RZxx Disk Drive Subsystem

digital

Pocket Service Guide

Part Number: EK-RZXXD-PS.003

Educational Services

RZxx Disk Drive Subsystem Pocket Service Guide

EK-RZXXD-PS-003

October 1991

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Introduction

The RZ22, RZ23, RZ23L, RZ24, and RZ25 hard disk drives are half-height, high-density, 3.5-inch Winchester disk drives for use with low-end desktop and workstation systems to provide random-access data storage/retrieval capability. The drives are designed to be mounted horizontally, vertically, and upside-down. The disk drives have small computer system interface (SCSI) ability. These random-access rotating memory devices store data in fixed-length blocks on 90-mm, thin film, rigid media disks.

The RZ55, RZ56, RZ57, RZ58, and RZ73 hard disk drives are high-performance 5.25-inch drives. The drives are designed to be mounted horizontally or vertically in a system enclosure (such as a BA213 or BA400) or expansion box (such as the BA40 or BA42). These random-access rotating memory devices store data in fixed-length blocks on 130-mm, thin film, rigid media disks.

The RZ series disk drives conform to the common command set (CCS). The medium contained within each RZ series disk drive is a fixed, nonremovable head/disk assembly (HDA).

Formatted Capacity

RZ22	52Mb	**RZ55**	332Mb
RZ23	104Mb	**RZ56**	665Mb
RZ23L	121Mb	**RZ57**	1.0Gb
RZ24	209Mb	**RZ58**	1.3Gb
RZ25	426Mb	**RZ73**	2.0Gb

Service Strategy

For the RZ23L, RZ24, RZ25, and RZ58 the entire disk drive is replaced. For the RZ22, RZ23, and RZ55 disk drives replace the drive module and then the entire drive option. For the RZ56, RZ57, and RZ73 disk drives replace the drive module and then the HDA.

Associated Documents

DECstation 3100 Maintenance Guide
EK-291AA-MG
DECstation 2100/3100 Maintenance Guide
EK-291AB-MG
DECstation 5000 Maintenance Guide
EK-370AA-MG
MicroVAX 3100 Maintenance Guide
EK-A0297-MG
VAXstation 3100 Maintenance Guide
EK-285AA-MG
VAXstation 35xx Maintenance Guide
EK-258AA-MG

2
Configurations

The RZxx disk drives are not to be internally terminated. The SCSI bus must be terminated. Therefore, termination must be done within the host system itself or expansion boxes. Refer to the figures in this chapter for the location of the SCSI ID jumpers.

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

Refer to the system documentation for information on the correct termination of the SCSI bus. A brief list of system maintenance guides can be found in Chapter 1.

RZ22 and RZ23 Disk Drives

Figure 2–1 RZ22 and RZ23 Drive Module Layout

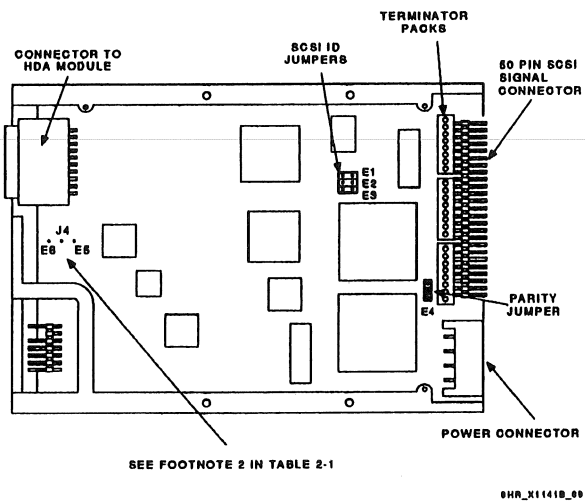

Table 2–1 RZ22 and RZ23 Jumpers

SCSI ID	E1	E2	E3	E4
0	Out	Out	Out	Out
1	In	Out	Out	Out
2	Out	In	Out	Out
3	In	In	Out	Out
4	Out	Out	In	Out
5	In	Out	In	Out
6	Out	In	In	Out
7	In	In	In	Out
	E5[1] is Out			E6[1] is In

[1]E5 and E6 are present on drive/modules with revision levels BO2 or higher. Manufacturing use only.

RZ23L Disk Drive

Figure 2–2 RZ23L Drive Module Layout

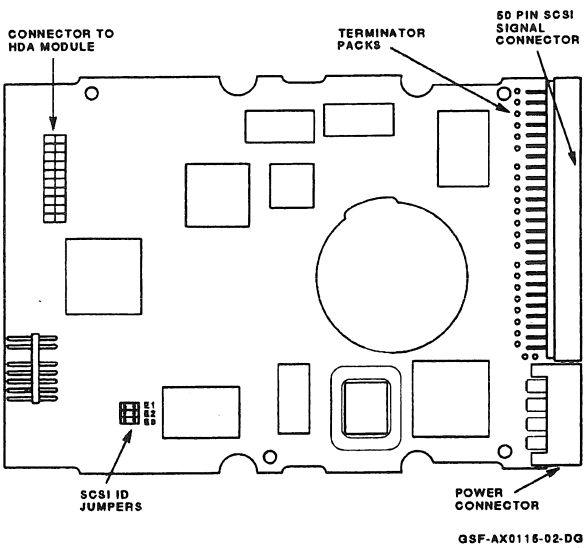

Table 2–2 RZ23L Jumpers

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

RZ24 Disk Drive

Figure 2–3 RZ24 Drive Module Layout

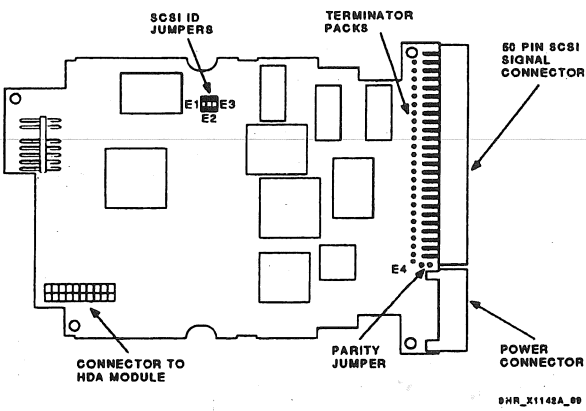

Table 2–3 RZ24 Jumpers

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

RZ25 Disk Drive

Figure 2–4 RZ25 Drive Module Layout

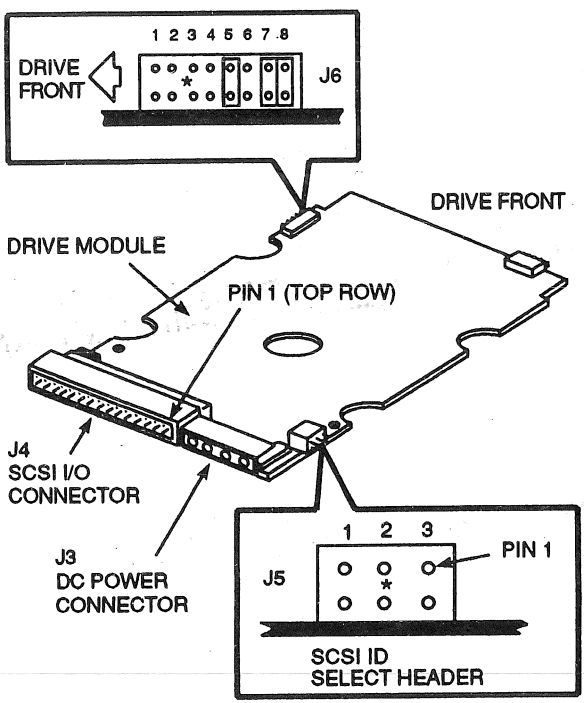

Table 2–4 RZ25 Jumpers (J5 and J6)

SCSI ID (J5)	3	2	1
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

J6	Jumper 2
Out	Spin-up on power-up.
In	Spin-up on SCSI command.
	Note that jumpers 5, 7, and 8 are always present.

RZ55, RZ56, RZ57, and RZ58 Disk Drives

Figure 2–5 RZ55, RZ56, RZ57, and RZ58 Drive SCSI Connectors

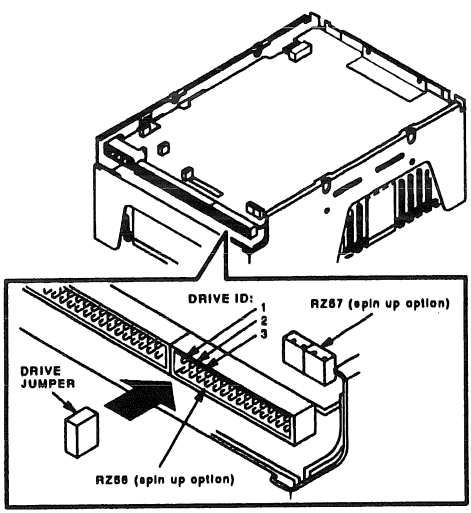

Table 2–5 RZ55, RZ56 RZ57, and RZ58 Drive SCSI ID

SCSI ID	3	2	1
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

The RZ57 and RZ58 can be set to spin up when power is applied to the host system. These jumpers can be seen in Figure 2–5. Note that when the jumper is removed on the RZ57, the spin up option is enabled. The spin up option is also enabled when the jumper is in place on the RZ58. When the spin up option is disabled, the drive will only spin up with a SCSI command.

RZ73 Disk Drive

Figure 2–6 RZ73 Drive SCSI Connectors

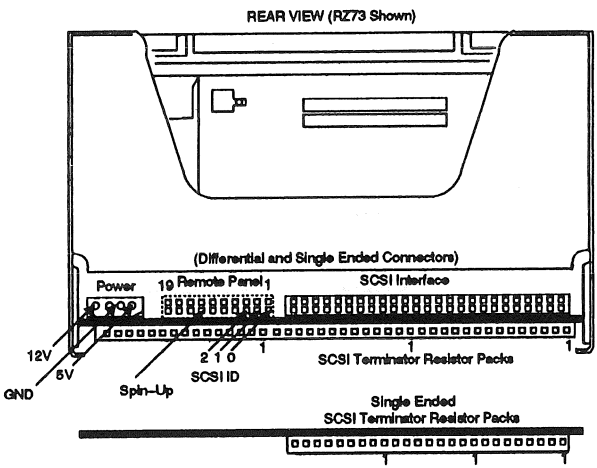

Table 2–6 RZ73 SCSI ID Selection

SCSI ID	Switch Positions[1]		
	1	2	3
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

	Jumper 13 and 14
Out	Spin-up on power-up.
In	Spin-up on SCSI command.

[1]SCSI address 7 is normally assigned to a system adapter.

3
Troubleshooting

To troubleshoot an RZxx disk drive, follow the same basic procedures as for any other disk drive. Check for the type of failures that are common to a faulty disk drive.

The RZxx disk drives depend on system-based diagnostics for troubleshooting. If you are going to use these diagnostics, make sure that you adhere to all system configuration criteria such as loopback connectors.

NOTE

Not all RZxx disk drives will use all of the troubleshooting flowcharts.

Check the items in the following list to determine if the drive is faulty:

- Make sure the drive is connected (both power and signal cables).
- Make sure there is power to the drive.
- Make sure the drive is correctly configured.

Figure 3–1 shows the logical procedure for troubleshooting an RZ drive in a system.

NOTE

Check SCSI ID before and after replacing the drive module.

NOTE

If the RZ23L and RZ25 disk drives fail replace the entire disk drive.

Figure 3–1 RZxx Troubleshooting Flowcharts

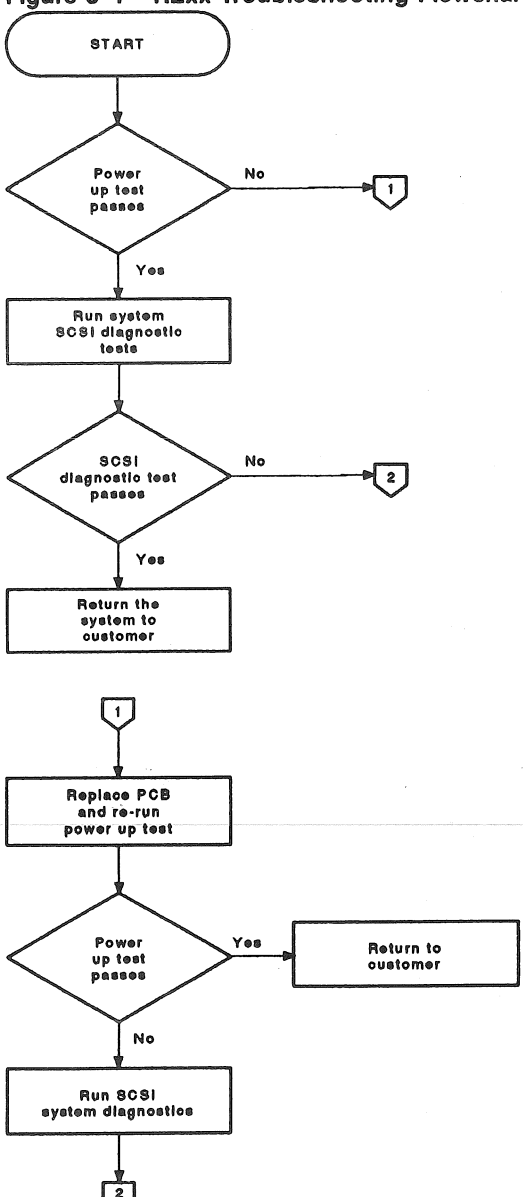

Figure 3–1 Cont'd on next page

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Figure 3–1 (Continued) RZxx Troubleshooting Flowcharts

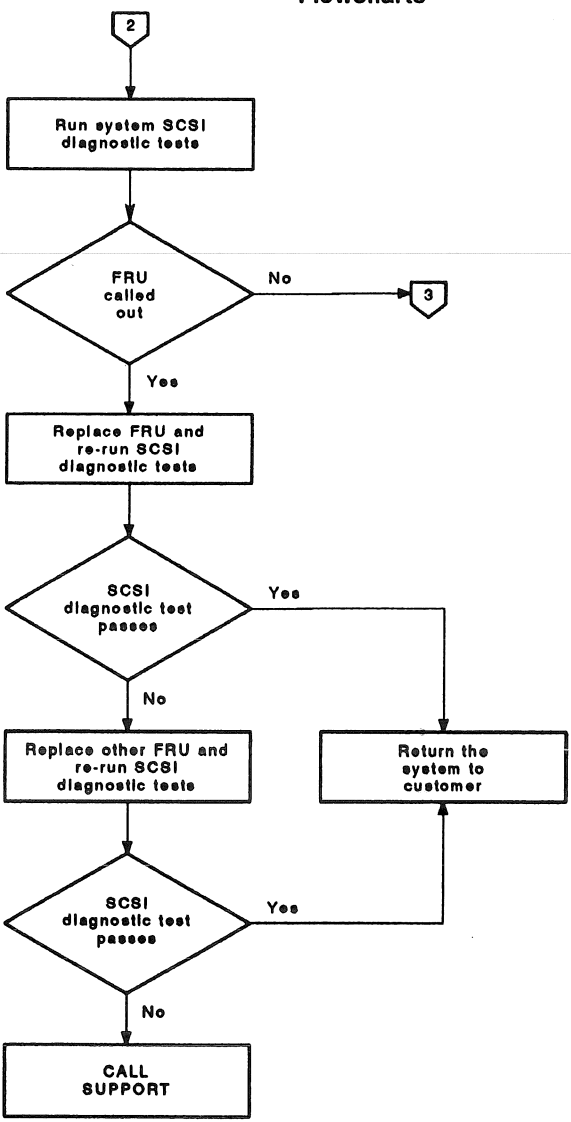
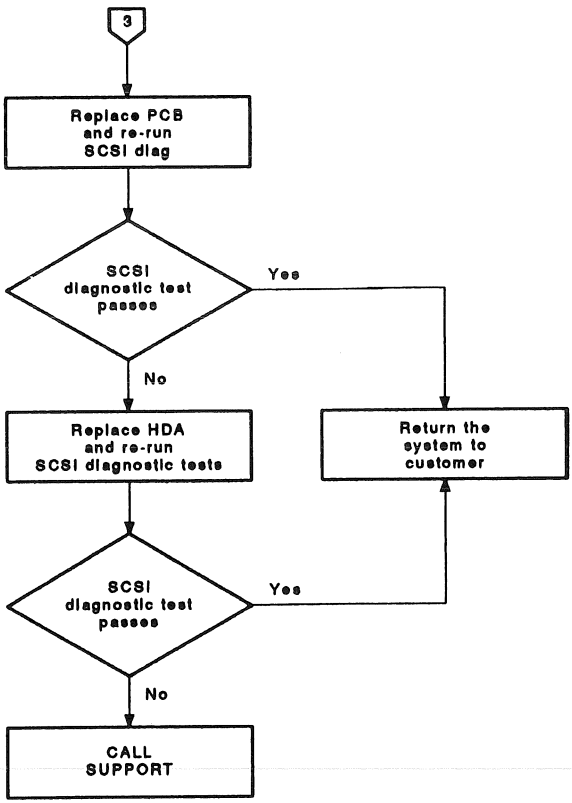


Figure 3–1 Cont'd on next page

Figure 3–1 (Continued) RZxx Troubleshooting Flowcharts



4
FRU Procedures

This chapter describes procedures for removing and replacing the drive module/frame on the HDA.

CAUTION

Wear a properly grounded, antistatic wrist strap, available in the Digital antistatic kit (Part number 29-26246-00), and use care when handling the drive.

Service Strategy

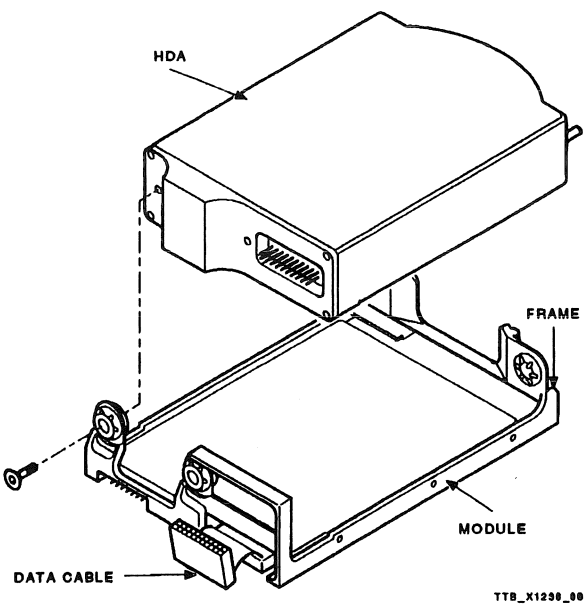
For the RZ23L, RZ24, RZ25, and RZ58 the entire disk drive is replaced. For the RZ22, RZ23, and RZ55, disk drives replace the drive module and then the entire drive option. For the RZ56, RZ57, and RZ73 disk drives replace the drive module and then the HDA.

Set the SCSI ID jumpers to match that of the replaced drive module or drive.

RZ22 and RZ23 Disk Drives

1. Once you have removed the drive from the system enclosure, position the drive as shown in the following figure.
2. Remove the HDA interconnect cable at the HDA end, *not* at the drive module/frame end.
3. Remove the two screws using a 1/16-inch hex driver.
4. Hold the drive in your left hand.
5. With your right hand, push the HDA back against the rear grommets. Pull the front of the HDA up and straight out (away from the drive module/frame).

Figure 4–1 RZ22 and RZ23 Drive Module/Frame Removal



RZ23L, RZ24 and RZ25 Disk Drives

The RZ23L, RZ24 and RZ25 disk drives are one piece FRUS.

The name "**Generic SCSI Device**" can be used for RZ23L disk drives that are embedded in the system.

For VMS operating system;

- Version 5.4.1 operating system will identify the RZ23L as a RZ23L disk drive.
- Version 5.3.x operating system or earlier will identify the RZ23L as a "Generic SCSI Device". At the console prompt type SHOW DEVICE. This command will perform an inquiry to the drive and identify the correct ID of the RZ23L disk drive.

For ULTRIX operating system;

- Version 4.1 operating system will identify the RZ23L as a RZ23L disk drive.
- Version 4.0 operating system or earlier will identify the RZ23L as a "Generic SCSI Device". At the console prompt type SCSI PB and this will display the RZ23L as a RZ23L disk drive.

RZ55 FRU Removal and Replacement

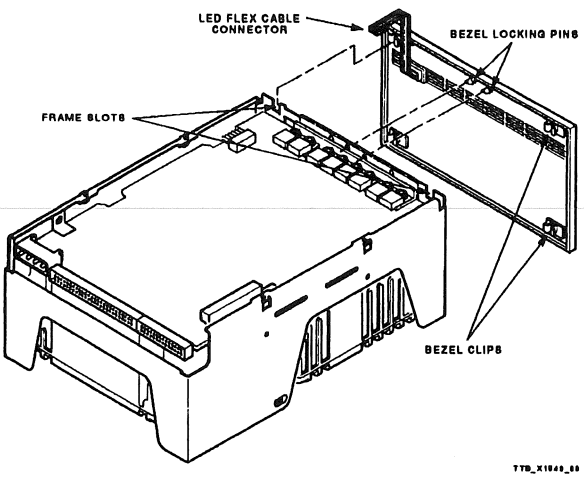
NOTE

Do not remove or alter any of the jumpers on the drive module as this may result in damage to the drive module or HDA. Set the SCSI ID jumpers to match that of the replaced drive module or drive.

To remove the bezel, follow the procedure below:

1. Position the drive with the module face up, and turn the drive so the bezel is facing away from you.
2. Unplug the LED flex cable.
3. Hold the sides of the bezel with the palms of your hands, with your fingers resting on the front of the bezel. Next, position your thumbs on the back of the bezel above the locking pins.
4. Carefully apply outward pressure to the bezel with your thumbs until the two bezel locking pins clear the holes in the frame. Note that the bezel must flex about 1/8 inch to clear the pins.
5. While the bezel is flexed, slide it upward until movement stops (about 3/8 inch). This frees the upper bezel clips from the upper frame slots.
6. Push the bezel away from the drive. This frees the lower bezel clips from the lower frame slots and releases the bezel.

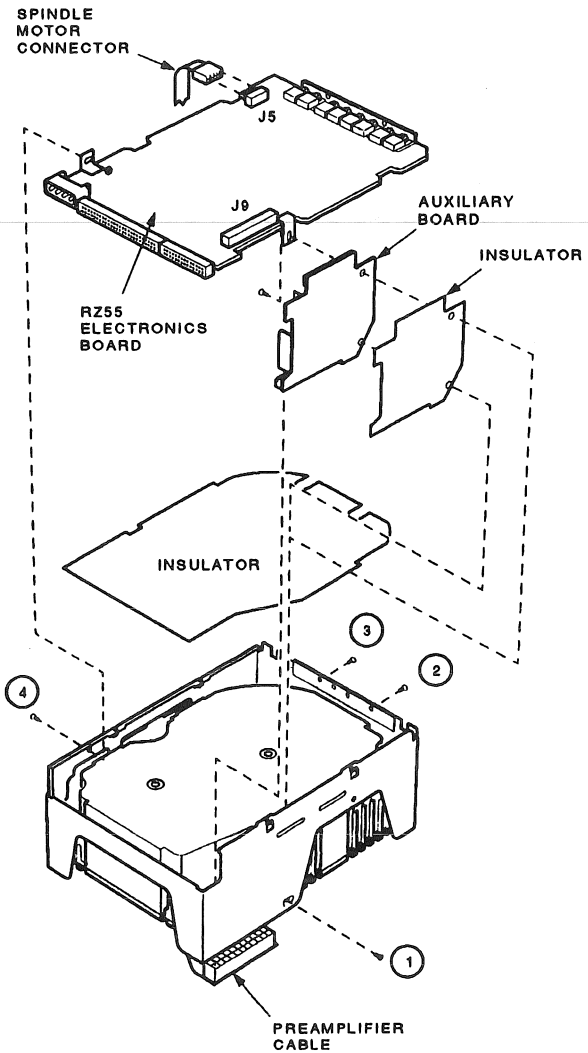
Figure 4–2 RZ55 Drive Bezel Removal



Once you have removed the bezel from the drive, follow the procedure below to remove the drive module:

1. Remove the screws labeled 1, 2, 3, and 4.
2. Unplug the spindle motor connector at J5.
3. Lift the drive module up and out of the drive.
4. Unplug the preamplifier cable connector at the auxiliary board.
5. Lift the drive module and auxiliary board up and out of the drive.
6. Remove the screw and speednut holding the drive module.
7. Unplug the auxiliary board from J9 on the drive module.
8. Exchange the bad module with the replacement module, and check the drive module configuration.

Figure 4–3 RZ55 Drive Module Removal



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RZ56, RZ57, and RZ58 FRU Removal and Replacement

Use the following procedure for the two FRUs of a RZ56 and RZ57 disk drive.

The RZ58 disk drive is a single FRU device. However, if the customer data is critical use this same procedure to replace the failed drive module using the drive module from your spare RZ58-E. If the failure continues then return the spare drive module to the spare RZ58-E HDA and replace the entire failed customer drive.

NOTE

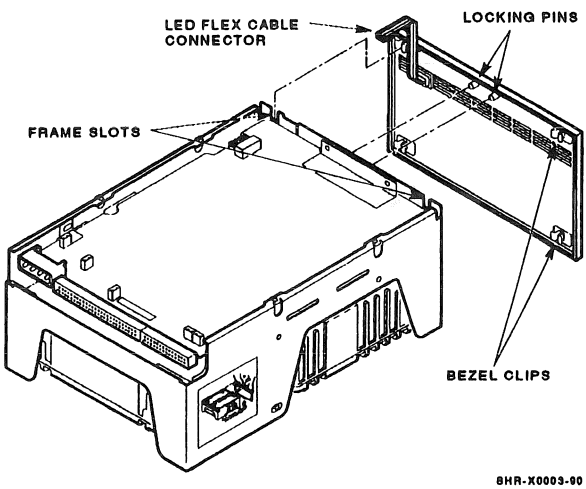
Do not remove or alter any of the jumpers on the drive module as this may result in damage to the drive module or HDA. Set the SCSI ID jumpers to match that of the replaced drive module or drive.

RZ56, RZ57, and RZ58 FRU Removal and Replacement (Cont.)

To remove the bezel on the RZ56 only, refer to Figure 4–4. (The RZ57 and RZ58 disk drives do not have a bezel.)

1. Position the drive with the module face up, and turn the drive so the bezel is facing away from you.
2. Unplug the LED flex cable.
3. Hold the sides of the bezel with the palms of your hands, with your fingers resting on the front of the bezel. Next, position your thumbs on the back of the bezel above the locking pins.
4. Carefully apply outward pressure to the bezel with your thumbs until the two bezel-locking pins clear the holes in the frame. Note that the bezel must flex about 1/8 inch to clear the pins.
5. While the bezel is flexed, slide it upward until movement stops (about 3/8 inch). This frees the upper bezel clips from the upper frame slots.
6. Push the bezel away from the drive. This frees the lower bezel clips from the lower frame slots and releases the bezel.

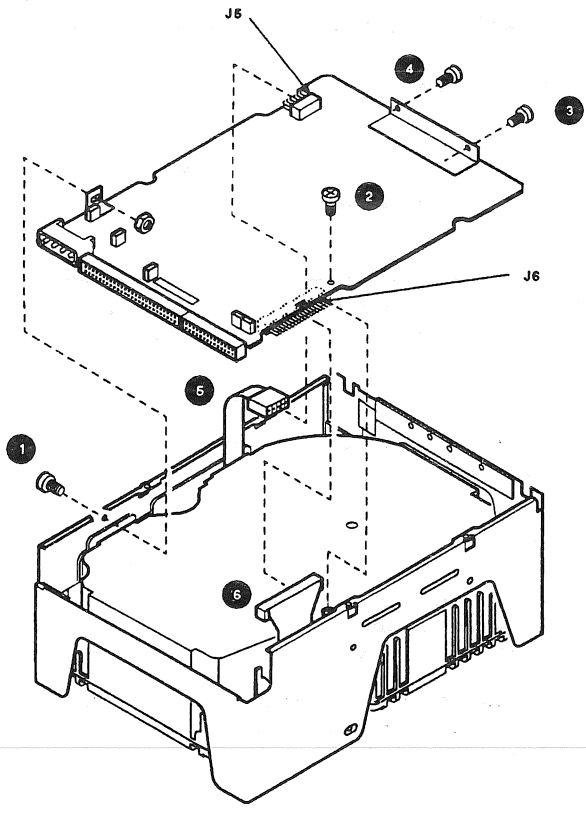
Figure 4–4 RZ56 Bezel Removal



To remove the module, follow the procedure below:

1. Remove the screws labeled 1, 2, 3, and 4.
2. Unplug the spindle motor connector at J5.
3. Lift the drive module up and out of the drive.
4. Unplug the data cable connector at J6.
5. Exchange the bad module with the replacement module, and check the drive module configuration.

Figure 4–5 RZ56, RZ57, and RZ58 Drive Module or HDA Removal



RZ73 Removal and Replacement

CAUTION

Do not handle the ISE unless you are wearing a properly grounded antistatic wrist strap. When working on the ISE, place it on an antistatic pad.

CAUTION

Handle the ISE with care. Excessive shock can cause damage to the HDA.

CAUTION

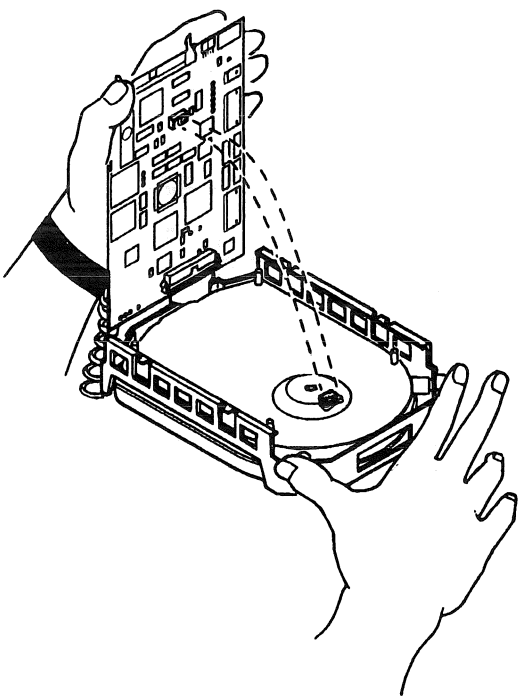
Do NOT lose the screws or use screws other than the ones that come with the device (DEC part number 90-00039-07). Replacement screws must be the same type and size (6/32 x 1/4" flathead) or the HDA may be damaged.

1. Remove the four screws securing the drive module to the HDA.

2. Carefully separate the drive module from the HDA, as shown in Figure 4–6. Be sure to lift the drive module from the end with the DSSI connector, separating the spindle motor from its socket on the drive module. Take care not to stress the flex circuit.

3. Carefully remove the connector attaching the flex circuit to the drive module, as shown in Figure 4–7.

Figure 4–6 Separating the RZ73 HDA from the Drive Module



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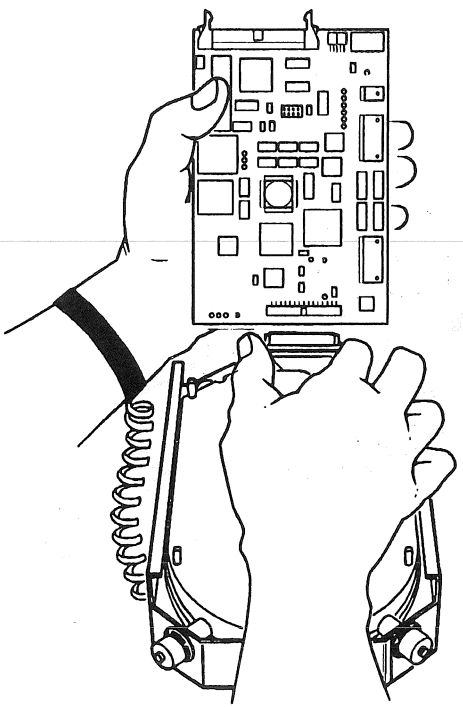
BHR-X0187-90

Figure 4–7 Disconnecting the RZ73 Flex Circuit



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BHR-X0156-90

4. Replace the faulty FRU and reconnect the flex circuit to the connector on the drive module.

5. Swing the drive module into position over the HDA and line up the four screw holes in the module over the corresponding holes in the HDA. Gently apply enough pressure to seat the pins from the spindle motor into the spindlesocket on the drive module.

6. Replace the four screws that secure the drive module to the HDA. These screws MUST be tightened firmly, as the drive module is subjected to vibration when the device is running.

7. Reattach any mounting hardware and reinstall the ISE into the enclosure.

8. Set the SCSI ID jumpers to match that of the replaced drive module or drive.

CAUTION

Make sure the screws are not touching the HDA.

5
Recommended Spare Parts

RZxx Disk Drive Major FRUs

Drive	Part Number
RZ22	RZ22-E
RZ23	RZ23-E
RZ23L	RZ23L-E
RZ24	RZ24-E
RZ25	RZ25-E
RZ55	RZ55-E
RZ56	n/a
RZ57	n/a
RZ58	RZ58-E
RZ73	n/a

ID Jumpers	Part Number
.019 inch	29-28229-01
.025 inch	29-28228-01

Continued on the next page.

RZxx Disk Drive Major FRUs

HDA	Part Number
RZ22	n/a
RZ23	n/a
RZ23L	n/a
RZ24	n/a
RZ25	n/a
RZ55	n/a
RZ56	29-27890-01
RZ57	29-28158-01
RZ58	n/a
RZ73	70-28814-01
Drive Module	**Part Number**
RZ22	29-27240-01
RZ23	29-27240-01
RZ23L	n/a
RZ24	n/a
RZ25	n/a
RZ55	29-27347-01
RZ56	29-27889-01
RZ57	29-28159-01
RZ58	n/a
RZ73	54-19110-01[1] 54-19131-01[2]

[1]Part number accomodates single ended.

[2]Part number accomodates differential.

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