

RZ57 Disk Drive Subsystem Service Manual

Order Number EK-RZ57D-SV-001

**digital equipment corporation
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About This Manual

The RZ57 Disk Drive Service Manual provides information and procedures for servicing the drive.

Structure of This Manual

Chapter 1, About the RZ57 Disk Drive, describes the RZ57 disk drive. This chapter also lists the specifications of the drive and how to replace the drive module and HDA.

Chapter 2, Troubleshooting the RZ57 Disk Drive in a System, describes the troubleshooting procedures to effectively fix a disk drive-related fault. This chapter also provides a troubleshooting flowchart.

Appendix A, Recommended Spares, lists the recommended spares for the RZ57 disk drive.

Intended Audience

This document is intended for Digital Customer Services personnel only.

Associated Documents

Title	Order Number
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 3520/3540 Maintenance Guide	EK-258AA-MG

About the RZ57 Disk Drive

1.1 Introduction

The RZ57 hard disk drive (1.0 Gbytes) is a high-performance, 5.25-inch drive. It has a small computer system interface (SCSI) that conforms to the common command set (CCS). The drive is a random access, rotating memory device. It stores data in fixed-length blocks on 130-mm thin film, rigid media disks. The storage medium in the drive is in a fixed, nonremovable head/disk assembly (HDA).

The RZ57 disk drive is for use in Digital products such as low-end desktop and workstation systems to provide the capability of random access data storage and retrieval. The RZ57 disk drive (Figure 1-1) consists of two field replaceable units (FRUs): the HDA (with frame) and the drive module.

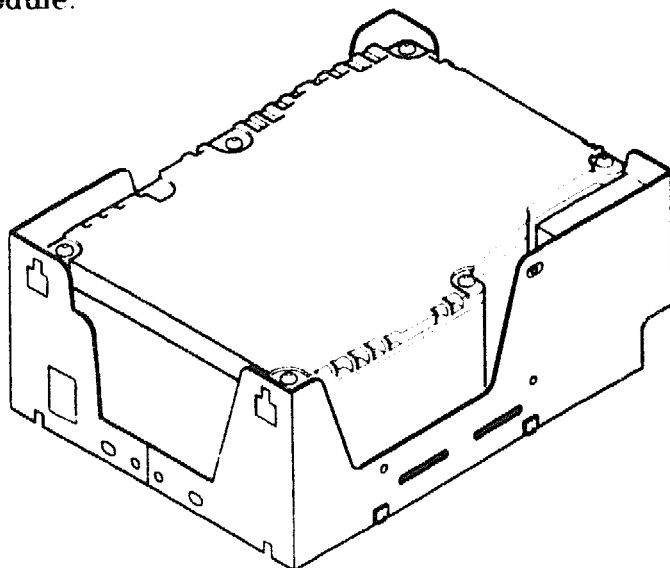


Figure 1-1 RZ57 Disk Drive

1.2 Configuration

The RZ57 disk drive is not internally terminated. The SCSI bus must be terminated. Therefore, termination must be done within the host system itself. Figure 1-2 shows the location of the SCSI ID jumpers.

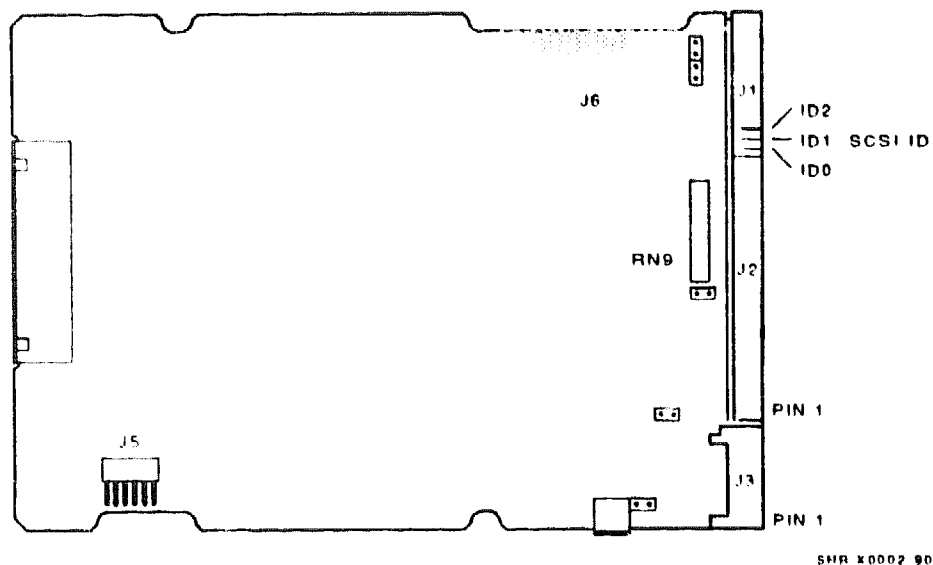


Figure 1-2 RZ57 Drive Module Layout

CAUTION

Make sure the drive is not internally terminated and the SCSI ID is properly set. Refer to Figure 1-2 and Table 1-1. The terminating resistors are just behind the SCSI port connector (J2). If the terminating resistor pack (RN9) is installed on the drive module, remove it with an IC extractor tool or needlenose pliers.

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.

Table 1-1 RZ57 Disk Drive SCSI ID Settings

SCSI Drive ID	Jumper Settings		
	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

1.3 Features

The RZ57 disk drive has the following features:

- Internal air filtration
- 512-byte block
- 256-Kbyte data buffer
- No preventative maintenance
- Factory formatted
- Resident diagnostics for power-on self-test
- Automatic error correction and retries
- High-performance rotary coil actuator with dedicated servo system
- Two-piece FRU: the HDA (with frame) and the drive module

1.4 Specifications

Table 1-2 lists the physical, functional, performance, and environmental specifications of the RZ57 disk drive.

Table 1-2 RZ57 Specifications

Physical Specifications

Height	82.55 cm (3.25 in)
Width	146.05 cm (5.75 in)
Depth	208.28 cm (8.0 in)
Weight	3.8 kg (8.4 lb)

Functional Specifications

Interface	SCSI
Recording density (BPI at ID)	42,441
Flux density (FCI at ID)	31,830
Track density (TPI)	1,690
Tracks per surface (unformatted)	1,928
Tracks per surface (formatted)	1,925
Read/write heads	15
Disks	8
Time to process ECC (512 bytes)	<100 ms

Performance Specifications

Formatted storage capacity

Per drive	1.0 Gbytes
Cylinders	1,925
Surfaces	15 data, 1 servo
Sectors	71
Per surface	136.7 Mbytes
Blocks per track	71

Table 1-2 (Cont.) RZ57 Specifications**Performance Specifications**

Bytes per block	512
Spare blocks per cylinder	11
Spare blocks per drive	96,009
Spare cylinders	71
Transfer rate (to/from media)	20 Mhz
Bus asynchronous	2.0 Mbytes/s
Bus synchronous	4.0 Mbytes/s
Seek time	
Track to track	<4 ms maximum
Average	<14.5 ms maximum
Maximum (full stroke)	35 ms maximum
Average latency	8.3 ms
Rotational speed	3,600 r/min
Start time (maximum)	20 s
Stop time (maximum)	20 s
Interleave	1:1

Table 1-2 (Cont.) RZ57 Specifications

Environmental Specifications**Ambient temperature**

Operating	10°C to 55°C (50°F to 130°F)
Nonoperating	-40°C to 66°C (-40°F to 151°F)

Maximum wet bulb noncondensing

Operating	25.6°C (78°F)
Nonoperating packaged	46°C (115°F)

Relative humidity

Operating	8% to 80%
Nonoperating (packaged)	8% to 95%

Altitude

Operating	-304.8 m to 4,572 m (-1,000 ft to 15,000 ft)
Nonoperating	-304.8 m to 12,192 m (-1,000 ft to 40,000 ft)

Heat dissipation

Operating	28 W (Btu/hr) typical
Random seek mode	32 W (Btu/hr)

1.5 FRU Removal and Replacement

Use the procedures in this section to remove and replace:

- The drive module (Section 1.5.1)
- The drive HDA (Section 1.5.2)

1.5.1 Drive Module

Use the following procedure to remove and replace the drive module.

CAUTION

Use care when handling the drive. Be sure to wear an antistatic wrist strap, and do not touch the exposed face of the drive module.

NOTE

The Digital antistatic kit (part number 29-26246-00) contains materials that you must use whenever you handle static-sensitive components of the system unit.

CAUTION

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.

Once you have taken the drive out of its enclosure, perform the following procedure to remove the drive module (Figure 1–3).

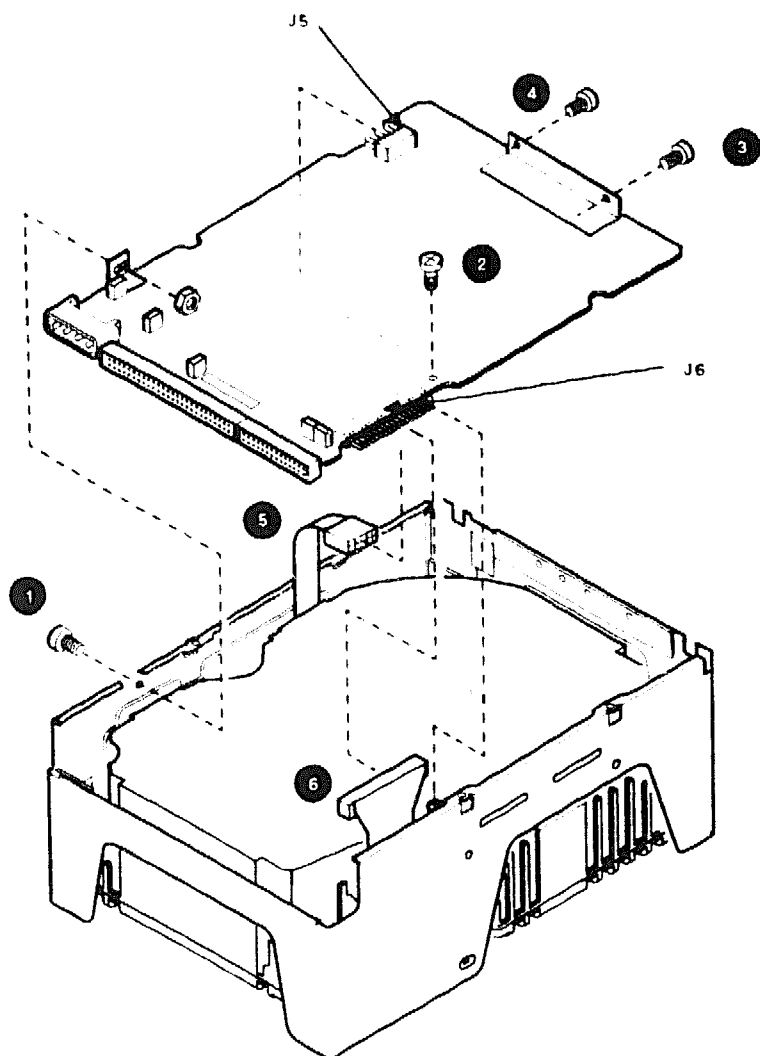
1. Remove the screws labeled 1, 2, 3, and 4.
2. At connector J5, unplug the spindle motor cable labeled 5.

NOTE

When setting the drive back on the work surface, place a support under the drive to protect the loose connectors.

3. Lift the drive module up and out of the drive.
4. At connector J6, unplug the data cable labeled 6.
5. Exchange the bad module with the replacement module.
6. Check the SCSI ID jumpers, and the terminator pack (RN9).

To replace the drive module, reverse this procedure.



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Figure 1-3 RZ57 Drive Module and HDA Removal

NOTE

Use this figure for drive module and HDA removal and replacement.

1.5.2 Drive HDA

NOTE

Do not perform this step unless you have first replaced the drive module. Do not remove the HDA from the frame.

Once you have removed the drive from its enclosure and replaced the drive module, perform the same procedure to remove the HDA. At this time, install the old drive module on the new HDA (with frame).

2

Troubleshooting the RZ57 Disk Drive in a System

2.1 Introduction

This chapter describes the troubleshooting procedures for the RZ57 disk drive. This chapter also provides a flowchart for troubleshooting the disk drive.

NOTE

This chapter is not intended to replace troubleshooting procedures in the system maintenance guides. This chapter should act as a guide for simple troubleshooting when the serviceperson is aware that there is a disk drive fault.

The host system must have a SCSI bus interface for the RZ57 disk drive. The RZ57 disk drive (or drives) can be housed in a BA40 or BA42 expansion box, or in a system enclosure such as a BA213.

Proper termination of the SCSI bus is accomplished in the host system or in the above-mentioned expansion boxes.

2.2 Troubleshooting the Drive in the System

To troubleshoot the RZ57 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. See Section 2.2.1 for a checklist of items to examine for determining whether the drive is faulty.

The RZ57 disk drive depends on the system software diagnostics for troubleshooting. See the system maintenance guide for the types of software diagnostics available on the system, and how to run them.

To troubleshoot the RZ57 disk drive on the SCSI bus, use the following tools:

- Checklist (Section 2.2.1)
- Flowchart (Section 2.2.2)

The following sections briefly describe troubleshooting procedures. See the system maintenance guide for more detailed system-specific information.

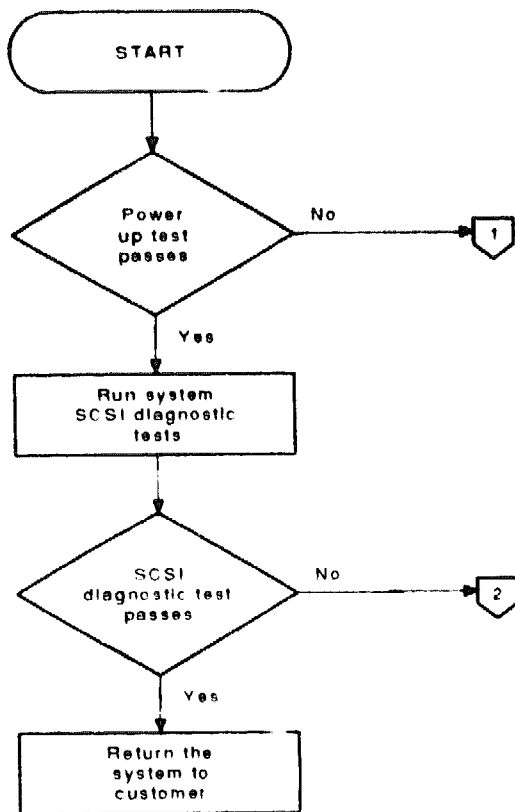
2.2.1 Troubleshooting Checklist

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.
- One of the features of the RZ57 disk drive is that field formatting is not necessary. It is possible, however, that the data has been corrupted by the customer. Check to see whether the disk needs to be erased or replaced.

2.2.2 Troubleshooting Flowchart

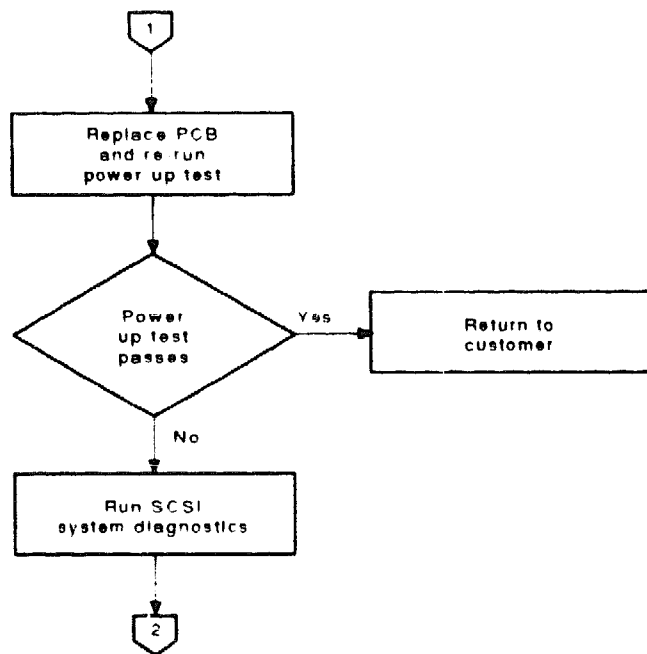
Figure 2-1 shows the logical procedure for troubleshooting an RZ drive in a system.



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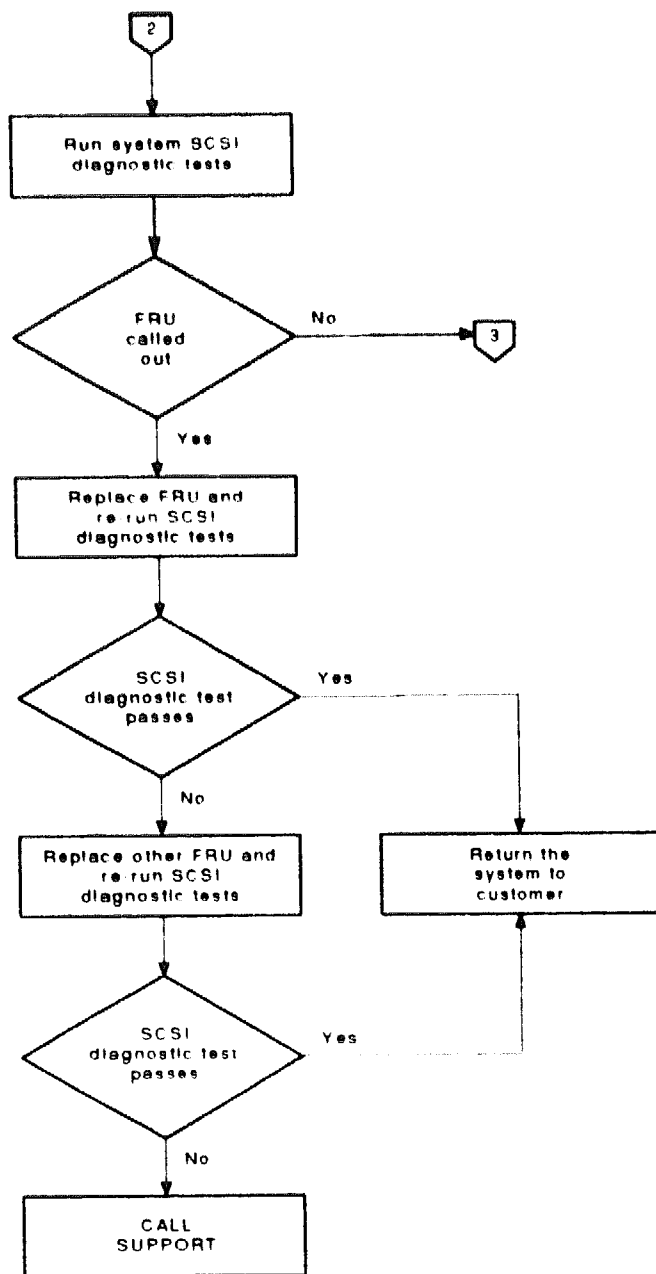
Figure 2-1 (Cont.) RZ57 Troubleshooting Flowchart

2-4 Troubleshooting the RZ57 Disk Drive in a System



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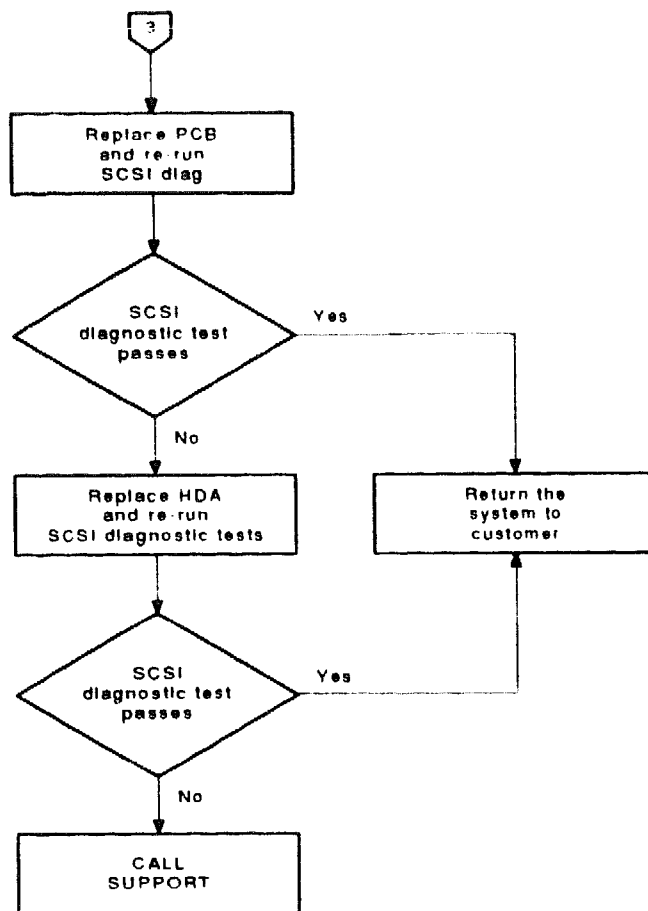
Figure 2-1 (Cont.) RZ57 Troubleshooting Flowchart



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Figure 2-1 (Cont.) RZ57 Troubleshooting Flowchart

2-6 Troubleshooting the RZ57 Disk Drive in a System



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Figure 2-1 RZ57 Troubleshooting Flowchart

APPENDIX A

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A

Recommended Spares

Table A-1 lists the spares and their part numbers for the RZ57 disk drive.

Table A-1 RZ57 Recommended Spares

Part	Part Number
Drive HDA/Frame	29-28158-01
Drive module/chassis PCBA	29-28159-01

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Head/disk assembly, 1-1

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