

# HSD05 DSSI-to-SCSI Bus Adapter

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## Operation Information for BA400-Based VAX 4000 Systems

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# Preface

This manual describes the procedures for configuring and operating the HSD05 DSSI-to-SCSI bus adapter in BA400-based VAX 4000 systems. It also contains operating information for the SCSI options that are available for use with the HSD05 DSSI-to-SCSI bus adapter. For ease of readability, the BA400-based VAX 4000 systems will be referred to as the VAX 4000 systems throughout this manual.

## Intended Audience

This manual is for customers and Digital employees responsible for BA400-based VAX 4000 systems using the HSD05 DSSI-to-SCSI bus adapter.

## Structure

This manual is structured as follows:

Chapter 1	Contains configuration and operating information for the HSD05 DSSI-to-SCSI bus adapter.
Chapter 2	Contains operating information for the RZ-series integrated storage elements.
Chapter 3	Contains operating information for the TZ86 and TZ87 cartridge tape subsystems.
Chapter 4	Contains operating information for the RRD43 CD-ROM and TLZ07 DAT tape drive.

## Related Documentation

The following documentation may be helpful in using the HSD05 DSSI-to-SCSI bus adapter and the associated SCSI options.

Title	Part Number
<i>BA400-Series Enclosures Storage Devices Installation Procedures</i>	EK-BA44A-IN
<i>HSD05 DSSI-to-SCSI Bus Adapter Installation Guide for BA400-Based VAX 4000 Systems</i>	EK-HSDD5-IN
<i>VAX/VMS Guide to Using Command Procedures</i>	AA-H782B-TE
<i>VAX/VMS Command Language User's Guide</i>	AA-DO23C-TE
<i>OpenVMS System Manager's Manual: Essentials</i>	AA-PV5MB-TK
<i>OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems</i>	AA-PV5NB-TK
<i>Guide to VAX/VMS Disk and Magnetic Tape Operations</i>	AA-M539A-TE
<i>VAX/VMS Backup Utility Reference Manual</i>	AA-Z407B-TE

## Conventions

The following conventions are used in this manual.

Convention	Description
<b>boldface type</b>	Boldface type indicates the first instance of terms being defined in text. In code examples, user input is shown in boldface type.
<i>italic type</i>	Italic type indicates emphasis and complete manual titles.
VAX 4000 system	A shortened term used throughout this manual refers to the BA400-based VAX 4000 system.
OpenVMS VAX system	A shortened term indicating the OpenVMS operating system for VAX hardware.
<b>NOTE</b>	Provides general information about the current topic.
<b>CAUTION</b>	Provides information to prevent damage to equipment or software.

# 1

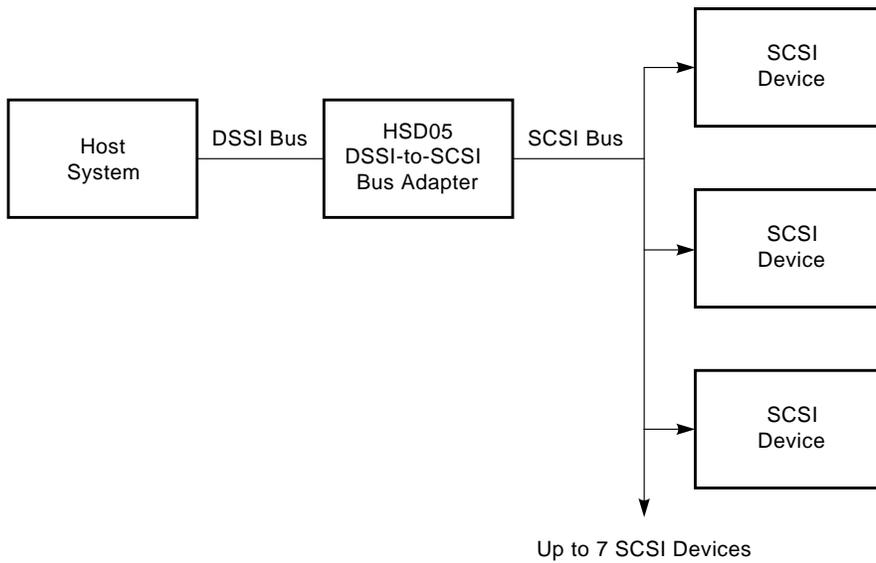
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## HSD05 DSSI-to-SCSI Bus Adapter Operation

The HSD05 DSSI-to-SCSI bus adapter is used to connect a Digital host system's Digital Storage Subsystem Interconnect (DSSI) bus to up to seven small computer system interface (SCSI) drives.

This chapter presents a basic description of the HSD05 DSSI-to-SCSI bus adapter's features, performance, operating environment, and controls and indicators. It also presents configuration and operation information for the HSD05 DSSI-to-SCSI bus adapter. Figure 1-1 presents a typical HSD05 installation, showing the relationship among basic system components.

**Figure 1-1 Typical HSD05 DSSI-to-SCSI Bus Adapter Installation**



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## 1.1 HSD05 DSSI-to-SCSI Bus Adapter Description

Connecting to a single port on a BA400-based VAX 4000 system DSSI bus, the HSD05 DSSI-to-SCSI bus adapter provides connectivity for up to seven SCSI disks or five SCSI disks and one SCSI tape device.

A DSSI bus connects to the HSD05 (installed in a BA400-series enclosure) either internally through the system CPU, or externally through a connector on the connector panel to the left of the card cage; SCSI bus connection is made through a backplane connector (J30). The HSD05 is a TMSCP/MSCP-compliant device that performs the translations required to support devices conforming to SCSI or SCSI-2 protocols. The HSD05 supports the following devices in VAX 4000 systems:

- TZ86 series cartridge tape subsystem
- TZ87 series cartridge tape subsystem
- TLZ07 digital audio tape drive
- RZ26L disk drive
- RZ28 disk drive
- RZ73 disk drive
- RZ74 disk drive
- RRD43 CD-ROM drive

Table 1–1 contains a listing and description of option numbers for the HSD05 DSSI-to-SCSI bus adapters, and for the integrated storage elements (ISEs) and tape subsystems that are supported by the HSD05.

**Table 1–1 HSD05 and Supported Options for a BA430/BA440/BA441 Enclosure**

<b>Option Number</b>	<b>Description</b>
HSD05-JA	HSD05 option factory installed in BA430/BA440 enclosures.
HSD05-JF	HSD05 option field installable in BA430/BA440 enclosures.
HSD05-JG	HSD05 option factory installed in BA441 enclosures.
HSD05-JH	HSD05 option field installable in BA441 enclosures.
RZ26L-AA	Single drive RZ26L-E ISE factory installed.
RZ262-AA	Dual drive RZ26L-E ISE factory installed.
RZ26L-AF	Single drive RZ26L-E ISE field installable.
RZ262-AF	Dual drive RZ26L-E ISE field installable.
RZ28E-AA	Single drive RZ28-E ISE factory installed.
RZ282-AA	Dual drive RZ28-E ISE factory installed.
RZ28E-AF	Single drive RZ28-E ISE field installable.
RZ282-AF	Dual drive RZ28-E ISE field installable.
RZ73E-AA	RZ73-E ISE factory installed.
RZ73E-AF	RZ73-E ISE field installable.
RZ74E-AA	RZ74-E ISE factory installed.
RZ74E-AF	RZ74-E ISE field installable.
TZ86-JA	TZ86-BA ISE factory installed.
TZ86-JF	TZ86-BA ISE field installable.
TZ87-JA	TZ87-BA ISE factory installed.
TZ87-JF	TZ87-BA ISE field installable.
DL-TLZ07-JA	TLZ07-BA/RRD43-AA dual ISE factory installed.
DL-TLZ07-JF	TLZ07-BA/RRD43-AA dual ISE field installable.
TLZ07-JA	TLZ07-BA ISE factory installed.
TLZ07-JF	TLZ07-BA ISE field installable.
RRD43-JA	RRD43-AB ISE factory installed.
RRD43-JF	RRD43-AB ISE field installable.

One or more HSD05 DSSI-to-SCSI bus adapters can be connected on the DSSI bus containing RFxx/TFxx drives, host nodes, or other DSSI-compliant nodes (up to eight nodes maximum).

### **1.1.1 HSD05 DSSI-to-SCSI Bus Adapter Features and Capabilities**

The HSD05 DSSI-to-SCSI bus adapter provides the following features:

- Support for OpenVMS VAX systems
- Multihost support for up to three host DSSI nodes in a cluster environment
- User-selectable SCSI and DSSI node IDs
- DUP support for modifying operating parameters, such as DSSI nodename and device allocation classes
- Host-based striping
- Host-based volume shadowing (with some restrictions, see Section 1.1.2.1)

The HSD05 DSSI-to-SCSI bus adapter also exhibits the following performance metrics:

- 500+ requests/second (aggregate)
- 1.7 MB/second sustained throughput (aggregate)

Each device served by the HSD05 DSSI-to-SCSI bus adapter is independently addressable. Attached disk and tape drives appear to the host as standard DIGITAL storage architecture (DSA) devices. Disk allocation class is user-definable, with all attached disks sharing the class value. Tape allocation class is independently user-definable in the same manner.

The HSD05 DSSI-to-SCSI bus adapter identifies itself as a node on the DSSI bus. The HSD05 DSSI-to-SCSI bus adapter identifies attached disk devices as RF72 or RA82 disk drives, and attached tape devices as TU81 tape drives. This identification is in device name only, and does not reflect actual device geometries.

## 1.1.2 Overview of HSD05 Operating Requirements/Limitations

The HSD05 DSSI-to-SCSI bus adapter normally serves as a terminating end of the SCSI bus. Its factory-default SCSI node address, or SCSI ID, is 7.

The HSD05 DSSI-to-SCSI bus adapter itself should only be removed when the power is off to all nodes on the DSSI bus that is attached to the HSD05 DSSI-to-SCSI bus adapter.

Depending upon the complexity of the configuration, total DSSI bus length should be limited to 60 feet, with an HSD05 DSSI-to-SCSI bus adapter attached, to guarantee DSSI bus integrity.

The HSD05 DSSI-to-SCSI bus adapter does not support dual pathing or failover operation for attached devices.

The HSD05 DSSI-to-SCSI bus adapter does not sequence disk drives when spinning up. To minimize surge current to the power supply, spin up one or two drives at a time.

### 1.1.2.1 OpenVMS VAX Volume Shadowing

The HSD05 DSSI-to-SCSI bus adapter supports host-based volume shadowing, but does not support controller-based shadowing assists. No HSD05 DSSI-to-SCSI bus adapter-based Redundant Array of Independent Disks (RAID) functionality is supported.

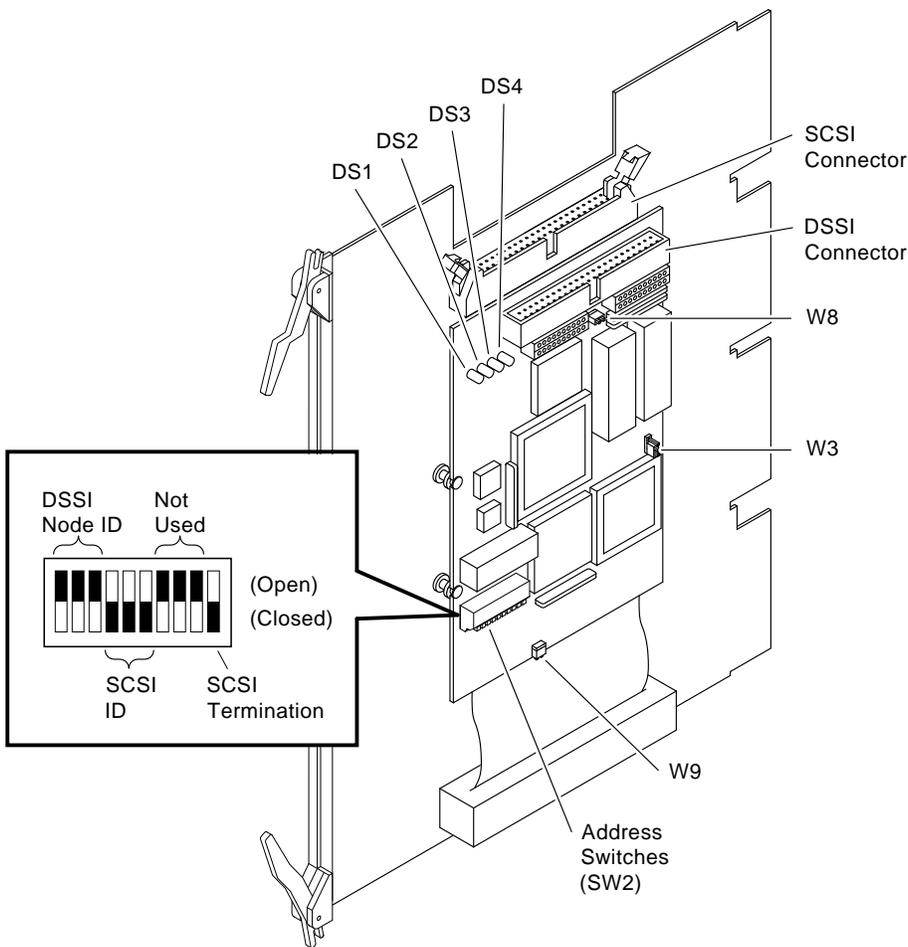
The HSD05 DSSI-to-SCSI bus adapter identifies attached disk devices as RF72 or RA82 disk drives, and attached tape devices as TU81 tape drives. This does not affect the actual accessible device storage space. However, the following restrictions apply to creating shadow sets:

- Due to device geometry differences, a disk drive served by the HSD05 DSSI-to-SCSI bus adapter cannot be part of a shadow set with true RF72 (or any other DSSI device) disk drives.
- Shadow sets using HSD05 DSSI-to-SCSI bus adapter-served disk drives must be of the same SCSI device type, for example all RZ26, or all RZ26L, or all RZ28 disk drives.
- Disk drives configured on an HSD05 DSSI-to-SCSI bus adapter may only be shadowed with disk drives that are also configured on an HSD05 DSSI-to-SCSI bus adapter; that is, a disk drive configured on a local SCSI adapter or on an HSC/HSJ-family controller may not be shadowed with a disk drive that is configured on an HSD05 DSSI-to-SCSI bus adapter.

### 1.1.3 HSD05 DSSI-to-SCSI Bus Adapter Switches, Jumpers and Indicators

The HSD05 DSSI-to-SCSI bus adapter module board contains switches, jumpers, and indicators, as shown in Figure 1-2. Table 1-2 through Table 1-4 list the jumper and switch settings and the indicator status.

Figure 1-2 HSD05 DSSI-to-SCSI Bus Adapter Module Board



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Table 1–2 lists the jumper settings for the HSD05 DSSI-to-SCSI bus adapter. All jumpers are installed at the factory and do not need to be changed during a normal installation of the HSD05 DSSI-to-SCSI bus adapter.

**Table 1–2 HSD05 Module Board Jumpers**

Jumper	Definition
W1	Reserved
W2	Reserved
W3	EPROM size
W4	Wait state
W5	Reserved
W6	Reserved
W7	Reserved
W8	DSSI terminator power supplied by module
W9	SCSI terminator power supplied by module

Table 1–3 lists the switch sections in the device configuration switchpack (SW2). You need to set these switches according to the procedures given in Section 1.2 to configure the DSSI ID and the SCSI ID.

**Table 1–3 HSD05 Device Configuration Switchpack (SW2) Sections**

Section	Definition	Default
SW2–1	MSB of DSSI ID	Open (DSSI ID = 0)
SW2–2	NSB of DSSI ID	Open
SW2–3	LSB of DSSI ID	Open
SW2–4	MSB of SCSI ID	Closed (SCSI ID = 7)
SW2–5	NSB of SCSI ID	Closed
SW2–6	LSB of SCSI ID	Closed
SW2–7	Spare	Open
SW2–8	Spare	Open
SW2–9	Spare	Open
SW2–10	Active SCSI termination	Closed (terminators installed)

Table 1–4 describes the four HSD05 DSSI-to-SCSI bus adapter indicators that are used to determine the status of the HSD05 DSSI-to-SCSI bus adapter. These indicators are visible from front to back after removing the module cover.

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**CAUTION**

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The HSD05 DSSI-to-SCSI bus adapter module cover should only be removed for service or maintenance. This cover needs to be in place for proper air flow and cooling, and to meet international regulatory requirements.

---

**Table 1–4 HSD05 Indicators**

<b>Indicator</b>	<b>Color</b>	<b>Status</b>
DS1	Green	Blinks during normal operation while the subsystem is booted.
DS2	Red	Blinks for 15 seconds during module boot. If this indicator blinks for longer than 15 seconds, there is a device fault.
DS3	Green	On to show that termination power, supplied by either the HSD05 DSSI-to-SCSI bus adapter or the host bus, is applied to the DSSI bus.
DS4	Green	On to show that termination power, supplied by the HSD05 DSSI-to-SCSI bus adapter or the host bus, is applied to the SCSI bus.

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### 1.1.4 HSD05 DSSI-to-SCSI Bus Adapter Specifications

Table 1–5 lists the environmental specifications for the HSD05 DSSI-to-SCSI bus adapter.

**Table 1–5 HSD05 Environmental Specifications**

Condition	Specification
<b>Optimum Operating Environment</b>	
Temperature	+18°C to +24°C (+65°F to +75°F)
<i>Rate of change</i>	3°C (5.4°F)
<i>Step change</i>	3°C (5.4°F)
Relative humidity	40% to 60% (noncondensing) with a step change of 10% or less (noncondensing)
Altitude	From sea level to 2400 meters (8000 feet)
Air quality	Maximum particle count .5 micron or larger, not to exceed 500,000 particles per cubic feet of air
Inlet air volume	.026 cubic meters per second (50 cubic feet per minute)
<b>Maximum Operating Environment (Range)</b>	
Temperature	+10°C to +40°C (+50°F to +104°F) Derate 1.8°C for each 1000 meters (1.0°F for each 1000 feet) of altitude Maximum temperature gradient 11°C/hr ±2°C/hr (20°F/hr ±4°F/hr)
Relative humidity	10% to 90% (noncondensing) Maximum wet bulb temperature: 28°C (82°F) Minimum dew point: 2°C (36°F)
<b>Maximum Nonoperating or Storage Environment (Range)</b>	
Temperature	+18°C to +29°C (+65°F to +85°F)
<i>Nonoperating</i>	
<i>Storage</i>	-40°C to +66°C (-40°F to +151°F)
Relative humidity	10% to 90% (noncondensing)
<i>Nonoperating</i>	
<i>Storage</i>	8% to 95% in original shipping container (noncondensing); otherwise, 50% (noncondensing)
Altitude	From -300 meters to +3600 meters (-1000 feet to +12,000 feet) MSL

## 1.2 Setting the Device Configuration on the HSD05 DSSI-to-SCSI Bus Adapter

This section explains how to set the switches on the HSD05 DSSI-to-SCSI bus adapter module board before you install the adapter in the VAX 4000 system. Locate the configuration switchpack, as shown in Figure 1-2.

The device configuration switchpack contains 10 switch elements, divided into DSSI ID and SCSI ID sections as shown in Figure 1-2. Refer to Section 1.4.3.1 for detailed information on the MSCP/TMSCP unit numbers.

### 1.2.1 Selecting and Setting the DSSI ID

The HSD05 DSSI-to-SCSI bus adapter is connected to the standard DSSI bus 0 on the VAX 4000 host computer and is externally accessible through the DSSI port on the connector panel to the left of the card cage.

Each device on the DSSI bus requires a unique device address in the range of 0 through 7. The DSSI ID of the HSD05 is factory set to 0; you may need to change this ID to one that is currently not being used on your system.

Table 1-6 lists the sections of SW2 used for setting the DSSI ID and the corresponding settings for each DSSI ID. On the switchpack, the closed position is with the switch in the down position, and the open position is with the switch in the up position.

**Table 1-6 HSD05 DSSI ID Switch Settings**

DSSI ID	SW2-1	SW2-2	SW2-3
0	Open	Open	Open (Default)
1	Open	Open	Closed
2	Open	Closed	Open
3	Open	Closed	Closed
4	Closed	Open	Open
5	Closed	Open	Closed
6	Closed	Closed	Open
7	Closed	Closed	Closed

Use the following procedure to set the DSSI ID:

1. At the system console prompt, enter the console command `SHOW DEVICE` to determine the DSSI ID numbers currently active on the DSSI bus.

2. Select an unused DSSI ID number for the HSD05 DSSI-to-SCSI bus adapter.
3. Refer to Figure 1–2 and Table 1–3 to locate the DSSI ID switches on the device configuration switchpack.
4. Using a small blade screwdriver or similar tool, set the switches to the DSSI ID number selected in Step 2.

### 1.2.2 Selecting and Setting the SCSI ID

The SCSI port plugs into the SCSI backplane connector (J30) when the HSD05 DSSI-to-SCSI bus adapter is installed in the card cage. This port must have a unique SCSI ID.

The HSD05 DSSI-to-SCSI bus adapter is factory set to SCSI ID = 7 to give the adapter the highest priority on the SCSI bus. The other devices in the configuration must have SCSI ID numbers between 0 and 6. For normal operation, you do not need to reset the SCSI ID.

Table 1–7 lists the sections of SW2 used for setting the SCSI ID and the corresponding settings for each SCSI ID. On the switchpack, the closed position is with the switch in the down position, and the open position is with the switch in the up position.

**Table 1–7 HSD05 SCSI ID Switch Settings**

SCSI ID	SW2–4	SW2–5	SW2–6
0	Open	Open	Open
1	Open	Open	Closed
2	Open	Closed	Open
3	Open	Closed	Closed
4	Closed	Open	Open
5	Closed	Open	Closed
6	Closed	Closed	Open
7	Closed	Closed	Closed (Default)

Use the following procedure to set the SCSI ID, if required:

1. Select an unused SCSI ID for the HSD05 DSSI-to-SCSI bus adapter.
2. Refer to Figure 1–2 and Table 1–3 to locate the SCSI ID switches on the node configuration switchpack.

3. Using a small blade screwdriver or similar tool, set the switches to the SCSI ID number selected in Step 1.

### 1.3 Applying Power to the HSD05

Apply power to the HSD05 DSSI-to-SCSI bus adapter as follows:

1. Place the power switch on the VAX 4000 system in the on position.
2. Verify that the HSD05 DSSI-to-SCSI bus adapter indicators (shown in Figure 1–2) are correctly lit as described in Table 1–4.
3. At the system console prompt, enter the console command `SHOW DEVICE` on the OpenVMS VAX system to verify that the HSD05 DSSI node address is online to the host system.

### 1.4 Setting Parameters for the HSD05 DSSI-to-SCSI Bus Adapter

The OpenVMS diagnostic and utility protocol (DUP) utility provides a gateway to modifying HSD05 DSSI-to-SCSI bus adapter parameters and parameters for the devices connected to the HSD05. You can run this utility from either the system console or from the OpenVMS system prompt.

Once a DUP connection to the HSD05 DSSI-to-SCSI bus adapter is established, the onboard PARAMS configuration utility is used to set and show HSD05 and device parameters. Section 1.5 contains procedures for using the HSD05 onboard device and diagnostic utility (UTILIT) during normal operation of the subsystem.

In the following sections, user input is shown in **boldface** type in the examples.

### 1.4.1 Starting PARAMS from the Console Prompt on OpenVMS VAX Systems

Use the following procedure to start PARAMS from the console prompt on OpenVMS VAX systems:

1. At the console prompt, enter the SHOW DEVICE command as shown in the following example:

```
>>> SHOW DEVICE
DSSI Node ID 0 (DSSI nodename) ❶
DSSI NODE ID 5 (*)
UQSSP Disk Controller 0 (772150)
-DUA0 (RA82)
Ethernet Adapter
-ESA0 (08-00-2B-13-80-85)
```

- ❶ This is the HSD05 DSSI-to-SCSI bus adapter. The *DSSI nodename* is initially a six-digit number. Do not confuse this number with the DSSI ID value.

2. Enter the following command line to use the DUP utility to establish a connection to the HSD05 DSSI-to-SCSI bus adapter:

```
>>> SET HOST/DUP/DSSI a PARAMS
Starting DUP server...
Copyright (C) 1994 Digital
HSD05 Serial No: 8
Firmware Rev. B1 (X36 )
PARAMS>
```

In the command, *a* is the DSSI ID of the HSD05 DSSI-to-SCSI bus adapter.

For systems with multiple DSSI buses, enter the following command line to use the DUP utility to establish a connection to the HSD05 DSSI-to-SCSI bus adapter:

```
>>> SET HOST/DUP/DSSI/BUS:n a PARAMS
Starting DUP server...
Copyright (C) 1994 Digital
HSD05 Serial No: 8
Firmware Rev. B1 (X36 )
PARAMS>
```

In the command, *n* is the DSSI bus number and *a* is the DSSI ID of the HSD05 DSSI-to-SCSI bus adapter.

For the KFQSA option, enter the following command line to use the DUP utility to establish a connection to the HSD05 DSSI-to-SCSI bus adapter:

```
>>> SET HOST/UQSPP/DUP/DISK a PARAMS
Starting DUP server...

Copyright (C) 1994 Digital
      HSD05   Serial No: 8
      Firmware Rev. B1   (X36 )

PARAMS>
```

In the command, *a* is the DSSI ID of the HSD05 DSSI-to-SCSI bus adapter.

3. At the PARAMS prompt, refer to Section 1.4.3 to configure the HSD05 parameters.

### 1.4.2 Starting PARAMS from the OpenVMS Prompt

You can start PARAMS from the OpenVMS prompt if both of the following are true:

- You have the appropriate system manager privileges on the host system.
- The DUP utility on your system has been started.

Activate the DUP server and use the following procedure to start PARAMS:

1. On OpenVMS VAX systems, connect to the DUP server as follows:

```
$ MC SYSGEN CONNECT FYA0/NOADAPTER
```

2. Enter the following to start PARAMS:

```
$ SET HOST/DUP/TASK=PARAMS/SERVER=MSCP$DUP n

Copyright (C) 1994 Digital
      HSD05   Serial No: 8
      Firmware Rev. B1   (X36 )

PARAMS>
```

In the command, *n* is the DSSI nodename of the HSD05.

3. At the PARAMS prompt, refer to Section 1.4.3 to configure the HSD05 parameters.

### 1.4.3 PARAMS Configuration Utility

The PARAMS configuration utility display shows the settings for the HSD05 DSSI-to-SCSI bus adapter parameters. At the PARAMS prompt, enter SHOW /ALL to display the current HSD05 parameters. When entering this command, a space is required between the SHOW and /ALL qualifier. The HSD05 default parameter settings are as follows:

```
PARAMS> SHOW /ALL
```

Parameter Name	Active	Min.	Max.	Units
NODENAME	"xxxxxxx"	1	8	Ascii
SYSTEMID	xxxxxxx	1	268435456	DecimalNum
DISK_ALCS	0	0	255	DecimalNum
TAPE_ALCS	0	0	255	DecimalNum
INTERVAL	60	0	32768	Seconds
NUMPOLL	7	0	7	DecimalNum
UNIT_OFFSET	0	0	9	DecimalNum
SYNC_RATE	7	1	10	DecimalNum
MAX_HOSTS	4	1	7	DecimalNum
FASTSCAN	0	0	1	Boolean
SCANNING	1	0	1	Boolean
POWERONRST	1	0	1	Boolean
TRYSYNC	1	0	1	Boolean
SPIN_DOWN	1	0	1	Boolean
TAGGED_CMD	1	0	1	Boolean
TRUNCATE	1	0	1	Boolean
DEVICE_TYPE	1	0	1	Boolean
IMMEDIATE	1	0	1	Boolean
TMARKSEARCH	0	0	1	Boolean
SHORT_TMARK	1	0	1	Boolean
WT_PROTECTED	00000000	0	1	BooleanM
ONLINE	11111111	0	1	BooleanM
NAME_ALGRM	0	0	255	DecimalNum
SCSI_ID_0	0	0	9999	DecimalNum
SCSI_ID_1	10	0	9999	DecimalNum
SCSI_ID_2	20	0	9999	DecimalNum
SCSI_ID_3	30	0	9999	DecimalNum
SCSI_ID_4	40	0	9999	DecimalNum
SCSI_ID_5	50	0	9999	DecimalNum
SCSI_ID_6	60	0	9999	DecimalNum
SCSI_ID_7	70	0	9999	DecimalNum

The meaning of each parameter is given in Table 1–8.

**Table 1–8 PARAMS Configuration Utility HSD05 DSSI-to-SCSI Bus Adapter Parameters**

<b>Parameter Name</b>	<b>Definition</b>
NODENAME	HSD05 node name. This value must be unique among all systems in the VAXcluster system. The string cannot include the dollar sign (\$) or underscore (_) characters, and cannot be longer than eight characters. The factory default for the node name is a unique six-digit number.
SYSTEMID	Specifies the lower order 32 bits of the 48-bit system identification number. The factory default for this identifier is the same as specified by the NODENAME parameter.
DISK_ALCS	Determines the device allocation class for all disk devices connected to the HSD05 DSSI-to-SCSI bus adapter. If disks are to be served to other nodes within the VAXcluster, this parameter must be non-zero and match the ALLOCLASS SYSGEN parameter on connected systems. The factory default for this parameter is zero.
TAPE_ALCS	Determines the device allocation class for all tape devices connected to the HSD05 DSSI-to-SCSI bus adapter. If tapes are to be served to other nodes within the VAXcluster, this parameter must be non-zero and match the ALLOCLASS SYSGEN parameter on connected systems. The factory default for this parameter is zero.
INTERVAL	Controls the rate at which SCSI device scanning is done. This value is only used if SCANNING is enabled. The factory default for this parameter is 60 seconds.
NUMPOLL	Controls the number of SCSI devices to look for during each INTERVAL. This parameter is currently not implemented but may be activated in a future revision of the firmware. The factory default for this parameter is 7, which scans for all available units at each interval.
UNIT_OFFSET	Helps to differentiate devices when a system has two DSSI buses. Unit offset is specified as the value to be used in the thousands position of the MSCP unit ID, such as x for DIAx210. This offset is automatically created by the system. The unit offset values must be unique for each DSSI bus on the system. The factory default for this parameter is 0.
SYNC_RATE	The rate in MHz that data is transferred during the data transmission phase between target and host. The factory default for this parameter is 7 MHz.

(continued on next page)

**Table 1–8 (Cont.) PARAMS Configuration Utility HSD05 DSSI-to-SCSI Bus Adapter Parameters**

<b>Parameter Name</b>	<b>Definition</b>
MAX_HOSTS	Determines the maximum number of hosts with which the HSD05 DSSI-to-SCSI bus adapter can communicate. This parameter is primarily used for disk and tape credit allotment. For best performance, set this parameter to the maximum number of hosts to be used. Digital supports up to three hosts (the factory default) in a multihost HSD05 DSSI-to-SCSI bus adapter configuration.
FASTSCAN	Reduces the SCSI SELECT timeout to a much smaller value, with the default timeout set at 250 milliseconds. This parameter is currently not implemented. The factory default for this parameter is 0 (disabled).
SCANNING	Enables/disables the HSD05 DSSI-to-SCSI bus adapter's ability to scan for newly connected devices. If scanning is disabled, the HSD05 DSSI-to-SCSI bus adapter only does one scan for devices at power up, and does not look for new devices every INTERVAL seconds. The factory default for this parameter is 1 (enabled).
DISCONNECT	Enables/disables the ability to disconnect all SCSI devices connected to the HSD05 DSSI-to-SCSI bus adapter. When only one device is connected to the HSD05 DSSI-to-SCSI bus adapter, this parameter can be disabled for better performance. The factory default for this parameter is 1 (enabled).
POWERONRST	Enables/disables issuing a SCSI BUS RESET command when the system is turned on. The factory default for this parameter is 1 (enabled).
TRYSYNC	Enables/disables synchronous negotiation when a SCSI device is initialized. For very short cables, synchronous negotiation can be disabled for better performance in ASYNC mode rather than SYNC mode. The factory default for this parameter is 1 (enabled).
SPIN_DOWN	Enables/disables the ability of the HSD05 DSSI-to-SCSI bus adapter to spin down drives or eject media when the operating system issues a spin down command, such as the OpenVMS command DISMOUNT/UNLOAD. The factory default for this parameter is 1 (enabled).
TAGGED_CMD	Enables/disables simple tag queuing. The factory default for this parameter is 1 (enabled).

(continued on next page)

**Table 1–8 (Cont.) PARAMS Configuration Utility HSD05 DSSI-to-SCSI Bus Adapter Parameters**

<b>Parameter Name</b>	<b>Definition</b>
TRUNCATE	This parameter truncates the number of blocks to be divisible by 126. The factory default for this parameter is 1. This default supports faster OpenVMS volume shadowing catch-up time. A value of 0 selects no truncation for compatibility with other third-party units.
DEVICE_TYPE	This parameter applies to disk drives only. When disabled (set to 0), the device type reported by the HSD05 DSSI-to-SCSI bus adapter to the OpenVMS operating system is an RA82 disk drive. When enabled, the HSD05 DSSI-to-SCSI bus adapter reports the RF72 device type. The device type reported to the host does not affect the accessible disk space. The factory default for this parameter is 1 (enabled).
IMMEDIATE	When enabled, this parameter causes the IMMEDIATE bit in the SCSI START and STOP commands to be set. Note that when IMMEDIATE is set to 0, the OpenVMS prompt does not return until the drive's media is ejected or the drive has spun down. The factory default for this parameter is 1 (enabled).
CMD_P3	Determines the type of transmission used on the DSSI bus for single host configurations only: 0 for standard and 1 for fast mode. This is a hidden parameter that is not displayed by the PARAMS SHOW /ALL, SHOW /SCSI, or SHOW /SCS commands. To display this parameter value, use the SHOW CMD_P3 command in the PARAMS utility. The factory default for this parameter is 1 (fast mode).
TMARKSEARCH	Enables fast tape mark searching. Because some tape drives perform slowly while looking for tape marks during operations on large space records, a skip tapemark is done instead. Because the device does not report the number of records skipped between tapemarks, the position (object) count is not correct when this parameter is enabled. The factory default for this parameter is 0 (disabled).
SHORT_TMARK	Enables/disables writing short filemarks on Exabyte devices. When disabled, all filemarks are written as large filemarks. The factory default for this parameter is 1 (enabled).

(continued on next page)

**Table 1–8 (Cont.) PARAMS Configuration Utility HSD05 DSSI-to-SCSI Bus Adapter Parameters**

Parameter Name	Definition
WT_PROTECTED	Enables/disables write protection for each SCSI ID. When disabled (set to 0), it allows read-write access to a SCSI ID, and when enabled, it restricts access to read only. This parameter is in the form of a boolean matrix, with the leftmost position representing a SCSI ID of 7, and the rightmost position representing a SCSI ID of 0. For example, a WT_PROTECTED setting of 00000001 allows read-write access to SCSI IDs 1 through 7 and read only access to SCSI ID 0. The factory default for this parameter is 00000000 (no devices write protected).
ONLINE	Controls whether devices are online or offline to the host. This parameter is in the form of a boolean matrix, with the leftmost position representing SCSI ID=7, and the rightmost position representing SCSI ID=0. For example, an ONLINE setting of 10000000 sets SCSI IDs 0 through 6 offline and SCSI ID 7 online. The factory default for this parameter is 11111111 (all devices online).
NAME_ALGRM	This parameter is fully described in Section 1.4.3.1.
SCSI_ID_X	Used in conjunction with the NAME_ALGRM parameter to set alternative device names for each SCSI ID.

#### 1.4.3.1 The NAME\_ALGRM Parameter

The NAME\_ALGRM parameter toggles between the HSD05 DSSI-to-SCSI bus adapter’s standard device naming convention and an alternative convention based upon the TMSCP/MSCP unit number. When NAME\_ALGRM is set to the default of 0, the HSD05 DSSI-to-SCSI bus adapter uses its standard naming algorithm, which assigns a unit number based on the following parameters:

- **Unit offset (*w*)**—A unique number (0 - 9) for each host DSSI bus. This parameter can be used to modify bus numbering conflicts in multiple DSSI bus configurations. It is recommended that this parameter be set to the DSSI bus number.
- **DSSI ID (*x*)**—The DSSI device address for the HSD05 DSSI-to-SCSI bus adapter.
- **SCSI ID (*y*)**—The SCSI device address for the storage device. This is set by the bus node ID plug on the device bezel.
- **SCSI logical unit number (*z*)**—The device address of a subdevice attached to a SCSI device identified by SCSI ID *y* (usually 0).

Setting NAME\_ALGRM to 1 activates the alternative naming algorithm, which assigns a unit number in conjunction with the SCSI\_ID\_X parameter. These two conventions are summarized in the next table:

NAME_ALGRM Setting	Formula for MSCP /TMSCP Unit Number <sup>1</sup>	Example																											
0	$wxyz$	1234 where: $w = 1, x = 2, y = 3, z = 4$																											
1	$scsi\_id\_x + ((w + 1) * z)$	Assuming $w = 1, z = 1$ , and the $scsi\_id\_x$ parameter values are as follows:																											
		<table border="1"> <thead> <tr> <th>SCSI ID</th> <th>SCSI_ID_X</th> <th>MSCP/TMSCP Unit Number</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>2</td></tr> <tr><td>1</td><td>10</td><td>12</td></tr> <tr><td>2</td><td>20</td><td>22</td></tr> <tr><td>3</td><td>30</td><td>32</td></tr> <tr><td>4</td><td>40</td><td>42</td></tr> <tr><td>5</td><td>50</td><td>52</td></tr> <tr><td>6</td><td>60</td><td>62</td></tr> <tr><td>7</td><td>70</td><td>72</td></tr> </tbody> </table>	SCSI ID	SCSI_ID_X	MSCP/TMSCP Unit Number	0	0	2	1	10	12	2	20	22	3	30	32	4	40	42	5	50	52	6	60	62	7	70	72
SCSI ID	SCSI_ID_X	MSCP/TMSCP Unit Number																											
0	0	2																											
1	10	12																											
2	20	22																											
3	30	32																											
4	40	42																											
5	50	52																											
6	60	62																											
7	70	72																											
<sup>1</sup> $w =$ UNIT_OFFSET parameter $x =$ DSSI ID $y =$ SCSI ID $z =$ SCSI logical unit number (LUN)																													

#### 1.4.4 Set Device Parameters Using the PARAMS Configuration Utility

The HSD05 DSSI-to-SCSI bus adapter operating parameters are initialized at the factory. Depending upon the specific configuration of your system or cluster, the following device parameters (at the minimum) may need to be set:

- **NODENAME**—A unique six character DSSI node name for the HSD05.
- **DISK\_ALCS**—It is recommended that this parameter be set to match the ALLOCLASS VMS SYSGEN parameter on connected systems.
- **TAPE\_ALCS**—It is recommended that this parameter be set to match the ALLOCLASS VMS SYSGEN parameter on connected systems.
- **UNIT\_OFFSET**—It is recommended that this parameter be set to the DSSI bus number.

---

#### CAUTION

---

Device unit numbers as seen by the hosts must be unique throughout the system or cluster containing the HSD05 DSSI-to-SCSI bus adapter. If a unit number is added that overlaps the unit number of another device on another controller in the system or cluster, all the devices on that other controller can disappear. In this event, the unit number conflict should be resolved, and controller power should then be cycled off/on to make the devices available to the host system or cluster.

---

Use the following procedure to set new device parameters:

1. At the PARAMS prompt, enter the parameters you wish to change; for example:

```
PARAMS> SET NODENAME HSD1
PARAMS> SET DISK_ALCS 10
```

In this example, the NODENAME has been changed to HSD1 and the DISK\_ALCS parameter set to 10.

2. Enter the SHOW /ALL command to display your changed parameters.

```
PARAMS> SHOW /ALL
```

Parameter Name	Active	Min.	Max.	Units
NODENAME	"HSD1 "	1	8	Ascii
SYSTEMID	131072	1	268435456	DecimalNum
DISK_ALCS	10	0	255	DecimalNum
TAPE_ALCS	0	0	255	DecimalNum
INTERVAL	60	0	32768	Seconds
.				
.				
SCSI_ID_4	40	0	9999	DecimalNum
SCSI_ID_5	50	0	9999	DecimalNum
SCSI_ID_6	60	0	9999	DecimalNum
SCSI_ID_7	70	0	9999	DecimalNum

3. Save the changes to nonvolatile memory with the following command:

```
PARAMS> WRITE
```

4. Reboot the HSD05 DSSI-to-SCSI bus adapter to use the new parameters.

```
PARAMS> RESTART
```

5. Reboot the host systems to update the host device tables to the new settings for the HSD05 DSSI-to-SCSI bus adapter and attached devices. Verify that any parameter changes are shown at both the console and within the OpenVMS operating system.

---

### CAUTION

---

The HSD05 DSSI-to-SCSI bus adapter returns a limited set of device type identification names to the host. All attached tape drives are identified as TU81 (MUAXxx). All attached disk drives are normally identified as RF72 (DIAxxx); this can be changed to identification as RA82 (DUAXxx) by setting the HSD05 parameter DEVICE\_TYPE to 0. These device types as reported to the host do not affect actual accessible device storage space.

Due to device geometry differences, a disk drive served by the HSD05 DSSI-to-SCSI bus adapter cannot be part of a shadow set with true RF72, or any other DSSI disk drives. Shadow sets using HSD05 DSSI-to-SCSI bus adapter-served disk drives must be of the same SCSI device type; for example, all RZ26L or all RZ28 disk drives.

---

## 1.5 HSD05 Device Utilities

The HSD05 onboard utilities (UTILIT) allow you to monitor, format, qualify, and exercise SCSI devices from the system console or the OpenVMS operating system. The onboard utilities are accessed through the diagnostic and utility protocol (DUP) server, either through the system console or from the OpenVMS prompt.

In the following sections, user input is shown in **boldface** type in the examples.

### 1.5.1 Starting UTILIT from the Console Prompt on OpenVMS VAX Systems

Use the following procedure to start UTILIT from the console prompt on OpenVMS VAX systems:

1. At the console prompt, enter the SHOW DEVICE command as shown in the following example:

```
>>> SHOW DEVICE
DSSI Node ID 0 (DSSI nodename) ❶
-DIA200 (RF72)
-DIA210 (RF72)
-DIA250 (RF72)

DSSI NODE ID 5 (*)

UQSSP Disk Controller 0 (772150)
-DUA0 (RA82)

Ethernet Adapter
-ESA0 (08-00-2B-13-80-85)
```

- ❶ This is the HSD05 DSSI-to-SCSI bus adapter. The *DSSI nodename* is initially a six-digit number. Do not confuse this number with the DSSI ID value.

2. Enter the following command line to use the DUP utility to establish a connection to the HSD05 DSSI-to-SCSI bus adapter:

```
>>> SET HOST/DUP/DSSI a UTILIT
Starting DUP server...

Copyright (C) 1994 Digital
HSD05 Serial No: 8
Firmware Rev. B1 (X36 )

UTILIT>
```

In the command, *a* is the DSSI ID of the HSD05 DSSI-to-SCSI bus adapter.

For systems with multiple DSSI buses, enter the following command line to use the DUP utility to establish a connection to the HSD05 DSSI-to-SCSI bus adapter:

```
>>> SET HOST/DUP/DSSI/BUS:n a UTILIT
Starting DUP server...

Copyright (C) 1994 Digital
      HSD05   Serial No: 8
      Firmware Rev. B1   (X36 )

UTILIT>
```

In the command,  $n$  is the DSSI bus number and  $a$  is the DSSI ID of the HSD05 DSSI-to-SCSI bus adapter.

For the KFQSA option, enter the following command line to use the DUP utility to establish a connection to the HSD05 DSSI-to-SCSI bus adapter:

```
>>> SET HOST/UQSSP/DUP/DISK a UTILIT
Starting DUP server...

Copyright (C) 1994 Digital
      HSD05   Serial No: 8
      Firmware Rev. B1   (X36 )

UTILIT>
```

In the command,  $a$  is the DSSI ID of the HSD05 DSSI-to-SCSI bus adapter.

3. At the UTILIT prompt, refer to Section 1.5.3 for information on device utility commands.

## 1.5.2 Starting the UTILIT Utility from the OpenVMS Prompt

You can start the UTILIT utility from the OpenVMS prompt if both of the following are true:

- You have the appropriate system manager privileges on the host system.
- The DUP utility on your system has been started.

Activate the DUP server and use the following procedure to start the UTILIT utility:

1. On OpenVMS VAX systems, connect to the DUP server as follows:

```
$ MC SYSGEN CONNECT FYA0/NOADAPTER
```

2. Enter the following to start the UTILIT configuration utility:

```
$ SET HOST/DUP/TASK=UTILIT/SERVER=MSCP$DUP n
```

```
Copyright (C) 1994 Digital  
HSD05   Serial No: 8  
Firmware Rev. B1   (X36 )
```

```
UTILIT>
```

In the command, *n* is the DSSI nodename of the HSD05.

3. At the UTILIT prompt, refer to Section 1.5.3 for information on device utility commands.

### 1.5.3 UTILIT Device Utility Commands

This section lists the UTILIT device commands and describes the action performed by each command.

#### 1.5.3.1 The HELP Command

The HELP command lists the onboard utilities commands and the proper syntax for each command, as shown in Example 1–1.

#### Example 1–1 HELP Commands and Syntax

```
UTILIT> HELP
HELP
SHOW                [device_name] | [/ALL]
SELECT              device_name
DESELECT            device_name
ABORT                device_name

- Disk Commands -
FORMAT              device_name
QUALIFY             device_name [/WRITE]
DISKTEST            device_name [/WRITE]

- Tape Commands -
TAPETEST            device_name
UTILIT>
```

The symbol *device\_name* refers to a valid MSCP/TMSCP device label for either a direct access or sequential access device. Direct access devices, such as disk drives, are specified with the “DIA” or “DUA” prefix to the device label, for example, “DIA100.” Sequential access devices, such as tape drives, are specified with the “MUA” prefix, for example, “MUA120.”

### 1.5.3.2 The SHOW Command

The SHOW command displays device information for either the device specified by the *device\_name* or for all devices by specifying the /ALL qualifier, as shown in Example 1-2.

#### Example 1-2 SHOW Command Display

```
UTILIT> SHOW DIA220
Device①SID②Vendor③ Model④ Rev⑤ Dev Stat⑥ Maint Oper⑦Maint Status⑧
-----
DIA220 2-0 DEC RZ28 435E MAINT DISKTEST IN PROGRESS
UTILIT> SHOW /ALL
Device SID Vendor Model Rev Dev Stat Maint Oper Maint Status
-----
MUA210 1-0 DEC TLZ06 0491 MAINT IDLE READY
DIA220 2-0 DEC RZ28 435E MAINT IDLE READY
MUA240 4-0 DEC TLZ6 0491 AVAILABLE
DIA260 6-0 DEC RZ26 329A AVAILABLE
UTILIT>
```

- ① Device is the MSCP or TMSCP device name.
- ② SID is the SCSI ID in the form target-logical unit number (LUN).
- ③ Vendor is the first seven characters of the manufacturer's name.
- ④ Model is the first seven characters of the manufacturer's model name.
- ⑤ Rev is the manufacturer's firmware revision code.
- ⑥ Dev Stat is the current device status.
- ⑦ Maint Oper is the UTILIT maintenance operation.
- ⑧ Maint Status is the UTILIT maintenance operation status.

### 1.5.3.3 The SELECT Command

The SELECT command is used to specify a device for maintenance before you perform a format, qualify, or exercise operation.

Use the SHOW command to determine if the device status is AVAILABLE to the HSD05 DSSI-to-SCSI bus adapter. Devices that are listed as being OFFLINE or ONLINE to the HSD05 DSSI-to-SCSI bus adapter cannot be selected.

When a device is selected, its operational status becomes MAINT and the device is not available to the OpenVMS operating system.

#### Syntax

The following is the syntax of the SELECT command:

```
SELECT device_name
```

The symbol *device\_name* refers to a valid MSCP/TMSCP device label for either a direct access or sequential access device. Direct access devices, such as disk drives, are specified with the “DIA” or “DUA” prefix to the device label, for example, “DIA100.” Sequential access devices, such as tape drives, are specified with the “MUA” prefix, for example, “MUA120.”

Example 1–3 is an example of the SELECT operation display.

#### Example 1–3 SELECT Operation Display

```
UTILIT> SELECT DIA220
Device①SID②Vendor③ Model④ Rev⑤ Dev Stat⑥ Maint Oper⑦Maint Status⑧
-----
DIA220 2-0 DEC RZ28 435E MAINT IDLE READY
UTILIT>
```

- ① Device is the MSCP device name.
- ② SID is the SCSI ID (target/lun).
- ③ Vendor is the first seven characters of the manufacturer’s name.
- ④ Model is the first seven characters of the manufacturer’s model name.
- ⑤ Rev is the manufacturer’s firmware revision code.
- ⑥ Dev Stat is the current device status.
- ⑦ Maint Oper is the UTILIT maintenance operation.
- ⑧ Maint Status is the UTILIT maintenance operation status.

#### 1.5.3.4 The DESELECT Command

The DESELECT command deselects the devices that were selected for maintenance by the UTILIT command SELECT. The deselected devices are then returned to the AVAILABLE state.

##### Syntax

The following is the syntax of the DESELECT command:

```
DESELECT device_name
```

The symbol *device\_name* refers to a valid MSCP/TMSCP device label for either a direct access or sequential access device. Direct access devices, such as disk drives, are specified with the “DIA” prefix to the device label, for example, “DIA100.” Sequential access devices, such as tape drives, are specified with the “MUA” prefix, for example, “MUA120.”

Example 1–4 is an example of the DESELECT command.

#### Example 1–4 DESELECT Command

```
UTILIT> DESELECT DIA100  
UTILIT>
```

### 1.5.3.5 The ABORT Command

Use the ABORT command to terminate the QUALIFY, DISKTEST, and TAPETEST operations. These operations normally run until stopped with the ABORT command or by powering off the HSD05 DSSI-to-SCSI bus adapter.

#### Syntax

The following is the syntax of the ABORT command:

```
ABORT device_name
```

The symbol *device\_name* refers to a valid MSCP/TMSCP device label for either a direct access or sequential access device. Direct access devices, such as disk drives, are specified with the “DIA” prefix to the device label, for example, “DIA100.” Sequential access devices, such as tape drives, are specified with the “MUA” prefix, for example, “MUA120.”

Example 1–5 is an example of the ABORT command.

#### Example 1–5 ABORT Command

```
UTILIT> ABORT DIA100  
UTILIT>
```

### 1.5.3.6 FORMAT

After a device is selected with the SELECT command, you can use the FORMAT command to perform a format operation.

#### **Syntax**

The following is the syntax of the FORMAT command:

```
FORMAT device_name
```

The symbol *device\_name* refers to a valid MSCP device label for a direct access device. Direct access devices, such as disk drives, are specified with the “DIA” prefix to the device label, for example, “DIA100.”

You are prompted to confirm the format operation on the selected drive. Answering “N” or “NO” aborts the operation with no change to the data on the device. Answering “Y” or “YES” to this prompt starts the format operation on the device.

The FORMAT command does not automatically display a completion message. You can monitor the format operation by periodically entering the SHOW command (status changes to COMPLETE when the format operation is finished) or by observing the device’s activity indicator. After formatting the device, you should run one or more qualification passes with the QUALIFY command.

Once started, you cannot abort the FORMAT operation.

Example 1-6 shows a FORMAT operation display.

### Example 1-6 FORMAT Operation Display

```
UTILIT> FORMAT DIA220
Device①SID②Vendor③ Model④ Rev⑤ Dev Stat⑥ Maint Oper⑦Maint Status⑧
-----
DIA220 2-0 DEC      RZ28      435E MAINT      IDLE      READY
FORMAT will destroy all data on this device. Are you sure (Y/N)? YES
Initiating Format
UTILIT>
```

- ① Device is the MSCP device name.
- ② SID is the SCSI ID (target/lun).
- ③ Vendor is the first seven characters of the manufacturer's name.
- ④ Model is the first seven characters of the manufacturer's model name.
- ⑤ Rev is the manufacturer's firmware revision code.
- ⑥ Dev Stat is the current device status.
- ⑦ Maint Oper is the UTILIT maintenance operation.
- ⑧ Maint Status is the UTILIT maintenance operation status.

### 1.5.3.7 The QUALIFY Command

It is recommended that you run one or more qualification passes with the QUALIFY command after a drive is formatted. The device to be qualified must first be selected with the SELECT command.

#### Syntax

The following is the syntax of the QUALIFY command:

```
QUALIFY device_name [/write]
```

The symbol *device\_name* refers to a valid MSCP device label for a direct access device. Direct access devices, such as disk drives, are specified with the “DIA” prefix to the device label, for example, “DIA100.” The /WRITE qualifier selects a write-read qualify operation.

The QUALIFY command can run either read-only or write-read (using the /WRITE qualifier). The write-read qualification operation consists of writing sequential 32-kilobyte chunks of data to the device and then reading it back. This sequence repeats until all logical blocks on the device have been written and read. Bad blocks are replaced and retested in a write-read qualify operation. You should use the write-read qualifier for newly formatted drives.

Running QUALIFY in the read-only mode verifies media readability and consistency, but does not alter any drive data.

You are prompted to confirm the qualify operation on the selected device. Answering “N” or “NO” aborts the operation with no change to the data on the device. Answering “Y” or “YES” to this prompt starts the qualify operation on the device.

QUALIFY runs until it is terminated with the ABORT command or until the HSD05 DSSI-to-SCSI bus adapter is powered off. The number of passes made is displayed on a pass counter.

Example 1–7 shows a write-read qualification run using the QUALIFY command.

### Example 1–7 Write-Read Qualification Run Using the QUALIFY Command

```
UTILIT> QUALIFY DIA220 /WRITE
Device①SID②Vendor③ Model④ Rev⑤ Dev Stat⑥ Maint Oper⑦Maint Status⑧
-----
DIA220 2-0 DEC      RZ28      435E MAINT    IDLE      READY
QUALIFY will destroy all data on this device. Are you sure (Y/N)? YES
Initiating device qualification
UTILIT>
```

- ① Device is the MSCP device name.
- ② SID is the SCSI ID (target/lun).
- ③ Vendor is the first seven characters of the manufacturer's name.
- ④ Model is the first seven characters of the manufacturer's model name.
- ⑤ Rev is the manufacturer's firmware revision code.
- ⑥ Dev Stat is the current device status.
- ⑦ Maint Oper is the UTILIT maintenance operation.
- ⑧ Maint Status is the UTILIT maintenance operation status.

### 1.5.3.8 The DISKTEST Command

The DISKTEST command performs an exercise on the selected disk device. You should run DISKTEST on all newly formatted and qualified devices. The device to be exercised must first be selected with the SELECT command.

#### Syntax

The following is the syntax of the DISKTEST command:

```
DISKTEST device_name [/write]
```

The symbol *device\_name* refers to a valid MSCP device label for a direct access device. Disk drives are specified with the “DIA” prefix to the device label. The /WRITE qualifier selects a write-read disktest operation.

The DISKTEST command can run either read-only or write-read (using the /WRITE qualifier) tests. The write-read DISKTEST operation consists of writing to randomly selected logical blocks and verifying the data. This sequence repeats until all logical blocks on the device have been written and read, then the test begins again until the ABORT command is entered to terminate the DISKTEST. You must perform a write-read disktest to write data to the disk before you perform the read-only disktest.

You are prompted to confirm the DISKTEST operation on the selected drive. Answering “N” or “NO” aborts the operation with no change to the data on the device. Answering “Y” or “YES” to this prompt starts the DISKTEST on the device.

Running the DISKTEST operation with the /WRITE qualifier replaces media errors when encountered. If other types of errors occur, the test is stopped and the error condition is displayed in the Maint Status field of the display.

The DISKTEST test operation runs until it is terminated with the ABORT command or until the HSD05 DSSI-to-SCSI bus adapter is powered off.

Example 1–8 shows a DISKTEST run.

### Example 1–8 DISKTEST Run Display

```
UTILIT> DISKTEST DIA220 /WRITE
Device①SID②Vendor③ Model④ Rev⑤ Dev Stat⑥ Maint Oper⑦Maint Status⑧
-----
DIA220 2-0 DEC      RZ28      435E MAINT    IDLE      READY
DISKTEST will overwrite some or all data on this device. Are you sure (Y/N)? YES
Initiating Disk Test
UTILIT>
```

- ① Device is the MSCP device name.
- ② SID is the SCSI ID (target/lun).
- ③ Vendor is the first seven characters of the manufacturer's name.
- ④ Model is the first seven characters of the manufacturer's model name.
- ⑤ Rev is the manufacturer's firmware revision code.
- ⑥ Dev Stat is the current device status.
- ⑦ Maint Oper is the UTILIT maintenance operation.
- ⑧ Maint Status is the UTILIT maintenance operation status.

### 1.5.3.9 The TAPETEST Command

This command performs a tape exercise on the selected tape device. This test requires enough tape to accommodate 10 megabytes of 1-kilobyte blocks. The device to be exercised must first be selected with the SELECT command.

#### Syntax

The following is the syntax of the TAPETEST command:

```
TAPETEST device_name
```

The symbol *device\_name* refers to a valid TMSCP device label for a direct access or sequential access device. Tape drives are specified with the “MUA” prefix to the device label.

The TAPETEST exercise consists of writing, rewinding, and reading each section of tape, up to but not including a filemark. Block sizes start at 32 kilobytes and are halved on each successive write/rewind/read pass. The test is restarted when the block size reaches 1 kilobyte.

You are prompted to confirm the TAPETEST operation on the selected drive. Answering “N” or “NO” aborts the operation with no change to the data on the device. Answering “Y” or “YES” to this prompt starts the TAPETEST operation on the device.

The TAPETEST operation replaces media errors when encountered. If other types of errors occur, the test is stopped and the error condition is displayed in the Maint Status field of the display.

TAPETEST runs until it is terminated with the ABORT command or until the HSD05 DSSI-to-SCSI bus adapter is powered off.

Example 1–9 shows a TAPETEST run.

### Example 1–9 TAPETEST Run Display

```
UTILIT> TAPETEST DIA220
Device①SID②Vendor③ Model④ Rev⑤ Dev Stat⑥ Maint Oper⑦Maint Status⑧
-----
DIA220 2-0 DEC      RZ28      435E MAINT      IDLE      READY
TAPETEST will overwrite some or all data on this device. Are you sure (Y/N)? YES
Initiating Tape Test
UTILIT>
```

- ① Device is the TMSCP device name.
- ② SID is the SCSI ID (target/lun).
- ③ Vendor is the first seven characters of the manufacturer's name.
- ④ Model is the first seven characters of the manufacturer's model name.
- ⑤ Rev is the manufacturer's firmware revision code.
- ⑥ Dev Stat is the current device status.
- ⑦ Maint Oper is the UTILIT maintenance operation.
- ⑧ Maint Status is the UTILIT maintenance operation status.

## 1.5.4 Device Utility Procedures

This section contains procedures and examples for some representative tasks that are frequently performed using the onboard utilities of the HSD05 DSSI-to-SCSI bus adapter.

### 1.5.4.1 Formatting and Qualifying a SCSI Drive

You can format a specified device that is AVAILABLE to the HSD05 DSSI-to-SCSI bus adapter using the FORMAT command. After the format operation is completed, you should use the QUALIFY command to verify that the device is ready for use. You should also run the DISKTEST procedure given in Section 1.5.4.2 to further test the drive before it is returned to service.

Use the following procedure to format and qualify a specified device:

1. At the UTILIT prompt, enter the SHOW command with the *device\_name* qualifier to determine device status.
2. If the device status is not AVAILABLE, enter the appropriate operating system commands to make the device available to the HSD05 DSSI-to-SCSI bus adapter.
3. At the UTILIT prompt, enter the SELECT command and specify a device name.
4. Verify that the device status has changed to MAINT in the SELECT display.
5. Enter the FORMAT command and specify the *device\_name* of the device to be formatted.
6. At the verification prompt, check that the device name given under the Device header of the FORMAT display is the device that you need to format. Answer “Y” or “YES” to begin the format operation.
7. Monitor the Maint Oper status of the format operation using the SHOW command. When the status changes to COMPLETE, the format operation is finished.
8. Enter the QUALIFY command to begin the qualify operation.
9. At the verification prompt, check that the device name given under the Device header of the QUALIFY display is the device that you need to qualify. Answer “Y” or “YES” to begin the qualify operation.
10. Monitor the pass counter of the SHOW command display until one or more passes have been completed by the utility.
11. Enter the ABORT command to terminate the qualify operation.

12. Enter the DESELECT command to bring the device back to the AVAILABLE status.
  13. Enter the appropriate operating system commands to bring the device on line.
- Example 1–10 shows the complete format/qualify task procedure.

### Example 1–10 Format/Qualify Task Procedure

```
UTILIT>SHOW DIA220
Device  SID  Vendor  Model  Rev  Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28   435E  AVAILABLE

UTILIT>SELECT DIA220
Device  SID  Vendor  Model  Rev  Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28   435E  MAINT     IDLE       READY

UTILIT>FORMAT DIA220
Device  SID  Vendor  Model  Rev  Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28   435E  MAINT     IDLE       READY
FORMAT will destroy all data on this device.  Are you sure (Y/N)? YES
Initiating Format
UTILIT>SHOW DIA220
Device  SID  Vendor  Model  Rev  Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28   435E  MAINT     FORMAT     IN PROGRESS

UTILIT>SHOW DIA220
Device  SID  Vendor  Model  Rev  Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28   435E  MAINT     FORMAT     COMPLETE

UTILIT>QUALIFY DIA220 /WRITE
Device  SID  Vendor  Model  Rev  Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28   435E  MAINT     IDLE       READY
QUALIFY will destroy all data on this device.  Are you sure (Y/N)? YES
Initiating device qualification
UTILIT>SHOW DIA220
```

(continued on next page)

### Example 1–10 (Cont.) Format/Qualify Task Procedure

```
Device  SID  Vendor  Model   Rev   Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28    435E  MAINT    QUALIFY    PASS #0
UTILIT>ABORT
UTILIT>DESELECT DIA220
UTILIT>
```

#### 1.5.4.2 Exercising a Disk Device

You can exercise a disk device using the DISKTEST command of the onboard utilities. This exercise can be done as part of a FORMAT/QUALIFY operation, or to verify the performance of the device while troubleshooting the system.

Use the following task procedure to exercise a specified disk device:

1. At the UTILIT prompt, enter the SHOW command with the *device\_name* qualifier to determine device status.
2. If the device status is not AVAILABLE, enter the appropriate operating system commands to make the device available to the HSD05 DSSI-to-SCSI bus adapter.
3. At the UTILIT prompt, enter the SELECT command and specify a device name.
4. Verify that the device status has changed to MAINT in the SELECT display.
5. Enter the DISKTEST command and specify the *device\_name* of the device to be exercised.
6. At the verification prompt, check that the device name given under the Device header of the DISKTEST display is the device that you need to exercise. Answer “Y” or “YES” to begin exercising the device.
7. Enter the ABORT command to terminate the DISKTEST operation.
8. Enter the DESELECT command to bring the device back to the AVAILABLE status.
9. Enter the appropriate operating system commands to bring the device on line.

Example 1–11 shows the complete DISKTEST task procedure.

### Example 1–11 DISKTEST Task Procedure

```
UTILIT>SHOW DIA220
Device  SID  Vendor  Model  Rev  Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28   435E  AVAILABLE
UTILIT>SELECT DIA220
Device  SID  Vendor  Model  Rev  Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28   435E  MAINT     IDLE       READY
UTILIT>DISKTEST DIA220 /WRITE
Device  SID  Vendor  Model  Rev  Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28   435E  MAINT     IDLE       READY
DISKTEST will overwrite some or all data on this device. Are you sure (Y/N)? Y
Initiating Disk Test
UTILIT>SHOW DIA220
Device  SID  Vendor  Model  Rev  Dev Stat  Maint Oper  Maint Status
-----
DIA220  2-0  DEC     RZ28   435E  MAINT     DISKTEST   IN PROGRESS
UTILIT>ABORT DIA220
UTILIT>DESELECT DIA220
UTILIT>
```

### 1.5.4.3 Exercising a Tape Device

You can exercise a tape device using the TAPETEST command of the onboard utilities. This exercise can be done to verify the performance of the device while troubleshooting the system.

Use the following procedure to exercise a specified tape device:

1. At the UTILIT prompt, enter the SHOW command with the *device\_name* qualifier to determine device status.
2. If the device status is not AVAILABLE, enter the appropriate operating system commands to make the device available to the HSD05 DSSI-to-SCSI bus adapter.
3. At the UTILIT prompt, enter the SELECT command and specify a device name.
4. Verify that the device status has changed to MAINT in the SELECT display.
5. Verify that the tape device to be exercised contains a scratch tape that can be overwritten by TAPETEST.
6. Enter the TAPETEST command and specify the *device\_name* of the device to be exercised.
7. At the verification prompt, check that the device name given under the Device header of the TAPETEST display is the device that you need to exercise. Answer “Y” or “YES” to begin exercising the device.
8. Monitor the pass counter of the SHOW command display until one or more passes have been completed by the utility.
9. Enter the ABORT command to terminate the TAPETEST operation.
10. Enter the DESELECT command to bring the device back to the AVAILABLE status.
11. Enter the appropriate operating system commands to bring the device on line.

Example 1–12 shows the complete TAPETEST procedure.

### Example 1–12 TAPETEST Task Procedure

```
UTILIT>SHOW MUA210
```

Device	SID	Vendor	Model	Rev	Dev Stat	Maint Oper	Maint Status
MUA210	1-0	DEC	TLZ06	0491	AVAILABLE		

```
UTILIT>SELECT MUA210
```

Device	SID	Vendor	Model	Rev	Dev Stat	Maint Oper	Maint Status
MUA210	1-0	DEC	TLZ06	0491	MAINT	IDLE	READY

```
UTILIT>TAPETEST MUA210
```

Device	SID	Vendor	Model	Rev	Dev Stat	Maint Oper	Maint Status
MUA210	1-0	DEC	TLZ06	0491	MAINT	IDLE	READY

TAPETEST will overwrite some or all data on this device. Are you sure (Y/N)? **Y**  
Initiating Tape Test.

```
UTILIT>SHOW MUA210
```

Device	SID	Vendor	Model	Rev	Dev Stat	Maint Oper	Maint Status
MUA210	1-0	DEC	TLZ06	0491	MAINT	TAPETEST	PASS #0

```
UTILIT>ABORT MUA210
```

```
UTILIT>DESELECT MUA210
```

```
UTILIT>
```

## 1.6 Troubleshooting

This section contains troubleshooting information for the HSD05 DSSI-to-SCSI bus adapter. The HSD05 DSSI-to-SCSI bus adapter uses a system of onboard LED indicator codes to indicate the source of an internal fault. You can also use the OpenVMS Analyze/Error utility to read an HSD05 error log for information about devices connected to the HSD05 DSSI-to-SCSI bus adapter.

### 1.6.1 LED Indicators

The location of the LED indicators (DS1 through DS4) is shown in Figure 1–3. During normal operation, these indicators are behind the module cover and are not visible.

---

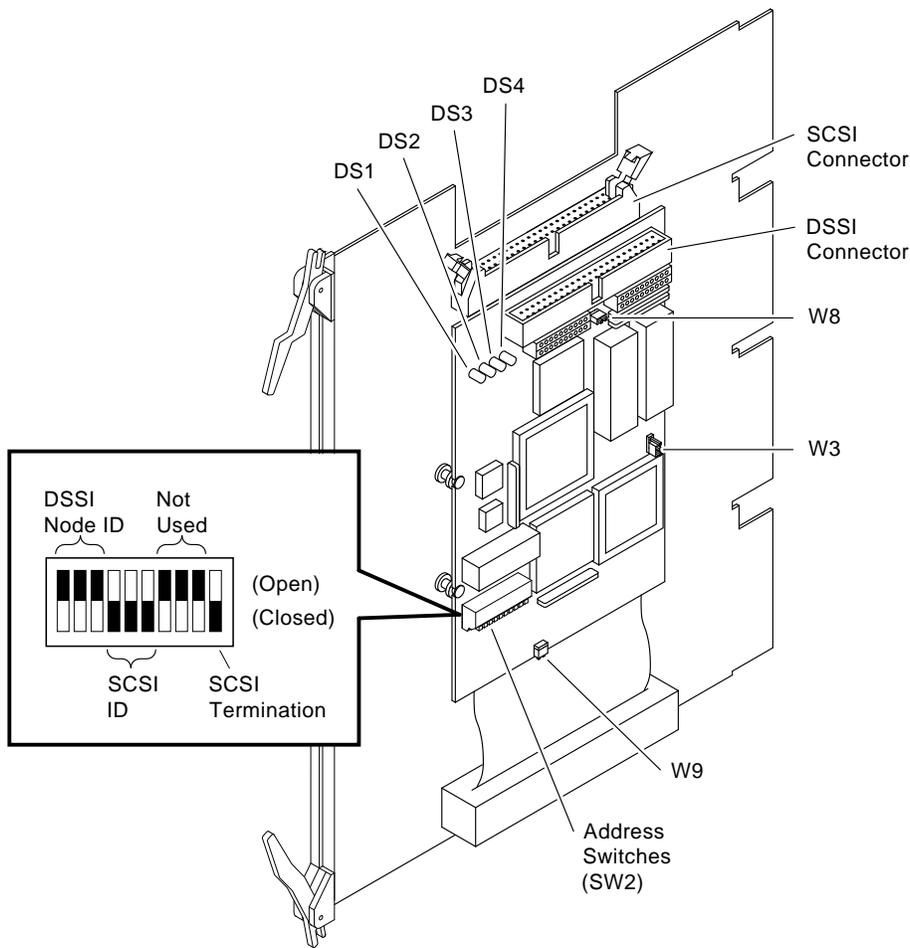
**CAUTION**

---

The HSD05 DSSI-to-SCSI bus adapter module cover should only be removed for service or maintenance. This cover needs to be in place for proper air flow and cooling, and to meet international regulatory requirements.

---

**Figure 1-3 HSD05 DSSI-to-SCSI Bus Adapter Module Board**



MLO-012801

When the HSD05 DSSI-to-SCSI bus adapter boots, red indicator DS2 blinks for 15 seconds before it shuts off. If this indicator blinks for more than 15 seconds, it indicates that the onboard diagnostics have found a fault.

The fault code is read out as a two-digit error code on the indicators; each digit of the code is indicated by the number of times the indicator blinks. The first digit of the code is separated from the second digit by a one-second pause. A two-second pause separates the error code from its next repetition. This code is repeated until reset by a power-off of the HSD05 DSSI-to-SCSI bus adapter.

Table 1–9 lists the serviceable error codes and the associated problem. For all other error codes, recheck the integrity of all bus terminator and cable connections. If these actions do not resolve the problem, replace the HSD05 DSSI-to-SCSI bus adapter.

**Table 1–9 HSD05 LED Indicator Codes**

Code	Problem	Resolution
11	DSSI port problem	Ensure that DSSI termination power is supplied by either the host bus or the HSD05 DSSI-to-SCSI bus adapter. Check all DSSI bus connections and terminations.
12	SCSI port problem	Ensure that SCSI termination power is supplied by either the host bus or the HSD05 DSSI-to-SCSI bus adapter. Check all SCSI bus connections and terminations.

## 1.6.2 HSD05 Error Logs

The HSD05 DSSI-to-SCSI bus adapter logs error conditions in the OpenVMS error log file ERRLOG.SYS. To retrieve this information, use the OpenVMS command ANALYZE/ERROR\_LOG. Refer to the applicable OpenVMS documentation to read this error log when troubleshooting the HSD05 DSSI-to-SCSI bus adapter.

The HSD05 DSSI-to-SCSI bus adapter reports the following two types of error logs:

- **Type 1** error logs are SCSI port related.
- **Type 2** error logs are SCSI command related.

For each of the types of error logs, there are also separate formats for disk and tape devices.

The following two tables contain information to be used in interpreting HSD05 DSSI-to-SCSI bus adapter errors during OpenVMS error log analysis:

- **Table 1–10** lists the possible SCSI port error codes that may be found in the error logs generated by the HSD05 DSSI-to-SCSI bus adapter.
- **Table 1–11** lists the SCSI bus phases reported by the HSD05 DSSI-to-SCSI bus adapter.

**Table 1–10 Port Error Codes**

<b>Code (Hexadecimal)</b>	<b>Port Status</b>
2000	Internal sync problem.
4002	Internal inconsistency error; tried to send an unsupported SPORT opcode.
4007	Internal inconsistency error; tried to send an unsupported message.
8000	Reserved.
8001	Reserved.
8003	Double Check condition encountered. Check condition status returned on a Request Sense due to previous check condition status.
8004	Unsupported SCSI status returned by target.
8005	Unsupported message received.
8006	Target rejected a non-rejectable message.
8008	Phase transition timeout.
8009	Gross error bit was set in SCSI chip.
800A	Parity error bit was set in SCSI chip.
800B	Illegal command bit was set in SCSI chip
800C	250 millisecond SCSI timeout because device does not exist.
800D	Illegal disconnect because target disconnected during data-out, data-in, or message-out phase.
800E	Hung bus timeout because target was connected to the bus for more than 30 seconds.
800F	Device did not go bus-free after device reset, abort tag, or clear queue condition.
8010	SCSI bus reset detected.
8011	Disconnected device timeout.

**Table 1–11 SCSI Bus Phases**

Code	Phase
00	Data out
01	Data in
02	Command
03	Status
04	Reserved
05	Reserved
06	Message out
07	Message in

### 1.6.2.1 Type 1 Error Logs for a Disk Drive

The following example shows a type 1 error log for a disk drive with a SCSI port problem:

```
LONGWORD1.    00002801
LONGWORD2.    0102800E
LONGWORD3.    000000FF
LONGWORD4.    00000000
LONGWORD5.    00000000
```

To decipher the error log, separate each longword into its constituent bytes, as shown in the following example:

```
LONGWORD1.    Byte:  3      2      1      0
                00      00      28      01

LONGWORD2.    Byte:  7      6      5      4
                01      02      80      0E

LONGWORD3.    Byte: 11      10      9      8
                00      00      00      FF

LONGWORD4.    Byte: 15      14      13      12
                00      00      00      00

LONGWORD5.    Byte: 19      18      17      16
                00      00      00      00
```

The meaning of these bytes is summarized in Table 1–12.

**Table 1–12 Type 1 Disk Drive Error Log Bytes**

Byte	Description
0	Indicates the type of error log: <ul style="list-style-type: none"><li>• <b>01</b> is a type 1 error log</li><li>• <b>02</b> is a type 2 error log</li></ul>
1	The hexadecimal number of SCSI command that was being executed when the error occurred. Refer to the SCSI documentation for a listing of SCSI commands. In the example, the number 28 indicates that the SCSI command being executed was a READ EXTENDED.
4 and 5	A hexadecimal number to indicate the type of port error encountered. Refer to Table 1–10 for a listing of port error codes. In the example, the error code 800E indicates that the error was a hung bus timeout.
6 through 12	The phase history leading up to the error. The bytes preceding the end marker “FF” represent the phases that the SCSI bus went through before encountering the error. Refer to Table 1–11 for a listing of SCSI bus phases. In the example, the “01” in byte 7 indicates that the error occurred in the Data In phase.

### 1.6.2.2 Type 1 Error Logs for a Tape Drive

A type 1 error log for a tape drive reports information on a SCSI port problem in a format similar to the following:

```
MSLG$B_FMTR_SVR  01  FORMATTER SOFTWARE VERSION #1
MSLG$B_FMTR_HVR  01  FORMATTER HARDWARE REVISION #1
TU81 DRIVE EXTENDED SENSE INFORMATION
BYTE1             0C  DATA CHECK
BYTE2             80  ILLEGAL CHANNEL COMMAND
BYTE3             02  VELOCITY CHECK
BYTE4             FF  BOT
                   UNRECOVERABLE
                   ID FAULT
                   READ DATA CHECK
                   PE CRC CHECK
                   AGC FAULT
BYTE5             00  FRMTR CMD CODE = 00(X)
BYTE6             00
BYTE7             00
BYTE8             00
BYTE9             00
BYTE10            00
BYTE11            00
BYTE12            00
BYTE13            00
BYTE14            00
BYTE15            00  DEV COMMAND CODE
BYTE16            00  DEV MARGINAL CONDITION CODE
```

The first byte in the stack identifies the type of error log that follows. In the example, the first byte is “01”, indicating a type 1 error log.

The second byte is the code for the SCSI command that was being executed when the error occurred. Refer to the SCSI documentation for a listing of command numbers. In the example, the code “01” indicates a SCSI REZERO UNIT command.

Bytes 1 and 2 of the extended sense information form a hexadecimal number indicating the type of port error encountered. A listing of port errors is given in Table 1–10. In the example, the code “800C” indicates that the device does not exist.

Bytes 3 through 16 of the extended sense information give the phase history leading up to the error. The bytes preceding the end marker “FF” represent the phases that the SCSI bus went through before encountering the error. Refer to Table 1–11 for a listing of SCSI bus phases. In the example, the code “02” in byte 3 indicates that the SCSI bus was in the Command phase when the problem occurred.

### 1.6.2.3 Type 2 Error Logs for a Disk Drive

The following example shows a type 2 error log for a disk drive with a SCSI command problem:

```
LONGWORD1.    00007002
LONGWORD2.    00000006
LONGWORD3.    00002900
LONGWORD4.    00280000
LONGWORD5.    98D01D00
```

To decipher the error log, separate each longword into its constituent bytes, as shown in the following example:

```
LONGWORD1.    Byte: 3      2      1      0
                00      00      70      02

LONGWORD2.    Byte: 7      6      5      4
                00      00      00      06

LONGWORD3.    Byte: 11     10     9      8
                00      00      29      00

LONGWORD4.    Byte: 15     14     13     12
                00      28      00      00

LONGWORD5.    Byte: 19     18     17     16
                98      D0      1D      00
```

The meaning of these bytes is summarized in Table 1–13.

**Table 1–13 Type 2 Disk Drive Error Log Bytes**

Byte	Description
0	Indicates the type of error log: <ul style="list-style-type: none"> <li>• <b>01</b> is a type 1 error log</li> <li>• <b>02</b> is a type 2 error log</li> </ul>
4	The sense key of the extended sense data, describing the general category of the error. Refer to the SCSI documentation for a listing of sense key definitions. In the example, the sense key value of “06” indicates that a UNIT ATTENTION condition has occurred.
9, 10	Indicates the additional sense code of the extended sense data to give a more detailed description of the error. Refer to the SCSI documentation for a listing of sense key definitions. In the example, the additional sense code value is “29”, indicating that the error was caused by a power on, a reset, or a bus reset condition.
14 through 19	The hexadecimal representation of the SCSI command that was being executed when the error occurred. Refer to the SCSI documentation for a listing of SCSI command numbers. In the example, the number “28” indicates that a READ EXTENDED command was executing when the error occurred.

#### 1.6.2.4 Type 2 Error Logs for a Tape Drive

A type 2 error log for a tape drive reports information on a SCSI command problem in the following format:

Line	Description
2	First byte of the Request Sense information.
4	Sense key; this is byte 2 of the sense data.
5 through 8	Bytes 3 through 6 of the Request Sense data.
9 and 10	ASC and ASC1: bytes 12 and 13 of the Request Sense data.
11 through 13	Bytes 14 through 16 of the Request Sense data.
14 through 19	First six bytes of the SCSI command.

The following is an example of a type 2 error log for a tape drive:

```
MSLG$B_FMTR_SVR      02   (TYPE 2 ERROR LOG)
MSLG$B_FMTR_HVR      01   (SENSE BYTE 0)
TU81 DRIVE EXTENDED SENSE INFORMATION
BYTE1 (SENSE KEY)    06   UNIT CHECK
BYTE2 (BYTE 3)       00
BYTE3 (BYTE 4)       00
BYTE4 (BYTE 5)       00
BYTE5 (BYTE 6)       00   FRMTR CMD CODE = 00(X)
BYTE6 (BYTE 12)      29   VARIABLE GAP MODE (SHORT)
                           DIAGNOSTIC MODE
                           AUTO SPEED MODE

BYTE7 (BYTE 13)      00
BYTE8 (BYTE 14)      00
BYTE9 (BYTE 15)      00
BYTE10 (BYTE 16)     00
BYTE11 (SCSI CDB 0) 01   TRACK IN ERROR = 2
BYTE12 (SCSI CDB 1) 00
BYTE13 (SCSI CDB 2) 00
BYTE14 (SCSI CDB 3) 00
BYTE15 (SCSI CDB 4) 00   DEV COMMAND CODE
BYTE16 (SCSI CDB 5) 00   DEV MARGINAL CONDITION CODE
```

The first byte in the stack identifies the type of error log that follows. In the example, the first byte is “02”, indicating a type 2 error log.

Byte 1 of the extended sense information give the sense key to indicate the general category of the error. Refer to the SCSI documentation for a listing of SCSI sense code values. In the example, the sense key value of “06” indicates that a UNIT ATTENTION condition has occurred.

Byte 6 of the extended sense information indicates the additional sense code in the extended sense data to give a more detailed description of the error. Refer to the SCSI documentation for a listing of SCSI sense code definitions. In the example, an additional sense code of “29” indicates that a power on, a reset, or a bus device reset occurred.

Byte 7 of the extended sense information indicates the additional sense code qualifier. When used with the additional sense code in byte 6, the qualifier may provide additional information about the error. Refer to the SCSI documentation for additional sense code qualifier definitions. In the example, the qualifier of “00” with an additional sense code of “29” provides no additional information.

Byte 11 is the first byte (in hexadecimal) of the command that was being executed when the error occurred. Refer to the SCSI documentation for a listing of the hexadecimal representations of each command. In the example, a value of “01” in byte 11 indicates that the error occurred during a REZERO UNIT command.



# 2

---

## Operating the RZ-series Integrated Storage Element Options

This chapter tells you how to operate the RZ-series integrated storage element (ISE) options that are supported by the HSD05 DSSI-to-SCSI bus adapter.

### 2.1 Introduction

The following RZ-series options are supported by the HSD05 DSSI-to-SCSI bus adapter in the BA400-based enclosures:

- RZ26L disk drive
- RZ28 disk drive
- RZ73 disk drive
- RZ74 disk drive

Refer to Table 1–1 for the option number and a description of these ISEs.

To use any mass storage device, you must properly identify the device to your operating system and use appropriate operating system commands. Refer to your system software documentation for details.

---

#### Note

---

Refer to Section 1.4.3 and Section 1.4.4 for information on displaying or setting device parameters.

---

Using the dual-disk RZ, your system can have up to seven RZ-series ISEs or up to five RZ-series ISEs and a tape drive.

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**Note**

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Some RZ ISEs have a dual-disk capability: Two separate ISEs can share the same mass storage cavity and front panel.

---

When your system has multiple ISEs, you should 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.

## 2.2 RZ-Series Controls and Indicators

Each RZ-series ISE has controls and indicators on its front panel. To access them, open the upper system door (top key position).

---

**Note**

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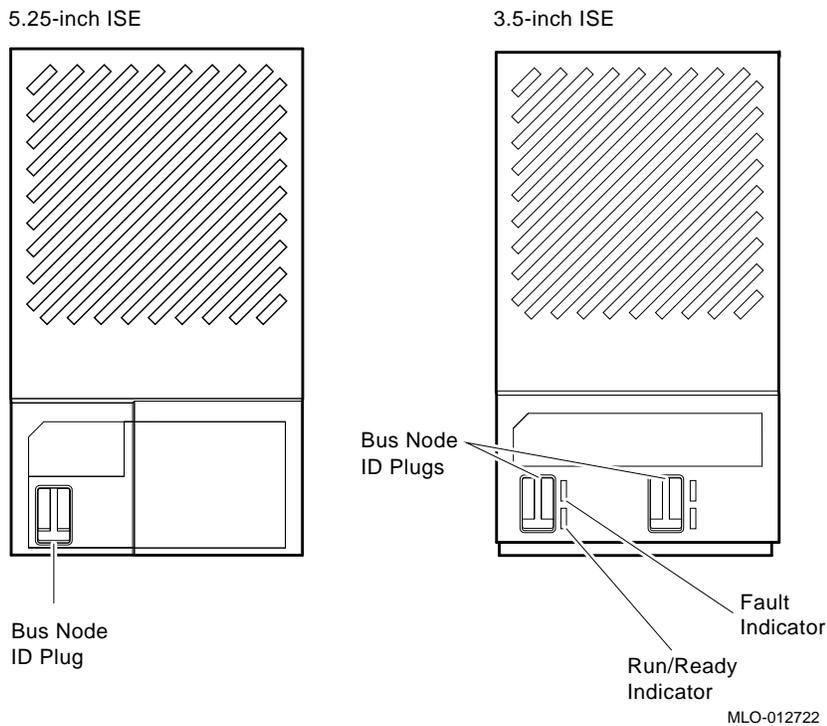
If your system has less than the maximum number of ISEs, a blank ISE front panel with no controls or indicators covers the empty ISE cavities. Such panels are required to meet international regulatory standards and airflow requirements.

If your system has a 3.5-inch RZ-series ISE with only one disk, one set of controls has a blank bus node ID plug and its indicators do not light.

---

Figure 2–1 shows the RZ-series ISE front panels.

**Figure 2–1 RZ-series ISE Front Panels**



Each 5.25-inch RZ-series ISE has a bus node ID plug on its front panel.

Each 3.5-inch RZ-series ISE has the following controls and indicators (there are two sets of controls and indicators, as 3.5-inch RZ-series ISEs can have two disks behind the one front panel).

- Bus node ID plug
- Fault indicator
- Run/Ready indicator

Bus node ID plugs identify the bus node number of each ISE to the system, as well as the unit number by default. Bus node numbers are configured at the factory in consecutive order from right to left.

Table 2–1 lists the RZ-series ISE controls and indicators.

**Table 2–1 RZ-Series ISE Controls and Indicators**

<b>Control</b>	<b>Position</b>	<b>Function</b>
Bus node ID plug	Installed	Identifies bus node ID number (unit number) of ISE to system. ID is factory set to number 0 through 6.
	Not installed	Bus node number undefined. Fault indicator lit on 3.5-inch RZ-series ISE.
Fault	Lit	Indicates error condition on 3.5-inch RZ-series ISE. Lights temporarily during power-up sequence (normal condition).
	Not lit	Indicates error-free condition in 3.5-inch RZ-series ISE.
Run/Ready	Lit (green)	3.5-inch RZ-series ISE is online, available for use. Green light flashes as seek operations are performed.

## 2.3 Specifications

The following table lists the specifications for the different RZ-series ISEs that are supported by the HSD05 DSSI-to-SCSI bus adapter in the VAX 4000 system.

Table 2–2 lists the specifications for the RZ26L, RZ28, RZ73, and RZ74 disk drives.

**Table 2–2 ISE Specifications**

Specification	RZ26L	RZ28	RZ73	RZ74
Form factor	3.5-inch 1-inch high	3.5-inch	5.25-inch	5.25-inch
Voltage and regulation	+5 Vdc $\pm$ 5%, +12 Vdc $\pm$ 5%			
Current (Max) <sup>1</sup>	+5 Vdc: .9 A, +12 Vdc: .6 A	+5 Vdc: .86 A, +12 Vdc: .96 A	+5 Vdc: 1.2 A, +12 Vdc: 1.75 A	+5 Vdc: 1.2 A, +12 Vdc: 2.9 A
Power (Max) startup	29.0 W	39.0 W	68.6 W	72.2 W
Power (Max) seeking <sup>1</sup>	12.3 W	16.6 W	28.0 W	40.8 W
Ambient operating temperature	+5°C to +55°C (+41°F to +131°F)	+10°C to +50°C (+50°F to +122°F)	+10°C to +50°C (+50°F to +122°F)	+10°C to +50°C (+50°F to +122°F)
Operating relative humidity	10% to 90% (noncondensing)	10% to 90% (noncondensing)	10% to 90% (noncondensing)	10% to 90% (noncondensing)
Storage capacity	1.05 Gbytes	2.1 Gbytes	2.0 Gbytes	3.5 Gbytes
Average seek time	9.5 ms	9.5 ms	12.5 ms	<12.5 ms
Average access time	15.1 ms	15.1 ms	20.8 ms	18.0 ms
Rotational speed	5400 rpm	5400 rpm	3600 rpm	5400 rpm
Transfer rate to/from media	2.7 to 5.5 MB/s	2.4 to 4.9 MB/s	2.2 MB/s	3.6 to 5.5 MB/s

<sup>1</sup>Assumes continuous random seek mode.

## 2.4 Write-Protecting an RZ-Series ISE

The following sections describe software and hardware write-protection for the RZ-series ISEs.

### 2.4.1 Software Write-Protect for RZ-series ISEs

You may want to write-protect an ISE containing sensitive data you do not want changed or accidentally erased.

For the RZ-series ISEs, you set write-protection using VMS commands.

Your system disk (the ISE containing system software) and ISEs containing work areas for users should be write-enabled, the normal setting.

Since the RZ-series ISE does not have a Write-Protect button, the software write-protect is the primary method for write-protecting an RZ-series ISE.

The software write-protect uses the VMS DCL MOUNT command with the /NOWRITE qualifier, as shown below:

```
MOUNT/SYSTEM/NOWRITE device_name volume_label logical_name
```

In this command, *device\_name* is the device name, as shown using the VMS DCL command SHOW DEVICE DI, *volume\_label* is the volume label for the device, and *logical\_name* is the logical name of the device; for example:

```
$ MOUNT/SYSTEM/NOWRITE $1$DIA10: OMEGA OMEGA$DISK
```

The above command line software write-protects device \$1\$DIA10.

Dismounting and then remounting the device (without using the /NOWRITE qualifier) write-enables the device.

Use the VMS DCL command SHOW DEVICE DI to check the protection status of the drive. A write-protected drive shows a device status of Mounted wrtlck. Refer to your VMS documentation for more information on using the MOUNT utility.

---

#### CAUTION

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When you dismount and then mount the device again, it is no longer write-protected.

---

## 2.4.2 Hardware Write-Protect for RZ-series ISEs

The hardware write-protect provides a more permanent write-protection than the software write-protect. Once you hardware write-protect an RZ-series ISE, it remains write-protected, regardless of the availability of the operating system or if the system is powered-down. In addition, a hardware write-protect cannot be removed by using the MOUNT or DISMOUNT commands.

You should consider hardware write-protecting an RZ-series ISE when:

- You want to write-protect an RZ-series ISE when the VMS operating system is not available, such as before running the MicroVAX Diagnostic Monitor (MDM).
- You want to ensure that an RZ-series ISE remains write-protected, since the hardware write-protect cannot be removed by the VMS MOUNT command and remains in effect even if the operating system is brought down.

Refer to Section 1.4.3 and Section 1.4.4 to display and set the HSD05 operating parameters. Refer to Table 1–8 for a detailed definition of the WT\_PROTECTED parameter.

## 2.5 Changing the Bus Node ID Plugs

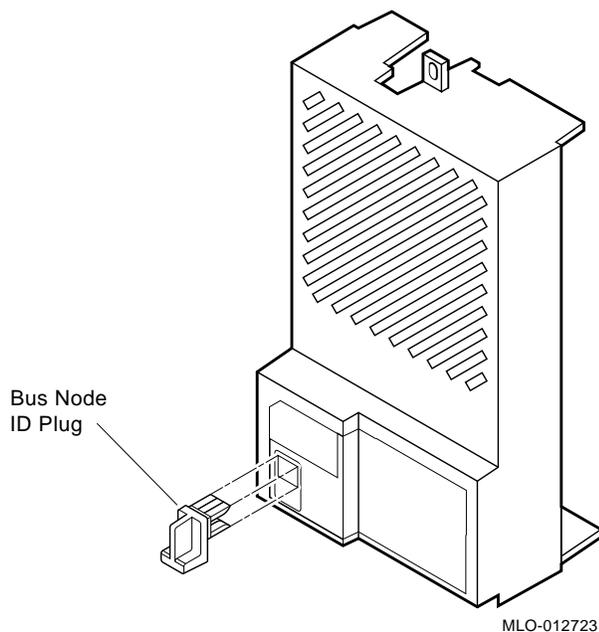
Spare bus node ID plugs are supplied with your system. Use them to renumber your ISEs if you

- Reconfigure your system with an expander
- Create a DSSI VAXcluster configuration

The ID plugs have prongs on the back that indicate the bus node number (unit number) of the ISE.

- To remove a plug, grasp it firmly and pull straight out (see Figure 2–2).
- To insert a plug, align the two center prongs with the two center slots and press the plug into the slots (see Figure 2–2).

**Figure 2–2 Removing and Inserting a Bus Node ID Plug**



Use these rules for renumbering your storage devices.

- For each DSSI bus, do not duplicate bus node numbers for your storage devices/adapters. For Bus 0, you can have only one device identified as node 0, one device as 1, and so on. For Bus 1, you can have only one device identified as node 0, one device as 1, and so on.

- That rule also applies to DSSI VAXcluster configurations. All DSSI bus node numbers for storage devices and DSSI adapters must be unique in a shared DSSI bus.
- The RZ-series ISEs are numbered in increasing order from right to left beginning with zero.
- DSSI adapters use the highest available bus nodes. The next highest available node (usually five) is reserved for a TZ/TLZ-series tape drive.
- If more than one DSSI bus is used and your system is using a nonzero allocation class, assign new Mass Storage Control Program (MSCP) unit numbers for devices on all but one of the DSSI buses. The unit numbers for all DSSI devices connected to a system's associated DSSI buses must be unique.

---

**Note**

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If you change the bus node ID plugs while your system is operating, you must turn off the system and then turn it back on for the new plug positions to take effect.

---



# 3

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## Operating the TZ86 and TZ87 Cartridge Tape Subsystems

This chapter explains how to operate the TZ86 and TZ87 cartridge tape options that are supported by the HSD05 DSSI-to-SCSI bus adapter.

### 3.1 TZ86 and TZ87 General Description

The TZ86 and TZ87 drives are streaming tape drives. The TZ86 drive can store up to 6.0 GB of data on a CompacTape III cartridge. The TZ87 drive can store up to 10.0 GB of data without compression and 20 GB of data with compression, assuming a 2:1 compression ratio, on a CompacTape III cartridge.

The TZ86 and TZ87 cartridge tape subsystems are used primarily for data backup, for data archiving, and for loading software onto computer systems. The TZ86 and TZ87 cartridge tape subsystems use the SCSI bus.

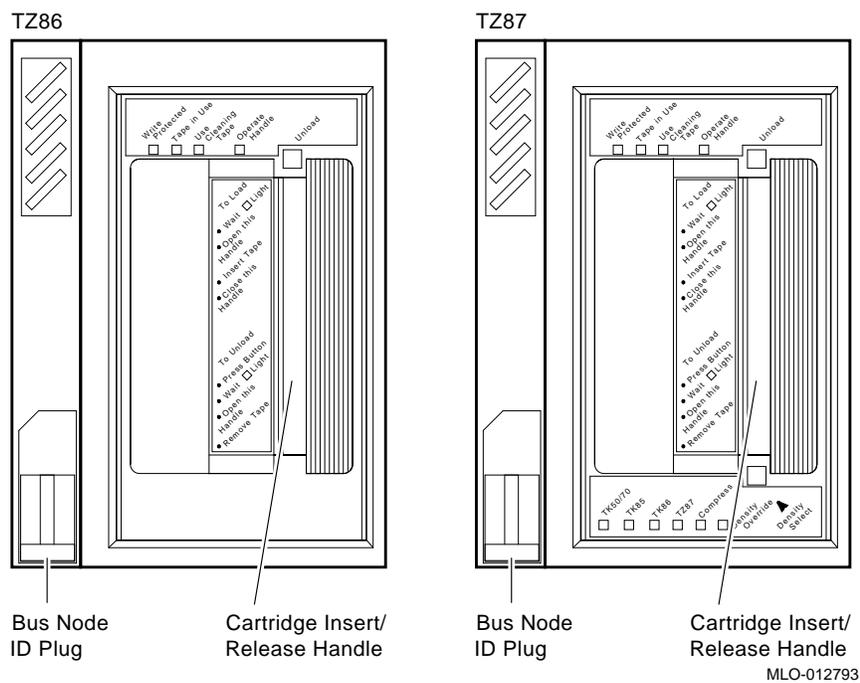
The TZ86 tape drive writes 56 pairs of tracks—112 tracks total—on the CompacTape III. The drive reads and writes data in a two-track parallel, serpentine fashion, traveling the entire length of tape on two tracks (at about 100 inches per second). The drive then steps the head and reverses tape direction and continues to read/write on the next two tracks.

The TZ87 tape drive writes 64 pairs of tracks—128 tracks total—on the CompacTape III. The drive reads and writes data in a two-track parallel, serpentine fashion, traveling the entire length of tape on two tracks (at about 110 inches per second). The drive then steps the head and reverses tape direction and continues to read/write on the next two tracks.

## 3.2 TZ86 and TZ87 Controls and Indicators

Figure 3–1 shows the TZ86 and TZ87 front panel indicators and controls.

Figure 3–1 TZ86 and TZ87 Indicators and Controls



### 3.2.1 TZ86 and TZ87 Indicators

Table 3–1 lists the indicators at the top of the TZ86 and TZ87 front panels and describes their operating condition.

**Table 3–1 TZ86 and TZ87 Top Front Panel Indicators**

Indicator	Color	State	Operating Condition
Write Protected	Orange	On	Tape is write-protected.
		Off	Tape is write-enabled.
Tape in Use	Yellow	Blinking	Tape is moving.
		On	Tape is loaded; ready for use.
Use Cleaning Tape	Yellow (TZ87) Orange (TZ86)	On	Drive head needs cleaning, or the current data cartridge is faulty (see Section 3.10).
		Remains on after you unload the cleaning tape.	Cleaning tape attempted to clean the drive head, but the tape expired, so cleaning was not done.
		After cleaning, turns on again when you reload the data cartridge.	Problem data cartridge. Try another cartridge.
		Off	Cleaning is complete, or cleaning is unnecessary.
Operate Handle	Green	On	Okay to operate the cartridge insert/release handle.
		Off	Do not operate the cartridge insert/release handle.
All top front panel indicators on the TZ86 or TZ87, and all bottom front panel indicators on the TZ87	–	On	Power-on self-test is in progress.
		Blinking	An error has occurred. Press the Unload button or turn drive power off and then on again to clear the error.

### 3.2.2 Additional TZ87 Indicators

Table 3–2 lists the additional indicators found at the bottom of the TZ87 front panel and describes their operating condition.

**Table 3–2 TZ87 Bottom Front Panel Indicators**

Indicator	Color	State	Operating Condition
TK50/70	Yellow	On	Indicates tape is recorded in TK50 or TK70 format.
TK85	Yellow	On	Indicates tape is recorded in TK85 format.
		Blinking	Indicates tape is recorded in another density. You selected this density for a write from BOT.
TK86	Yellow	On	Indicates tape is recorded in TK86 format.
		Blinking	Indicates tape is recorded in another density. You selected this density for a write from BOT.
TZ87	Yellow	On (default)	Indicates tape is recorded in TZ87 format.
		Blinking	Indicates tape is recorded in another density. You selected this density for a write from BOT.
Compress	Yellow	On	Compression mode enabled. (Compression can be done in TZ87 density only.)
		Off	Compression mode disabled.
Density Override	Yellow	On	A density selection has been set from the TZ87 drive's front panel.
		Off (default)	Density selection is under host control or automatic.
		Blinking	You are in density selection mode.

### 3.2.3 TZ86 and TZ87 Controls

Table 3–3 lists and describes the controls located on the TZ86 and TZ87 front control panels.

**Table 3–3 TZ86 and TZ87 Controls**

Control	Description
Bus node ID plug	Identifies the bus node ID number (unit number) of the drive to the system.
Beeper	A momentary beeper sounds when you can operate the cartridge insert/release handle. When you hear the beep, the green Operate Handle light is on.
Unload button	<p>The unload button rewinds the tape and unloads the tape from the drive back into the cartridge. The tape must be completely rewound and unloaded into the cartridge before you remove the cartridge from the drive. Depending on tape position, an unload operation may take from 10 seconds to 4 minutes.</p> <p>If the drive is in error state (all four top front panel lights flashing), pushing the unload button causes the drive to reset and unload the tape if possible.</p>
Cartridge insert/release handle	Operate the cartridge insert/release handle to load a cartridge or to eject a cartridge only when the Operate Handle indicator is on, and after the momentary beep sounds. The handle pulls to the left to the open position and pushes to the right to the closed position. See Section 3.7 and Section 3.8 for the operating procedures.
Density select switch (TZ87 only)	Pressing the density select switch once enters the density select mode. Press the density select switch again to toggle through the different density options. Stop when you reach the selected density. The selected density indicator blinks and the tape's actual density indicator remains steady.

### 3.3 Running the Power-on Self-test

When the TZ86/TZ87 subsystem is powered up, the drive performs the power-on self-test (POST). The sequence of events is listed in Table 3–4.

**Table 3–4 Power-on Self-test Events**

Stage	What Happens
1	The indicators on the TZ86 and TZ87 top front panel turn on sequentially, from left to right and then they all stay on for a few seconds.
2	All indicators on the TZ87 bottom front panel turn on at the same time for about three seconds and then turn off.
3	The green Operate Handle, the orange/yellow Write Protected <sup>1</sup> , and the yellow Use Cleaning Tape indicators turn off.
4	The yellow Tape in Use indicator blinks while the tape drive initializes.
5	After initialization, with no cartridge loaded, the green Operate Handle indicator turns on and the beeper sounds.

---

<sup>1</sup>The Write Protected indicator is orange on the TZ86 tape drive and yellow on the TZ87 tape drive.

---

POST completes in about 13 seconds and the subsystem responds normally to all commands. However, it might take longer for the media to become ready. After a bus reset, the tape drive responds within a bus selection timeout period.

### 3.4 TZ86 and TZ87 Specifications

Table 3–5 lists the specifications for the TZ86 and TZ87 cartridge tape subsystems.

**Table 3–5 TZ86 and TZ87 Specifications**

Specification	TZ86	TZ87
Maximum transfer rate	800 kB/s, formatted	1.25 MB/s (noncompressed mode) 2.5 MB/s write, 3 MB/s read (compressed mode)
Bit density	42,500 bits/in.	62,500 bits/in.
Number of tracks	112	128
Tape speed	100 in./s	110 in./s read/write, 150 in./s rewind/spacing
Track format	Two-track parallel, serpentine recording	Two-track parallel, serpentine recording
Cartridge capacity	Up to 6.0 GB, formatted	Up to 10 GB (uncompressed) Up to 20 GB (compressed), assuming a 2:1 compression ratio
Maximum power	40 W	22.1 W
Operating voltage /Current	12 V /1.2 A (1.5 A surge)  +5 V/3.5 A	12 V /0.8 A (read/write), 1.5 A (start/stop)  +5 V/2.5 A (read/write), 2.8 A (start/stop)

## 3.5 Description of the CompacTape III Cartridge

The tape cartridge, shown in Figure 3–2, is a 4 1/8-inch, gray, plastic cartridge containing 1200 feet of 1/2-inch magnetic metal particle tape.

The CompacTape III is supplied with a:

- Set of slide-in labels for cartridges
- Cartridge handling information sheet

### 3.5.1 Cartridge Write-Protect Switch

The CompacTape III cartridge has a write-protect switch to prevent accidental erasure of data. Before loading the tape cartridge into the drive, position the write-protect switch on the front of the cartridge (Figure 3–2). The switch can move to the:

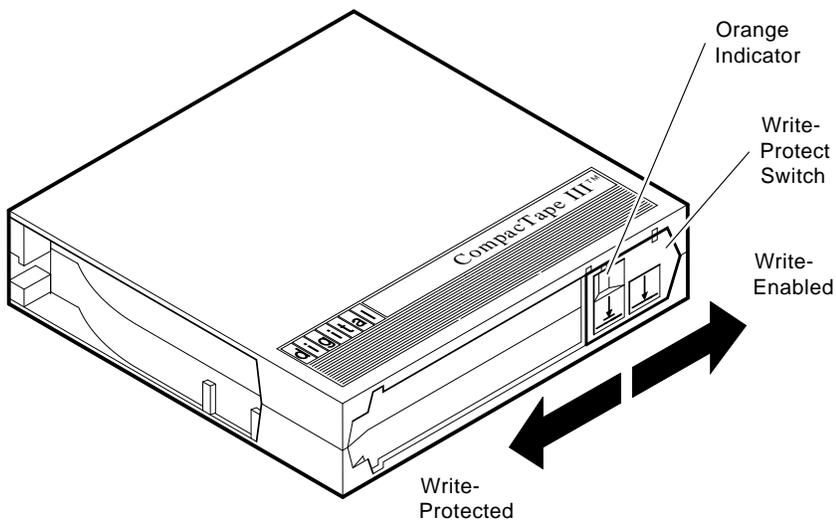
- Left, so the cartridge is write-protected
- Right, so the cartridge is write-enabled

When the switch is moved to the left and the small orange rectangle is visible, data cannot be written to the tape. Beneath the orange rectangle is an arrow over two lines on the write-protect switch. The arrow over the two lines symbolizes that data cannot be written to the tape.

On the right side of the write-protect switch is another symbol, an arrow over one line. This symbol indicates that if the write-protect switch is moved to the right, data can be written to the tape.

Figure 3-2 shows the CompacTape III cartridge and the write-protect switch.

**Figure 3-2 CompacTape III Cartridge**



MLO-012720

### 3.5.2 Data Protection

If you move the cartridge write-protect switch to the left, the drive turns on the write protect LED immediately. However, if the drive is writing to the tape, the write protect does not take effect until the write is completed.

Table 3–6 describes what happens to data protection when you move the write-protect switch before loading the cartridge.

**Table 3–6 Before Loading the Cartridge**

<b>If you move the write-protect switch. . .</b>	<b>Then. . .</b>
To the left, the tape is write-protected, with the orange indicator showing	You cannot write data to the tape.
To the right, the tape is write-enabled	You can write data to the tape (if it is not software write-protected).

Table 3–7 describes what happens to data protection when you move the write-protect switch during operation.

**Table 3–7 After Loading the Cartridge and Operating**

<b>If you move the write-protect switch. . .</b>	<b>Then. . .</b>
From the write-protected position to the write-enabled position	The tape becomes write-enabled after a variable amount of time (on order of seconds).
From the write-enabled position to the write-protected position	The tape becomes write-protected after a variable amount of time (on order of seconds).

### 3.5.3 Comparison of Read/Write Ability

Table 3–8 shows cartridge compatibility with the TZ86 tape drive.

**Table 3–8 TZ86 Cartridge Compatibility**

Cartridge Type/Format (Capacity)	Read/Write Ability in the TZ86
CompacTape III/TK85 (2.6 GBF)	Read/write in 85 Mode
CompacTape III/TK86 (6.0 GBF)	Read/write in 86 Mode
CompacTape III/Blank (6.0 GBF)	Read/write in 86 Mode

Table 3–9 shows cartridge compatibility with the TZ87 tape drive.

**Table 3–9 TZ87 Cartridge Compatibility**

Cartridge Type/Format (Capacity)	Read/Write Ability in the TZ87
CompacTape/TK50 (95 MBF)	Read only
CompacTape II/TK70 (296 MBF Mode)	Read only
CompacTape III/TK85 (2.6 GBF Mode)	Read/write in 85 Mode <sup>1</sup>
CompacTape III/TK86 (6.0 GBF Mode)	Read/write in 86 Mode <sup>1</sup>
CompacTape III/TZ87 (10.0 GBF, 20.0 GBF assumes 2:1 compression)	Read/write in 87 Mode <sup>1</sup>
CompacTape III/Blank	Read/write in 85 <sup>2</sup> , 86 <sup>2</sup> , or 87 Mode, as selected

<sup>1</sup>Recording format can be changed to that of 85, 86, or 87 mode on a write from BOT.

<sup>2</sup>Read/write, backward compatible with drive of selected density.

## 3.6 TZ86/TZ87 Density Selection

The following sections describe the TZ86 and TZ87 drive's density select features.

---

### CAUTION

---

If you reuse a prerecorded tape and write from beginning of tape (BOT), all prerecorded data is lost. This includes density changes, since they only occur when writing from BOT.

---

### 3.6.1 TZ87 Density Selection

To select density with the TZ87:

1. Insert the tape into the drive. The yellow Tape in Use indicator blinks while the tape loads and calibrates.
2. After calibration completes, the yellow Tape in Use indicator remains lit.
3. Press the Density Select switch once to enter the density select mode. The Density Override indicator and the indicator of the tape's actual density lights.
4. Press the Density Select switch again to toggle through the different density options. Stop when you reach the selected density. The selected density indicator blinks and the tape's actual density indicator remains steady.
5. After the tape is written to in the selected format, the selected density indicator lights steadily, and the previous density indicator shuts off.

If you have installed a tape with a prerecorded TK85 density and you use the density selection button to select TZ87 density, the following occur:

- The TK85 indicator remains lit, indicating that the density selection of the current tape has not changed yet.
- The TZ87 indicator blinks, indicating that a density change is pending.
- The density override indicator is lit, indicating that a density selection has been made from the front panel.

When a write from BOT occurs, the following occur:

- The TK85 indicator goes off.
- The TZ87 indicator becomes steady.
- The density override indicator remains lit.

Density selection occurs according to the following rules:

**READ WRITE APPEND**

The density selected reflects the density of the tape already in the drive.

**WRITE from BOT**

The density selected may occur via the use of the front panel Density Select button. Using the Density Select button always overrides the existing density of the tape.

If the Density Select button is not used, the density selected is the native default, TZ87 mode (compression enabled).

---

**Caution**

---

Regardless of the operating conditions, a write from BOT destroys existing data on the tape.

---

---

**Note**

---

You can use the drive's control panel at various times, not just after loading a tape. Density selection is inactive until a write command is issued at Beginning of Tape (BOT). The controller remembers the density selection state until you do one of the following:

- Change the density selection.
  - Unload the tape.
-

Table 3–10 lists the results of different density selection actions.

**Table 3–10 Results of Density Selection**

<b>If. . .</b>	<b>Then . . .</b>
You did not use the density select button	The indicators show the actual density when the tape is reading and writing. The drive density indicator lights steadily and the density override indicator is off.
You used the density select button, and if the actual tape density is the same as the density you selected	The indicator for both the actual density and density override indicators are lit. For example, if the actual tape density is TZ87 and the selected tape density is TZ87, then the indicator next to TZ87 lights.
You used the density select button, and if the actual tape density differs from the density selected:	<ol style="list-style-type: none"><li>1. The density override indicator lights steadily.</li><li>2. The indicator next to the actual density lights steadily.</li><li>3. The indicator next to the selected density blinks.</li></ol> <p>For example if the actual tape density is TZ87 and the selected density is TK86, the TZ87 indicator lights steadily, the TK86 indicator blinks, and the density override indicator remains steady. After writing from BOT begins, the TZ87 indicator turns off, the TK86 indicator lights steadily and the density override indicator lights steadily.</p>

### 3.6.2 TZ86 Density Selection

In HSD05 applications, the TZ86 tape drive defaults to using TK86 format (high density) for all writes from Beginning of Tape (BOT). When you append data to a tape cartridge written in TK85 format, the current media density is used.

### **3.7 Loading a CompacTape III Cartridge**

The directions for loading a cartridge into the drive are printed on the front of the drive.

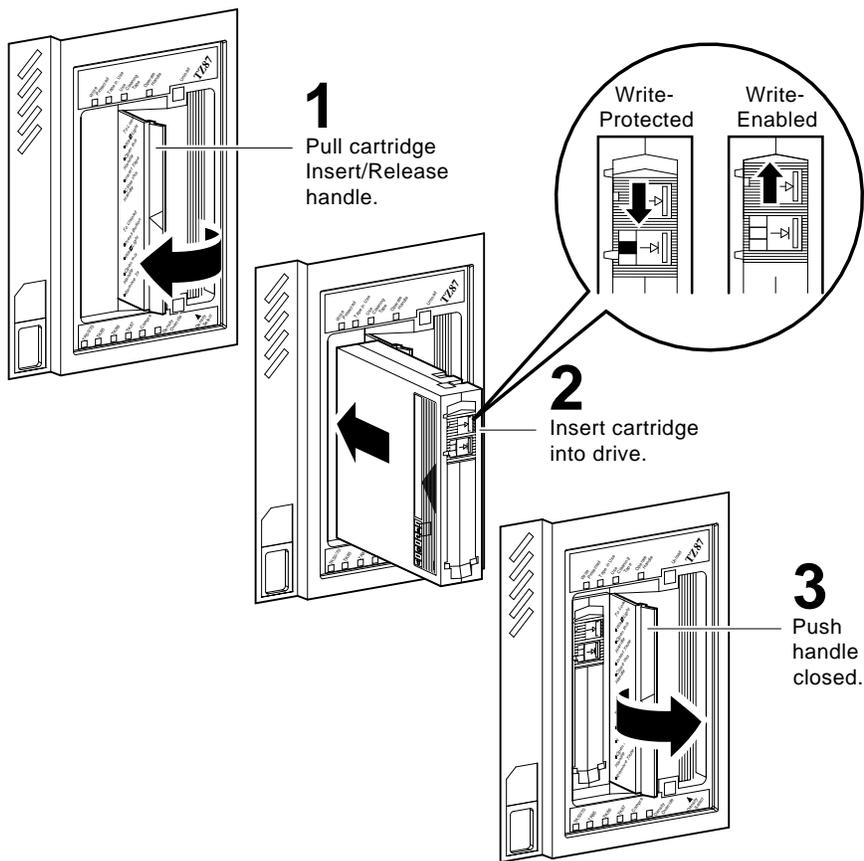
The following are more detailed steps for loading a cartridge (Figure 3–3):

1. When the green Operate Handle light is on steadily, pull the cartridge insert /release handle open.
2. Insert the cartridge and push it into the drive.
3. Push the handle closed.

The green Operate Handle light turns off and the yellow Tape in Use light blinks to show the tape is loading. When the tape is at the beginning-of-tape (BOT) marker, the yellow Tape in Use light turns on steadily. The tape is now ready for use.

Figure 3–3 shows how to load a CompacTape III cartridge into the drive.

**Figure 3-3 Loading a CompacTape III Cartridge**



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Whenever the yellow Tape in Use light is on steadily, the tape is ready to use. When the tape is being read, written, or rewound, the yellow Tape in Use light blinks.

Use Table 3–11 to determine what is happening during cartridge use.

**Table 3–11 During Cartridge Use (Top Front Panel Lights)**

<b>If. . .</b>	<b>It means. . .</b>
The yellow Tape in Use light is on steadily	A cartridge is loaded, but the tape is not moving. This condition can mean that no application is communicating with the controller, or that the application is communicating but is not delivering commands for tape motion.
The yellow Tape in Use light blinks irregularly	A read or write is in progress.
The yellow Tape in Use light blinks regularly	The tape is loading, unloading, or rewinding.
The green Operate Handle light turns on and the beeper sounds	The tape is unloaded.
All four lights at the top of the front panel blink	An error has occurred during operation.

## 3.8 Unloading a CompactTape III Cartridge

The directions for unloading a cartridge from the drive are printed on the front of the drive.

To unload a cartridge from the drive (Figure 3-4):

1. Press the Unload button (or issue the appropriate system software command). The yellow Tape in Use indicator blinks as the tape rewinds.
2. When the green Operate Handle light turns on (the beeper also sounds), pull the cartridge insert/release handle open to eject the cartridge.
3. Remove the cartridge.
4. Push the handle closed.

---

### CAUTIONS

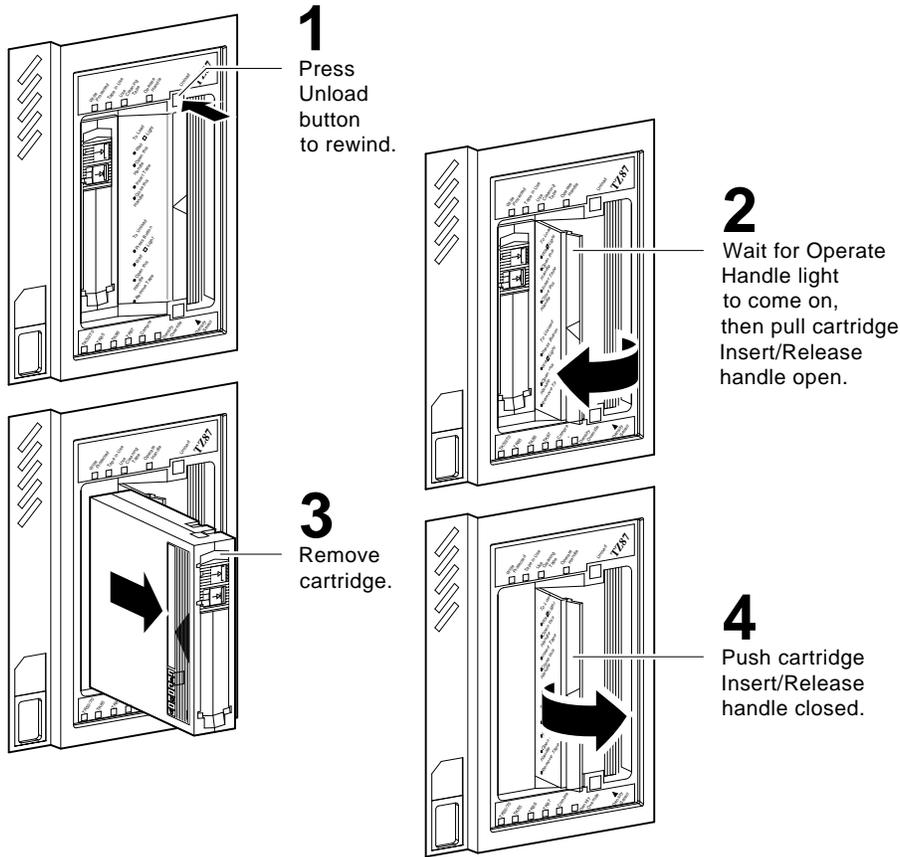
---

Remove a cartridge from the drive before turning off host system power. Failure to remove a cartridge can result in cartridge and drive damage.

When you remove the cartridge from the drive, return the cartridge to its plastic case to prolong the cartridge life.

---

**Figure 3-4 Unloading a CompacTape III Cartridge**



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### 3.9 Preserving CompacTape III Cartridges

For longer life of recorded or unrecorded cartridges, store cartridges in a clean environment with the following conditions:

- Do not drop or bang the cartridge. Doing so can displace the tape leader, making the cartridge unusable and possibly damaging the drive.
- Keep tape cartridges out of direct sunlight and away from heaters and other heat sources.
- Store tape cartridges in temperatures between 10°C and 40°C (50°F to 104°F). For longer cartridge life, always store the cartridge in its plastic container and in room environment conditions of 22°C ± 4°C (72°F ± 7°F).
- If the tape cartridge has been exposed to heat or cold extremes, stabilize the cartridge at room temperature for the same amount of time it was exposed—up to 24 hours.
- Do not place cartridges near electromagnetic interference sources, such as terminals, motors, video, or X-ray equipment. Data on the tape can be altered.
- Store tape cartridges in a dust-free environment where the relative humidity is between 20% and 80%. For longer cartridge life, store the cartridge at 40% ± 20% relative humidity.
- Place an identification label only in the slide-in slot on the front of the cartridge.
- Do not adhere labels to the cartridge anywhere except in the slide-in slot.

### 3.10 Using the CleaningTape III Cartridge

The CleaningTape III is a 4-1/8-inch square, light yellow, plastic cartridge containing 1200 feet of 1/2-inch cleaning tape. See Table 3-12 for information on using the CleaningTape III.

Your CleaningTape III is supplied with a:

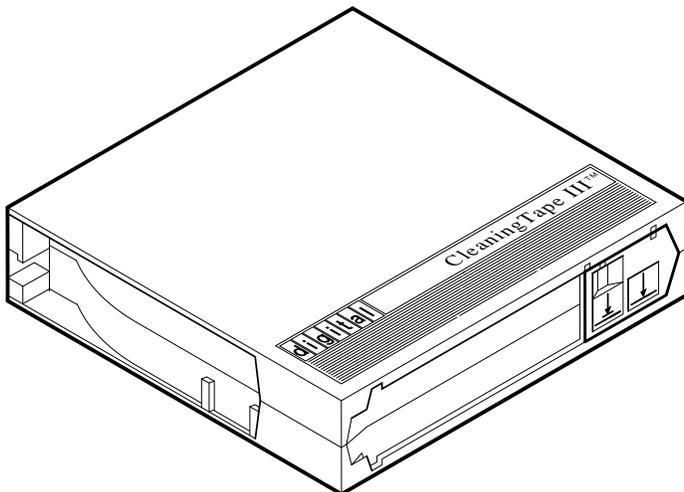
- Slide-in label that has 20 boxes, each for marking a check after cartridge use.
- Cartridge handling information sheet

You can use the CleaningTape III cartridge 20 times before it expires. The word *expire* does not pertain to an expiration date. *Expire* means that there is no unused cleaning area left on the tape.

To record the number of uses, mark a check in a box on the cartridge label after each cleaning. After the final use, discard the cleaning tape cartridge.

Figure 3-5 shows the CleaningTape III cartridge.

**Figure 3-5 CleaningTape III Cartridge**



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Use Table 3–12 to determine when to use the cleaning cartridge.

**Table 3–12 When to Use the Cleaning Cartridge**

<b>If...</b>	<b>It means...</b>	<b>And you should...</b>
The Use Cleaning Tape indicator turns on (Figure 3–1)	The drive head needs cleaning or the tape is bad (see 3rd item in table).	Use the cleaning cartridge. Follow the instructions in Section 3.7 for loading a cartridge into the drive. When cleaning is complete, the beeper sounds for you to remove the cleaning cartridge.
A particular cartridge causes the Use Cleaning Tape indicator to turn on frequently		Back up this data on another cartridge, and then discard the old cartridge. A damaged cartridge may cause unnecessary use of the cleaning cartridge.
The Use Cleaning Tape indicator turns on after you clean the drive head and reload your data cartridge	Your data cartridge may be causing the problem.	Try another data cartridge.
The Use Cleaning Tape indicator is on after you load the cleaning cartridge	Cleaning has not been done and the cartridge is expired.	Replace the cleaning cartridge.

### 3.11 Standard OpenVMS Tape Commands

There are certain guidelines you should follow to use the TZ86 and TZ87 subsystem effectively with your host application. To maximize the subsystem's efficiency, you must use certain qualifiers with the MOUNT and BACKUP commands.

---

#### Note

---

Not all OpenVMS tape qualifiers are functional with tape devices connected to the HSD05.

---

For efficient operation of the TZ86 and TZ87 subsystems:

- Choose a large block size when mounting a tape; 65534 is recommended.
- Do not use the COPY command to save more than 9999 files onto the tape.

---

#### Notes

---

Using the COPY command to move multiple files may not achieve optimum performance. Check with your system manager or your OpenVMS documentation for more information.

The HSD05 DSSI-to-SCSI bus adapter always operates cache-capable tape devices in cached mode, regardless of the setting of the MOUNT /CACHE=TAPE command.

---

The TZ86 and TZ87 cartridge tape subsystems use the standard magnetic tape commands that can be invoked under the OpenVMS operating system, version 5.4-2 or later. The OpenVMS commands used to operate the TZ86 and TZ87 are:

- ALLOCATE
- INITIALIZE
- MOUNT
- BACKUP
- COPY
- DISMOUNT
- DEALLOCATE

### 3.11.1 Using the ALLOCATE Command

The **ALLOCATE** command provides exclusive access to a device and optionally establishes a logical name for that device. Once you have allocated a device, other users cannot access that device until you explicitly **DEALLOCATE** it, or until you log out. Use the following format to allocate the TZ86 or TZ87 subsystem:

```
$ ALLOCATE device_name: [logical name]
```

For example, to allocate the TZ86 or TZ87 subsystem for your use and assign it the logical name *TAPE1*, do the following:

```
$ ALLOCATE MUA0: TAPE1
```

### 3.11.2 Using the INITIALIZE Command

---

#### CAUTION

---

When a tape is initialized, any data already on the tape will be destroyed.

---

Use the **INITIALIZE** command to specify the device name, and write a volume name to the magnetic tape volume loaded into the TZ86 or TZ87 tape drive. The tape must be write-enabled for the initializing operation.

For the TZ86 and TZ87, use the following format:

```
$ INITIALIZE device_name: [volume label]
```

As an example, to initialize the device *MUA0* and assign the volume name *GMB001*, type the following for the TZ86 and TZ87:

```
$ INITIALIZE MUA0: GMB001
```

For the initialization to succeed, the cartridge must not have been mounted (with the **MOUNT** command).

For detailed information regarding volume names and magnetic tape operations, see the *Guide to VAX/VMS Disk and Magnetic Tape Operations* (AA-M539A-TE).

### 3.11.3 Using the MOUNT Command

The **MOUNT** command lets you make a magnetic tape volume available for processing. It loads the tape with the protection set according to the write-protect switch on the cartridge. It can determine the maximum block size on the TZ87.

Use the following format to mount a tape on the TZ86 and TZ87 subsystem for use with the BACKUP utility:

```
$ MOUNT/FOREIGN/BLOCKSIZE=65534 device_name: [volume label] [logical name]
```

As an example, to make the device *MUA0* available for processing on the TZ86 or TZ87 and assign it the logical name *TAPE1*, type the following:

```
$ MOUNT/FOREIGN/BLOCKSIZE=65534 MUA0: GMB001 TAPE1
```

The screen displays a message:

```
%MOUNT-I-MOUNTED, GMB001 mounted on MUA0:
```

You must use the /FOREIGN qualifier when you are performing **BACKUP** commands. Do not use it when you are performing **COPY** commands.

### 3.11.4 Using the BACKUP Command

The **BACKUP** command provides protection against file volume corruption by creating backup copies.

Use the following format to back up a file on the TZ86 and TZ87:

```
$ BACKUP/BLOCK=65534/ignore=(label) source:*. * tape:file.name
```

You can also back up lists of files and entire volumes.

See your system manuals before deciding on qualifiers for use with the BACKUP command. For detailed information about BACKUP and other OpenVMS tape commands, see the *VAX/VMS Backup Utility Reference Manual* (AA-Z407B-TE).

### 3.11.5 Using the COPY Command

Use the **COPY** command, with the TZ86 and TZ87 subsystem, to copy files from tape.

In the following example, the **MOUNT** command requests that the volume labeled *GMB001* be mounted on the drive at *MUA0* and assigns the logical name *TAPE1*.

The **COPY** command uses the logical name *TAPE1* for the input file specification. All files on *MUA0* are copied to the current default disk and directory. The files keep their original file names and file types.

Use the following format on the TZ86 and TZ87:

```
$ MOUNT/BLOCKSIZE=65534 MUA0: GMB001 TAPE1:  
$ COPY TAPE1:*.* *.*
```

---

#### Notes

---

Using the **COPY** command to move multiple files may not achieve optimum performance. Check with your system manager or your OpenVMS documentation for more information.

The HSD05 DSSI-to-SCSI bus adapter always operates cache-capable tape devices in cached mode, regardless of the setting of the **MOUNT /CACHE=TAPE** command.

---

### 3.11.6 Using the DISMOUNT Command

The **DISMOUNT** command cancels the previous **MOUNT** command, makes the unit unavailable for processing, and unloads the tape.

Use the following format for the TZ86 and TZ87:

```
$ DISMOUNT logical_name or device_name:
```

### 3.11.7 Using the DEALLOCATE Command

The **DEALLOCATE** command cancels the previous **ALLOCATE** command and makes the unit available for other users. The following is an example of the command:

```
$ DEALLOCATE MUA0: or TAPE1
```

## 3.12 Solving Problems

The following sections describe what to do if you have drive or tape problems.

### 3.12.1 Common TZ86/TZ87 Errors

You can avoid some errors by following these guidelines:

- Use the correct cartridge type. See Section 3.5.3.
- Care for your cartridges according to the guidelines in Section 3.9.
- Make sure the cartridge leader and the drive leader are in their correct positions. See Section 3.12.2 and Section 3.12.3.
- Unload the cartridge before powering down the system.

If an error does occur during subsystem operation, you may be able to correct the error yourself. Factors influencing errors include:

- Defective media
- Dirty drive head
- Operator or user errors
- Incorrect backup commands

Use Table 3–13 to interpret error symptoms, determine their causes, and take corrective action.

**Table 3–13 TZ86 and TZ87 Error Conditions**

Symptom	Probable Cause	Possible Correction
Failure to mount or read /write with new or used cartridge	Bad cartridge	Retry with another cartridge.
	Dirty drive head	Use CleaningTape III.
OpenVMS INITIALIZE command fails with parity error	Tape calibration failed	Use the CleaningTape III, or try another cartridge.
Green Operate Handle light is on and tape does not move (yellow Tape in Use light stays on, does not blink)	Cartridge load error	Inspect the cartridge for a mispositioned leader (see Section 3.12.2). Replace the cartridge if its leader is mispositioned.  Inspect the drive for a damaged, misplaced, or unhooked leader (see Section 3.12.3). Call Digital services if the drive leader is not in the correct location.
All top front panel lights on the TZ86 or TZ87, and all bottom front panel lights on the TZ87 are blinking	Drive failed self-test or detected a hard error during operation	Try to clear the error by pressing the Unload button or turn power off and then on again. If the error does not clear (the tape does not rewind and unload and the lights blink), you have a hardware failure. Call Digital services.

### 3.12.2 Checking the Cartridge Leader

Before you use a tape cartridge, be sure the tape leader is in the same position as the one shown in Figure 3–6. Lift the door lock with your thumb and open the small door to expose the leader.

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#### CAUTIONS

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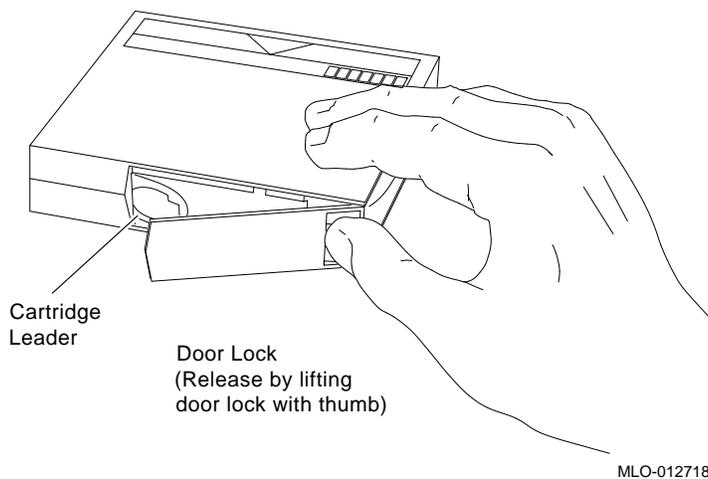
Do not touch the exposed magnetic tape.

If the tape leader is not in the correct position, do not try to fix it. Throw it away and use another cartridge instead.

---

Figure 3–6 shows the correct position of the cartridge leader.

**Figure 3–6 CompacTape III Cartridge Leader**



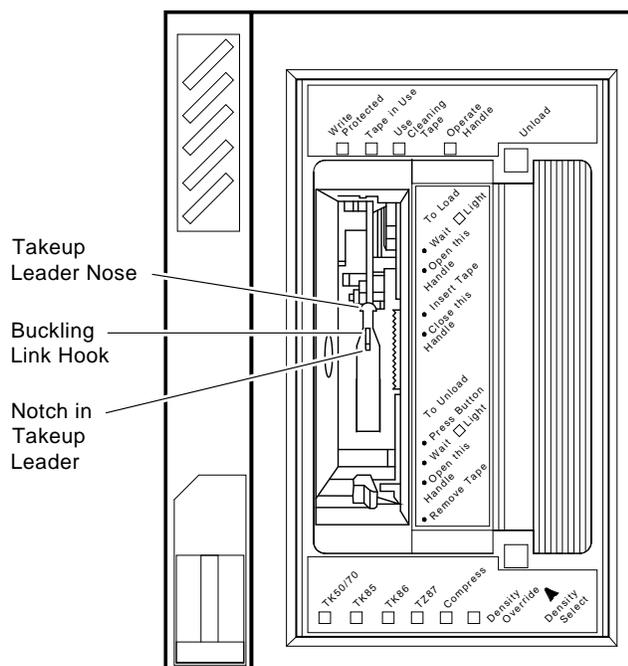
### 3.12.3 Checking the Drive Leader

To examine the drive takeup leader, open the cartridge receiver door on the front of the drive. Look inside to see that the drive leader is connected to the buckling link hook. The hook should be engaged in the leader slot (Figure 3-7).

If the leader is unhooked, misplaced, or damaged, call Digital services. Do not try to fix the leader.

Figure 3-7 shows the location of the leader inside the drive.

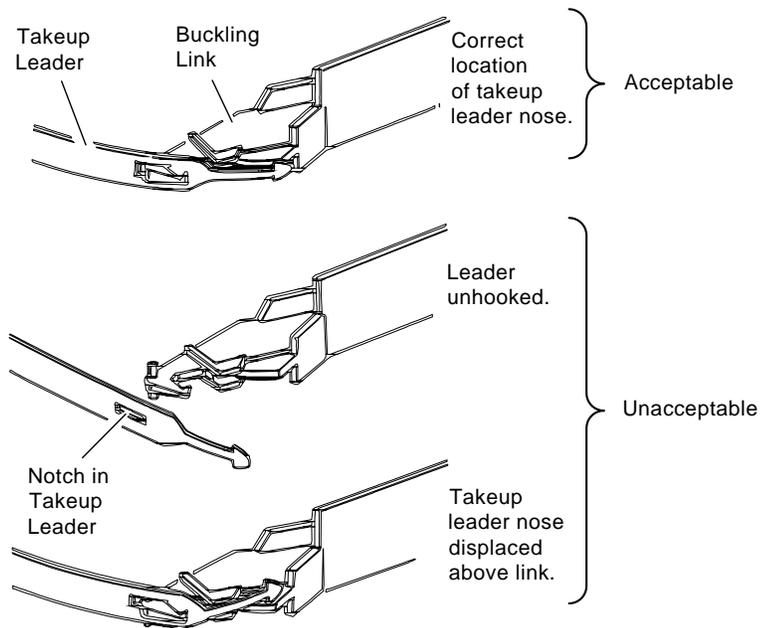
Figure 3-7 TZ86/TZ87 Drive Leader



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Figure 3-8 shows the correct and incorrect locations of the drive leader.

**Figure 3-8 Correct and Incorrect Positions of the TZ86/TZ87 Drive Leader**



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# 4

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## Operating the RRD43 CD-ROM and TLZ07 DAT Tape Drive

This chapter explains how to operate the RRD43 CD-ROM and the TLZ07 DAT tape drive option that is supported by the HSD05 DSSI-to-SCSI bus adapter.

### 4.1 RRD43 CD-ROM and TLZ07 General Description

The RRD43 CD-ROM and the TLZ07 DAT tape drive are available as a dual device ISE or as single device ISEs. The dual device RRD43/TLZ07 can be installed only in the removable-media (right-most) option slot in the VAX 4000 system. Figure 4-1 shows the dual device RRD43/TLZ07 front panel and bezel.

The RRD43 compact disc drive and the TLZ07 digital audio tape (DAT) cassette tape drive can also be installed separately. An RRD43-JA/JF disc drive installed separately utilizes different mounting brackets than the dual device ISE which allows it to be installed in any storage option slot. A TLZ07-JA/JF tape drive installed separately utilizes the same mounting brackets as the dual device ISE and can only be installed in the removable-media (right-most) option slot. The operating procedures are the same, whether installed as a dual device or separately.

The RRD43 compact disc drive is a read-only device that can read information from industry standard 600 MB compact discs. The compact disc is inserted directly into the drive. The single ISE RRD43 compact disc drive can be installed in any storage option slot.

---

#### Note

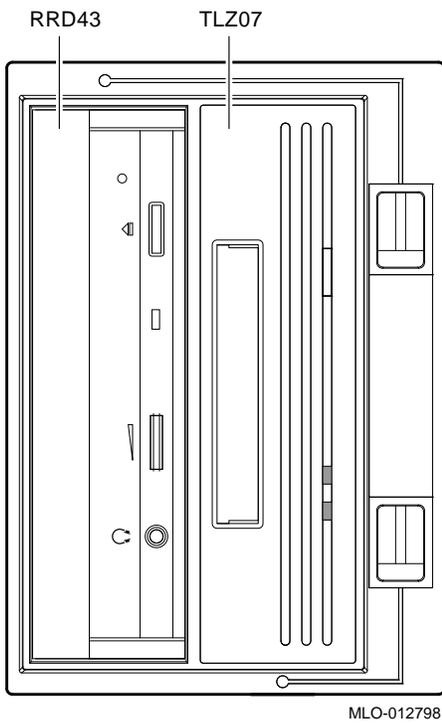
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If the single ISE RRD43 is installed in the removable-media (right-most) option slot in the VAX 4000 system, a small filler panel (PN 70-27414-01) is used to fill the remaining space.

---

The TLZ07 digital audio tape (DAT) cassette tape drive provides a high capacity, off-line data storage. It is capable of reading and writing on a 4 mm data cassette tape.

**Figure 4-1 Dual Device RRD43/TLZ07 Front Panel**



## 4.2 RRD43 Specifications

Table 4–1 contains the specifications for the RRD43 compact disc drive.

**Table 4–1 RRD43 Disc Drive Specifications**

<b>Overview</b>	
Description	Half-height optical CD-ROM disc drive
Features	Photo CD capable; can be used as an independent audio CD player
Media	Removable 5 1/4-inch compact disc
Capacity	600 MB
Form factor	5 1/4 in (1-inch high)
Average access time	320 ms
Transfer rate	1X: 150 kB/s, 2X: 300 kB/s
Rotational speed	1X: Inner track = 530 rpm/Outer track = 200 rpm 2X: Inner track = 1060 rpm/Outer track = 400 rpm
Temperature	5°C—50°C (41°F—122°F) (operating) -10°C—65°C (14°F—149°F) (nonoperating)
Relative humidity	8%–80%
Voltage	+5 Vdc ±5%
Current	1X - +5 V: 950 mA; 2X - +5 V: 1.0 A
Power	<7 W @ 5 V (maximum)

### 4.3 TLZ07 Specifications

Table 4–2 contains the specifications for the TLZ07 cassette tape drive.

**Table 4–2 TLZ07 Tape Drive Specifications**

<b>Characteristic</b>	<b>Specification(s)</b>
Mode of operation	Streaming, and start/stop
Drive interface	Small Computer System Interconnect (SCSI)
Dimensions	22.5 mm × 12 mm × 29.5 mm (9 in × 5 in × 3.25 in)
Weight	2.2 kg (4.7 lb)
Media (4 mm x 60 m)	TLZ04-CA cassette tape
Media (4 mm x 90 m)	TLZ06-CA cassette tape
Media (4 mm x 120 m)	TLZ07-CA cassette tape
Bit density	114 Mbits per square inch
Transfer rate (sustained)	400 kB/s noncompression
Recording format	Digital data storage (DDS-2, DDS, DC)
Cassette capacity (typical)	4 GB with 120 meter tape 8 GB with 120 meter tape and data compression
Operating temperature	10°C to 40°C (50°F to 104°F)
Nonoperating temperature	-40°C to 70°C (-40°F to 158°F)
Operating humidity	20% to 80% RH maximum, noncondensing
Nonoperating humidity	5% to 95% RH maximum, noncondensing
Operating altitude	0 to 4.6 km (0 to 15,000 ft)
Nonoperating altitude	0 to 15.2 km (0 to 50,000 ft)
Passes per cassette tape	300
Power consumption	9 W
Power requirements	+5 Vdc: 0.89 A, +12 Vdc: 0.2 A

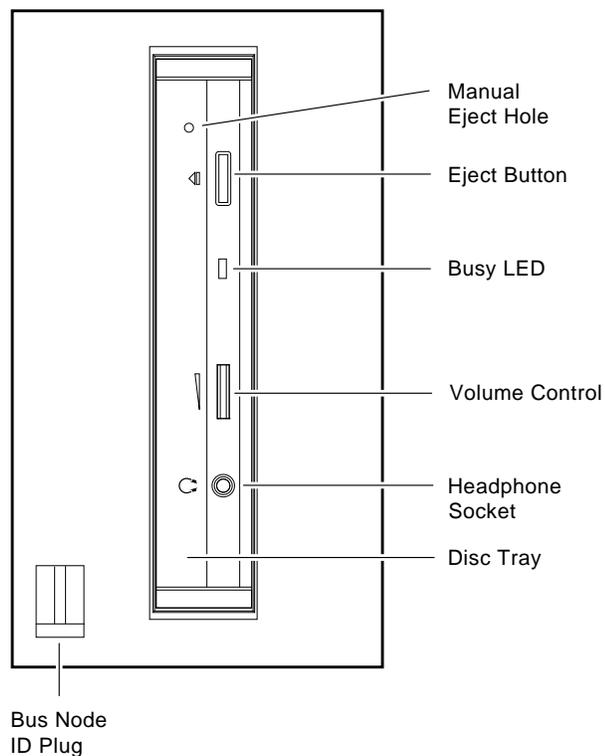
## 4.4 RRD43 Operation

The following sections describe the RRD43 controls and indicators, how to insert a compact disc into the drive, how to remove a compact disc from the drive, and how to manually eject a compact disc from the drive.

### 4.4.1 RRD43 Controls and Indicators

The front panel of the RRD43 compact disc drive contains the disc tray and has an eject button, a busy LED, and a manual eject hole. The front bezel also contains a bus node ID plug. Figure 4–2 shows the front panel of a single RRD43 compact disc drive.

Figure 4–2 RRD43 Compact Disc Drive Front Panel



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Table 4–3 lists and describes the controls and indicators on the RRD43 front panel.

**Table 4–3 RRD43 Controls and Indicators**

<b>Control/Indicator</b>	<b>Description</b>
Bus node ID plug	Identifies the bus node ID number (unit number) of the drive to the system.
Manual eject hole	Used to manually eject the disc tray if a power failure occurs (see Section 4.4.4).
Eject button	Press this button to eject the disc tray from the RRD43.
Busy LED	This LED turns on when data is read from the disc. It flashes during seek operations.
Disc tray	Holds the compact disc.
Volume control and headphone socket	Not used.

#### 4.4.2 Inserting a Compact Disc into the RRD43 Disc Drive

To insert a disc in the RRD43, see Figure 4–3 and follow these steps.

1. Press the eject button inward to release the disc tray.
2. The tray ejects part way out; pull the tray out manually to its full extension.
3. Pick up the disc by the edges, taking care not to touch the bottom (unlabelled) part of the disc with your hand or fingers (hold by the side edge and push into place in the disc tray). Insert the disc into the tray with the disc label facing to the left.
4. Push the disc tray back into the RRD43 until it is completely inserted and latched.

The busy LED stays on for a few seconds. When the busy LED goes off, the RRD43 can receive commands and you can read data from the compact disc.

If the disc is upside-down, not properly inserted in the tray, or if other conditions prevent the RRD43 from reading the disc, the busy LED blinks, then stays on steadily.

---

#### Note

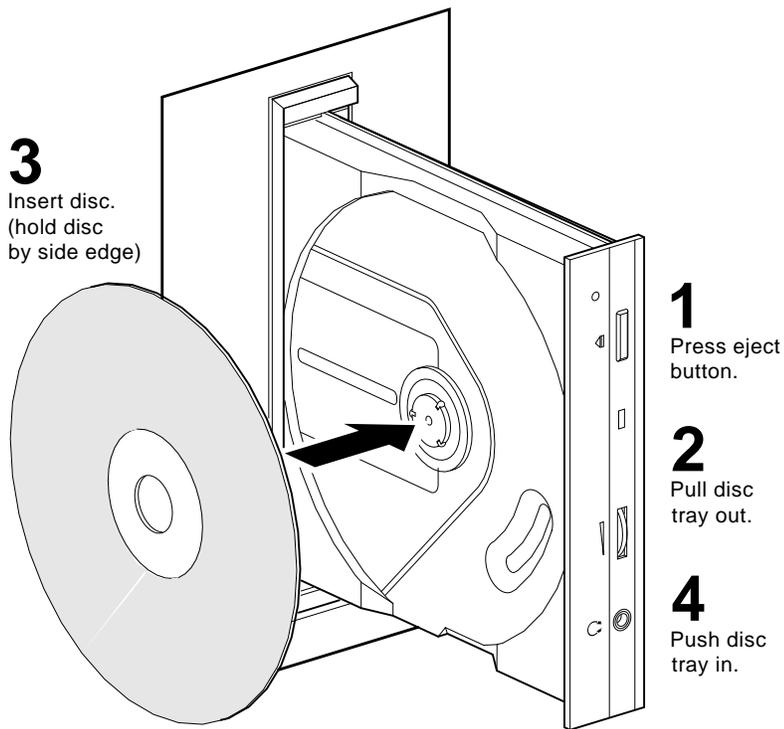
---

To avoid false errors, use the MOUNT/NOWRITE command when mounting the CD-ROMs (see Section 2.4).

Failure to use the /NOWRITE qualifier when mounting the CD-ROMs results in many false error messages.

---

**Figure 4-3** Inserting a Disc in the RRD43



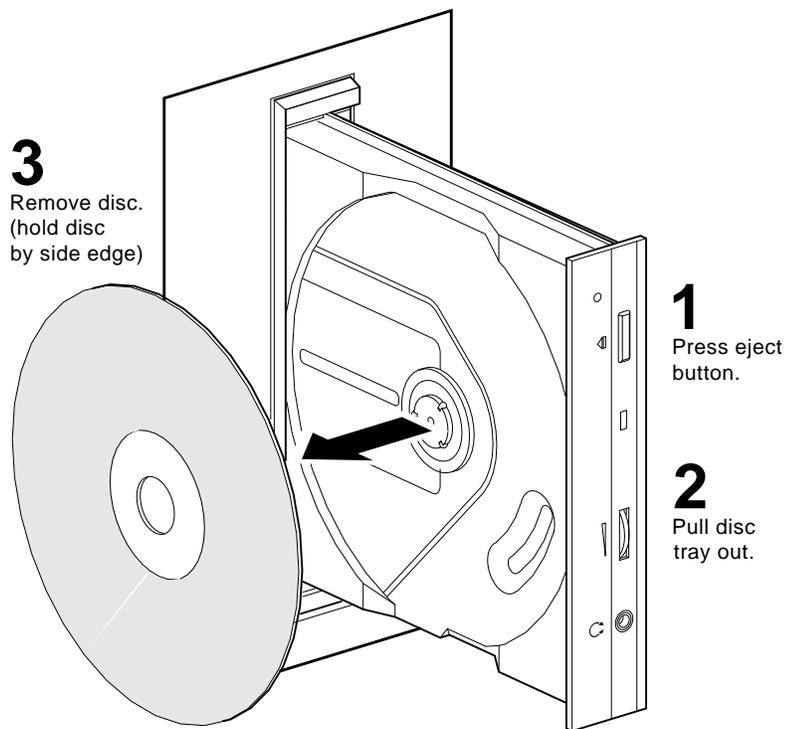
MLO-012730

### 4.4.3 Removing the Disc from the RRD43

To remove a disc from the RRD43, see Figure 4–4 and follow these steps.

1. Press the eject button inward to release the disc tray.
2. The tray ejects part way out; pull the tray out manually to its full extension.
3. Remove the disc from the tray; pick up the disc by the edges, taking care not to touch the bottom (unlabelled) part of the disc with your hand or fingers (hold by the side edge and remove from the disc tray).
4. Push the disc tray back into the RRD43 until it is completely inserted and latched.

Figure 4–4 Removing a Disc from the RRD43



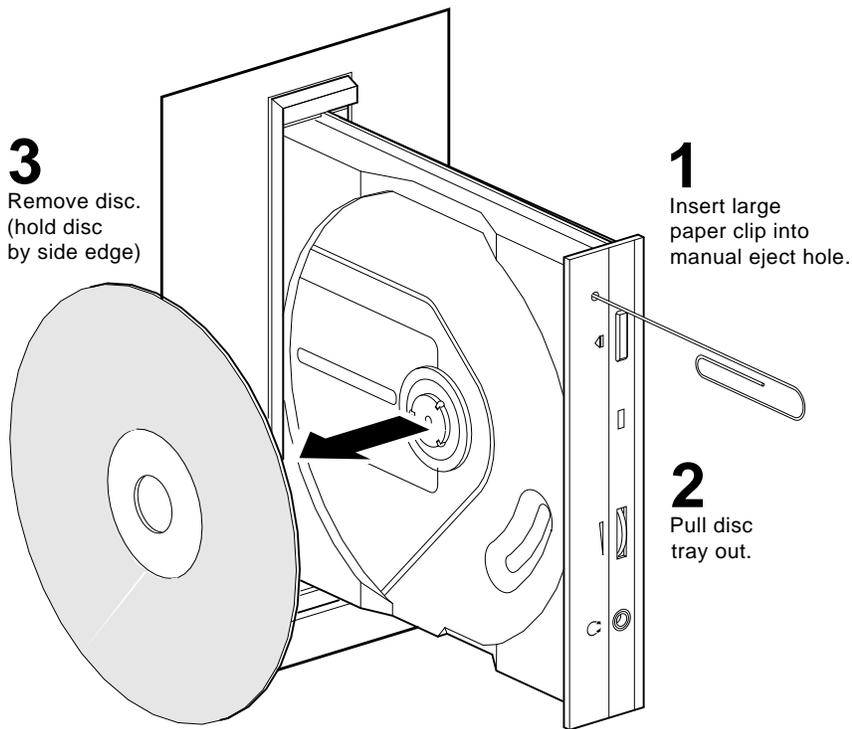
MLO-012791

#### **4.4.4 Removing a Disc Manually**

To remove a disc manually from the RRD43, in the event of a power failure for example, set the on/off switch on the system unit to the off (O) position then see Figure 4-5 and follow these steps:

1. Insert a straightened large paper clip or metal rod, 1.2 millimeters (0.047 inches) in diameter and not less than 35 mm (1.38 in.) long, into the emergency eject hole and push the clip or rod in until the disc tray disengages.
2. Pull the tray out manually to its full extension.
3. Remove the disc from the tray; pick up the disc by the edges, taking care not to touch the bottom (unlabelled) part of the disc with your hand or fingers (hold by the side edge and remove from the disc tray).
4. Push the disc tray back into the RRD43 until it is completely inserted and latched.

**Figure 4-5 Removing a Disc Manually**



MLO-012792

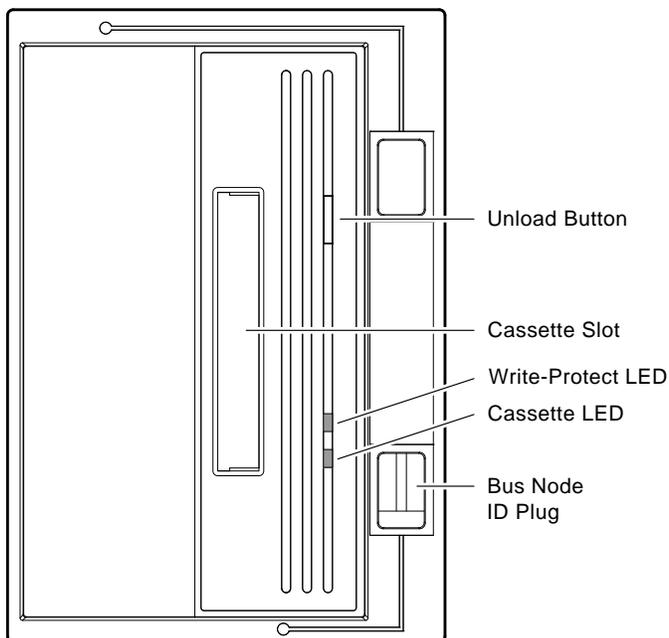
## 4.5 TLZ07 Operation

The following sections describe the TLZ07 controls and indicators, how to load a cassette tape into the drive, how to remove a cassette tape from the drive, the write-protect tab on the cassette tape, proper handling of cassette tapes, and how to clean the heads.

### 4.5.1 TLZ07 Controls and Indicators

The front panel of the TLZ07 DAT tape drive contains the cassette slot and has an unload button, a write-protect LED, and a cassette LED. The front bezel also contains a bus node ID plug. Figure 4–6 shows the front panel of a TLZ07 tape drive.

Figure 4–6 TLZ07 Tape Drive Front Panel



MLO-012799

Table 4–4 lists and describes the controls and indicators located on the TLZ07 front control panel.

**Table 4–4 TLZ07 Controls and Indicators**

<b>Control/Indicator</b>	<b>Description</b>
Bus node ID plug	Identifies the bus node ID number (unit number) of the drive to the system.
Unload button	Pressing and holding the unload button for 1 to 2 seconds ejects the cassette tape.
<hr/> <b>CAUTION</b> <hr/>	
Pressing the unload button during normal tape operations may halt the tape operation in progress.	
Write protect LED (amber)	This indicator comes on amber when the cassette is write protected.
Cassette LED (green)	This indicator comes on green when a cassette is loaded. It flashes when there is drive activity.

Table 4–5 describes the Write-Protect and Cassette LEDs.

- In the normal operating state, the Write-Protect LED is used to indicate write-protect status only.
- In the normal operating state, the Cassette LED is used to indicate drive activity and tape load status.

**Table 4–5 TLZ07 LED Status**

<b>Status</b>	<b>Write-Protect LED</b>	<b>Cassette LED</b>
No tape loaded	Off	Off
Tape loaded, write-enabled	Off	Green
Tape loaded, write-protected	Amber	Green
No drive activity	Write-protect	Green
Drive activity	Write-protect	Activity (blinking)
Load sequence	Off, goes to write-protected.	Flashes green, 1 Hz. Goes to steady green when done. Indicates drive activity.
Unload sequence	Write-protected, goes to off.	Flashes green, 1 Hz. Goes to off when done.
Reset sequence	Amber Amber Write-protected	Green, both blink on. Green, both blink off. Normal indications.
Power-on self-test (POST): Lvl 1 (basic) self-test	Flashes amber, 2 Hz, for duration of test. Write-protected when self-test is complete.	Flashes green, 2 Hz for duration of test. Normal indications.
Lvl 2 (extended) self-test	Write-protected	Flashes green until test completes (1 to 4 minutes). Same as normal activity indications.
Test complete, no failure.	Resume normal operation. Write-protected.	Resume normal operation. Normal indications.
Test failure, drive fault.	Flashes amber, 2 Hz.	Flashes green, 2 Hz.

### 4.5.2 TLZ07 Power-on Self-test

To execute the power-on self-test on the TLZ07 cassette tape drive, perform the following:

1. Turn ON the VAX 4000 system power source.
2. Observe that, with no cassette in the drive, the Cassette and Write-Protect indicators light for approximately 1 to 5 seconds and then extinguish.  
With a cassette in the drive, the Cassette indicator continues flashing (approximately 20 seconds) until the cassette is loaded.
3. After successful completion of the power-on self-test, the Cassette and Write-Protect indicators turn off.

---

**NOTE**

---

If a tape is loaded, the Cassette indicator stays on and the Write-Protect indicator displays the write-protect status of the cassette.

---

4. If the Write-Protect indicator flashes amber and the drive indicator flashes green continuously for more than 30 seconds, then the power-on self-test failed. Attempt to clear the failure by re-executing the power-on self-test. (Power off and power on the drive.)

### 4.5.3 Description of the TLZ07 Cassette Tape

Depending on the type of 4 mm data cassette tape used, the TLZ07 tape drive can typically store:

<b>Tape Type</b> (see NOTES 1 & 2.)	<b>No Compression</b>	<b>Compression</b>
TLZ04-CA (60 m)	1.3 GB	2.6 GB
TLZ06-CA (90 m)	2.0 GB	4.0 GB (see NOTE 3.)
TLZ07-CA (120 m)	4.0 GB	8.0 GB (see NOTE 3.)

---

#### NOTES

---

1. The TLZ07 is compatible with TLZ04 (60 m) cassette tapes in the noncompression mode only.
  2. The TLZ07 is compatible with the TLZ06 using 60 m and 90 m tapes only.
  3. The compression measurements are typical for a 2-to-1 data compression ratio, but the actual ratio is dependent on the data.
- 

The cassette tape includes a write-protect tab (Figure 4–7), which contrasts in color to the cassette tape body. Use a pen (NOT A PENCIL) to set the write-protect tab.

- Slide the tab to the left to write-protect the tape.
- Slide the tab to the right to write-enable the tape.

---

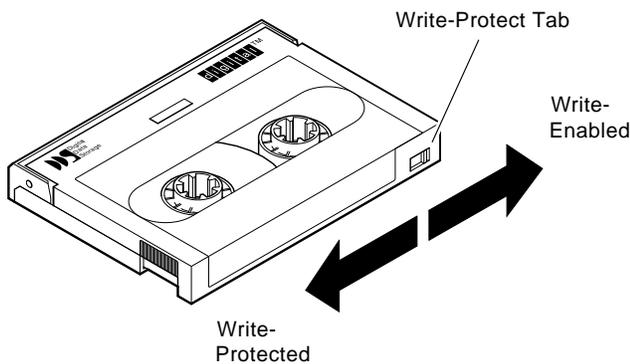
#### NOTE

---

The tab is not visible when the cassette tape is loaded in the TLZ07 drive.

---

**Figure 4-7 TLZ07 Cassette Tape**



MLO-012800

Observe the following guidelines when setting the write-protect tab.

- If you are using the tape to read or are copying from the tape, set the write-protect tab to write-protected. This disables writing to tape and ensures that data will not be accidentally overwritten.
- If you are writing data, set the write-protect tab to write-enabled.
- The write-protect tab position is shown on the front panel Write-Protect indicator.

#### **4.5.4 Loading a Cassette Tape into the TLZ07 Drive**

Insert the TLZ07 cassette tape into the cassette slot on the TLZ07 front panel with the cassette's write-protect tab at the top, facing you.

The green cassette LED flashes at 1 Hz and then goes to a steady green when the load sequence has completed.

If the cassette tape that is being loaded has the write-protect tab in the write-protect position, the amber write-protect LED lights. If the cassette tape that is being loaded has the write-protect tab in the write-enable position, the amber write-protect LED stays off.

### 4.5.5 Unloading a Cassette Tape from the TLZ07 Drive

Press the unload button on the TLZ07 front panel to unload the TLZ07 cassette tape. The cassette tape unloads and is ejected from the cassette slot on the TLZ07 front panel.

The green cassette LED flashes at 1 Hz while the tape is rewinding and then goes off when the unload sequence has completed.

If the cassette tape that is being unloaded has the write-protect tab in the write-protect position, the amber write-protect LED goes off when the unload sequence has completed. If the cassette tape that is being unloaded has the write-protect tab in the write-enable position, the amber write-protect LED stays off during the entire unload sequence.

### 4.5.6 Proper Handling of Cassette Tapes

To ensure optimal performance from the TLZ07 cassette tapes, observe the following guidelines when handling them.

- Avoid placing the cassette tapes near sources of electromagnetic interference, such as terminals, video, or X-ray equipment. Emissions from such equipment can erase data on the tape.
- Keep cassette tapes out of direct sunlight and away from heaters and other sources of heat.
- Store cassette tapes (and cleaning cassette) where the room temperature is between 5°C and 32°C (40°F and 90°F).
- Store cassette tapes in a dust-free environment where the relative humidity is 20% to 60%.

---

#### WARNING

---

Always place the tape label in the recessed area on the cassette. Never place one label on top of another label.

---

### 4.5.7 Cleaning the TLZ07 Tape Drive Heads

This section explains how to clean the TLZ07 tape drive heads. The heads are the components that physically read and write data to and from the media (in this case, a cassette tape).

**Digital Equipment Corporation recommends that you perform the head cleaning procedure about every 2 weeks, or after every 50 hours of drive usage.**

**Under normal conditions, it is not necessary to exceed this cleaning schedule. If a particular data cassette causes problems, try changing to another data cassette.**

---

#### CAUTION

---

Never attempt to clean the heads in a manner other than described in this procedure. Doing so voids the product warranty.

---

To clean the heads, use the head cleaning cassette as follows:

1. Ensure that the drive is powered on.
2. Insert the head cleaning cassette (Part No. TLZ04-HA) into the drive.
3. With the head cleaning cassette inserted, the drive automatically executes head cleaning. The drive ejects the head cleaning cassette after approximately **30 seconds**.
4. Locate the card enclosed with the head cleaning cassette. Place a check mark on the card every time you use the head cleaning cassette.

Under normal conditions, the head cleaning cassette is used for about 25 cleanings. Additional cassettes are available from your Digital sales representative or DECdirect.

If the head cleaning cassette has been overused, both the Cassette and the Write-Protect LEDs flash. Press the eject button to remove the cleaning cassette. No cleaning action will have occurred.

## 4.5.8 Solving TLZ07 Problems

Table 4–6 describes TLZ07 tape drive problems and possible solutions.

**Table 4–6 Problem Solving**

Symptom	Probable Cause	Possible Solution
Unable to back up or copy data to cassette tape.	Cassette write-protected.	Set write-protect tab on cassette to write-enabled.
	No cassette tape in drive.	Insert cassette tape.
Write-Protect LED flashes amber.	Excessive tape errors.	Perform head cleaning procedure (see Section 4.5.7). If error repeats, try another cassette tape.
Both LEDs flash rapidly, in unison.	Dirty heads or bad media.	Eject cassette tape. Perform head cleaning procedure (see Section 4.5.7). If error repeats, try another cassette tape.
	Drive error, possibly a hard failure.	Eject cassette tape. Power off and power on the drive. If error repeats, call Digital services.
After applying power, nothing happens. All indicators are off.	Drive not receiving power.	Remove the drive from the VAX 4000 and check power cable connections to the drive. Reseat the drive and apply power again. If the drive is still not receiving power, call Digital services.
Unit not available to system.	Bus node ID plug set to incorrect address.	Check bus node ID plug.
	Faulty or improper cable connection.	Remove the drive from the VAX 4000 and check all cable connections to the drive and front panel. Reseat the drive and apply power again. If the unit is still not available to the system, call Digital services.

The VAX 4000 system has system-based diagnostics that can be used to test the TLZ07 tape drive. The HSD05 also has onboard utilities that can be used to test the TLZ07 tape drive (see Section 1.5.4.3).

System-based diagnostics are usually referred to as *console-based diagnostics*, *self-tests*, or *system exercisers*. Refer to your system documentation for information about these diagnostics.

## 4.6 Standard OpenVMS TLZ07 Tape Commands

There are certain guidelines you should follow to use the TLZ07 subsystem effectively with your host application. To maximize the subsystem's efficiency, you must use certain qualifiers with the MOUNT and BACKUP commands.

---

### Note

---

Not all OpenVMS tape qualifiers are functional with tape devices connected to the HSD05.

---

For efficient operation of the TLZ07 subsystem:

- Choose a large block size when mounting a tape; 65534 is recommended.
- Do not use the COPY command to save more than 9999 files onto the tape.

---

### Notes

---

Using the COPY command to move multiple files may not achieve optimum performance. Check with your system manager or your OpenVMS documentation for more information.

The HSD05 DSSI-to-SCSI bus adapter always operates cache-capable tape devices in cached mode, regardless of the setting of the MOUNT /CACHE=TAPE command.

---

The TLZ07 cassette tape subsystem uses the standard magnetic tape commands that can be invoked under the OpenVMS operating system, Version 5.4-2 or later. The OpenVMS commands used to operate the TLZ07 are:

- ALLOCATE
- INITIALIZE
- MOUNT
- BACKUP
- COPY
- DISMOUNT
- DEALLOCATE

### 4.6.1 Using the ALLOCATE Command

The **ALLOCATE** command provides exclusive access to a device and optionally establishes a logical name for that device. Once you have allocated a device, other users cannot access that device until you explicitly **DEALLOCATE** it, or until you log out. Use the following format to allocate the TLZ07 subsystem:

```
$ ALLOCATE device_name: [logical name]
```

For example, to allocate the TLZ07 subsystem for your use and assign it the logical name *TAPE1*, do the following:

```
$ ALLOCATE MUA0: TAPE1
```

### 4.6.2 Using the INITIALIZE Command

---

**CAUTION**

---

When a tape is initialized, any data already on the tape will be destroyed.

---

Use the **INITIALIZE** command to specify the device name, and write a volume name to the magnetic tape volume loaded into the TLZ07 tape drive. The tape must be write-enabled for the initializing operation.

For the TLZ07, use the following format:

```
$ INITIALIZE device_name: [volume label]
```

As an example, to initialize the device *MUA0* and assign the volume name *GMB001*, type the following for the TLZ07:

```
$ INITIALIZE MUA0: GMB001
```

For the initialization to succeed, the cassette must not have been mounted (with the **MOUNT** command).

For detailed information regarding volume names and magnetic tape operations, see the *Guide to VAX/VMS Disk and Magnetic Tape Operations* (AA-M539A-TE).

### 4.6.3 Using the MOUNT Command

The **MOUNT** command lets you make a magnetic tape volume available for processing. It loads the tape with the protection set according to the write-protect switch on the cassette. It can determine the maximum block size on the TLZ07.

Use the following format to mount a tape on the TLZ07 subsystem for use with the **BACKUP** utility:

```
$ MOUNT/FOREIGN/BLOCKSIZE=65534 device_name: [volume label] [logical name]
```

As an example, to make the device *MUA0* available for processing on the TLZ07 and assign it the logical name *TAPE1*, type the following:

```
$ MOUNT/FOREIGN/BLOCKSIZE=65534 MUA0: GMB001 TAPE1
```

The screen displays a message:

```
%MOUNT-I-MOUNTED, GMB001 mounted on MUA0:
```

You must use the **/FOREIGN** qualifier when you are performing **BACKUP** commands. Do not use it when you are performing **COPY** commands.

### 4.6.4 Using the BACKUP Command

The **BACKUP** command provides protection against file volume corruption by creating backup copies.

Use the following format to back up a file on the TLZ07:

```
$ BACKUP/BLOCK=65534/ignore=(label) source:*. * tape:file.name
```

You can also back up lists of files and entire volumes.

See your system manuals before deciding on qualifiers for use with the **BACKUP** command. For detailed information about **BACKUP** and other OpenVMS tape commands, see the *VAX/VMS Backup Utility Reference Manual* (AA-Z407B-TE).

### 4.6.5 Using the COPY Command

Use the **COPY** command, with the TLZ07 subsystem, to copy files from tape.

In the following example, the **MOUNT** command requests that the volume labeled *GMB001* be mounted on the drive at *MUA0* and assigns the logical name *TAPE1*.

The **COPY** command uses the logical name *TAPE1* for the input file specification. All files on *MUA0* are copied to the current default disk and directory. The files keep their original file names and file types.

Use the following format on the TLZ07:

```
$ MOUNT/BLOCKSIZE=65534 MUA0: GMB001 TAPE1:  
$ COPY TAPE1:*. * *.*
```

---

#### Notes

---

Using the **COPY** command to move multiple files may not achieve optimum performance. Check with your system manager or your OpenVMS documentation for more information.

The HSD05 DSSI-to-SCSI bus adapter always operates cache-capable tape devices in cached mode, regardless of the setting of the **MOUNT /CACHE=TAPE** command.

---

### 4.6.6 Using the DISMOUNT Command

The **DISMOUNT** command cancels the previous **MOUNT** command, makes the unit unavailable for processing, and unloads the tape.

Use the following format for the TLZ07:

```
$ DISMOUNT logical_name or device_name:
```

### 4.6.7 Using the DEALLOCATE Command

The **DEALLOCATE** command cancels the previous **ALLOCATE** command and makes the unit available for other users. The following is an example of the command:

```
$ DEALLOCATE MUA0: or TAPE1
```

#### 4.6.8 OpenVMS TLZ07 Compression and Noncompression Modes

The default mode for the TLZ07 tape drive is noncompression mode. To use the TLZ07 tape drive in compression mode, when installed on an HSD05, use the **/DENSITY=** modifier. To select the noncompressed density, use the **/DENSITY=1600** modifier; to select the compressed density, use the **/DENSITY=6250** modifier. The selected density will be displayed in the SHOW DEVICE/FULL display.

For initializing a tape on the TLZ07 in compression mode, use the following format:

```
$ INITIALIZE/DENSITY=6250 device_name: [volume label]
```

As an example, to initialize the device *MUA0* in compression mode and assign the volume name *OMEGA*, type the following for the TLZ07:

```
$ INITIALIZE/DENSITY=6250 MUA0: OMEGA
```



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## Reader's Comments

HSD05 DSSI-to-SCSI Bus Adapter  
Operation Information  
for BA400-Based  
VAX 4000 Systems  
EK-HSDC5-IN. B01

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<b>I rate this manual's:</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
Accuracy (product works as manual says)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Completeness (enough information)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clarity (easy to understand)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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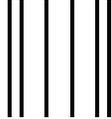
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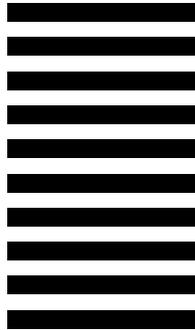
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