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**MicroVAX 3100 and VAXserver 3100
Options Installation Guide Addendum:
RRD42, RZ23L, and TZK10 Drives**

Order Number EK-MIVAX-AD.001

Digital Equipment Corporation

First edition, April 1991

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About This Manual

About This Manual

This document is an addendum to the *MicroVAX 3100 and VAXserver 3100 Options Installation Guide* (EK-424AA-TS). It provides general information about the following options:

- RRD42 disc drive
- RZ23L hard disk drive
- TZK10 cartridge tape drive

Audience

This manual is intended only for Digital Customer Services personnel and self-maintenance customers. Readers should be familiar with the options.

Organization

This manual contains 3 chapters and 1 appendix:

- Chapter 1 provides general information about the RRD42 disc drive.
- Chapter 2 provides general information about the RZ23L hard disk drive.
- Chapter 3 provides general information about the TZK10 cartridge tape drive.
- Appendix A provides a list of related documentation.

Related Documentation

See Appendix A for a list of related documentation.

Conventions

The following conventions are used in this manual:

Convention	Meaning
CAUTION	Provides information to prevent damage to equipment or software
NOTE	Provides general information about the current topic
P/N	Part number

RRD42 Disc Drive

This chapter provides general information about the RRD42 disc drive

1.1 Description

The RRD42 disc drive is a half-height, 5¼-inch, 600-megabyte, compact disc, storage device.

The RRD42 disc drive has the following features

- Audio playback capability; it has audio line outputs and a headphone jack
- Uses the SCSI-2 (small computer system interface) bus
- Functions in a horizontal or vertical position

The RRD42 disc drive can be used as the load device for operating system software and layered products. It is designed to be installed in the host system.

The RRD42 disc drive is supported under the following operating systems

ULTRIX
VMS
MS-DOS
SCO UNIX

1.2 Controls and Indicators

Table 1-1 describes the functions of the controls on the front of the drive

Table 1-1 RRD42 Disc Drive Front Controls

Controls	Function
Caddy insertion slot	Accepts a caddy loaded with a disc
Emergency eject hole	Accepts a rod to manually eject a caddy
Eject button	Ejects the caddy from the drive when power is on
Busy indicator	Lights when data is read from the disc, and blinks during seek operations
Headphone level control	Adjusts the volume
Headphone jack	Accepts headphone connector

Table 1-2 describes the functions of the drive's rear components

Table 1-2 RRD42 Disc Drive Rear Components

Components	Function
Jumpers for SCSI bus ID	Specifies assignment of the RRD42 drive SCSI bus ID
Mode select jumper	Selects mode
SCSI bus interface connector	Connects the drive to a SCSI host adapter using a connecting cable
Power-in connector	Connects the drive to the power supply within the computer
Frame ground tab	Grounds the drive to the host computer when the drive frame is not in direct contact with the computer
Audio output connector	Connects output to the external audio amplifier

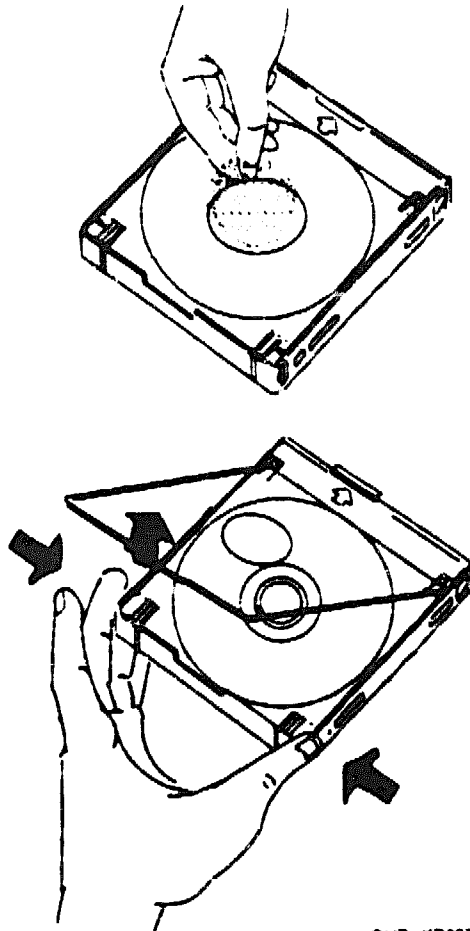
1.3 Using the RRD42 Disc Drive

This section briefly describes how to use the RRD42 disc drive.

1.3.1 Placing the Disc in the Caddy

Follow these steps to place the disc in the caddy.

1. If a protective film is on the lid of the caddy, remove the film before using the caddy.
2. To open the lid of the caddy, press the tabs on both sides, and lift the lid.



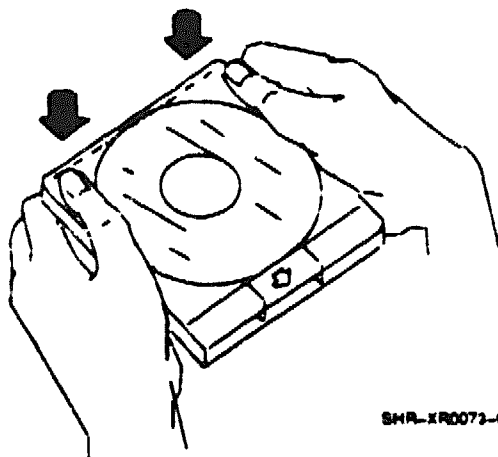
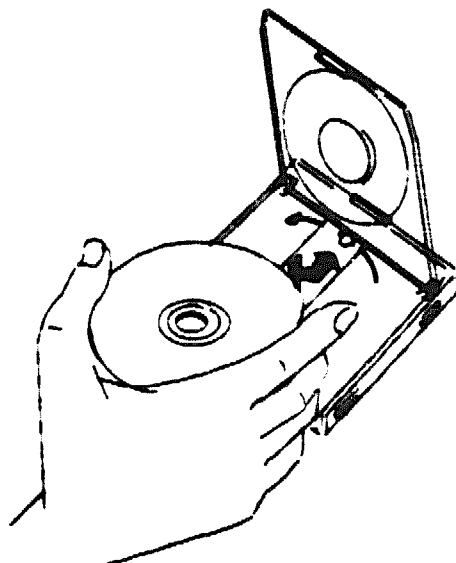
SMR-XR007D-90

1-4 RRD42 Disc Drive

3. Hold the disc by the edges, and place the disc (with disc label up) into the caddy.

CAUTION

Do not touch the surface of the disc beneath the edge of the caddy.



SHR-XR0073-80

4. Close the lid firmly.

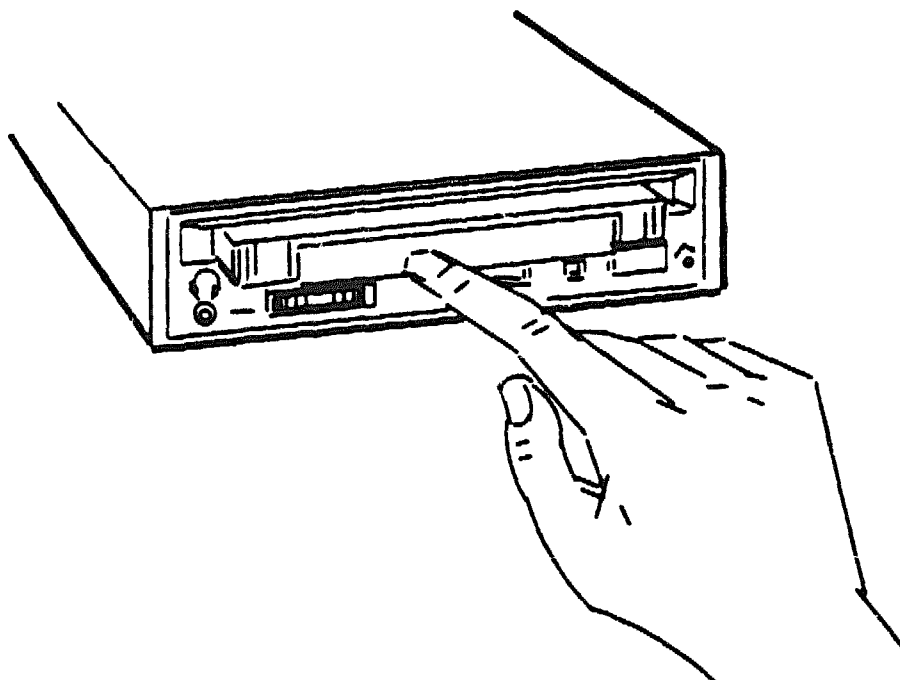
1.3.2 Loading the Drive

Follow these steps to load the drive.

NOTE

Make sure the supporting software is installed in the host system before operating the drive.

1. Insert the caddy into the caddy insertion slot.



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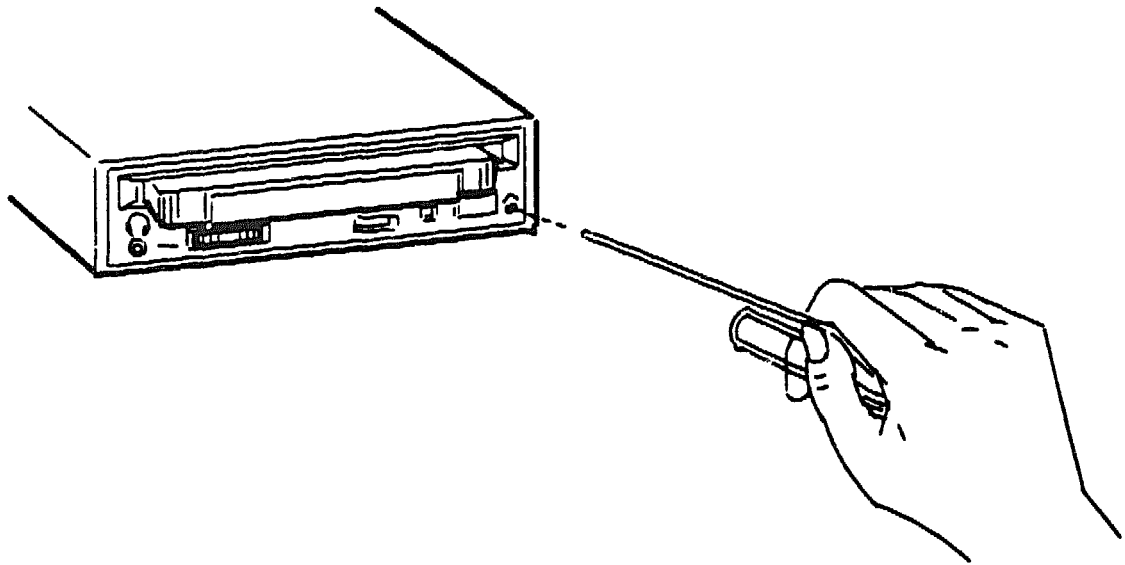
The drive reads the table of contents (TOC) on the disc. The busy indicator lights while the TOC is read.

2. When the busy indicator goes off, the drive is ready to receive the command from the host computer.
3. Follow the instructions provided by the host system's software manual.

1.3.3 Ejecting the Caddy

With the power on, press the eject button on the drive to eject the caddy. If the eject button is disabled by the software or if power to the drive is turned off, the eject button will not function. If the drive does not eject the caddy after you press the eject button, then follow these procedures for manually ejecting the caddy:

1. Turn off the power to the drive.
2. Insert a steel rod, about 1.2 millimeters in diameter and 35 millimeters (1.37 inches) long, and push the rod into the emergency eject hole. A rod can be made by straightening a large paper clip.



SHR-XR0075-90B

1.4 Configuration

This section describes how to configure the drive.

1.4.1 Mode Select Jumper

CAUTION

The mode select jumper is a user-selectable feature. If you do not select the correct mode, the drive does not operate properly.

The mode select jumper has two modes:

- Mode 0 - default mode

When the drive is shipped from the factory, the jumper is **not** installed. The drive operates in the default mode with a block size of 2 kilobytes. Use mode 0 under MS-DOS and SCO UNIX operating systems.

- Mode 1 - standard mode

When the jumper is installed, the drive operates in standard mode with a block size of 512 bytes. Use mode 1 under VMS and ULTRIX operating systems.

The mode select jumper does not affect other operations.

NOTE

The microcode revision reported by the RRD42 disc drive depends on the mode that the drive is running on.

1.4.2 Assigning the SCSI ID

Follow these guidelines for assigning the SCSI ID:

- Assign the SCSI ID number for each drive using the ID select jumper on the rear.
- Be sure to assign a unique ID number to each SCSI device.

Figure 1-1 shows the location of the RRD42 ID select jumper.

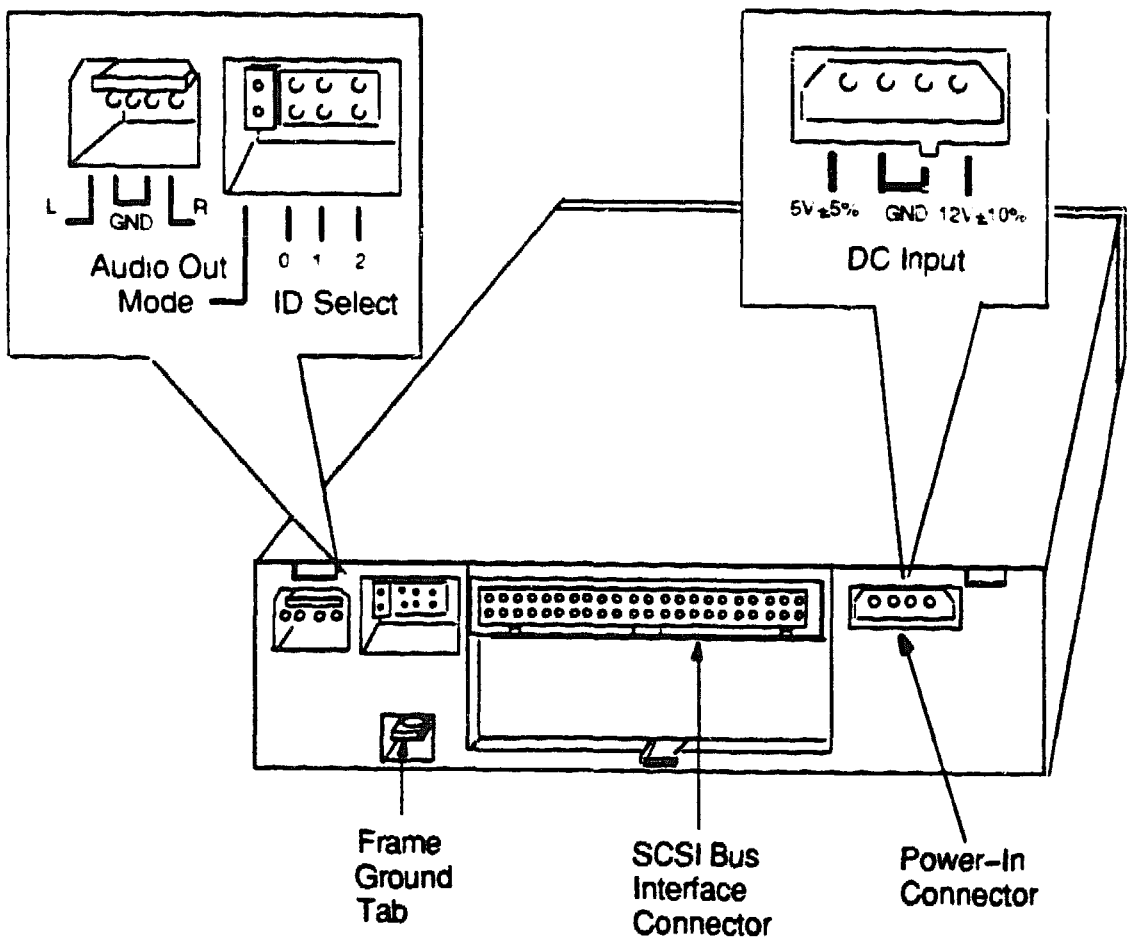


Figure 1-1 RRD42 ID Select Jumper Location

Table 1-3 lists the RRD42 ID select jumper settings.

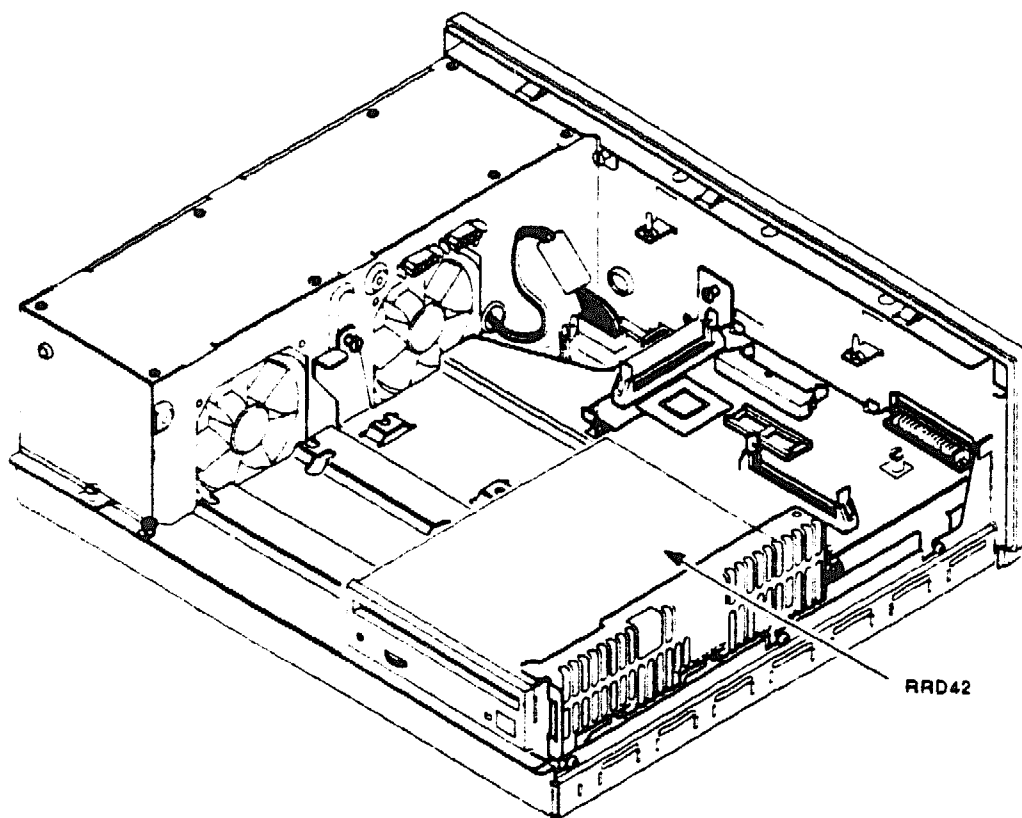
Table 1-3 RRD42 ID Select Jumper Settings

SCSI ID	0	1	2
0	Out	Out	Out
1	In	Out	Out
2	Out	In	Out
3	In	In	Out
4	Out	Out	In
5	In	Out	In
6*	Out	In	In
7	In	In	In

*Reserved address ID - do not use.

1.5 Installation

The RRD42 disc drive can be installed in either the right-hand or left-hand storage compartment on the lower shelf of the Model 20/20e. It can only be installed in the right-hand storage compartment of the Model 10/10e.



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Figure 1-2 Installing the RRD42 Disc Drive

1.5.1 RRD42 Disc Drive Installation Procedure

Follow these procedures to install the RRD42 disc drive:

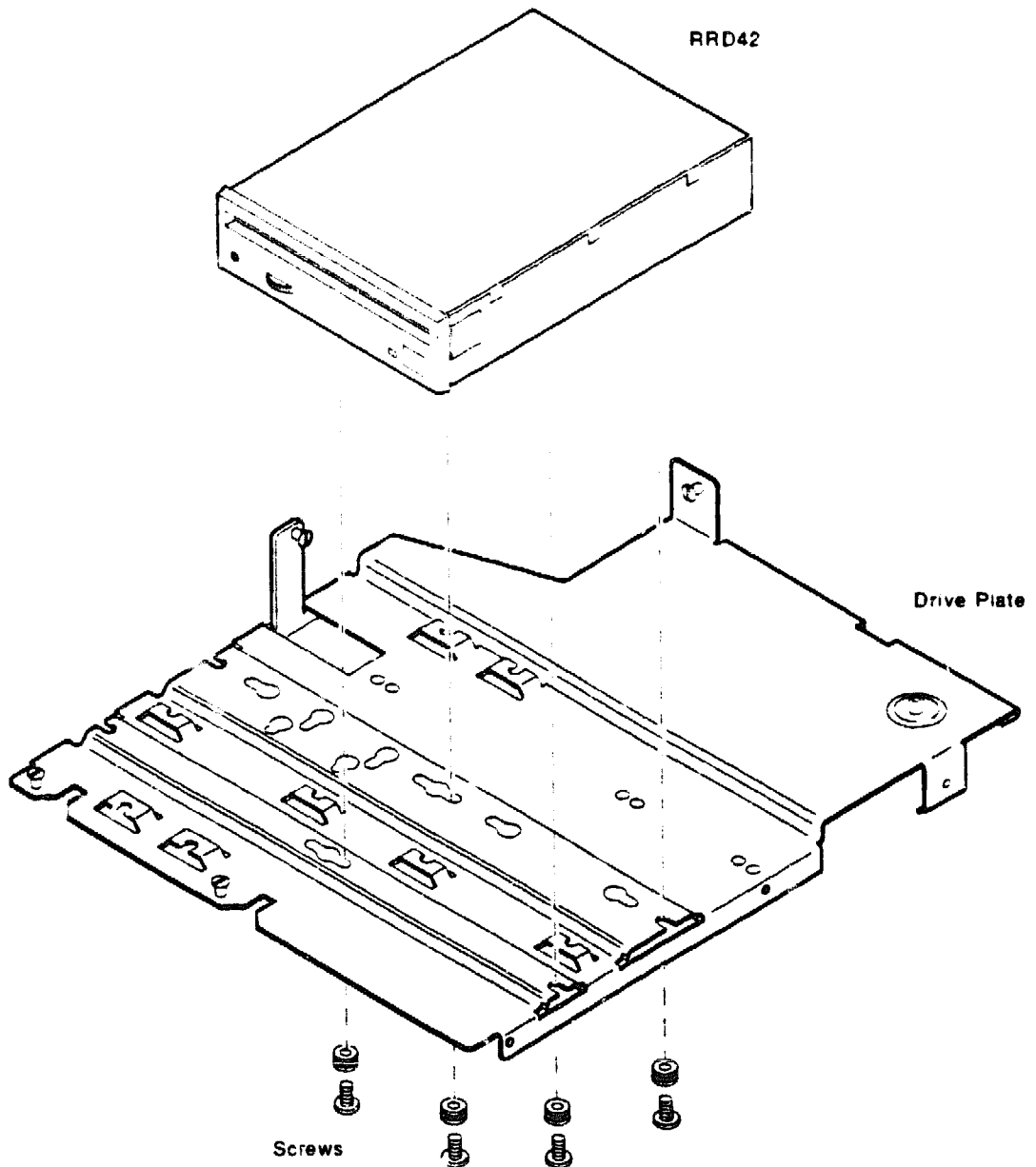
1. Bring the software operating system down and halt the system.
2. At the console prompt (>>>), enter the **SHOW DEVICE** command to determine existing SCSI address IDs.

NOTE

This must be done to avoid possible address duplication.

3. Determine the SCSI address and set the SCSI ID jumpers on the RRD42 disc drive. See Table 1-3 for RRD42 ID select jumper settings and Figure 1-1 for the SCSI ID jumper location.
4. Power down the system box and the expansion boxes (if applicable).

5. For the disassembly procedures, refer to the system documentation for either the Model 10 or the Model 20.
6. Using the four slotted screws and the four rubber grommets, mount the disk drive into the lower drive shelf.



7. Connect the SCSI data cable.
8. Connect the dc power connector to the rear of the RRD42 disk drive.
9. For the reassembly procedures, refer to the system documentation for either the Model 10 or the Model 20.
10. If applicable, make sure that all the expansion boxes are powered up first. Then, power up the system.
11. After power-up and successful completion of the self-test, verify the presence of the tape drive just installed by entering the SHOW DEVICE command at the console prompt (>>>). You should see "RRD42" under the DEVTYPE column.

The minimum version of VMS which supports the RRD42 disc drive is VMS V5.4-2.

1.6 Specifications

Table 1-4 lists the specifications of the RRD42 disc drive.

Table 1-4 RRD42 Disc Drive Specifications

Characteristic	Specifications
Acceptable disc	CDROM mode-1 data disc CDROM mode-2 data disc CD audio disc Audio-combined disc
Rotational speed	Innermost track: 530 r/min at CLV = 1.4 m/s Outermost track: 200 r/min at CLV = 1.2 m/s
Data transfer rate	Sustained rate: 150 Kbytes/s Burst rate: 1.5 Mbytes/s
Access time	Full stroke: 0.7 s (typical) Average 1/3 stroke: 0.45 s (typical)
External SCSI interface cable length	6 m (19.69 ft) maximum 2 m (6.56 ft) for systems using the KZQSA adapter module
Audio output level ¹	Line out: 0.5 V at 47K Ω Headphone: 0.55 V at 32 Ω (at maximum volume)
¹ Audio function support differs depending on the operating system.	

Table 1-5 lists the environmental specifications.

Table 1-5 RRD42 Disc Drive Environmental Specifications

Characteristic	Operating Specifications	Nonoperating Specifications
Temperature	5°C (41°F) to 50°C (122°F)	-30°C (-22°F) to 55°C (131°F)
Relative humidity	10% to 90%	10% to 90%
Atmosphere	Noncondensing	Noncondensing
Maximum wet bulb	28°C (82°F)	46°C (115°F noncondensing)
Altitude	-1000 ft to 15000 ft	-1000 ft to 40000 ft
Temperature gradient	11°C/h (20°F/h)	20°C/h (36°F/h)

Table 1-6 describes the physical specifications.

Table 1-6 RRD42 Disc Drive Physical Specifications

Characteristic	Dimensions
Width	146.05 mm (5 3/4 in)
Height	41.4 mm (1 5/8 in)
Depth	203.2 mm (8 in)
Weight	1.3 kg (2 lb, 14 oz)

RZ23L Hard Disk Drive

This chapter provides general information about the RZ23L hard disk drive.

2.1 Description

The RZ23L hard disk drive is a half-height, high-density, 3 $\frac{1}{2}$ -inch, 121 megabyte (formatted) disk drive with small computer system interface (SCSI) ability.

The disk drive is a random-access, rotating memory device that stores data in fixed length blocks on 90-millimeter thin film rigid media disks. The storage medium contained within the drive is in a fixed, nonoperator-removable configuration.

The RZ23L hard disk drive has the following features:

- Provides memory storage for applications and user files
- Provides random-access data storage and retrieval
- Functions horizontally, vertically, or upside-down, depending on the hardware layout of the system

NOTE

The RZ23L is a replacement for the RZ23 hard disk drive.

2.2 Using the RZ23L Hard Disk Drive

To use the RZ23L, software must be installed on the disk. Use a diskette drive, a tape drive, or a CDROM drive to load the software on the RZ23L. The RZ23L hard disk drive is formatted (ready to receive information) when shipped from the factory.

2.3 Configuration

The RZ23L hard disk drive is not to be internally terminated. The SCSI bus must be terminated. Therefore, termination must be done within the host system itself or within the expansion boxes.

If you receive a drive or drive module with the terminator resistor packs installed, use needlenose pliers to remove them. The terminator resistor packs are located just behind the SCSI port connector.

Refer to the system documentation for the correct termination of the SCSI bus.

2.3.1 Assigning the SCSI ID

Follow these guidelines for assigning the SCSI ID:

- Assign the SCSI ID number for each drive using the ID select jumper.
- Be sure to assign a unique ID number to each SCSI device.

Figure 2-1 shows the location of the SCSI ID jumpers.

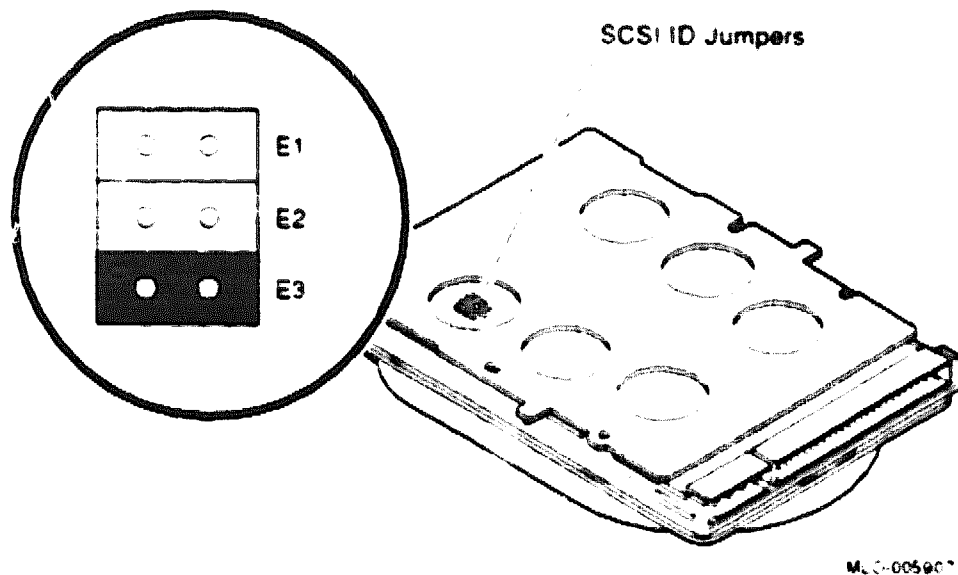


Figure 2-1 RZ23L SCSI ID Jumper Location

All SCSI devices are set to a default SCSI ID before the devices leave the factory. Default settings should be changed only when a system is configured with more than one of a particular device.

Table 2-1 shows the SCSI ID jumper settings

Table 2-1 SCSI ID Jumper Settings

SCSI ID	E1	E2	E3
0	Out	Out	Out
1	In	Out	Out
2	Out	In	Out
3	In	In	Out
4	Out	Out	In
5	In	Out	In
6*	Out	In	In
7	In	In	In

*Reserved address ID - do not use

2.4 Installation

For installation refer to the RZ23 installation procedures in the MicroVAX 3100 and VAXserver 3100 system documentation. The RZ23L can be installed anywhere that the RZ23 can be installed.

2.5 Specifications

Table 2-2 describes the specifications of the RZ23L hard disk drive.

Table 2-2 RZ23L Hard Disk Drive Specifications

Characteristic	Specifications
Interface	SCSI
Recording density (bits/in at ID)	36.250
Flux density (fci at ID)	24.170
Track density (tpi)	1850
Tracks surface (formatted)	1523
Read/write heads	4
Disks	2
Time to process ECC (512 bytes)	<100 ms

Table 2-3 describes the environmental specifications.

Table 2-3 RZ23L Hard Disk Drive Environmental Specifications

Characteristic	Operating Specifications	Nonoperating Specifications
Ambient temperature	10°C to 55°C (50°F to 122°F)	-40°C to 66°C (-40°F to 151°F)
Relative humidity	8% to 80%	8% to 95% (noncondensing)
Maximum wet bulb (noncondensing)	25.6°C (78°F)	46°C (115°F)
Altitude	-1000 ft to 15000 ft	-1000 ft to 40000 ft
Heat dissipation	3.8 watts (seeking)	N/A
	3.6 watts (Read/write mode)	N/A
Temperature gradient	11°C/h (20°F/h)	20°C/h (36°F/h)

Table 2-4 describes the physical specifications

Table 2-4 RZ23L Hard Disk Physical Specifications

Characteristic	Specifications
Height	25.40 mm (1.00 in)
Width ¹	101.60 mm (4.00 in)
Depth	144.05 mm (5.75 in)
Weight	0.544 kg (1.2 lb)

¹Mounting bosses should not exceed 4.00 inches

Depositing or Retrieving Hard Disk Drives from Storage

When depositing or retrieving hard disk drives from storage conditions follow these guidelines:

- Avoid rapid transfers between cold and warm, humid environments that could cause damaging condensation.
- Allow a minimum of 12 hours soak-time in the intended operating environment, preferably in the original packing, before unpacking and operating the drive.

TZK10 Cartridge Tape Drive

3.1 Description

The TZK10 cartridge tape drive is a half-height, 5 $\frac{1}{4}$ -inch, streaming tape drive that uses quarter-inch cartridges (QIC). The TZK10 provides archival storage and retrieval, and data collection activities. The TZK10 cartridge tape drive uses the small computer system interface (SCSI).

The TZK10 cartridge tape drive is one unit consisting of the drive and built-in controller logic.

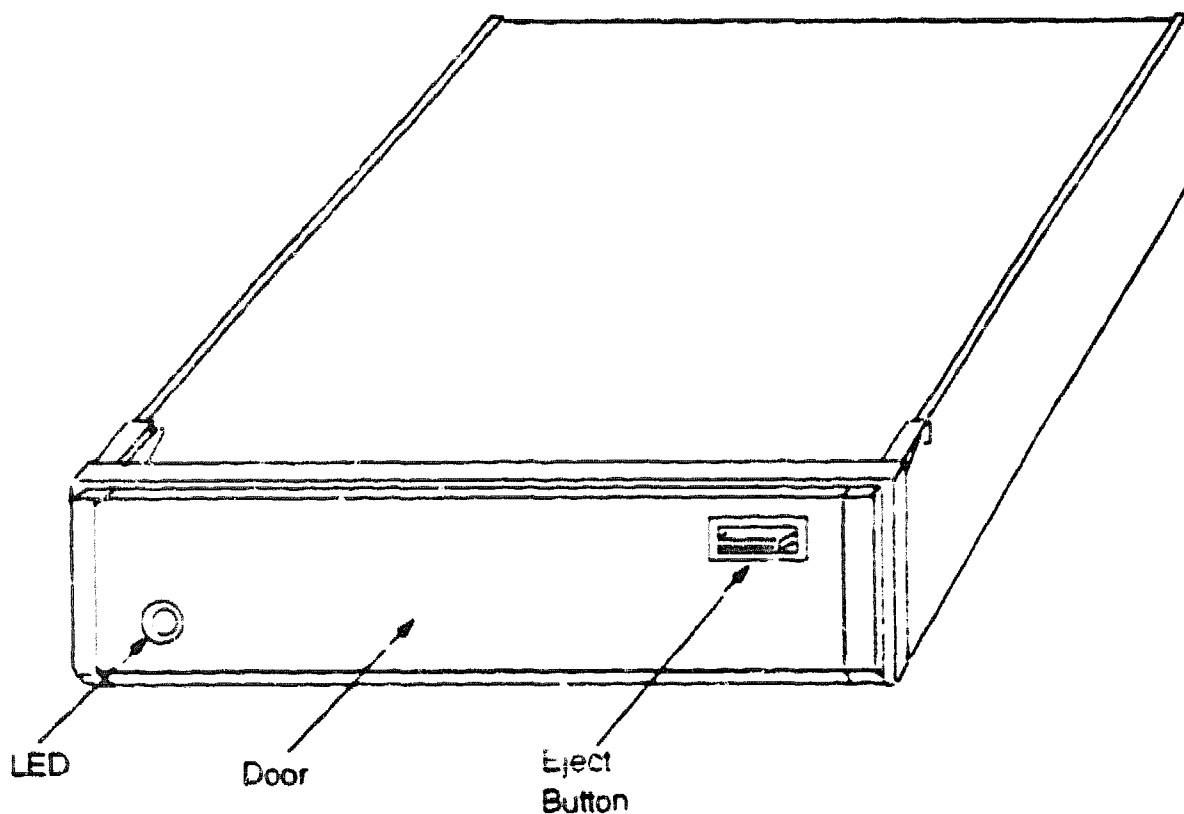
The TZK10 has the following features:

- Functions in vertical and horizontal positions
- Uses status LED protocol

3.2 Controls and Indicators

The front of the TZK10 cartridge tape drive contains a single dual-color (glows green or amber) LED and an eject button (Figure 3-1).

3-2 TZK10 Cartridge Tape Drive



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Figure 3-1 TZK10 Cartridge Tape Drive (Front View)

3.2.1 LED Indicator

Table 3-1 defines various states of the drive LED during operation.

Table 3-1 LED Status

Drive Status	LED State
Tape not loaded	Off
Tape loaded ¹	Solid green
Tape in motion	Blinking green
Tape faulted	Solid amber

¹Tape is automatically loaded upon insertion of the cartridge tape

3.2.2 Eject Button

The eject button unlocks the door and partially ejects the cartridge tape from the drive.

3.3 Using the Cartridge Tape

This section explains how to do the following procedures:

- Set the write-protect switch
- Insert a cartridge tape into the drive
- Remove a cartridge tape from the drive
- Retension the tape

3.3.1 Setting the Write-Protect Switch

Observe the following guidelines when setting the write-protect switch:

- If you are reading data or copying data from a tape, set the write-protect switch to **SAFE** (write-protect mode).
- If you are writing data, set the write-protect switch to the write-permit position.

3.3.2 Inserting the Cartridge Tape into the Drive

To insert the cartridge tape into the drive, follow these procedures:

1. Insert the cartridge tape into the drive with the cartridge's write-protect switch in the upper right corner.
2. Slide the cartridge straight into the cartridge area until you feel resistance.
3. Close the cartridge door.

When the tape is properly inserted, the LED glows solid green and the drive is ready to accept operating system commands.

3.3.3 Removing the Cartridge Tape from the Drive

After the tape is dismounted by the software, the LED goes from blinking green to solid green to indicate that you can remove the tape from the drive.

3-4 TZK10 Cartridge Tape Drive

To remove the cartridge tape from the drive, follow these procedures:

1. Press the eject button. The door will open and the cartridge tape will eject part of the way
2. Pull down on the cartridge door, grasp the cartridge tape, and slide it out of the drive

3.3.4 Retensioning

It is recommend by Digital that the cartridge tape be conditioned by doing the following:

- Exposing it to the operating environment for a period equal to or greater than the period it has been out of the operating environment, up to a maximum of eight hours
- Running the tape one complete end-to-end pass (retensioning) in any of the following cases
 - Each time the cartridge tape is inserted in the drive
 - After prolonged operation over a limited area
 - After exposure to a temperature change greater than 16°C (30°F)
 - After one hour of start-stop or shuffle operation

If you are using the ULTRIX operating system, retension the tape by performing the following ULTRIX command

```
#mt -f /dev/rmt0h ret
```

where **n** equals the drive unit number

If you are using the VMS operating system, retension the tape by performing the following VMS command.

To rewind the tape:

```
$ SET MAGTAPE/RETENSION/REWIND n
```

where **n** equals the device name (for example, MKA500:)

To unload the tape:

```
$ SET MAGTAPE/UNLOAD/RETENSION n
```

The retension command may be different for other operating systems or tape utilities. Refer to the system-specific documentation.

3.4 Configurations

This section describes how to configure the tape drive.

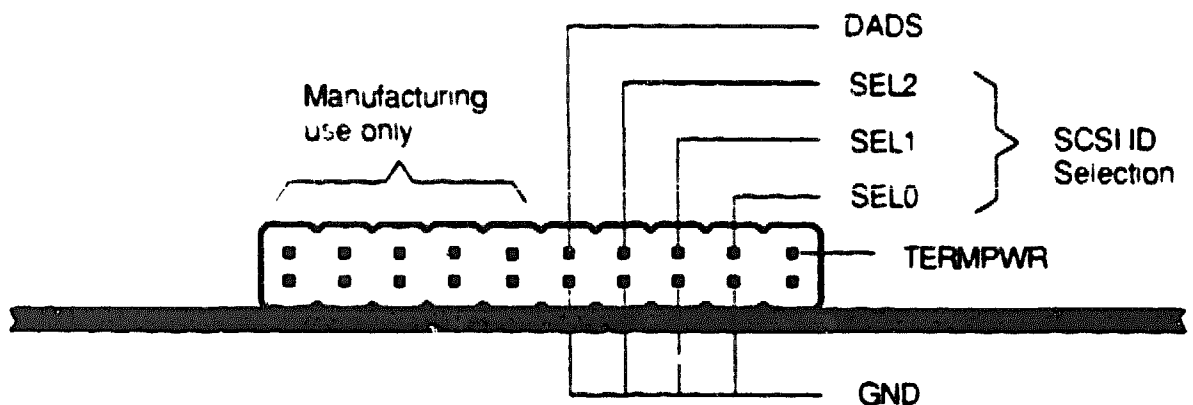
3.4.1 SCSI ID Settings

TZK10 cartridge tape drive is set to a SCSI ID of 5 during manufacturing and, in most cases, the SCSI ID should not need to be changed. The only time these SCSI IDs may have to be changed is when a TZK10 cartridge tape drive is added to a host system that already has another TZK10 installed.

NOTE

Each SCSI device must have its own SCSI ID.

The SCSI ID is set or changed by adding jumpers to, or removing jumpers from, a connector at the rear of the tape drive. Figure 3-2 shows the jumper location.



DADS (Disable Auto Density) – When the jumper is installed, automatic density selection is disabled.

TERMPWR (Terminator Power) – When the jumper is installed, power for the terminator is provided by the drive.

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Figure 3-2 TZK10 SCSI ID Jumper Location

3-6 TZK10 Cartridge Tape Drive

Disable Auto Density (DADS)

The disable auto density (DADS) jumper should be installed when you are using the VMS and ULTRIX operating systems. The DADS jumper should be removed when you are using the MS-DOS and SCO UNIX operating systems. See Figure 3-2 for the location of the DADS jumper.

Table 3-2 lists the jumper settings necessary to configure the TZK10 cartridge tape drive for a particular SCSI ID.

Table 3-2 TZK10 SCSI ID Jumper Settings

SCSI ID	SEL2	SEL1	SEL0
0	Out	Out	Out
1	Out	Out	In
2	Out	In	Out
3	Out	In	In
4	In	Out	Out
5*	In	Out	In
6†	In	In	Out
7	In	In	In

*Default ID for the TZK10 tape drive

†Reserved address ID - do not use.

3.5 Installation

The TZK10 cartridge tape drive can be installed in either the right-hand or left-hand storage compartment of the lower shelf on the Model 20/20e. It can only be installed in the right-hand storage compartment of the Model 10/10e.

If the TZK10 is installed in the right-hand storage compartment the power harness will need to be extended using the supplied extension cable (P/N 17-00342-01).

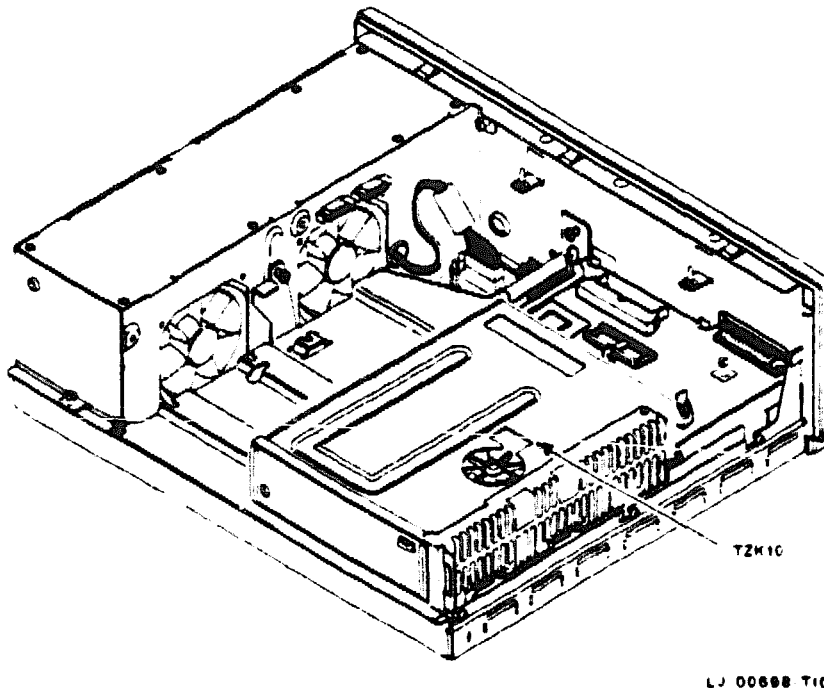


Figure 3-3 Installing TZK10 Cartridge Tape Drive

3.5.1 TZK10 Cartridge Tape Drive Installation Procedure

Follow these procedures to install the TZK10 tape drive:

1. Bring the software operating system down and halt the system.
2. At the console prompt (>>>), enter the SHOW DEVICE command to determine existing SCSI address IDs.

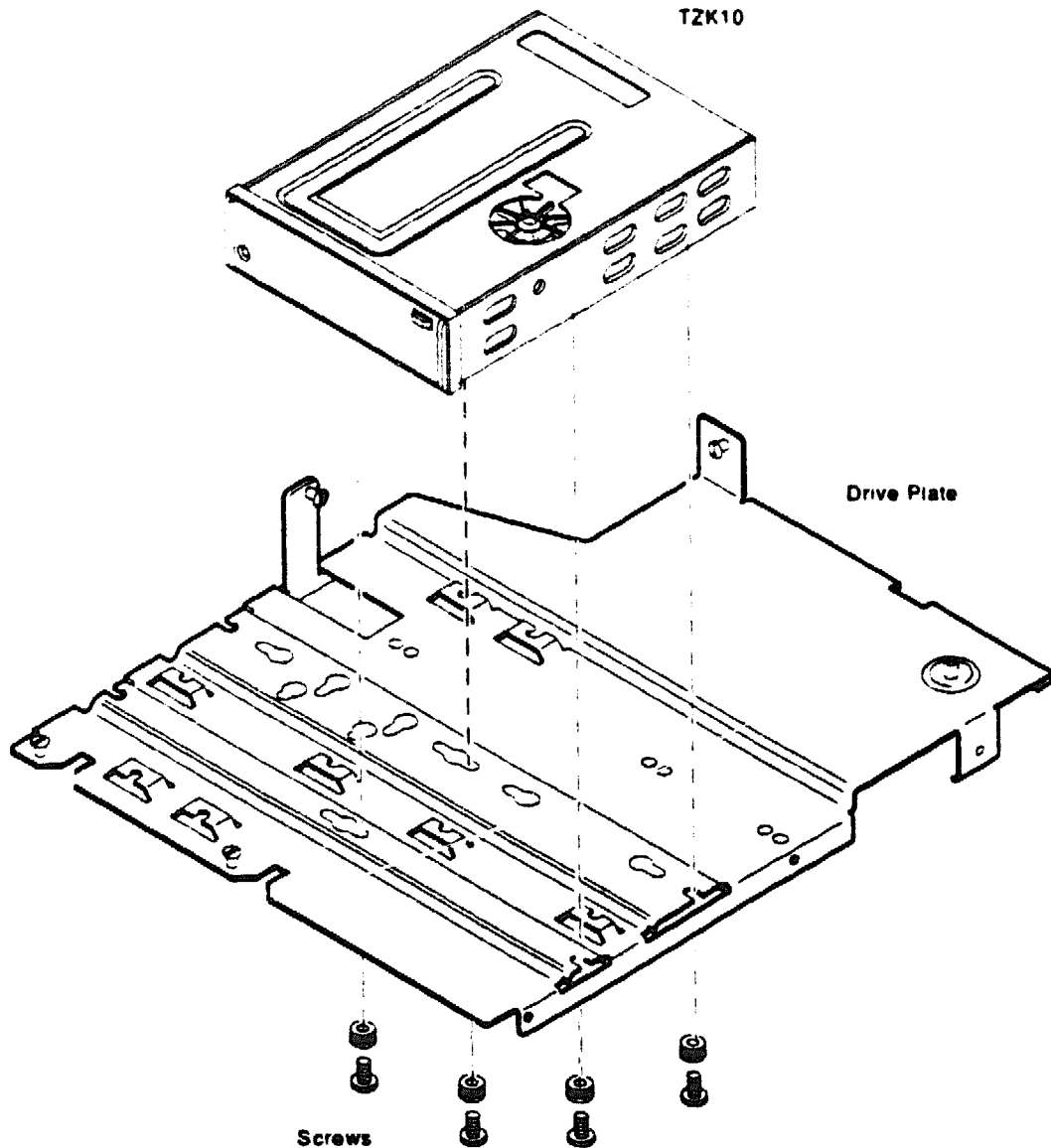
NOTE

This must be done to avoid possible address duplication.

3. Determine the SCSI address and set the SCSI ID jumpers on the TZK10 tape drive using Table 3-2 for the SCSI ID jumper settings and Figure 3-2 for the SCSI ID jumper location.
4. Power down the system box and the expansion boxes (if applicable).
5. For the disassembly procedures, refer to the system documentation for either the Model 10 or the Model 20.

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6. Using the four slotted screws and the four rubber grommets, mount the tape drive into the lower drive shelf.



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7. Connect the SCSI data cable.
8. Connect the dc power connector to the rear of the TZK10 tape drive.
9. For the reassembly procedures, refer to the system documentation for either the Model 10 or Model 20.

10. If applicable, make sure that all the expansion boxes are powered-up. Then, power up the system.
11. After power-up and successful completion of the self-test, verify the presence of the tape drive just installed by entering the SHOW DEVICE command at the console prompt (>>>). You should see "TZK10" under the DEVTYPE column.

The minimum version of VMS which supports the TZK10 cartridge tape drive is VMS V5.4-2.

3.6 Specifications

Table 3-3 describes the TZK10 cartridge tape drive specifications.

Table 3-3 TZK10 Cartridge Tape Drive Specifications

Characteristic	Specifications
Drive interface	SCSI-2
Media	DC6320/DC6525 or Digital-approved equivalent
Track width, write	0.1778 mm +0.0000 mm/-0.0127 mm (0.0070 in +0.0000 in /-0.0005 in)
Track width, read	0.1270 mm +0.0127 mm/-0.0000 mm (0.0050 in +0.0005 in /-0.0000 in)
Data density	16,000 bits/in
Number of tracks	26
Transfer rate	200 Kbytes/s at average streaming mode 1.5 Mbytes/s at SCSI (maximum)
Tape speed	3.05 cm/s (120 ips)
Track format	Multiple track serpentine recording
Cartridge capacity	320 Mbytes, formatted (approximately) - DC6320 525 Mbytes, formatted (approximately) - DC6525

Table 3-4 lists the power requirements.

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Table 3-4 TZK10 Cartridge Tape Drive Power Requirements

Characteristic	Specifications
Power	+12 V $\pm$ 5% @ 1.0 A (2.0 A surge), 150 mV ripple peak-to-peak +5 V $\pm$ 5% @ 1.2 A (1.8 A surge), 150 mV ripple peak-to-peak
Power consumption	
Nominal	20 W
Peak	33 W

Table 3-5 lists the environmental specifications.

Table 3-5 TZK10 Cartridge Tape Drive Environmental Specifications

Characteristic	Operating Specifications	Nonoperating Specifications
Temperature	5°C (41°F) to 40°C (104°F)	-30°C (-22°F) to +60°C (151°F)
Relative humidity	20% to 80% RH maximum	10% to 90% RH maximum
Altitude	2.4 km (13,000 ft)	4.9 km (40,000 ft)

Table 3-6 lists the physical specifications.

Table 3-6 TZK10 Cartridge Tape Drive Physical Specifications

Characteristic	Dimensions
Width	146.05 mm (5.75 in)
Height	44 mm (1.732 in)
Depth	206.28 mm (8.20 in)
Weight	1.1 kg (2.4 lb)

A

Related Documentation

The following table provides a list of documentation related to the options described in this manual.

Table A-1 Related Documentation

Documentation	Part Number
RRD42 Disc Drive Owner's Manual	EK-RRD42-OM
RZXX Disk Drive Subsystem Pocket Service Guide	EK-RZXX-PS
TZK10 Cartridge Tape Drive Owner's Guide	EK-TZK10-OG