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VAXstation 4000 Model 60
to VAXstation 4000 Model 90
Upgrade Guide

EK-VX690-UP. A01

Digital Equipment Corporation

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About This Guide

Purpose of this Guide

This guide describes how to upgrade a VAXstation 4000 Model 60 to a VAXstation 4000 Model 90, a faster, more powerful VAXstation. The VAXstation 4000 Model 90 utilizes the new KA49 CPU module, which houses up to 128 Mbytes of SIMM main memory.

The upgrade is accomplished by removing the Ethernet ROM and the SIMM memory modules from the VAXstation 4000 Model 60 KA46 CPU module and installing them into the KA49 CPU module. Also one of the following graphics modules (LCSPX, SPXg or SPXgt) can be installed. The SPXg and SPXgt modules require a SPXg/gt diagnostic ROM with a version of 1.2 or higher.

Who Should Use This Guide

Only Digital Services or qualified self-maintenance personnel should perform this upgrade. You must have a working knowledge of, and experience working on, the internal hardware devices of the VAXstation 4000 systems. If you are not qualified to perform this upgrade, call Digital Services to schedule an upgrade.

Note

It is the customer's responsibility to perform all software backups of the system and user disks. All backups should be performed before the Digital Services representative arrives at the site. Backups are mandatory to ensure that data is not lost during the upgrade.

About This Guide, Continued

Structure of this Guide

This guide is comprised of three chapters and one appendix:

- Chapter 1 describes an overview of the VAXstation 4000 Model 60 and Model 90. It also lists the contents of the upgrade kits.

- Chapter 2 describes how to disassemble the VAXstation 4000 Model 60 and remove the necessary components for the upgrade.

- Chapter 3 describes how to install the necessary components and reassemble the VAXstation 4000 Model 90.

- Appendix A describes how to pack the modules and components to be sent back to Digital and also provides the necessary forms to be completed and returned to Digital after the upgrade.

Related Documentation

If additional information is needed for the procedures in this guide, refer to the following documents:

The following documents provide additional information relating to the VAXstation 4000 Model 60:

- *VAXstation 4000 Options Installation Guide*, EK-VAXOP-IN

- *VAXstation 4000 Model 60 Service Information*, EK-V466B-SV

The following documents provide additional information relating to the VAXstation 4000 Model 90:

- *VAXstation 4000 Options Installation Guide*, EK-VAXOP-IN

- *VAXstation 4000 Model 90 Service Information*, EK-KA490-SV

- *VAXstation 4000 Model 90 Owner's Installation Guide*, EK-VAXOG-IN

About This Guide, Continued

Conventions Used in this Guide

The following conventions are used in this guide:

Convention	Meaning
Return	A name enclosed in a box in interactive examples indicates a key you press on the keyboard.
Warning	Warnings contain information to prevent personal injury. Read warnings carefully.
Caution	Cautions provide information to prevent damage to equipment or software. Read cautions carefully.
Note	Notes provide general information about the current topic.

Chapter 1
Overview of the VAXstation 4000 Model 60 and the VAXstation 4000 Model 90

Overview

Purpose

The purpose of this chapter is to provide an overview of the VAXstation 4000 Model 60, and the VAXstation 4000 Model 90, and to provide a list of the contents of the upgrade kits.

VAXstation 4000 Model 60 Product Description

**Product
Description**

The VAXstation 4000 Model 60 system is a single-user engineering
workstation, based on the KA46 system module. The Model 60
includes:

- An LK401 keyboard

- A VSXXX-GA mouse or VSXXX-AB tablet

- A monochrome or color video monitor

- One or more storage devices

- SCSI and Ethernet controllers

- Memory SIMMs, which supports up to 108 MB

Each Model 60 system is housed in a desktop BA46 system
enclosure that contains a KA46 system module and an H7819-AA
power supply.

Contents of the Upgrade Kit

Note	**If a system started out as a VAXstation 3100 and was upgraded to a VAXstation 4000 Model 60, then it may not be upgraded to a VAXstation 4000 Model 90.**

Upgrade Kit Versions	The following is a list of the various PV71U upgrade kits that can be used to upgrade to a VAXstation 4000 Model 90:

Part Number	Description
PV71U-AF	Includes the LCSPX graphics module
PV71U-AH	For the SPXg graphics module
PV71U-AJ	For the SPXgt graphics module

PV71U-AF

Table 1–1 lists the contents of the PV71U-AF upgrade kit.

Table 1–1 Contents of PV71U-AF

Part Number	Description
75-00003-04	Software licenses
70-30299-01	VAXstation Model 60 to 90, which includes the following:

Part Number	Contents
54-21177-01	CPU system module
54-21795-01	LCSPX graphics module
EK-VAXOG-DK	Documentation kit, which includes the following:
	– *VS4000 Owner's Installation Guide*
	– *VS4000 Options Installation Guide*
	– *VS4000 Quick Installation Card*
EK-VX690-UP	*VAXstation 4000 Model 60 to VAXstation 4000 Model 90 Upgrade Guide*
74-41856-08 A	Medallion, VAXstation 4000 90
74-42680-02	Clamp, video board

Part Number	Description
12-36175-01	Disposable wrist strap

Contents of the Upgrade Kit, Continued

PV71U-AH   Table 1–2 lists the contents of the PV71U-AH upgrade kit.

Table 1–2   Contents of PV71U-AH

Part Number	Description
75-00020-01	PHIGS 3D software licenses, including the DEC PHIGS/V RT license.
75-00003-04	Software licenses
70-30299-02	VAXstation Model 60 to 90, which includes the following:

Part Number	Contents
54-21177-01	CPU system module
EK-VAXOG-DK	Documentation kit, which includes the following:
	– *VS4000 Owner's Installation Guide*
	– *VS4000 Options Installation Guide*
	– *VS4000 Quick Installation Card*
EK-VX690-UP	*VAXstation 4000 Model 60 to VAXstation 4000 Model 90 Upgrade Guide*
74-41856-09 A	Medallion, VAXstation 4000 90 SPXg
23-226E8-00	SPXg/gt diagnostic ROM

12-36175-01	Disposable wrist strap

Contents of the Upgrade Kit, Continued

PV71U-AJ　　　　Table 1–3 lists the contents of the PV71U-AJ upgrade kit.

Table 1–3　Contents of PV71U-AJ

Part Number	Description
75-00020-01	PHIGS 3D software licenses, including the DEC PHIGS/V RT license.
75-00003-04	Software licenses
70-30299-03	VAXstation Model 60 to 90, which includes the following:

Part Number	Contents
54-21177-01	CPU system module
EK-VAXOG-DK	Documentation kit, which includes the following:
	– *VS4000 Owner's Installation Guide*
	– *VS4000 Options Installation Guide*
	– *VS4000 Quick Installation Card*
EK-VX690-UP	*VAXstation 4000 Model 60 to VAXstation 4000 Model 90 Upgrade Guide*
74-41856-10 A	Medallion, VAXstation 4000 90 SPXgt
23-226E8-00	SPXg/gt diagnostic ROM

12-36175-01	Disposable wrist strap

VAXstation 4000 Model 90 Product Description

Product Description

The VAXstation 4000 Model 90 is housed in a BA46 system enclosure. The KA49 system module with either 4-MB or 16-MB SIMM modules form the CPU/memory subsystem.

The VAXstation 4000 Model 90 supports three graphics options:

Option	Description
LCSPX	Standard 2D graphics
SPXg	8-Plane 3D graphics
SPXgt	24-Plane 3D graphics

Some of the main features of the VAXstation 4000 Model 90 are:

- Up to 128 Mbytes of SIMM main memory

- ThinWire or Thickwire connection for Ethernet network

- Subsystem uses the SCSI-1 bus to communicate with mass storage devices

- A 16 bit programmed I/O port connection for synchronous communications

- Four serial lines controllers for:

  — Keyboard

  — Pointing device

  — Printer

  — Asynchronous communication

- Audio input/output connector supported by the sound generator interface

VAXstation 4000 Model 90 Product Description, Continued

Product Description (continued)

- ROM-based diagnostics (field programmable flash ROMs) for:
    — Power-up self-test
    — User selected self-test
    — System level tests
- VMS software distribution by:
    — CDROM disk
    — TK tape
    — VMS Version 5-5.2 or higher
    — System down line loaded over Ethernet
- MS–DOS applications distribution by floppy diskette

Chapter 2
Disassembly of the VAXstation 4000 Model 60 and Removal of Components

Overview

Purpose

The purpose of this chapter is to provide information so that Digital Services Engineers or knowledgeable Digital customers can disassemble an existing VAXstation 4000 Model 60 and remove the necessary components for the upgrade.

Caution

Only Digital Services or qualified self-maintenance personnel should perform this upgrade. You must have a working knowledge of, and experience working on, the internal hardware devices of the VAXstation 4000 systems. If you are not qualified to perform this upgrade, call Digital Services to schedule an upgrade.

Note

It is the customer's responsibility to back up the software before Digital Services personnel arrive at the site. This is important to ensure that data is not lost during the service process. The customer should also shut down the workstation software. Before performing any maintenance work, Digital Services personnel must confirm that the customer has completed both of these tasks.

Overview, Continued

**Summary
of Removal
Process**

The following table summarizes the recommended removal
process and lists the applicable page number for reference to
that procedure.

Procedure	Found on Page
Preparing VAXstation 4000 Model 60 for disassembly	2-3
Shutting down peripherals and disconnecting cables	2-5
Protecting against static	2-6
Removing top cover of the VAXstation 4000 Model 60	2-9
Removing mass storage devices	2-10
Removing power supply	2-12
Removing lights and switches module	2-13
Removing graphics module	2-15
Removing synchronous communications option	2-19
Removing TURBOchannel adapter module and option	2-20
Removing KA46 system module (CPU)	2-21
Removing MS44 memory SIMMs	2-22
Removing Ethernet ROM	2-24
Swapping medallions	2-25

Preparing VAXstation Model 60 for Disassembly

Run SHOW CONFIG Command

To run the SHOW CONFIG command, complete the following steps and refer to Example 2–1.

Step	Action
1	Press the Halt button located behind the door in the front of the system box. Results: The system displays the console prompt on the screen.
2	Enter **SHOW CONFIG** at the console prompt and press Return . >>> **SHOW CONFIG** Return
3	Record the Ethernet hardware address. This address will be verified upon completion of the upgrade.
4	Record the SPXg/gt diagnostic ROM version. If the version is Version 1.1 or lower, then you will need to replace the ROM during the assembly.

Preparing VAXstation Model 60 for Disassembly, Continued

Example 2–1 Typical Screen Display of a SHOW CONFIG Command (Model 60)

```
KA46-A V1.1-31E-V4.0            ! CPU type and firmware revision
08-00-2B-F3-31-03              ! Ethernet hardware address
16 MB                          ! Total memory

DEVNBR  DEVNAM  INFO
------  ------  ----
    1   NVR    OK                      ! Non-volatile RAM
    2   LCG    OK                      ! 2D high res. color graphics rev 2.7
               HR - 8 PLN FB -2.7
    3   DZ     OK                      ! Serial line controller
    4   CACHE  OK                      ! Cache memory
    5   MEM    OK                      ! Memory configuration

             16MB = SY=8MB, S0/S1=8MB, S2/S3=0MB, S4/S5=0MB

    6   FPU    OK                      ! Floating point unit
    7   IT     OK                      ! Interval Timer
    8   SYS    OK                      ! Other system functions
    9   NI     OK                      ! Ethernet
   10   SCSI   OK                      ! SCSI and drives
               1-RZ23L 6-INITR         ! One RZ23L at ID 1, system at ID 6.
   11   AUD    OK                      ! Sound
   12   COMM   OK                      ! DSW21 communications device
>>>
```

Shutting Down Peripherals and Disconnecting Cables

Shut Down the System

After shutting down the operating system, turn the system peripherals off in the following order:

1. System unit

2. Monitor

3. Printer, modem, and any other equipment

4. Expansion boxes

Warning

The monitor power should be off for at least three minutes before removing the power cord. You should remove the power cord before moving the monitor.

The monitor is heavy and may require two people to lift it.

Disconnect Cables

Disconnect the following cables from the back of the system in the following order:

1. System power cord, first from the wall and then from the system unit

2. Monitor power cord (set monitor aside)

3. Keyboard cable

4. Mouse cable

5. ThinWire Ethernet and/or standard Ethernet connector/terminator

6. SCSI terminator or external SCSI cable

7. Monitor video cable

8. Printer and communications cables

Protecting Against Static

Use the Antistatic Wrist Strap

The following rules **must** be adhered to while handling system components:

- Wear a properly grounded antistatic wrist strap.

- Any module or device removed from the system unit must be placed on an antistatic mat.

Note

It is recommended that you have two antistatic mats for which to place all the removed devices and components.

Protecting Against Static, Continued

**Static
Protection
Method**

To protect against static, complete the following steps:

If you have...	Then...
An alligator clip	
	1. Place the antistatic strap on your wrist.
	2. Attach the alligator clip to the metal latch located on the left center of the power supply. Refer to Figure 2–1.
A disposable wrist strap	
	1. At the wrist end, wrap the shiny black side firmly around the wrist touching the skin.
	2. At the system end, peel the strip off the metal grounding contact and stick the contact to the inside rear of the enclosure.

System FRU Locations

System FRU Locations   Refer to Figure 2–1 for the VAXstation 4000 Model 60 FRU locations mentioned in this chapter.

Note   **The SPXgt, TURBOchannel adapter module, and any TURBOchannel option are not shown in Figure 2–1.**

Figure 2–1   VAXstation 4000 Model 60 FRU Locations

Cover Assy
SPX g Frame Buffer Module
GSP Module
LCG Module
Power Supply
Light and Switch Module
Video Board Clamp
Sync–Comm Module
Hard Disk Drive Assy
Memory Modules
RFI Filler Shield
Drive Assy
Metal Latch
Filler Plate
RX26 Drive Assy
Drive Bracket
Hard Disk Drive Assy
Bezel Assy

LJ–02240–SCAN
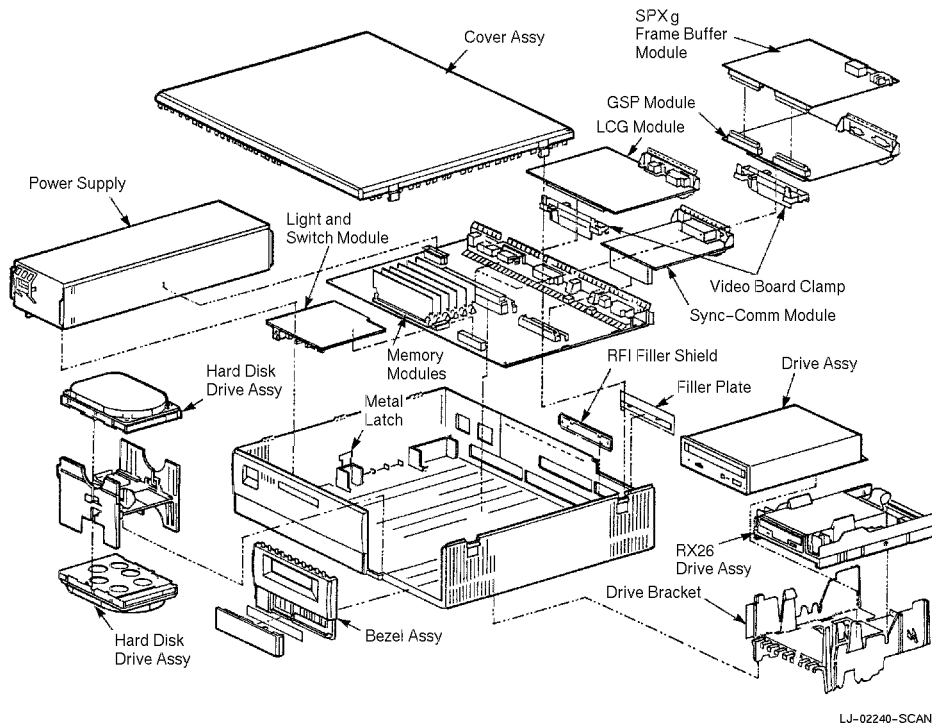
Removing Top Cover of the VAXstation 4000 Model 60

Warning	**Be careful not to touch the sharp edges of the system cover.**

Remove the Top Cover

The top cover of the VAXstation 4000 Model 60 needs to be removed to gain access to the modules and components in the BA46 system enclosure.

To remove the top cover, complete the following steps:

Step	Action
1	Carefully release the latches on the right side of the system unit.
2	Pull the cover up and away from the system. You will need to pull forcefully to release the retention devices on the middle front and rear edges of the cover.
3	Place the cover aside.

Removing Mass Storage Devices

Note	**Before removing any cables, be sure to label and note their locations.**

Remove the Hard Disk Drive

To remove the hard disk drive assembly from the BA46 system enclosure, complete the following steps:

Step	Action
1	Pull the colored tab on the H-bracket toward the front of the system. The tab is located at the upper left corner of the bracket.
2	Lift the drive(s) and bracket from the system enclosure.
3	Disconnect both the internal SCSI and dc power cable from the drive assembly.
4	Place the assembly on the antistatic mat.

Removing Mass Storage Devices, Continued

Remove the Removable Media Drives

The removable media drive assembly may contain one of the following drives:

- RRD42 CDROM drive
- RX26 diskette drive
- TLZ06 cassette tape drive
- TZK10 QIC tape drive

To remove the removable media drive assembly from the BA46 system enclosure, complete the following steps:

Step	Action
1	Push the colored tab located at the right upper front of the bracket, to the right and away from the power supply, and push the tab located behind the screw hole at the bottom left center of the bracket to the right.
2	Lift the drive and drive bracket from the system enclosure.
3	Disconnect both the internal SCSI and dc power cable from the drive assembly.
4	Place the assembly on the antistatic mat.

Removing Power Supply

Warning

Do not attempt to open the power supply. There are dangerous voltages inside the power supply, and there are no user serviceable parts.

Remove the Power Supply

To remove the power supply from the BA46 system enclosure, complete the following steps:

Step	Action
1	Release the metal latch located at the left center of the power supply by moving it to the left.
2	Pull forward on the colored tab, located on the right toward the front of the enclosure just under the power supply, and lift the front of the power supply slightly.
3	Lift the rear end of the power supply, and remove the power supply from the system box.
4	Place the power supply on the antistatic mat.

Removing Lights and Switches Module

Caution	When removing the lights and switches module, be very careful to avoid touching the system module (CPU) in the area shown in Figure 2–2. Touching the board in the area indicated could damage some of the components on the board.

Note	For orientation purposes, some of the devices that may have been previously removed are shown in Figure 2–2.

Figure 2–2   Avoid Touching This Area
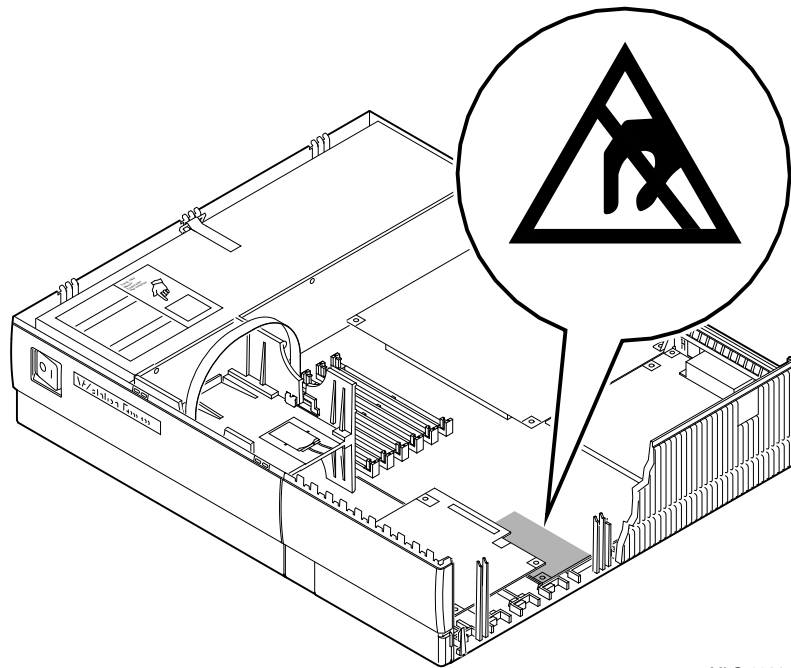
MLO-008159

Removing Lights and Switches Module, Continued

Remove the Lights and Switches Module

To remove the lights and switches module from the BA46 system enclosure, complete the following steps:

Step	Action
1	Disconnect the module connector from the system module by lifting up on the module where it overlaps the system module.
2	Lift the module away from the system.
3	Place the lights and switches module on an antistatic mat.

Removing Graphics Module (if applicable)

**Graphics
Module Types**

If you have graphic capabilities in your VAXstation 4000 Model 60, then you may find one of the following graphics module types:

- LGC (one board)

  The LGC must be replaced with a new LCSPX graphics module during the upgrade along with the video board clamp from the kit.

- SPXg (two boards consisting of graphics module and frame buffer module)

  The SPXg is transferable to the Model 90.

- SPXgt (two boards consisting of graphics module and frame buffer module)

  The SPXgt is transferable to the Model 90.

Note

If the SPXg/gt diagnostic ROM version is 1.1 or lower, then the diagnostic ROM will need to be replaced during the reassembly process. The diagnostic ROM in the kit will be the latest version.

Removing Graphics Module (if applicable), Continued

Remove the Graphics Module(s)

To remove the graphics module(s) from the BA46 system enclosure, complete the following steps:

If you have an...	Then...
LCG	
	1. Release the graphics module latches and lift the module out of the BA46 enclosure.
	2. Place the LCG graphics module on the antistatic mat.
SPXg	
	1. Release the graphics module latches on the video board clamp. Refer to Figure 2–1.
	2. Lift the graphics assembly free of the system module connector, and remove it from the system enclosure.
	3. Place the graphics assembly on the antistatic mat.
	4. Remove the video board clamp from the KA46 system module by spreading the sides of the video board clamp away from the connector, and then lift the clamp off and away from the system module. Save the video board clamp for use on the KA49 system module.

Removing Graphics Module (if applicable), Continued

Remove the Graphics Module(s) (continued)

If you have an...	Then...
SPXgt	

1. Remove the E-clip located closest to the tail bracket holding the SPXgt assembly together.

   CAUTION Do not lift from the tail bracket. To prevent the frame buffer from bending and any damage occurring, gently lift by grasping the center of the module.

2. Lift the frame buffer tail bracket just enough to free it from the ridge on the disk drive H-bracket.

3. Slide the top of the remaining E-clip off of the frame buffer module, it will stay attached to the graphics module.

4. Lift the frame buffer module and gently work it free of the RFI gasket. Remove the frame buffer module from the system enclosure.

5. Place the frame buffer module on the antistatic mat.

6. Release the graphics module latches on the video board clamp.

7. Lift the graphics module free of the system module connector, and remove it from the system enclosure.

   NOTE The RFI gasket is now loose, remove and place it aside for installation on the Model 90.

8. Place the graphics module on the antistatic mat.

Continued on next page

2–17

Removing Graphics Module (if applicable), Continued

**Remove the
Graphics
Module(s)
(continued)**

If you have an...	Then...
SPXgt (cont.)	9. Remove the video board clamp from the KA46 system module by spreading the sides of the video board clamp away from the connector, and then lift the clamp off and away from the system module. Save the video board clamp for use on the KA49 system module.

Removing Synchronous Communications Option (if applicable)

Remove the Synchronous Communications Option

To remove the synchronous communications option from the BA46 system enclosure, complete the following steps:

Step	Action
1	Lift the synchronous communications option away from the system module at the point directly behind the SCSI connector.
2	Place the synchronous communications option on the antistatic mat.

Removing TURBOchannel Adapter Module and Option (if applicable)

Remove the TURBOchannel Adapter and Option

To remove the TURBOchannel adapter module and option from the BA46 system enclosure, complete the following steps:

Step	Action
1	Remove the two screws holding the filler plate on the TURBOchannel option located at the rear of the enclosure.
2	Lift the TURBOchannel option away from the system module at the point directly behind the SCSI connector.
3	Place the TURBOchannel option on the antistatic mat.
4	Remove the TURBOchannel adapter module from the four plastic standoffs.
5	Place the TURBOchannel adapter module on the antistatic mat.

Removing KA46 System Module (CPU)

Remove the KA46 System Module

To remove the KA46 system module from the BA46 system enclosure, complete the following steps:

Step	Action
1	Disconnect the SCSI and power cables from the system module.
2	Remove the system module (CPU) by lifting the front slightly, so that it clears the two stops at the front right and left of the module.
3	Using the large center connector, pull the module toward the front of the system enclosure so that it is free of the five base latches, then lift the module out of the system enclosure.
4	If present, remove the four standoffs for the TURBOchannel adapter module.
5	Place the system module on the antistatic mat.

Removing MS44 Memory SIMMs

Cautions

Memory components can easily be damaged by static electricity. An antistatic wrist strap must always be worn when removing or installing memory components.

Memory modules must always be removed starting from the rear of the module. You must remove any modules at the back of the board and work toward the front of the board. Memory modules are numbered on the right edge of the memory connectors located on the system board.

Failure to release the two module retainers will permanently damage the module connector located on the system module.

Remove the MS44 Memory SIMMs

To remove the MS44 memory SIMMs located on the KA46 system module, complete the following steps and refer to Figure 2–3.

Step	Action
1	Release the two metal retainers at each end of the memory SIMM connector.
2	Rotate the memory SIMM back approximately 55 degrees to the rear of the unit.
3	Lift the SIMM out of the slot.
4	Place the MS44 memory SIMM on the antistatic mat.

Removing MS44 Memory SIMMs, Continued

Remove the MS44 Memory SIMMs (continued)

Figure 2–3   Removing a MS44 Memory SIMM (Model 60)
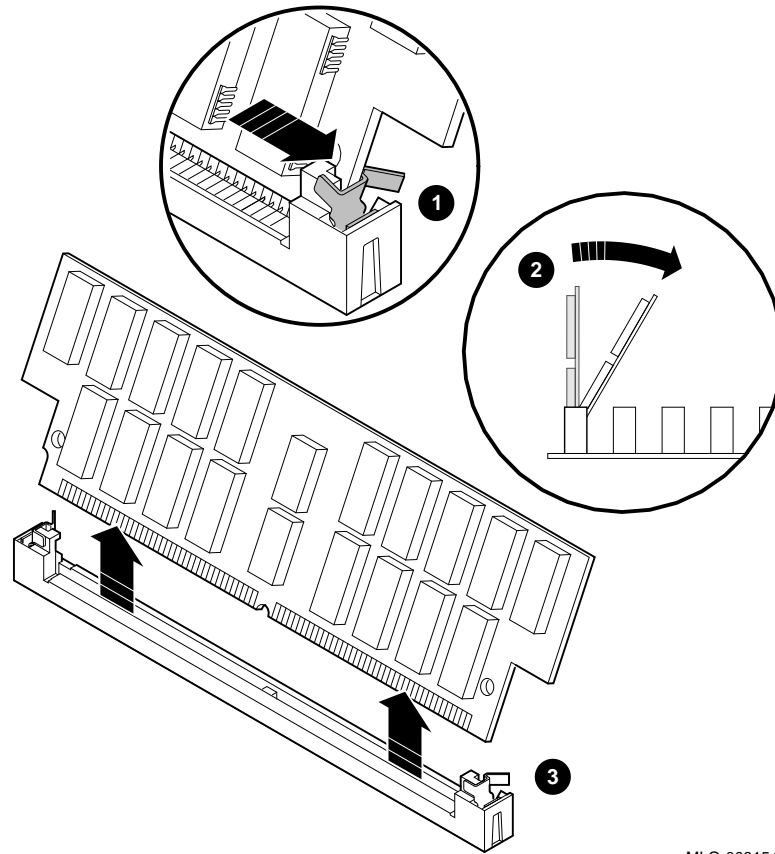
MLO-008154

Removing Ethernet ROM

Note

If the same unique Ethernet address is not required, for example, for a standalone system, then do not remove the Ethernet ROM. Consult with the customer.

The Ethernet ROM is the only socketed 16-pin chip on the system module. The Ethernet ROM has distinct manufacturer's markings on the top; written on it is ENET ADRS (abbreviation for "Ethernet Address").

Cautions

When removing ROMs from the system board, antistatic precaution must be adhered to.

Before removing the Ethernet ROM, be sure you note the orientation of the IC chip keyway in relation to the chip IC socket. If you put the Ethernet ROM in backwards, then the system will not function.

Remove the Ethernet ROM

To remove the Ethernet ROM from the KA46 system module, complete the following steps:

Step	Action
1	Locate the Ethernet ROM on the KA46 system module and remove it using a chip puller or a flat-head screwdriver.
2	Place the Ethernet ROM on the antistatic mat.

Swapping Medallions

Swap the Medallions

To swap the medallion on the VAXstation 4000 Model 60 to the new medallion, complete the following steps:

Step	Action
1	Squeeze the tabs on the medallion and pull the medallion away from the BA46 system enclosure.
2	Align the new medallion and snap it into place.

Chapter 3
Installation of Upgrade Components and Reassembly of the New VAXstation 4000 Model 90

Overview

Purpose

The purpose of this chapter is to provide information so that Digital Services Engineers or knowledgeable Digital customers can install the upgrade components and reassemble the VAXstation 4000 Model 90.

Overview, Continued

Summary of Installation Process

The following table summarizes the recommended installation process and lists the applicable page number for reference to that procedure.

Procedure	Found on Page
Installing Ethernet ROM	3-5
Installing MS44 memory SIMMs	3-6
Installing KA49 system module (CPU)	3-10
Installing TURBOchannel adapter module and option	3-11
Installing synchronous communications option	3-12
Swapping SPXg/gt diagnostic ROM	3-13
Installing graphics module(s)	3-14
Installing lights and switches module	3-18
Installing power supply	3-19
Installing mass storage devices	3-20
Restoring the system	3-21

System FRU Locations

System FRU Locations

Refer to Figure 3–1 for the VAXstation 4000 Model 90 FRU locations mentioned in this chapter.

Note

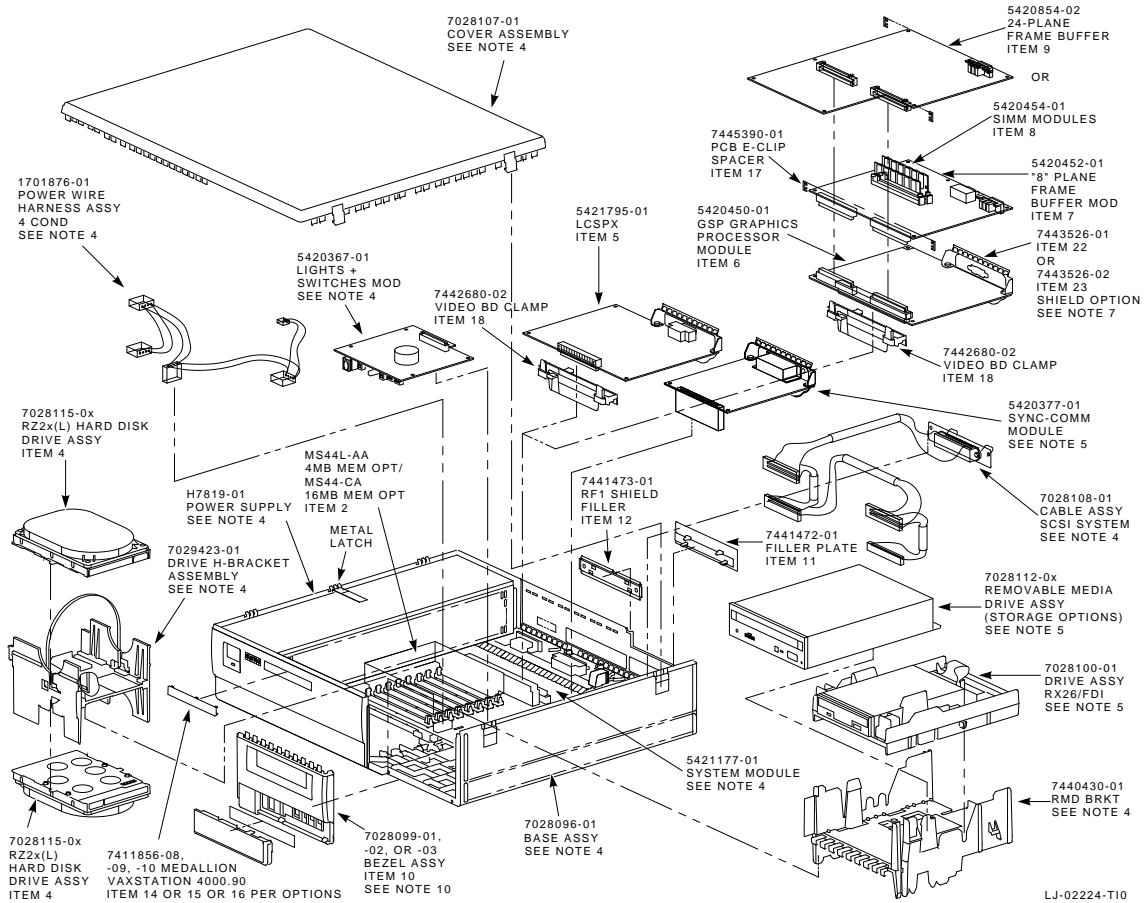**The TURBOchannel adapter module and any TURBOchannel option are not shown in Figure 3–1.**

The references of "Note" and "Item" that appear in Figure 3–1 are used in the *VAXstation 4000 Model 90 Service Information Guide* and do not apply to this guide.

Figure 3–1 VAXstation 4000 Model 90 FRU locations

7028107-01
COVER ASSEMBLY
SEE NOTE 4

5420854-02
24-PLANE
FRAME BUFFER
ITEM 9

OR

5420454-01
SIMM MODULES
ITEM 8

7445390-01
PCB E-CLIP
SPACER
ITEM 17

5420452-01
"8" PLANE
FRAME
BUFFER MOD
ITEM 7

1701876-01
POWER WIRE
HARNESS ASSY
4 COND
SEE NOTE 4

5420367-01
LIGHTS +
SWITCHES MOD
SEE NOTE 4

5421795-01
LCSPX
ITEM 5

5420450-01
GSP GRAPHICS
PROCESSOR
MODULE
ITEM 6

7443526-01
ITEM 22
OR
7443526-02
ITEM 23
SHIELD OPTION
SEE NOTE 7

7442680-02
VIDEO BD CLAMP
ITEM 18

7442680-02
VIDEO BD CLAMP
ITEM 18

7028115-0x
RZ2x(L) HARD DISK
DRIVE ASSY
ITEM 4

MS44L-AA
4MB MEM OPT/
MS44-CA
16MB MEM OPT
ITEM 2

7441473-01
RF1 SHIELD
FILLER
ITEM 12

5420377-01
SYNC-COMM
MODULE
SEE NOTE 5

7028108-01
CABLE ASSY
SCSI SYSTEM
SEE NOTE 4

H7819-01
POWER SUPPLY
SEE NOTE 4

METAL
LATCH

7441472-01
FILLER PLATE
ITEM 11

7029423-01
DRIVE H-BRACKET
ASSEMBLY
SEE NOTE 4

7028112-0x
REMOVABLE MEDIA
DRIVE ASSY
(STORAGE OPTIONS)
SEE NOTE 5

7028100-01
DRIVE ASSY
RX26/FDI
SEE NOTE 5

5421177-01
SYSTEM MODULE
SEE NOTE 4

7440430-01
RMD BRKT
SEE NOTE 4

7028115-0x
RZ2x(L)
HARD DISK
DRIVE ASSY
ITEM 4

7411856-08,
-09, -10 MEDALLION
VAXSTATION 4000.90
ITEM 14 OR 15 OR 16 PER OPTIONS

7028099-01,
-02, OR -03
BEZEL ASSY
ITEM 10
SEE NOTE 10

7028096-01
BASE ASSY
SEE NOTE 4

LJ-02224-TI0

3–4

Installing Ethernet ROM

Note

If the same unique Ethernet address is not required, for example, for a standalone system, then do not install the Ethernet ROM. Consult with the customer.

Install the Ethernet ROM

To install the Ethernet ROM in the new KA49 system module, complete the following steps:

Step	Action
1	Remove the Ethernet ROM from the KA49 system module and install it in the old KA46 system module.
2	Take the Ethernet ROM that was placed on the antistatic mat from the old KA46 system module and install it in the new KA49 system module.

Installing MS44 Memory SIMMs

Caution

The memory modules are keyed and can be installed in one direction only. Excessive force applied to the modules when they are not properly aligned with the connector can cause permanent damage to either the modules or to the connector.

MS44 Memory Slots (Model 90)

There are eight slots for memory SIMMs, as shown in Figure 3–2. When you install memory SIMMs, sets of four of the same value must go in either the 0 slots or the 1 slots.

Slots 0 are marked in etch as:

- 0A
- 0C
- 0B
- 0D

Slots 1 are marked in etch as:

- 1E
- 1G
- 1F
- 1H

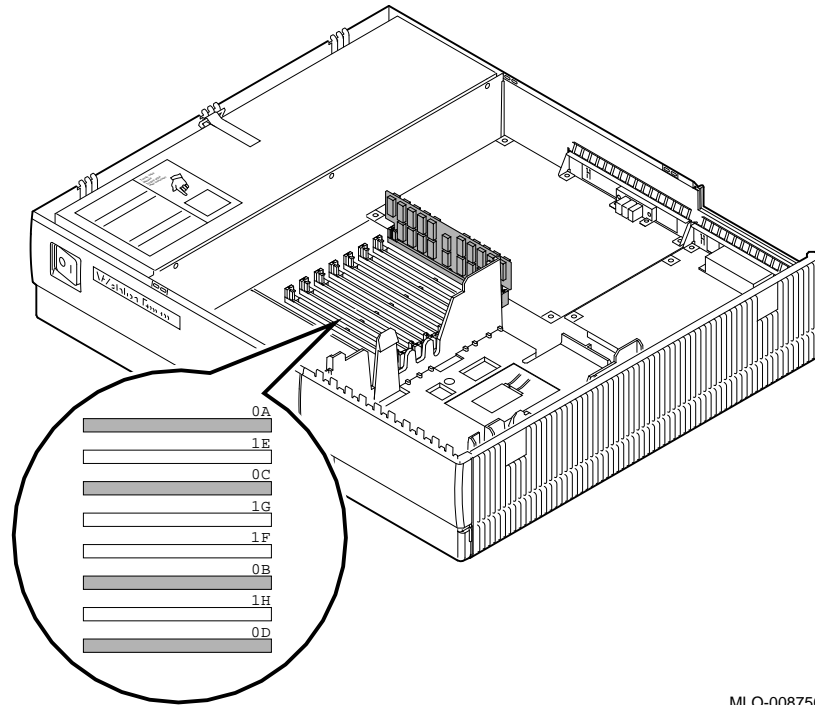Memory SIMMs must be installed working from the rear to the front, for example 0A, 0C, 0B, then 0D.

Installing MS44 Memory SIMMs, Continued

MS44 Memory Slots (Model 90) (continued)

Figure 3–2 Memory Slots in the Model 90

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Installing MS44 Memory SIMMs, Continued

Memory Configurations (Model 90)

For memory configurations, refer to Table 3–1.

Table 3–1   Memory Configurations (Model 90)

Desired Memory	Boards to Add	Slot Number
16 MB	Four 4-MB	All 0s or all 1s
32 MB	Eight 4-MB	All
64 MB	Four 16-MB	All 0s or all 1s
80 MB	Four 16-MB	0s
	Four 4-MB	1s
128 MB	Eight 16-MB	All

Install the MS44 Memory SIMMs

To install the MS44 memory SIMMs on the KA49 system module, complete the following steps and refer to Figure 3–3.

NOTE
For orientation purposes, some of the devices that may have not yet been installed are shown in Figure 3–3.

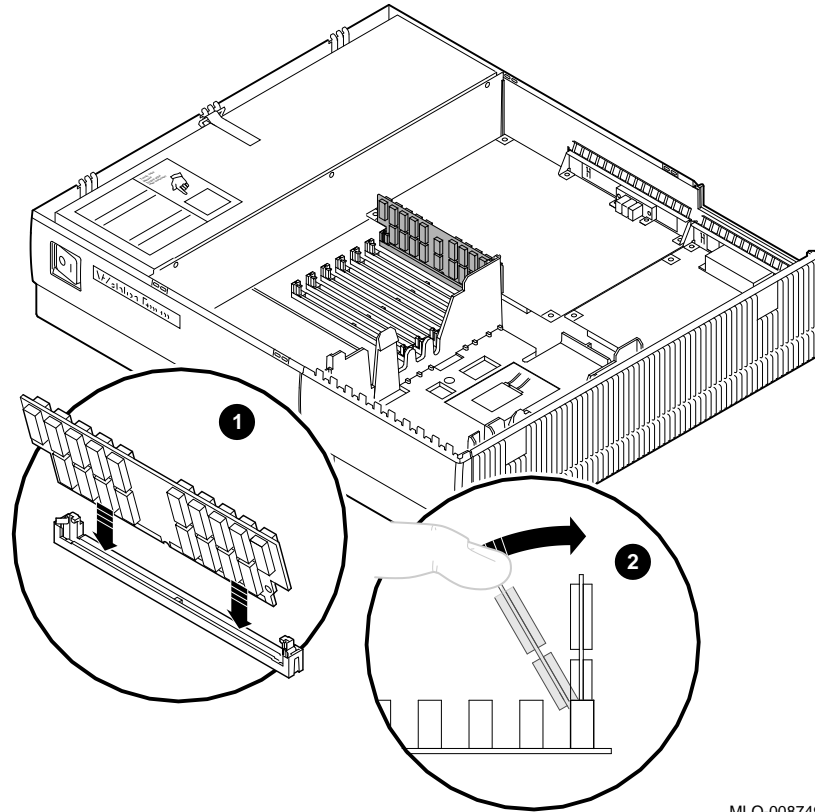| Step	Action
1	Make sure the double notched lower corner of the memory SIMM is away from the location of the power supply. Lean the SIMM approximately 55 degrees forward and place the memory SIMM in the connector.
2	Pivot the memory SIMM upward until the metal tabs lock the memory SIMM in place.

Installing MS44 Memory SIMMs, Continued

Install the MS44 Memory SIMMs (continued)

Figure 3–3   Installing the First MS44 Memory SIMM (Model 90)

MLO-008749

Installing the KA49 System Module (CPU)

Install the KA49 System Module

To install the KA49 system module in the BA46 system enclosure, complete the following steps:

Step	Action
1	Align the five slots in the module with the five latches on the base of the system enclosure.
2	Slide the module to the rear of the enclosure until the front of the module drops behind the two stops on the base of the enclosure.
3	Reconnect the SCSI and power cables to the system module.

Installing TURBOchannel Adapter Module and Option (if applicable)

**Install the
TURBOchannel
Adapter
Module and
Option**

To install the TURBOchannel adapter module and option in the
BA46 system enclosure, complete the following steps. Refer to
the *VAXstation 4000 Options Installation Guide* for additional
information.

| Step	Action
1	Add standoffs to the CPU board.
2	Line up TURBOchannel adapter over the standoffs, press down to snap the module into place, making sure the connector is firmly seated.
3	Slide the TURBOchannel option firmly towards the rear of the enclosure, as similar to the synchronous communications option shown in Figure 3–4.
4	Press the front of the TURBOchannel option so that the connector underneath mates into the connector on the TURBOchannel adapter.
5	Screw on the filler plate.

Installing Synchronous Communications Option (if applicable)

Install the Synchronous Communications Option

To install the synchronous communications option in the BA46 system enclosure, complete the following steps and refer to Figure 3–4.

Step	Action
1	Slide the synchronous communications option firmly towards the back of the system enclosure.
2	Make sure that the two small openings in the metal bracket under the rear 50-pin connector slide onto the plastic bracket along the top rear of the system module.
3	After making sure that the connectors are carefully aligned, press the board down firmly and directly above the 64-pin connector.

Figure 3–4 Installing the Synchronous Communications Option

MLO-008163
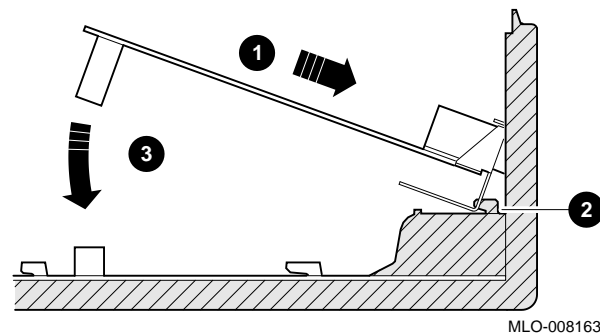
Swapping SPXg/gt Diagnostic ROM (if applicable)

Cautions

When swapping the diagnostic ROM from the graphics module, antistatic precaution must be adhered to.

Before removing and installing the diagnostic ROM, be sure to note the orientation of the IC chip keyway in relation to the chip IC socket. If you put the diagnostic ROM in backwards, then the system will not function.

Swapping the SPXg/gt Diagnostic ROM

If the SPXg/gt diagnostic ROM is version 1.1 or lower, then it will need to be replaced. To replace the ROM, complete the following steps:

Step	Action
1	Locate the SPXg/gt diagnostic ROM on the graphics module and remove it from the socket using a chip puller or a small flat-head screwdriver.
2	Install the new SPXg/gt diagnostic ROM into the chip socket.

Installing Graphics Module (if applicable)

Note	**The refresh rate for the LCSPX and SPXg are switch selectable, 66 or 72 Hz. They must match the refresh cycle of the monitor.**

Setting the Refresh Rate

If the refresh rate needs to be changed, then complete the following steps:

If you have an...	Then...
LCSPX	
	1. Set switch 2 toward the On marker on the Switch Pack for a 72 Hz refresh rate.
	Set switch 2 away from the On marker on the Switch Pack for a 66 Hz refresh rate.
	2. Switch 1 can be in either position (inactive).
SPXg	
	1. Set switch 2 toward the B marker on the frame buffer module for a 66 Hz refresh rate.
	Set switch 2 away from the B marker on the frame buffer module for a 72 Hz refresh rate.
	2. Switch 1 can be in either position (inactive).

Installing Graphics Module (if applicable), Continued

Install the Graphics Module(s)

To install the graphics module(s) in the BA46 system enclosure, complete the following steps:

If you have an...	Then...	
LCSPX		
	1.	Install the video board clamp that came with the kit.
	2.	Make sure the two slots in the metal bracket on the graphics module line up with the two notches on the plastic bracket along the rear of the system module.
	3.	Press down firmly on the module until it secures within the two front latches on the video board clamp.
	4.	Check to see if the front edge of the metal bracket locks behind the ridge on the plastic bracket.

Install the Graphics Module(s) (continued)

SPXg

1. Install the video board clamp on the KA49 system module that was removed from the KA46 system module.

2. Make sure the two slots in the metal bracket on the graphics module line up with the two notches on the plastic bracket along the top rear of the system module.

3. Press down firmly on the module assembly until it secures within the two front latches of the video board clamp.

4. Check to see if the front edge of the metal bracket locks behind the ridge on the plastic bracket.

Installing Graphics Module (if applicable), Continued

**Install the
Graphics
Module(s)
(continued)**

If you have an...		Then...
SPXgt		
	1.	Install the video board clamp on the KA49 system module that was removed from the KA46 system module.
	2.	Make sure the two slots in the metal bracket on the graphics module line up with the two notches on the plastic bracket along the top rear of the system module.
	3.	Press down firmly on the module until it secures within the two front latches of the video board clamp.
	4.	Check to see if the front edge of the metal bracket locks behind the ridge on the plastic bracket.
	5.	Place the RFI gasket in between the system enclosure and the metal bracket on the graphics module.
	6.	Align and mate the frame buffer module with the graphics module and the RFI gasket. The frame buffer module tail bracket should snap under the ridge on the disk drive H-bracket.
	7.	Slide the E-clip back onto the frame buffer.
	8.	Install the E-clip located closest to the tail bracket.

Installing Lights and Switches Module

Note	**When installing the module, be sure to align the module jacks and switches with the cutouts in the front panel.**

Install the Lights and Switches Module

To install the lights and switches module in the BA46 system enclosure, complete the following steps:

Step	Action
1	Align the switches with their respective holes in the front bezel, most notably the Halt button.
2	Align the connector on the under side of the module with the connector on the system module and seat the connector.

Installing Power Supply

**Install the
Power Supply**

To install the power supply in the BA46 system enclosure, complete the following steps:

Step	Action
1	Align the two guides (one on the right front and one on the right rear of the supply) with the slots on the system enclosure.
2	Push the power supply down into place. The power supply snaps into place if positioned properly.
3	Pull the metal latch toward the power supply.

Installing Mass Storage Devices

Install the Hard Disk Drive

To install the hard disk drive assembly in the BA46 system enclosure, complete the following steps:

Step	Action
1	Connect both the SCSI and dc power cables to the drive(s).
2	Snap the bracket assembly back into place.
3	Check the cable routing. For more information on cable routing, refer to the *VAXstation 4000 Options Installation Guide*.

Install the Removable Media Drives

The removable media drive assembly may contain one of the following drives:

- RRD42 CDROM drive
- RX26 (diskette) drive
- TLZ06 cassette tape drive
- TZK10 QIC tape drive

To install the removable media drive assembly from the BA46 system enclosure, complete the following steps:

Step	Action
1	Connect both the SCSI and dc power cables to the drive.
2	Snap the bracket assembly back into place.
3	Check the cable routing. For more information on cable routing, refer to the *VAXstation 4000 Options Installation Guide*.

Restoring the System

Restore the System

To restore the system, complete the following steps:

Step	Action
1	Replace the system cover. Align the hinged teeth of the cover with the hinged teeth on the left side of the BA46 system enclosure and lower the cover until it clicks into place.
2	Reconnect the cables and (terminators, if present) at the rear of the system.
3	Plug the system power cord into the wall outlet.
4	Reconnect the monitor.
5	Power up the system.

Restoring the System, Continued

Run SHOW CONFIG Command

To run the SHOW CONFIG command, complete the following steps and refer to Example 3–1.

Step	Action
1	Press the Halt button located behind the door in the front of the system box.
	Results: The system displays the console prompt on the screen.
2	Enter **SHOW CONFIG** at the console prompt and press Return .
	>>> SHOW CONFIG Return
3.	Verify the Ethernet hardware address. The address must be the same as the one recorded before the upgrade began. Refer to the section **Preparing VAXstation Model 60 for Disassembly** for more information.
4.	Verify that the SPXg/gt diagnostic ROM is Version 1.2 or higher.

Note

The TURBOchannel adapter module and options are not tested by test 100. For more information, refer to the *VAXstation 4000 Model 90 Service Information Guide*.

Run the System Exerciser

Verify that all devices are interacting properly by using the TEST 100 command to run the system exerciser.

Restoring the System, Continued

Example 3–1   Typical Screen Display of a SHOW CONFIG Command (Model 90)

```
KA49-A V0.0-051-V4.0      ! System type and firmware revision
08-00-2B-F3-31-03         ! Ethernet hardware address
16 MB                     ! Total memory

DEVNBR  DEVNAM  INFO
------  ------  ----
    1   NVR    OK                       ! Non-volatile RAM
    2   LCSPX  OK
               Highres - 8 Plane  4MPixel  FB - V1.2
    3   DZ     OK                       ! Serial line controller
    4   CACHE  OK                       ! Cache memory
    5   MEM    OK                       ! Memory configuration

               16 MB 0A,OB,0C,0D = 4 MB,  1E,1F,1G,1H, = 0 MB

    6   FPU    OK                       ! Floating point accelerator
    7    IT    OK                       ! Interval timer
    8   SYS    OK                       ! Other system functions
    9    NI    OK                       ! Ethernet
   10   SCSI   OK                       ! SCSI and drives
               0-RZ24  1-RZ25  2-RRD42  6-INITR
   11   AUD    OK                       ! Sound
   12   COMM   OK                       ! DSW21 communications device
>>>
```

Appendix A
Packing Instructions and
Upgrade Return Forms

Packing Instructions

Overview
The Digital Services representative should work together with the customer to ensure that the hardware is packaged properly for return to Digital and that the proper return forms in this appendix are completed.

Use the packing material from the upgrade kit to pack the leftover modules and components for shipment back to Digital.

Return Forms
The Digital Services representative who performs the upgrade must complete the Digital Services Upgrade Worksheet and the Installation Receipt–Customer Copy and the Installation Receipt–Digital Services Copy. The Digital Services representative and the customer must work together to complete the Returns Material Checklist.

Digital Services Upgrade Worksheet

This form acts as a verification of the work performed on the system and as a check on the procedures used. Please fill out this form and return it to your Contract Administrator for updating the customer's contract.

Customer: _____

System Serial Number: _____

Old System Model Number: _____

Old CPU Module Serial Number: _____

New System Name: _____

New System Model Number: _____

New CPU Module Serial Number: _____

Installation Receipt—Customer Copy

For VAXstation 4000 Model 60 upgrade to VAXstation 4000 Model 90.

This form acts as a customer receipt and as verification for Digital Services that the upgrade was completed.

Digital Services: Complete both copies of this form. Then, give a copy to the customer and a copy to the local CAS office for filing with customer documents.

Customer: Digital will contact you within the next several days to arrange for package pickup and return. Keep this copy as your record of installation by Digital.

NOTE
Contact the local CAS office to obtain the RA (return authorization) number. You should have the Digital order number available. Be sure to note the name of the person you speak with.

Name of CAS
representative: _____

Branch Office: _____, will arrange for
package pickup and return.

Return Authorization (RA)
Number: _____

Digital Order Number: _____

Old CPU Module Serial Number:

_____

Converted to: _____

Installation Receipt—Customer Copy, Continued

New CPU Module Serial Number:

Installation was performed on this date:

Module Packed for Return:

Customer Name:

Phone Number:

Customer Signature:

Digital Services Representative
Signature:

Installation Receipt—Digital Services Copy

For VAXstation 4000 Model 60 upgrade to VAXstation 4000 Model 90.

This form acts as a customer receipt and as verification for Digital Services that the upgrade was completed.

Digital Services:	Complete both copies of this form. Then, give a copy to the customer and a copy to the local CAS office for filing with customer documents.
Customer:	Digital will contact you within the next several days to arrange for package pickup and return. Keep this copy as your record of installation by Digital.

NOTE
Contact the local CAS office to obtain the RA (return authorization) number. You should have the Digital order number available. Be sure to note the name of the person you speak with.

Name of CAS
representative: _____

Branch Office: _____, will arrange for package
pickup and return.

Return Authorization (RA)
Number: _____

Digital Order Number: _____

Old CPU Module Serial Number:

_____

Converted to: _____

Installation Receipt—Digital Services Copy, Continued

New CPU Module Serial Number:

_____

Installation was performed on this date:

_____

Module Packed for Return:

Customer Name:_____

Phone Number:_____

Customer Signature: _____

Digital Services Representative
Signature:_____

Return Material Checklist

For VAXstation 4000 Model 60 upgrade to VAXstation 4000 Model 90.

This form must be filled out and returned with the old modules to ensure that the customer does not incur a penalty charge.

Date:_____

Return Authorization (RA) Number:

_____

Digital Order
Number:_____

Customer
Name:_____

Customer Address:_____

_____

_____

Customer
Contact:_____

Customer Telephone
Number:_____

Return Material Checklist, Continued

HARDWARE BEING RETURNED:

1._____

2._____

3._____

4._____

5._____

6._____

7._____

8._____

System Number from Rear of System

_____

Serial Number_____

Include This Form With Your Module Return

Customer Administrative Services District Offices

Name, Location	Phone Number
Allegheny District, Pittsburgh	(412) 244–7410
Carolinas District, Columbia	(803) 798–6477
Chicago District, Chicago	(312) 806–2478
Connecticut District, Meriden	(203) 634–5325
CSS District, Nashua	(603) 884–6549
DECdirect District, Nashua	(603) 884–9115
Florida District, Tampa	(813) 882–6822
Greater Boston District, Waltham	(617) 895–5455
Great Lakes District, Detroit	(313) 344–2285
Los Angeles District, Culver City	(213) 417–4232
Midsouth District, Memphis	(901) 761–6712
New England District, Bedford	(603) 472–6061
New Jersey Commercial District, Piscataway	(201) 562–4728
New Jersey Financial District, New York	(212) 714–2648
New York Financial District, New York	(212) 714–2648
New York Suburban District, Tarrytown	(914) 524–5284
North Central District, Minneapolis	(612) 851–2225
North Texas/Oklahoma District, Dallas	(214) 404–6135
Northwest District, Bellevue	(206) 462–2540
Ohio Valley District, Cincinnati	(513) 984–7739
Philadelphia District, Blue Bell	(215) 834–4115
Rocky Mountain District, Englewood	(303) 649–3073
Santa Clara District, Santa Clara	(408) 496–4274

Name, Location	Phone Number
Southeast District, Atlanta	(404) 257–2282
Southern California District, Costa Mesa	(714) 850–7606
South Texas District, Houston	(713) 953–3918
Southwest District, Tempe	(602) 894–4747
Upstate New York District, Rochester	(716) 385–7152
U.S. Distribution/Sales District, Marlboro	(508) 480–4259
Virginia District, Landover	(301) 306–2566
Washington DC District, Landover	(301) 459–2890
Washington DC District, FDA Landover	(301) 459–2292

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