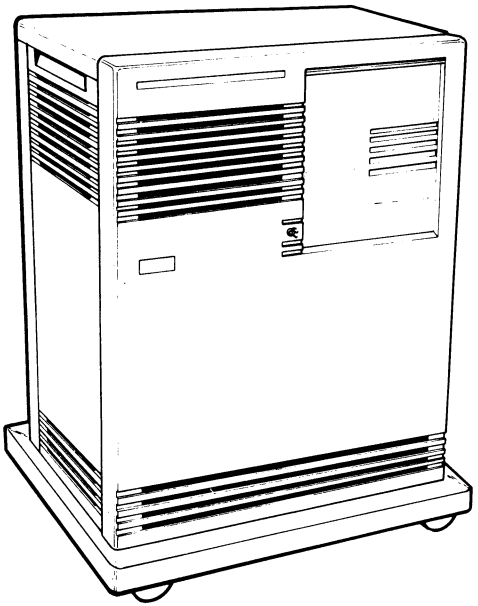
MicroVAX 3500
VAXserver 3500

digital

MicroVAX 3500
VAXserver 3500
Operation

Order Number EK–O28AB–OM–002



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Preface

The hardware for the MicroVAX 3500 and VAXserver 3500 systems is the same. The software differs because the systems serve different functions. The MicroVAX 3500 is a timesharing system that uses the VMS, ULTRIX, or VAXELN operating systems, and functions as an end-node on an Ethernet network. The VAXserver 3500 is a full-function network node that uses the VMS operating system and LAVc (Local Area VAXcluster) software.

This manual describes how to use the MicroVAX 3500 and VAXserver 3500 systems. The manual is structured as follows:

- Chapter 1 provides an overview of the systems.
- Chapter 2 describes how to use each system.
- Chapter 3 describes how to use options installed in the systems.
- The appendix lists related documentation.
- A glossary explains key terms.

NOTE: *VAXserver 3500 systems are designed to offer maximum performance for applications that do not require timesharing. Some of the devices referred to in this manual are designed for multiuser systems and may not be suitable for a VAXserver system. Contact your DIGITAL representative if you have any questions about whether use of a specific device is appropriate for your VAXserver system.*

Conventions

The following conventions are used in this book:

Convention	Meaning
Key	A symbol denoting a terminal key used in text and examples in this book. For example, Break indicates that you press the Break key on your terminal keypad. Return indicates that you press the Return key on your terminal keypad.
Ctrl/C	A symbol indicating that you hold down the Ctrl key while you press the C key.
Bold	Bold type is used to indicate user input. For example: **>>>BOOT MUA0** This line shows that the user must type BOOT MUA0 at the ">>>" prompt.
WARNING	Provides information to prevent personal injury.
CAUTION	Provides information to prevent damage to equipment or software.
NOTE	Provides general information about the current topic.

Chapter 1
System Overview

This introductory section describes the MicroVAX 3500 and VAXserver 3500 systems.

MicroVAX 3500 and VAXserver 3500 systems contain all system components in a pedestal-mounted BA213 enclosure. The BA213 enclosure houses the following:

- Central processing unit (CPU)
- Memory modules
- Communications controllers
- Mass storage controllers
- RA70 disk drive (optional)
- RD54 disk drive (optional)
- TK70 tape drive
- Power supplies

Depending on the configuration you ordered, your system contains an RA70 disk drive(s) or an RD54 disk drive(s).

- **RA70-based systems** contain one or two RA70 disk drives.
- **RD54-based systems** contain one to three RD54 disk drives.

The illustrations in this manual show RA70-based systems.

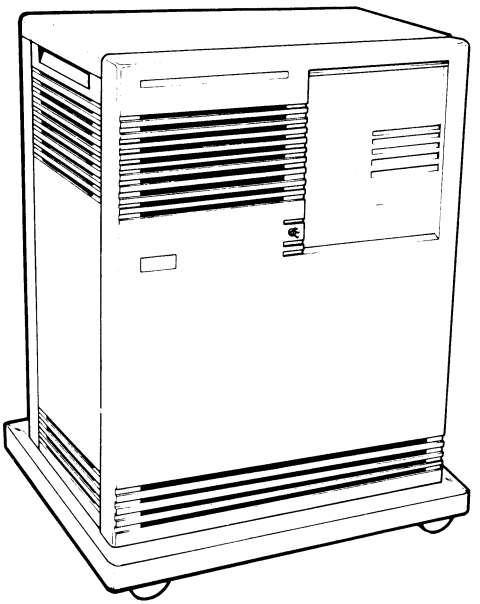
This chapter describes the MicroVAX 3500 and VAXserver 3500 system components and their functions. The front of the system has a removable front panel that restricts access to some of the system controls. The front panel, the enclosure behind the panel, and the function of the system components are described in turn.

Chapters 2 and 3 describe how to use the system and options.

1.1 Front View of the MicroVAX/VAXserver 3500 System

Figure 1–1 shows the MicroVAX/VAXserver 3500 system with the front panel attached.

Figure 1–1: MicroVAX/VAXserver 3500 Enclosure



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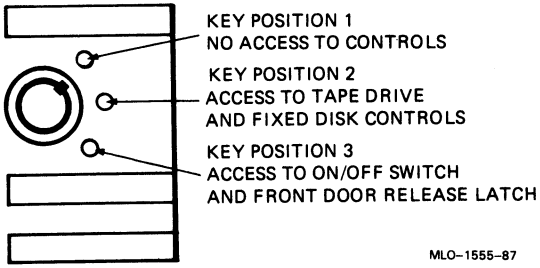
The front panel has a sliding window controlled by a 3-position rotary lock. You can lock the window in one of three positions: closed, partially open, and fully open. Each position limits access to certain system controls. When the window is locked in any of its three positions, you can still raise it to a higher position. However, you cannot lower it beyond the locked position without using the key.

To open the window, turn the key to position 2 or 3, then slide the window down. To close the window, slide the window up, then turn the key to lock the window in position.

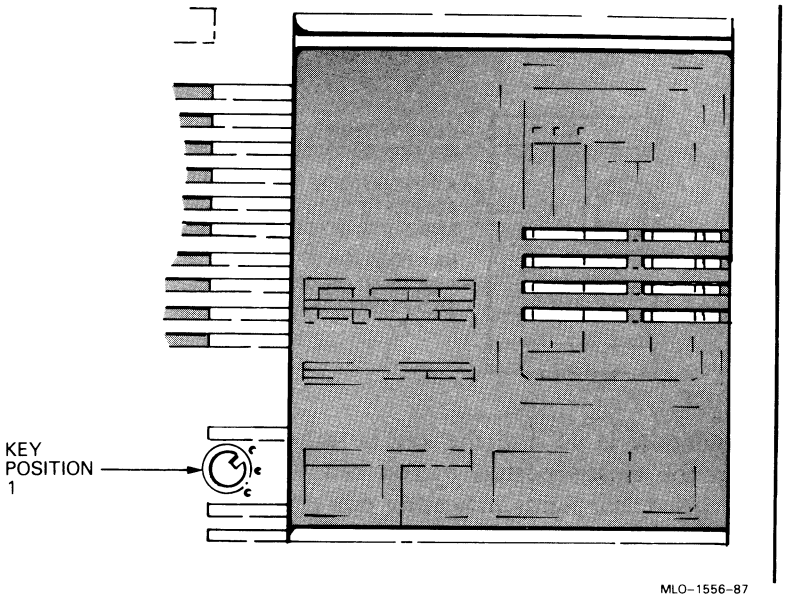
Figure 1–2 shows the three key positions and the controls accessible in each position.

Figure 1–2: Key Positions



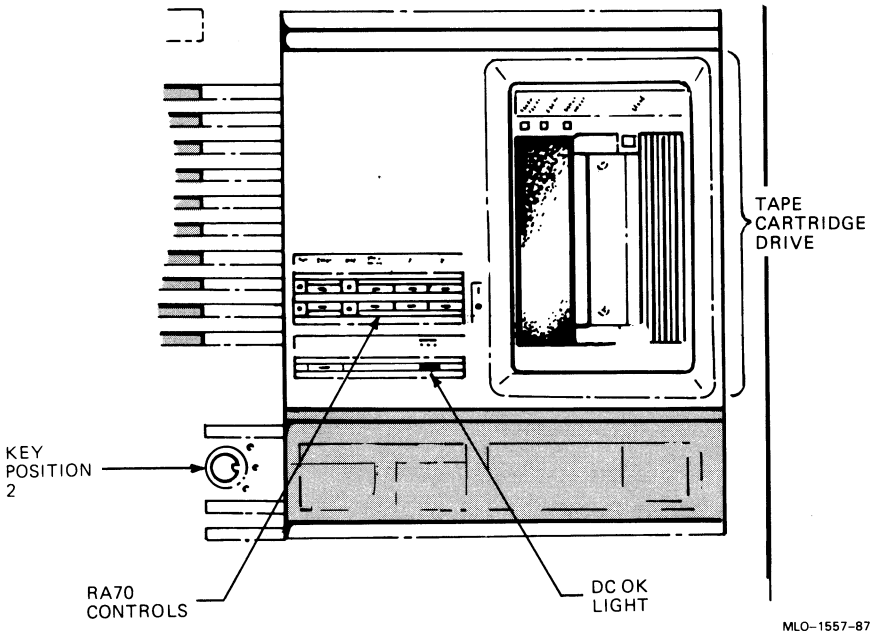
When the window is up and the key is turned to position 1, the window is locked in the closed position. You cannot use any controls when the window is closed, but lights indicating power to the system and activity on the disks and tape are visible through the window. Figure 1–3 shows the closed window and key position.

Figure 1–3: Sliding Window Closed



When the key is turned to position 2, you can open the window partially, as shown in Figure 1–4. You can use the TK70 tape drive, operate the controls for the RA70 or RD54 disk drives, and use the Halt button (RA70-based systems only). Chapter 3 has instructions for using the tape and disk drives and the Halt button.

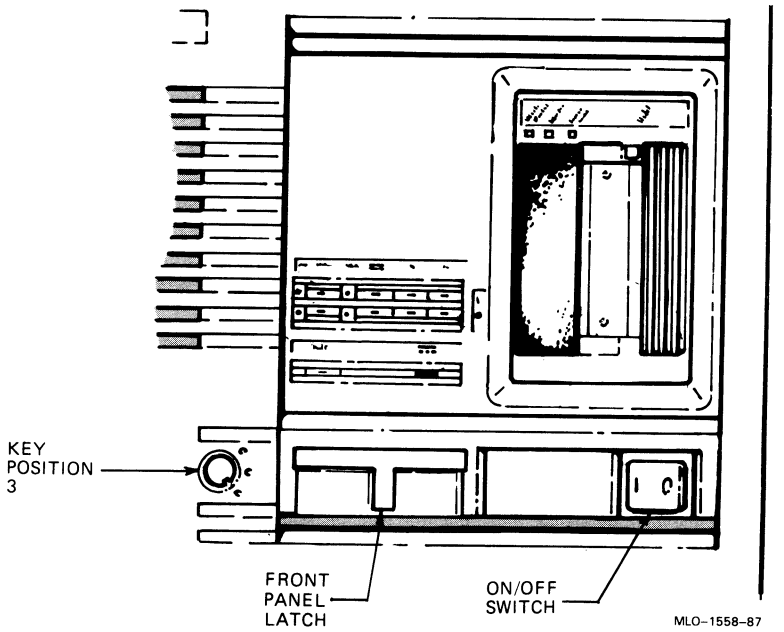
Figure 1–4: Window Partially Open



When the key is turned to position 3, you can open the window fully, as shown in Figure 1–5.

When the window is fully open, you can turn the system on and off, and you can release the latch that locks the front panel.

Figure 1–5: Window Fully Open

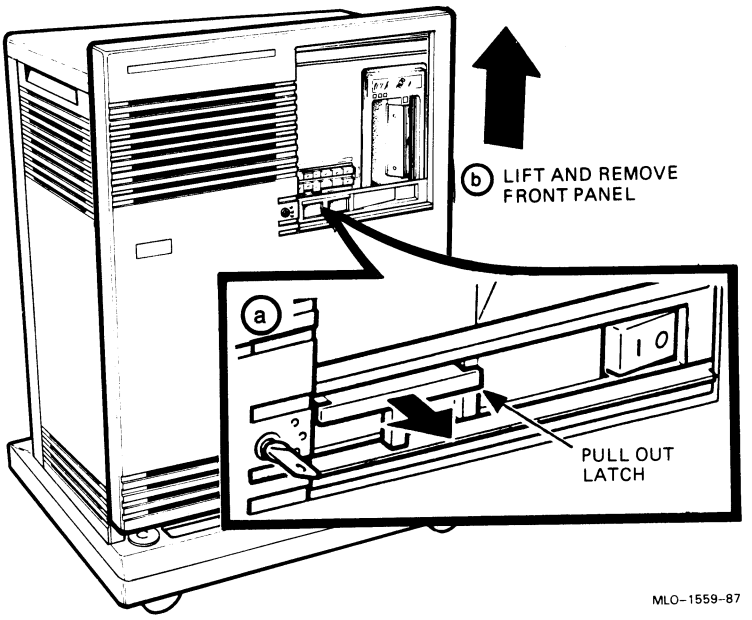


Removing the Front Panel

You must remove the front panel to use controls on the CPU cover panel and power supplies. Remove the front panel, as follows:

1. Insert the key into the lock on the front cover. Turn the key to the bottom position.
2. Slide the window down.
3. Turn the on/off power switch to off (position 0) and unplug the power cord from the wall outlet.
4. Remove the cover by doing the following (see Figure 1–6):
   a. Pull out the front panel release latch.
   b. Lift the front panel up and out.

Figure 1–6: Removing the Front Panel



The next section describes the BA213 enclosure, which is exposed when you remove the front panel.

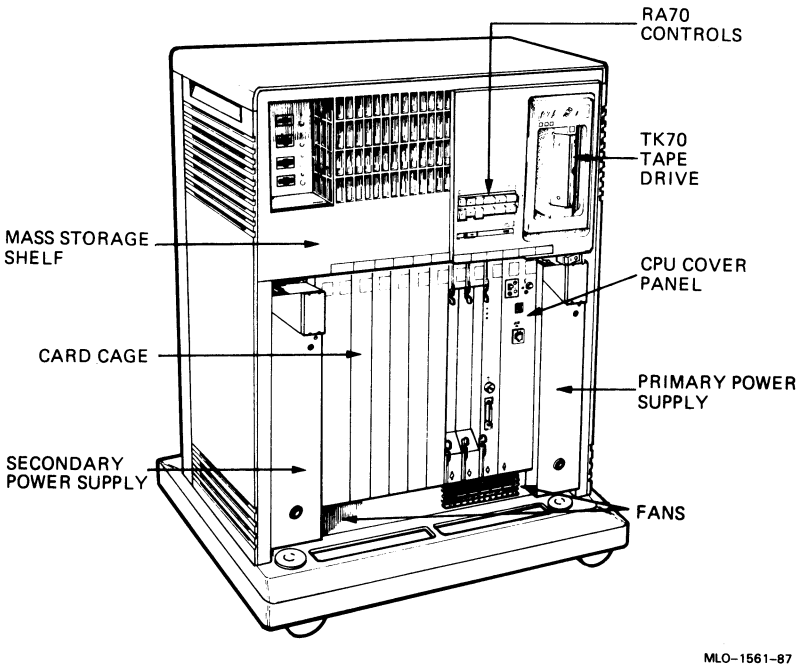
1.1.1 The BA213 Enclosure

Removing the front panel enables you to see the components housed in the BA213 enclosure. Figure 1–7 shows a typical configuration.

The BA213 enclosure contains the following:

- Mass storage—A fixed-disk drive(s) and a TK70 tape drive
- Card cage containing modules—CPU, memory, communications controllers, mass storage controllers
- Power supplies (2)
- Fans (2)

Figure 1–7: Front View of the BA213 Enclosure



1.1.1.1 Mass Storage Shelf

The mass storage shelf extends across the top of the enclosure. The shelf contains a TK70 tape drive and a fixed-disk drive(s) (either RA70 or RD54). The fixed-disk drives are behind the control panel. Figure 1–8 shows the control panel of an RA70-based system. Figure 1–9 shows the control panel of an RD54-based system.

The fixed-disk drive control panel has several buttons and indicators for each drive which light when the system is turned on. Chapter 3 describes how to use the control panel. Only control panel indicators that correspond to a drive light when you turn on your system. For example, if an RA70-based system contains one RA70 fixed-disk drive, only one of the two sets of control panel indicators lights on power-up.

Below the fixed-disk drive control panel is the system DC OK light. When lit, the green DC OK light indicates that the voltages are within the correct operating range. When unlit, there is a problem with one of the power

supplies. If the DC OK light is not lit, contact your DIGITAL service representative.

RA70-based systems have a halt button to the left of the DC OK light. The Halt button is a two-position button. When you press in the button, the system halts and the console mode prompt >>> appears on the console terminal screen. Before you can enter console commands, press the Halt button again to return it to the out position. Now you can enter console commands. If you inadvertently press the Halt button, type "c Return" to continue.

CAUTION: *Pressing in the Halt button halts the system regardless of the setting of the Break Enable/Disable switch on the CPU cover panel.*

Some early models of RA70-based MicroVAX 3500 and VAXserver 3500 systems do not have a Halt button. You halt these systems by pressing the Break key, after setting the Break Enable/Disable switch on the CPU cover panel to enable. Chapter 2 describes halting the system in more detail.

Figure 1–8: Mass Storage Shelf (RA70 based)

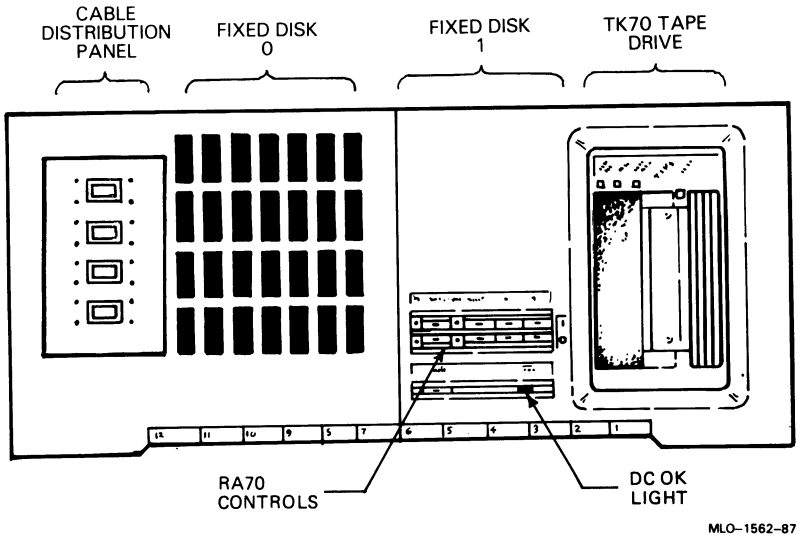
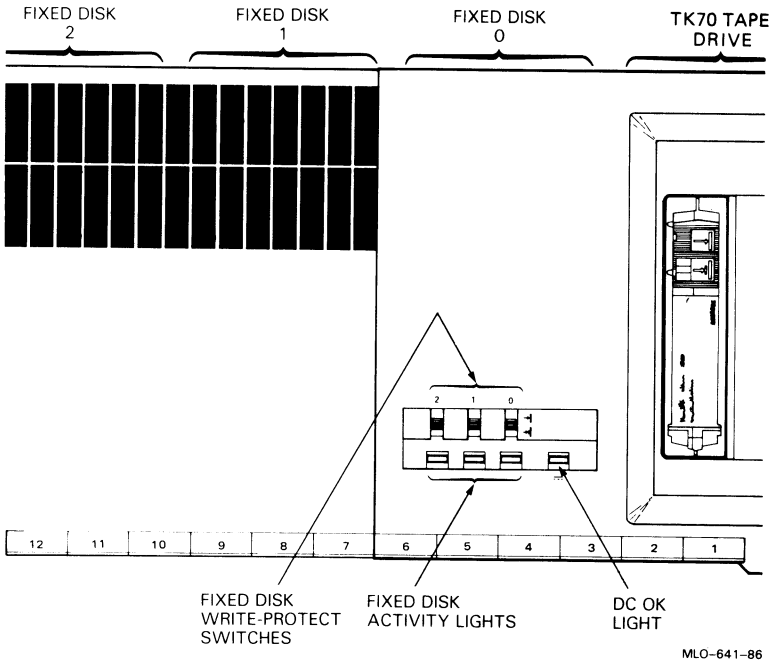


Figure 1–9: Mass Storage Shelf (RD54 based)



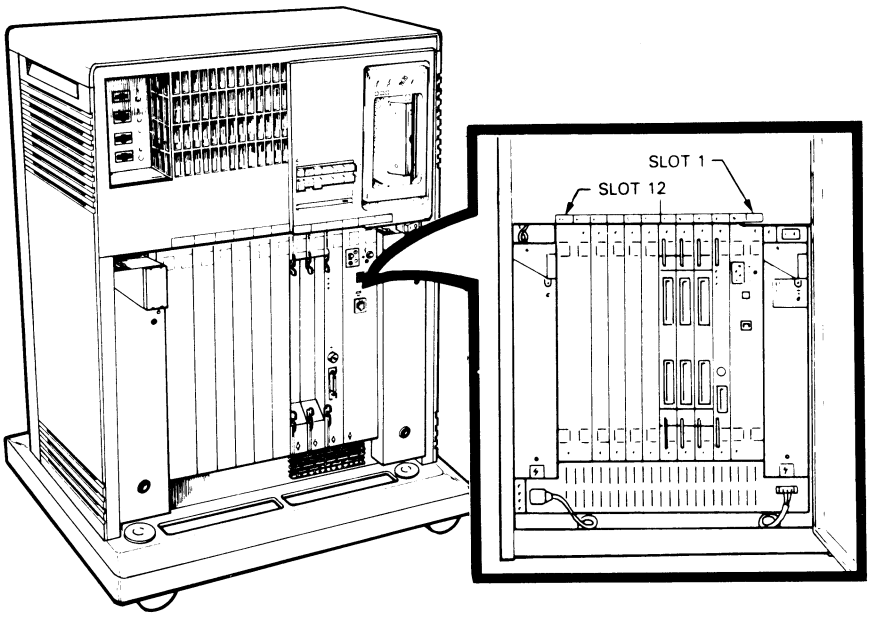
1.1.1.2 Card Cage

The modules in your system are mounted in a 12-slot card cage under the mass storage shelf. The slots are numbered 1 to 12 from right to left, as shown in Figure 1–10.

The number and type of modules installed in your system depend on your configuration. Each slot, even an empty one, is protected by a cover panel. Together the panels form a shield with a twofold purpose: to protect external devices from electrical interference generated by the system, and to protect the system from electrical interference generated by external devices.

CAUTION: *Do not operate the system without DIGITAL-supplied module cover panels. The cover panels are required to protect the equipment and to meet international regulatory standards. Do not substitute other cover panels as they may not meet the required specifications.*

Figure 1–10: Card Cage



Operating the system without the module cover panels has the following consequences:

- The system may overheat due to improper air circulation.
- The system will not comply with FCC and VDE requirements for shielding and may produce electrical interference that affects other equipment.
- The system is susceptible to electrical interference or damage from external sources.

The design of the cover panels varies, depending on the type of module installed in the slot. Modules requiring external cable connections, such as communications controllers (excluding Ethernet cable connections), have recessed cover panels that are riveted directly to the module. The recessed panels allow space for connecting cables. Modules requiring no external cable connections, such as mass storage controllers, are covered by flush cover panels. Empty slots are also covered by flush cover panels which may be single or double width. All cover panels, except those covering empty slots, have a label identifying the module installed in the slot.

Cables connecting your system to peripheral devices (such as terminals, modems, and printers) are attached to communications controllers. Each cable can contain multiple lines. The cables run under the BA213 enclosure and out the back of the enclosure, where the cables are split into individual lines. Chapter 3 describes these connections in more detail.

The central processing unit (CPU) module is installed in slot 1 with its associated memory module in slot 2. Additional memory modules may be installed in slots 3 through 5. The CPU and the first memory module are behind a double-width cover panel that has internal cable connections to the CPU module. Figure 1–11 shows the CPU cover panel.

CPU Cover Panel Components

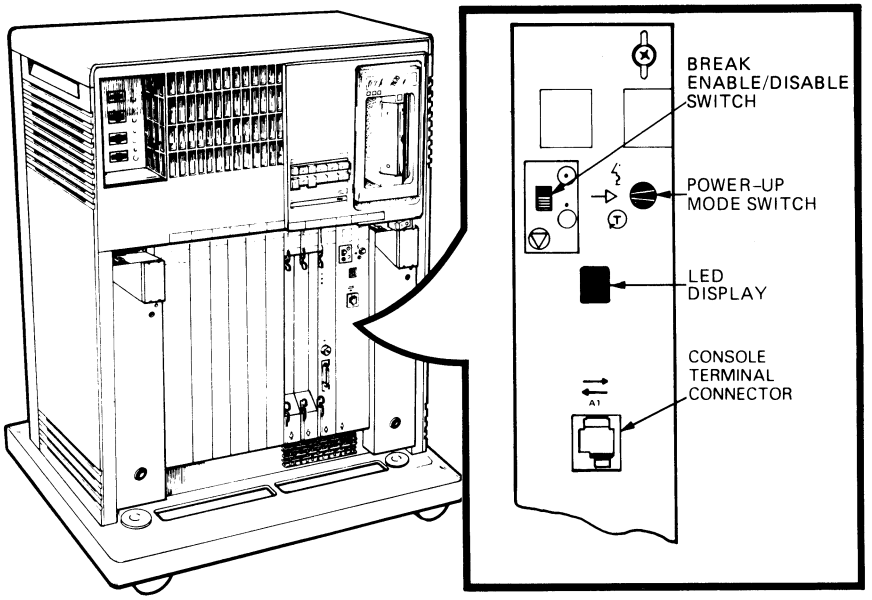
The CPU cover panel has the following components:

- Break Enable/Disable switch—When the switch is down (dot outside the circle), breaks are disabled. When the switch is up (dot inside the circle), breaks are enabled. When breaks are enabled, pressing Break on the console terminal halts the processor and transfers control to the console program. When you change the switch from one setting to the other, you must activate the new setting by resetting the system. To reset the system, press the Reset button on either power supply. All processes will be interrupted.
- Power-Up Mode switch—This 3-position rotary switch determines how the system responds at power-up:

  Language Inquiry Mode (in the top position, indicated by a human profile) causes the system to display a language selection menu at power-up if your console terminal supports multiple languages.

  Run Mode (in the middle position, indicated by an arrow) is the normal operating setting.

Figure 1–11: CPU Cover Panel



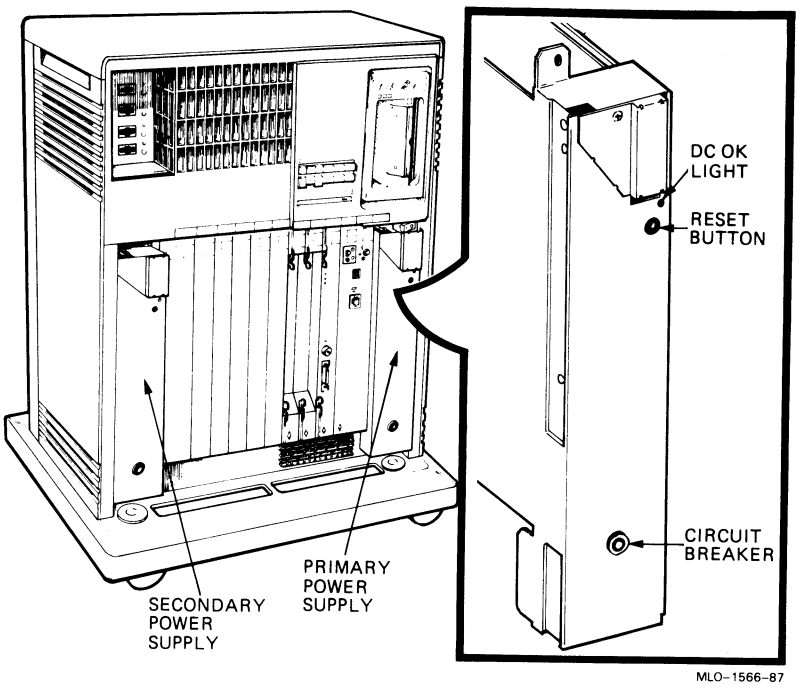
Loop Back Test Mode (in the bottom position, indicated by a T in a circle) causes the system to run loopback tests on the console serial line at power-up. This setting requires special loopback connectors and is for DIGITAL field service use only.

- The light-emitting diode (LED) display shows the testing sequence during power-up.
- Console terminal connector—This modified modular jack (MMJ), labeled A–1, provides the connection for the console terminal.

1.1.1.3 Power Supplies

Your system has two power supplies. The one on the right is the primary power supply; the one on the left is the secondary power supply. Figure 1–12 shows the controls and indicators on each power supply.

Figure 1–12: Power Supply



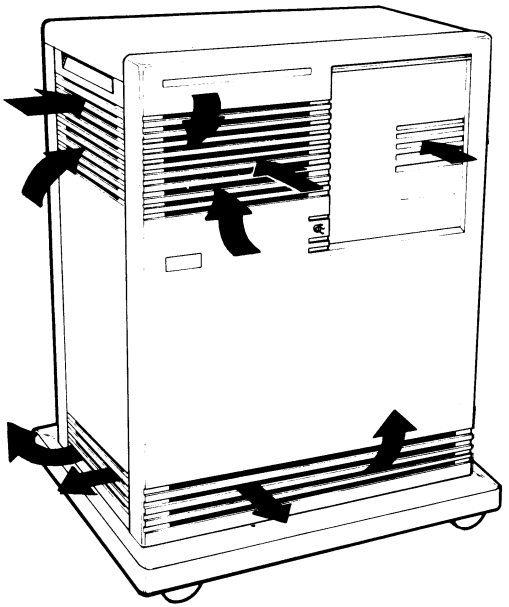
The controls and indicator lights function as follows:

- DC OK—When the DC OK light is lit, the voltages are within the correct operating range. An unlit DC OK light indicates a problem with the power supply. Turn off the system and call your DIGITAL service representative.
- Reset button—A recessed Reset button enables you to reset the system to a power-on state without turning it off. The Reset button is recessed to prevent you from inadvertently resetting the system. Use your fingertip or a small tool to press the button. See Chapter 2 for the correct procedures for resetting the system.
- Circuit breaker—The circuit breaker trips to protect the system from power surges. When tripped, the circuit breaker is in the out position. To reset the breaker, press the circuit breaker to the in position.

1.1.1.4 Fans

Two fans located under the card cage draw air through the BA213 enclosure. The fans draw air from the top of the enclosure, down through the card cage, and out the bottom. The speed of the fans varies with the temperature of the surrounding environment. Figure 1–13 shows the air flow through the system enclosure.

Figure 1–13: System Air Circulation



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1.1.2 Mass Storage Options

Each MicroVAX 3500 and VAXserver 3500 system has a TK70 tape drive and either

- One or two RA70 fixed-disk drives, or
- One, two, or three RD54 fixed-disk drives.

Instructions for using each of these devices are in Chapter 3.

1.2 Functional Description of Base System Components

Each MicroVAX/VAXserver 3500 system includes base system components common to all systems and, perhaps, optional components. Your system was configured at the factory, based on your order.

The following sections describe base system components and options.

1.2.1 Base System Components

Base system components include the following:

- Central processing unit (CPU)
- Console serial line unit (SLU)
- Main memory
- Mass storage devices and controllers
- Power supplies
- Fans

1.2.1.1 Central Processing Unit (CPU)

The central processing unit (CPU) controls the execution of all instructions and processes. The CPU circuits contain the logic, arithmetic, and control functions used by the system.

1.2.1.2 Console Serial Line Unit (SLU)

Each system has a serial line unit (a line on which each bit of information is sent sequentially on a single channel) connecting the console terminal to the CPU module. The SLU connector (an MMJ) is located on the CPU cover panel. The console serial line provides a means of communicating with the CPU.

1.2.1.3 Main Memory

Main memory provides the physical storage area for data and instructions used by the CPU. When you start your system, the operating system is loaded into main memory. Application programs must also be loaded into memory.

When the system cannot load everything into memory at once, it reads in units of data called pages (512 bytes of data) from disk. Having a large main memory increases the efficiency of processing, since fewer pages must be

copied to and from disk. Each configuration comes with a standard memory option that you can upgrade to increase efficiency.

The contents of memory are volatile. This means they are lost when you turn off power to the system. Use mass storage devices, such as fixed disks and tape cartridges, to store software and data permanently.

1.2.1.4 Mass Storage Devices and Controllers

Mass storage devices record data on magnetic media. The data recorded is not lost when you turn off the system, but can be altered or erased if you record over the data. Use mass storage devices to store data and software permanently. When the data or software is needed, the CPU copies it from the mass storage device into main memory. The two primary types of mass storage devices are fixed disks and devices with removable media, such as tape cartridges.

Fixed-Disk Drives

Fixed-disk drives are installed in your system. They provide large-capacity storage for software and data files, as well as rapid access to the data by the CPU. Your system may have multiple fixed-disk drives.

Devices with Removable Media

Devices with removable media, such as disk packs, tape cartridges, and tapes, are used as both input and output devices. You use them as input devices when you install software or copy data to your system. Tape cartridges are the primary media for loading software. You use these devices as output devices when you copy software or data from your system. You can copy individual files or programs, or you can copy (back up) the contents of an entire fixed disk. Tapes and disk packs are commonly used to archive data from systems.

Mass Storage Controllers

All mass storage devices require a controller, a separate module that controls activity between the CPU and the mass storage devices. The controller for the TK70 tape drive (the TQK70) and the controller for the fixed-disk drives are installed to the left of other modules in the card cage. (RA70 fixed-disk drives require a KDA50 controller; RD54 fixed-disk drives require an RQDX3 controller.)

1.2.1.5 Power Supplies

The system has two power supplies. The primary power supply provides power to modules installed in slots 1–6, one or two mass storage devices (the TK70 tape drive and fixed disk 1, if present), and the two fans. The second power supply provides power for modules in slots 7–12 and fixed disk 0.

1.2.1.6 Fans

Two fans located near the bottom of the system draw in air from the top of the system and pull it down through the modules and out the bottom. The speed of the fans varies, depending on the surrounding room temperature. To reduce the load on the fans, keep the system away from heat sources.

1.2.2 Optional Components

System options can include multiples of components that are part of the base system (for example, additional memory modules or disk drives) and the following kinds of options:

- Communications controllers
- Real-time controllers
- Printer interfaces

1.2.2.1 Communications Controllers

Besides the console serial line, most systems have additional communications controllers for connecting additional terminals, and for communicating with other systems over telephone or network lines. Communications controllers provide standard interfaces between peripheral devices and the system. Many communications controllers provide support for multiple data lines.

The following types of communications controllers are available:

- Asynchronous serial controllers
- Synchronous serial controllers
- DECservers
- Network controllers

Serial controllers transmit data one character at a time. A device at the transmitting end breaks bytes of data into bits. A device at the receiving end assembles incoming bits into bytes of data.

Asynchronous Serial Controllers

Asynchronous serial controllers provide low-speed connections between peripheral devices and the system. Asynchronous communication between the system and the peripheral depends on recognition of a pattern of start and stop bits, not on a time interval.

Asynchronous serial controllers may be divided into those without modem support and those with modem support.

You use serial controllers without modem support to connect additional terminals and printers to your system. For example, the CXA16 module provides connections for up to 16 serial lines with no modem support.

NOTE: *Printers equipped with a microprocessor (intelligent printers) may require modem control signals to function correctly. Do not attach a printer requiring modem control signals to a controller with no modem support. Check your printer documentation to determine the proper communications interface for your printer.*

Communications controllers with modem support allow you to communicate over telephone lines. With a modem connected to your system, you can access other computers and you can dial into your system from a remote terminal or computer.

Computers transmit digital signals, while telephone lines (with the exception of digital leased lines) transmit analog signals. When two computers communicate over telephone lines, a modem is required at both the transmitting and receiving end of the line. At the transmitting end, the modem converts digital signals from the computer (or terminal) to analog signals prior to transmission over telephone lines. At the receiving end, another modem converts the analog signals from the telephone line back into digital signals the computer can understand.

The degree of modem support depends on the number of modem control signals recognized by the device. Full modem support (according to DIGITAL standards) requires recognition of eleven signals. The CXY08 module supports up to eight serial lines with full modem support.

Synchronous Serial Controllers

Synchronous serial controllers provide high-speed connections between systems. Communication between synchronous devices depends on time intervals that are synchronized before transmission of data begins. Synchronous devices can also have modem support.

DECservers

DECservers are terminal servers (a combination of hardware and software) that allow you to connect multiple terminals or printers to hosts in an Ethernet Loca Area Network (LAN).

Terminal servers perform the functions of traditional data terminal switches but multiplex the lines over the Ethernet. Using a DECserver offloads communications processing from the host system.

Network Controllers

Network communications controllers allow you to connect to an Ethernet local area network or other network types. With a network connection and appropriate DECnet software, you can use network services, such as mail; access data stored on other systems; perform operations, such as editing and printing on remote systems; and share resources, such as laser printers.

1.2.2.2 Real-Time Controllers

Real-time controllers interface devices that monitor processes, for example, laboratory equipment or manufacturing equipment connected to the system. Typically, real-time controllers are parallel devices, not serial devices. Parallel devices transmit more than one bit of information simultaneously.

1.2.2.3 Printer Interfaces

Some printers require specific interfaces to communicate with the system. For example, the LG01 and LG02 require the LPV11–SA interface.

1.2.2.4 Other Available Options

Your system arrives configured with the options you ordered. As your needs change, you can add more options. Your DIGITAL sales representative can advise you on available options. *MicroVAX 3500 VAXserver 3500 Technical Information* describes the options currently available for MicroVAX 3500 and VAXserver 3500 systems. DIGITAL provides installation for additional options that you order.

Chapter 2
Using the System

This chapter describes how to use your system once the system software has been installed.

2.1 Before You Use a New System

This chapter assumes that your system has been properly installed by a DIGITAL service representative. Installation includes running the diagnostic software shipped with your system. To install operating system options or layered products, see the instructions in your system software installation manual or layered product installation manual. Some of the instructions may require you to remove the front panel of the system to change switch settings.

The remainder of this chapter assumes that system software has been installed.

2.2 Switch Settings

Switch settings vary, depending on the operation being performed. The next two sections describe switch settings for normal and for special operations. Set the switches according to your needs.

2.2.1 Normal Operation

Switch settings for normal operation are the following:

- **RA70-based systems:** The Halt button on the mass storage control panel is set to out.
- The Break Enable/Disable switch on the CPU cover panel is set to disable (down position). With break disabled, your system automatically boots system software when powered up. Once system software is installed, DIGITAL recommends you run your system with break disabled to prevent the user of the console terminal from inadvertently halting the system by pressing Break on the console terminal. Halting the system causes all activity to stop.

CAUTION: *Pressing in the Halt button on RA70-based systems halts the system regardless of the setting of the Break Enable/Disable switch on the CPU cover panel.*

- The Power-Up Mode switch on the CPU cover panel is set to Run (indicated by an arrow).
- The baud rate switch, located on the inside of the CPU cover panel, is set to 9600. If you need to change the baud rate, for example, to use a non-DIGITAL terminal, you must remove the CPU cover panel. Instructions on changing the baud rate are in *MicroVAX 3500 VAXserver 3500 Technical Information.*
- **RA70-based systems:** The Write-Protect button for each RA70 fixed-disk drive is set to out (not lit). Either the A or B button (or both) for each RA70 drive is in. This setting puts the drive on-line. The difference between A and B is the port used for communications between the drive and the controller.
- **RD54-based systems:** The write-protect switch for each RD54 fixed-disk drive is in the write-enabled (up) position.

2.2.2 Special Operation

Certain operations require that you change some of the normal operating settings.

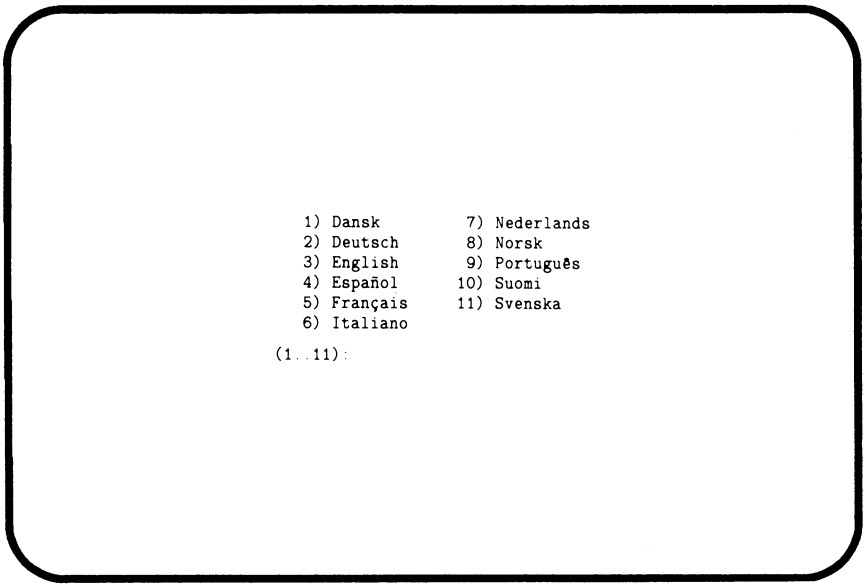
- If you need the ability to halt the system from the console terminal, for example, when installing system software or performing certain types of backup, you can set the Break Enable/Disable switch to enable (up position). This allows you to halt the system by pressing Break on the console terminal.

  NOTE: *When you change the Break Enable/Disable switch from one setting to the other, you must activate the new setting by resetting the system. To reset the system, press the Reset button on either power supply. All processes will be interrupted.*

- **RA70-based systems**: If you have an RA70-based system, it is not necessary to change the setting of the Break Enable/Disable switch. Halt the system by pressing the Halt button to the left of the DC OK light.
- If your system has been powered off for more than seven days, the battery unit that saves the system clock and the language selection may be depleted. Each time you power up the MicroVAX/VAXserver 3500 system, the CPU determines whether or not the battery power is sufficient.

If the battery power is depleted, the Language Selection Menu appears, as shown in Figure 2–1.

Figure 2–1: Language Selection Menu



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Select a language by typing in the number listed next to the language.

If the Power-Up Mode switch is set to Run Mode (indicated by an arrow), then the language selected is saved and is automatically used during subsequent reboots of the system.

If the Power-Up Mode switch is set to Language Inquiry Mode (indicated by the human profile), the system will prompt for the language at each power-up.

Once the system is booted, reset the system clock as described in your system software manual.

- If you want data on a particular fixed disk to be write-protected, you must write-protect the drive.
  - **RA70-based systems:** push the Write-Protect button to in (glows).

- **RD54-based systems:** set the Write-Protect switch to the down position.

NOTE: *Disks containing system software and user accounts must remain write-enabled. Disks containing applications or sensitive data may be write-protected.*

2.3 Turning On the System

Once you have set the switches correctly, you are ready to turn on the system. The sliding window must be fully open. If the window is not open, turn the key to position 3 and lower the window.

Turn on the system as follows:

1. Turn on the console terminal and wait for it to complete its self-tests.
2. Turn on the system by setting the power on/off switch to 1. The switch glows to indicate power to the system.

When you turn on the power, you should see the indications listed in Table 2–1.

Table 2–1: Normal Power-On Indications

Indicator	Normal Indication
On/Off switch	Glows amber
System DC OK light	Glows green
RA70 Ready lights	Glow green steadily within 60 seconds
RA70 Run lights	Glow yellow
RD54 activity lights	Glow steadily for several seconds
TK70 tape drive indicator lights	Orange, yellow and green lights glow during self-tests. The yellow light blinks alone for several seconds and then the green light glows alone.

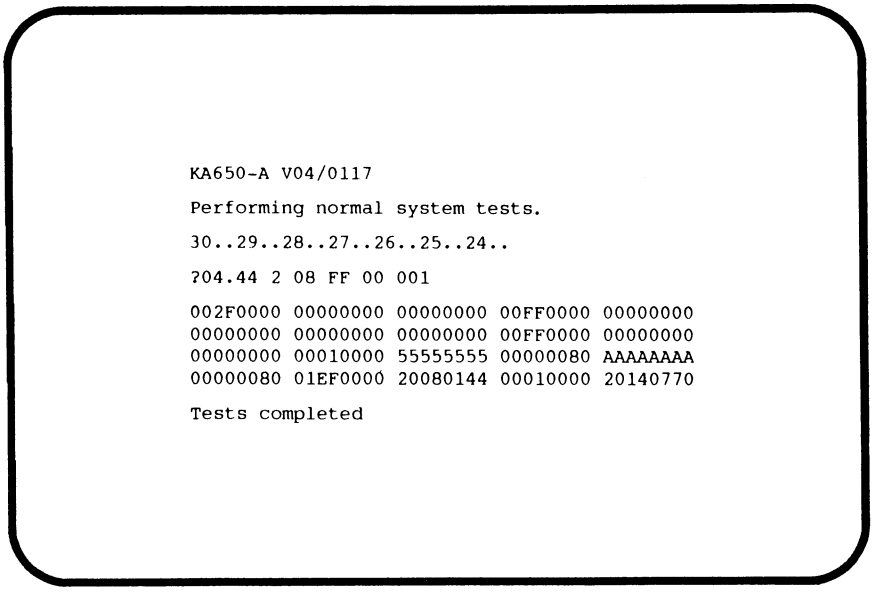
If you do not observe the indications in Table 2–1, refer to *MicroVAX Troubleshooting and Diagnostics.*

Every time you turn on your system, it runs a series of self-tests on the CPU and memory.

The console terminal first displays a line of information identifying the CPU, the version of the microcode, and the version of VMB—the primary bootstrap program. In the sample screen shown in Figure 2–2, the CPU is identified as a KA650–A, the version of the microcode is V04, and the version of VMB is 0117. These version numbers may differ from those on your system. The console terminal then displays a countdown as the system tests itself. When the self-tests are successful, the system either autoboots system software or goes into console mode, as described in Section 2.4.1 and Section 2.4.2.

When your system detects an error during its self-tests, it displays an error summary consisting of hexadecimal numbers. A DIGITAL service representative can use the error summary to diagnose the system. Depending on the type of error, one or more error summaries may display on the console terminal. A sample error summary is shown in Figure 2–2.

Figure 2–2: Sample Error Summary



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If possible, print out the error summary and give it to your DIGITAL service representative.

2.4 Booting the System

The system boots in one of two ways. You can manually boot the system from console mode, or you can configure the system to autoboot on power-up. The setting of the Break Enable/Disable switch determines how the system boots.

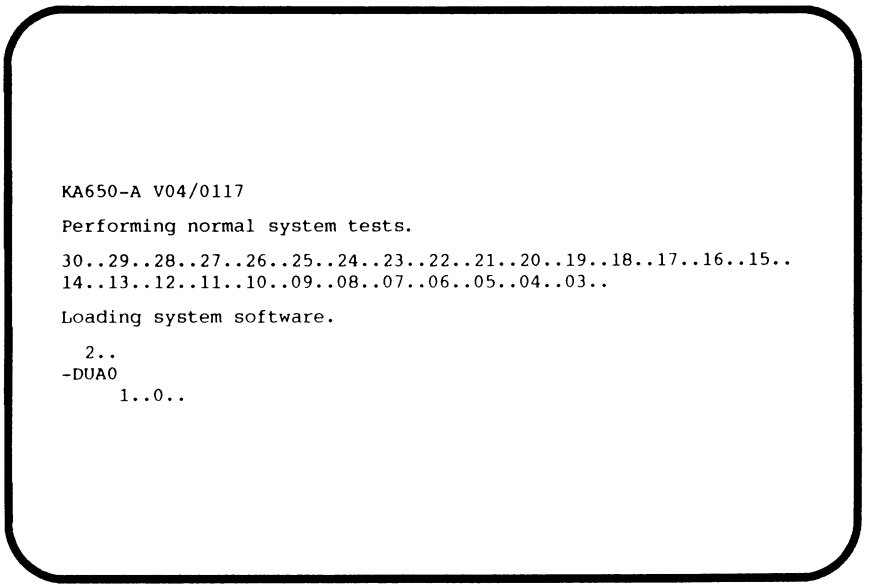
2.4.1 Autobooting the System

When the Break Enable/Disable switch is set to disable, the down position (the normal operating setting), the system runs self-tests. On completion of the self-tests, the system attempts to load system software from each bootable device in the order shown in Table 2–2.

When the system is ready to load system software, the message "Loading system software" displays on the screen. The system begins testing devices when the number "2" appears on the screen. As the system attempts to boot from each device, the device name displays on the console terminal.

When the system begins booting from a device, the countdown continues from 1 to 0, as shown in Figure 2–3. The boot device in the example is DUA0.

Figure 2–3: Successful Power-On and Automatic Boot



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To direct the system to boot automatically from a specific device, put the system into console mode and use the Set Boot command (SET BOOT device-name). For example, "SET BOOT XQA0" causes the system to boot from the Ethernet controller. To determine the name of the device that you want to boot the system from, refer to Table 2–2.

Table 2–2: Console Program Boot Sequence

Controller Type	Controller	Device Name
MSCP (Disk)	RQDX	DUmn (removable disks)[1]
MSCP (Disk)	KDA50	DJmn (removable disks)
		DUmn (fixed disks)
MSCP (Tape)	TQK70	MUmn
PROM	MRV11	PRAn
Ethernet adapter	DELQA	XQmn

[1] m = MSCP controller designator (A = first, B = second, etc.)
n = unit number

For more information about the MicroVAX 3500 system's booting process, refer to *MicroVAX 3500 VAXserver 3500 Technical Information.*

2.4.2 Booting the System from Console Mode

When the Break Enable/Disable switch is set to enable, the up position, the system powers up to console mode (indicated by the >>> prompt) after successfully completing its self-tests. Figure 2–4 shows a successful power-on to console mode.

To load system software from console mode, you must use the BOOT command (BOOT device-name) at the >>> prompt. For example,

>>>BOOT MUA0

tells the system to boot software from a cartridge in the TK70 tape drive.

NOTE: *To determine the name of the device that you want to boot the system from, refer to Table 2–2.*

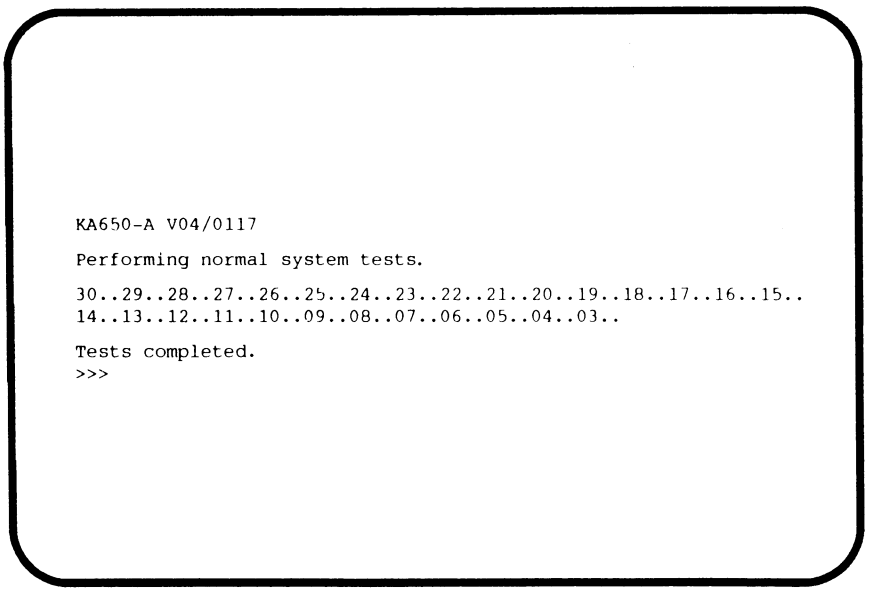
Software manuals may instruct you to power up with break enabled and to use the BOOT command.

2.5 Using the System

Once the system software is loaded, the first display for the system software appears on the console terminal after a few seconds. That display is described in the system software documentation.

You are now ready to use the system. Refer to the system software manual and application manual for more specific instructions on using the system.

Figure 2–4: Successful Power-On to Console Mode



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Your system software manuals cover the following:

- Installing software on your system
- Running software to perform tasks
- Making and restoring backup copies of system software or data files
- Accessing devices and utilities in your system

2.6 Turning Off the System

Do not turn off your system unless it requires maintenance or you know of a planned power outage.

CAUTION: *Turning off your system without following the shutdown procedure described in your system software manuals may result in loss of data.*

Once you have completed the recommended procedure, you can turn off your system by setting the on/off switch to 0.

2.7 Halting the System

Halting the system interrupts all processes and returns control to the console program. You may need to halt the system during software installation. Or, you may want to boot the system from another device; for example, a tape cartridge containing MicroVAX Diagnostic Monitor (MDM) software.

CAUTION: *Halting your system without following the shutdown procedure described in your system software manuals may result in loss of data.*

RA70-based systems: To halt the system, press in the Halt button to the left of the DC OK light. When the console mode prompt >>> appears on the console terminal screen, the system is halted. Before you can enter console commands, press the Halt button again to return it to the out position. Now you can enter console commands. If you inadvertently press the Halt button, type "c Return" to continue.

RD54-based systems and early RA70-based systems: To halt the system, first set the Break Enable/Disable switch on the CPU cover panel to enable (indicated by the dot inside the circle).

NOTE: *When you change the Break Enable/Disable switch from one setting to the other, you must activate the new setting by resetting the system. To reset the system, press the Reset button on either power supply. All processes will be interrupted.*

Once the Break Enable/Disable switch setting is enabled, halt the system, by pressing Break on the console terminal. When the console mode prompt >>> appears on your screen, the system is halted.

If you inadvertently halt the system by pressing Break, type "c Return" at the console prompt: >>>c. The processes interrupted by the halt continue.

2.8 Resetting the System

Resetting the system allows you to return the system to a power-on condition without turning it off. The usual power-on self-tests are run. Resetting the system aborts all current and pending operations.

CAUTION: *Resetting your system without following the shutdown procedure described in your system software manuals may result in loss of data.*

You reset the system by pressing the Reset button on either power supply.

Chapter 3
Using System Options

This chapter describes how to use options that may already be part of your system, or that you can add to your system. The following types of options are covered:

- Mass storage devices and controllers
- Communications controllers
- Real-time controllers
- Printers

3.1 Mass Storage Options

MicroVAX 3500 and VAXserver 3500 systems have two mass storage options.

- **RA70-based systems** contain a TK70 tape drive and an RA70 fixed-disk drive(s).
- **RD54-based systems** contain a TK70 tape drive and an RD54 fixed-disk drive(s).

NOTE: *In addition, the TS05 and the TU81–Plus tape drives can be attached to the MicroVAX 3500 or VAXserver 3500. If your system contains a TS05 or a TU81–Plus tape drive, refer to the TS05 Tape Transport System User's Guide or the TU81–Plus Tape Subsystem User's Guide for instructions on how to operate the device.*

This chapter describes how to use the controls for mass storage devices. In the case of removable media, it also describes how to insert and remove the media. To use any mass storage device, you must properly identify the device to the operating system and use appropriate operating system commands. Refer to your system software documentation for details.

3.1.1 Fixed-Disk Drives

Fixed-disk drives provide high-volume mass storage for the MicroVAX 3500 or VAXserver 3500 system.

- If your system contains RA70 disk drives, you may have one or two fixed-disk drive(s) located within the BA213 enclosure.
- If your system contains RD54 disk drives, you may have up to three fixed-disk drives(s) located within the BA213 enclosure.

When your system has multiple disks, we recommend that you separate them according to function. For example, if your system has two disks, you may want to use them as follows:

- Disk 0 contains the operating system and applications installed on the system.
- Disk 1 contains work areas for each user with an account on the system.

If your system has three disks, you may want to use them as follows:

- Disk 0 contains the operating system and applications installed on the system.
- Disk 1 contains a database or files accessible to all users, subject to the normal file protection explained in your software manuals.
- Disk 2 contains work areas for each user with an account on the system.

Refer to your system software manual for a description of procedures required to name and access multiple disks.

The storage capacities and other specifications of each fixed-disk drive are listed in *MicroVAX 3500 VAXserver 3500 Technical Information.*

For more information about the fixed-disk drive(s) in your system, refer to the section on that particular drive. If your system contains RA70 fixed-disk drives, refer to Section 3.1.1.1. If your system contains RD54 fixed-disk drives, refer to Section 3.1.1.2.

3.1.1.1 RA70 Fixed-Disk Drives

Your system may have one or two RA70 disk drives mounted to the left of the tape drive.

RA70 Fixed-Disk Drive Controls

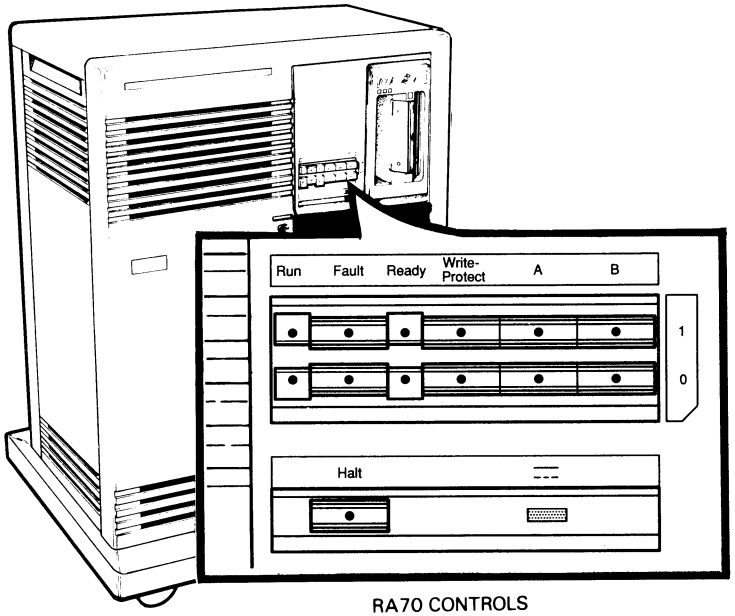
Controls for the RA70 are located behind the sliding window on the front of the system. To access the controls for the RA70 drives, you must turn the

key to position 2 or 3 and slide down the window. Figure 3–1 shows the controls and indicators for the RA70 fixed-disk drives.

There are controls and indicators for two RA70 fixed-disk drives. Activity on the first RA70 disk drive (drive 0) displays on the bottom set of controls and indicators. Activity on a second RA70 disk drive (drive 1) displays on the top set of controls and indicators.

Table 3–1 lists the function of each RA70 fixed-disk drive control.

Figure 3–1: RA70 Controls and Indicators



Note that the RA70 always spins up when the system is turned on. You cannot spin down the RA70 drive. The Run indicator light glows when the spindle is in motion and remains lit as long as the system is turned on. When both the Run and Ready lights are lit, the disk drive is available for use.

When the Ready light is on, the disk is ready to perform read/write operations. When the light blinks, the drive is performing continuous seek operations. (A seek involves moving the heads of the drive to the appropriate

cylinder to read data.) When the Ready light is off, the disk is either spinning up or disabled by a software command.

Table 3–1: RA70 Controls and Indicators

Control	Position	Function
Run	Lit	Indicates that the drive is spinning. When the Ready light comes on, the drive is ready to use.
	Not lit	Indicates that the drive has stopped spinning. Since the drive cannot be spun down in the MicroVAX/VAXserver 3500 system, an unlit Run light indicates a problem. Refer to *MicroVAX Troubleshooting and Diagnostics* for instructions.
Fault	Lit	Indicates an error condition within the disk drive.
	Not lit	Indicates an error-free condition within the disk drive.
Ready	Lit	Indicates the disk drive is ready to read or write information on the disk.
	Not lit	Indicates the drive is not ready to use. The drive could still be spinning up or could be dismounted as a result of a software command.
Write-Protect	In (lit)	Disk is write-protected. Prevents system software from writing on the disk.
	Out (not lit)	Disk is not write-protected. Normal position for software operation. System software is free to read or write information on the disk.
A	In (lit or unlit)	Normal operating position. Indicates the disk drive can communicate with the system through port A. While communication is occurring, the light is lit.
	Out (not lit)	Indicates the disk drive cannot communicate with the system through port A.

Table 3–1 (Cont.): RA70 Controls and Indicators

Control	Position	Function
B	In (lit or unlit)	Indicates the disk drive can communicate with the system through port B. While communication is occurring, the light is lit.
	Out (not lit)	Indicates the disk drive cannot communicate with the system through port B.

The Write-Protect button controls whether the system can write data to the disk drive. The system can read from the disk regardless of the setting of the Write-Protect button. When the Write-Protect button is out (not lit), the system can write to the disk. Your system disk (the disk containing system software) and disks containing work areas for users should be write-enabled, the normal operating setting.

If you want to write-protect a disk containing sensitive data that you do not want changed or accidentally erased, set the Write-Protect button to in (lit).

3.1.1.2 RD54 Fixed-Disk Drives

Your system may have one to three RD54 drives located behind the panel to the left of the tape drive. Each drive has a green activity light and write-protect switch, as shown in Figure 3–2.

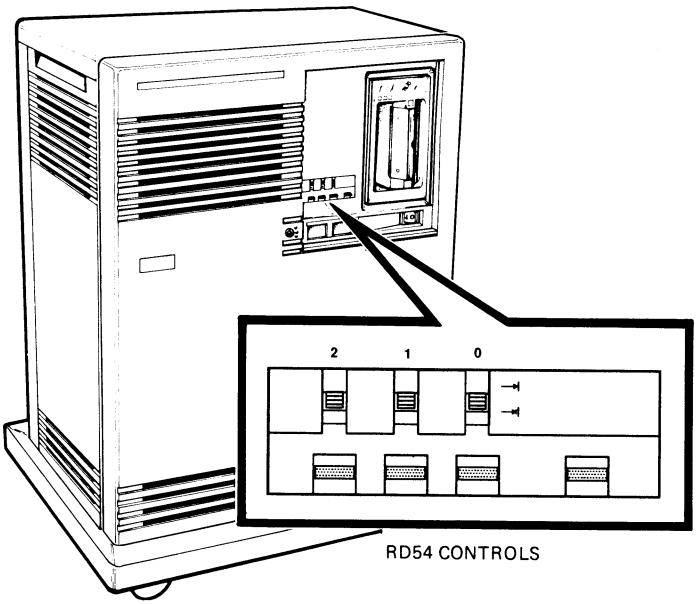
The activity lights operate only when a disk is installed. For example, if your system has one fixed-disk (fixed disk 0), only the right-most light is active. The other two lights remain unlit.

The activity lights glow steadily for a few seconds when you turn on the system. They blink rapidly during read/write activity to the disks.

Above the activity light for each fixed disk is a write-protect switch. The switches are recessed to prevent accidental changing of the switch position. Use a pen tip or other small tool to change the switch setting.

When the switch is in the up position, the disk is write-enabled. The system can read and write to the disk. Your system disk and disks containing work areas for users should be write-enabled, the normal operating setting for most disks.

Figure 3–2: RD54 Fixed-Disk Switches and Activity Lights



When the switch is in the down position, the disk is write-protected. The system can read data from the disk but cannot write data to it. You may want to write-protect a disk containing sensitive data that you do not want changed or accidentally erased.

The storage capacities and other specifications for the RD54 disk drive are listed in *MicroVAX/VAXserver 3500 Technical Information.*

3.1.2 TK70 Tape Drive

The TK70 tape drive is located behind the sliding window on the front of the system. To use the drive, move the key to position 2 or 3 and slide down the window.

The TK70 tape drive holds one removable magnetic tape cartridge. The drive can read data written on either a COMPACTape II or COMPACTape cartridge. You can identify the type of cartridge by the label on the cartridge. The COMPACTape II has a blue label strip.

You can use a COMPACTape II or COMPACTape cartridge as an input device to load software or data into your system. The TK70 drive can read data on both types of cartridges, written by either a TK70 drive or a TK50 drive. (The TK50 drive records data in a format different from that of the TK70.)

You should use a COMPACTape II as an output device to make copies or backups of software or data. The TK70 drive cannot write to a COMPACTape II or COMPACTape that has been written by a TK50 tape drive.

TK70 Tape Drive Controls

The tape drive has two primary controls: the cartridge insert/release handle (subsequently referred to as "the handle") and the Unload button. You use the handle to insert or remove cartridges and lock them into position. Pull the handle open to insert or remove a tape cartridge. Push the handle closed to lock a tape cartridge into position and load the tape.

You use the Unload button to rewind and unload the tape. Unloading and rewinding can also be controlled by software. Refer to your system software manuals for appropriate commands.

The drive also has three indicator lights that let you know the status of the drive.

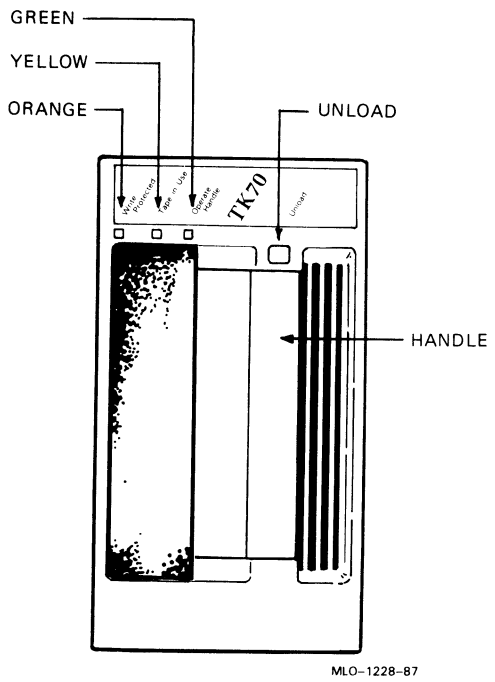
- Orange light (Write-Protected): A steady orange light indicates that the cartridge is write-protected.
- Yellow light (Tape in Use): A steady yellow light indicates that the tape is loaded. A blinking yellow light indicates that the tape is in motion.
- Green light (Operate Handle): A steady green light indicates that you can move the handle to insert or remove a tape. A blinking green light indicates a cartridge load fault. You can also move the handle when the green light is blinking.

All three lights blinking simultaneously indicates a fault condition.

Figure 3–3 shows the TK70 tape drive with the controls and indicator lights labeled.

To operate the drive properly, you must carefully monitor the indicator lights. The instructions for inserting and removing cartridges, which appear later in this section, tell you what should happen at each step. A table at the end of the section summarizes light and control combinations.

Figure 3–3: TK70 Tape Drive



3.1.2.1 Design of the Drive

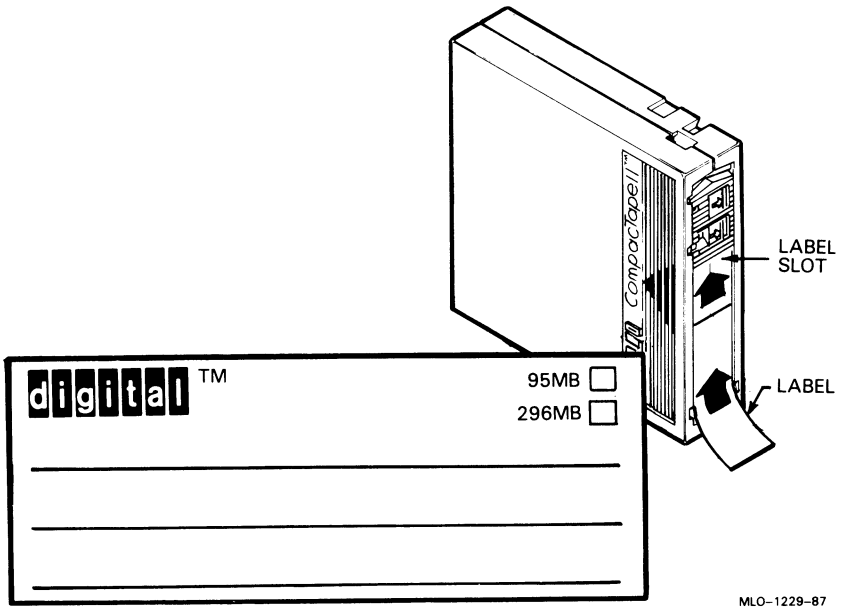
The TK70 tape drive operates like a reel-to-reel tape deck. Inside the drive is a take-up reel with a leader attached. Inside the cartridge is a single reel containing the magnetic tape. When you insert the cartridge and push in the handle, the leader in the drive automatically couples with the leader in the cartridge, and the tape winds onto the take-up reel. The coupling and winding process is called loading. When the automatic loading process is complete, the tape is ready to use.

Once the cartridge is loaded, you cannot remove it without rewinding and uncoupling the leaders, a process called unloading. Even if you have not used the tape, you must unload it before you can remove the cartridge. When you press the Unload button, the tape rewinds into the cartridge and the leaders uncouple.

3.1.2.2 Labeling a Tape Cartridge

When recording data on a cartridge, label its contents. For your convenience, a slot for the label is provided on the front of the cartridge. Write the identification on the label and insert the label in the slot on the front of the cartridge, as shown in Figure 3–4. The label is visible when the tape is in the drive.

Figure 3–4: Labeling a Tape Cartridge



To indicate that the tape was recorded on a TK70 tape drive, check the box labeled 296MB. The 95MB box is used for tapes recorded on a TK50 drive.

NOTE: *Do not write on the tape cartridge or attach labels to the top, bottom, or sides of the cartridge.*

3.1.2.3 Write-Protecting a Tape Cartridge

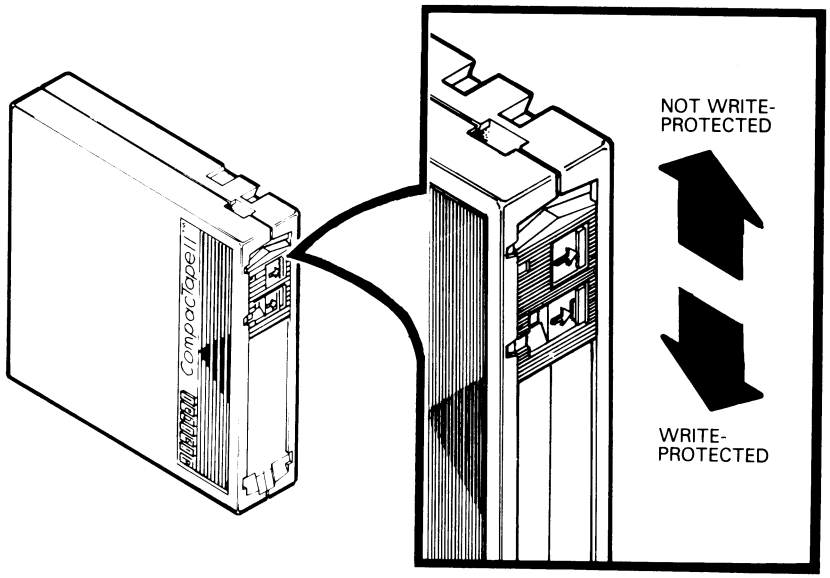
Write-protecting a tape cartridge prevents accidental erasure of information stored on the tape. You can write-protect a tape cartridge in two ways:

- Set the write-protect switch on the cartridge to the write-protect position.
- Write-protect the cartridge by using operating system commands described in your system software manuals.

Your system can read information on the tape regardless of the position of the write-protect switch or whether writing is software-disabled. However, the system cannot write data to the tape when the write-protect switch is set to the write-protect position, or when writing is software disabled.

When you use a cartridge to install software, make sure the cartridge is write-protected. Two icons on the switch indicate the write-protect status, as shown in Figure 3–5. An orange rectangle is visible when the switch is in the write-protect position. If you do not see an orange rectangle, slide the switch toward the label slot.

Figure 3–5: Tape Cartridge Write-Protect Switch



When you insert a write-protected cartridge into the drive, the orange indicator light comes on. The system recognizes the tape as being write-protected under any one of the following conditions:

- The write protect switch on the cartridge is set to the write-protect position.
- An operating system command has write-protected the tape.
- A tape recorded on a TK50 tape drive is inserted into the drive.

Removing write-protection depends on how the tape was recorded and how it is write-protected. You cannot write-enable a tape recorded on a TK50 tape drive either by moving the write-protect switch on the cartridge or by using software commands. The TK70 drive always recognizes a tape recorded on a TK50 drive as write-protected. You can remove write-protection on tapes recorded on a TK70 drive as follows:

- If the cartridge is write-protected *only* by the write-protect switch on the cartridge and not the operating system, moving the switch to the write-enabled position causes the orange light to go out at the end of the executing command.
- If the cartridge is write-protected *only* by a software command and not the write-protect switch, removing the operating system restriction causes the orange light to go out.
- If the cartridge is write-protected by *both* the switch on the cartridge and a software command, you must change the switch setting and remove the operating system restriction.

When you use a COMPACTape II cartridge to make a backup copy of files, make sure the orange write-protect light on the TK70 drive is off. If the light is not off, check for any of the write-protect conditions described above. Change the switch setting and/or operating system restriction as necessary. Do not begin your operation until the orange light goes off.

3.1.2.4 Tape Cartridge Handling and Storage Guidelines

- Do not touch the exposed surface of the tape.
- Do not drop the tape cartridge. The impact from a fall can damage the tape cartridge.
- Allow new tapes to stabilize at room temperature for 24 hours before using them.

- Place an identification label only in the label slot on the front of the tape cartridge.
- Store tape cartridges in a dust-free environment.
- Keep tape cartridges away from direct sunlight, heaters, and other sources of heat. Store tape cartridges in a stable temperature between 10° and 40° Celsius (50° and 104° Fahrenheit).
- Store tape cartridges where the relative humidity is between 20 and 80 percent.
- Keep tape cartridges away from magnets and equipment that generate magnetic fields, such as motors, transformers, terminals, and audio equipment.
- Keep tape cartridges away from x-ray equipment.

3.1.2.5 Inserting a Tape Cartridge

Before you use the tape drive, make sure the system is turned on (the power switch glows). During power-up, the TK70 drive runs self-tests that last a few seconds. All three lights (orange, yellow, and green) come on momentarily, then the yellow light blinks during the self-tests. At the end of the tests, the yellow light goes off and the green light comes on, accompanied by a short beep. The green light and the beep indicate that you can move the cartridge release handle.

CAUTION: *Move the handle only when the green indicator light is on. Moving the handle while the yellow light is on could damage the drive. If all three lights blink rapidly at any time, a fault condition exists. Press the Unload button once. If the fault is cleared, the tape unloads. The yellow light blinks during unloading, then the green light comes on. If the fault is not cleared, the three lights continue to flash. Do not attempt to use the tape drive or to remove the tape cartridge. Call your DIGITAL service representative.*

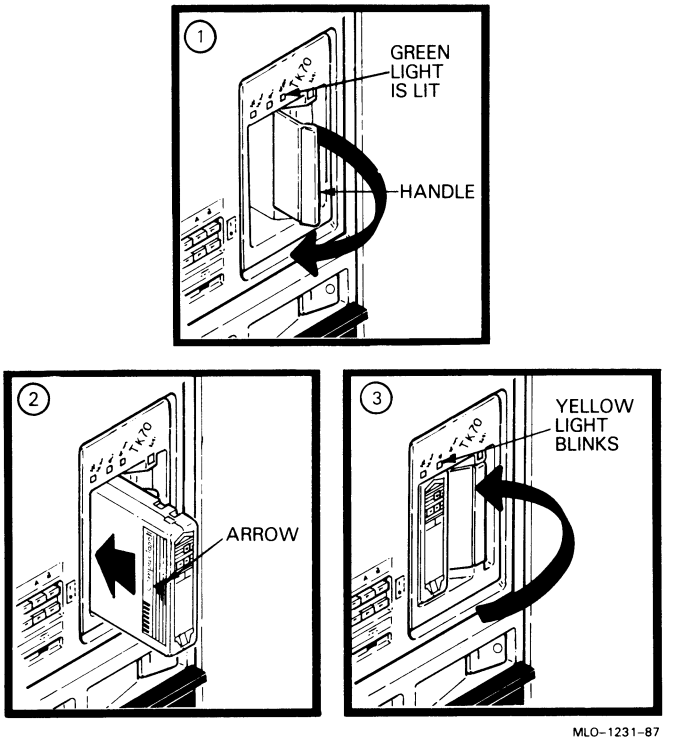
Use the following procedure to insert a tape cartridge (see Figure 3–6):

1. Pull the handle open.
2. Position the cartridge so the arrow on the cartridge faces left and points toward the drive. Insert the cartridge into the TK70 tape drive until you feel the cartridge lock into place.
3. Push the handle closed.

   The green light goes off and the yellow light blinks as the tape loads. When the yellow light glows steadily, the tape is ready to use.

NOTE: *If the green light blinks rapidly when you push the handle closed, the drive has detected a cartridge fault. Pull the handle open and remove the cartridge. Use another cartridge.*

Figure 3–6: Inserting a Tape Cartridge



Refer to your system software manual for instructions on how to use the tape cartridge, for example, to load software or perform backup.

NOTE: *If a cartridge is new, the drive performs a calibration sequence that takes approximately 30 seconds when the drive receives the first command from the operating system. The yellow light blinks rapidly and irregularly during calibration.*

3.1.2.6 Removing a Tape Cartridge

You must unload a tape before you can remove the cartridge from the tape drive. Use the following procedure (see Figure 3–7):

1. Press the Unload button. You can also issue a software command to unload the cartridge. Refer to your system software manuals for the appropriate command.

   The yellow light blinks slowly, as the tape rewinds and unloads into the cartridge. This may take up to 90 seconds.

2. When the yellow light goes off and the green light comes on (you also hear a beep), pull the handle open.

   CAUTION: *Move the handle only when the yellow indicator light is off and the green indicator light is on. Moving the handle while the yellow light is blinking could damage the drive.*

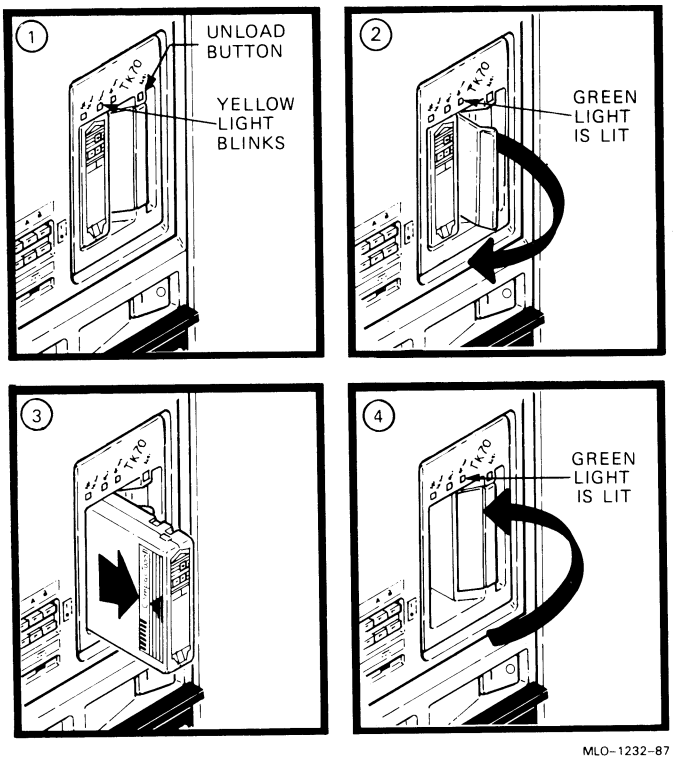
3. Remove the tape cartridge and store it in its container.

4. Push the handle closed.

The green light remains on, indicating that there is power to the drive and that you can safely move the handle.

CAUTION: *Remove the tape cartridge from the tape drive when the cartridge is not in use or before you turn off the system. Failure to remove the cartridge may damage the tape cartridge.*

Figure 3–7: Removing a Tape Cartridge



3.1.2.7 Summary of TK70 Tape Drive Controls and Indicator Lights

Table 3–2 summarizes the TK70 tape drive controls. Table 3–3 describes the meaning of the indicator lights.

Table 3–2: TK70 Tape Drive Controls

Control	Position	Function
Handle	Open	Lets you insert or remove a tape after rewind and unload operations are completed.
	Closed	Locks tape in operating position and begins load sequence.
Unload button	Momentary contact switch	Rewinds and unloads the tape.

Table 3–3: TK70 Tape Drive Indicator Lights

Orange	Yellow	Green	Condition
Off	Off	Off	No power to the tape drive.
Off	Off	On steadily	Safe to move cartridge release handle. Power is present.
Off	Off	Blinking	Load fault. The cartridge leader may be defective. Pull out the handle and remove the cartridge. Do not use the cartridge.
On/Off	On steadily	Off	Tape is loaded but not in motion.
On/Off	Blinking	Off	Tape is in motion.
On	On steadily/ blinking	On	Cartridge is write-protected.

Table 3–3 (Cont.): TK70 Tape Drive Indicator Lights

Orange	Yellow	Green	Condition
Blinking	Blinking	Blinking	A fault is occurring. Press the Unload button to unload the tape cartridge. If the fault is cleared, the yellow light blinks while the tape rewinds. When the green light comes on, you can move the handle to remove the cartridge. If the fault is not cleared, all three lights continue to blink. Do not attempt to remove the tape cartridge. Call your DIGITAL service representative.

3.1.3 TS05 Tape Drive

If your system contains a TS05 tape drive, refer to the *TS05 Tape Transport System User's Guide* for instructions on how to operate the device.

3.1.4 TU81–Plus Tape Drive Subsystem

If your system contains a TU81–Plus magnetic tape drive, refer to the *TU81–Plus Tape Subsystem User's Guide* for instructions on how to operate the device.

3.2 Communications Controller Options

The following types of communications controllers are available for the MicroVAX 3500 and VAXserver 3500 systems:

- Asynchronous serial controllers (with or without modem support)
- Synchronous serial controllers (with or without modem support)
- Network controllers

3.2.1 Asynchronous Serial Controllers

The following asynchronous controllers are available for MicroVAX 3500/VAXserver 3500 systems, with and without modem support.

- CXA16
- CXB16
- CXY08
- DFA01
- DSRVB

3.2.1.1 Without Modem Support

Before using any peripheral device connected to a serial communications controller, check the following:

- Make sure the peripheral device is properly connected to the system.
- Make sure the peripheral device is properly installed, plugged into an appropriate power source, and turned on.
- Make sure the peripheral device is properly set up. Set-up involves choosing how the device operates. Some set-up choices are matters of personal choice; for example, the number of columns that display on a terminal screen. Others, like baud rate (a measure of the speed at which data is transmitted over a data line), must match the system setting if the peripheral device and system are to communicate.

  You choose set-up options from a series of menus that display when you press the Set-Up key on the terminal keyboard. Set-up instructions for terminals vary according to model, or, in some cases, according to which read-only memory (ROM) cartridge is installed in your terminal. Be sure to read the documentation provided with your terminal.

  While most default settings are acceptable, you should perform the set-up procedure for your terminal to ensure appropriate set-up values. The two examples below provide set-up instructions for VT300-series and VT200-series terminals:

  For VT300-series terminals:

  1. Press Set-Up to display the Set-Up Directory screen.
  2. Use the arrow keys to select the "Communications Set-Up" option and press Enter.

3. Make sure the "Transmit Speed" option in the "Current Setting" column is set to 9600. Use the left and right arrow keys to change the setting.
4. Make sure the "Receive Speed" option in the "Current Setting" column is set to "receive=transmit." Use the down arrow to move the cursor to this option, and the left and right arrows to change the setting.
5. Press Select to return to the Set-Up Directory screen.
6. Use the arrow keys to select the "Global Set-Up" option and press Enter.
7. Select the option "Comm Port".
8. If the port in the "Current Setting" column is selected for "RS-232", press Enter to select the "DEC-423" port.
9. Press Select to return to the Set-Up Directory screen.
10. Use the arrow keys to select the "Save Current Settings" option. Press Enter to save all current settings; then press Set-Up to exit the Set-Up Directory.

For VT200-series terminals:

1. Press Set-Up to display the Set-Up Directory screen.
2. Use the arrow keys to select the "Default" option and press Enter. Default correctly sets all values except transmit speed.
3. Use the arrow keys to select the "Comm" option and press Enter to display the Communications Set-Up menu.
4. Use the arrow keys to select the "Transmit" option and, using Enter, set the speed to 9600.
5. Use the arrow keys to select the "To Directory" option and press Enter.
6. Use the arrow keys to select the "Save" option and press Enter; this option stores the set-up values. Then press Set-Up to exit the Set-Up Directory.

Your operating system may have other requirements for using serial communications devices. Refer to your system software manual.

3.2.1.2 With Modem Support

Using serial devices with modem support requires that you install two modems: one connected to the system and one connected to the remote terminal. Both must be connected to phone lines.

Before using modems with your system, check the following:

1. Make sure each modem is connected to the system.
2. Make sure the modem is properly installed and connected to a phone jack.
3. Set controls on the modem according to instructions in the modem user's guide.

Before using the modem connected to the remote terminal, check the following:

1. Make sure the modem is properly installed and connected to a phone jack.
2. Set controls on the modem according to instructions in the modem user's guide.
3. Check the settings on the terminal attached to the modem. Depending on the type of modem and the type of lines used, the baud rate may be 300, 1200, or 2400. Other settings should be the same as those described in the previous section.

Before using a line with modem support, you must set certain parameters such as line speed. See your system software manuals for details.

3.2.2 Synchronous Controllers

The following synchronous controllers are available for the MicroVAX 3500 VAXserver 3500 system:

- DPV11
- KMV1A

Before using a synchronous controller you must verify the following:

- The system you want to communicate with has an appropriate synchronous controller. Synchronous communications require a synchronous controller on both the transmitting and receiving system.
- Both the transmitting and receiving systems must have supporting host software installed. Synchronous communications operate under specific

protocols that define how data is interpreted. Two common protocols are X.25 and PSI. Appropriate host software is required to interpret the protocol.

3.2.3 Network Controllers

Before using a network controller you must do the following:

1. Make sure the transceiver cable connected to the DELQA module in the system is properly connected to the network in one of the following ways:
   - To an H4000 transceiver located on a traditional Ethernet
   - To a DELNI, which can be connected to a larger Ethernet or which can serve to connect up to eight systems in a local area network
   - To a DESTA, an adapter that enables you to connect to a ThinWire Ethernet
2. Have the DECnet application installed on your system.
3. Register your node with the network manager so that your node is recognized by other systems in the network.

Some software products, for example, Local Area VAXcluster (LAVc) software, use the Ethernet hardware address of other systems to operate properly.

To find the hardware address of your Ethernet device, use the command SHOW ETHER from console I/O mode. The hardware address of your Ethernet device displays on the terminal, as shown in the following example:

```
>>>SHOW ETHER

08--00--2B--03--50--5C
```

Refer to your software manuals and DECnet manuals for other requirements and further instructions on using a network connection.

3.3 Real-Time Options

- DRQ3B
- DRV1W
- IEQ11
- IBQ01

- AAV11-S
- ADV11-S
- KWV11-S
- AXV11
- ADQ32

Before using a real-time controller, make sure the devices connected to the controller are properly set up. For additional information and instructions, refer to documentation supplied with the real-time device.

3.4 Printer Options

Before using a printer, make sure it is properly set up and passes any self-tests. Verify that the printer is connected to an appropriate controller. Some printers, such as the LG01 and LG02, require the LPV11-SA interface. Other printers require modem control signals. Consult your printer documentation for the interface requirements.

The MicroVAX 3500 and VAXserver 3500 systems have several printer options available. Consult the *MicroVAX 3500 VAXserver 3500 Technical Information* for a list of printers and printer interface requirements.

3.5 Adding New Options

If you have available slots, you may be able to add new modules to your system. Possible limitations to adding new modules include the following:

- Power limitations
- Physical space limitations
- Bus limitations (ac/dc loading)

Your DIGITAL sales representative can advise you about modules available for your system and what you need to order. A DIGITAL service representative should perform the installation, since the system must be properly configured to work correctly.

CAUTION: *Do not attempt to remove, rearrange, or install new modules. Contact a DIGITAL service representative for assistance. If you want to perform maintenance on your system, purchase the MicroVAX 3500 and MicroVAX 3600 Systems Maintenance Update.*

Appendix A
Related Documentation

Document	Order Number
Hardware Documentation	
MicroVAX 3500 and MicroVAX 3600 Systems Maintenance Update	EK–159AA–MG
KA650–AA CPU Module Technical Manual	EK–KA650–UG
TSV05 Tape Transport System User's Guide	EK–TSV05–UG
TU81–Plus Tape Subsystem User's Guide	EK–TU81E–UG
Software Documentation	
Overview of VMS Documentation	AA–LA95A–TE
VAXELN Host System Guide	AA–JG87B–TE
VAXELN Run-Time Facilities Guide	AA–JM81B–TE
ULTRIX–32 Basic Installation Guide for the MicroVAX 3500 and 3600	AA–KT04A–TE
Microcomputer Handbook Series	
VAX Architecture Handbook	EB–19580–20
VAX Software Handbook	EB–21812–20
Microcomputer Interfaces Handbook	EB–20175–20
Microcomputers and Memories Handbook	EB–18451–20

Documentation specific to supported options is listed with the option in *MicroVAX 3500 VAXserver 3500 Technical Information.*

Glossary

Application program
A program designed to meet specific user needs, such as a program that monitors a manufacturing process.

Backplane
1. The connector block that printed circuit boards plug into.
2. A printed circuit board containing the bus.

Back up
The process of making copies of the data stored in your disk drive(s) so that you can recover that data after an accidental loss. You make these copies on a tape cartridge and then store it in a safe place.

Backup copy
A duplicate copy of data on your fixed disk that is stored on a tape cartridge.

Baud rate
The speed at which signals are transmitted serially along a communication line. One baud equals one bit per second.

Binary
A number system that uses only two digits: 0 and 1. These digits are usually represented in circuitry by two voltage levels.

Bit
A binary digit, the smallest unit of information in a binary system of notation, designated as a 0 or a 1.

Boot
To use a bootstrap program to start a computer system.

Bootable medium
A fixed disk or magnetic tape containing software (such as an operating system) that the bootstrap program can load into the system memory.

Bootstrap
A program that you start when you turn on the system. The bootstrap loads software contained on a fixed disk or magnetic tape cartridge into memory. The system then stops executing the bootstrap and starts executing the software in memory. The software usually loads an operating system or other software into memory, so that the system can start processing.

Bug
An error in the design or implementation of hardware or software system components.

Bus
A printed circuit board that is part of the backplane. The bus permits communications among the other printed circuit boards.

Byte
A group of eight binary digits (bits). A byte is one-half the size of a word and one-quarter the size of a longword.

Central processing unit (CPU)
The part of a computer system that controls the interpretation and execution of instructions.

Command
An order given by a user to a computer, often through a terminal keyboard.

Communication line
A cable along which electrical signals are transmitted. Systems or devices connected by communication lines can share information and resources.

Computer system
A combination of computer hardware, software, and external devices that performs specific operations or tasks.

Console terminal
The terminal you use when installing software and running diagnostic programs.

Controller
A component that regulates the operation of one or more peripheral devices. Controllers are often called interface units.

CPU
See *Central processing unit.*

Data
A representation of facts, concepts, or instructions, suitable for communication, interpretation, or processing by human beings or by machines.

Data transmission
The movement of data, in the form of electrical signals, along a communication line.

Debug
To detect, locate, and correct errors (bugs) in system hardware or software.

Device
The general name for any entity connected to a system that is capable of receiving, storing, or transmitting data.

Device name
The name by which a device or controller is identified within a system. You use the device name to refer to that device when communicating with the system.

Diagnostic program
A program that detects and identifies abnormal hardware operation. The MicroVAX Diagnostic Monitor software contains several diagnostic programs.

Disk
A flat circular plate with a coating on which data is stored magnetically in concentric circles (tracks).

Disk drive
A device that contains a fixed disk or one or more diskettes. The drive contains mechanical components that spin the disk or diskettes and move the read/write heads that store and read information on the surface of the disk or diskettes.

EIA
Electronic Industries Association.

Error message
A message displayed by the system to indicate it has detected an error or malfunction.

File
A collection of related information treated by the computer as a single item.

Firmware
Software instructions stored in a fixed form, usually in read-only memory (ROM). In a MicroVAX 3500 or VAXserver 3500 system, the power-on self-tests and bootstrap program are firmware.

Formatted data
Data laid out in a particular pattern to conform to a predetermined structure. The structure is dictated by the system software.

Hardware
The physical components—mechanical and electrical—that make up a computer system. Compare *Software*.

Head
The part of a fixed-disk drive, diskette drive, or tape drive that reads, records, and erases data. Also called read/write head.

Input device
A piece of equipment used to transfer data into the computer. A keyboard is an input device.

Input/Output (I/O) device
A piece of equipment that accepts data for transmission both to and from a computer. A terminal is an input/output device.

Interactive
The method of communicating with a computer system. You type a command at the keyboard, the system executes the command, and then responds with a message or prompts for another command.

Interface
A device or piece of software that lets different components of a computer communicate with one another.

I/O
Abbreviation for input/output.

Kbyte
1024 bytes.

LED
Light-emitting diode. A LED on the CPU cover panel displays a hexadecimal countdown during the power-on sequence.

Load
1. To move software, usually from a peripheral device into memory.
2. To place a disk in a disk drive, or tape in a tape drive.

Longword
A group of 32 bits, equal to two words or four bytes.

Magnetic tape
A long strip of plastic coated with magnetic oxide, used for storing data. Often called magtape. The tape contained in a tape cartridge.

Mbyte
1,048,576 bytes.

Memory
The area where a computer finds the instructions and data it will process.

Menu
A displayed list of options. The list usually contains commands you can enter.

Off-line
Pertaining to equipment, devices, and events that are not under direct control of the computer system.

Operating system
A collection of programs that controls the overall operation of a computer and performs such tasks as:

- Assigning places in memory to programs and data
- Processing requests, scheduling jobs
- Controlling the operation of input and output devices

Output device
A device by means of which data can be extracted from a computer system; for example, a printer.

Peripheral device
Any device distinct from the central processing unit that provides it with additional memory storage or communication capability. Examples are disk and diskette drives, video terminals, and printers.

Power-on sequence
A series of ordered events that occurs when you supply power to a system by turning it on.

Printer
A peripheral device that provides paper copies of information stored in a computer.

Program
The complete sequence of instructions necessary for a computer to perform a task. See *Software*.

Prompt
A character or words that a computer displays to indicate it is waiting for you to type a command.

Read-only memory (ROM)
A memory that does not allow modification of its contents. The computer can use data in a ROM but cannot change it.

Reboot
To restart a computer system. Pressing the Reset button reboots the system.

Record
A set of related data that a program can treat as a unit. A file consists of a number of records.

ROM
See *Read-only memory*.

Run
1. A single continuous execution of a program.
2. To execute a program.

Software
Programs executed by a computer system to perform a chosen or required function. Compare *Hardware*.

Software package
A set of related programs that performs a specific task.

Storage medium
Any device capable of recording information, for example, a tape cartridge.

Store
To enter data into a storage device, such as a disk, or into memory.

System
A combination of computer hardware and software and external devices that performs specific processing operations.

System management
Tasks performed by the operating system to control the overall operation of the computer system.

Terminal
An input/output device generally used for communication between the users of a computer system and the system itself.

Video terminal
A terminal that displays information on the screen of a cathode ray tube (CRT).

Word
A word is 16 bits long.

Write-protect
To protect a disk, diskette, or other storage medium against the addition, revision, or deletion of information.

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HOW TO ORDER

ADDITIONAL DOCUMENTATION

From	Call	Write
Alaska, Hawaii, or New Hampshire	603–884–6660	Digital Equipment Corporation P.O. Box CS2008
Rest of U.S.A. and Puerto Rico*	800–258–1710	Nashua, NH 03061
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Canada	800–267–6219 (for software documentation)	Digital Equipment of Canada Ltd. 100 Herzberg Road Kanata, Ontario, Canada K2K 2A6
	613–592–5111 (for hardware documentation)	Attn: Direct Order desk
Internal orders (for software documentation)	—	Software Distribution Center (SDC) Digital Equipment Corporation Westminster, MA 01473
Internal orders (for hardware documentation)	617–234–4323	Publishing & Circulation Serv. (P&CS) NR03–1/W3 Digital Equipment Corporation Northboro, MA 01532

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MicroVAX 3500
VAXserver 3500 Operation
EK–O28AB–OM–002

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