HSC50

USER GUIDE

digital

HSC50
User Guide

CONTENTS

CHAPTER 4   HSC50 UTILITIES

CHAPTER 5   CUSTOMER EQUIPMENT CARE

FIGURES

TABLES

PREFACE

This manual describes the HSC50 Mass Storage Server in the detail required by users. Subjects include controls and indicators, auxiliary terminal use, and the utility programs.

All information in this guide is intended for the equipment user. For this reason, emphasis is placed on information concerning the SET/SHOW Utility necessary for HSC50 operation.

Installation, maintenance, and servicing are not covered by this guide. Detailed descriptions of utilities other than SET/SHOW are not included. These subjects are covered in other documentation. For a list of such related publications, refer to Chapter 1.

CHAPTER 1
GENERAL INFORMATION

1.1 INTRODUCTION

This chapter contains a general description of the HSC50, its specifications, the HSC50 base unit and options, and a list of related documentation.

1.2 HSC50 DESCRIPTION

The HSC50 is defined as an intelligent mass storage subsystem server housed in a single cabinet (refer to Figure 1-1).

Up to seven types of modules are contained in the HSC50 (Figure 1-2). Module names, module numbers (stamped on the module handle), and the function of each module follow:

- Port Link Module (L0100) — Communicates over the computer interconnect (CI). This module is also known as CI Link.

- Port Buffer Module (L0109 or Pila) — Provides a limited number of high-speed buffers used to stage CI transfers.

- Port Processor Module (L0107-YA or K.pli) — Functions as the interface between the CI and the rest of the subsystem.

- Disk Data Channel (L0108-YA or K.sdi) — Supports up to four SDI disk drives (for example, the RA80, RA81, and/or RA60).

- Tape Data Channel (L0108-YB or K.sti) — Supports up to four STI tape formatters (for example, the TA78).

- Memory Module (L0106-AA or M.std) — Contains three areas of memory: control memory (128K bytes), data memory (128K bytes), and program memory (256K bytes).

- I/O Control Processor Module (L0105 or P.ioc) — Defines and directs all internal activity within the HSC50 subsystem. Contains an F-11 chip set microprocessor.

In utilizing the computer interconnect, the HSC50 interfaces one or more host computer systems via the Star Coupler (a passive, RF-transformer coupling network) to a set of mass storage devices. If the device is a disk drive, the HSC50 communicates over the Standard Disk Interconnect (SDI) bus; if it is a tape formatter, the Standard Tape Interconnect (STI) bus is used. This subsystem is diagrammed in Figure 1-2.
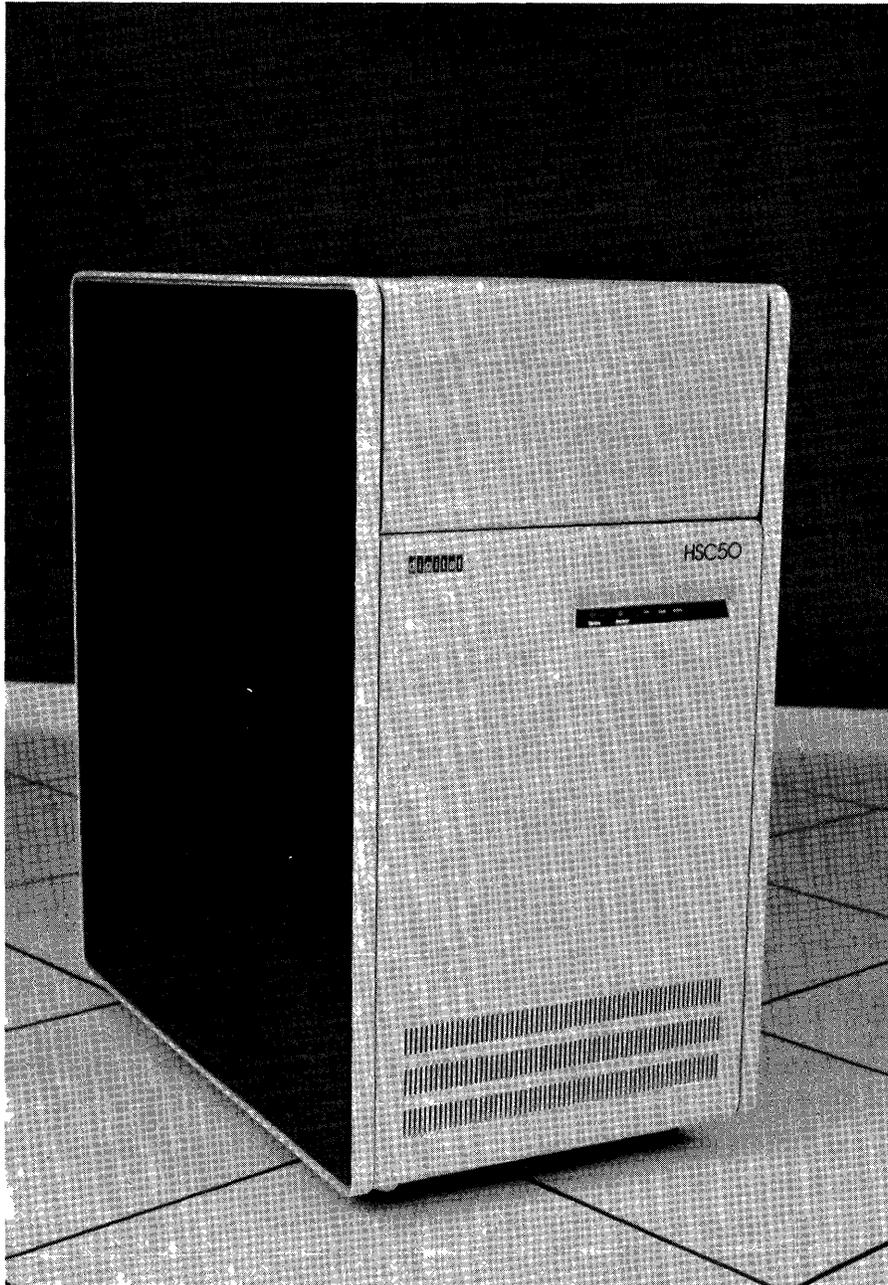
Figure 1-1   HSC50 Mass Storage Server
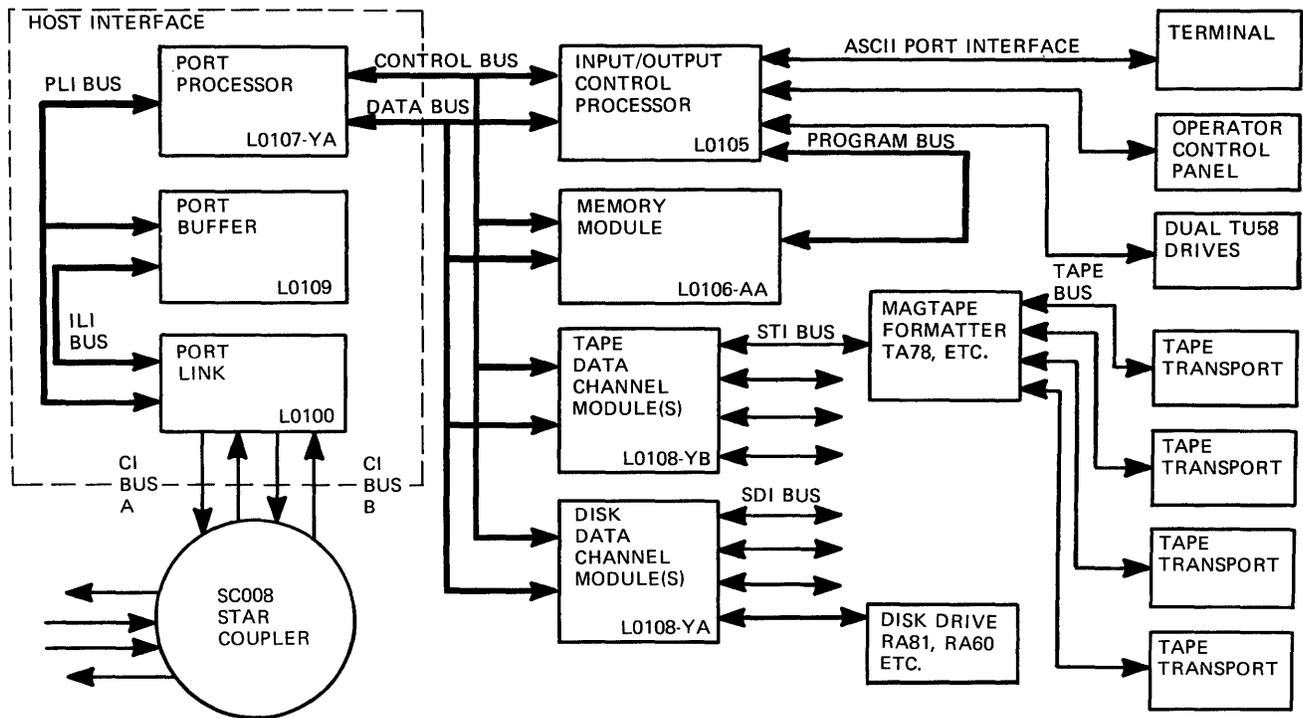
Figure 1-2 Subsystem Block Diagram

The HSC50 can support a total of six disk and/or tape data channels. Each one of these data channels accommodates four cabling bulkhead ports. Maximum disk configuration for a single HSC50 is 24 drives. The maximum number of tape drives in each HSC50 subsystem is found in the current HSC50 release notes.

Mass Storage Control Protocol (MSCP) is a communication protocol used over the CI between a host system and the HSC50. This protocol enables a single class driver to replace multiple device-specific drivers. Separate but similar protocols exist for disk and tape communication. Disk MSCP frees the host from responsibility for disk I/O functions and error recovery. Tape MSCP includes those protocol variations necessary for tape functionality in the subsystem.

1.2.1 HSC50 Features
The HSC50:

• Supports disk and tape drives with data rate bursts of up to 25 megabits per second.

• Utilizes the MSCP/TMSCP protocol allowing software standardization of all future SDI/STI device drivers.

• Connects to one port on a mass storage device leaving the other port available to a different HSC50. This feature allows increased data availability through redundancy.

• Serves multiple hosts and multiple types of hosts.

• Uses radial connection to disk drives and tape formatters permitting increased configuration flexibility.

1-3

- Interprets the disk-geometry specifics (number of heads, cylinders, tracks, and sectors) of each disk drive.

- Maps around faulty sectors by replacing them from a spare sectors pool. As a result, hosts always perceive perfect media guaranteed through several levels of redundancy.

- Reads redundant copies of the sector header to ensure correct head positioning before executing any disk drive transfer.

- Utilizes an Error Correction Code (ECC) to detect and correct up to 8 independent error bursts, each up to 10 bits in length, anywhere within the data area of a sector.

- Appends an Error Detection Code (EDC) to the data that travels to the disk. As the data is read, the HSC50 repeatedly checks the EDC to ensure data integrity.

1.2.2 HSC50 Optimizing Functions
The HSC50 optimizes throughput using the following functions:

- Overlapping data transfers − Utilizes a multiple data channel configuration to simultaneously perform multiple I/O transfers.

- Offloading host error handling − Saves significant host computing cycles and memory space with HSC50 performing disk and tape error functions.

- Overlapping error recovery and diagnostic operations while I/O processing − Continues to service normal I/O requests while recovering from localized errors or diagnosing localized malfunctions (as long as the required subsystem resources remain available).

- Deep buffering − Allows multisector data buffering to accommodate disk transfer speeds up to 25 megabits per second while minimizing unused disk rotations.

- Overlapping seeks − Issues parallel seeks to all drives with outstanding requests. Also issues seeks in parallel with ongoing data transfers.

- Ordering seeks − Optimizes the cylinder sequence for SEEK commands to individual drives.

- Interunit rotational position sensing (RPS) − Assigns a data transfer channel to the first drive reaching a sector designated for data transfer.

- Intraunit RPS − Splits a data transfer request into a series of smaller fragments. The first fragment that appears under the disk head is transferred.

1.2.3 HSC50 Maintainability
Following are the HSC50 maintainability features:

- Sensing loss of cooling air flow. If this condition reaches a dangerous level, the HSC50 stops ongoing internal processes and turns itself off to avoid damage.

- Utilizing physical and electrical isolation from other computer system devices.

- Reporting detected errors to the host error-logging facility.

- Supporting an ASCII serial line for direct communication between the auxiliary terminal and HSC50 software.

- Containing onboard loadable self diagnostics, exercisers, and utilities.

- Including front panel indicators which report fault information.

- Containing modules with LEDs to indicate operational status.

- Allowing online connection or disconnection of disk drives and/or tape formatters.

- Allowing online connection or disconnection of the CI.

1.3 HSC50 SPECIFICATIONS
HSC50 specifications are listed in Figure 1-3.

DESCRIPTION	OPTION DESIGNATION
HSC50 MASS STORAGE SERVER	HSC50—AA = 60 HZ/120V
	HSC50—AB = 50 HZ/240V

MECHANICAL

MOUNTING CODE	WEIGHT		HEIGHT		WIDTH		DEPTH		CAB TYPE (IF USED)
	LBS	KG	IN	CM	IN	CM	IN	CM	
FS	400	181.2	42	106.7	21.3	54.1	36	91.4	MODIFIED H9642

POWER (AC)

AC VOLTAGE NOMINAL	AC VOLTAGE TOLERANCE	FREQUENCY & TOLERANCE	PHASE	STEADY—STATE CURRENT (RMS)	POWER CONSUMPTION (MAX)
120	104—128V	60 HZ ±1	3	13.5A	2228 WATTS
240	208—256V	50 HZ ±1	3	6.75A	2223 WATTS

POWER (AC)

AMPS (MAX) BY PHASE			
120V	ØA = 0.7	240V	ØA = 0.44
	ØB = 14.2		ØB = 7.09
	ØC = 13.5		ØC = 6.75

POWER (AC)

PLUG TYPE	POWER CORD LENGTH	INTERRUPT TOLERANCE	APPARENT POWER (KVA)
NEMA — L21 — 30P	15 FT (4.5 M)	4MS (MIN)	3.4 (KVA)

POWER (AC)

INRUSH CURRENT 60HZ	INRUSH CURRENT 50HZ	SURGE DURATION
65A RMS	130A RMS	1 CYCLE

DEVICE ENVIRONMENT

TEMPERATURE		RELATIVE HUMIDITY		RATE OF CHANGE		HEAT DISSIPATION	
OPERATING*	STORAGE	OPERATING	STORAGE	TEMP	HUMIDITY	BTU/HR	KJ/HR
50 — 104° F	−40 — 140° F	10 — 90%	10 — 90%	36° F/HR	20%/HR	7600	8021
10 — 40° C	−40 — +60° C			20° C/HR			

DEVICE ENVIRONMENT

ALTITUDE (MAX)		AIR VOLUME (AT INLET)		AIR QUALITY
OPERATING	STORAGE	FT³/MIN	DAL/MIN	PARTICLE COUNT (MAX)
8000 FT	30,000 FT	210	75.6	N/A
2.4 KM	9.1 KM			

* ALTITUDE CHANGES: DE-RATE THE MAXIMUM TEMPERATURE 1.8° C PER THOUSAND METERS (1.0° F PER THOUSAND FEET).

CX—280A

Figure 1-3   HSC50 Specifications

1.4 HSC50 BASE UNIT AND OPTIONS

Table 1-1 lists the HSC50 base unit and the currently available options.

Table 1-1   HSC50 Base Unit and Options

Option	Description
HSC50-AA/AB	Stand alone package − contains backplane, power supply, CI Link to Star Coupler, CI interface modules, I/O control processor, memory, and modified H9642 cross-products cabinet. The base unit supports six data channels and one supplemental power supply. AA = 60 Hz/120 V, AB = 50 Hz/240 V.
HSC5X-BA	Disk data channel − supports up to four SDI disk drives (RA80, RA81, and/or RA60).
HSC5X-CA	Tape data channel − supports up to four STI tape formatters (TA78).
HSC5X-EA/EB	Auxiliary power supply − adds the power supply required when more than eight modules are configured in the same base unit. EA = 60 Hz/120 V, EB = 50 Hz/240 V.

Refer to the *HSC50 Installation Manual* (EK-HSC50-IN) for data channel and auxiliary power supply installation procedures.

1.5   HSC50 RELATED DOCUMENTATION

External DIGITAL customers may order from the following list of HSC50-related manuals.

- *HSC50 Installation Manual* (EK-HSC50-IN)
- *HSC50 Service Manual* (EK-HSC50-SV)
- *HSC50 Maintenance Guide* (AA-P672A-TC)
- *HSC50 Illustrated Parts Breakdown* (EK-HSC50-IP)
- *HSC50 Inline Diagnostics User Documentation* (EK-IHSC5-UG)
- *HSC50 Offline Diagnostics User Documentation* (EK-OHSC5-UG)
- *HSC50 Utilities User Documentation* (ED-UHSC5-UG)
- *DSA Controllers Documentation Kit* (QP906-GZ)*
- *DSA Drives Documentation Kit* (QP907-GZ)*
- Maintenance Guide Loose-Leaf Binder (AV-L980A-TK)
- *TU58 DECtape II User Guide* (EK-0TU58-UG)
- *Star Coupler User Guide* (EK-SC008-UG)

* The DSA Controllers Documentation Kit consists of a small loose-leaf binder and the maintenance guides for all DSA controllers. The DSA Drives Documentation Kit consists of the two small binders containing the current maintenance guides for disks and tapes that operate on the DSA controllers.

Employees: The *User Guide* and *Service Manual* can be ordered directly from Publication
                    and Circulation Services, 10 Forbes Road, Northboro, Massachusetts 01532 (RCS
                    Code: NR12, Mail Code: NR03/W3).

                    The *Maintenance Guide*, Maintenance Guide Looseleaf Binder, Maintenance
                    Documentation Kit, and the Field Maintenance Print Set can be ordered direct-
                    ly from the Software Distribution Center, 444 Whitney Street, Northboro,
                    Massachusetts 01532 (RCS Code: MSDC, Mail Code: NR02-1/J6).

Non-Employees: The above documents can be ordered directly from Digital Equipment Corpora-
                    tion, P.O. Box CS2008, Nashua, New Hampshire 03061, or by calling toll
                    free: 800-258-1710.

Outside the United States, consult local DIGITAL offices.

CHAPTER 2
CONTROLS AND INDICATORS

2.1 INTRODUCTION
HSC50 operator control switches/indicators and their uses are described in this chapter. These switches and indicators are found in the following locations:

1. Operator control panel (OCP)

2. Inside the front door

2.2 SWITCHES AND INDICATORS
Figure 2-1 shows the switches and indicators on the HSC50 operator control panel (OCP). Following paragraphs describe the functions of each one.
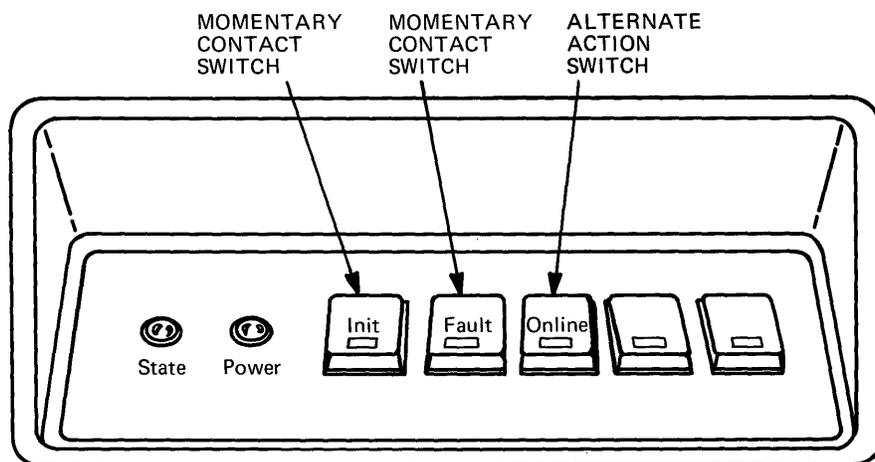
CX–008B

Figure 2-1 OCP Switches and Indicators

2.2.1 State and Init Indicators
These indicators indicate HSC50 status. During initialization, the State and Init indicators display the initialization phase the HSC50 is currently executing.

When the HSC50 is turned on, the State indicator is off and the Init indicator is on. At this point, the HSC50 executes the I/O control processor ROM bootstrap diagnostic test.

This bootstrap then loads the Init I/O control processor diagnostic. Notice the TU58 LED comes on (refer to paragraph 2.3.1) indicating the tape is moving. After successful completion of this diagnostic, the State indicator goes on and the Init indicator goes off.

The HSC50 operational firmware is then loaded. The TU58 LED comes on, indicating the HSC50 operational firmware is being loaded into memory. When the operational firmware begins loading, the State indicator starts pulsing and continues to pulse, 200 milliseconds on and 200 milliseconds off throughout the entire loading operation. When this operation is complete, the State indicator begins to pulse at a much slower rate, approximately 400 milliseconds on and 400 milliseconds off.

If the State indicator remains steadily off or on, an error is indicated. (Whether this LED remains off or on is determined by the state it was in when the error occurred.)

2.2.2 Power Indicator
This indicator shows all three dc voltages in the HSC50 are available. It is lit except when a problem exists with one or more of the dc voltages or if ac power is not available.

NOTE
If the OCP Power indicator is not on, ensure the ac power cord is plugged in and the computer room circuit breakers are switched on. If the Power indicator remains off, call your field service office.

2.2.3 Init Switch
This is a momentary contact switch which causes the HSC50 to initialize and reboot as if powering on. The indicator, when lit, shows the subsystem is beginning the booting process.

When the Init switch is pushed, the HSC50 progresses through the same sequence explained in the previous State and Init Indicators section.

NOTE
The Secure/Enable switch must be in the ENABLE position to use the Init switch.

2.2.4 Fault Switch/Indicator
This assembly is a momentary contact switch and indicator. While this switch is pressed in, all of the OCP indicators are lit. If any one of these indicators is inoperable, call field service.

When illuminated, the Fault LED is evidence of a subsystem problem. To identify the problem, press the FAULT switch once and release, displaying a blinking 5-bit code in the OCP indicators. (The operator can choose to read this code in binary, octal, or hexadecimal.) Refer to Figure 2-2.

The subsystem may or may not continue operation when this indicator is lit, depending on the nature of the fault.

In the case of fatal faults, the system becomes inoperable until the HSC50 is reinitialized. Nonfatal faults, however, do not affect system operation. They are displayed in order of occurrence when the Fault switch is pressed and released.

	HEXA-DECIMAL	OCTAL	INIT	FAULT	ONLINE		
PORT PROCESSOR MODULE FAILURE	01	01	OFF	OFF	OFF	OFF	ON
DISK DATA CHANNEL FAILURE	02	02	OFF	OFF	OFF	ON	OFF
TAPE DATA CHANNEL FAILURE	03	03	OFF	OFF	OFF	ON	ON
I/O CONTROL PROCESSOR MODULE FAILURE	11	21	ON	OFF	OFF	OFF	ON
MEMORY MODULE FAILURE	12	22	ON	OFF	OFF	ON	OFF
TU58 FAILURE	13	23	ON	OFF	OFF	ON	ON
PORT LINK MODULE FAILURE	15	25	ON	OFF	ON	OFF	ON
MISSING REQUIRED FILES	16	26	ON	OFF	ON	ON	OFF
NO WORKING REQUESTORS IN SUBSYSTEM	18	30	ON	ON	OFF	OFF	OFF
REBOOT BEFORE PREVIOUS BOOT COMPLETE	19	31	ON	ON	OFF	OFF	ON
SOFTWARE DETECTED INCONSISTENCY	1A	32	ON	ON	OFF	ON	OFF

CX-281A

Figure 2-2   Operator Control Panel Fault Codes

2.2.4.1   Fault Remediation − If a fault is displayed on the OCP, use Figure 2-2 to find the cause. When the fault is a TU58 failure or if required files are missing, take the following recommended action.

FAULT	RECOMMENDED ACTION
TU58 Failure	Move the inserted tape to the other TU58 drive. Reboot the HSC50.
	Try the backup copy of the tape.
	Troubleshoot a possible TU58 failure.
Missing Required Files	Ensure the correct tape is mounted in the TU58.
	Try the backup copy of the HSC50 System tape.

Detailed error interpretation for the fault codes shown in Figure 2-2 is found in the *HSC50 Service Manual*.

Retain your system error log printout and make notes of any specific fault code(s) for reference by field service personnel. For additional advice on these or other faults not discussed, telephone your field service office.

2.2.5   Online Switch/Indicator
With the Online switch pushed to the in position, any node on the CI can establish a logical connection to the HSC50. When the switch is in the out position, the HSC50 is unable to establish any **new** logical connections with other nodes over the CI bus. However, current logical connections are not broken.

When the Online switch is depressed (in), the HSC50 is placed in the available state. Any node on the CI bus can then attempt to establish a logical connection with the HSC50. In this state, the Online indicator remains off until the first logical connection is established and then lights. At this point, the HSC50 is in the online state.

When the Online switch is out, the HSC50 does not make new logical connections. The Online LED stays on until the last connection is broken by the last host connected to the HSC50.

2.2.6 Blank Indicators
Two blank indicators are used in the fault code display. Other functions are reserved for future use.

2.3 INTERNAL CONTROLS AND INDICATORS
Certain controls and indicators are located inside the HSC50. Open the front door with a key to access the internal controls and indicators. Refer to Figure 2-3.
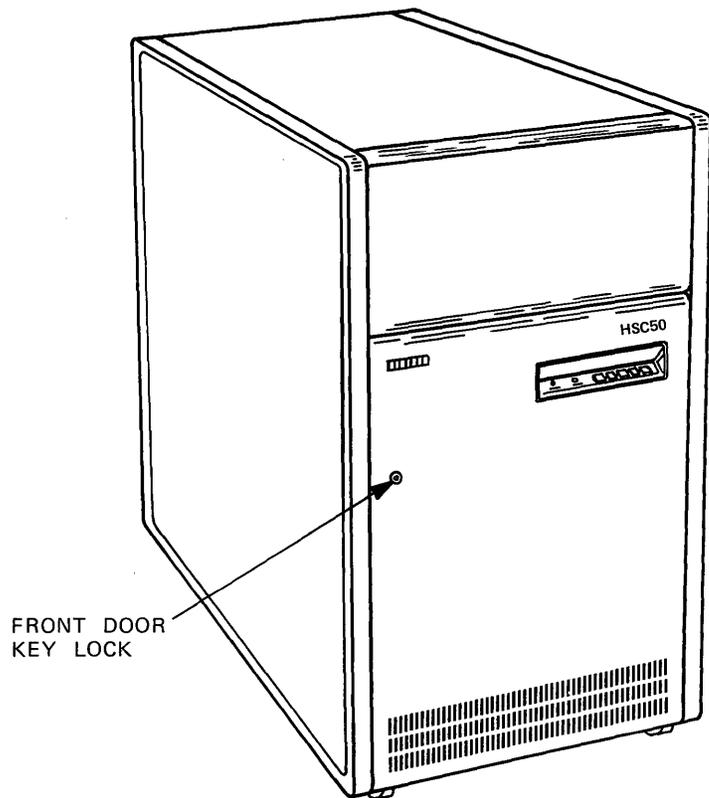
CX—282A

Figure 2-3   HSC50 Front Door

2.3.1 Secure/Enable Switch

Figure 2-4 shows the location of the Secure/Enable switch, a 2-position rocker switch. Its purpose is to control operator access to control panel functions as well as to the diagnostics and utilities.

In the SECURE position, the OCP continues to display the state of the HSC50. When the switch is secured, operator action is restricted to the following extent:

1. Only the Fault and Online switches on the OCP are enabled. Fault codes are normally displayed when the Fault switch is pressed. All other switches on the operator control panel are disabled.

2. Only the SHOW commands may be input using the auxiliary terminal. SHOW commands are described in Chapter 4.

3. Break characters are disabled from the HSC50 console terminal.

In the ENABLE position, the operator controls the system. All auxiliary terminal and front panel operations are enabled. Operator intervention includes the following:

1. Detecting any changes in the OCP switches.

2. Using SET commands from the auxiliary terminal. SET commands are described in Chapter 4.

2.3.2 Enable Indicator

The Enable LED indicator is on when the Secure/Enable switch is in the ENABLE position; off in the SECURE position (Figure 2-4).

2.3.3 TU58 Indicators

Figure 2-4 shows the location of the TU58. It contains two slots (Drive 0 and Drive 1) for the tapes and a run indicator LED for each drive.

In addition, a self-test indicator is located on the bottom of the TU58 controller. This indicator can be viewed through the vents at the top of the TU58 (refer to Figure 2-4).

2.3.3.1 TU58 Run Indicators — Each drive has a LED indicator which lights to show tape in motion.

CAUTION
Data loss can occur if a tape is removed during a Write
operation. The tape should not be removed while the
run indicator LED is on.

2.3.3.2 TU58 Self-Test Indicator — The TU58 self-test indicator LED is observed through the slots on top of the TU58 enclosure. Upon powerup or when the Init switch is pressed, the self-test indicator lights for one-half of a second, goes off for one-half of a second, goes on, and then remains on. Call field service if the self-test indicator goes off after this point.

TU58 SELF—TEST INDICATOR
(VIEWED FROM THE TOP)

TU58 TAPE
CARTRIDGE
STORAGE

DECAL   TU58 DRIVE 0   TU58 DRIVE 1

Secure   Enable   0   1

SECURE/ENABLE
SWITCH
            ENABLE LED   TU58 RUN
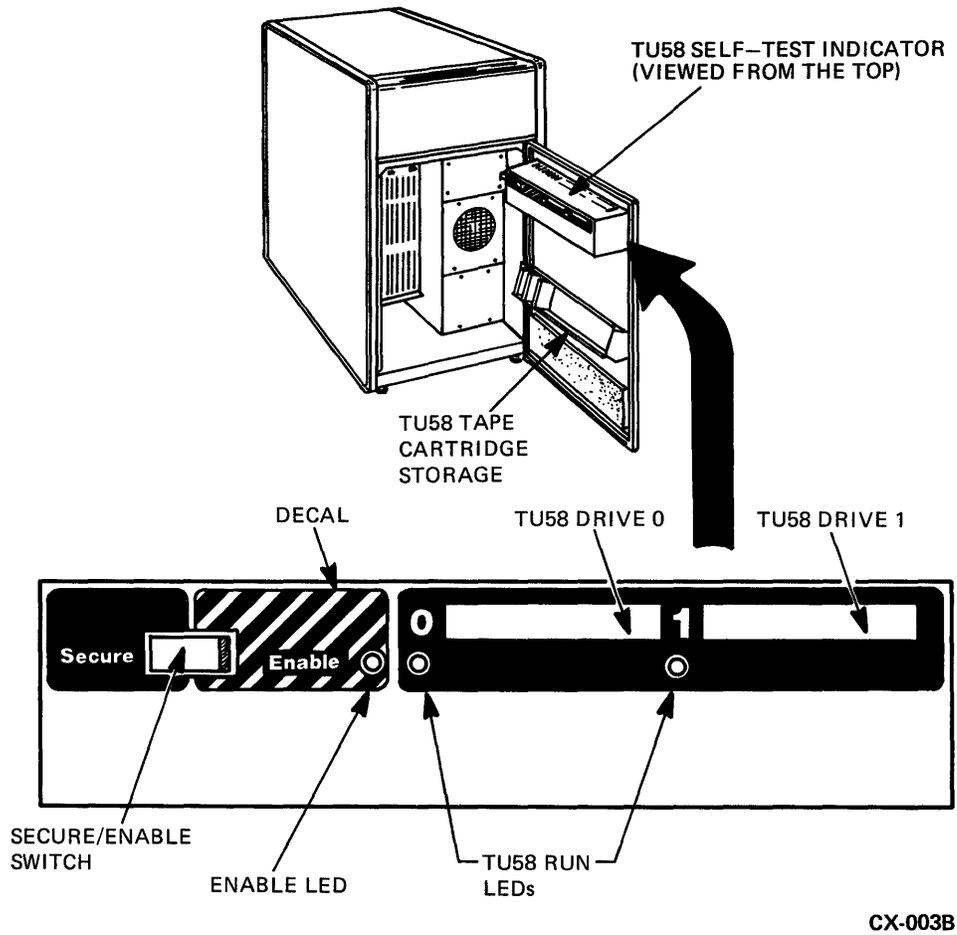   LEDs

CX-003B

Figure 2-4   Inside Front of HSC50 Cabinet

2.3.4 TU58 Tapes

Three prerecorded tapes are shipped with the subsystem. One tape is labeled HSC50 System tape. This tape includes the firmware necessary for subsystem operation and automatic diagnosis. You can use this tape to boot the subsystem. The second is labeled HSC50 Utilities tape and is used in conjunction with the System tape to run inline diagnostics or utility programs while the HSC50 is online. The third tape is labeled HSC50 Offline Diags and contains the offline diagnostics run at installation or during maintenance.

CAUTION
Use the HSC50 System tape only on this HSC50. Each
system tape is written with information unique to each
individual HSC50. Moving a System tape from one
HSC50 to another can cause confusion to other nodes
on the CI.

These tapes are stored in the tape rack on the inside of the front door of the HSC50, shown in Figure 2-4.

NOTE
Upon receipt, two copies of each TU58 tape should be
duplicated for backup purposes. Refer to the TU58
Duplication Utility in Chapter 4 of this document.

Whenever the subsystem is running, the HSC50 System tape must remain in the drive where it was mounted during system boot. Removal of the HSC50 System tape from an operating subsystem significantly degrades such functions as diagnostics, utilities, and error recovery.

During system operation, the HSC50 System tape must be in Write Enable position. Only when Write is enabled can the System Configuration Table (SCT) be updated, automatic periodic TU58 tests perform Write functions, and interactive sessions (such as the Set/Show utility) be run using the System tape.

NOTE
Refer to the *TU58 DECtape II User Guide*
(EK-0TU58-UG) for instructions on loading, unloading,
and care of tapes.

Drive 1 may be used to make backup copies of distributed tapes. You can also use Drive 1 to load the maintenance utility programs.

2.4 BOOTING THE HSC50 USING THE SYSTEM TAPE
Using the HSC50 System tape, boot the HSC50 according to the following procedure:

1. Ensure the Power indicator is on.

2. Check the state of the Online switch. If you want the HSC50 to go online after you boot, ensure the switch is in. If you do not want the HSC50 to go online, ensure the switch is out.

3. Open the front door.

4. Check the HSC50 System tape to ensure the write protect tab is in the write enable position (Figure 2-5). Refer to section 2.3.4 for an explanation of this tab. Insert the HSC50 System tape into one drive of the TU58 (typically Drive 0).

WRITE PROTECT TAB IN
ENABLE POSITION

MOVE RIGHT TO RECORD

MOVE LEFT TO PROTECT

CX–011B
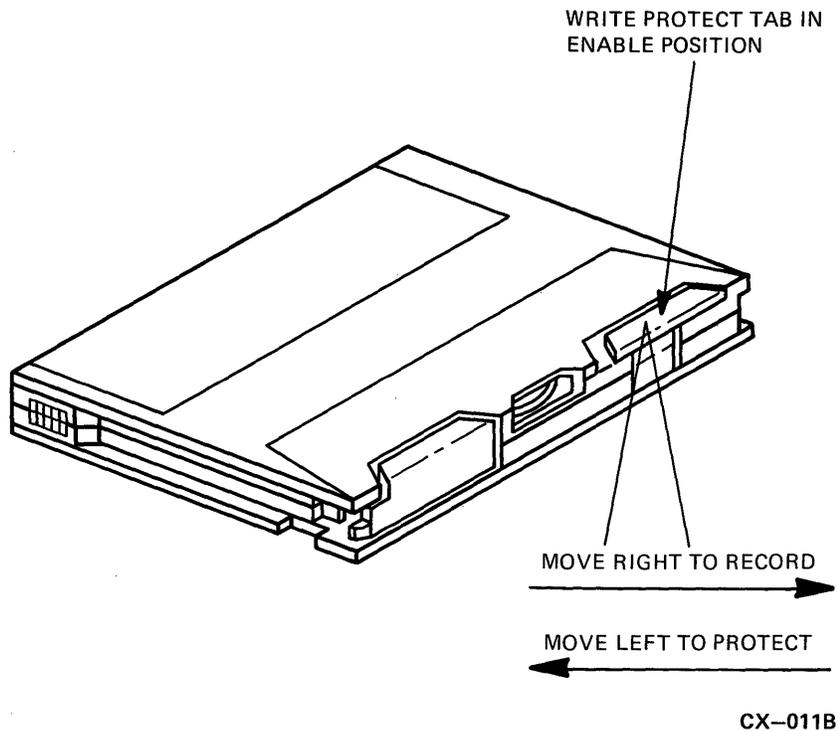
Figure 2-5   TU58 Write Protect Tab

5.   From this point on, tapes are only changed or touched for the following reasons:

   • Tape wears out.

   • Software is updated.

   • Offline diagnostics or programs are desired which are not on the HSC50 System or Utility tape.

6.   Ensure the Secure/Enable switch is in the ENABLE position.

7.   Push and release the Init switch on the OCP.

8.   Notice the Init and State indicators show the different phases the HSC50 progresses through when loading operational firmware. (Refer to section 2.2.1.)

9.   Also, note the start of I/O control processor diagnostics, indicated by the following display on the auxiliary terminal screen:

   INIPIO-I BOOTING...

10.   During the basic diagnostic checkout, the State indicator pulses continuously at a fast rate. When the subsystem is fully operational (within approximately five minutes), the State LED slows its pulse rate and the following message is displayed on the auxiliary terminal:

   HSC50 VERSION VNNN (DATE TIME)

2-8

11. Operational programs may now be run. Instructions for program access and program command descriptions are found in Chapter 3.

12. Place the Secure/Enable switch in the SECURE position. This inhibits accidental operation of the Init switch.

13. Close the front door.

Under the following conditions, the subsystem may automatically reinitialize and reboot:

- Power failure.

- Operational failure detected by a host.

- Operational failure detected by the subsystem.

CHAPTER 3
AUXILIARY TERMINAL OPERATION AND USES

3.1 INTRODUCTION

This chapter explains the operation and usage of the HSC50 auxiliary terminal attached to the back of the HSC50. Connected during initial installation, this terminal is EIA compatible and is set at 9600 baud. Major uses for the terminal are:

- Accessing the HSC50 operational program.

- Running subsystem utilities, inline diagnostics, and offline diagnostics.

- Recording subsystem exceptions and operational failures.

3.2 TERMINAL OPERATION

Consult your terminal user guide for operating instructions not included in the following paragraphs.

NOTE
**The auxiliary terminal may generate a BREAK
character when it is connected/disconnected or powered
on/off while the HSC50 is powered on. As a result, the
I/O control processor may also halt.**

If it is necessary to change the state of connection or power to the auxiliary terminal, use the following procedure:

1. Ensure the Secure/Enable switch is in the SECURE position.

2. Make the change to the terminal.

3. Type three spaces.

If the I/O control processor halts, the State indicator stops pulsing. Use the following procedure after the I/O control processor has halted.

1. Put the Secure/Enable switch in the ENABLE position.

2. Push and release the Init switch to reboot the HSC50.

3. Return the Secure/Enable switch to the SECURE position, if appropriate.

4. Save any hardcopy terminal output which may help field service determine the cause of HSC50 I/O processor halting.

3.2.1 Reinitializing the System Configuration Table

Whenever the System tape is replaced by a different one, the SCT on the replacement tape must be reinitialized. This is accomplished by pushing and releasing the Init switch while holding in the Fault switch. Continue holding the Fault switch until the following message appears on the terminal screen:

```
INIPIO-1 BOOTING
```

This causes a software autoconfiguration and initializes the System tape SCT.

3.2.2 Control Characters

Table 3-1 includes the control characters you can use on the auxiliary terminal with the HSC50 operational program.

Table 3-1 HSC50 Terminal Control Characters

Character	Effect
CTRL/C	Aborts currently running program. Echoes as ^C. CTRL/C performs an implicit CTRL/Q.
DELETE	Erases the last character entered. Echoes as backslash, character, backslash on a hardcopy terminal. Echoes as backspace, space, backspace on a video terminal. The SET [No]SCOPE command must be used to define your terminal type. Refer to the Set Commands in Chapter 4.
CTRL/O	Discards all output until the next input operation or CTRL/O is typed. Echoes as ^O.
CTRL/P	Causes an entry to ODT, if the appropriate ODT set flags are enabled and the Secure/Enable switch is in the ENABLE position. (Refer to the SET commands in Chapter 4.) The HSC50 responds with the command prompt, asterisk *. If CTRL/P is typed accidentally, causing an inadvertent entry into ODT, immediately type ;P to resume normal operation.
CTRL/Q	Resumes output.
CTRL/R	Repeats the current line. Echoes as ^R and repeats the current line. CTRL/R can be used to check the accuracy of a line containing numerous corrections.
CTRL/S	Stops output.
CTRL/U	Erases all input characters. Echoes as ^U and repeats the last prompt (if any).
CTRL/Y	Aborts the currently running program (if any) and alerts the HSC50 to accept a command. Echoes as ^Y. The HSC50 responds with the command prompt, HSC50>.

Table 3-1 HSC50 Terminal Control Characters (Cont.)

Character	Effect
CTRL/Z	Erases all input characters and signals the end of transmission.
	Signals end of input if typed at the command prompt, HSC50 >, and disables further input over the auxiliary terminal until CTRL/C or CTRL/Y is typed.
	Signals end of session if typed at a specific program (for example, ILEXER) prompt level. The program defaults remaining prompts and begins execution.
	Echoes as ^ Z.

3.3 ACCESSING THE HSC50 OPERATIONAL PROGRAM

Following paragraphs describe access to the HSC50 operational program. (Items in bold lettering include both screen displays and user input.)

If the auxiliary terminal is connected when you boot the HSC50 operational program, the following message appears:

HSC50 VERSION VNNN (DATE TIME)

Before you can enter a command, you must type

CTRL Y

in order to receive the

HSC50>

prompt.

NOTE
You must respond with an operational program command within five minutes or the auxiliary terminal keyboard deactivates.

If the HSC50 operational program is already running when you connect the auxiliary terminal, you do not receive a **HSC50 Version Vnnn (Date Time)** report. Instead, you type

CTRL Y

to receive the

HSC50>

prompt.

3.3.1 HSC50 Operational Program Commands

You can enter any one of five operational program commands (DIRECTORY, RUN, SET, SHOW, and EXIT) after you have received the

```
HSC50>
```

prompt. After a response is completed, you must enter another

```
CTRL Y
```

to receive the

```
HSC50>
```

prompt before entering another command.

3.3.1.1 Accessing the System Tape Directory — Use the DIRECTORY command to display a directory of the HSC50 System tape.

Type

```
DIR
```

> **NOTE**
> DIR DDn: produces a directory of the tape in TU58
> slot n. DIR LB: produces a directory of the TU58 tape
> which booted the HSC50.

3.3.2 Running Utilities and Diagnostics

Use the RUN command to run a utility program or an inline diagnostics program. When an offline diagnostic runs, the specified unit cannot be accessed for normal I/O. (An inline diagnostic program, however, can be run while continuing to service host requests.)

Type

```
RUN <PROGRAM NAME>
```

3.3.2.1 Utility Programs — Utility programs you can run are listed below and described in Chapter 4.

- HSC50 Set/Show
- Backup
- Restore
- Disk Formatter
- Disk Verifier
- TU58 Patch
- TU58 Duplication

3.3.2.2 Inline Diagnostics − The following paragraphs describe the inline diagnostics programs you can run. Abbreviated program names appear in parentheses, followed by program descriptions.

- **Inline TU58 Test (ILTU58)** − This diagnostic tests and exercises the TU58 interface and drive. The diagnostic consists of a Read/Write test of one block on the tape. No scratch tape is required as TU58 data is not destroyed.

  The device name of the tested TU58 is the only user prompt for this program:

  ```
  DEVICE NAME OF TU58 TO TEST (A) [] ?
  ```

  The (A) indicates an ASCII string is expected. The [] indicates no default value exists for the prompt. The user must enter one of the following strings:

  - `DD0:`

  - `DD1:`

  - `LB:`

  > **NOTE**
  > Entering either DD0: or DD1: selects a specific physical drive. Entering LB: selects the drive which previously booted the system.

  If one of the above strings is not entered, the programs displays

  ```
  ILTU58>D>ILLEGAL DEVICE NAME
  ```

  and the prompt is repeated.

  At the end of the program, the following message is displayed:

  ```
  ILTU58>D>(TIME) EXECUTION COMPLETE
  ```

  > **NOTE**
  > Refer to the *HSC50 Installation Manual* for a description of the user prompts for each of the following inline diagnostics programs.

- **Inline Disk Drive Test (ILDISK)** − This diagnostic tests a specific drive called out by the operator. The drive is then dedicated to the testing. The testing consists of initiating the drive-resident diagnostics and executing a series of I/O operations on the drive. These operations include positions, reads, and writes based on available drive characteristics.

- **Inline Exerciser (ILEXER)** − This diagnostic exercises up to 12 disks and/or tapes. The exerciser functions randomly with regard to sequences of drives, data patterns, and operations. Full subsystem error handling and correcting features are employed.

- **Inline Tape Diagnostic (ILTAPE)** − This diagnostic tests a specific tape formatter dedicated to the test. ILTAPE initiates all formatter-resident diagnostics and executes a series of I/O operations on the tape drives connected to that formatter. An 80 percent fault isolation between formatter, STI, and tape drive is achieved by this diagnostic.

- **Inline Tape Compatibility Test (ILTCOM)** − This diagnostic is an inline compatibility test for tapes that may have been written on different systems and different drives. ILTCOM tests such tapes for compatibility with STI TA78 drives connected to an HSC50. A compatibility tape can be generated, modified, read, or listed by this test. Compatibility tapes contain files with specific data patterns and data read from them is compared to the expected pattern.

- **Inline Memory Diagnostic** − (ILMEMY) − Inline memory tests the data buffers that previously produced parity errors during use by the HSC50 control program. Failing buffers are automatically tested by ILMEMY. This diagnostic checks for previous testing of the same buffer and retires buffers that have been tested before. If the failing buffer was previously untested, it is tested at this point. When the test completes successfully, the buffer is returned to service and, if it fails, it is not used again. Typically, this diagnostic runs in an automatic mode, but it can be initiated by operator request.

3.3.2.3 Use of SET, SHOW, and EXIT Commands − Use the SET command when you want to set a subsystem parameter.

NOTE
To use the SET commands, the Secure/Enable switch must be in the ENABLE position. Some of these commands may initiate an HSC50 reboot process.

Type

```
SET <PARAMETER>
```

Refer to Chapter 4 for the SET commands.

Use the SHOW command when you want to display a subsystem parameter.

Type

```
SHO <PARAMETER>
```

Refer Chapter 4 for the SHOW commands.

Use the EXIT command when you want to exit a utility or an inline diagnostics program.

Type

```
EXIT
```

3.3.3 Subsystem Exceptions
If a subsystem exception is encountered, the HSC50 reboots and the terminal displays an error message in the following format:

```
SINI-E ERROR SEQUENCE N. AT DD-MON-YY HH:MM:SS.DD
      LAST SOFT INIT CAUSED BY FFFFFF FFFFFF
      FROM PROCESS PPPPP
      PC AAAAAA
      PSW PPPPPP
      STACK DUMP: NNNNNN NNNNNN NNNNNN
```

Ensure printed hardcopy of the subsystem exception information is saved for the field service representative.

4.1 INTRODUCTION

This chapter describes the HSC50 utilities programs run from the auxiliary terminal. A list of these utilities with the abbreviated program name in parentheses, follows:

- Set/Show (SETSHO)

- Backup (BACKUP)

- Restore (RESTOR)

- Disk Formatter (FORMAT)

- Disk Verifier (VERIFY)

- TU58 Patch (TPATCH)

- TU58 Duplication (TUCOPY)

To obtain the command prompt

`HSC50>`

the System tape must be mounted and Control Y (^Y) keyed to an auxiliary terminal. At this point, enter the appropriate program command explained in the following paragraphs.

4.2 SUBSYSTEM PARAMETER ALTERATION/DISPLAY (SET/SHOW)

The Set/Show utility is an operating tool for examining and changing the internal state of the HSC50. This utility allows the operator to control portions of the HSC50 decision-making process.

SET and SHOW run simultaneously as a single procedure. SET is used to change parameters of the HSC50; SHOW is used to display its various parameters and states.

You cannot use the SET function if the Secure/Enable switch is in the SECURE position. However, this switch has no effect on the SHOW function.

4.2.1 Initiating the Set/Show Utility

After obtaining the command prompt (HSC50>), SETSHO is utilized, allowing certain options. From the HSC50 terminal, enter:

1. A single SET or SHOW command

2. A full interactive session, entering multiple SET and SHOW commands

To enter a single command, type either the word SET or SHOW followed by any valid SETSHO command or a carriage return.

To initiate an interactive session, you must type the words RUN SETSHO. SETSHO then indicates it is loaded properly and it is ready for user input by displaying the following:

SETSHO>

Then you can enter any valid SETSHO command. Other options are: entering the keyword SET or SHOW followed by a carriage return, or entering EXIT, HELP, HELP SET, HELP SHOW. These SETSHO specific commands are not followed by a carriage return.

4.2.1.1 Miscellaneous Commands –

- Typing the following prompts a display of all valid commands for SET or SHOW or both, if neither is specified.

  - HELP
  - HELP SET
  - HELP SHOW

- ^ Z – Takes default values for as many consecutive optional parameters as possible then prompts for nondefaultable parameters (if any).

- **EXIT** – Exits the SETSHO process after updating the system configuration table (SCT) on the TU58 if necessary. If the changes warrant a reboot of the system, the command issues the following prompt:

  REBOOTING HSC; Y TO CONTINUE, CNTRL Y TO ABORT:

- ^ C or ^ Y – Exits the SETSHO utility without any changes to the HSC50 system configuration table (SCT).

If you key in a carriage return without entering an option, SETSHO prompts for input by displaying:

WHAT>

At this point, enter a valid SET or SHOW option. If a SET option is followed by a carriage return, you are prompted by:

TO>

Enter any valid SET command. If the SET command contains more than one option, the prompt is:

WHICH>

Enter any valid SET command option.

4.2.2 SET Commands

Following paragraphs describe the SET and SHOW commands used with the SET/SHO utility program. Items in brackets [ ] indicate options for the commands. Items in parentheses ( ) indicate the legal command abbreviations (a minimum of three characters). When using either the parameters or options, do not type the brackets or parentheses.

Most of the SET commands take effect upon the next initialization of the HSC50.

NOTE
Where applicable, bolded letters indicate the initial
command default of the HSC50 Utilities tape, before
being changed via the SET command.

Set Allocate Disk n (SET **ALL** DIS n)
Set Allocate Tape n (SET **ALL** TAP n)

    The character n is a decimal number in a range 0 through 255. This command is used in conjunction with VAXcluster functionality and the initial default value is 0.

Set Automatic__Diagnostics Enable (SET AUT **ENA**)
Set Automatic__Diagnostics Disable (SET AUT DIS)

    The execution of automatically scheduled diagnostics is enabled or disabled the next time the HSC50 is initialized.

Set CI nn (SET CI nn)
Set CI All (SET CI **ALL**)

    Displays the event counters returned by the port processor module. This command causes the port processor module to set these event counters to zero. It also directs the port processor to begin statistics collection for the specified (nn) node or all nodes. The symbol nn is a decimal number from 0 to 15.

Set Date date and time (SET DA nn-nnn-nnnn:n:nn:nn)

    Sets the subsystem date and time. An example of the format follows. Notice the colon between the year and time.

        SET DATE 22-JAN-1984:8:22:57

Set Disk Dnnn [No]Host__Access (SET Dnnn [NO]**HOS**)

Denies or permits all host access to the specified mass storage unit. Requests already received may or may not be completed. This command must be entered again after an HSC50 reboot and after several clock resumptions from the disk.

NOTE
Do not use the following command unless directed to do so by a DIGITAL representative.

Set [No]Dump Console (SET [NO]**DUM** nn)

Enables/disables crash dump action upon system failure.

Set Error error-level [/PER] (SET ERR nnnnnnn [/PER])

Sets the error levels displayed on the HSC50 console terminal. The /PER option sets the level permanently across system initialization. Valid error-level options follow. (All options must be completely spelled out.)

• **SUCCESS** − all error messages are displayed.

• **INFO** − informational, warning, error, and fatal error messages are displayed.

• **WARNING** − warning, error, and fatal error messages are displayed.

• **ERROR** − error and fatal error messages are displayed.

• **FATAL** − fatal messages only are displayed.

Set Host Enable nnn (SET HOS ENA nnn)
Set Host Disable nnn (SET HOS DIS nnn)
Set Host Enable [/ALL] (SET HOS ENA /**ALL**)
Set Host Disable [/ALL] (SET HOS DIS /ALL)

Disables or enables the host connect to the specified (nnn) node (or all nodes) from the HSC50. The symbol nnn is a decimal number from 0 to 15. This command is effective upon the next HSC50 initialization.

Set ID%Xnnnnnnn (SET ID%Xnnnnnnn)

Sets the HSC50 system identification the next time the HSC50 is initialized. The nnnnnnn field represents a 48-bit hexadecimal number larger than 0 and no larger than 7FFFFFFFFFFF.

NOTE
Do not use the following command with module options CI, DF, DM, EL, MR, and TF unless directed to do so by a DIGITAL representative.

Set [No]Load module option (SET [NO] LOA nnnn)

Controls which system software modules are loaded the next time the HSC50 is initialized.

1.   CI − CI Manager or CI Emulator

2.   DF − Disk Functional Code and DFECC

3.   DM − DEMON

4.   EL − Central Error Logging

5.   TF − Tape Functional Code

6.   RS − CI Responder

NOTE
Do not use the following SET MAX__FORMATTER
or SET MAX__TAPE commands unless directed to
do so by a DIGITAL representative.

Set Maximum Formatters nnn (SET MAX__F nnn)

Sets the maximum number of formatters used the next time the HSC50 is initialized. The nnn field is a decimal number from 1 to 24.

Set Maximum Tapes nnn (SET MAX__T nnn)

Sets the maximum number of tape drives used the next time the HSC50 is initialized. A decimal integer 1 to 96 is placed in the nnn field.

Set Memory Enable/All (SET MEM **ENA/ALL**)
Set Memory Disable address-id (SET MEM DIS nnn)

Enables or disables the specified location (address-id) in HSC50 memory the next time the HSC50 is initialized. Address-id is an octal number from 0 to 16777777.

Set Name nnnnnn (SET NAM nnnnnn)

When this command is used to set a name associated with the HSC50 subsystem, the SETSHOW utility accepts the following as valid characters: A thru Z; 0 thru 9; dollar sign ($); underscore (__).

However, when the HSC50 subsystem is used as a node within a VAXcluster, the node name should consist of six or fewer alphanumeric characters. Alphabetic characters only are permitted in the leading position. Unless these conditions are met, a situation could arise where devices attached to the HSC50 subsystem are unreachable from any VMS host.

NOTE
Do not use the following three commands unless
directed to do so by a DIGITAL representative.

Set [NO]ODT
Set [NO]ODT INIT__BPT
Set [NO]ODT DUMP__BPT

> Enables/disables ODT SCT flags the next time the HSC50 is reinitialized. Set ODT INIT and Set ODT DUMP are functional only when Set ODT is enabled. The following enable/disable options are available:

- To allow ODT to exist in the HSC50 subsystem — ODT

- Enable ODT to be entered during HSC50 initialization — ODT INIT__BPT

- Enable ODT to be entered after a crash dump — ODT DUMP__BPT

- Disallow ODT to exist in the HSC50 subsystem — NOODT

- Disable ODT to be entered during HSC50 iniltialization — NOODT INIT__BPT

- Disable ODT to be entered after a crash dump — NOODT DUMP__BPT

Set Outband error-level [/PER] (SET OUT nnnnnnn [/PER])

> Controls which out-of-band error logs are sent to hosts. The /PER option sets the level permanently across system initialization. Valid error-level options are listed below. (All options must be completely spelled out.)

- **SUCCESS** — all error messages are displayed.

- **INFO** — informational, warning, error, and fatal error messages are displayed.

- **WARNING** — warning, error, and fatal error messages are displayed.

- **ERROR** — error and fatal error messages are displayed.

- **FATAL** — fatal messages only are displayed.

Set [No]Periodic__Diagnostics nn (**SET [NO]PER nn**)

> Execution of periodically-scheduled diagnostics is enabled or disabled the next time the HSC50 is initialized. When this command is enabled, it establishes the minimum time interval (nn) between periodically-scheduled diagnostics (a decimal number from 1 to 59, indicating minutes). The default setting (SET PER) enables periodically-scheduled diagnostics, with n equal to 1.

Set Requestor nn Enable (SET REQ nn **ENA**)
Set Requestor nn Disable (SET REQ nn DIS)

> Denies or permits host access to the specified requestor (nn) and all resources it controls the next time the HSC50 is initialized. Requestor numbers for nn are in the range 2 through 9. The default enables all working requestors within the subsystem.

Set Restart Warm (SET RES **WAR**edc)
Set Restart Cold (SET RES COL)

> Currently, not implemented.

Set Restart Clear (SET RES CLE)

Clears the exception context table in the system configuration table.

Set [No]Scope [/PER] (SET [NO]SCO [/PER])

Identifies the current ASCII serial line being used as a hardcopy or a video terminal connection. The /PER option allows a permanent setting across system initialization. Following are the legal options for this command:

- SET SCO − Sets the serial line as a video terminal.

- SET NOSCO − Sets the serial line as a hardcopy terminal.

- SET SCOPE/PER − Sets the serial line as a video terminal whenever the HSC50 is initialized.

- SET NOSCOPE/PER − Sets the serial line as a hardcopy terminal whenever the HSC50 is initialized.

Set SCT Clear (SET SCT CLE)

Causes the current system configuration table (SCT) to be deleted and the template SCT to be used the next time the HSC50 is initialized.

Set Sector__Size **512** [576] (SET SEC nnn)

Sets the HSC50 logic to recognize disk sectors as either 512 or 576 bytes (nnn) per sector the next time the HSC50 is initialized.

Set tape-id [NO]HOST__ACCESS (SET Tnnn [NO]**HOS**)

Denies/permits all host access to the specified formatter or drive. Requests already received may or may not be completed.

4.2.3 SHOW Commands
Show All (SHO ALL)

Executes all SHOW commands except:

- Show Exception

- Show Disk-id

- Show Tape-id

- Show OCP

Show CI (SHO CI)

Displays the event counters returned by the port processor module. This causes the port processor module to set these event counters to zero and to continue collecting statistics for the same node(s).

Show Control__Blocks (SHO CON)

Displays the number of control memory blocks and short lifetime control memory blocks allocated the next time the HSC50 is initialized.

Show Disks (SHO DIS)

Displays the status of all disks attached to the HSC50. Major drive characteristics are displayed for each controller-online drive. A coded number corresponding to drive microcode (MC) and a number representing hardware revision (HV) provide the most current information on drive configuration.

Show Error (SHO ERR)

Displays on the HSC50 terminal the error message levels for the current operation and those for the next HSC50 initialization. The following message levels can be displayed:

- SUCCESS − All messages are displayed.
- INFO − Informational, warning, error, and fatal error messages are displayed.
- WARNING − Warning, error, and fatal error messages are displayed.
- ERROR − Error and fatal error messages are displayed.
- FATAL − Fatal messages only are displayed.

Show Exception (SHO EXC)

Displays the current exception context list in the SCT.

Show Hosts (SHO HOS)

Displays the list of disabled and enabled hosts currently in the SCT.

Show Lines (SHO LIN)

Displays the status of the ASCII serial line ports.

Show Load (SHO LOA)

Displays the current software modules loaded the next time the HSC50 is initialized.

Show Max__Formatter (SHO MAX__F)

Displays the current maximum number of formatters used the next time the HSC50 is initialized.

Show Max__Tape (SHO MAX__T)

Displays the current maximum number of tapes used the next time the HSC50 is initialized.

Show Memory (SHO MEM)

Displays the contents of the disabled and suspect memory lists.

Show OCP (SHO OCP)

Displays the current Operator Control Panel settings in the SCT.

Show ODT (SHO ODT)

Displays the current ODT settings in the SCT.

Show Outband (SHO OUT)

Shows out-of-band errors sent to hosts for the current operation and those levels to be used at the next HSC50 initialization. If SET OUT has determined error levels, those errors only are shown. If no level is set, the default shows informational through fatal error levels (defined in Set Outband).

Show Pool (SHO POO)

Displays the current quantity of free control memory blocks, short lifetime control memory blocks, and buffers.

Show Requestors (SHO REQ)

Displays the status of each of the HSC50 backplane requestor slots. The board type is displayed and a status code is reported.

Show System (SHO SYS)

Displays the following system parameters:

- Date
- Uptime
- System version number
- System identification
- System name
- Front panel key status
- Sector size
- Settings of the automatic core dump flags
- Restart setting
- Diagnostic flags and intervals
- Disk and tape allocation class values

Show Tapes

Displays the status of all known tapes and formatters. Major characterics are displayed for all controller-online tape drives. The most current information on formatter and tape drive configuration is shown by coded numbers corresponding to the tape drive microcode (DMC), drive hardware revision (DHV), formatter microcode (FMC), and formatter hardware revision (FHV).

Show Virtual__Circuits (SHO VIR)

Displays the virtual circuit table (VCT) for nodes 0 through 15.

Restrictions − All values displayed are those valid at the time of the inquiry. Certain values (such as ERRORS, DAYTIME, and specific location contents) are subject to constant change.

4.3 BACKUP UTILITY
The BACKUP utility is used to physically back up either 512- or 576-byte disks to tape(s). Located on the HSC50 Utility tape, the BACKUP program is initiated by typing

```
CTRL/Y
```

followed by

```
RUN DDn:BACKUP
```

where n is the number of the TU58 drive containing the Utility tape.

After BACKUP is invoked, a series of prompts are presented to the user. These prompts include requests for all the required user input and continue throughout the operation of this utility. An invalid user response causes the output of an appropriate message and a reissue of the prompt. Operations are terminated at any point in the operation by entering a control C or control Y character from the terminal keyboard.

Beginning with the first prompt

```
BACKUP-0 ENTER DISK UNIT NUMBER?
```

the BACKUP utility moves through a series of messages and prompts until its conclusion.

Error and informational message are provided throughout the process.

4.4 RESTORE UTILITY
Used in conjunction with the BACKUP utility and also located on the Utilities tape, RESTORE is used to retrieve backed up tape data for either a 512- or 576-byte disk.

This program is invoked by typing

```
CTRL/Y
```

followed by

```
RUN DDHn:RESTOR
```

where n is the number of the TU58 drive containing the Utilities tape.

As in the BACKUP utility, all required user input is prompted continuously throughout the program. Error and informational messages are also included. Demand termination is possible using the same process as previously described in the BACKUP utility.

4.5 DISK FORMATTER (FORMAT)

NOTE
Do not use this program unless directed to do so by
a DIGITAL representative.

This utility reformats the specified offline disk unit. In the process, all previously-written files may be destroyed. Because the program automatically replaces any bad sectors, the result is a logically perfect disk media. The disk to be formatted must be dedicated to the utility and offline to the host. The total number of logical blocks is reduced when a 576-byte drive is formatted to the 512-byte mode.

4.6 DISK VERIFIER (VERIFY)

This utility is used to check the integrity of an offline disk. Any discrepancies or faulty blocks are reported. Information about revectors and bad replacement block numbers is printed. In addition, a printed summary of the faulty blocks and the revectors by type is available.

4.7 TU58 PATCH (TPATCH)

The TU58 Patch Utility (TPATCH) updates the HSC50 tapes as changes are made to the programs. With each patch release by Digital you will receive step-by-step instructions for using TPATCH.

4.8 TU58 DUPLICATION (TUCOPY)

This program allows TU58 cassettes duplication. Backup copies of TU58 cassettes are user maintained. Use this program to make two backup copies each of the system tape, the utilities tape, and the offline diagnostics tape.

A typical printout of a successful copying session follows. (Bolded items represent user responses to screen prompts.)

```
^Y
HSC50> RUN TUCOPY
TUCOPY> SOURCE UNIT (U) [DD0]? <RET>
TUCOPY>TARGET UNIT (U) []? DD1
TUCOPY>FULL VERIFICATION (Y/N) [Y]? Y
TUCOPY>REALLY COPY DD0: TO DD1:, VERIFY (Y/N) [N]? Y
TUCOPY>MOUNT SOURCE TAPE IN DD0:, RETURN TO CONTINUE: <RET>
TUCOPY>MOUNT TARGET TAPE IN DD1: (WRITE ENABLED), RETURN TO CONTINUE: <RET>
TUCOPY>BEGINNING COPY...
TUCOPY>EXITING...
```

Upon the exit of TUCOPY, the backup tape is complete.

CHAPTER 5
CUSTOMER EQUIPMENT CARE

5.1 INTRODUCTION

This chapter contains instructions for cleaning the HSC50 front door filter and references information concerning the TU58 DECtape II.

5.2 HSC50 FRONT DOOR FILTER

Customers are responsible for cleaning and inspecting the HSC50 front door filter at least once every six months. (Refer to Figure 5-1.)
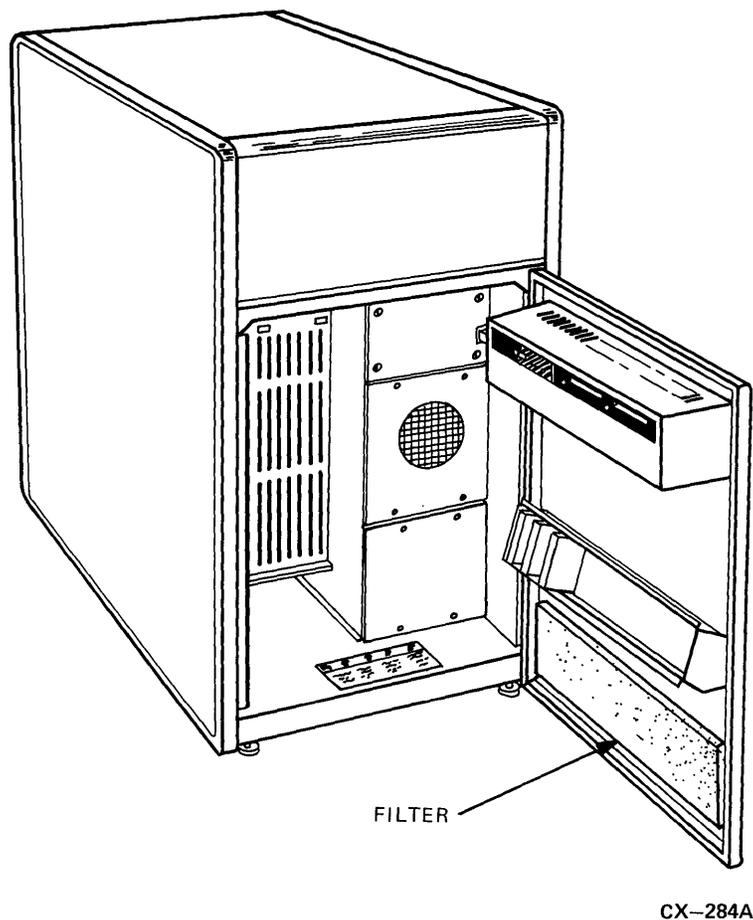
FILTER

CX–284A

Figure 5-1   Front Door Filter Location

Following is the filter cleaning procedure:

1. Remove the filter by separating it from the black plastic strip securing it to the front door.

2. Wash the filter with detergent and water and rinse it thoroughly. Let the filter air dry completely before replacing it in the HSC50.

3. Replace the filter by reattaching it to the black plastic strip.

5.3 TU58 DECtape II

For customer equipment care information, refer to the *TU58 DECtape II User Guide* (EK-0TU58-UG).