

**MicroVAX 3800  
VAXserver 3800  
Operation**

Order Number EK-165AA-OM-001

**digital equipment corporation  
maynard, massachusetts**

---

**March 1989**

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation.

Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

The software, if any, described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license. No responsibility is assumed for the use or reliability of software or equipment that is not supplied by Digital Equipment Corporation or its affiliated companies.

---

© Digital Equipment Corporation 1989. All rights reserved.

Printed in U.S.A.

---

The READER'S COMMENTS form on the last page of this document requests the user's critical evaluation to assist in preparing future documentation.

The following are trademarks of Digital Equipment Corporation:

COMPACTape	DIBOL	RSX
DDCMP	DSSI	RT
DEC	MASSBUS	ThinWire
DECmate	MicroVAX	ULTRIX
DECnet	PDP	UNIBUS
DECserver	P/OS	VAX
DECUS	Professional	VAXcluster
DECwriter	Q-bus	VAXELN
DELNI	Rainbow	VAXlab
DELQA	ReGIS	VMS
DEQNA	RQDX	VT
DESTA	RSTS	Work Processor

**digital**<sup>™</sup>

ML-S934

**FCC NOTICE:** The equipment described in this manual generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense may be required to take measures to correct the interference.

This document was prepared using VAX DOCUMENT, Version 1.1.

---

# Contents

---

Preface

ix

---

## Chapter 1 System Overview

---

1.1	Front View and Physical Description . . . . .	1-1
1.1.1	The BA213 Enclosure . . . . .	1-9
1.1.1.1	Mass Storage Shelf . . . . .	1-11
1.1.1.2	Card Cage . . . . .	1-13
1.1.1.3	Power Supplies . . . . .	1-16
1.1.1.4	Fans . . . . .	1-18
1.2	Functional Description of Base System . . . . .	1-18
1.2.1	Base System Components . . . . .	1-19
1.2.1.1	Central Processing Unit (CPU) . . . . .	1-19
1.2.1.2	Console Serial Line Unit (SLU) . . . . .	1-19
1.2.1.3	Main Memory . . . . .	1-19
1.2.1.4	Network Controller . . . . .	1-19
1.2.1.5	Mass Storage Devices and Controllers . . . . .	1-20
1.2.2	Optional Components . . . . .	1-20
1.2.2.1	Mass Storage Subsystems . . . . .	1-21
1.2.2.2	Communications Controllers . . . . .	1-21
1.2.2.3	Real-Time Controllers . . . . .	1-23
1.2.2.4	Printer Interfaces . . . . .	1-23
1.2.2.5	Other Available Options . . . . .	1-23
1.3	Dual-Host Capability (VMS Systems Only) . . . . .	1-23

## Chapter 2 Operating the System

---

2.1	Before You Operate the System .....	2-1
2.2	Switch Settings .....	2-1
2.2.1	Normal Operation .....	2-1
2.2.2	Special Operation .....	2-2
2.3	Turning On the System .....	2-4
2.4	Booting the System .....	2-5
2.4.1	Autobooting the System .....	2-5
2.4.2	Booting the System from Console Mode .....	2-8
2.5	Using the System .....	2-8
2.6	Turning Off the System .....	2-9
2.7	Halting the System .....	2-9
2.8	Restarting the System .....	2-10

## Chapter 3 Operating System Options

---

3.1	Mass Storage Options .....	3-1
3.1.1	RF71 Integrated Storage Elements .....	3-2
3.1.2	TK70 Tape Drive .....	3-6
3.1.2.1	Design of the Drive .....	3-7
3.1.2.2	Labeling a Tape Cartridge .....	3-8
3.1.2.3	Write-Protecting a Tape Cartridge .....	3-9
3.1.2.4	Tape Cartridge Handling and Storage Guidelines .....	3-11
3.1.2.5	Inserting a Tape Cartridge .....	3-11
3.1.2.6	Removing a Tape Cartridge .....	3-14
3.1.2.7	Summary of TK70 Tape Drive Controls and Indicator Lights .....	3-16
3.1.3	RV20 Optical Disk Subsystem .....	3-17
3.1.4	RRD40/50 Digital Disk Subsystem .....	3-17
3.1.5	TVS05 Tape Drive .....	3-17
3.1.6	TU81-Plus Tape Drive .....	3-17
3.2	Communications Controller Options .....	3-17
3.2.1	Asynchronous Serial Controllers .....	3-17
3.2.1.1	Without Modem Support .....	3-18
3.2.1.2	With Modem Support .....	3-19
3.2.2	Synchronous Controllers .....	3-20

3.2.3	Network Controllers .....	3-20
3.3	Real-Time Options .....	3-21
3.4	Printer Options .....	3-22
3.5	Adding Options .....	3-22

## Appendix A Related Documentation

---

## Appendix B Reprogramming the KFQSA Storage Adapter

---

B.1	Reprogramming the KFQSA for Dual-Host Systems .....	B-1
B.2	Changing the ISE Allocation Class .....	B-10
B.3	Reprogramming the KFQSA When Adding an R215F Expander .....	B-11

## Glossary

---

## Index

---

## Examples

---

B-1	Entering Console Mode Display .....	B-3
B-2	SHOW DEVICE Display .....	B-4
B-3	SHOW QBUS Display .....	B-4
B-4	Configure Display .....	B-5
B-5	Programming the First KFQSA Display .....	B-7
B-6	Programming the Second KFQSA Display .....	B-9
B-7	Display for Changing Allocation Class and Unit Number ...	B-11
B-8	Entering Console Mode Display .....	B-14
B-9	SHOW DEVICE Display .....	B-15
B-10	SHOW QBUS Display .....	B-15
B-11	Configure Display .....	B-16
B-12	Programming the KFQSA Display .....	B-18

## Figures

---

1-1	MicroVAX/VAXserver 3800 System . . . . .	1-2
1-2	Key Positions . . . . .	1-3
1-3	Sliding Window Closed . . . . .	1-4
1-4	Window Partially Open . . . . .	1-5
1-5	Window Fully Open . . . . .	1-6
1-6	Removing the Front Panel . . . . .	1-7
1-7	Attaching the Front Panel . . . . .	1-8
1-8	Front View of the BA213 Enclosure . . . . .	1-10
1-9	Mass Storage Shelf . . . . .	1-11
1-10	Card Cage . . . . .	1-13
1-11	CPU Cover Panel . . . . .	1-15
1-12	Power Supply . . . . .	1-17
1-13	System Air Circulation . . . . .	1-18
1-14	KFQSA-Based Dual-Host Configuration . . . . .	1-25
2-1	Language Selection Menu . . . . .	2-3
2-2	Sample Error Summary . . . . .	2-5
2-3	Successful Power-On and Automatic Boot . . . . .	2-6
2-4	Successful Power-On to List of Bootable Devices . . . . .	2-6
2-5	Successful Power-On to Console Mode . . . . .	2-8
3-1	Operator Control Panel . . . . .	3-3
3-2	Inserting and Removing RF71 Unit I.D. Plugs . . . . .	3-5
3-3	TK70 Tape Drive . . . . .	3-7
3-4	Labeling a Tape Cartridge . . . . .	3-8
3-5	Tape Cartridge Write-Protect Switch . . . . .	3-10
3-6	Inserting a Tape Cartridge . . . . .	3-13
3-7	Removing a Tape Cartridge . . . . .	3-15
B-1	Dual-Host Configuration Nodes and Addresses (Example) . . . . .	B-2
B-2	Expanded System Nodes and Addresses (Example) . . . . .	B-13

## Tables

---

2-1	Normal Power-On Indications .....	2-4
2-2	Device Names .....	2-7
3-1	RF71 Controls and Indicators .....	3-4
3-2	TK70 Tape Drive Controls .....	3-16
3-3	TK70 Tape Drive Indicator Lights .....	3-16

# Preface

---

This manual describes how to use MicroVAX 3800 and VAXserver 3800 systems. The hardware and software for each of these systems differs slightly, according to the function of the system. The MicroVAX 3800 is a multiuser system that uses the VMS, ULTRIX or VAXELN 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.
- Appendix A lists related documentation.
- Appendix B provides instruction on reprogramming the KFQSA module.
- A glossary explains key terms.

**NOTE:** *VAXserver 3800 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 manual:

---

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

---

# Chapter 1

## System Overview

---

MicroVAX 3800 and VAXserver 3800 systems house all system components in a BA213 enclosure. The enclosure is generally pedestal-mounted and houses the following:

- Central processing unit (CPU) module
- Memory modules
- Communications controllers
- Tape drive controller
- RF71 Integrated Storage Elements
- TK70 tape drive
- Power supplies

Up to three RF71 Integrated Storage Elements (ISEs) can be mounted inside the BA213 enclosure.

This chapter describes the MicroVAX 3800 and VAXserver 3800 system components and their functions. The front panel, the enclosure behind the panel, and the function of the system components are described in turn.

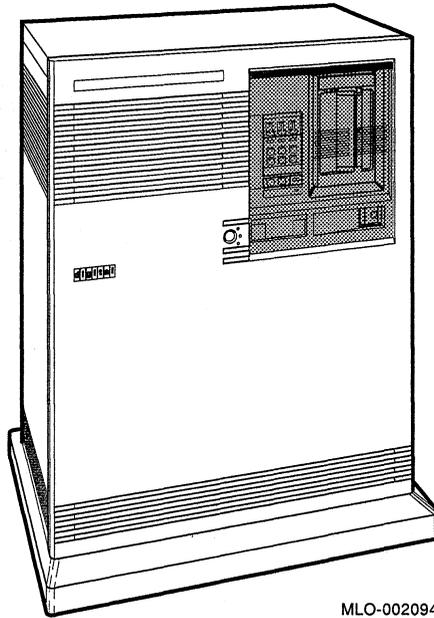
Chapters 2 and 3 describe how to use the system and options.

### 1.1 Front View and Physical Description

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.

**Figure 1-1: MicroVAX/VAXserver 3800 System**



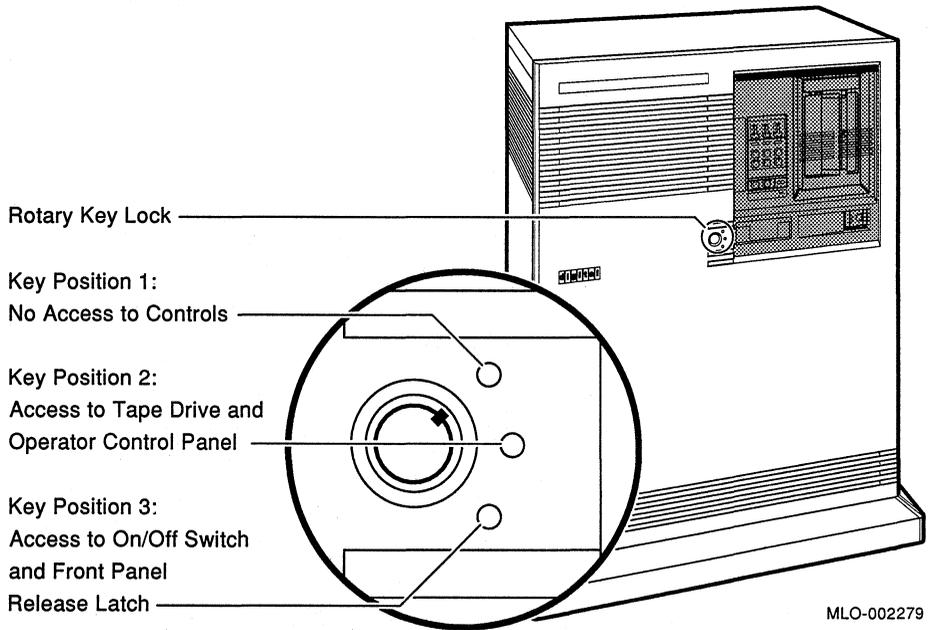
MLO-002094

The front panel has a sliding window controlled by a three-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.

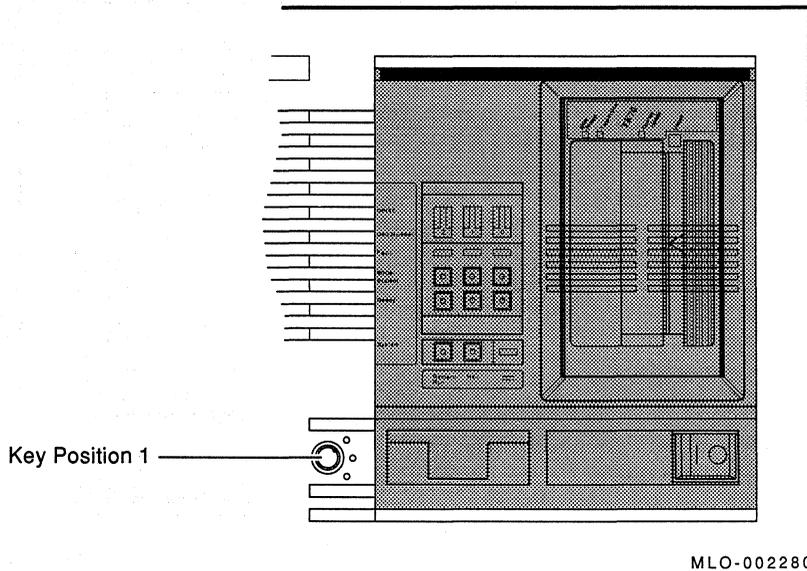
**Figure 1-2: Key Positions**



MLO-002279

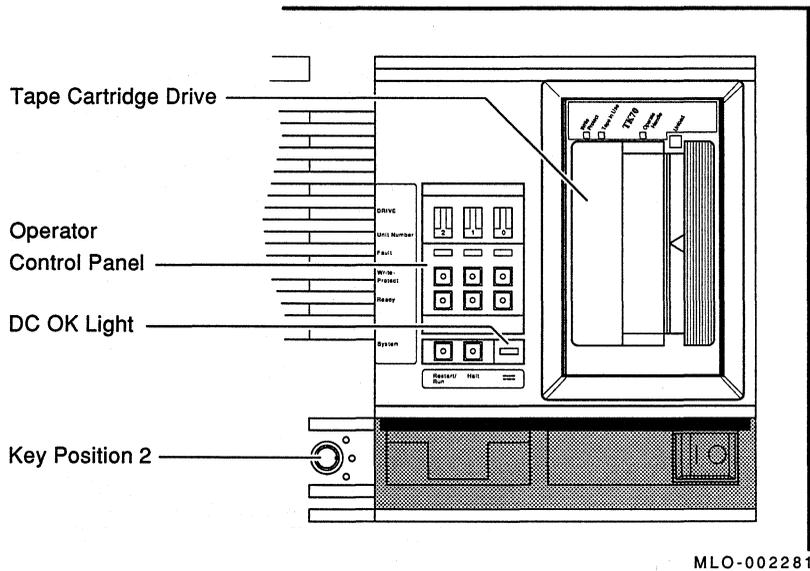
When the window is up and the key is turned to position 1, the window is locked in the closed position. You cannot use any controls when the window is closed, but indicator lights are visible through the window. Figure 1-3 shows the closed window and key position.

**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. With the window in this position you can access the tape drive and the controls on the Operator Control Panel (OCP). Chapter 3 has instructions for using these controls.

**Figure 1-4: Window Partially Open**

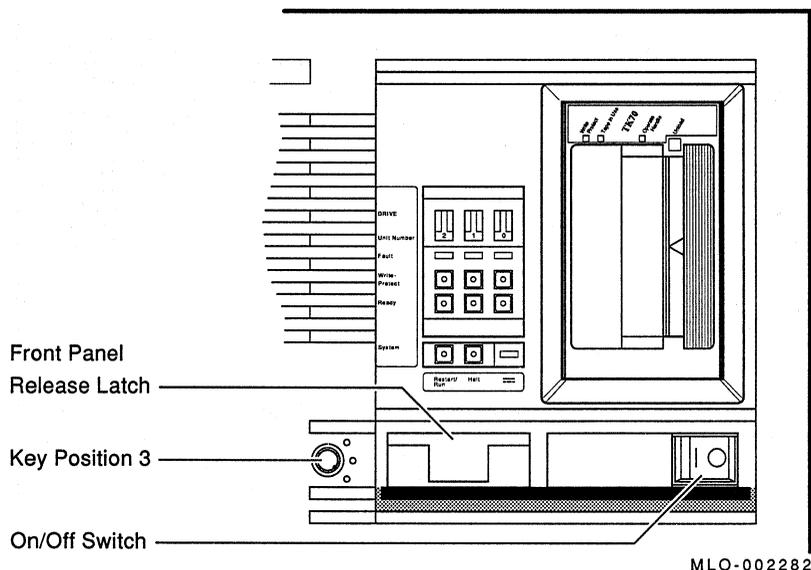


MLO-002281

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**



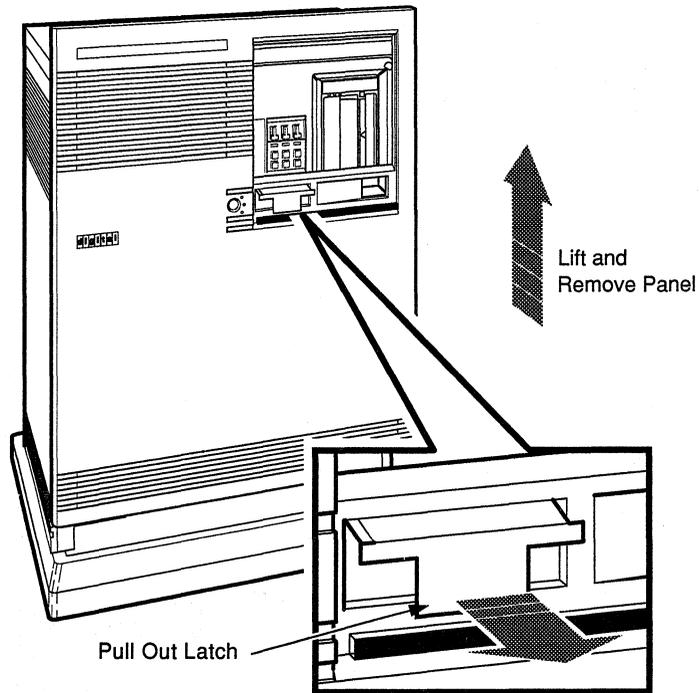
### Removing the Front Panel

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

**NOTE:** *The window on the front panel must be open to remove and attach the front panel.*

1. Insert the key into the lock on the front cover. Turn the key to the bottom position. See Figure 1-6.
2. Slide the window down.
3. Pull the latch to the out position.
4. Lift the front panel up and out.

**Figure 1-6: Removing the Front Panel**



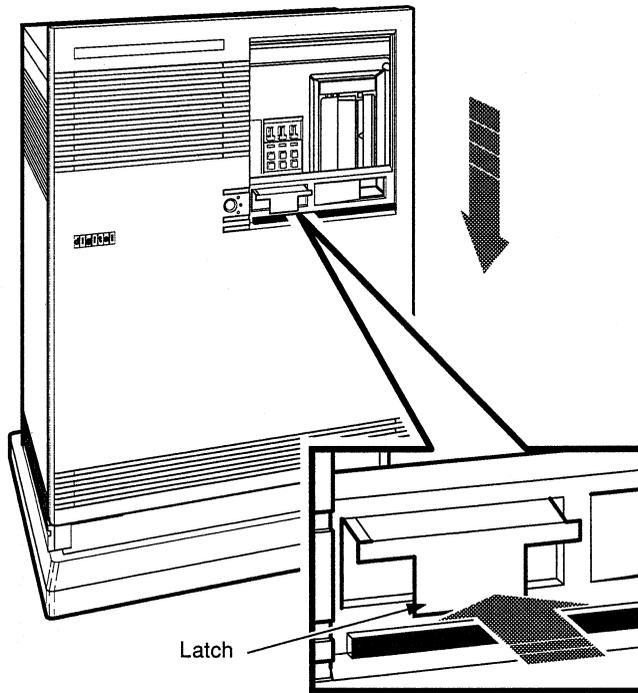
MLO-002283

### **Attaching the Front Panel**

**NOTE:** *The window on the front panel must be open to attach the front panel.*

1. Pull the latch on the front panel to the out position. See Figure 1-7.
2. Holding the panel with two hands, place it flush against the front of the unit, about an inch above the bottom.
3. Slide the panel down until it locks into place.
4. Secure the panel by pushing in the latch.

**Figure 1-7: Attaching the Front Panel**



MLO-002278

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

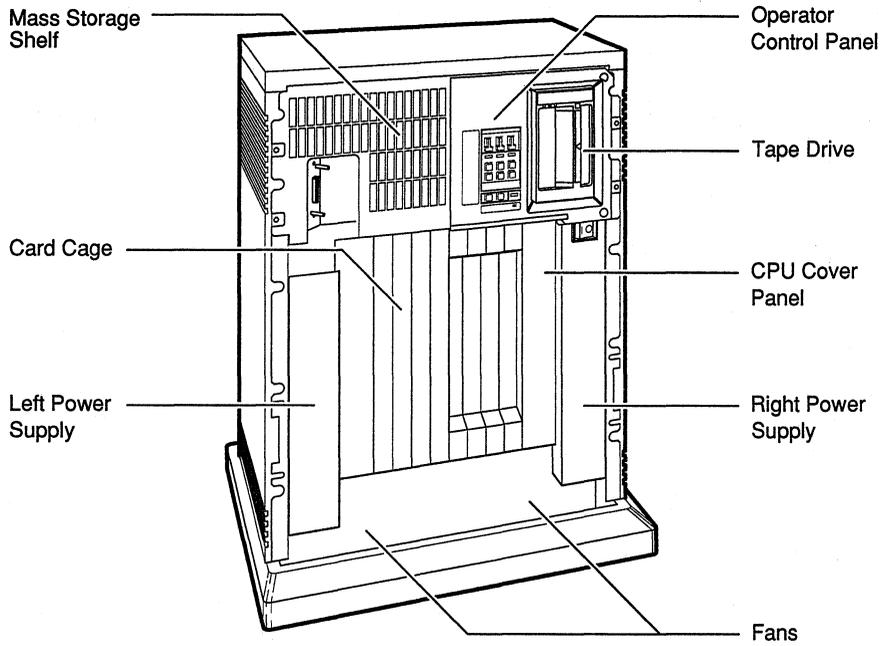
### **1.1.1 The BA213 Enclosure**

Removing the front panel enables you to see the components housed in the BA213 enclosure. Figure 1-8 shows a typical configuration.

The BA213 enclosure contains the following:

- Mass storage — TK70 tape drive and up to three RF71 Integrated Storage Elements (ISEs)
- Operator Control Panel (OCP)
- Card cage containing modules — CPU, memory, communications controllers, mass storage controllers
- Power supplies (2)
- Fans (2)

**Figure 1-8: Front View of the BA213 Enclosure**

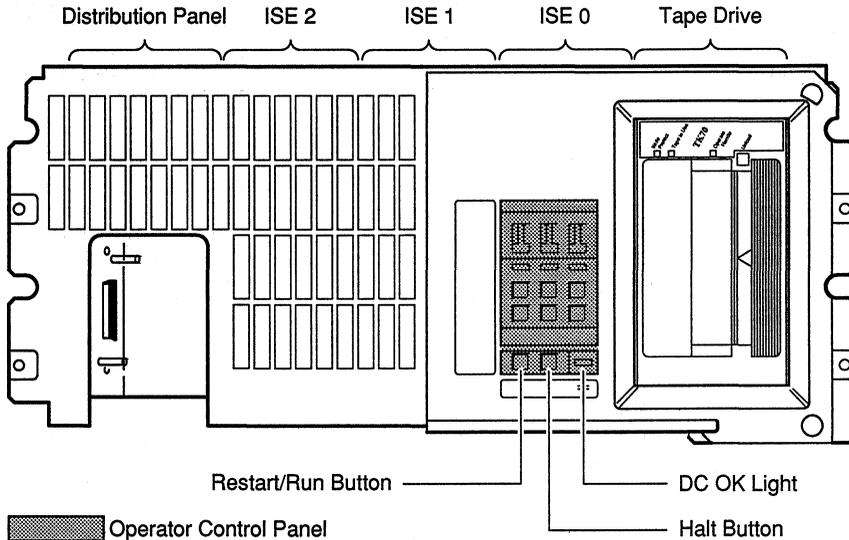


MLO-002284

### 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 up to three RF71 ISEs. The storage elements are behind the operator control panel, shown in Figure 1-9. Instructions for using each of these devices are in Chapter 3.

**Figure 1-9: Mass Storage Shelf**



The operator control panel has several buttons and indicators for each of the three possible ISEs. When you turn on your system, indicator lights come on for each ISE present. Chapter 3 describes how to operate the ISEs.

Below the controls for the ISEs is the system DC OK light. When lit, the green DC OK light indicates that the voltages are within the correct operating range. When not lit, 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 >>> displays 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 " to continue. Chapter 2 describes halting the system in more detail.

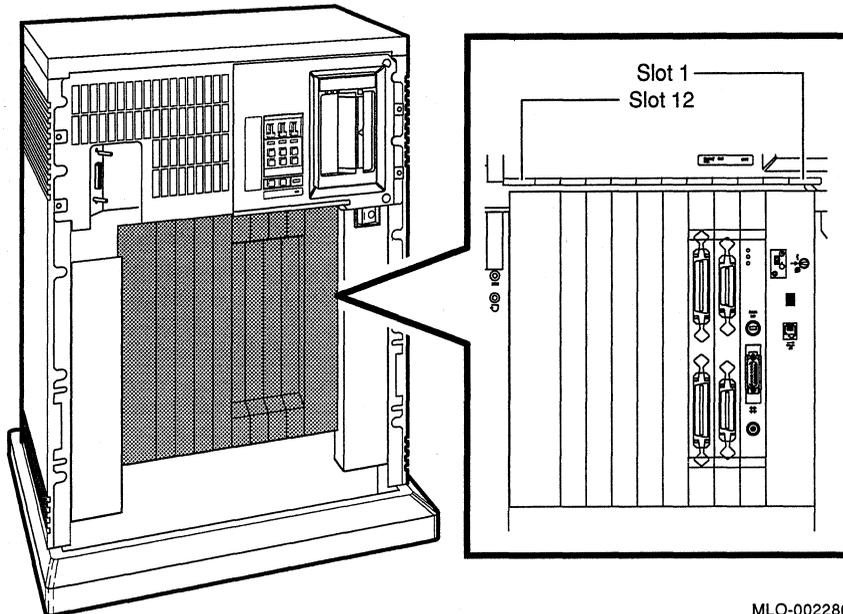
**CAUTION:** *Pressing in the Halt button halts the system regardless of the setting of the Break Enable/Disable switch on the CPU cover panel.*

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 1-10.

Figure 1-10: Card Cage



MLO-002286

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 three-fold purpose: to protect external devices from electrical interference generated by the system; to protect the system from electrical interference generated by external devices; and to maintain air flow integrity.

**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:*

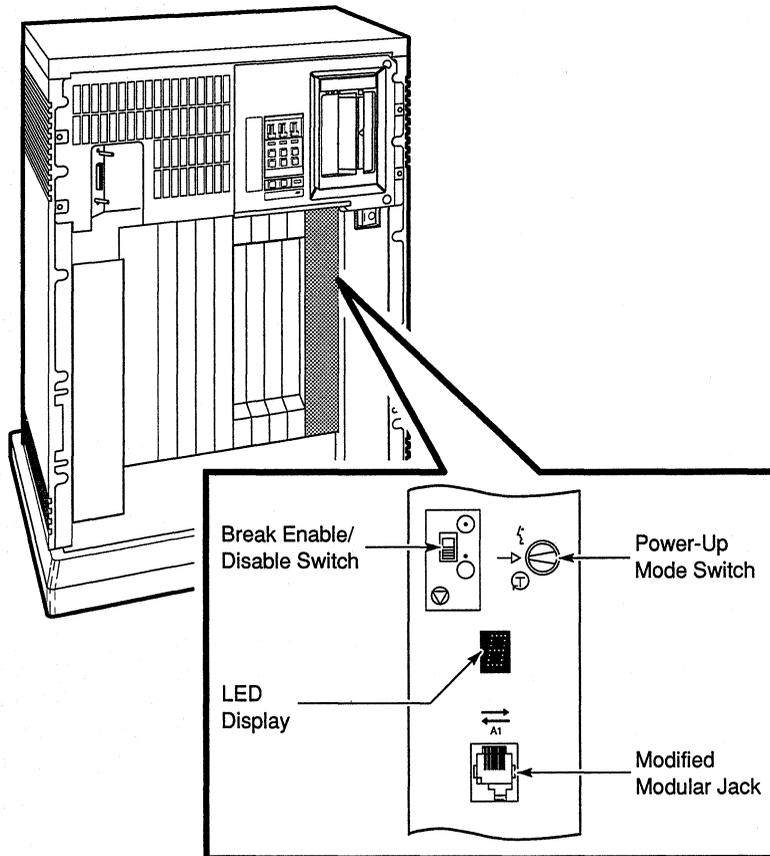
- *The system may overheat due to improper air circulation.*
- *The system will not comply with FCC and VDE requirements for shielding and may produce electrical interference that affects other equipment.*
- *The system is susceptible to electrical interference or damage from external sources.*

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 1-11 shows the CPU cover panel.

**Figure 1-11: CPU Cover Panel**



MLO-002287

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.

- **Power-Up Mode switch** — This three-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.

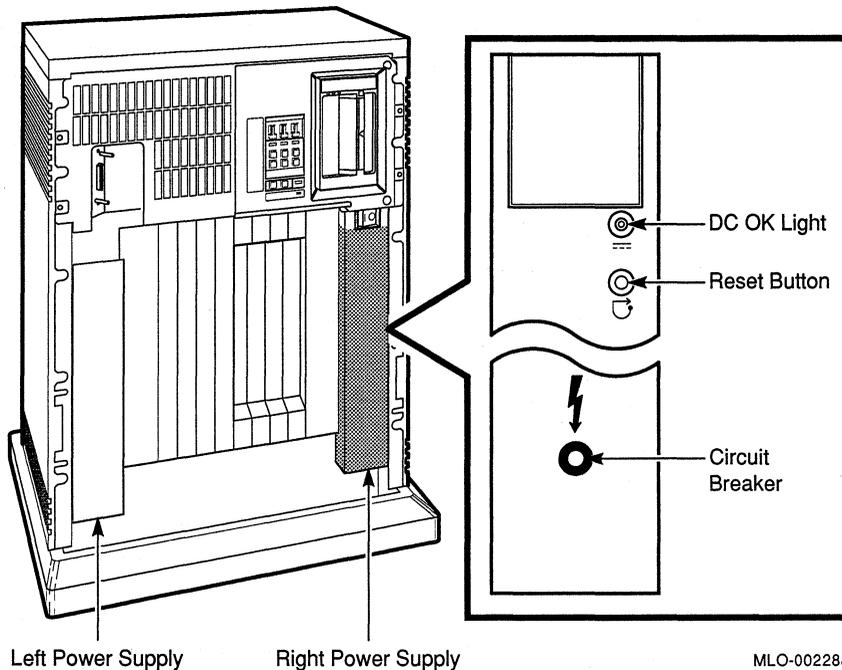
Loop Back Test Mode (in the bottom position, indicated by a T in a circle) causes the system to run loopback tests on the console serial line at power-up. This setting requires special loopback connectors and is for DIGITAL Field Service use only.

- The light-emitting diode (LED) display shows the testing sequence during power-up.
- **Modified modular jack (MMJ)** — This console terminal connector, labeled A1, provides the connection for the console terminal.

### **1.1.1.3 Power Supplies**

Your system has two power supplies. The right power supply provides power to modules installed in slots 1–6, one or two mass storage devices (the TK70 tape drive and one RF71 ISE), and the two fans. The left power supply provides power to modules installed in slots 7–12 and a second or third RF71 ISE, if present. Figure 1–12 shows the controls and indicators on each power supply.

**Figure 1-12: Power Supply**



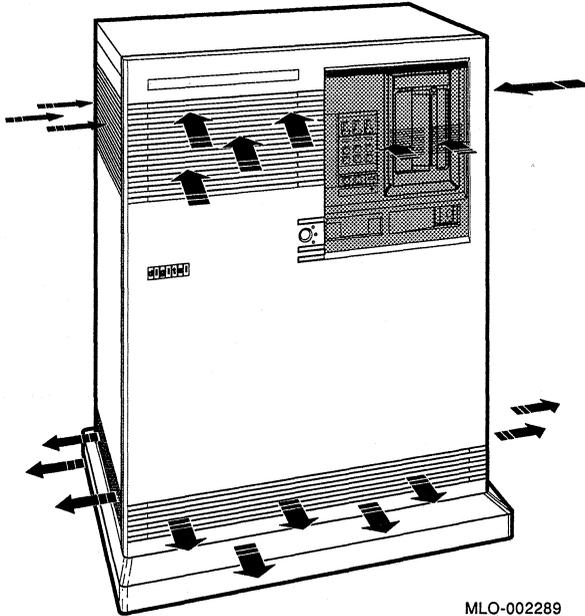
The controls and indicator lights function as follows:

- **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 in through the top of the enclosure, down through the card cage, 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. Figure 1-13 shows the air flow through the system enclosure.

**Figure 1-13: System Air Circulation**



## 1.2 Functional Description of Base System

Each MicroVAX 3800 and VAXserver 3800 system includes base system components common to all systems. Your system may have optional components as well. 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
- Network controller
- Mass storage devices and controllers

### **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 electrical 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 add 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 Network Controller**

Network communications controllers allow you to connect to an Ethernet network. 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. Your system comes with the DESQA

Ethernet controller, which allows you to connect to either standard Ethernet cable or to ThinWire Ethernet cable.

### **1.2.1.5 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 transfers it from the mass storage device into main memory. The two primary types of mass storage devices are the RF-series integrated storage elements and devices with removable media, such as tape cartridges, and compact disks.

#### **Integrated Storage Elements**

Up to three RF-series integrated storage elements are installed in your system. An integrated storage element is an intelligent storage device that contains its own controller.

#### **Devices with Removable Media**

Devices with removable media, such as tape cartridges are used as both input and output devices. In addition, compact optical disks are used as input devices when you install software or copy data to your system. Tape cartridges are the primary media for loading software. You use tape cartridges and tapes 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 are commonly used to archive data.

#### **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 the TK70 tape drive is the TQK70. The controller for each RF71 ISE is built-in to the storage element. The CPU communicates with the ISEs through an adapter module, the KFQSA. The TQK70 and the KFQSA modules are installed to the left of other modules in the card cage.

### **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 ISEs) and the following kinds of options:

- Mass storage subsystems
- Communications controllers

- Real-time controllers
- Printer interfaces

### **1.2.2.1 Mass Storage Subsystems**

Several optional mass storage subsystems are available for MicroVAX and VAXserver 3800 systems. Such subsystems include RRD40/50 Digital Disk Subsystems, the RV20 Optical Disk Subsystem, and TS05 and TU81 tape drives. If your system includes an optional mass storage subsystem, refer to the user's guide or owner's manual for that subsystem for instructions on how to operate the device.

### **1.2.2.2 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. At the receiving end, another modem converts the analog signals 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.

### 1.2.2.3 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.

### 1.2.2.4 Printer Interfaces

Some printers require specific interfaces to communicate with the system. For example, the LG01, LG02, LP25—LP29 printers require the LPV11—SA interface.

### 1.2.2.5 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 3800/3900 VAXserver 3800/3900 Technical Information* describes the options currently available for MicroVAX and VAXserver 3800 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.*

*If there is a TK tape drive in each system, a DIGITAL service representative must set the unit number on one of the TQK controllers to 1. This will provide each tape drive with a unique device name.*

A dual-host MicroVAX system consists of two MicroVAX systems in the same VAXcluster sharing their ISEs via a Digital Storage System Interconnect (DSSI) bus. Each system can have direct access to any of the ISEs in either system; this can include a shared common system disk.

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 systems. The system disk physically resides in one enclosure, however, both systems have equal access to the system disk and to any other DSSI mass storage device in either enclosure.

A Digital Storage System Interconnect (DSSI) storage element, such as the RF71, has a built-in multihost capability that allows it to connect to more than one DSSI host adapter. Since the DSSI host adapter, the KFQSA in this case, is located in the card cage of the MicroVAX 3800 system, two MicroVAX 3800 systems can be connected to the same DSSI bus.

**NOTE:** *Systems that use the KFQSA host adapter module can only form a dual-host configuration with other KFQSA-based systems. For example, a MicroVAX 3800 (host adapter is the KFQSA module) cannot form a dual-host configuration with a MicroVAX 3400 (host adapter is on the KA640 CPU module).*

Using an external DSSI cable, any two KFQSA-based systems (MicroVAX 3800, VAXserver 3800, and those MicroVAX/VAXserver 3500 systems with the KFQSA module) can be connected to form a dual-host configuration. Figure 1-14 shows a possible dual-host configuration.

**NOTE:** *Dual-host capability is only supported under VMS (version 5.1-1 and later) when the two systems are configured into the same Local Area VAXcluster (LAVC).*

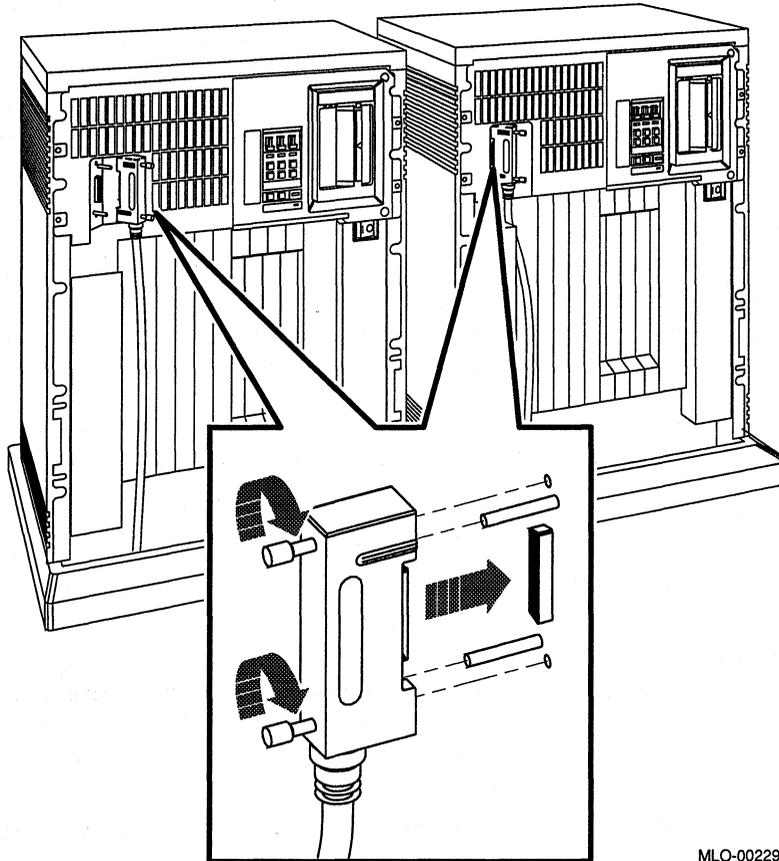
The benefits of a KFQSA-based dual-host configuration are:

- VAXcluster features such as shared data across systems and satellite nodes.
- Higher system availability — If one of the KFQSA-based systems is unavailable, for example, due to a system malfunction, the satellites booted through it are able to continue operating through the other KFQSA-based system. This process is described in detail in the following paragraphs.

If one of the KFQSA-based systems fails, all satellite nodes booted through that system lose connections to the system disk. Each satellite node knows, however, that the system disk is also available through a second path. The satellite nodes establish a new connection through the other system and continue operation.

To increase system availability, more redundancy may be added to 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 KFQSA-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.

**Figure 1-14: KFQSA-Based Dual-Host Configuration**



MLO-002290

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, refer to the VMS VAXcluster manual that is part of the VMS documentation. If this manual is not available, contact your DIGITAL representative.
2. Reprogram the KFQSA configuration table and set each ISE's parameter to a nonzero allocation class to match that of the two host systems. Consult your DIGITAL service representative or follow the instructions provided in Appendix B.

3. Change the Unit I.D. plugs that identify the ISEs to the system. (Supplemental Unit I.D. plugs are included with your system.) When two systems are connected together, one system's RF71s must be renumbered, using different Unit I.D. plugs. (Each ISE must have its own node number. The node numbers start at 0 and may continue through 5. The ISEs should be numbered consecutively without skipping a node number.) For instructions on how to change a Unit I.D. plug, refer to Appendix B and the section on RF71 ISEs in Chapter 3 of this manual.

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

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

**NOTE:** *If you have ordered a tapeless MicroVAX or VAXserver 3800 system, an external DSSI cable is included with your system shipment.*

*The power should be off when you attach the DSSI cable.*

To attach the DSSI cable, feed the ends of the cables under the hosts from the back or side. Plug the cable into the DSSI ports by fitting the cable connectors over the two pins on each DSSI port as shown in Figure 1-14.

First tighten the connections by hand, then use the screwdriver shipped with your system to firmly secure the connection.

**NOTE:** *If you need to remove the DSSI cable, loosen the screws at the connector, and carefully remove the cable by pulling the cable straight out by the two screw heads simultaneously.*

## Chapter 2

# Operating the System

---

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

### 2.1 Before You Operate the System

This chapter assumes that your system has been properly installed. 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 on the CPU cover panel.

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 Break Enable/Disable switch on the CPU cover panel is set to disable (down). Once system software is installed, DIGITAL recommends you run the system with halt disabled to prevent the user from inadvertently halting the system by pressing **Break** on the console terminal. Halting the system causes all activity to stop. With halt disabled, the system automatically boots system software when powered up.
- The Power-Up Mode switch on the CPU cover panel is set to Run (indicated by an arrow).
- The baud rate switch on the CPU cover panel is set to 9600.

- The Write-Protect button for each RF71 ISE is set to out (not lit). This setting allows system software to write to the storage element.
- The Ready button for each RF71 ISE is set to out (glows green when the storage element is not being used). This setting makes the storage element available for use.
- The Halt button on the OCP is set to out (not lit).

## 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). This allows you to halt the system by pressing **[Break]** on the console terminal.
- If you want data on a particular ISE to be write-protected, you must set the Write-Protect switch to in (glows).

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

- If you want to use the Language Selection Menu to select a new language for the console program, before you turn on your system, set the Power-Up Mode switch to Language Inquiry Mode. A human profile indicates the language inquiry mode. When you turn on your system, a Language Selection Menu appears, as shown in Figure 2-1.

## Figure 2-1: Language Selection Menu

KA655-A V5.3 VMB 2.7

- 1) Dansk
  - 2) Deutsch (Deutschland/Osterreich)
  - 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. Save the language you have selected by rotating the Power-Up Mode switch to Run Mode, indicated by an arrow.

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.

**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.*

In addition to the Language Selection Menu, the system may issue a list of bootable devices and prompt you to select a device from the list. If this happens, refer to Section 2.4.1 for more information.

If your system has been powered off for more than 10 days, the battery unit that saves the system clock and the language selection may have run down. The Language Selection Menu will automatically display when you power up your system, regardless of the Power-Up Mode switch setting. Once the system is booted, reset the system clock, as described in your system software manual.

## 2.3 Turning On the System

Once you have set the switches correctly, you are ready to turn on the system. Use the following procedure:

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

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

**Table 2-1: Normal Power-On Indications**

<b>Indicator</b>	<b>Normal Indication</b>
On/Off switch	Glow amber
System DC OK light	Glow green
RF71 Ready lights	Glow green steadily within 20 seconds
TK70 tape drive indicator lights	Orange, yellow, and green lights glow during self-tests. The green light remains on.
TK50 tape drive Load/Unload button	Glow red for 2 seconds and then goes out
TK50 tape drive indicator light	Glow green when red light goes out

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. Your console terminal first displays a line of information identifying the CPU, the version of the firmware, and the version of VMB—the primary bootstrap program. In the sample screen shown in Figure 2-2, the CPU is identified as a KA655-A, the version of the firmware is V5.3, and the version of VMB is 2.7. 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 several lines 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

```
KA655-A V5.3 VMB 2.7

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

?30 2 04 FF 00 0000

P1=00000001 P2=9F600001 P3=00000000 P4=000F0000 P5=06060606
P6=00020000 P7=00000064 P8=A002000A P9=20051A6F P10=20051D98
r0=9F600001 r1=00002000 r2=00000002 r3=00000000 r4=FFFFFFFE
r5=200519B2 r6=00000001 r7=20080144 r8=00000000 ERF=80000180

Normal operation not possible.

>>>
```

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

## 2.4 Booting the System

MicroVAX and VAXserver 3800 systems boot in one of two ways. You can configure the system to autoboot on power-up 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.

Depending on whether or not a boot device has been selected, the system loads system software or prompts you to select a boot device.

#### Loading System Software (When a Boot Device Has Been Selected)

When a boot device has been selected, the system identifies the boot device and the number "2" displays on the screen. As the system begins booting, the countdown continues from 1 to 0.

Figure 2-3 shows a successful power-on and automatic boot when DUA0 has been selected as the boot device.

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

KA655-A V5.3, VMB 2.7

Performing normal system tests.

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 DUA0)

2..

-DUA0

1..0..

### Loading System Software (If You Have Not Selected a Boot Device)

If you have not selected a boot device when the Break Enable/Disable switch is set to disable, the system runs self-tests and, on completion, issues a list of bootable devices. You are prompted to select a boot device from the list, as shown in Figure 2-4.

### Figure 2-4: Successful Power-On to List of Bootable Devices

KA655-A V5.3 VMB 2.7

Performing normal system tests.

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:

-DUA0 (RF71))

-MUA0 (TK70)

-XQA0 (08-00-2B-03-50-5C)

-DEVICE? [XQA0]:

To select a boot device, type in a device name at the system prompt. When you have selected a boot device, the system boots from that device. Figure 2-3 shows a successful power-on when DUA0 has been selected as the boot device. The next time the system is turned on, it will autoboot from the device you have just selected.

**NOTE:** *If you do not type a device name within thirty seconds, the system attempts to boot from the Ethernet device, XQA0.*

### Changing the Boot Device

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

- 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.)
- Change the boot device by using the SET BOOT command.

### Using the SET BOOT Command

To direct the system to boot automatically from a specific device or to change the setting of the default boot device, put the system into console mode and at the >>> prompt, enter "SET BOOT *device-name*". For example "SET BOOT XQA0" sets the system default boot device to be the 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 device from which to boot the system, refer to Table 2-2.

**NOTE:** *Selecting a default boot device other than the Ethernet device, XQA0, is not appropriate for diskless and tapeless systems which must boot software over the network.*

**Table 2-2: Device Names**

Controller Type	Controller	Device Name
MSCP (Disk)	KFQSA	DUmn <sup>1</sup>
MSCP (Tape)	TQK70	MUmn
PROM	MRV11	PRAn
Ethernet adapter	DESQA	XQAn

<sup>1</sup>m = MSCP controller designator (A = first, B = second, etc.)

n = unit number

When under operating system control, DUmn devices are recognized as DImn devices.

For more information about the MicroVAX 3800 system's booting process, refer to *MicroVAX 3800/3900 VAXserver 3800/3900 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.

**Figure 2-5: Successful Power-On to Console Mode**

```
KA655-A V5.3, VMB 2.7
```

```
Performing normal system tests.
```

```
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

To load system software from console mode, enter the BOOT command, "BOOT *device name*". 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 from which to boot the system, 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 manuals and application manuals for more specific instructions on using the system.

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

**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.

**CAUTION:** *If you are using a diskless system that is part of a VAXcluster, do not turn off, halt, or restart the system without consulting the cluster manager. Performing any of these activities will interrupt the processes of the entire cluster.*

## 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.
- If the Break Enable/Disable switch on the CPU cover panel is set to enable (indicated by the dot inside the circle) you can press the **Break** key on the console terminal. If the Break Enable/Disable switch is not set to enable and you wish to halt the system by pressing **Break**, change the setting of the Break Enable/Disable switch from disable to enable.

When the console mode prompt >>> displays on your screen, the system is halted.

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

## 2.8 Restarting the System

**NOTE:** *Restarting the system aborts all current and pending operations. To prevent loss of data, warn all users to log off prior to restarting the system.*

Restarting returns the system to a power-on condition. All current and pending operations are aborted and the usual power-on tests are run.

You restart the system by pressing in the Restart button on the Operator Control Panel.

## Chapter 3

# Operating 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 3800 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 included with MicroVAX and VAXserver 3800 systems:

- RF71 Integrated Storage Elements (ISE)
- TK70 tape drive

**NOTE:** *In addition, the RV20 Optical Disk Subsystem, RRD40/50 Digital Disk Subsystems, and TSV05 and TU81 tape drives can be attached to the MicroVAX 3800 or VAXserver 3800. If your system contains one of these options, refer to the user's guide or owner's manual for instructions on how to operate the device.*

This chapter describes how to use the controls for the RF71 ISEs and the TK70 tape drive. In the case of the tape drive, it also describes how to insert and remove the tape cartridge. 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 RF71 Integrated Storage Elements**

Your system may have up to three RF71 ISEs. When your system has multiple ISEs, DIGITAL recommends that you separate them according to function. For example, if your system has two ISEs, you may want to use them as follows:

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

The storage capacities and other specifications for the RF71 ISE are listed in *MicroVAX 3800/3900 VAXserver 3800/3900 Technical Information*.

#### **RF71 Controls and Indicators**

Controls for the RF71 ISEs are located on the Operator Control Panel (OCP) behind the sliding window on the front of the system. To access the controls on the OCP, you must turn the key to position 2 or 3 and slide down the window. Figure 3-1 shows the OCP.

# **RF71 Integrated Storage Element Addenda to MicroVAX 3400/3500 VAXserver 3400/3500 Customer Hardware Information**

Order Number EK-305AA-AD-001

This document provides information for operating the RF71 Integrated Storage Element (ISE).

The information is in two parts: *Addendum to Operation*, which describes the controls and indicators for the RF71 ISE, and *Addendum to Technical Information*, which lists the specifications for the RF71 ISE.

Please add both parts to your MicroVAX *Customer Hardware Information* binder.

**digital equipment corporation  
maynard, massachusetts**

---

**March 1989**

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation.

Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

The software, if any, described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license. No responsibility is assumed for the use or reliability of software or equipment that is not supplied by Digital Equipment Corporation or its affiliated companies.

---

© Digital Equipment Corporation 1989. All rights reserved.

Printed in U.S.A.

---

The **READER'S COMMENTS** form on the last page of this document requests the user's critical evaluation to assist in preparing future documentation.

The following are trademarks of Digital Equipment Corporation:

DEC	MicroVAX	UNIBUS
DECmate	MicroVMS	VAX
DECnet	PDP	VAXBI
DECUS	P/OS	VAXELN
DECwriter	Professional	VAXcluster
DELNI	Q-bus	VAXstation
DEQNA	Rainbow	VMS
DESTA	RSTS	VT
DIBOL	RSX	Work Processor
DSSI	RT	
MASSBUS	ThinWire	
MicroPDP-11	ULTRIX	

ML-S1186

**FCC NOTICE:** The equipment described in this manual generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense may be required to take measures to correct the interference.

This document was prepared using VAX DOCUMENT, Version 1.1.

---

# **Addendum to Operation**

This addendum describes the controls and indicators for the RF71 Integrated Storage Element (ISE).

The RF71 Integrated Storage Element (ISE) is an intelligent fixed-disk storage device that handles device operations internally rather than through a disk controller. It has a formatted storage capacity of 400 Mbytes and uses the Digital Storage System Interconnect (DSSI) bus and interface. Your MicroVAX system can contain up to three RF71 ISEs.

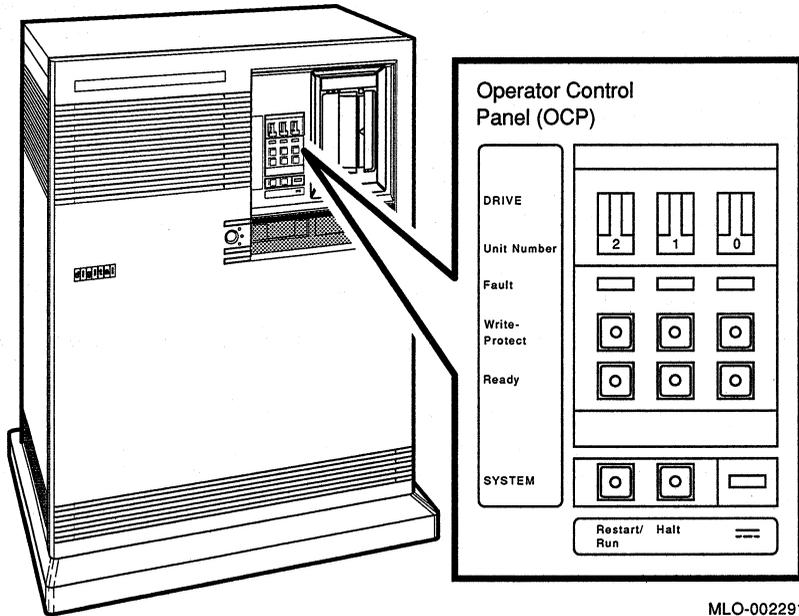
When your system has multiple ISEs, DIGITAL recommends that you separate them according to function. For example, if your system has two ISEs, you may want to use them as follows.

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

Specifications for RF71 ISEs are listed in the attached *Addendum to Technical Information*.

Controls for the RF71 ISEs are located on the Operator Control Panel (OCP) behind the sliding window on the front of your system. To access the OCP, turn the key to position 2 or 3 and slide down the window. Figure 1 shows the OCP.

**Figure 1: Operator Control Panel**



MLO-002291

The OCP has the following controls and indicators for each of the three possible RF71 ISEs.

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

Unit I.D. plugs identify the unit numbers of the RF71 ISEs in your system. The ISEs are numbered at the factory or by your DIGITAL service representative during installation.

**NOTE:** *Reassigning a Unit I.D. plug on systems using the KFQSA storage adapter may require reprogramming of that adapter by a DIGITAL service representative.*

Table 1 lists the functions of the controls and indicators for RF71 ISEs.

**Table 1: Controls and Indicators**

<b>Control</b>	<b>Condition</b>	<b>Function</b>
Fault	Lit	Indicates an error condition within the ISE.
	Not lit	Indicates an error-free condition within the ISE.
Write-Protect	In (lit)	ISE is write-protected. Prevents system software from writing on the ISE.
	Out (not lit)	ISE is not write-protected. Normal position for software operation. System software is free to read or write information on the ISE.
Ready	Out	ISE is on-line. When the ISE is available for use, the green light in the button is on. When the ISE is being used, the green light is off.
	In	ISE is off-line and cannot be accessed. The green light in the button is off.

The Write-Protect button controls whether the system can write data to the RF71 ISE. The system can read from the ISE regardless of the setting of the Write-Protect button. When the Write-Protect button is out (not lit), the system can write to the ISE. Your system disk (the ISE containing system software) and ISEs containing work areas for users should be write-enabled, the normal operating setting.

If you want to write-protect an RF71 ISE containing data that you do not want changed or accidentally erased, set the Write-Protect button to in (lit).

# **Addendum to Technical Information**

---

**This addendum lists the specifications for the RF71 Integrated Storage Element (ISE).**

The RF71 Integrated Storage Element (ISE) is an intelligent fixed-disk storage device that handles device operations internally rather than through a disk controller. It has a formatted storage capacity of 400 Mbytes and uses the Digital Storage System Interconnect (DSSI) bus and interface.

---

### Storage Capacity

---

User capacity	400 Mbytes 781,440 blocks
---------------	------------------------------

---

### Performance

---

Average random seek time	19.20 milliseconds
Average rotational latency	8.33 milliseconds
Average access time	34.2 milliseconds
Peak transfer rate	4.0 Mbits/second

---

### Physical Specifications

---

Height	13.3 cm (5.25 in)
Width	14.60 cm (5.75 in)
Depth	20.75 cm (8.17 in)
Weight	4.09 kg (9.0 lb)

---

### Configuration Information

---

Power requirements	+5 Vdc, 1.25 A +12 Vdc, 1.64 A
Power consumption	25.93 W

---

### Operating System Support

---

VMS	Version 5.1 and later
VMS dual host	Version 5.1-1 and later
ULTRIX-32	Version 3.0 and later
VAXELN	Version 3.2 and later

---

### Diagnostic Support

---

MicroVAX Diagnostic Monitor	Version 3.01 and later
Self-test	Yes

---

---

**Related Documentation**

---

EK-RF71D-IM  
EK-RF71D-UG

RF71 Integrated Storage Element Installation Manual  
RF71 Integrated Storage Element User's Guide

---

**Ordering Information**

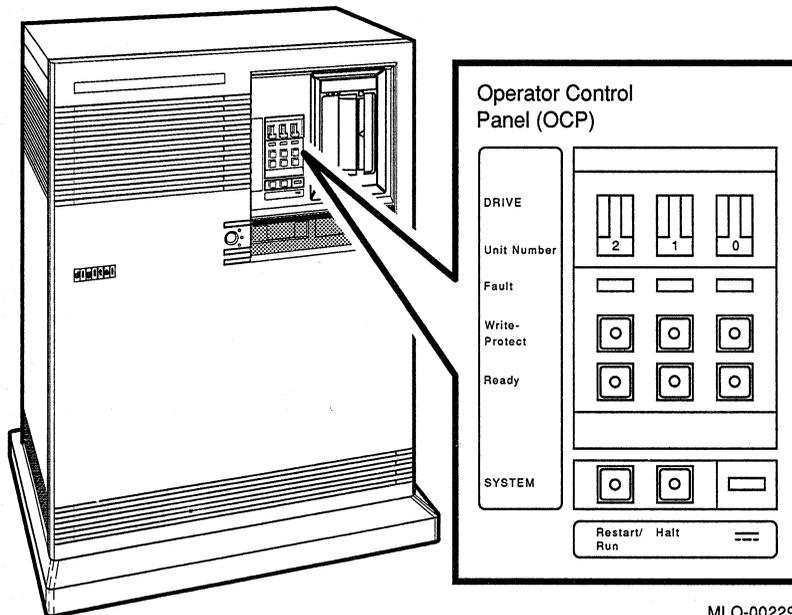
---

RF71E-SA  
RF71E-SF

Factory-installed kit  
Field-installed kit

---

**Figure 3-1: Operator Control Panel**



The OCP has controls and indicators for three storage elements. Each ISE has the following controls and indicators arranged in columns 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 ISEs to the system, as well as the node number. The factory configuration identifies the rightmost ISE as ISE 0, the center ISE as Disk 1, and the leftmost ISE as Disk 2.

Table 3-1 lists RF71 controls and indicators.

**Table 3-1: RF71 Controls and Indicators**

<b>Control</b>	<b>Position</b>	<b>Function</b>
Fault	Lit	Indicates an error condition within the storage element.
	Not lit	Indicates an error-free condition within the storage element.
Write-Protect	In (lit)	Storage element is write-protected. Prevents system software from writing to the storage element.
	Out (not lit)	Storage element is not write-protected. Normal position for software operation. System software is free to read from or write to the storage element.
Ready	Out	The storage element is on-line. When the storage element is available for use, the green indicator light in the switch is on. When the storage element is being used, the green indicator light is off.
	In	The storage element is off-line 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 ISE. The system can read from the ISE regardless of the setting of the Write-Protect button. When the Write-Protect button is out (not lit), the system can write to the ISE. Your system disk (the ISE containing system software) and ISEs containing work areas for users should be write-enabled, the normal operating setting.

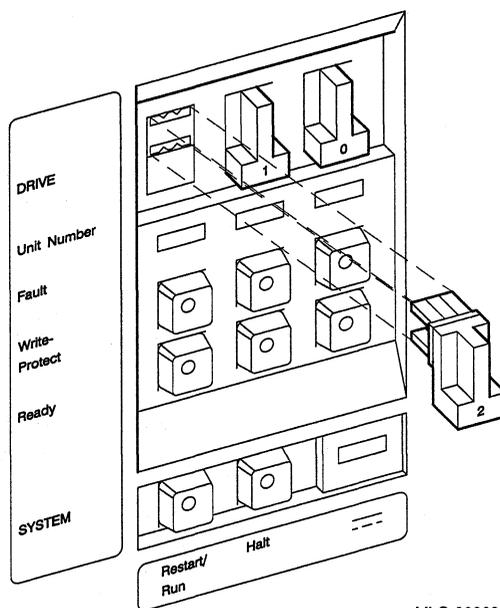
If you want to write-protect an ISE containing sensitive data that you do not want changed or accidentally erased, set the Write-Protect button to in (lit).

### **Changing the Unit I.D. Plugs**

Spare Unit I.D. plugs are supplied with your system. Use the spare plugs to renumber your ISEs if you expand your system with an R215F or B213F expander, or if you create a dual-host configuration.

The Unit I.D. plugs have prongs on the back that indicate the unit number of the ISE. To remove an I.D. plug, grasp it firmly and pull straight out. To insert an I.D. plug, align the two center prongs with the two center slots and press the plug into the slots. See Figure 3-2.

**Figure 3-2: Inserting and Removing RF71 Unit I.D. Plugs**



MLO-000686

**NOTE:** *If you renumber the ISEs, you must reprogram the KFQSA module. Call your DIGITAL service representative or follow the instructions in Appendix B to reprogram the KFQSA configuration table.*

Use the rules below for renumbering your storage elements:

- Do not duplicate unit numbers for your storage elements. You can only have one storage element identified as drive 1, one storage element as 2, and so on.
- An expanded MicroVAX or VAXserver 3800 system can have up to six RF-series Integrated Storage Elements. By convention, the ISEs are numbered in increasing order from right to left.
- Use a blank Unit I.D. plug where no ISE is present.

### 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 tell you the status of the drive.

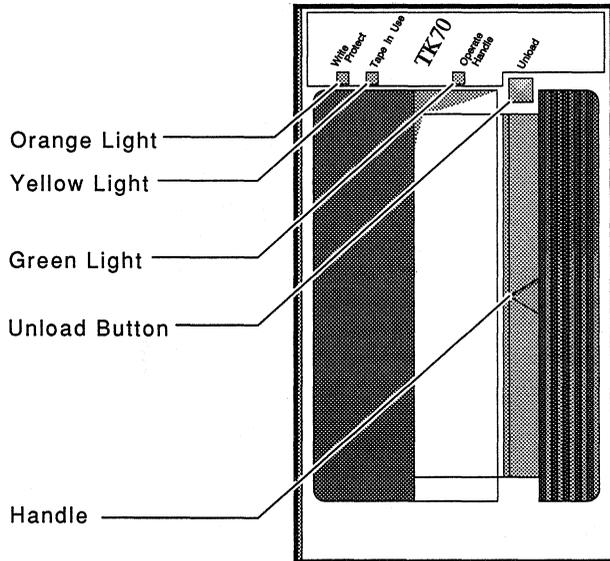
- **Orange light (Write-Protected):** A steady orange light indicates that the cartridge is write-protected.
- **Yellow light (Tape in Use):** A steady yellow light indicates that the tape is loaded. A blinking yellow light indicates that the tape is in motion.
- **Green light (Operate Handle):** A steady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



MLO-002292

### 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.

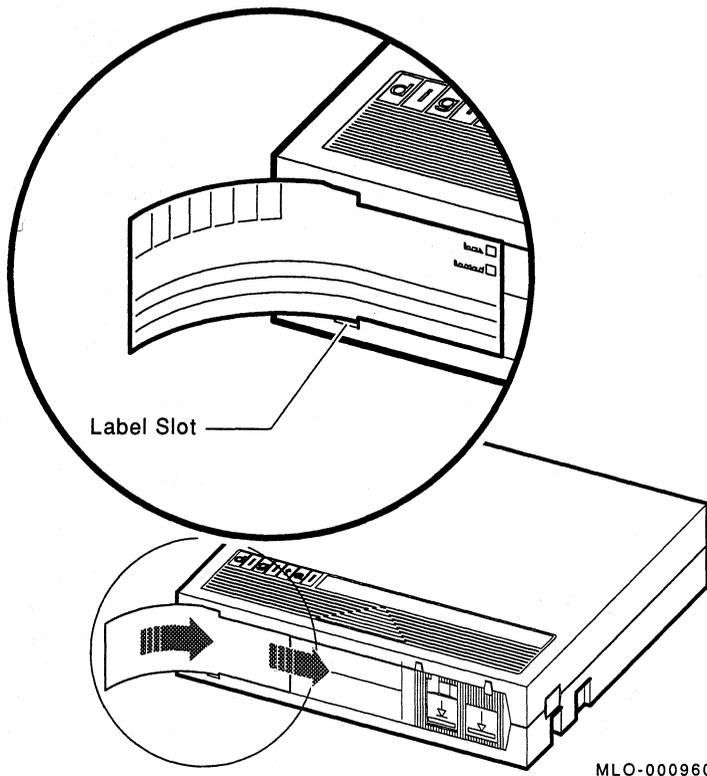
Once the cartridge is loaded, you cannot remove it without rewinding and uncoupling the leaders, a process called unloading. Even if you have not used the tape, you must unload it before you can remove the cartridge.

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.

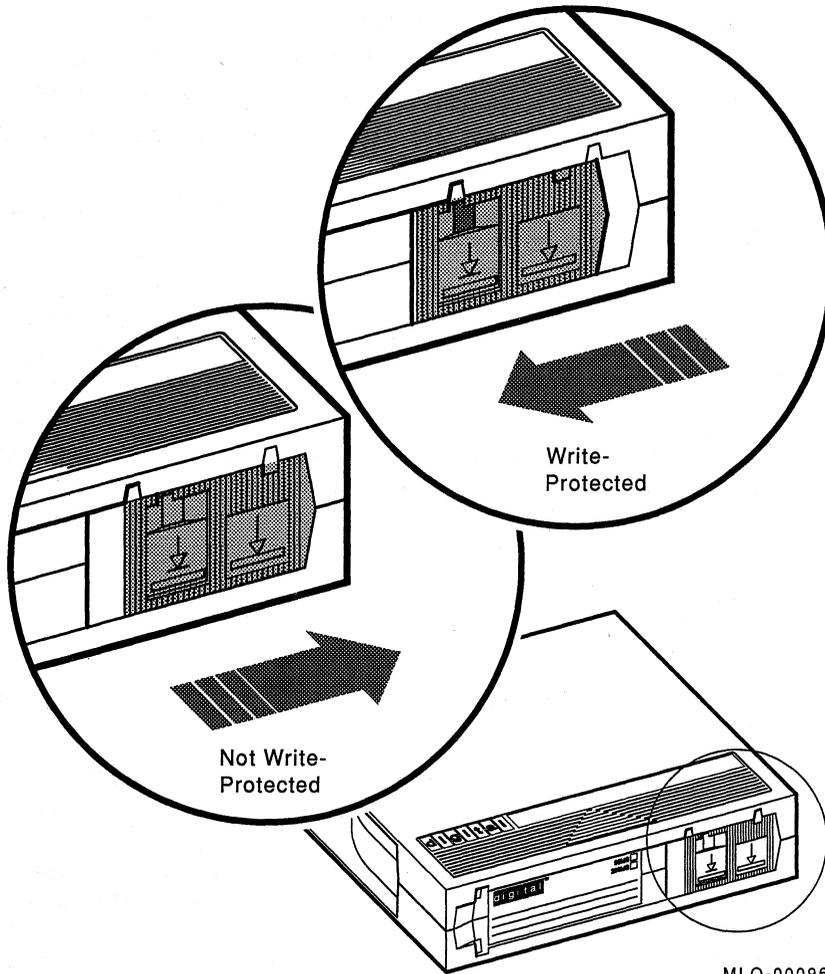
When you insert a write-protected cartridge into the drive, the orange indicator light comes on. The system recognizes the tape as being write-protected under any one of the following conditions:

- 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.

**Figure 3-5: Tape Cartridge Write-Protect Switch**



MLO-000961

- 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 generates 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.

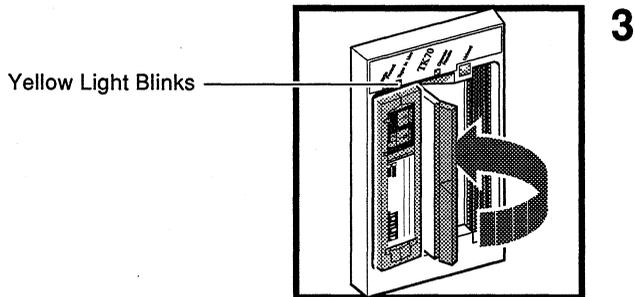
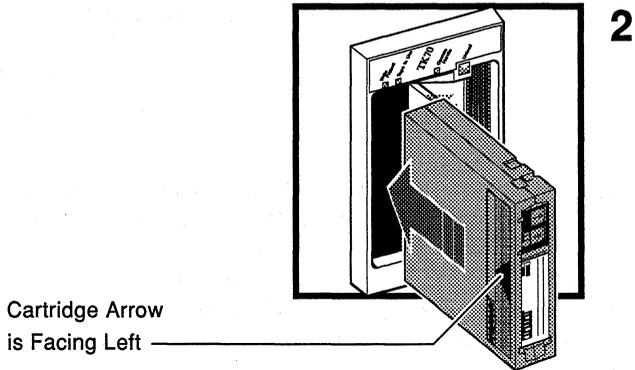
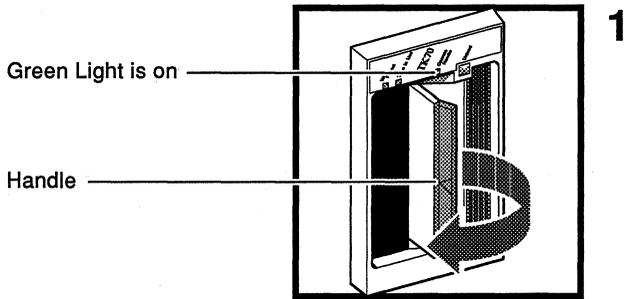
The green light goes off and the yellow light blinks as the tape loads. When the yellow light glows steadily, the tape is ready to use.

**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.*

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.*

**Figure 3-6: Inserting a Tape Cartridge**



MLO-002459

### 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.

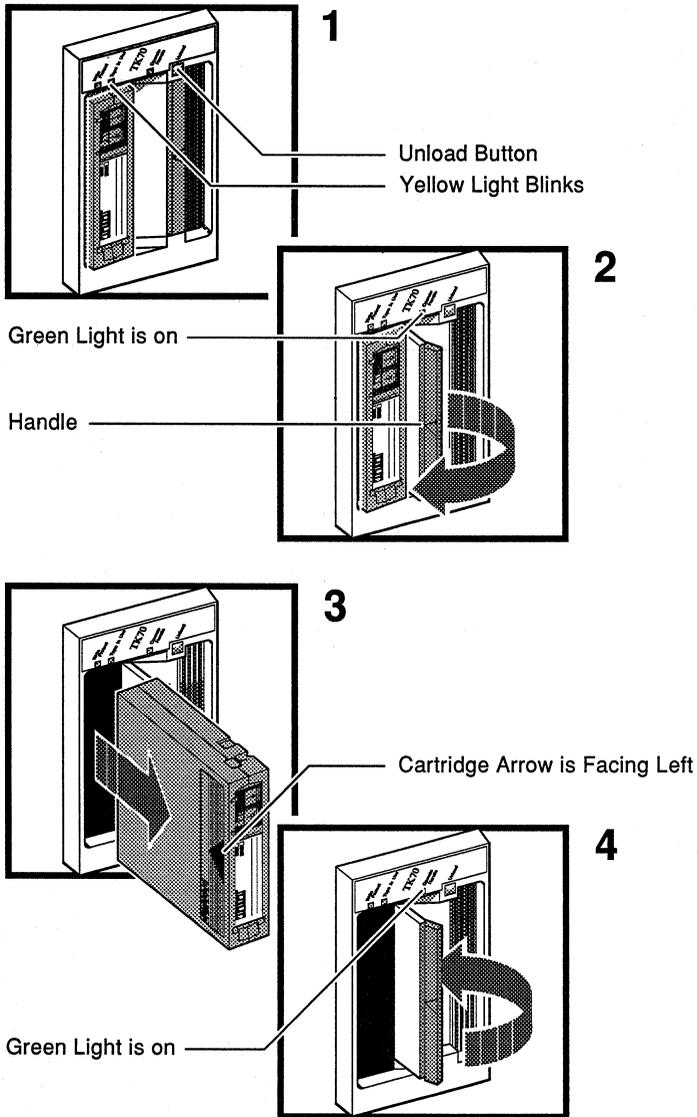
**CAUTION:** *Move the handle only when the yellow indicator light is off and the green indicator light is on. Moving the handle while the yellow light is blinking could damage the drive.*

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**



MLO-002460

### 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 includes 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 RRD40/50 Digital Disk Subsystem**

If your system includes an RRD40/50 Digital Disk Subsystem, refer to its user guide for instructions on how to operate the device.

### **3.1.5 TVS05 Tape Drive**

If your system includes a TVS05 tape drive, refer to the *TS05 Tape Transport System User's Guide* for instructions on how to operate the device.

**NOTE:** *The TSV05 is a data interchange device and is not supported as a backup device.*

### **3.1.6 TU81-Plus Tape Drive**

If your system includes a TU81-Plus 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 3800 and VAXserver 3800 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 phone 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**

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 DESQA. The light next to the connector should be lit, indicating an active connection. If not lit, move the Ethernet jumper 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 DESQA Ethernet adapter 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
- KVV11-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 3800 and VAXserver 3800 systems have several printer options available. Consult the *MicroVAX 3800/3900 VAXserver 3800/3900 Technical Information* for a list of printers and printer interface requirements.

### 3.5 Adding Options

If you have available slots, you may be able to add modules to your system. Possible limitations to adding 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 modules. Contact a DIGITAL service representative for assistance.*

## Appendix A

# Related Documentation

---

---

Document	Order Number
----------	--------------

---

### Hardware Documentation

---

KA655 CPU Systems Maintenance	EK-306AA-MG
KA655-AA CPU Module Technical Manual	EK-KA655-TM
TSV05 Tape Transport System User's Guide	EK-TSV05-UG
RF30/RF71 User Guide	EK-RF71D-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	TBD

---

### 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 3800/3900 VAXserver 3800/3900 Technical Information*.

## Appendix B

# Reprogramming the KFQSA Storage Adapter

---

This appendix describes how to reprogram the KFQSA storage adapter in the event you are setting up a dual-host system or adding an expander with additional ISEs to a previously installed MicroVAX 3800. If you are setting up a dual-host system, follow the instructions in Section B.1, followed by instructions for setting allocation classes in Section B.2. If you are adding an expander with additional ISEs, follow the instructions in Section B.3.

### B.1 Reprogramming the KFQSA for Dual-Host Systems

The KFQSA module is a storage adapter that allows Q-bus host systems which support the KFQSA to communicate with storage peripherals based on the Digital Storage Architecture (DSA), using the Digital Storage System Interconnect (DSSI). The DSSI bus supports six RF-series Integrated Storage Elements (ISEs) and two KFQSA storage adapters, for a total of eight devices.

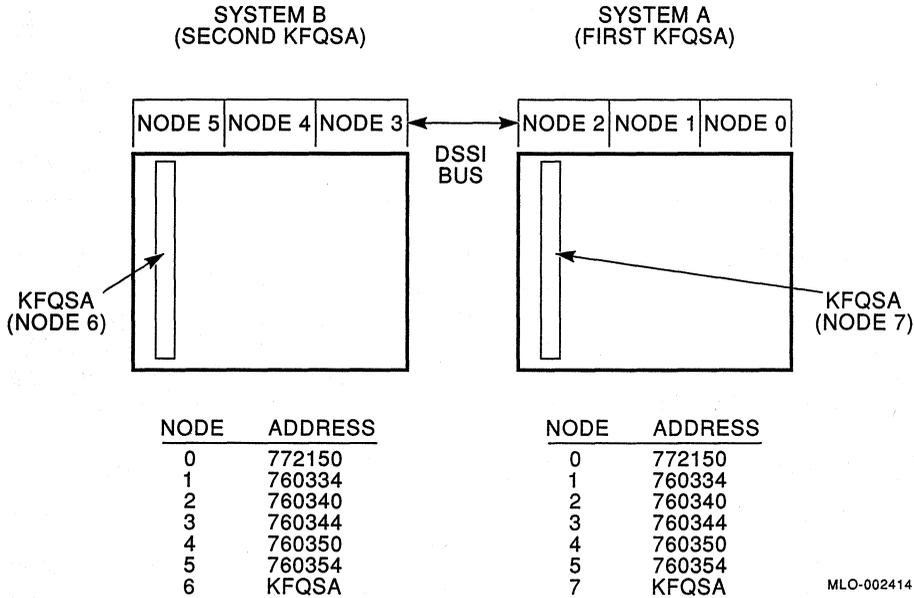
The KFQSA makes a connection between the host and a requested ISE. Each ISE has its own controller that contains the intelligence and logic necessary to control data transfers over the DSSI bus.

The EEROM on the KFQSA contains an address configuration table. To set up a dual-host system, you need to program the EEROM in both KFQSAs (one in each host) to recognize all the ISEs in the dual-host system. You also need to assign the KFQSA in the second host to node number six.

Figure B-1 is a diagram of the DSSI bus and an example of the nodes and addresses in a dual-host configuration. Throughout this procedure, the host with the lower number ISEs (0, 1, 2) will be referred to as the first system, the host with the higher number ISEs, as the second system.

**NOTE:** *Either system need not have the maximum of three ISEs. Each system can have between one and three ISEs.*

**Figure B-1: Dual-Host Configuration Nodes and Addresses (Example)**



MLO-002414

**NOTE:** Power to both systems should be turned off. The DSSI cable connecting the two systems should not yet be in place.

1. Enter the console I/O mode.

The procedures for reprogramming the KFQSA modules require you to issue a series of commands to the KA655 system at the console prompt (>>>). You may type these commands in either uppercase or lowercase letters. Unless otherwise specified, type each command, then press .

Enter the console I/O mode as follows:

- a. Set the Break Enable/Disable switch on the CPU cover panel of the first system to the enable position (up, dot inside the circle).
- b. Set the on/off switch on the first system to on (1).
- c. When the power-up self-tests complete, the console prompt appears, as shown in Example B-1.

## Example B-1: Entering Console Mode Display

Performing normal system tests.

```
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.

>>>

### 2. Display the current addresses and devices.

You should make hardcopy printouts of the displays in this step. The information obtained in this step will be needed later on.

- a. At the console prompt, type `SHOW DEVICE` for a display of all devices currently in the system. The display includes RF-series ISEs, tape drives and the Ethernet adapter, as shown in Example B-2.

This display lists the Q-bus address (octal) and port name of the device, such as DUA0 RF71.

- b. Type `SHOW QBUS` for a display of the eight-digit VAX address (hex) for each device, as shown in Example B-3.
- c. Find the eight-digit VAX address (hex) that corresponds to the Q-bus address for an ISE in the system. Record this address as it will be needed in a later step.

In examples B-2 and B-3, the Q-bus address (772150) for ISE 0 has a corresponding VAX address (hex) of 20001468.

### Example B-2: SHOW DEVICE Display

```
>>> show device
UQSSP Disk Controller 0 (772150)
-DUA0 (RF71)

UQSSP Disk Controller 1 (760334)
-DUB1 (RF71)

UQSSP Disk Controller 2 (760340)
-DUC2 (RF71)

UQSSP Tape Controller 0 (774500)
-MUA0 (TK70)

Ethernet Adapter 0 (774440)
-XQA0 (08-00-2B-09-A3-96)
```

### Example B-3: SHOW QBUS Display

```
>>> show qbus
Scan of Qbus I/O Space
-200000DC (760334)=0000 (300) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-200000DE (760336)=0AA0
-200000E0 (760340)=0000 (304) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-200000E2 (760342)=0AA0
-20001468 (772150)=0000 (154) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-2000146A (772152)=0AA0
-20001920 (774440)=FF08 (120) DELQA/DEQNA/DESQA
-20001922 (774442)=FF00
-20001924 (774444)=FF2B
-20001926 (774446)=FF09
-20001928 (774450)=FFA3
-2000192A (774452)=FF96
-2000192C (774454)=0050
-2000192E (774456)=1030
-20001940 (774500)=0000 (260) TQK50/TQK70/TU81E/RV20/KFQSA-TAPE
-20001942 (774502)=0BC0
-20001F40 (777500)=(004) IPCR
```

### 3. Run the Configure utility.

You run the Configure utility to find the correct address for each device and module in the dual-host system. Run the Configure utility as follows. Refer to Example B-4.

- a. At the console prompt, type **CONFIGURE**, then type **HELP** at the Device,Number? prompt for a list of devices that can be configured.

**NOTE:** *Some of the devices listed in the HELP display are not supported by the KA655-AA CPU.*

- b. For each device in the system, type the device name at the Device,Number? prompt. If you have more than one of the same type, type a comma followed by the total number of that device. Include the ISEs under the KFQSA-DISK; in Example B-4, the system contains one KFQSA and six ISEs.

Be sure you list *all* devices in the first system, and the ISEs in both systems (A and B).

- c. Type EXIT. The Configure utility displays an address and vector assignment for each device. Example B-4 shows the device input and the address and vector assignments.

**NOTE:** *Each ISE is assigned a unique address.*

#### **Example B-4: Configure Display**

```
>>> configure
Enter device configuration, HELP, or EXIT
Device,Number? help
Devices:
LPV11   KXJ11       DLV11J     DZQ11     DZV11     DFA01
RLV12   TSV05       RXV21      DRV11W    DRV11B    DPV11
DMV11   DELQA       DEQNA      DESQA     RQDX3     KDA50
RRD50   RQC25       KFQSA-DISK TQK50     TQK70     TU81E
RV20    KFQSA-TAPE  KMV11      IEQ11     DHQ11     DHV11
CXA16   CXB16       CXY08      VCB01     QVSS      LNV11
LNV21   QPSS        DSV11      ADV11C    AAV11C    AAV11C
KVV11C  ADV11C      AAV11D     VCB02     QDSS      DRV11J
DRQ3B   VSV21       IBQ01      IDV11A    IDV11B    IDV11C
IDV11D  IAV11A     IAV11B     MIRA      ADQ32     DTC04
DESNA   IGQ11

Numbers:
1 to 255, default is 1
Device,Number? kfqsa-disk,6
Device,Number? desqa
Device,Number? tqk70
Device,Number? exit
```

**Example B-4 Cont'd. on next page**

## Example B-4 (Cont.): Configure Display

### Address/Vector Assignments

```
-774440/120 DESQA
-772150/154 KFQSA-DISK      ! Node 0 (assigned in order, 0 to n)
-760334/300 KFQSA-DISK      ! Node 1
-760340/304 KFQSA-DISK      ! Node 2
-760344/310 KFQSA-DISK      ! Node 3
-760350/314 KFQSA-DISK      ! Node 4
-760354/320 KFQSA-DISK      ! Node 5
-774500/260 TQK70
```

4. Compare the Configure utility printout to that of the SHOW QBUS display.

Adding the second system's ISEs to the first system may bump the address of another Q-bus device. Make sure that all device addresses, other than those of the ISEs, have not changed. If the address of a device differs between the two displays, your DIGITAL service representative must reconfigure your system.

5. If no addresses are changed by the addition of the ISEs, repeat steps 1 through 4 for the second system.

**NOTE:** *When repeating step 3.b. be sure to list all devices in the second system, and all the ISEs in both systems (A and B).*

6. Program the KFQSA in the first system.

Program the configuration table in the EEROM of the first KFQSA to include all ISEs in the system, as follows. Refer to Example B-5.

- a. At the console prompt for the first system, type SET HOST/UQSSP/MAINT followed by a VAX address of one of the currently recognized ISEs (from the list of addresses you obtained from using the SHOW QBUS command—in most cases this address will be 20001468.) This allows you to access the KFQSA in the system.
- b. Type HELP to display a list of supported commands.
- c. Program the KFQSA to include each DSSI device in the dual-host system:

For each DSSI device, type SET, followed by the node number, the CSR address (from the list of addresses you obtained from the Configure utility), and the model number (disk ISEs are model 21).

- d. Type SHOW to display the configuration table you just programmed.

- e. Check the display against the output of the Configure command to make sure the addresses are correct.
- f. Type EXIT to save the configuration table, or QUIT to abort reprogramming and leave the table unchanged.

### Example B-5: Programming the First KFQSA Display

```
>>> set host/uqssp/maint 20001468      !20001468 is a current CSR address
                                       !for an ISE on the system.
```

```
UQSSP Controller (772150)
```

```
Enter SET, CLEAR, SHOW, HELP, EXIT, or QUIT
```

```
Node      CSR Address      Model
  0         772150         21
  1         760334         21
  2         760340         21
  7         ----- KFQSA -----
```

```
? help
```

```
Commands:
```

```
  SET <NODE> /KFQSA                !Sets KFQSA DSSI node
                                     !number
  SET <NODE> <CSR_ADDRESS> <MODEL> !Enables a DSSI device
  CLEAR <NODE>                      !Disables a DSSI device
  SHOW                               !Displays current
                                     !configuration
  HELP                               !Displays this display
  EXIT                               !Saves the KFQSA program
  QUIT                               !Does not save the KFQSA
                                     !program
```

```
Parameters:
```

```
  <NODE>                             !0 through 7
  <CSR_ADDRESS>                       !760010 to 77774
  <MODEL>                              !21 (disk) or 22 (tape)
? set 3 760344 21
? set 4 760350 21
? set 5 760354 21
? show
```

**Example B-5 Cont'd. on next page**

### Example B-5 (Cont.): Programming the First KFQSA Display

Node	CSR Address	Model
0	772150	21
1	760334	21
2	760340	21
3	760344	21
4	760350	21
5	760354	21
7	----- KFQSA -----	

? exit

Programming the KFQSA... !Note from the system that the KFQSA is  
!being programmed.

#### 7. Program the KFQSA in the second system.

Program the configuration table in the EEROM of the second KFQSA to include all ISEs in the system, and set the second KFQSA to node 6, as follows. Refer to Example B-6.

a. At the console prompt for the second system, type `SET HOST/UQSSP/MAINT` followed by a VAX address of one of the currently recognized ISEs (from the list of addresses you obtained from using the `SHOW QBUS` command.) This allows you to access the KFQSA in the system.

b. Program the KFQSA to include each DSSI device in the system:

For each DSSI device, type `SET`, followed by the node number, the CSR address (from the list of addresses you obtained from the Configure utility), and the model number (disk ISEs are model 21).

c. Type `SET 6/KFQSA` to set the node to 6 for the second KFQSA.

**NOTE:** *This step ensures that each KFQSA has a different node number.*

d. Type `SHOW` to display the configuration table you just programmed.

e. Check the display to make sure the addresses are correct.

f. Type `EXIT` to save the configuration table, or `QUIT` to abort reprogramming and leave the table unchanged.

## Example B-6: Programming the Second KFQSA Display

```
>>> set host/uqssp/maint 20001468      !20001468 is a current CSR address
                                         !for an ISE on the system.
```

UQSSP Controller (772150)

Enter SET, CLEAR, SHOW, HELP, EXIT, or QUIT

Node	CSR Address	Model
0	772150	21
1	760334	21
2	760340	21
7	----- KFQSA -----	

? set 3 760344 21

? set 4 760350 21

? set 5 760354 21

? set 6/KFQSA

? show

Node	CSR Address	Model
0	772150	21
1	760334	21
2	760340	21
3	760344	21
4	760350	21
5	760354	21
6	----- KFQSA -----	

? exit

Programming the KFQSA... !Note from the system that the KFQSA is  
!being programmed.

8. Turn off the system power for both systems by setting the on/off switches to off (0).
9. Remove the DSSI terminator from the DSSI port of each host and connect the DSSI cable to the hosts. Instructions on connecting the cable are provided in Section 1.3 of this manual.
10. Renumber the Unit I.D. plugs on the second system's Operator Control Panel (OCP) to match the node I.D.s you just programmed.

Instructions for inserting and removing Unit I.D. plugs are provided in Section 3.1.1 of this manual.

11. Power on both systems by setting the on/off switches to on (1).

Wait for the self-tests to complete.

12. Verify the procedure for both systems. For each system:

- a. At the console prompt, type `SHOW QBUS` to verify that all addresses are present and correct.
- b. Type `SHOW DEVICE` to verify that all ISEs are displayed correctly.

**NOTE:** *Be certain the ISE device names are the same for both systems. If the device names (DUcv: where c represents the controller number, and v represents the unit number) are not identical for both systems, the ISE addresses were not assigned in the proper order (as listed in the Configure Display).*

## B.2 Changing the ISE Allocation Class

This section describes how to change the ISE allocation class. For dual-host configurations you must assign the same nonzero allocation class to both host systems and their ISEs. The ISEs ship with the allocation class set to zero.

Change the allocation class parameter using the console-based DUP driver utility, as follows. Refer to Example B-7.

1. Determine the correct allocation class for the RF-series ISEs according to the rules on clustering.

**NOTE:** *In a dual-host configuration, you must assign the same allocation class to both host systems and to the RF-series ISEs. This allocation class must be different from that of other systems or of hierarchical storage controllers (HSCs) in a cluster.*

2. Enter console I/O mode as follows.
  - a. Set the Break Enable/Disable switch on the CPU cover panel of one of the host systems to the enable position (up, dot inside the circle).
  - b. Set the on/off power switch on both systems to on (1).

Wait for the console prompt `>>>` to display.

3. At the console prompt, type `SET HOST /DUP/UQSSP/DISK 0 PARAMS (0 through 5 for the ISE to which you want to connect)` to start the DUP server.

**NOTE:** *This command is only valid after the KFQSA storage adapters have been properly configured.*

4. At the `PARAMS>` prompt, type `SHOW ALLCLASS` to check the current allocation class.
5. Type `SET ALLCLASS 2` to set the new allocation class to 2 (or type the number you desire).
6. Type `SHOW ALLCLASS` to check the new allocation class.
7. Type `WRITE`, then type `Y` to save the new values into the `EEROM`, or `N` to cancel the reprogramming.
8. Repeat steps 3 through 7 for each ISE in the dual-host system.

### Example B-7: Display for Changing Allocation Class and Unit Number

```
>>> set host /dup/uqssp/disk 0 params
Starting DUP server...

UQSSP Disk Controller 0 (772150)
Copyright (c) 1988 Digital Equipment Corporation

PARAMS> show allclass

Parameter      Current      Default      Type      Radix
-----
ALLCLASS        1            0      Byte      Dec      B

PARAMS> set allclass 2

PARAMS> show allclass

Parameter      Current      Default      Type      Radix
-----
ALLCLASS        2            0      Byte      Dec      B

PARAMS> write

Changes require controller initialization, ok? [Y/ (N) ] y

Stopping DUP server...

>>>
```

## B.3 Reprogramming the KFQSA When Adding an R215F Expander

The KFQSA module is a storage adapter that allows Q-bus host systems that support the KFQSA to communicate with storage peripherals based on the Digital Storage Architecture (DSA), using the Digital Storage System Interconnect (DSSI). The DSSI bus can support six RF-series Integrated

Storage Elements (ISEs) and two KFQSA storage adapters for a total of eight devices.

The KFQSA makes a connection between the host and a requested ISE. Each ISE has its own controller that contains the intelligence and logic necessary to control data transfers over the DSSI bus.

The EEROM on the KFQSA contains an address configuration table. When you are adding RF-series ISEs to your system, you need to program the EEROM in the host system's KFQSA to recognize the new ISEs.

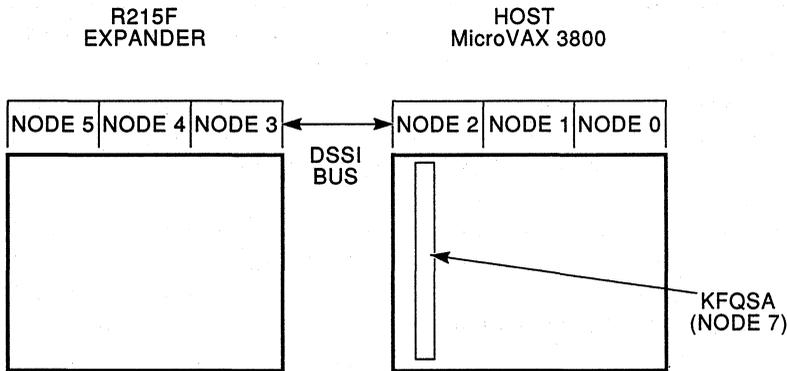
**NOTE:** *Expanders shipped with your new MicroVAX or VAXserver 3800 system are factory-configured. The KFQSA storage adapter only needs to be reprogrammed if you are adding an R215F expander to a previously installed MicroVAX or VAXserver 3800.*

*B213F expanders added to a previously installed MicroVAX or VAXserver 3800 system must be installed by a DIGITAL service representative.*

Figure B-2 shows a diagram of the DSSI bus and an example of the nodes and addresses in an expanded system.

**NOTE:** *Either unit need not have the maximum of three ISEs. Each unit can have between one and three ISEs.*

**Figure B-2: Expanded System Nodes and Addresses (Example)**



NODE	ADDRESS
0	772150
1	760334
2	760340
3	760344
4	760350
5	760354
7	KFQSA

MLO-002415

**NOTE:** Power to both host and expander should be turned off. The DSSI cable connecting the host and R215F expander should not yet be in place.

1. Enter the console I/O mode.

The procedures for reprogramming the KFQSA modules require you to issue a series of commands to the KA655 system at the console prompt (>>>). You may type these commands in either uppercase or lowercase letters. Unless otherwise specified, type each command, then press Return.

Enter the console I/O mode as follows:

- a. Set the Break Enable/Disable switch on the CPU cover panel of the host MicroVAX to the enable position (up, dot inside the circle).
- b. Set the on/off switch on the host MicroVAX 3800 to on (1).
- c. When the power-up self-tests complete, the console prompt appears, as shown in Example B-8.

## Example B-8: Entering Console Mode Display

Performing normal system tests.

```
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.

>>>

### 2. Display the current addresses and devices.

You should make hardcopy printouts of the displays in this step. The information obtained in this step will be needed later on.

- a. At the console prompt, type `SHOW DEVICE` for a display of all devices currently in the system. The display includes RF-series ISEs, tape drives, and the Ethernet adapter, as shown in Example B-9.

This display lists the VAX address and port name of the device, such as DUA0 RF71.

- b. Type `SHOW QBUS` for a display of the eight-digit VAX address (hex) for all devices, as shown in Example B-10.
- c. Find the eight-digit VAX address (hex) that corresponds to the Q-bus address for an ISE in the system. Record this address as it will be needed in a later step.

In examples B-9 and B-10, the Q-bus address (772150) for ISE 0 has a corresponding VAX address (hex) of 20001468.

### Example B-9: SHOW DEVICE Display

```
>>> show device
UQSSP Disk Controller 0 (772150)
-DUA0 (RF71)

UQSSP Disk Controller 1 (760334)
-DUB1 (RF71)

UQSSP Disk Controller 2 (760340)
-DUC2 (RF71)

UQSSP Tape Controller 0 (774500)
-MUA0 (TK70)

Ethernet Adapter 0 (774440)
-XQA0 (08-00-2B-09-A3-96)
```

### Example B-10: SHOW QBUS Display

```
>>> show qbus
Scan of Qbus I/O Space
-200000DC (760334)=0000 (300) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-200000DE (760336)=0AA0
-200000E0 (760340)=0000 (304) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-200000E2 (760342)=0AA0
-20001468 (772150)=0000 (154) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-2000146A (772152)=0AA0
-20001920 (774440)=FF08 (120) DELQA/DEQNA/DESQA
-20001922 (774442)=FF00
-20001924 (774444)=FF2B
-20001926 (774446)=FF09
-20001928 (774450)=FFA3
-2000192A (774452)=FF96
-2000192C (774454)=0050
-2000192E (774456)=1030
-20001940 (774500)=0000 (260) TQK50/TQK70/TU81E/RV20/KFQSA-TAPE
-20001942 (774502)=0BC0
-20001F40 (777500)=(004) IPCR
```

### 3. Run the Configure utility.

You run the Configure utility to find the correct address for each system. Run the Configure utility as follows. Refer to Example B-11.

- a. At the console prompt, type CONFIGURE, then type HELP at the Device, Number? prompt for a list of devices that can be configured.

**NOTE:** Some of the devices listed in the HELP display are not supported by the KA655-AA CPU.

- b. For each device in the system, type the device name at the Device,Number? prompt. If you have more than one of the same type, type a comma followed by the total number of that device. Include the ISEs under the KFQSA-DISK; in Example B-11, the system contains one KFQSA and six ISEs.

Be sure you list *all* the devices, including the total number of ISEs in the expanded system.

- c. Type EXIT. The Configure utility displays an address and vector assignment for each device. Example B-11 shows the device input and the address and vector assignments.

**NOTE:** *Each ISE is assigned a unique address.*

### Example B-11: Configure Display

```
>>> configure
Enter device configuration, HELP, or EXIT
Device,Number? help
Devices:
LPV11   KXJ11   DLV11J  DZQ11   DZV11   DFA01
RLV12   TSV05   RXV21   DRV11W  DRV11B  DPV11
DMV11   DELQA   DEQNA   DESQA   RQDX3   KDA50
RRD50   RQC25   KFQSA-DISK  TQK50   TQK70   TU81E
RV20    KFQSA-TAPE  KMV11   IEQ11   DHQ11   DHV11
CXA16   CXB16   CXY08   VCB01   QVSS    LNV11
LNV21   QPSS    DSV11   ADV11C  AAV11C  AAV11C
KVV11C  ADV11C  AAV11D  VCB02   QDSS    DRV11J
DRQ3B   VSV21   IBQ01   IDV11A  IDV11B  IDV11C
IDV11D  IAV11A  IAV11B  MIRA    ADQ32   DTC04
DESNA   IGQ11
Numbers:
1 to 255, default is 1
Device,Number? kfqsa-disk,6
Device,Number? desqa
Device,Number? tqk70
Device,Number? exit
```

**Example B-11 Cont'd. on next page**

## Example B-11 (Cont.): Configure Display

### Address/Vector Assignments

```
-774440/120 DESQA
-772150/154 KFQSA-DISK      ! Node 0 (assigned in order, 0 to n)
-760334/300 KFQSA-DISK      ! Node 1
-760340/304 KFQSA-DISK      ! Node 2
-760344/310 KFQSA-DISK      ! Node 3
-760350/314 KFQSA-DISK      ! Node 4
-760354/320 KFQSA-DISK      ! Node 5
-774500/260 TQK70
```

4. Compare the Configure utility printout to that of the SHOW QBUS display.

Adding the expander system's ISEs to the host system may bump the address of another Q-bus device. Make sure that all device addresses, other than those of the ISEs, have not changed. If the address of a device differs between the two displays, your DIGITAL service representative must reconfigure your system. If no addresses are bumped by the addition of the ISEs, proceed to the next step to program the KFQSA.

5. Program the KFQSA storage adapter.

Program the configuration table in the EEROM of the KFQSA to include all ISEs in the system, as follows. Refer to Example B-12.

- a. At the console prompt for the first system, type `SET HOST/UOSSP/MAINT` followed by a VAX address of one of the currently recognized ISEs (from the list of addresses you obtained from using the SHOW QBUS command—in most cases this address will be 20001468.) This allows you to access the KFQSA in the system.
- b. Type `HELP` to display a list of supported commands.
- c. Program the KFQSA to include each DSSI device in the expanded system:  
  
For each DSSI device, type `SET`, followed by the node number, the CSR address (from the list of addresses you obtained from the Configure utility), and the model number (disk ISEs are model 21).
- d. Type `SHOW` to display the configuration table you just programmed.
- e. Check the display against the output of the Configure command to make sure the addresses are correct.

- f. Type EXIT to save the configuration table, or QUIT to abort reprogramming and leave the table unchanged.

### Example B-12: Programming the KFQSA Display

```
>>> set host/uqssp/maint 20001468      !20001468 is a current CSR address
                                       !for an ISE on the system.
```

UQSSP Controller (772150)

Enter SET, CLEAR, SHOW, HELP, EXIT, or QUIT

Node	CSR Address	Model
0	772150	21
1	760334	21
2	760340	21
7	----- KFQSA -----	

? help

Commands:

SET <NODE> /KFQSA	!Sets KFQSA DSSI node !number
SET <NODE> <CSR_ADDRESS> <MODEL>	!Enables a DSSI device
CLEAR <NODE>	!Disables a DSSI device
SHOW	!Displays current !configuration
HELP	!Displays this display
EXIT	!Saves the KFQSA program
QUIT	!Does not save the KFQSA !program

Parameters:

<NODE>	!0 through 7
<CSR_ADDRESS>	!760010 to 777774
<MODEL>	!21 (ISE) or 22 (tape)

? set 3 760344 21

? set 4 760350 21

? set 5 760354 21

? show

Node	CSR Address	Model
0	772150	21
1	760334	21
2	760340	21
3	760344	21
4	760350	21
5	760354	21
7	----- KFQSA -----	

? exit

Programming the KFQSA... !Note from the system that the KFQSA is  
!being programmed.

6. Turn off the power for the host MicroVAX 3800 by setting the on/off switch to off (0).
7. Renumber the Unit I.D. plugs on the expander's Operator Control Panel (OCP) to match the node I.D.s you just programmed.

Instructions for inserting and removing Unit I.D. plugs are provided in Section 3.1.1 of this manual.

8. Connect the DSSI cable to the host and expander. Instructions for connecting the DSSI cable are provided in the *R215F Expander Addenda to Customer Hardware Information* shipped with the expander.
9. Power on both units by setting the on/off switches to on (1).  
Wait for the self-tests to complete.
10. Verify the procedure.
  - a. At the console prompt, type `SHOW QBUS` to verify that all addresses are present and correct.
  - b. Type `SHOW DEVICE` to verify that all ISEs are displayed correctly.

# 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 ISE(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 ISE that is stored on a tape cartridge.

**Baud rate**

The speed at which signals are transmitted serially over a communication line.

**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**

The connection between the central processing unit (CPU) and input/output devices in the system. Information signals such as address, data, and control signals are carried through the bus.

**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 3800 or VAXserver 3800 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.

**ISE**

An integrated storage element. ISEs are intelligent storage devices that contain their own controller.

**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. An LED on the CPU cover panel displays an 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(s) or word(s) 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.

# Index

---

## A

---

- Air circulation, 1-18
- Autobooting the system, 2-5

## B

---

- Base system components
  - function, 1-18
- BOOT command
  - uses, 2-8
- Booting from console mode, 2-8
- Booting the system
  - autobooting, 2-5
  - from console mode, 2-8
- Break Enable/Disable switch, 1-15

## C

---

- Card cage
  - location, 1-13
  - slots, number of, 1-13
- Cartridge release handle, 3-6
- Central processing unit (CPU)
  - function, 1-19
- Circuit breaker
  - function, 1-17
  - location, 1-17
  - operation, 1-17
- Communications controllers
  - asynchronous serial devices, 1-21
  - CXA16, 1-21
  - CXY08, 1-22
  - function, 1-21
  - network devices, 1-21
  - set-up required, 3-18
  - synchronous serial devices, 1-21

- Communications controllers (cont'd.)
  - types, 1-21, 3-17
  - using controllers with modem support, 3-19
  - using controllers without modem support, 3-18
  - using network controllers, 3-20
- Console terminal connector
  - function, 1-16
  - location, 1-16
- Cover panel
  - CPU, 1-14
  - labels, 1-14
  - types, 1-14
- CPU
  - location, 1-14
- CPU *See* Central processing unit
- CXA16
  - communications controller, 1-21
- CXY08
  - communications controller, 1-22

## D

---

- DC OK light
  - function, 1-17
  - on power supply, 1-12, 1-17
  - system, 1-12
- DELNI
  - connecting to an Ethernet cable, 3-20
- DESQA
  - before using, 3-20
- Door
  - front panel, 1-2
- Dual-host capability, 1-23

## **E**

---

- Enclosure
  - front view, 1-9
- Error messages
  - at power-on, 2-4

## **F**

---

- Fans, 1-18
  - function, 1-18
  - location, 1-18
- Fixed-disk drives
  - location, 1-11
- Front door
  - description, 1-1
  - opening, 1-6

## **H**

---

- Halting the system, 2-9
  - description, 2-9

## **I**

---

- Indicator lights
  - on TK70 tape drive, 3-6
- Inserting a tape cartridge, 3-11
- Integrated storage elements, 1-13
  - controller, 1-20
  - description, 1-20
  - function, 1-20

## **K**

---

- KFQSA storage adapter
  - programming instructions for, B-1, B-11

## **L**

---

- Labeling a TK70 tape cartridge, 3-8
- Language Inquiry Mode
  - setting of Power-Up Mode switch, 1-16
- LED display
  - on CPU cover panel, 1-16

- Loading a TK70 tape cartridge, 3-7
- Loading system software
  - with BOOT command, 2-8
- Locking the window, 1-2
- Loop Back Test Mode
  - setting of Power-Up Mode switch, 1-16

## **M**

---

- Main memory, 1-19
- Mass storage, 1-20
  - controllers, 1-20
  - devices, 1-20, 3-6
  - options, 3-1
  - subsystems, 1-21
- Mass storage devices
  - RF71, 3-2
- Mass storage shelf
  - description, 1-11
- Modems
  - function, 1-21
  - using, 3-19
- Module identification labels, 1-14
- Multihost capability, 1-24

## **N**

---

- Network
  - communications controllers, 1-19, 1-22
- New system
  - using, 2-1

## **O**

---

- Opening the window, 1-2
- Optional devices
  - adding to system, 1-23

## **P**

---

- Pages and memory management, 1-19
- Power-on indicators
  - normal, 2-4

- Power-on self-tests
  - description, 2-4
- Power supplies
  - and system components, 1-16
  - location, 1-16
- Power-Up Mode switch, 1-16
- Printers
  - use of, 3-22

## R

---

- Removable media
  - function, 1-20
- Removing a tape cartridge, 3-14
- Reset button, 1-17
- Restarting the system
  - description, 2-10
- RF71 Integrated storage elements
  - write-protecting, 3-4
- RF71 Integrated Storage Elements, 3-2
  - changing the unit I.D. plugs, 3-4
  - controls and indicators, 3-3
  - description, 1-20
- Run Mode
  - setting of Power-Up Mode switch, 1-16

## S

---

- Serial controllers
  - with modem control support, 1-21
  - without modem control support, 1-21
- SET BOOT *device name* command
  - use of, 2-7
- Shutdown procedure
  - when turning off system, 2-9
- Switch settings, 2-1
  - normal operation, 2-1
  - special operation, 2-2
- System components
  - optional, 1-20

## T

---

- Tape cartridge
  - handling instructions, 3-11
  - inserting, 3-11
  - removing, 3-14
  - storage guidelines, 3-11
- TK50/70 tape cartridge
  - calibration, 3-12
  - write-protect switch, 3-9
- TK70 tape cartridge
  - labeling, 3-8
  - write-protecting, 3-9
- TK70 tape drive
  - access to, 3-6
  - controls, 3-6
  - indicator lights, 3-6
  - loading, 3-7
  - location, 1-11
  - operation, 3-7
  - summary of indicator lights, 3-16
  - uses of, 3-6
- Turning off the system, 2-9
- Turning on the system, 2-4

## U

---

- Unit I.D. plugs
  - changing, 3-4
  - removing, 3-4
- Unload button, 3-6
- Unloading a TK70 tape cartridge, 3-7
- Using a new system, 2-1

## W

---

- Write-protecting
  - a TK70 tape cartridge, 3-9
- Write-protect switch
  - on a TK50/70 tape cartridge, 3-9