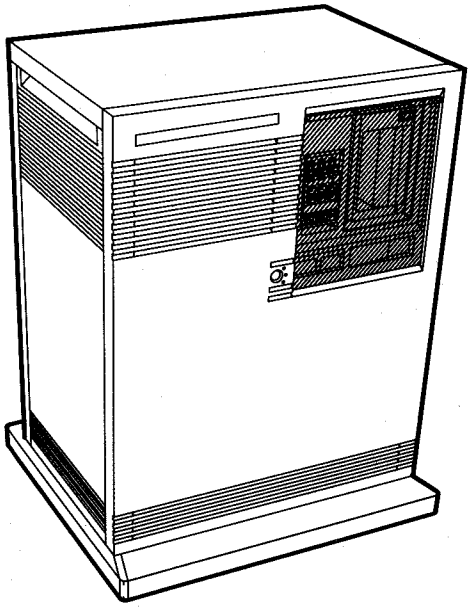
MicroVAX 3400
VAXserver 3400
Operation

Order Number EK–161AA–OM–001



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Preface

This manual describes how to use MicroVAX 3400 and VAXserver 3400 systems. The hardware and software for each of these systems differs slightly, according to the function of the system. The MicroVAX 3400 is a multiuser system that uses the VMS or ULTRIX operating systems, and functions as an end- or full-function node on an Ethernet network. VAXserver systems are single-user systems that use either VMS or ULTRIX operating systems. VAXserver systems that use VMS are DECnet full-function network nodes; systems that use ULTRIX are DECnet end-function nodes.

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 3400 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 VAXserver systems. 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

MicroVAX 3400 and VAXserver 3400 systems house all system components in a BA213 enclosure. The enclosure is generally pedestal-mounted and houses the following:

- Central processing unit (CPU) module containing on-board Ethernet controller and disk drive adapter and 4 Mb of main memory
- Memory modules
- Communications controllers
- Tape drive controller
- RF30 fixed-disk drives
- TK70 tape drive[1]
- Power supplies

Depending on the configuration you ordered, up to three RF30 disk drives may be mounted inside the BA213 enclosure.

This chapter describes the MicroVAX 3400 and VAXserver 3400 system components and their functions. 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.

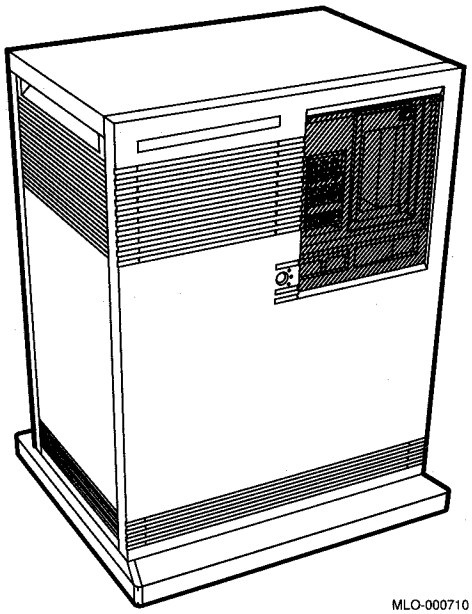
1.1 Front View and Physical Description of the MicroVAX and VAXserver 3400 System

The front of the system has a removable front panel that restricts access to some of the system controls.

Figure 1–1 shows the system with the front panel attached.

[1] Optionally, the system may be tapeless, or a TK50 tape drive may be configured into the system.

Figure 1–1: MicroVAX/VAXserver 3400 System



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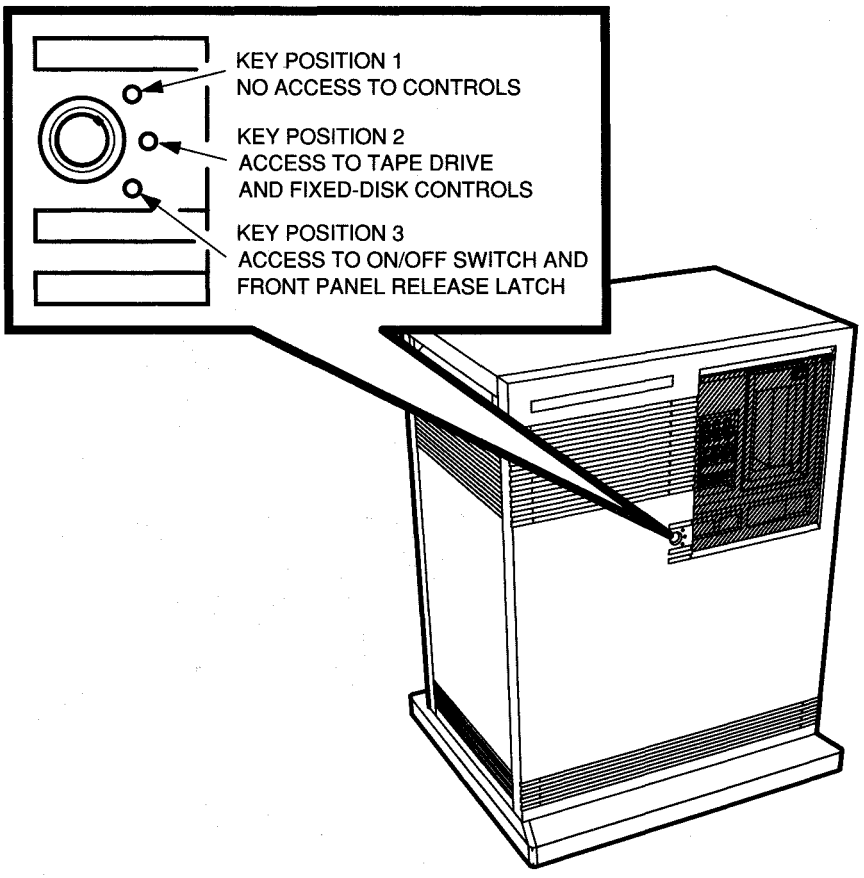
The front panel has a sliding window controlled by a 3-position rotary lock. You can lock the window in one of three positions: closed, partially open, and fully open. Each position limits access to certain system controls. When the window is locked in any of its three positions, you can still raise 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.

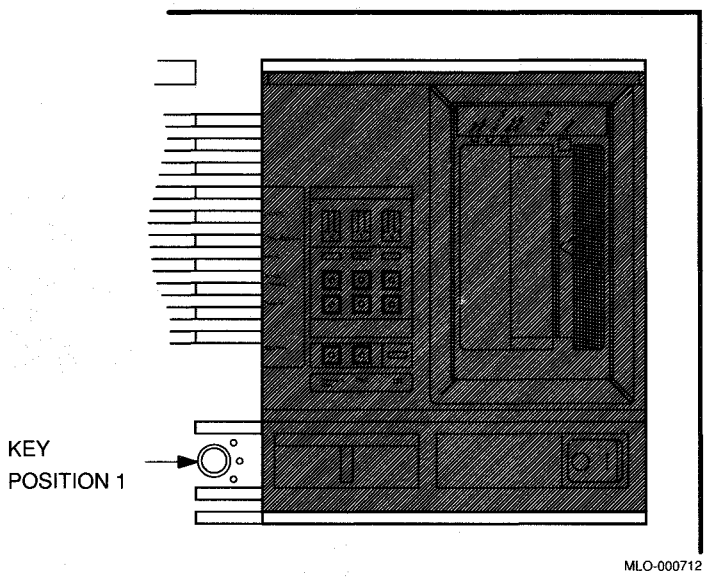
Figure 1–2 shows the three key positions and the controls accessible in each position.

Figure 1–2: Key Positions



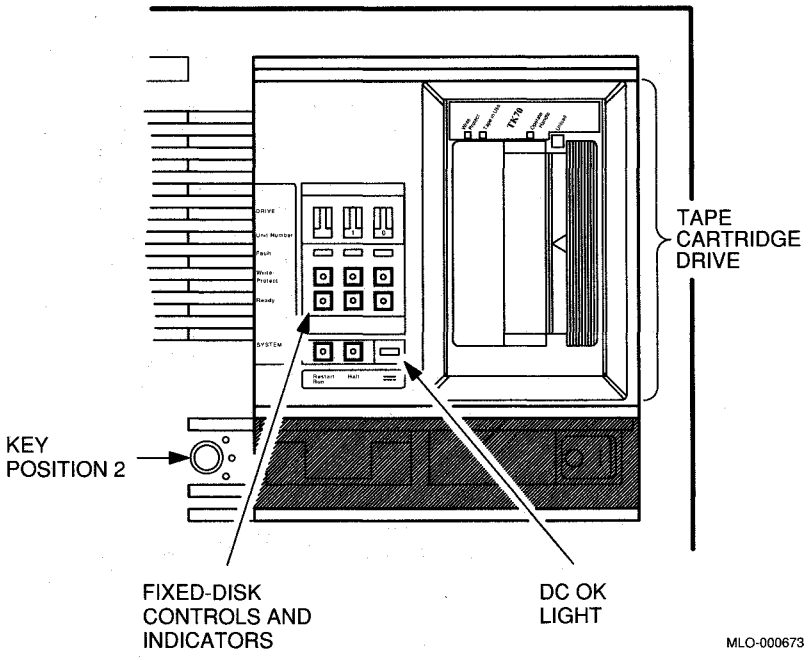
When the window is up and the key is turned to position 1, the window is locked in the closed position. You cannot use any controls when the window is closed, but lights indicating power to the system and activity on the disks and tape are visible through the window. Figure 1–3 shows the closed window 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 disk drives, and use the Halt and Restart buttons. Chapter 3 has instructions for using these controls.

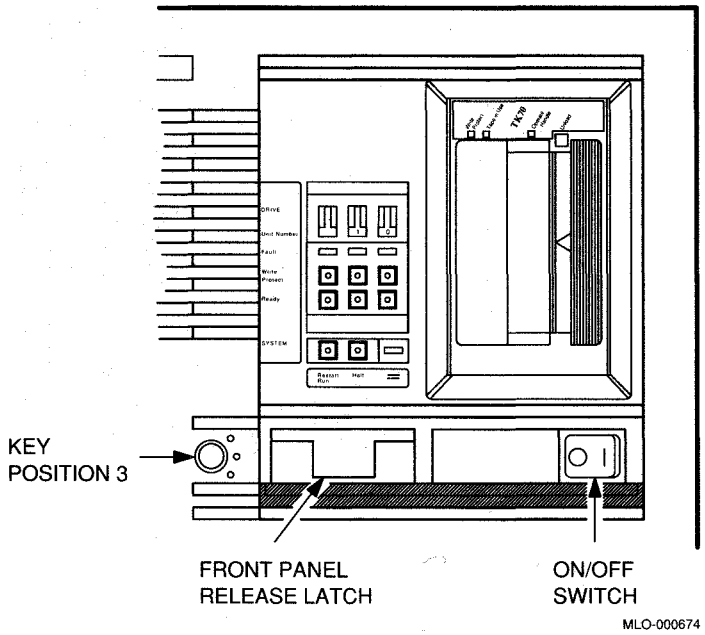
Figure 1–4: Window Partially Open



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



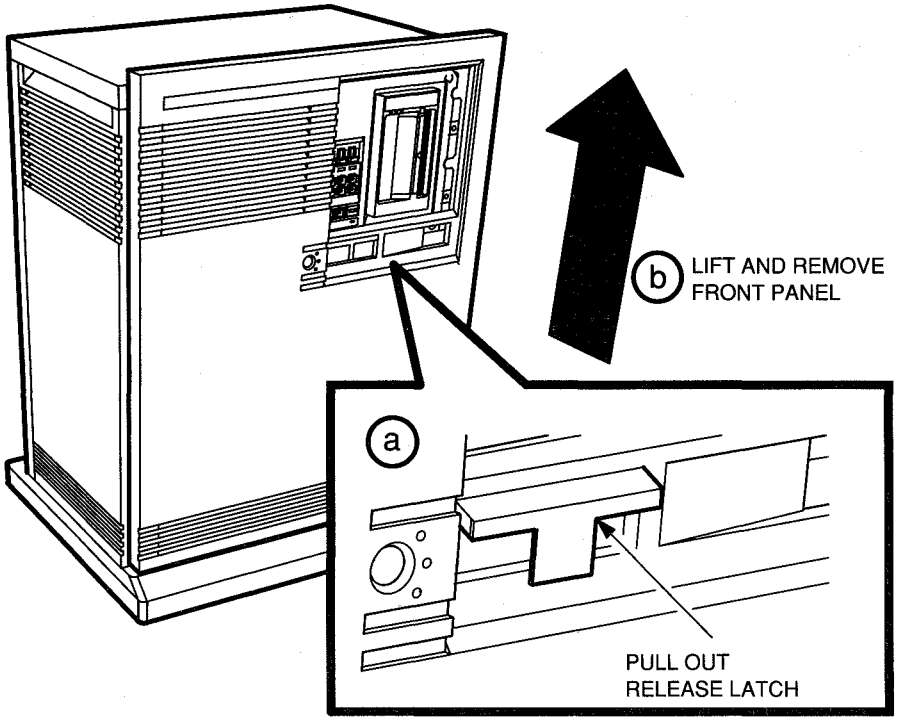
Removing the Front Panel

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 position three, the bottom position.
2. Slide the window down.

3. Turn the on/off power switch to off (position 0).
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.

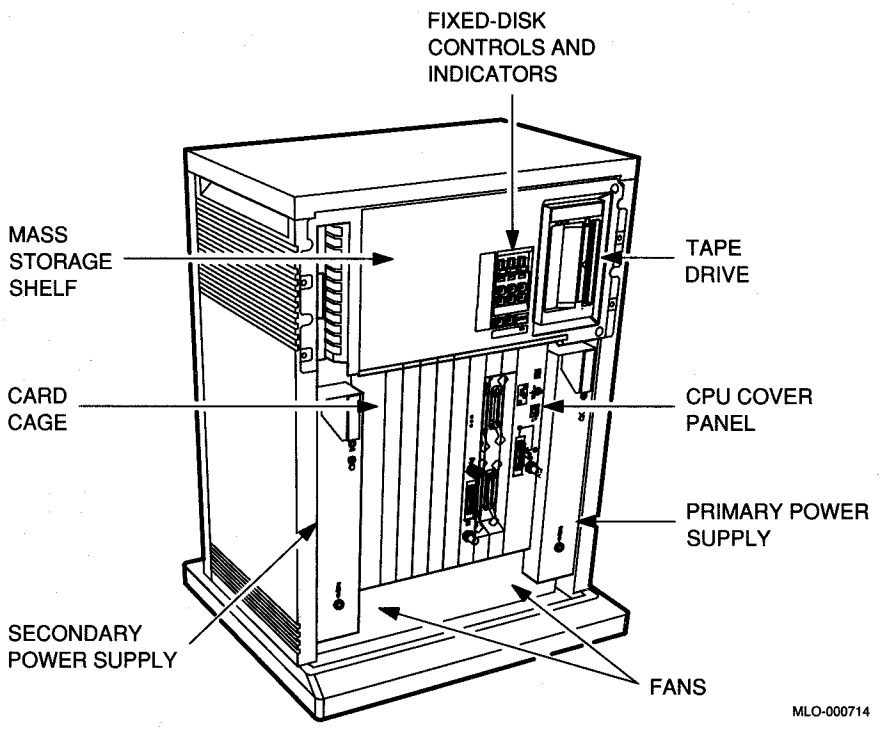
1.1.1 The BA213 Enclosure

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 — TK70 tape drive and two or three RF30 fixed-disk drives
- RF30 fixed-disk control panel
- Card cage containing modules — CPU, memory, communications controllers, mass storage controllers
- Power supplies
- Fans (2)

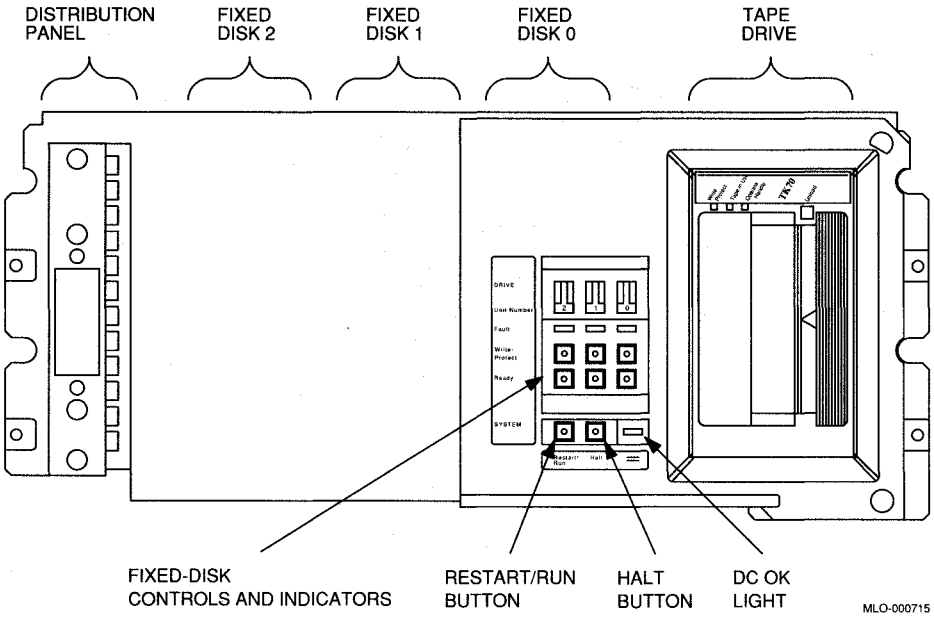
Figure 1–7: Front View of the BA213 Enclosure



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 two to three RF30 fixed-disk drives. The RF30s are behind the control panel, shown in Figure 1–8.

Figure 1–8: Mass Storage Shelf



The RF30 control panel has several buttons and indicators for each of the three possible drives. When you turn on your system, indicator lights come on for each drive present. Chapter 3 describes how to use the control panel.

Below the RF30 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.

To the left of the DC OK light is the Halt button. 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. Chapter 2 describes halting the system in more detail.

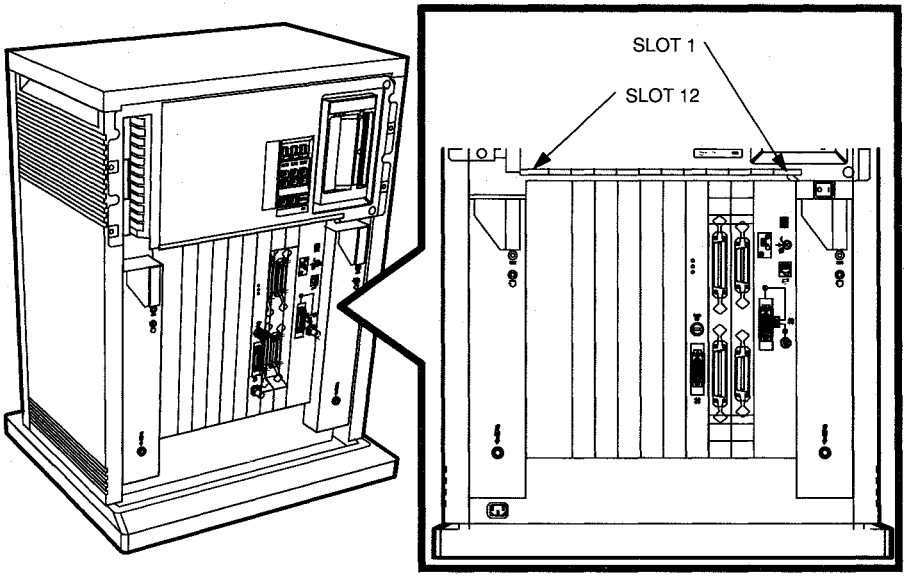
CAUTION: *Pressing in the Halt button halts the system regardless of the setting of the Break Enable/Disable switch on the CPU cover panel.*

To the left of the Halt button is the Restart button. When you press the Restart button, the system reboots system software. Further instructions on restarting your system are in Chapter 2.

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 1–9.

Figure 1–9: Card Cage



The number and type of modules installed in your system depend on your configuration. Each slot, even an empty one, is protected by a module cover panel. Together the panels form a shield with a two-fold 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 module cover panels as they may not meet the required specifications.*

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

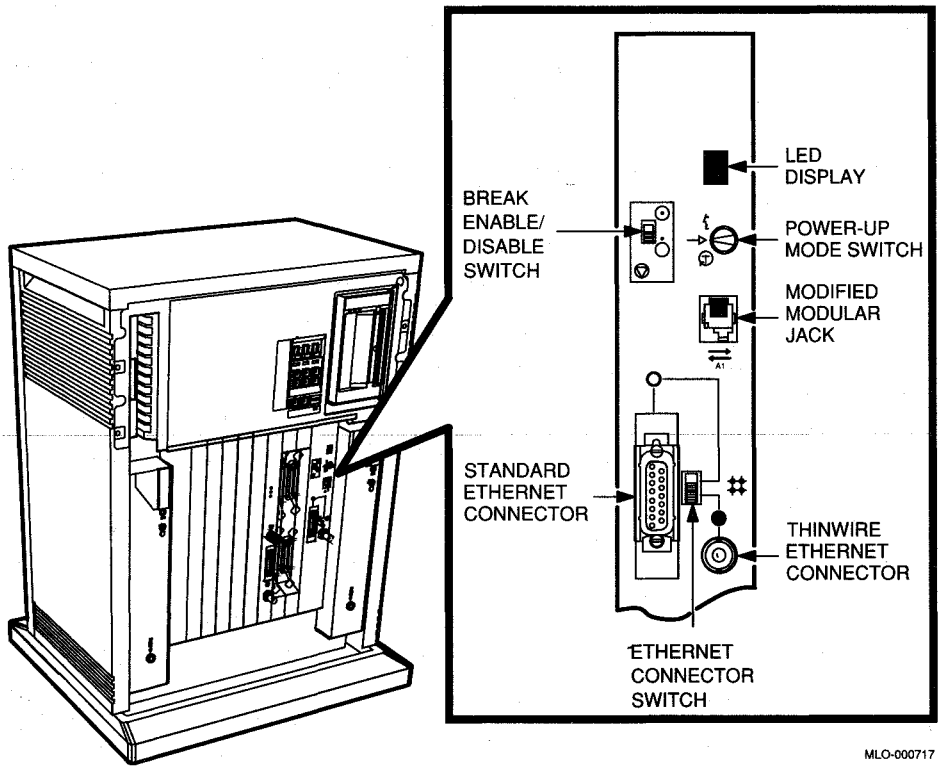
- The system may overheat due to improper air circulation.
- The system will not comply with FCC and VDE requirements for shielding and may produce electrical interference that affects other equipment.
- The system is susceptible to electrical interference or damage from external sources.

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 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 or side 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. Additional memory modules may be installed in slots 2 through 4. The CPU and the first memory module are behind a double-width cover panel that has internal cable connections to the CPU module. Figure 1–10 shows the CPU cover panel.

Figure 1–10: CPU Cover Panel



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.

CAUTION: *When you press the Reset button, all processing is interrupted. If an operating system is running, always follow the appropriate shutdown procedure before pressing the Reset button.*

- 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. Also, if a default boot device has not been selected, this mode causes the system to issue a list of bootable devices and prompts you to select a device from the list. Once a device is selected, the system autoboots from that device each time you turn it on.

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

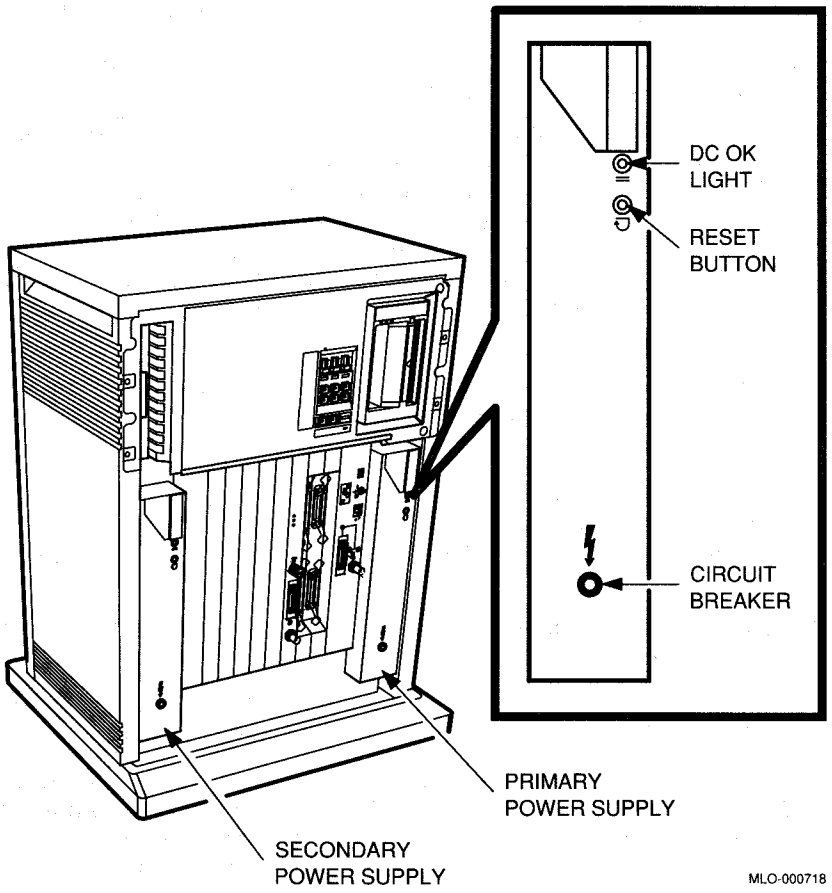
  Loop Back Test Mode (in the bottom position, indicated by a T in a circle) causes the system to run loopback tests on the console serial line at power-up. This setting requires special loopback connectors and is for DIGITAL field service use only.

- The light-emitting diode (LED) display shows the testing sequence during power-up.
- Console terminal connector — This modified modular jack (MMJ), labeled A1, provides the connection for the console terminal.
- Ethernet connectors. The cover panel has two Ethernet connectors: a BNC-type connector for ThinWire Ethernet, and a 15-pin connector for a standard Ethernet transceiver cable. The Ethernet connector switch allows you to set the type of connection. To use the transceiver cable connection, set the switch to the up position. To use the ThinWire cable connection, set the switch to the down position. A green indicator light (LED) for each connector indicates which connection is active.

1.1.1.3 Power Supplies

Your system has two power supplies. Figure 1–11 shows the controls and indicators on each power supply.

Figure 1–11: 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

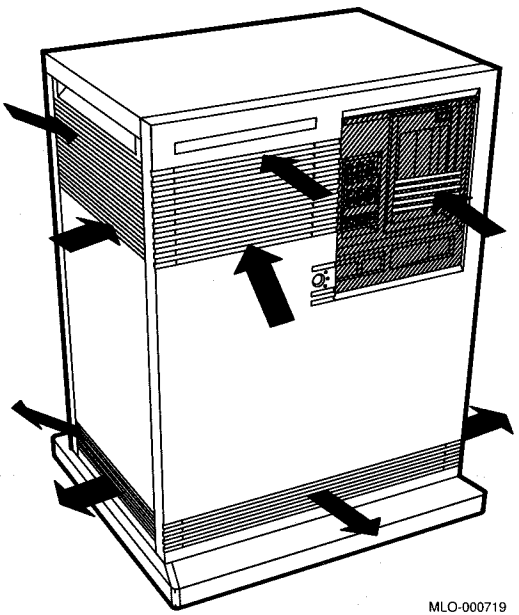
fingertip or a small tool to press the button. See Chapter 2 for the correct procedures for resetting the system.

- 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 1–12 shows the air flow through the system enclosure.

Figure 1–12: System Air Circulation



1.1.2 Mass Storage Options

Each MicroVAX 3400 and VAXserver 3400 system has a TK70 tape drive and two or three RF30 fixed-disk drives mounted in the BA213 enclosure.

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

1.2 Functional Description of Base System

Each MicroVAX 3400 and VAXserver 3400 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 in turn.

1.2.1 Base System Components

Base system components include the following:

- Central processing unit (CPU)
- Console serial line unit (SLU)
- Main memory
- Ethernet controller
- 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 connecting the console terminal to the CPU module. The SLU connector (a modified modular jack) 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. A large main memory increases the efficiency of processing, since fewer pages must be copied to and from the 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.

Network Controller

A network controller is on the CPU module. The system can be connected to an Ethernet network by either a standard transceiver cable or a ThinWire cable. Connections for both types of cables are on the CPU cover panel.

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 device that controls activity between the CPU and the mass storage devices. The controller for each RF30 fixed-disk drive is built-in to the drive. The CPU communicates to the RF30 drives through an adapter on the CPU module. The controller for the TK70 tape drive (the TQK70) is a module installed to the left of other modules in the card cage.

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 one RF30 disk drive), and the two fans. The secondary power supply provides power to modules installed in slots 7–12 and a second or third RF30 if present.

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 process.

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 Local 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. The network controller function for your system is implemented on the CPU module.

1.2.2.2 Real-Time Controllers

Real-time controllers interface with devices that monitor or control particular 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 3400 VAXserver 3400 Technical Information* describes the options currently available for MicroVAX and VAXserver 3400 systems. DIGITAL provides installation for additional options that you order.

1.3 Dual-Host Capability (VMS Systems Only)

CAUTION: *Before building a dual-host configuration, consult your DIGITAL service representative and reference your system warranty. The terms of your warranty may be violated if you attempt to configure these systems yourself.*

A Digital Small Storage Interconnect (DSSI) disk drive, such as the RF30, has a built-in multihost capability that allows it to connect to more than one DSSI host adapter. Since the DSSI adapter is located on the KA640 CPU module, two KA640-based systems can be connected to the same DSSI bus.

Using an external DSSI cable, any two KA640-based systems (MicroVAX 3400, VAXserver 3400, MicroVAX 3300, VAXserver 3300) can be connected to form a dual-host configuration. Figure 1–13 shows a possible dual-host configuration.

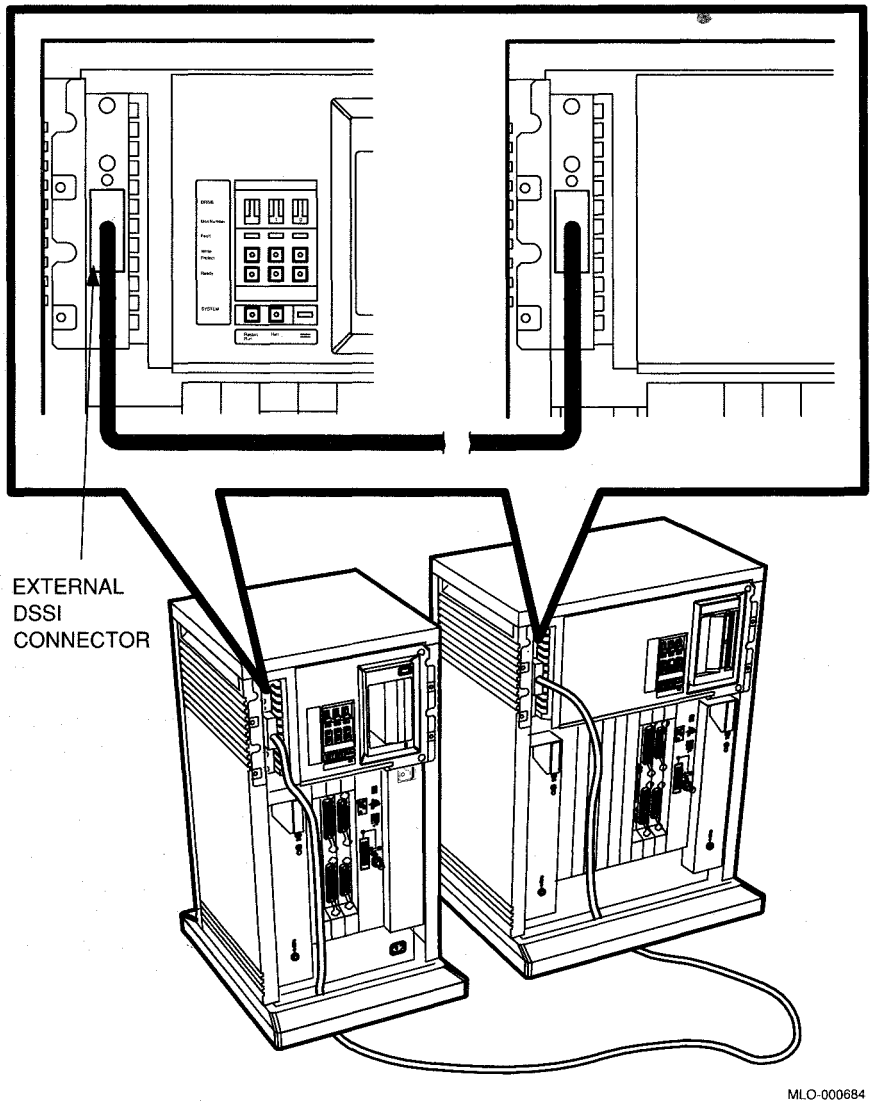
NOTE: *Dual-host capability is only supported under VMS when the two systems are configured into the same VAXcluster.*

The benefits of a KA640-based dual-host configuration are:

- VAXcluster features such as shared data across systems and satellite nodes.
- Higher system availability — if one of the KA640-based systems is unavailable, for example, due to software update or system malfunction, the satellites booted through it are able to continue operating through the other KA640-based system. This process is described in more detail below.

The primary application for such a configuration is a VAXcluster system. The simplest dual-host configuration, for example, is to configure one system disk to be used as the system disk by both KA640-based machines. The system disk physically resides in one enclosure, however, both systems have equal access to the disk and to any other DSSI mass storage device in either enclosure.

Figure 1–13: KA640-Based Dual-Host Configuration



If one of the KA640 CPU modules fail, all satellite nodes booted through that KA640 lose connections to the system disk. Each satellite node knows, however, that the system disk is also available through a second path — that of the remaining KA640 module. The satellite nodes establish a new connection through the other system and continue operation.

To increase system availability, more redundancy may be configured into a configuration. This can be done in a dual-host configuration by using two system disks (one for each boot node). In the event of one system disk failure, the remaining system disk would continue to serve one KA640-based system and the satellite nodes booted through it. As with any VAXcluster, however, a second system disk improves availability while increasing system management tasks.

To build a dual-host configuration, perform the following steps:

1. Form a VAXcluster configuration. If your systems are not already clustered, you must cluster them. For more information, find the VMS VAXcluster manual that is part of the VMS documentation. If this manual is not available, contact your DIGITAL representative.

2. Obtain an external DSSI cable which connects the two system enclosures. Order this through your DIGITAL representative.

   NOTE: *If you have ordered a tapeless MicroVAX or VAXserver 3300 or 3400 system, an external DSSI cable is included with your system shipment.*

3. Change the DSSI node address of one system's KA640 CPU module.

   CAUTION: *This should be performed by a qualified DIGITAL service professional. Contact your service representative to schedule an appointment.*

4. Change the Unit I.D. plugs that identify the RF30 disk drives to the system. (Supplemental Unit I.D. plugs are included with your system.) When two systems are connected together, one system's RF30s may need to be renumbered using different Unit I.D. plugs. (Each device on a DSSI bus must have a unique address.) For instructions on how to change a Unit I.D. plug, refer to the section on RF30 Disk Drives, in Chapter 3 of this manual.

NOTE: *The DSSI bus supports eight devices/adapters. With two DSSI adapters, the dual-host configuration supports a maximum of six DSSI devices.*

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 and installing the base operating 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:

- The Halt button on the mass storage control panel (Figure 1–8) is set to out (not lit).
- The Break Enable/Disable switch on the CPU cover panel (Figure 1–10) is set to disable (down position). 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. With break disabled, your system automatically boots system software when powered up.

CAUTION: *Pressing in the Halt button on the mass storage control panel 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 (Figure 1–10) is set to Run (indicated by an arrow).
- The baud rate switch, located on the inside of the CPU cover panel (see *Technical Information*) 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 found in *Technical Information*.
- The Write-Protect button for each RF30 fixed-disk drive (Figure 3–1) is set to out (not lit).
- The Ready button for each RF30 drive (Figure 3–1) is out (lit). This setting makes the drive available for use.

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, 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.*

- 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 3400 or VAXserver 3400 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

```
KA640-A T3.4-2 VMB 2.3

 1) Dansk
 2) Deutsch (Deutschland/Österreich)
 3) Deutsch (Schweiz)
 4) English (United Kingdom)
 5) English (United States/Canada)
 6) Español
 7) Français (Canada)
 8) Français (France/Belgique)
 9) Français (Suisse)
10) Italiano
11) Nederlands
12) Norsk
13) Português
14) Suomi
15) Svenska
 (1..15):
```

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.

In addition to the Language Selection Menu, the system issues a list of bootable devices and prompts you to select a device from the list.

NOTE: *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.*

If you do not type a device name within thirty seconds, the system boots by default from the Ethernet adapter, ESA0.

If you have typed in a device name within thirty seconds, the system boots from that device. The system will continue to autoboot from that device each time you turn it on unless a new default device is assigned.

NOTE: *Selecting a default boot device other than the Ethernet adapter, ESA0, is not appropriate for diskless and tapeless systems which must boot software over the network.*

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 set the Write-Protect switch to in (glows).

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
RF30 Ready lights	Glow green steadily within 20 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 steadily.

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 KA640–A, the version of the microcode is T3.42 and the

version of VMB is 2.3. 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 Sections 2.4.1 and 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

```
KA640-A T3.4-2 VMB 2.3

Performing normal system tests.
41..40..39..38..37..36..35..34..33..32..

?58 2 01 FF 00 0000

P1=00000000  P2=00000000  P3=00000000  P4=00000000  P5=00000000
P6=00000001  P7=00000000  P8=2004E4D4  P9=201406B4 P10=20053510
r0=00000054  r1=20100100  r2=2010C380  r3=0000001C  r4=20100005
r5=20100001  r6=7DDDE3FF  r7=20084600  r8=2010E3E0 ERF=800001C0

Normal operation not possible.

>>>
```

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

2.4 Booting the System

At power-on, the MicroVAX or VAXserver 3400 system can be set to automatically boot (autoboot) itself, or you can manually boot the system from console mode. The Break Enable/Disable switch setting determines how the system boots.

2.4.1 Autobooting the System

When the Break Enable/Disable switch is set to disable (the normal operating setting), the system runs self-tests and, on completion, attempts to load system software.

Selecting a Boot Device

When attempting to load system software, the system does not test all devices in search of bootable software. Rather it looks for a previously-selected boot device.

If you have not selected a boot device, the system issues a list of bootable devices and prompts you to select a boot device from the list, as shown in Figure 2–3.

Figure 2–3: Successful Power-On to List of Bootable Devices

```
KA640-A T3.4-2, VMB 2.3

Performing normal system tests.
41..40..39..38..37..36..35..34..33..32..31..30..29..28..27..26..
25..24..23..22..21..20..19..18..17..16..15..14..13..12..11..10..
09..08..07..06..05..04..03..
Tests completed.
Loading system software.
No default boot device is set.

Devices:
--DIA0 (RF30)
--MUA0 (TK70)
--ESA0 (08--00--2B--08--E7--A4)
--DEVICE? [ESA0]:
```

If you do not type a device name within thirty seconds, the system boots by default from the Ethernet adapter, ESA0.

If you type in a device name within thirty seconds, the system boots from that device.

When the boot device is identified, the number "2" displays on the screen. As the system begins booting from a device, the countdown continues from 1 to 0.

Once you have selected a boot device from the list of bootable devices, the system boots from that device at each power-up (as long as the system is set to autoboot).

Figure 2–4 shows a successful power-on and automatic boot when the device, DIA0, has been selected as the boot device.

When a boot device is identified, the system autoboots from that device each time you turn it on, until you do one of the following:

Figure 2–4: Successful Power-On and Automatic Boot

```
KA640-A T3.4-2, VMB 2.3

Performing normal system tests.
41..40..39..38..37..36..35..34..33..32..31..30..29..28..27..26..
25..24..23..22..21..20..19..18..17..16..15..14..13..12..11..10..
09..08..07..06..05..04..03..
Tests completed.
Loading system software.
(BOOT/R5:0 DIA0)

   2..
--DIA0
      1..0..
```

- Change the boot device through one of the following methods:
  1. Using the SET BOOT *device name* command from console mode.
  2. Selecting a new boot device when the bootable device list appears with the system in Language Inquiry Mode.
- Change the setting of the Break Enable/Disable switch to enable (dot inside the circle). (If you do so, the system will not autoboot but will enter console mode after completing self-tests.)

NOTE: *Selecting a default boot device other than the Ethernet adapter, ESA0, is not appropriate for diskless and tapeless systems which must boot software over the network.*

Using the SET BOOT Command

The SET BOOT command identifies the boot device to the system. To use the command, put the system into console mode by pressing the Halt button twice. At the >>> prompt, enter "SET BOOT *device-name*." For example, "SET BOOT ESA0" sets the system default boot device to be the on-board Ethernet controller. Once you have selected a boot device, the system autoboots from that device each time you turn it on.

To determine the name of the boot device refer to Table 2–2.

Table 2–2: Device Names

Controller Type	Controller	Device Name
DSSI	On-board CPU	DImn[1]
TMSCP	TQK70	MUmn
PROM	MRV11	PRAn
Ethernet adapter	On-board CPU	ESAn

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

For more information about the MicroVAX 3400 system's booting process, refer to *MicroVAX 3400 VAXserver 3400 Technical Information.*

2.4.2 Booting the System from Console Mode

When the Break Enable/Disable switch is set to enable, the system powers up to console mode (indicated by the >>> prompt) after successfully completing its self-tests. Figure 2–5 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.

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 2–5: Successful Power-On to Console Mode

```
KA640-A T3.4-2, VMB 2.3

Performing normal system tests.
41..40..39...38..37..36..35..34..33..32..31..30..29..28..27..26..
25..24..23..22..21..20..19..18..17..16..15..14..13..12..11..10..
09..08..07..06..05..04..03..
Tests completed.
>>>
```

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.*

You can halt the system in two ways. You can press the Halt button twice — in to halt the system and out to enter console mode. Or you can press the Break key on the console terminal, if the Break Enable/Disable switch on

the CPU cover panel is set to enable. When the console mode prompt >>> appears on your screen, the system is halted.

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.*

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

With dual-host configurations, you can halt one processor without affecting the other. As long as the system disk is spinning and on-line, the second system continues to operate normally.

2.8 Restarting the System

CAUTION: *Do not press the Restart button while in console mode. Doing so destroys the system state. You will not be able to continue normal operation.*

Restarting the system allows you to reboot the system software without performing the start-up tests. For example, if your system is hung, you can press Restart and the system reboots.

With a dual-host configuration, you can restart one processor without affecting the other. As long as the system disk is spinning and on-line, the second CPU continues to operate normally.

2.9 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 the 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

NOTE: *Some of these options may not be appropriate for VAXserver 3400 systems. Contact your DIGITAL representative if you have any questions about whether a specific option is appropriate for your system.*

3.1 Mass Storage Options

The following mass storage options are available for the MicroVAX and VAXserver 3400 systems:

- RF30 fixed-disk drive
- TK70 tape drive

NOTE: *In addition, the RV20 Optical Disk Subsystem and the TS05 tape drive can be attached to the MicroVAX 3400 or VAXserver 3400. If your system contains an RV20 or a TS05 drive, refer to the device user's guide or owner's manual 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 RF30 Fixed-Disk Drives

The RF30 fixed-disk drive provides high-volume mass storage for your MicroVAX 3400 or VAXserver 3400 system. Your system may have two or three RF30 drives.

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

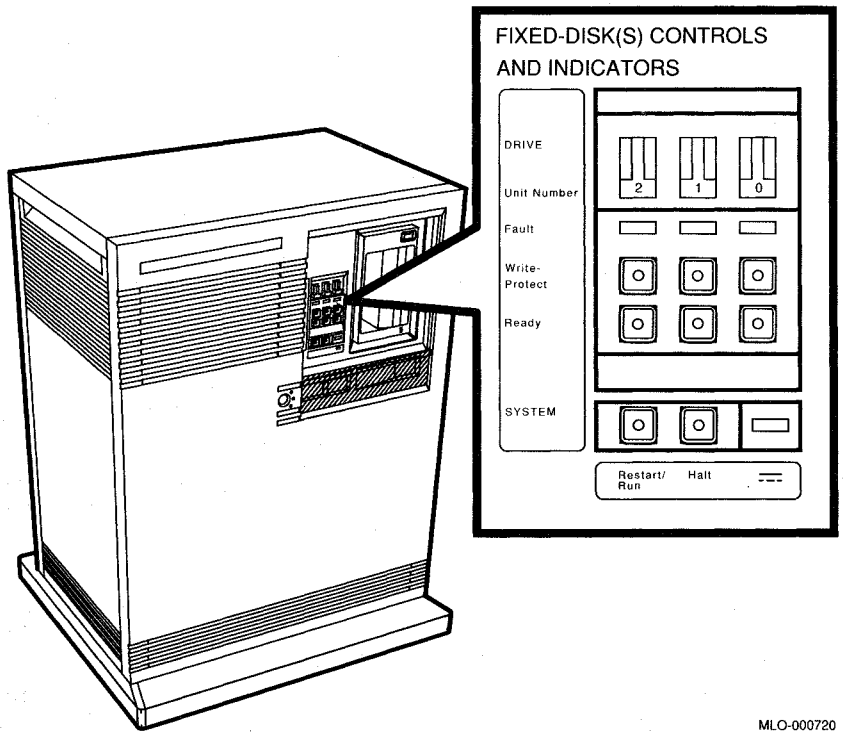
- Disk 0 contains the operating system and applications installed on the system.
- Disk 1 contains work areas for each user with an account on the system.

The storage capacities and other specifications of the RF30 fixed-disk drive are listed in *MicroVAX 3400 VAXserver 3400 Technical Information.*

RF30 Fixed-Disk Drive Controls

Controls for the RF30 are located behind the sliding window on the front of the system. To access the controls for the RF30 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 RF30 fixed-disk drives.

Figure 3–1: RF30 Disk Drive Controls and Indicators



The system has controls and indicators for three RF30 fixed-disk drives. Each RF30 has the following controls and indicators arranged in a column on the control panel.

- Unit I.D. plug
- Fault light
- Write-Protect button
- Ready button

Unit I.D. plugs identify the unit number of the drives to the system. The factory configuration identifies the rightmost drive as Disk 0, the center drive as Disk 1, and the leftmost drive as Disk 2.

Table 3–1 lists the function of each RF30 fixed-disk drive control.

Table 3–1: RF30 Controls and Indicators

Control	Position	Function
Fault	Lit	Indicates an error condition within the disk drive.
	Not lit	Indicates an error-free condition within the disk drive.
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.
Ready	Out	The drive is online. When the drive is available for use, the green indicator light in the switch is on. When the drive is being used, the green indicator light is off.
	In	The drive is offline and cannot be accessed. The green indicator light cannot be lit when the Ready button is in.

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).

Changing the Unit I.D. Plugs

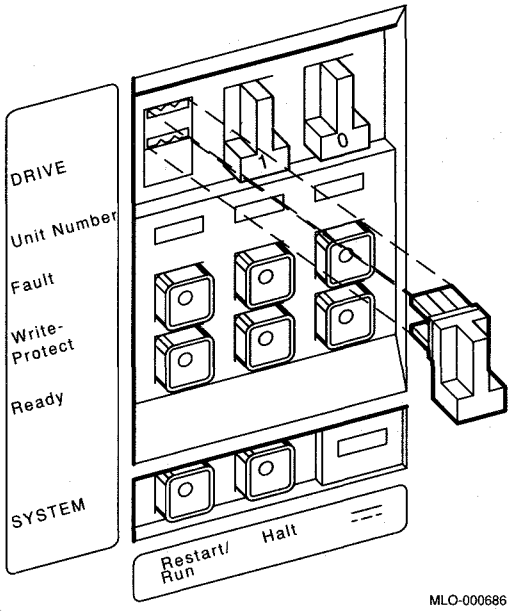
Spare unit I.D. plugs are supplied with your system. When two MicroVAX 3300 and/or 3400 systems are configured in a dual-host configuration, you use the spare Unit I.D. plugs to renumber the unit numbers of one system's disk drives.

The I.D. plugs have prongs on the back that indicate the unit number of the drive. When changing the order of I.D. plugs or adding new I.D. plugs, the new unit number is identified to the system once you have cycled power on the system.

NOTE: *If the Unit I.D. plug for an RF30 is changed while the system is powered on, the system must be powered off, then on again, before the new unit number is recognized.*

To remove an I.D. plug, grasp it firmly and pull it out. To insert an I.D. plug, align the two center prongs with the two center slots and press it in. See Figure 3–2.

Figure 3–2: Inserting and Removing RF30 Unit I.D. Plugs



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.

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 previously 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.

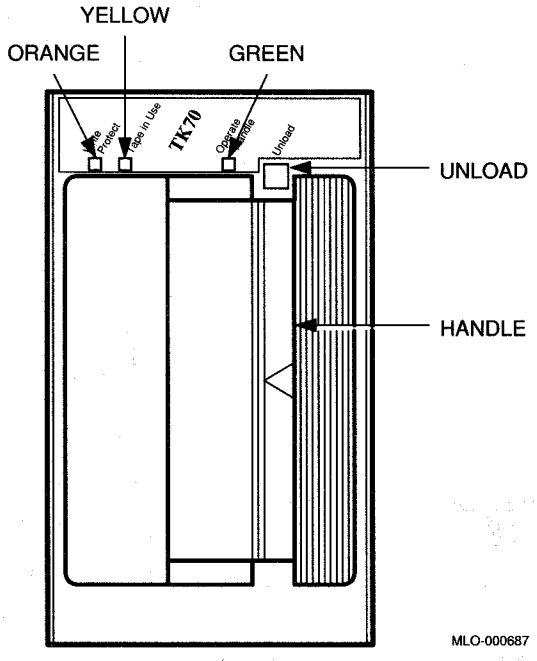
- Orange light (Write-Protected): A steady orange light indicates that the cartridge is write-protected.
- Yellow light (Tape in Use): A steady yellow light indicates that the tape is loaded. A blinking yellow light indicates that the tape is in motion.
- Green light (Operate Handle): A steady green 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

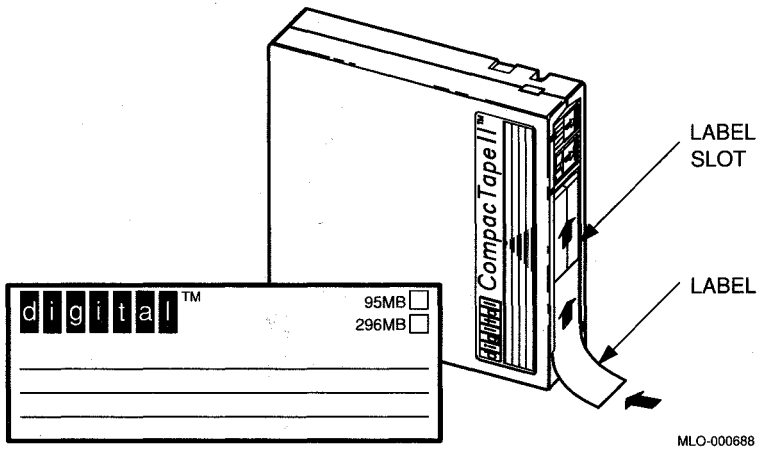
The TK70 tape drive operates like a reel-to-reel tape deck. Inside the drive is a take-up reel with a leader attached. Inside the cartridge is a single reel containing the magnetic tape. When you insert the cartridge and push in the handle, the leader in the drive automatically couples with the leader 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:

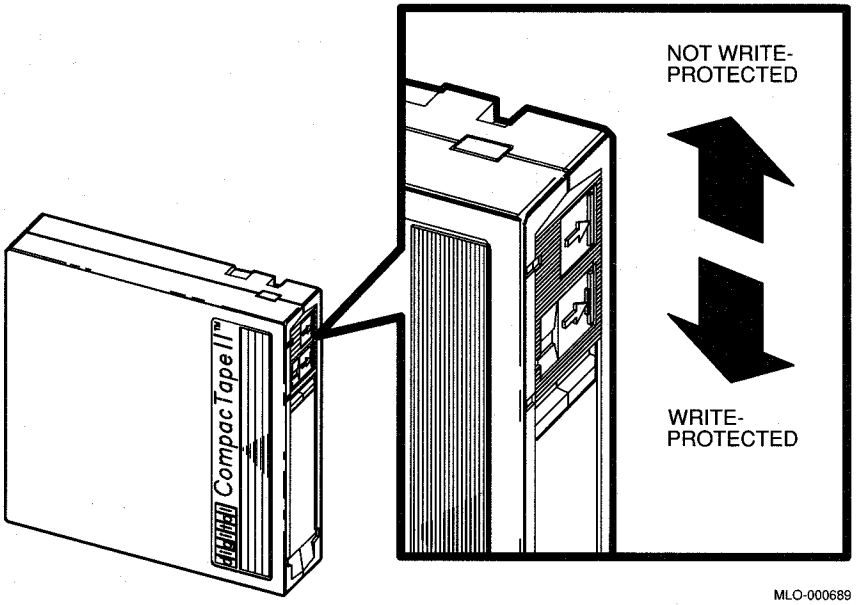
- Set the write-protect switch on the cartridge to the write-protect position.
- Write-protect the cartridge by using operating system commands described in your system software manuals.

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.*

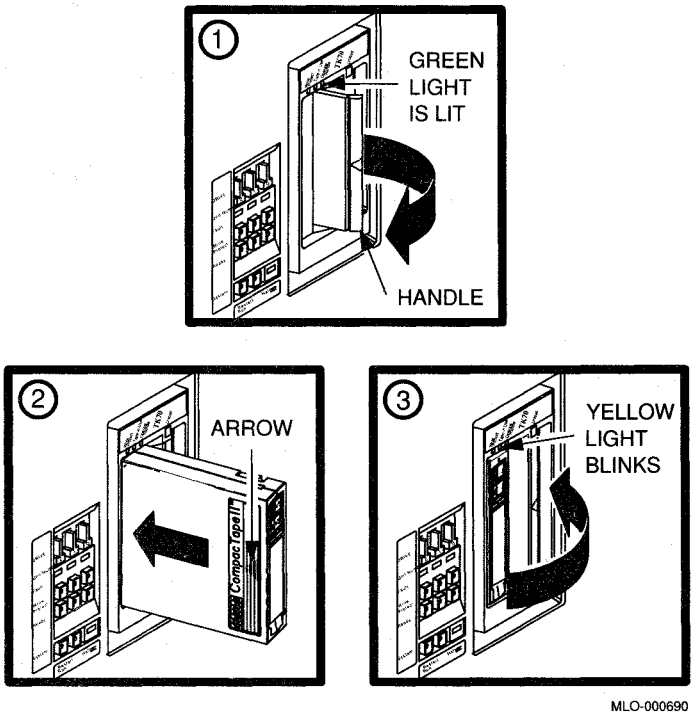
Use the following procedure to insert a tape cartridge (see Figure 3–6):

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.*

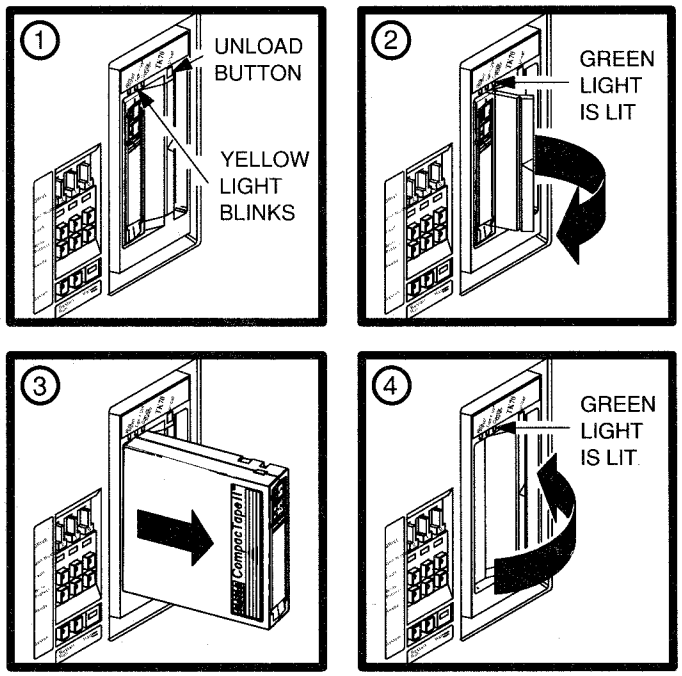
3. Remove the tape cartridge and store it in its container.

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



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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.
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 RV20 Optical Disk Subsystem

If your system contains an RV20 Optical Disk Subsystem, refer to the *RV20 Optical Disk Subsystem Owner's Manual* for instructions on how to operate the device.

3.1.4 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.

3.2 Communications Controller Options

The following types of communications controllers are available for the MicroVAX 3400 and VAXserver 3400 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 your MicroVAX system, with and without modem support:

- CXA16– 16-line multiplexer, Q-bus controller
- CXB16– 16-line multiplexer
- CXY08– 8-line multiplexer with modem control, Q-bus controller
- DFA01– 2-line controller with integral modems, Q-bus controller
- DSRVB– 8-line terminal server, Ethernet device

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. Refer to your terminal or printer manual for complete set-up instructions. Generally, the default settings for your terminal are acceptable.

  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 your MicroVAX system:

- DPV11– Single-line programmable controller
- DSV11– Dual-line controller
- KMV1A– Programmable communications interface, Q-bus controller

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

NOTE: *The MicroVAX 3400 or VAXserver 3400 system contains an Ethernet controller on the CPU module. This section is pertinent only if you require use of a second Ethernet controller with your system.*

Before using a network controller you must do the following:

1. Make sure the Ethernet cable (either standard transceiver cable or ThinWire cable) is connected to the CPU cover panel. The light next to the connector should be lit, indicating an active connection. If not lit, move the Ethernet connector switch to the proper position.
2. Make sure the Ethernet cable is properly connected to the network. A transceiver cable can be connected in one of the following ways:
   - To an H4000 transceiver located on a traditional Ethernet
   - To a Local Network Interconnect (DELNI), which can be connected to a larger Ethernet or can serve to connect up to eight systems in a local area network

   A ThinWire cable can be connected as follows:
   - To a ThinWire Ethernet Multiport Repeater (DEMPR) or ThinWire Singleport Repeater (DESPR), which can be connected to a larger Ethernet or can serve to connect many systems in a local area network
   - To an available connection on a T connector of other ThinWire nodes
3. Have the DECnet application installed on your system.
4. Register your node with the network manager so that your node is recognized by other systems in the network.

Some software products, for example, Ethernet-based VAXcluster systems, use the Ethernet hardware address of other systems to operate properly.

To find the hardware address of your Ethernet device, remove the front panel of your system. The hardware address of your Ethernet device is printed on a label on the bottom half of the CPU module.

You can also 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

The following real-time options are available for your MicroVAX system:

- DRQ3B– High-speed interface with two unidirectional 16-bit data channels
- DRV1W– General purpose interface with one 16-bit input port, one 16-bit output port
- IEQ11– DMA controller that connects a Q-bus to two independent buses
- IBQ01– DMA controller that connects a Q-bus to RS–485 control
- AAV11–S– Digital-to-analog converter with DMA capability
- ADV11–S– Analog-to-digital converter with DMA capability
- KWV11–S– Programmable clock that can count from one to five frequencies
- AXV11– Input/output circuit board for analog devices
- ADQ32– Analog-to-digital converter with DMA capability

Before using a real-time controller, make sure the devices connected to the controller are properly set up. Refer to the documentation for 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 3400 and VAXserver 3400 systems have several printer options available. Consult the *MicroVAX 3400 VAXserver 3400 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 KA640 CPU Systems Maintenance.*

Appendix A
Related Documentation

Document	Order Number
Hardware Documentation	
KA640 CPU Systems Maintenance	EK–179AA–MG
KA640–AA CPU Module Technical Manual	EK–KA640–TM
TSV05 Tape Transport System User's Guide	EK–TSV05–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 3300 and 3400	AA–LY24A–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 3400 VAXserver 3400 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 3400 or VAXserver 3400 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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