
VAX 6000

VAX 6000: Installing the FV64A Vector Option

Order Number EK–60VEA–IN–001

This manual describes how to install the FV64A vector option in VAX 6000 systems (Model 400 and later).

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maynard, massachusetts

First Printing, January 1991

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Preface

Intended Audience

This manual is written for Digital customer service engineers and self-maintenance customers installing the FV64A vector processor in VAX 6000 systems. The FV64A option can only be used in Model 400 and later model systems.

Document Structure

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

This manual has two chapters and three appendixes:

- **Chapter 1, Installing the FV64A Vector Processor,** describes system preparation and installation of the vector processor module.
- **Chapter 2, Verifying the System,** describes verification procedures.
- **Appendix A** explains how to handle modules.
- **Appendix B** gives configuration rules for the XMI card cage.
- **Appendix C** summarizes the system self-test display.

VAX 6000 Series Documents

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

Table 1: VAX 6000 Series Documentation

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

Manuals specific to models are listed in Table 2

Table 2: VAX 6000 Model Level Documentation

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

Associated Documents

Table 3 lists other documents that you may find useful.

Table 3: Associated Documents

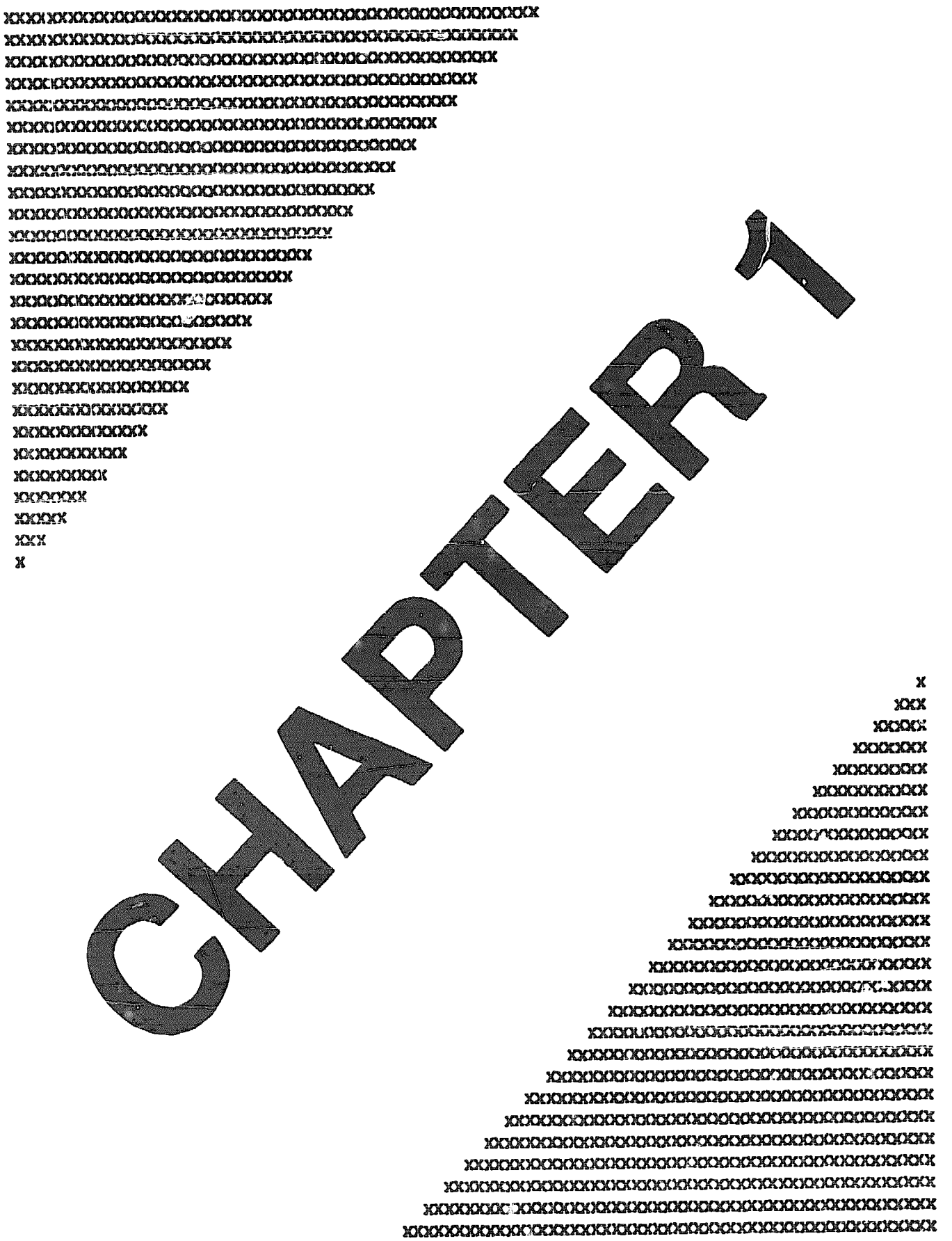
Title	Order Number
System Hardware Options	
VAXBI Expander Cabinet Installation Guide	EK-VBIEA-IN
VAXBI Options Handbook	EB-32255-46
System I/O Options	
CIBCA User Guide	EK-CIBCA-UG
CIXCD Interface User Guide	EK-CIXCD-UG
DEC LANcontroller 200 Installation Guide	EK-DEBNI-IN
DEC LANcontroller 400 Installation Guide	EK-DEMNA-IN
InfoServer 100 Installation and Owners Guide	EK-DIS1K-IN

Table 3 (Cont.): Associated Documents

Title	Order Number
System I/O Options	
KDB50 Disk Controller User's Guide	EK–KDB50–UG
KDM70 Controller User Guide	EK–KDM70–UG
RRD40 Disc Drive Owner's Manual	EK–RRD40–OM
RA90/RA92 Disk Drive User Guide	EK–ORA90–UG
SA70 Enclosure User Guide	EK–SA70E–UG
Operating System Manuals	
Guide to Maintaining a VMS System	AA–LA34A–TE
Guide to Setting Up a VMS System	AA–LA25A–TE
Introduction to VMS System Management	AA–LA24A–TE
ULTRIX–32 Guide to System Exercisers	AA–KS95B–TE
VMS Upgrade and Installation Supplement: VAX 6000 Series	AA–LB36C–TE
VMS Networking Manual	AA–LA48A–TE
VMS System Manager's Manual	AA–LA00A–TE
VMS VAXcluster Manual	AA–LA27B–TE
Peripherals	
HSC Installation Manual	EK–HSCMN–IN
H4000 DIGITAL Ethernet Transceiver Installation Manual	EK–H4000–IN
Installing and Using the VT320 Video Terminal	EK–VT320–UG
RV20 Optical Disk Owner's Manual	EK–ORV20–OM
SC008 Star Coupler User's Guide	EK–SC008–UG
TA78 Magnetic Tape Drive User's Guide	EK–OTA78–UG

Table 3 (Cont.): Associated Documents

Title	Order Number
Peripherals	
TA9C Magnetic Tape Subsystem Owner's Manual	EK-OTA90-OM
TK70 Streaming Tape Drive Owner's Manual	EK-OTK70-OM
TU81/TA81 and TU/81 PLUS Subsystem User's Guide	EK-TUA81-UG
VAX Manuals	
VAX Architecture Reference Manual	EY-3459E-DP
VAX Systems Hardware Handbook — VAXBI Systems	EB-31692-46
VAX Vector Processing Handbook	EC-H0739-46


CHAPTER 1

Chapter 1

Installing the FV64A Vector Processor

Adding a vector processor to a VAX 6000 Model 400 or later model system involves the following steps:

- **Check Requirements and Determine Configuration**
- **Install the Vector Module and Cable**
- **Change System Number Plate**
- **Return Scalar and Vector Modules**

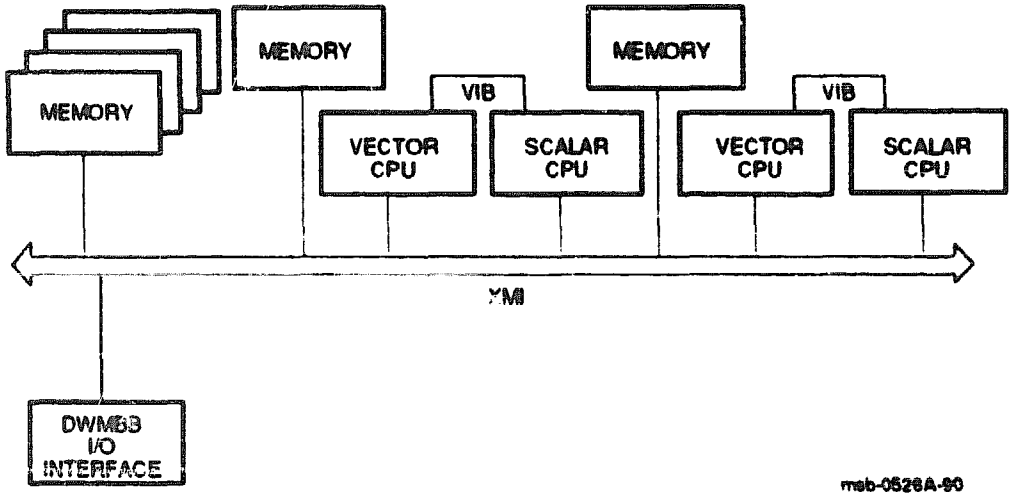
NOTE: ***Make sure that the version of the operating system installed supports the vector processor (see Digital's Systems and Options Catalog). If necessary, upgrade the software before proceeding with the hardware installation.***

Be sure to check that the scalar and vector modules are at required minimum levels for the system (see the applicable revision matrix). Upgrading a Model 400 system to one with a vector processor or adding a second vector processor requires that the scalar CPU, its ROMs, and the vector module be at certain minimum revisions.

1.1 Check Requirements and Determine Configuration

- **Check that all scalar modules in the system and vector modules to be installed are at the required revision level.**
- **Check that the system has enough memory modules to provide the memory interleaving required for a vector processing system.**
- **Finally, decide how to configure the XMI card cage (see Appendix B for configuration rules).**

Figure 1–1: VAX 6000 Vector Processing System



Check Module/ROM Revisions

Check to see that the system meets the requirements shown in Table 1–1.

The module revision is indicated on the module and is listed in the SHOW CONFIGURATION display.

Check Memory Requirements

A single vector processor requires two-way memory interleaving. A system with two vector processors requires four-way memory interleaving.

Determine Configuration of XMI Card Cage

Figure 1–1 is a block diagram of a vector processing system. A system with vector processors attached to scalar processors has specific configuration rules. Appendix B gives configuration rules for vector processors (Section B.2) in addition to general configuration rules (Section B.1).

Table 1–1: Module/ROM Requirements (Minimum Revision)

Item	Requirement*
FV64A	Revision J in a dual vector system
KA64A	Revision K if attached to a vector processor
ROMs	Version 2 to support vector processing
ROMs	Version 3 to support MS65A memories and XMI I/O devices
KA65A	Revision A

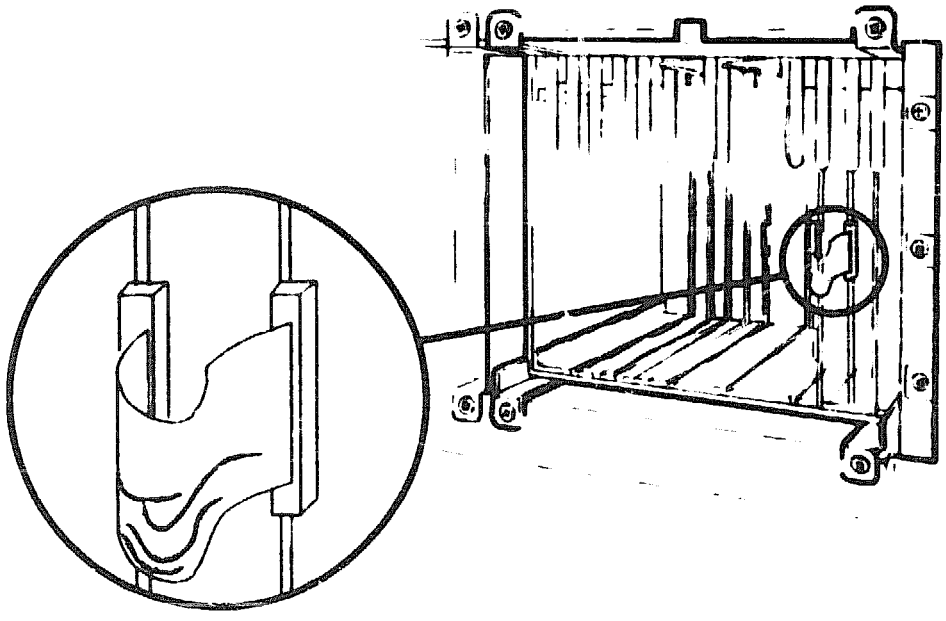
*These are the required revisions at publication time; check the system or option revision matrix for the latest requirements.

If necessary remove older revision modules and install spares. Modules removed from the system must be returned to customer service logistics (see Section 1.4).

1.2 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 1–2. 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.

Figure 1–2: Installation of VIB Cable



mab-0407-90

CAUTION: *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.

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 and remove the plastic door in front of the XMI cage.

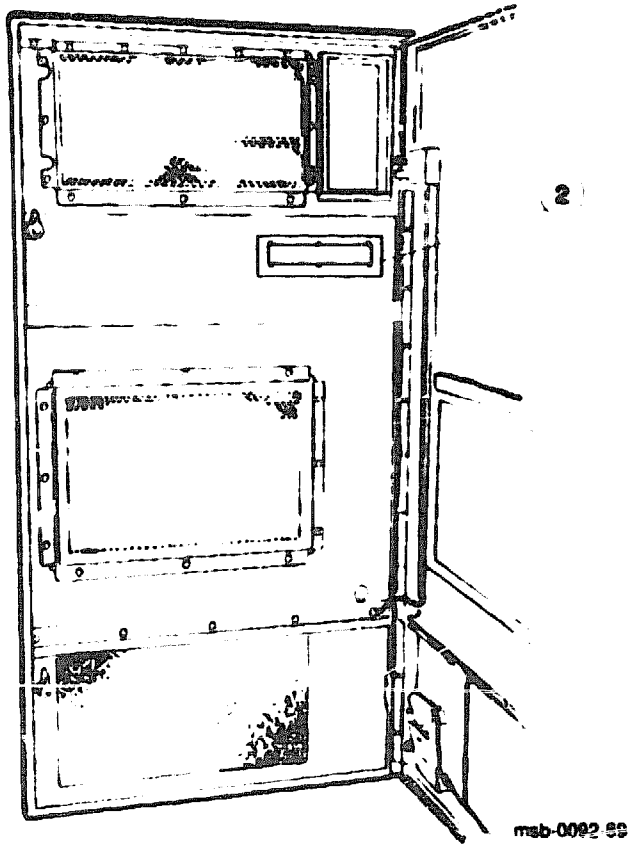
   CAUTION: *You must wear an antistatic wrist strap attached to the cabinet when you handle any modules.*

4. Select the slots for the scalar/vector pair based on the information in Appendix B. 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.
5. 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.
6. Attach the connecting VIB (vector interface bus) cable (17-02240-03). The keyed end of the cable attaches to the vector module.
7. Press the lever down to close the connector.
8. Replace the plastic door and shut the cabinet door.
9. Power up the system by turning the lower key switch to Halt and the upper key switch to Enable.
10. Check the self-test display for the new vector processor (see Appendix C, Self-Test).

1.3 Change System Number Plate

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

Figure 1–3: Front Door (Inside View)

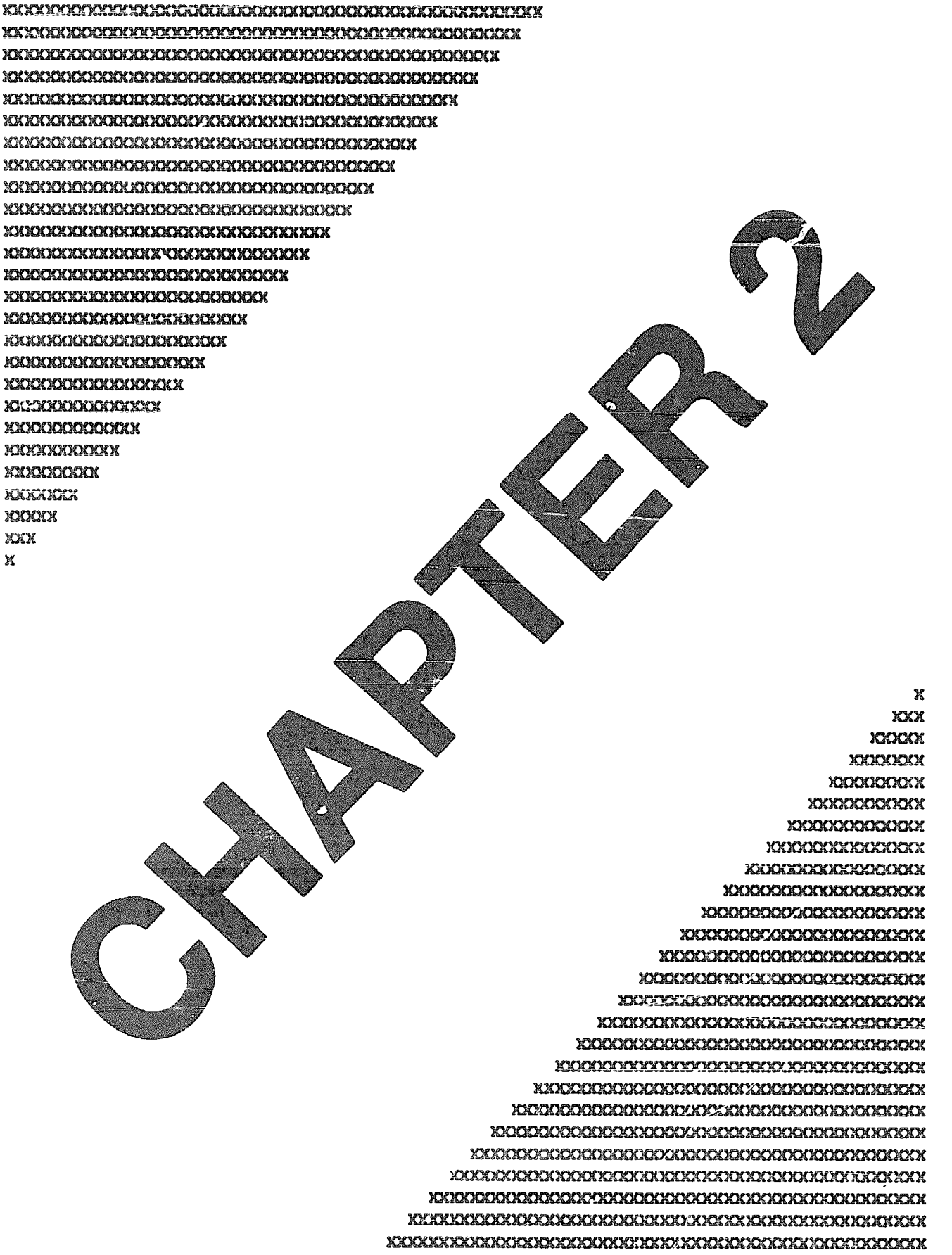


1. Locate the number plate (74-39700-XX) in your upgrade kit.
2. To change the VAX number plate, working from the inside of the front cabinet door, remove the retainer and push out the system numbers. See ❷ in Figure 1–3. Install the new number for your vector system.

1.4 Return Scalar and Vector Modules

Place any incorrect revision processor modules taken from the system in ESD boxes and return them to customer service logistics.

The modules that you removed from the system should be returned to customer service logistics, so that they can be modified in accord with engineering change orders. Place each module in the correct ESD box. The vector module requires a special ESD box, part number 99-08536-02.


CHAPTER 2

Chapter 2
Verifying the System

The first step in verifying the correct operation of the upgraded system is self-test (see Appendix C). Results can be checked by examining the console display and by checking the module LEDs. The next steps are described in this chapter. Sections include:

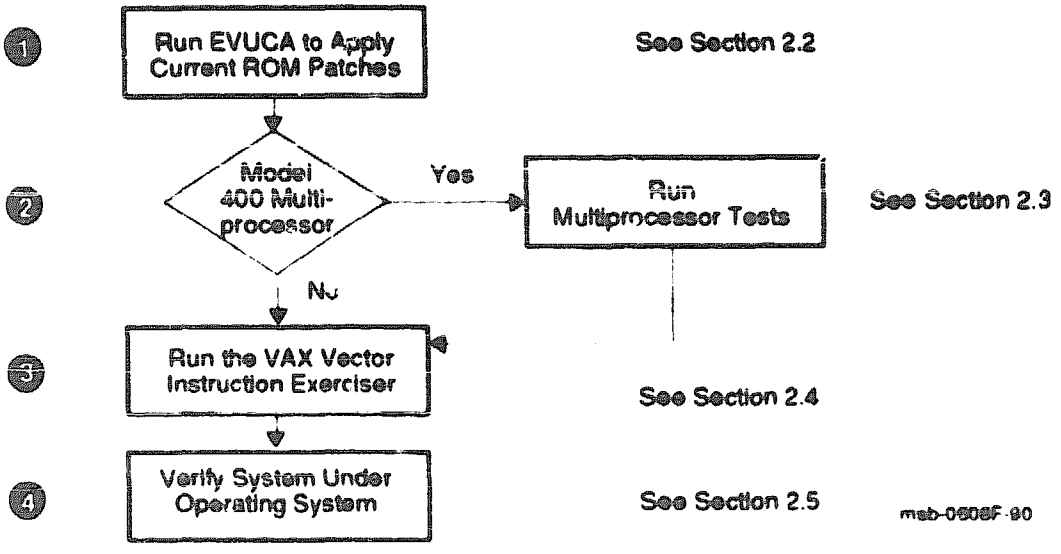
- Verification Overview
- Run EVUCA to Apply Current ROM Patches
- Run the Multiprocessor Tests (Model 400 only)
- Run the VAX Vector Instruction Exerciser
- Verify System Under Operating System

If you want to run ROM-based diagnostics, see the diagnostics chapter of the VAX 6000 system *Service Manual* for more information.

2.1 Verification Overview

Apply current ROM patches with EVUCA. For Model 400 multiprocessing systems run ERKMP. Run the VAX Vector Instruction Exerciser and then boot the operating system.

Figure 2–1: Verification Flowchart



After the system is powered on, self-test runs and the results are displayed. Example 2–1 shows a system with two scalar/vector pairs. (See Appendix C for more details on self-test.)

Example 2–1: Sample Self-Test Results (Model 500)

```
0123456789 0123456789 0123456789 0123456789 0123456789 012345678
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  M   V-  -P      TYP
    +   +   .   .   .   +   +   +   +   +   +   +   +   +      STF
                                        E   E       E   E      BZD
                                        +   +   +   +   +      ETF
                                        E   E       E   E      BPD

                        A3  A2  A1  A4          A4             ILV
                        64  64  64  32          32         256 MB

CONSOLE - V2.00  RBDs - V2.00  EEPROM - 2.00/2.00  S/N - SG01234567

>>>
```

After self-test you then take the steps shown in Figure 2–1 to verify the upgraded system:

1. Boot the VAX Diagnostic Supervisor and run the EVUCA program to apply current ROM patches. See Section 2.2.
2. For Model 400 multiprocessor systems run the multiprocessor tests. In a Model 500 system the multiprocessor tests are automatically run in self-test. See Section 2.3.
3. Run the VAX Vector Instruction Exerciser. See Section 2.4.
4. Verify the system under the operating system. See Section 2.5.

2.2 Run EVUCA to Apply Current ROM Patches

You must run EVUCA to ensure that all CPU 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 2–2: EVUCA Program (Part 1)

```
>>> BOOT /XMI:D /R5:10 /BI:4 DU0 (1)
                  [The VAX Diagnostic Supervisor banner appears.]

DS> RUN EVSBA (2)

DS> SELECT ALL (3)

DS> SET TRACE

DS> RUN EVUCA (4)

.. Program: EVUCA - VAX 6000 EEPROM Update Utility, revision 1.0, 5 tests,
   at 00:04:30.61
Testing: _KA0 _KA1

Booting secondary CPU 04
Test 2: Load data from media

Data file? <EMUCA.BIN> (5)

Searching for data file
Data file loaded


Looking for patch for CPU 01 - ROM 02.00 EEPROM 02.00
Patch image is revision 02.01
Do you really want to apply this patch [(No), Yes] YES (6)

Looking for patch for CPU 04 - ROM 02.00 EEPROM 02.00
Patch image is revision 02.01
Do you really want to apply this patch [(No), Yes] YES (7)

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

Getting selectable boot primitives for CPU 01, ROM 02.00
```

EVUCA checks ROM levels on all processors and applies the latest patches to each processor. Example 2–2 and Example 2–3 show a sample EEPROM update of a Model 500 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 4.

1. At the console prompt, boot VAX/DS. The /R5 qualifier specifies the VAX Diagnostic Supervisor program.
2. 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
3. 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.
4. Issue the RUN EVUCA command to start the program. The EVUCA banner appears, with its revision level and subtest numbers. It tests all processors and then loads test 2.
5. EVUCA displays the data file to be run to update the processors (EMUCA.BIN for the KA65A or ERUCA.BIN for the KA64A). Press Return to continue the program. Program messages inform you of progress.
6. 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 2–3: EVUCA Program (Part 2)

```
CPU 04 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 04
Secondary CPU 04 Done.
Test 5: Show Boot primitives (10)

ROM boot primitives for CPU 01, revision 02.00 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 04 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 04 was successfully updated. (12)

Current ROM and EEPROM revisions for each CPU are:
CPU 01 - ROM 02.00 EEPROM 02.01
CPU 04 - ROM 02.00 EEPROM 02.01 (13)

. End of run, 0 errors detected, pass count is 1,
  time is  31-DEC-1990 00:04:32.16
DS> (14)
```

- EVUCA program compares the existing ROM revisions of all CPUs attached. Here, it notes that both CPUs are at the same revision level.
- Program informs you that it is updating the CPU at node 1.
- Program informs you that it is updating secondary CPUs. In this example, there is only one secondary CPU at node 4.
- EVUCA program begins display of boot primitives that are being loaded into EEPROM.
- Again, the program checks that the ROM revision levels of all CPUs match. This is similar to ⑤.
- Update of secondary processor(s) reported.
- 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.
- The VAX/DS prompt returns.

2.3 Run the Multiprocessor Tests (Model 400 only)

Model 500 systems and single-processor systems do not need this step. The program runs under the VAX Diagnostic Supervisor.

Example 2–4: Running the Multiprocessor Diagnostic (Model 400 only)

```
DS> RUN ERKMP  (1)

. . Program:  ERKMP -- KA64A MP Exerciser, revision 1.0, 10 tests,
   at 00:04:33.30
Testing:     _KA0 _KA1

                    Booting Secondary Processor #04

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
        Only 2 CPU(s) selected for testing...
        XMI LOCKOUT can only be verified with 6 CPUs selected.
continuing

Test 8: Cache Coherency Test
Test 9: XMI Suppress Test
        Only 2 CPU(s) selected for testing...
        XMI SUPPRESS can only be verified with 4 or more CPUs selected.
continuing

Test 10: Multiprocessor Exerciser
    End of run, 0 errors detected, pass count is 1,
    time is  31-DEC-1990  00:04:34.77

DS>  (2)
```

From the VAX Diagnostic Supervisor (VAX/DS) you can run various tests. For Model 400 multiprocessor systems, you will need to run the multiprocessor test; this test runs automatically as part of the self-test diagnostics in Model 500 systems.

1. Run the multiprocessor test ERKMP, which tests the interprocessor interrupts and cache functions for the model number of the system.
2. The VAX/DS prompt returns.

2.4 Run the VAX Vector Instruction Exerciser

Use the VAX Diagnostic Supervisor to run the two-part vector diagnostic, EVKAG and EVKAH, on each scalar/vector pair.

Example 2–5: 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 2–5 shows how to run the vector diagnostics from the VAX Diagnostic Supervisor. The example assumes that you have run the autosizer program and selected all devices, as in Example 2–2. If you need additional information on the VAX Vector Instruction Exerciser, see the *Service Manual* for your system.

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.

❹ Run the EVKAH diagnostic.

❺ From the self-test display printout, 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.

2.5 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). First log in and check the devices. Then start the tests.

Example 2–6: 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 31-DEC-1990 16:12:23.00 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*.

APPENDIX A

Appendix A
Module Handling

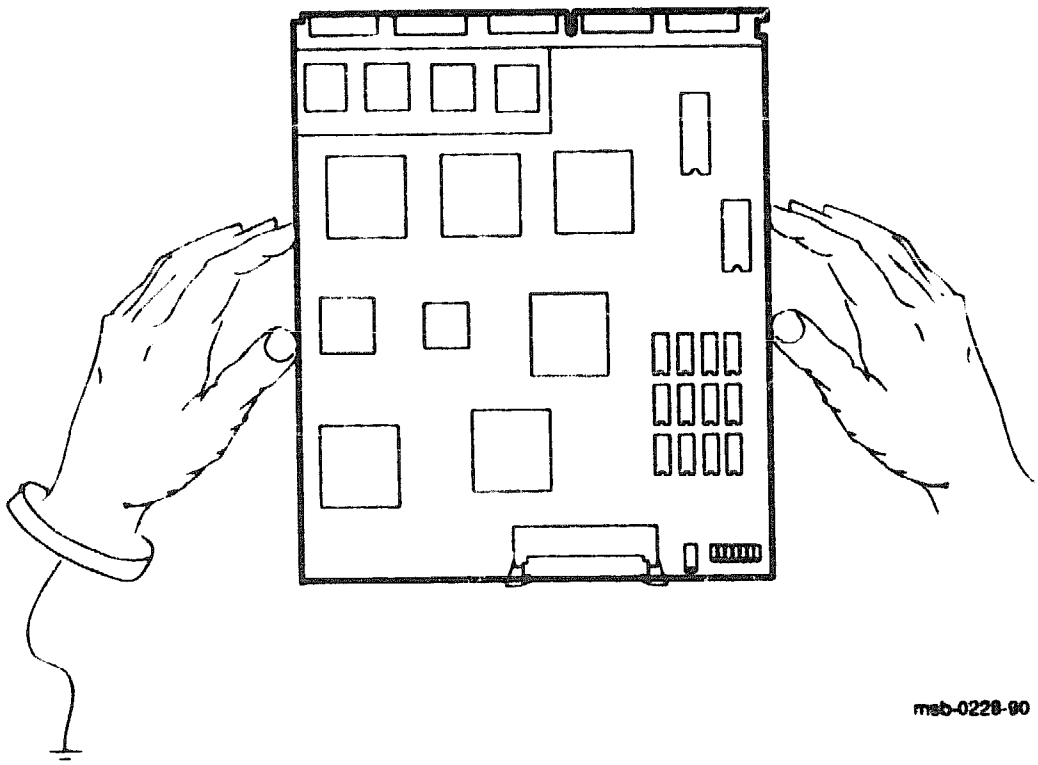
This appendix gives detailed instructions on handling scalar and vector processor modules for VAX 6000 systems. The sections include:

- 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

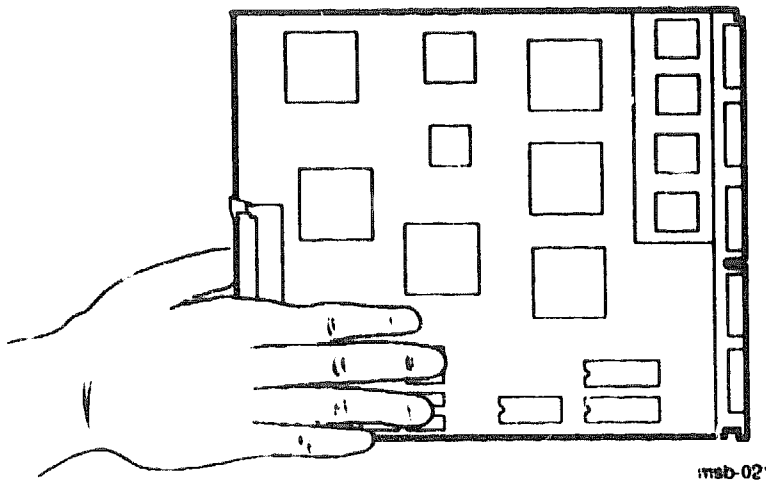
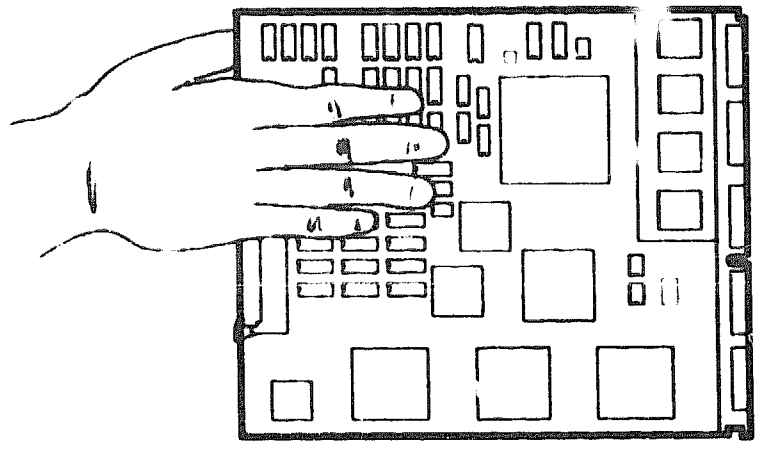


Figure A–3: Inserting the Vector Processor in an XMI Card Cage



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

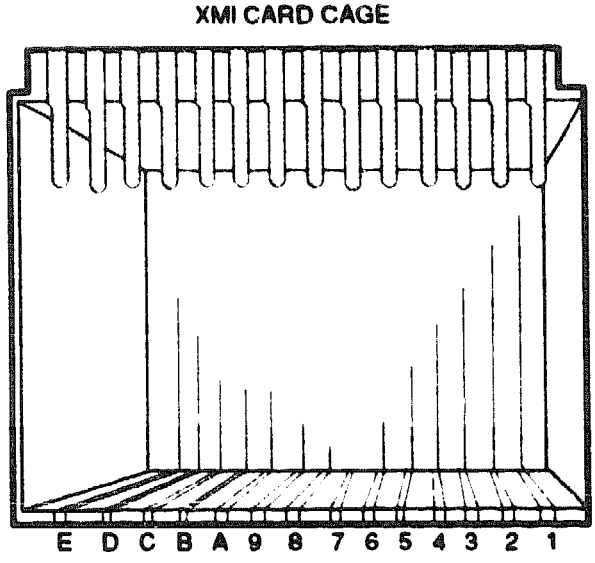
Appendix B
XMI Configuration Rules

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



B.1 General Configuration Rules

Figure B–2 and Figure B–3 show XMI configuration information for Model 400 and 500 systems.

Figure B–2 shows the maximum number of processor, memory, and I/O modules that may be installed in a Model 400 system. Figure B–3 shows comparable information for Model 500 systems. 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 Model 400

		SLOT (1)													
MODULE	LIMIT	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 DWMBA/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.

Figure B–3: XMI Configuration Rules for Model 500

		SLOT (1)													
MODULE	LIMIT	E	D	C	B	A	9	8	7	6	5	4	3	2	1
PROCESSOR	6 (2)														
MEMORY	8 (3)	N													N
I/O	10 (4)						N	N	N	N					

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(1) Slot E must contain a module. A DWMBB/A module is in slot E when the system has a VAXBI bus. (A DWMBA/A module shorts power to ground.)

(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. Only MS65A memory is supported. No memory is permitted in slots 1 and E in an XMI-1 card cage.

(4) Slots 6 through 9 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–4: Scalar/Vector Configurations

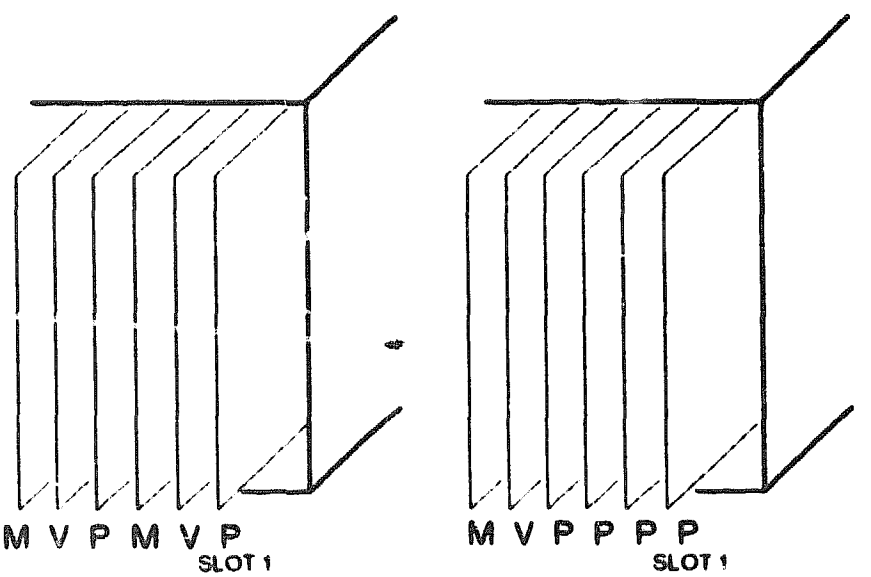


Table B–1 shows the maximum number of scalar and vector processors supported in VAX 6000 systems (Model 400 and later).

Table B–1: Processor Module Combinations

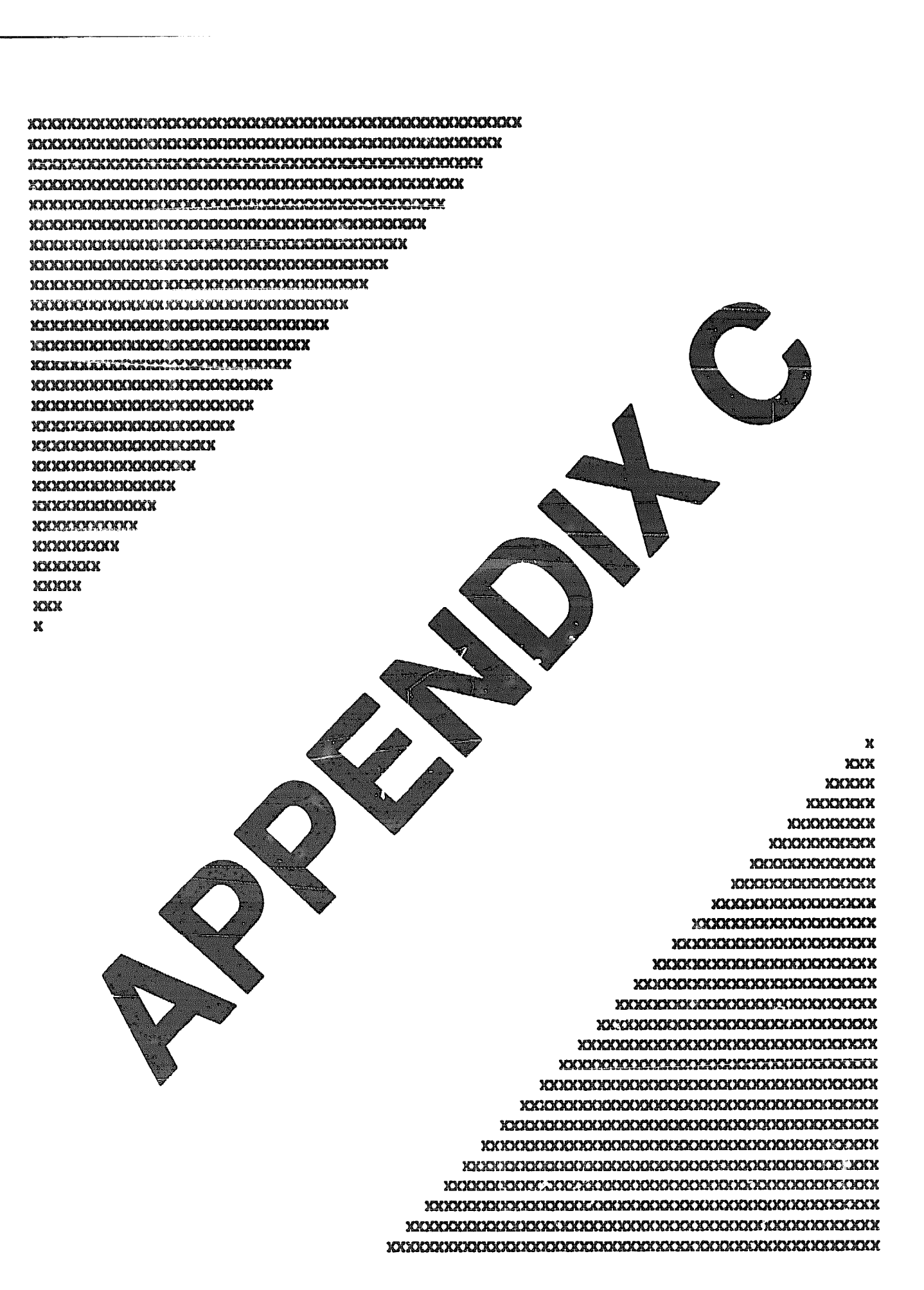
Maximum Scalar Processors	Maximum Vector Processors	Configuration (Slot 1 at Right)
6	0	P P P P P P
4	1	M V P P P P
2	2	M V P M V P

Figure B–4 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–4. 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

Appendix C
Self-Test

Self-test results are displayed on the console terminal and are reported by module LEDs.

Example C–1 shows a sample self-test for a Model 500 system with two vector processors.

Figure C–1 shows the KA65A LEDs after self-test, and Figure C–2 shows the LEDs for the KA64A modules. The red LEDs on the scalar CPU 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 C–1: Sample Self-Test with Vector Processors (Model 500)

```
0123456789 0123456789 0123456789 0123456789 0123456789 012345678 (1)

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

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

                   A3 A2 A1 A4          A4             ILV
                   64 64 64 32          32          256 Mb (5)

CONSOLE = V2.00  RBDs = V2.00  EEPROM = 2.00/2.00  SN = SG01234567

>>>
```

(1) The progress trace indicates that the processor in slot 1 passed all 57 tests that comprise self-test for Model 500 CPUs with vector processors.

(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.

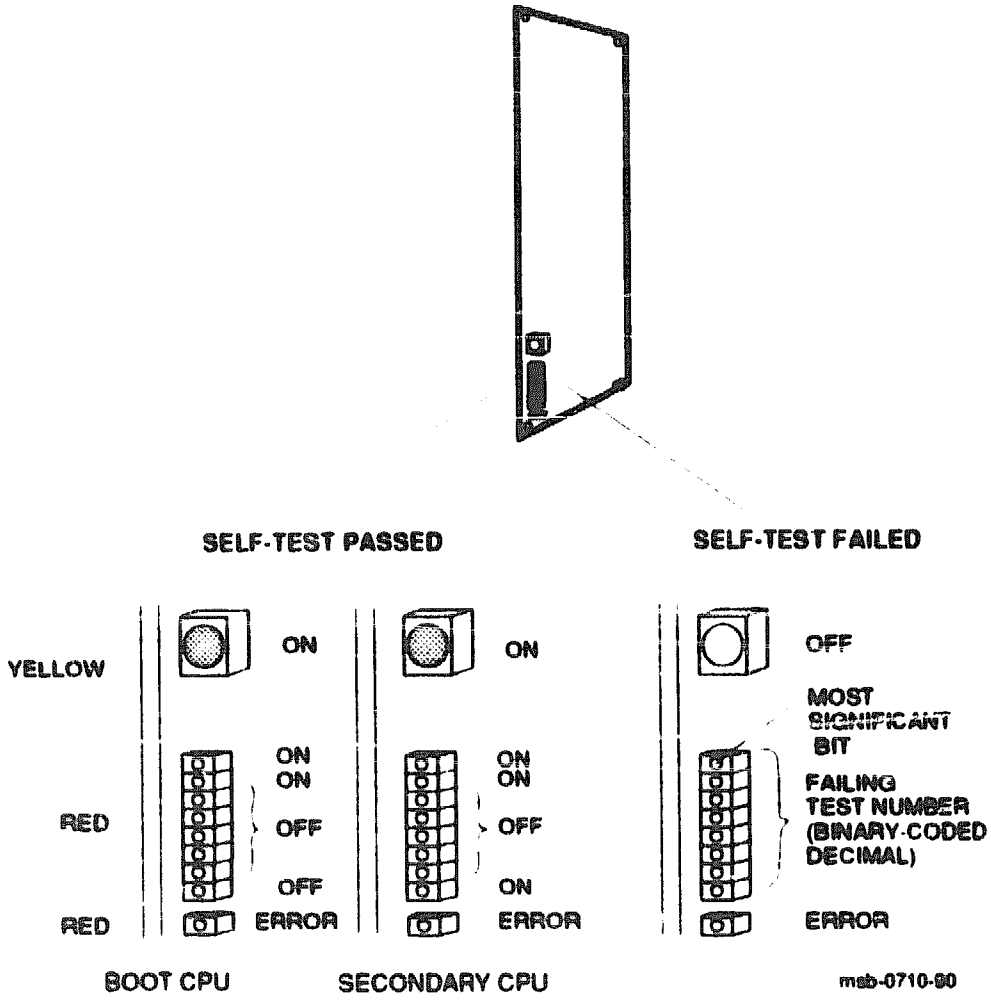
(3) The boot processor is determined and is indicated by B. The E for the other scalar processor indicates that it is eligible to be boot processor.

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.

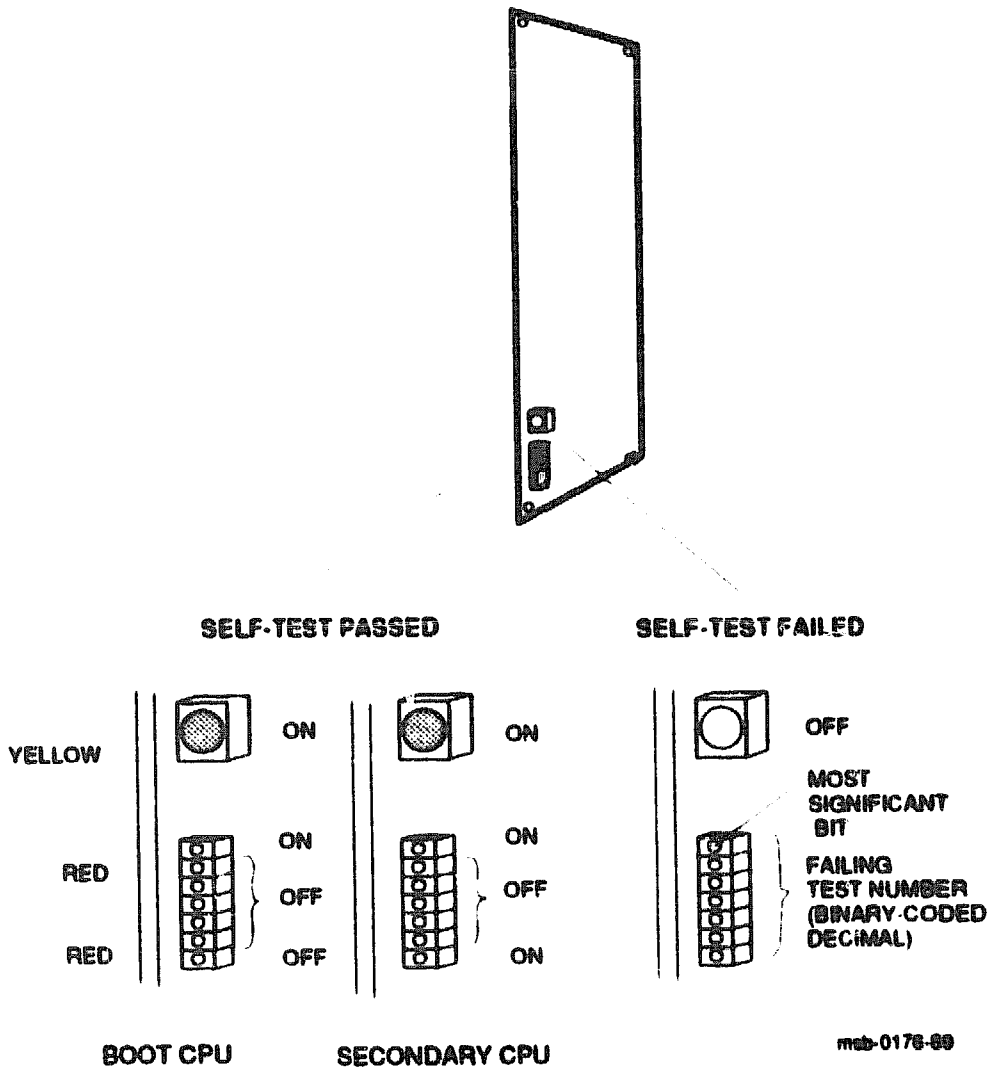
(5) Memory is configured beginning with the largest size memory modules. Since there are two 32-Mbyte modules, together they complete a 4-way interleave set.

Figure C–1: KA65A LEDs After Self-Test



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

Figure C–2: KA64A LEDs After Self-Test



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