `SHOW SYSTEM` or `SHOW CLUSTER` for a VMS operating system
- `cat /etc/motd` for an ULTRIX operating system

In addition, if the system uses a console tape because of a CIBCA-A,¹ make a new tape with the latest version of VMB. VMB is used by both VMS and ULTRIX as the primary bootstrap loader.

To make a new console tape, issue the commands seen in Example 3-1.

¹ Early VAX 6000 series systems used the CIBCA-A CI adapter. The CIBCA-A loads microcode from the console media. The microcode for CIBCA-B adapters, found on later VAX 6000 series systems, is onboard.

3.2 Record EEPROM Parameters

To make a record of the system parameters deposited in the EEPROM, use the console INITIALIZE and SHOW ALL commands. If a record already exists, you can ignore this step.

Example 3–2: Retrieving EEPROM Information

```
>>>INITIALIZE ❶
```

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

ROM = 3.0 EEPROM = 2.00/3.00 SN = SG01234567

```
>>> SHOW ALL ❷
```

Type	Rev	
1+ KA62A	(8001) 0002	! Shows the system configuration
2+ KA62A	(8001) 0002	! for a VAX 6000 Model 220 system
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.): Retrieving EEPROM Information

```
Current Primary: 1
/NOENABLED-
/NOPRIMARY- 2

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
English
XMI:D BI:6 08-00-2B-08-3D-64
DEFAULT /XMI:E /BI:4 DU0
DIAG /R5:00000010 /XMI:E /BI:5 DU1
HSC /R5:40000000 /XMI:D /BI:2 /NODE:00000405 DU0
```

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

Since you will be replacing all processors, you will need to set the system parameters as they were before the upgrade.

- ❶ The INITIALIZE command runs self-test and displays the results.

The system serial number is displayed in the last line. The number can also be found on a label placed on the rear left cabinet upright near the bottom. You must store the system serial number in the EEPROM of each processor.

- ❷ The SHOW ALL command provides a summary of much of the information that is stored in the EEPROM on each processor. Record these system parameters by printing SHOW ALL to the console printer.

3.3 Replace Processors

Remove the older model processor modules from the XMI card cage and place in ESD boxes for return to Digital (see Section 4.11). Carefully insert the new processor modules. See Appendix B for configuration rules.

CAUTION: *VAX 6000 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

```
#123456789 0123456789 0123456789 01234567# ⑨
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 ⑩
      O   O   .   .   +   +   .   .   .   .   +   +   +   +           STF
      .   .   .   .   .   .   .   .   .   .   E   E   E   B           BPD
      .   .   .   .   .   .   .   .   .   .   +   +   +   +           ETF
      .   .   .   .   .   .   .   .   .   .   E   E   E   B           BPD
.   .   .   .   .   .   .   .   .   +   .   +   .   .   +   .   XBI D +
.   .   .   .   .   .   .   .   .   +   .   +   .   .   +   .   XBI E +

      .   .   .   .   A2   A1   .   .   .   .   .   .   .   .           ILV
      .   .   .   .   32   32   .   .   .   .   .   .   .   .           64 Mb
ROM0 = V3.00  ROM1 = V3.00  EEPROM = 2.03/3.00  SN = SG00000000
?4F System serial number has not been initialized. ⑪
```

Example 3-3 shows the output of a VAX 6000 Model 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. Open the front cabinet door.
4. 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.*

5. Remove the processors to be replaced and put them in ESD boxes to be returned (see Section 4.11). 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.
6. Replace the clear door.
7. Use the Break key on the terminal to set its baud rate to 1200, the default baud rate for processor modules communicating to the console.
8. Power up the system by turning the lower key switch to Halt and the upper key switch to Enable.
9. The first line of the self-test display in Example 3-3 indicates the progress of self-test (see ❸); these numbers appear only for Model 400 systems.
10. Check the self-test display for the four new processors, each indicated by a P on the TYP line in the example (see ❹). If the processors show a plus sign (+) on both lines STF and ETF, they passed self-test.
11. Check the error messages (see ❺). The ?4F error message appears:

?4F System serial number has not been initialized.

(Section 4.3 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.*

You can now verify the system operation. See Chapter 4 for verification procedures.

Chapter 4

Verifying the System

The steps to verify the correct operation of the upgraded system are described in this chapter. In addition, the chapter describes the final steps to complete the upgrade including the setting and recording of system parameters, changing the number plate on the cabinet, and instructions on returning modules. Sections include:

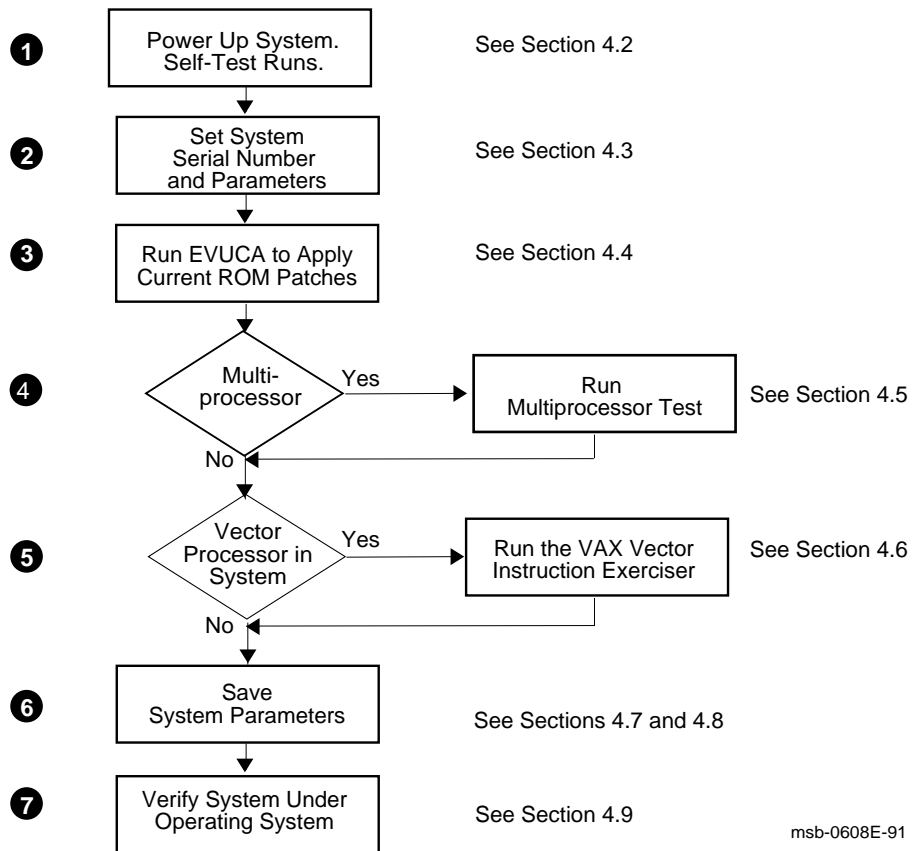
- Verification Overview
- Examine the Self-Test
- Set System Parameters (Mandatory)
- Run EVUCA to Apply Current ROM Patches (Mandatory)
- Run the Multiprocessor Test (Optional)
- Run the VAX Vector Instruction Exerciser (Optional, Model 400 only)
- Print System Parameters (Optional)
- Save EEPROM to TK Tape (Optional)
- Verify System Under Operating System
- Change System Number Plate
- Return Modules

If you want to run ROM-based diagnostics, see the processor chapters of the *VAX 6000 Models 300 and 400 Service Manual* for more information.

4.1 Verification Overview

To verify the new processors, turn the system on and run self-test. Set system parameters. Apply current ROM patches with EVUCA. If necessary, run the Multiprocessor Test and the VAX Vector Instruction Exerciser. Boot the operating system and run applicable tests.

Figure 4-1: Verification Flowchart



To complete installation and verification of the upgraded system:

- ❶ Power up the system. Self-test runs and tests all modules.
- ❷ Set the system serial number on all new processors.

Set system parameters. As part of the preparation for the upgrade, you issued the INITIALIZE and SHOW ALL console commands. Using this listing, restore system-specific parameters such as boot specifications, console baud rate, memory interleave, and so forth. You might want to check with the system manager to see if any new parameters should be set. See Section 4.3.
- ❸ Boot the VAX Diagnostic Supervisor and run the EVUCA program to apply current ROM patches. See Section 4.4.
- ❹ Run the Multiprocessor Test if the system is a multiprocessing system. See Section 4.5.
- ❺ If the system has a vector processor, run the VAX Vector Instruction Exerciser. See Section 4.6.
- ❻ If parameters were changed, record and save them. If your system has a TK tape, use the SAVE EEPROM command to save the EEPROM image. Otherwise save a hardcopy record. See Sections 4.7 and 4.8.
- ❼ Verify the system under the operating system. See Section 4.9.

Finally, if you upgraded across models, return the old processor modules to Digital.

4.2 Examine the Self-Test

At system power-up, self-test runs, checking all modules.

Example 4–1: Self-Test for Upgrading VAX 6000 Model 410 to 420

```
#123456789 0123456789 0123456789 01234567#
F   E   D   C   B   A   9   8   7   6   5   4   3   2   1   0   NODE #
      A   A   .   .   A   M   M   .   .   .   .   .   .   P   P       TYP ①
      +   +   .   +   +   +   .   .   .   .   .   .   +   +       STF ②
      .   .   .   .   .   .   .   .   .   .   .   .   E   B       BPD
      .   .   .   .   .   .   .   .   .   .   .   .   +   +       ETF ③
      .   .   .   .   .   .   .   .   .   .   .   .   E   B       BPD
      .   .   .   .   A2  A1   .   .   .   .   .   .   .   .       ILV
      .   .   .   . 128 128   .   .   .   .   .   .   .   .       256Mb

ROM0 = 3.00   ROM1 = 3.00   EEPROM = 2.03/3.00   SN = SG01234567

?2D For Secondary Processor n
?5A System serial number mismatch. Secondary Processor has xxxxxxxx ⑤
>>>
```

Example 4–2: Self-Test for Upgrading VAX 6000 Model 220 to 340

```
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 ①
      O   O   .   .   +   +   +   +   .   .   +   +   +   +       STF ②
      .   .   .   .   .   .   .   .   .   .   E   E   E   B       BPD
      .   .   .   .   .   .   .   .   .   .   +   +   +   +       ETF ③
      .   .   .   .   .   .   .   .   .   .   E   E   E   B       BPD
      .   .   .   .   .   .   .   .   .   .   +   .   +   +       XBI D + ④
      .   .   .   .   .   .   .   .   +   .   +   +   +       XBI E +
      .   .   .   .   A4  A3  A2  A1   .   .   .   .   .   .       ILV
      .   .   .   .  32  32  32  32   .   .   .   .   .   .       128Mb

ROM = 6.0           EEPROM = 2.0/6.0           SN = 0000000000

?4F System serial number not initialized on primary processor. ⑤
>>>
```

The first phase of verification involves checking the self-test results. When you power up the system, self-test runs, showing the state of each module in the system. (Entering the INITIALIZE command at the console prompt also generates self-test.)

Example 4-1 shows a self-test of an upgrade from a VAX 6000 Model 410 to a Model 420. Example 4-2 shows an upgrade from a VAX 6000 Model 220 to a Model 340.

NOTE: *If self-test does not display on power-up, the console baud rate in the EEPROM and your terminal baud rate may not be set the same. Hit the **BREAK** key, which steps the terminal baud rate in the available increments, until you get the console prompt (>>>). Then type INIT to start self-test.*

- ❶ Examine the self-test results. P on the TYP line shows which slots contain processors (see ❶ in both Example 4-1 and Example 4-2).
- ❷ Check the STF line to see that all processors and other XMI modules passed self-test.
- ❸ Check the ETF line to see that all processors passed the extended test.
- ❹ Check the XBI lines for self-test results for VAXBI modules. (Only the system in Example 4-2 contains a VAXBI.)
- ❺ The system serial number error message appears, indicating that the processors do not have the system serial number in their EEPROMs. Note that the error messages in the two examples are different. In Example 4-1 the message points out that there is a system serial number mismatch. In Example 4-2 the message points out that the system serial number has not been initialized on the primary processor.

If a processor module fails self-test, as shown by a minus (-) rather than a plus in the STF or ETF rows, the most likely cause is a poor electrical contact between the ZIF connector and the module. Power the system down, reseal the failed module by jiggling it and opening and closing the ZIF connector, and power the system up again.

If the processor module continues to fail self-test, replace it. To further isolate the problem, look at the module LEDs. Appendix C shows how to interpret the error LEDs on the processor modules.

4.3 Set System Parameters (Mandatory)

Set the system serial number on all new processors using the SET SYSTEM SERIAL command.

Example 4–3: Setting the System Serial Number and Parameters

```
>>> SET CPU n ②                                ! Connect the console to
                                                ! the rightmost new CPU.

>>> [CTRL/3] [ or [ESC] ] [DEL] SET SYSTEM SERIAL ③
Enter system serial number? aaaaaaaaaa ! System prompts for serial
                                         ! number; enter 2-alpha,
                                         ! 8-numeric digit serial number.

Update EEPROM? (Y or N) >>> Y              ! System prompts for response.
?73 System serial number updated.          ! Enter Y to update the boot
                                         ! processor's serial number.

>>> SET BOOT DEFAULT /XMI:E /BI:4 DU0 ④

>>> SET LANGUAGE INTERNATIONAL

>>> SET TERMINAL /[NO]SCOPE /SPEED:9600 /[NO]BREAK
```

You must set the system serial number on each new processor.

To set the serial number and set other system parameters:

1. Set the lower key switch to Update. If you forget to set the key switch, you will receive a console error message when trying to write to the EEPROM.
2. The SET SYSTEM SERIAL command does not propagate from one CPU to the next as do the other SET commands. Therefore, the console must be connected to each new processor and the command issued to that processor. To do this, connect the console to the rightmost new processor by issuing the SET CPU *n* command, where *n* is the slot of the target CPU (see ❷).
3. Set the system serial number to be the same as the old serial number. To issue the SET SYSTEM SERIAL command, depending on your keyboard, you enter one of the following:

```
>>> [CTRL/3] [DEL] SET SYSTEM SERIAL NUMBER ! VT200 terminal and higher
```

```
>>> [ESC] [DEL] SET SYSTEM SERIAL NUMBER ! VT100 and hardcopy terminal
```

At the prompt enter the serial number for the system. Confirmation is requested. You type Y.

Repeat Steps 2 and 3 for each new CPU.

4. Now issue other console commands to customize system parameters. These commands include SET BOOT, SET TERMINAL, SET LANGUAGE, and SET CPU. These SET commands need only be issued once, since they propagate to each CPU in the system. Refer to the printout you created using the SHOW ALL command for the parameter settings.

4.4 Run EVUCA to Apply Current ROM Patches (Mandatory)

You must run EVUCA to ensure that EEPROMs on all modules are up to the latest patch revision. Boot the VAX Diagnostic Supervisor (VAX/DS), run the autosizer EVSBA, and then run the EVUCA program.

Example 4-4: EVUCA Program (Part 1)

```
>>> BOOT /XMI:D /R5:10 /BI:4 DU0 ❶
      [The VAX Diagnostic Supervisor banner appears.]

DS> RUN EVSBA ❷
DS> SELECT ALL ❸
DS> SET TRACE
DS> RUN EVUCA ❹

.. Program: EVUCA - VAX 6000 EEPROM Update Utility, revision 1.0, 5 tests,
   at 00:05:57.61.
Testing: _KA0 _KA1

Booting secondary CPU 02.
Test 2: Load data from media

Data file? <ELUCB.BIN> ❺

Searching for data file.
Data file loaded.

Looking for patch for CPU 01 - ROM 06.00 EEPROM 06.00.
Patch image is revision 06.01
Do you really want to apply this patch [(No), Yes] YES ❻

Looking for patch for CPU 02 - ROM 06.00 EEPROM 06.00.
Patch image is revision 06.01
Do you really want to apply this patch [(No), Yes] YES ❻

Test 3: Determine Typecodes Updated
Test 4: Update EEPROM data

Getting selectable boot primitives for CPU 01, ROM 06.00
```

EVUCA checks ROM levels on all processors and applies the latest patches to each processor. Example 4-4 and Example 4-5 show a sample EEPROM update of a Model 300 two-processor system. In these examples, the boot processor is in slot 1 of the XMI card cage, and a secondary processor is in slot 2.

- ❶ At the console prompt, boot VAX/DS. The /R5 qualifier specifies the VAX Diagnostic Supervisor program.
- ❷ At the VAX/DS prompt, run the autosizer EVSBA to attach all devices. This process takes time now, but saves you time when you run the other subtests.
- ❸ Type SELECT ALL to select all devices in the system configuration. SET TRACE enables printing of test numbers and names when EVUCA runs. It allows you to follow the progress of testing.
- ❹ Issue the RUN EVUCA command to start the program. The EVUCA banner appears, with its revision level and subtest numbers. The program determines which VAX model it is running on and then loads test 2.
- ❺ EVUCA displays the data file for the VAX model it is running on. Press Return to continue the program. EVUCA finds and loads the data file indicated. Program messages inform you of progress.
- ❻ EVUCA prompts you to verify that a patch is to be made. The program requires verification for each processor to apply patches. Enter *YES* to continue the program.

Example 4-5: EVUCA Program (Part 2)

CPU 02 has the same ROM revisions as CPU 01 ⑦
Boot primitives are the same for these CPUs.

Updating CPU 01 ⑧
Primary CPU 01 Done.

Secondary CPUs are being updated, please wait a maximum of 20 seconds. ⑨
Updating CPU 02
Secondary CPU 02 Done.

Test 5: Show Boot primitives ⑩

ROM boot primitives for CPU 01, revision 06.01 are:

- 1 This boot primitive supports the following:
 - boot primitive designation CI
 - Device CIBCA, device type 0108
 - Device CIXCD, device type 0C05
 - 2 This boot primitive supports the following:
 - boot primitive designation DU
 - Device KDB50, device type 010E
 - Device KDM70, device type 0C22
 - 3 This boot primitive supports the following:
 - boot primitive designation ET
 - Device DEBNI, device type 0118
 - Device DEBNA, device type 410F
 - Device DEMNA, device type 0C03
 - 4 This boot primitive supports the following:
 - boot primitive designation MU
 - Device TBK50, device type 410E
 - Device TBK70, device type 410B
- No boot primitives found in EEPROM for CPU 01

CPU 02 has the same ROM revisions as CPU 01 ⑪
Boot primitives are the same for these CPUs.

The primary CPU was successfully updated.
Secondary CPU 02 was successfully updated. ⑫

Current ROM and EEPROM revisions for each CPU are:
CPU 01 - ROM 06.00 EEPROM 06.01
CPU 02 - ROM 06.00 EEPROM 06.01 ⑬

.. End of run, 0 errors detected, pass count is 1,
time is 31-DEC-1990 00:04:45.16
DS> EXIT ⑭

>>>

4-10 VAX 6000: Installing Model 200/300/400 Processors

- ⑦ EVUCA program compares the existing ROM revisions of all CPUs attached. Here, it notes that both CPUs are at the same revision level.
- ⑧ Program informs you that it is updating the CPU at node 1.
- ⑨ Program informs you that it is updating secondary CPUs. In this example, there is only one secondary CPU at node 2.
- ⑩ EVUCA program begins display of boot primitives that are being loaded into EEPROM.
- ⑪ Again, the program checks that the ROM revision levels of all CPUs match. This is similar to ⑦.
- ⑫ Update of secondary processor(s) reported.
- ⑬ ROM and EEPROM levels are reported. These revision numbers will appear at the bottom line of the system's self-test printout at next system reset.
- ⑭ Issue an EXIT command to exit EVUCA and the VAX Diagnostic Supervisor. The console prompt returns.

4.5 Run the Multiprocessor Test (Optional)

Run the multiprocessor test once; it is not necessary to change boot processors.

Example 4–6: Running the Multiprocessor Diagnostic

```
DS> SET EVENT 2 ❶      ! Sets event flag to suppress messages for
                        ! tests 7 and 9.

DS> RUN ERKMP ❷        ! ERKMP is the multiprocessor test for
                        ! 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: XMI Lockout Test
Test 8: Cache Coherency Test
Test 9: XMI Suppress Assertion Test
Test 10: Multiprocessor Exerciser
.. End of run, 0 errors detected, pass count is 1,
time is 1-JAN-1991  00:33:49.77

DS> EXIT ❸

>>>
```

Example 4-6 assumes that the VAX Diagnostic Supervisor has been booted and that the standalone autosizer (EVSBA) has been run. It also assumes that the trace flag has been set and that the processors have been targeted by the SELECT command. Each of these conditions should have been done in Section 4.4.

- ❶ Issue SET EVENT 2 to suppress a large number of messages.
- ❷ 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.
- ❸ If the system does not have a vector processor, exit VAX/DS.

4.6 Run the VAX Vector Instruction Exerciser (Optional, Model 400 only)

If your system has a vector processor, use the VAX Diagnostic Supervisor to run the two-part vector diagnostic, EVKAG and EVKAH, on each scalar/vector pair.

Example 4-7: 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 16:02:48.71.
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
>>>
```

Example 4-7 shows how to run the vector diagnostics from the VAX Diagnostic Supervisor. There are two scalar/vector pairs; one in XMI slots 1 and 2 and another in XMI slots 4 and 5. The scalars are in slots 1 and 4. Example 4-7 assumes that you have run the autosizer, EVSBA, and selected all devices, as in Example 4-4. Example 4-8 shows the self-test display for the system being tested.

- ❶ Issue the SET QUICK command to run the shorter version of the tests.
- ❷ All devices were selected previously, so you must now deselect 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 4–8 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 4–8), find 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. At ❺, the BOOT command specifies the CPU at node 4 as the boot processor.
- ❻ Deselect KA0, select KA1, and run EVKAG and EVKAH on KA1.
- ❼ Issue the BOOT command to return the CPU at node 1 to boot processor and exit.

Example 4–8: Self-Test from System with Vector Processors

```
#123456789 0123456789 01234567890 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
    +  +  .  .  .  +  +  .  +  +  +  +  +  STF
    .  .  .  .  .  .  .  .  .  E  E  .  E  B  BPD
    .  .  .  .  .  .  .  .  .  +  +  .  +  +  ETF
    .  .  .  .  .  .  .  .  .  E  E  .  E  B  BPD

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

ROM0 = 3.00  ROM1 = 3.00  EEPROM = 2.03/3.00  SN = SG01234567
```

4.7 Print System Parameters (Optional)

If you made changes to the system parameters, use the INITIALIZE and SHOW ALL commands to print the system parameters in effect for this system. Turn the console terminal printer on and save the printout from the console commands in your Site Management Guide.

Example 4–9: System Parameters Printout

```
❶ >>> INITIALIZE
    [self-test display prints]

❷ >>> SHOW ALL
    [show all display prints]
```

For future troubleshooting and maintenance, record system parameters. This step is especially important for single-processor systems and systems that have a CD load device. Use hardcopy printout and save the printout in your *Site Management Guide*.

❶ INITIALIZE

Enter the INITIALIZE command at the console prompt. This display includes the system serial number, which is not included in the SHOW ALL command.

❷ SHOW ALL

Use the SHOW ALL command to record other system information for future reference.

4.8 Save EEPROM to TK Tape (Optional)

If your system has a TK tape, save EEPROM to the TK. This tape would be used in case the EEPROM contents become corrupted and must be restored.

Example 4–10: Saving EEPROM to TK Tape

```
>>> SAVE EEPROM ❶  
Proceed with save to tape? (Y or N) >>> Y ❷  
?6B EEPROM saved to tape successfully  
>>>
```

Put a blank cartridge in the TK drive, write-enabled. The following steps save the contents of the EEPROM to TK tape:

- ❶ Enter the SAVE EEPROM command.
- ❷ The console program queries you. Enter a *Y* to save the EEPROM contents to tape. The console program then confirms that the save operation completed successfully.

Label the cartridge and store on site. Leave the TK cartridge with the system manager, in case EEPROM contents become corrupted and need to be restored.

NOTE: *Use this TK cartridge with this system only. TK tapes are not transferable, since the parameters saved are system-specific.*

4.9 Verify System Under Operating System

After you have started the operating system, run any appropriate tests. With VMS, you can use a set of programs called UETP (User Environment Test Package). With ULTRIX, you will want to run the various system exercisers.

Example 4-11: Running UETP

```
Username: SYSTEST ❶
Password:
$ @UETP ❷
    Welcome to VAX/VMS UETP Version V5.x ❸

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

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

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

Example 4–12: Running ULTRIX System Exercisers

```
% su ❶ ! Log in as a superuser
Password:
# cd /usr/field ❷ ! Set the current directory as usr/field

# syscript ❸ ! Create and run a system test
OR
# sh testsuit ! Run a system test previously created
[diagnostic test results print] ❹
```

- ❶ Log in as a superuser.
- ❷ Set the current directory to the **usr/field** where the system exercisers reside. The exercisers cover the following system areas:
 - System memory and file systems
 - Peripherals
 - Network and communications systems
- ❸ Either set up a new system test using the **syscript** command or run a previously entered set of tests. The **syscript** command executes the exercisers you specify and writes a file called **testsuit** that can be executed again later.
- ❹ The results of the exercisers are printed on the terminal from which they are run. The results are also written to log files placed in the current directory. Errors are also recorded in the error log.

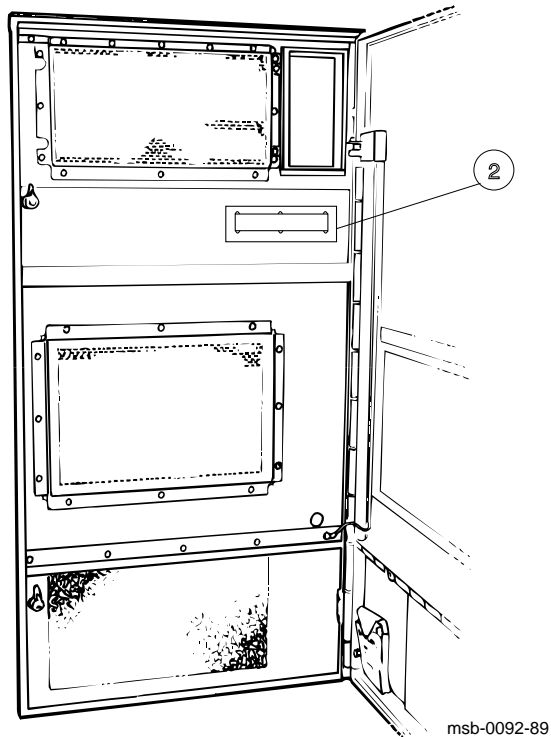
See the *ULTRIX-32 Guide to System Exercisers* for more information on the ULTRIX system exercisers.

See the *ULTRIX-32 Guide to the Error Logger System* for information on the ULTRIX error logger.

4.10 Change System Number Plate

On the system cabinet front door, change the number plate to reflect the number of your system upgrade.

Figure 4-2: Front Door (Inside View)



1. Locate the number plate (74-39700-XX) in your upgrade kit.
2. To change the VAX number plate, working from the inside of the front cabinet door, remove the retainer and push out the system numbers. See ❷ in Figure 4-2. Install the new number for your upgraded system.

4.11 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.)

Appendix A

Module Handling

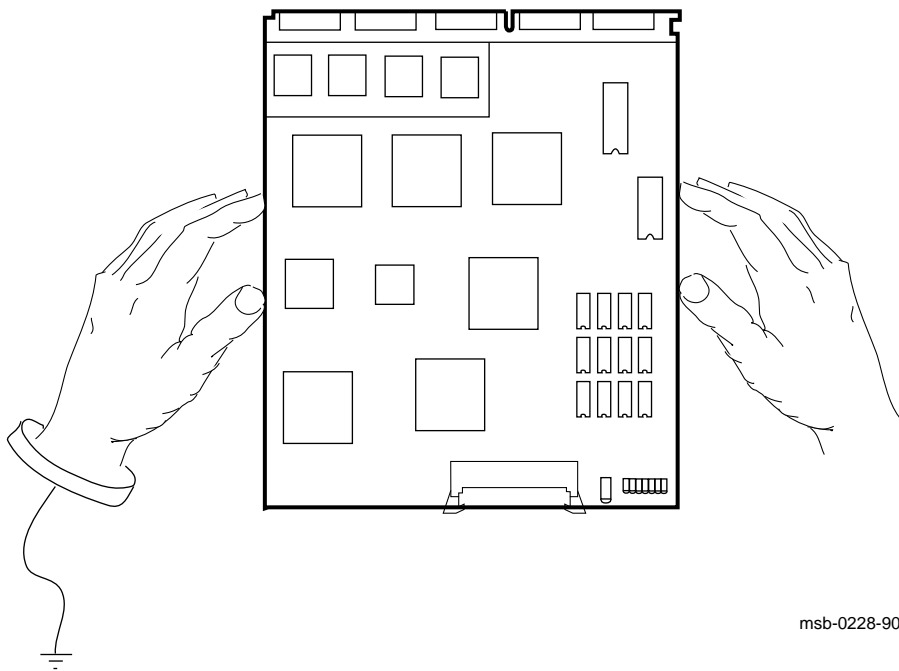
This appendix gives detailed instructions on handling scalar and vector processor modules for VAX 6000 systems. The sections include:

- 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



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The 6000 series modules require careful handling. Prepare yourself and the work area before handling these modules. Roll up your sleeves and remove any jewelry. Figure 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

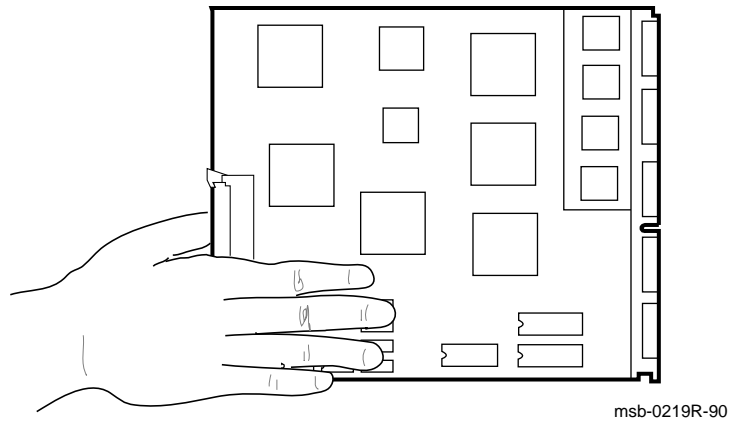
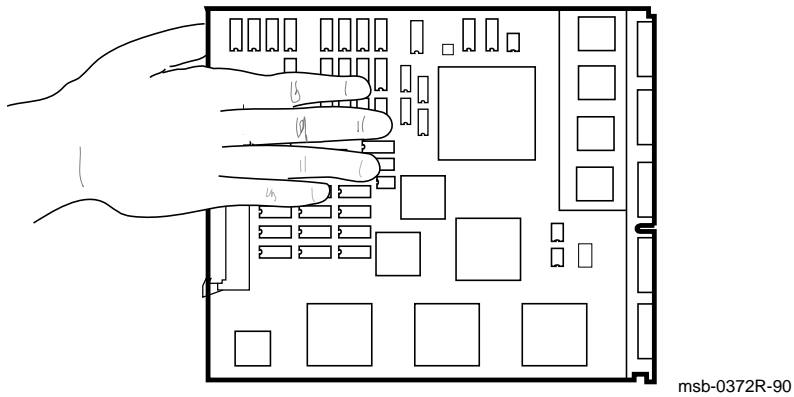


Figure A-3: Inserting the Vector Processor in an XMI Card Cage



A-4 VAX 6000: Installing Model 200/300/400 Processors

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.

Appendix B

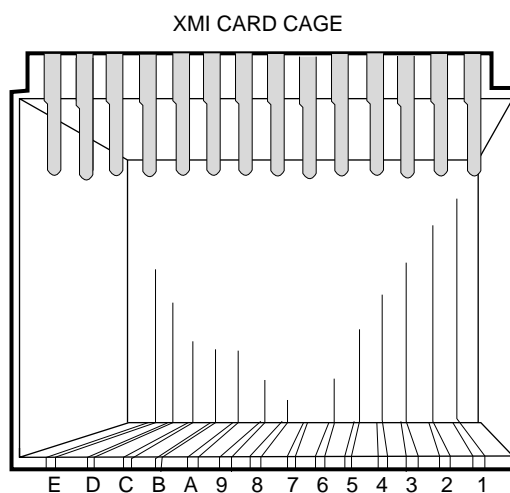
XMI Configuration Rules

This appendix gives configuration rules for the XMI card cage. Sections in this appendix include:

- General Configuration Rules
- FV64A Vector Configuration Rules

Figure B-1 shows the numbering of the XMI card cage slots.

Figure B-1: Numbering of XMI Slots



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B.1 General Configuration Rules

Figure B-2 shows XMI configuration information for Model 200, 300, and 400 systems.

Figure B-2 shows the maximum number of processor, memory, and I/O modules that may be installed in a Model 200, 300, or 400 system. Slots where a module may **not** be installed are indicated by the letter N. Installation in all other slots is permitted.

Typically, I/O adapters are installed first, then processors, followed by memory.

Figure B-2: XMI Configuration Rules for Models 200, 300, and 400

MODULE	LIMIT	① SLOT													
		E	D	C	B	A	9	8	7	6	5	4	3	2	1
PROCESSOR	6 ②														
MEMORY	8 ③	N													N
I/O	8 ④					N	N	N	N	N	N				

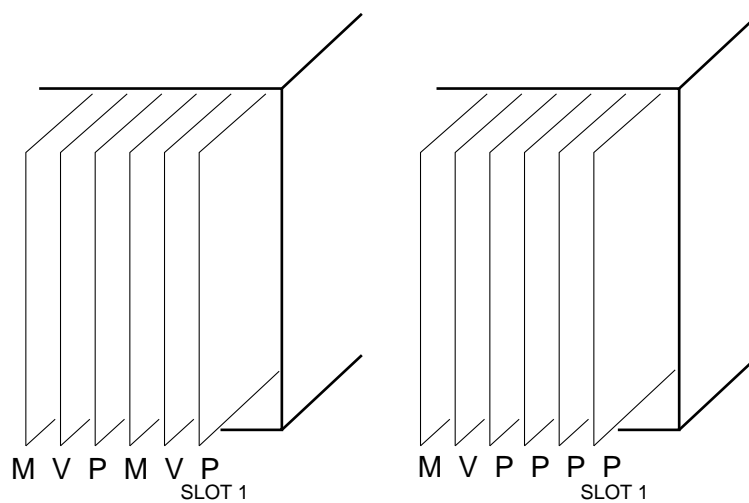
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- ① Slot E must contain a module. A DWMBB/A or DWMBB/A module is in slot E when the system has a VAXBI bus.
- ② A system with a vector processor has special configuration rules; see Section B.2.
- ③ The total amount of memory is limited to 512 Mbytes. MS62A and MS65A memory are supported. No memory is permitted in slots 1 and E in an XMI-1 card cage.
- ④ Slots 5 through A may not contain I/O modules.

B.2 FV64A Vector 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 B-3: Scalar/Vector Configurations



TWO SCALAR/VECTOR PAIRS

ONE SCALAR/VECTOR PAIR

KEY:

M= MEMORY
V= VECTOR PROCESSOR
P= SCALAR PROCESSOR

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Table B-1 shows the maximum number of scalar and vector processors supported in VAX 6000 systems (Model 400 and later).

Table B-1: Processor Module Combinations

Maximum Scalar Processors	Maximum Vector Processors	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 B-3 shows configurations for a VAX 6000 system with one or two vector processors. The left side of the figure indicates the configuration for two scalar/vector pairs with a memory module in the slot to the left of the vector processor. The right side of the figure shows a single scalar/vector pair with additional scalar processors.

Typically, I/O adapters are installed first, then processors, followed by memory. However, in a system with a vector processor, the modules should be installed as shown in Figure B-3. 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 module.
- 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 is 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 C

Self-Test

Self-test results are displayed on the console terminal and are reported by module LEDs. Example C-1 is a sample self-test display for a VAX 6000 system; the example deliberately includes some failures to illustrate the type of information reported. Figure C-1 shows how to read LEDs on the KA64A, and Figure C-2 shows how to read LEDs on the KA62B and the KA62A. For a full discussion of self-test, see the *VAX 6000 Models 300 and 400 Service Manual* or the *VAX 6000 Series Owner's Manual*.

Example C-1: Sample Self-Test Results

```
#123456789 0123456789 0123456789 01234567# ❶

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

      A  A  .  .  M  M  M  M  .  .  P  P  P  P      TYP ❸
      o  o  .  .  +  +  +  +  .  .  +  +  -  +      STF ❹
      .  .  .  .  .  .  .  .  .  .  E  B  E  D      BPD ❺
      .  .  .  .  .  .  .  .  .  .  +  -  -  +      ETF ❻
      .  .  .  .  .  .  .  .  .  .  B  E  E  D      BPD ❼

.  .  .  .  .  .  .  .  .  .  .  .  .  .  .  XBI D - ❽
.  .  .  .  .  .  .  .  .  +  .  +  .  -  +  .  XBI E +

      .  .  .  .  B2  B1  A2  A1  .  .  .  .  .  .      ILV ❾
      .  .  .  .  32  32  32  32  .  .  .  .  .  .      128Mb ❿

ROM0 = V3.00  ROM1 = V3.00 ❾ EEPROM = 2.03/3.01 ❿ SN = SG01234567 ❿
>>>
```

❶ 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; you will see more tests.)

❷ Identifies the node number (NODE #).

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

❸ Identifies the module type (TYP).

P = processor
M = memory
A = adapter

❹ Gives self-test failure results (STF).

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

❺ Shows boot processor designation (BPD).

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

- ⑥ Gives extended CPU/memory tests failure results (ETF). Same interpretation as STF.
- ⑦ Shows the second boot processor designation, which may be different from that on the first BPD line.
- ⑧ Shows DWMBB or DWMBB test results, node number, and self-test results of the VAXBI nodes (XBI). The + or – at the right means that the DWMBB or DWMBB passed or failed when tested by the boot processor. If the DWMBB or DWMBB passed, a + or – corresponding to each VAXBI node indicates whether that node passed or failed its own self-test.
- ⑨ Displays the memory array membership in interleave sets (ILV). Each letter denotes a different interleave set.
- ⑩ Gives each memory array size and the total working memory size (Mb).
- ⑪ Shows the version number of the boot processor's ROMs (ROM0 and ROM1).
- ⑫ 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 example, revision 3.01 means that there has been one patch for base revision 3.00.
- ⑬ Lists the serial number of the system (SN).

Figure C-1: Sample KA64A Failure (Binary-Coded Decimal)

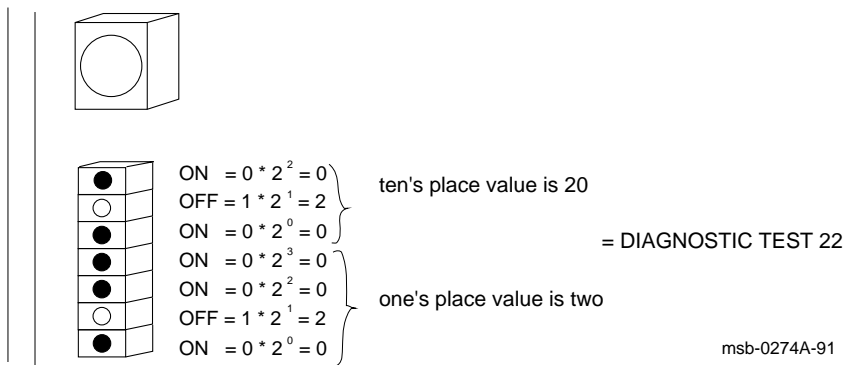
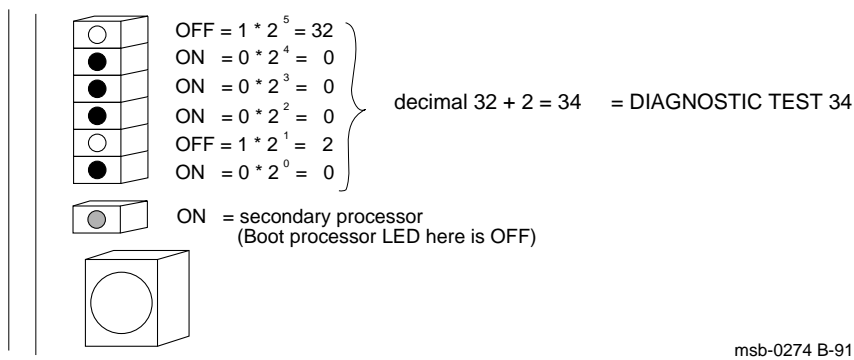


Figure C-2: Sample KA62A/KA62B Failure (In Binary)



Appendix D

ROM Replacement

This appendix describes how to install the timeshare console ROM. Early conversion kits were made up solely of ROMs; newer conversion kits contain modules. If you have a kit with a module, proceed as if you were upgrading within a system. If the kit has ROMs, use this appendix and the *VAX 6000 Model 200/300/400 Processor Console and Diagnostic ROM Upgrade Instructions* that are part of the kit.

To convert a server module to a timeshare module, you replace the server console ROM with a timeshare console ROM. Table D-1 gives the module designations before and after conversion. Figure D-1 and Figure D-2 show the location of the console ROMs.

Table D-1: Module Designation Before and After Conversion

Module	Part Number of Server	Part Number after Conversion
KA64A-AB	T2015 (-YA, -YB)	T2015
KA62B-AB	T2011-YC	T2011-YA
KA62A-AB	T2011-YB	T2011

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 extractor, remove the server console ROM from the module (see the figures for the location). Place the extractor 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.

Figure D-1: KA64A Processor Layout (T2015 Module)

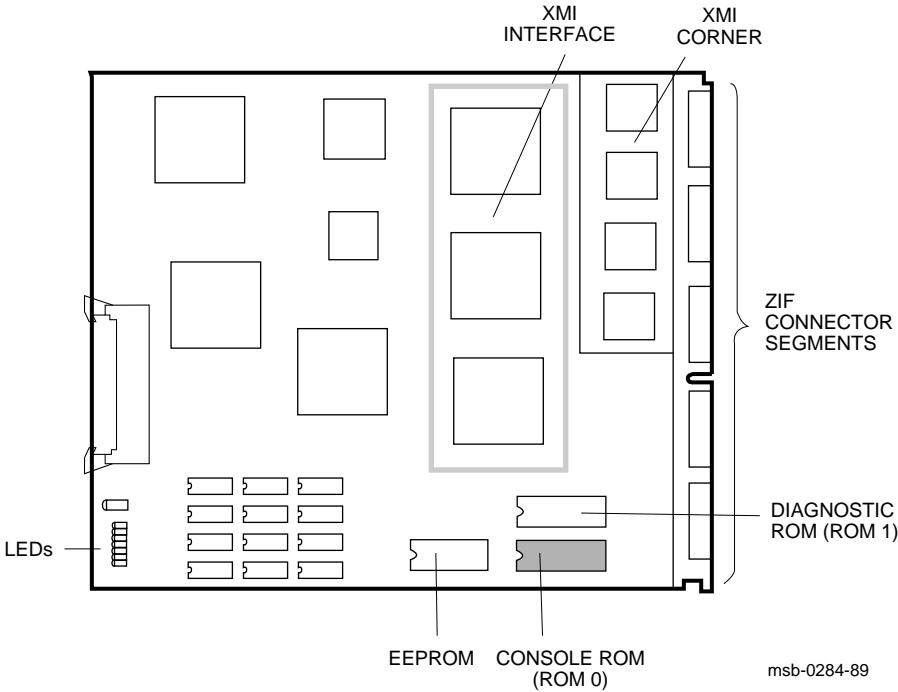
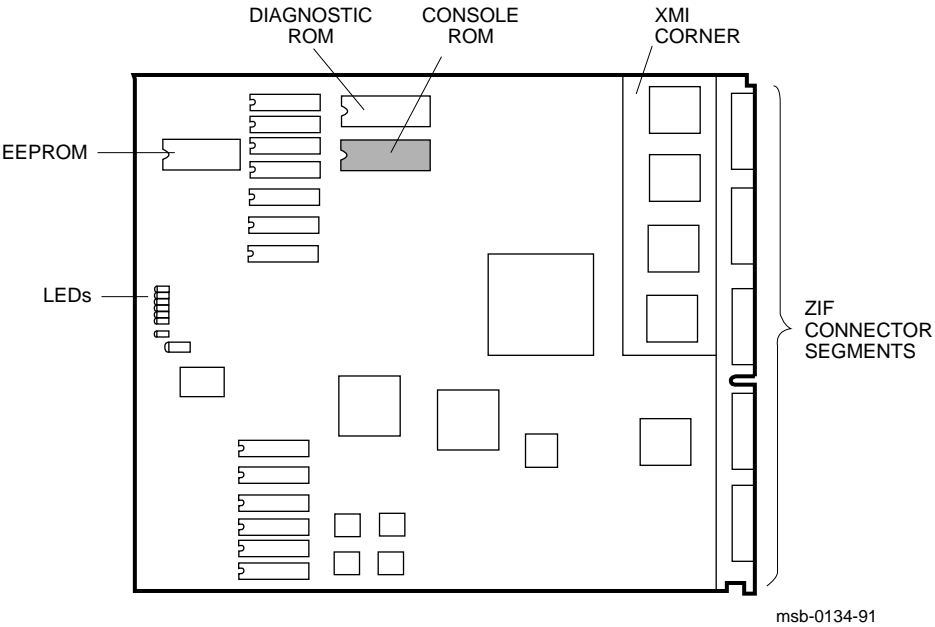


Figure D-2: KA62A and KA62B Processor Layout (T2011 Module)



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