RF Series Integrated Storage Element

Installation in BA200 Series Enclosures

Order Number: EK-RF72D-IM-006

Contents

3 Controls and Indicators

4 Installation Procedure

5 Completing the Installation

6 Troubleshooting Procedures

Index

Figures

Tables

About This Manual

Introduction

This manual provides information and procedures for installing the RF31/31F/31T, RF35, RF36, RF72, RF73 and RF74 integrated storage elements (ISEs) into the BA213, BA215, and R215F enclosures.

> **Note**
>
> The RF31F ISE is a high-speed, lower capacity version of the RF31 ISE. Unless otherwise specified, references to the RF31 ISE in this manual apply to both the RF31 and the RF31F ISEs.
>
> The RF31T is a lower capacity RF35. Unless otherwise specified, references to the RF35 also apply to the RF31T.

Intended Audience

This document is intended for Digital Services personnel or qualified self-maintenance customers only.

For the Customers

Software Backup

It is the customer's responsibility to perform a software backup prior to the arrival of Digital Services personnel at the site. This step is important to ensure that data is not lost during any installation process.

If you are not qualified to install the ISE, call Digital Services to schedule an installation.

Installation

To install the ISE, follow the instructions and procedures outlined in this manual for your system. If you have any difficulty performing the installation, call Digital Services for assistance.

Documents

To order documents, contact your Digital Equipment Corporation representative.

For Digital Services Personnel

DSSI Storage Adapter

The ISE can be embedded within any MicroVAX system that has a DSSI storage adapter installed. The procedures outlined in this manual can be followed if an adapter and all necessary DSSI cabling are in place. Refer to your system or adapter installation manual for instructions on installing, configuring, and cabling a DSSI subsystem.

Installation

To install the ISE, follow the installation procedures outlined in this manual for the appropriate system. When you have completed the installation, submit a LARS form. For information on completing this form, contact your unit manager.

Documents

To order documents, contact your Digital Equipment Corporation representative.

1

General Information

RF Series Integrated Storage Elements

Introduction

This chapter describes the RF31, RF31F, RF31T, RF35, RF36, RF72, RF73, and RF74 integrated storage elements (ISEs) and the BA200 enclosure.

ISE Overview

The RF31 ISE[1] is a half-height, 5 ¼-inch, fixed-disk mass storage device. The RF35/RF36/RF31T ISE[2] is a 3 ½-inch, fixed-disk mass storage device. The RF72/RF73/RF74 ISE is a full-height, 5 ¼-inch, fixed-disk mass storage device.

The RF31, RF31F, RF31T, RF35, RF36, RF72, RF73, and RF74 integrated storage elements are part of a family of storage devices based on the Digital Storage Architecture (DSA) using the DSSI bus and interface. The term **integrated storage element**, or ISE, applies to any DSSI storage device.

---

[1]   A high-speed, lower-capacity version of the RF31 ISE is also available: the RF31F ISE. Unless otherwise specified, references to the RF31 ISE in this manual apply to the RF31 and the RF31F ISEs.

[2]   The RF31T is a lower-capacity version of the RF35 ISE. Unless otherwise specified, references to the RF35 ISE apply to the RF31T.

An ISE contains the following:

- On-board DSSI bus controller
- MSCP server
- Drive
- Control electronics

DSSI Interface   The DSSI interface supports up to seven ISEs through a single cable to an adapter in the host. DSSI adapters can be adapters embedded within a CPU module (for example, the KA640 module) or they can be separate modules, such as the KFQSA adapter.

RF31, RF31F, RF31T, RF35, RF36 ISE   Figures 1–1 and 1–2 show the RF31/RF31F and RF31T/RF35 /RF36 integrated storage elements (ISEs):

Figure 1–1   RF31/RF31F Integrated Storage Element
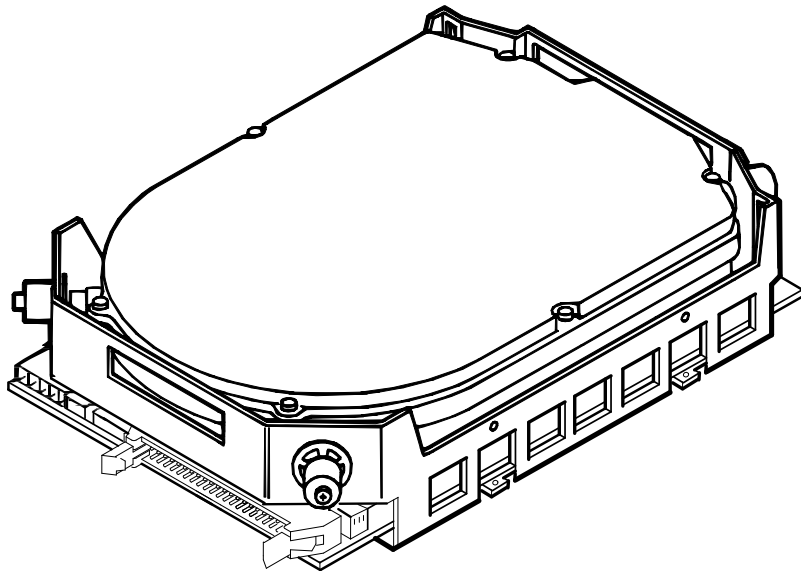
SHR_X1075_89_SCN

Figure 1–2 RF35/RF36/RF31T Integrated Storage Element
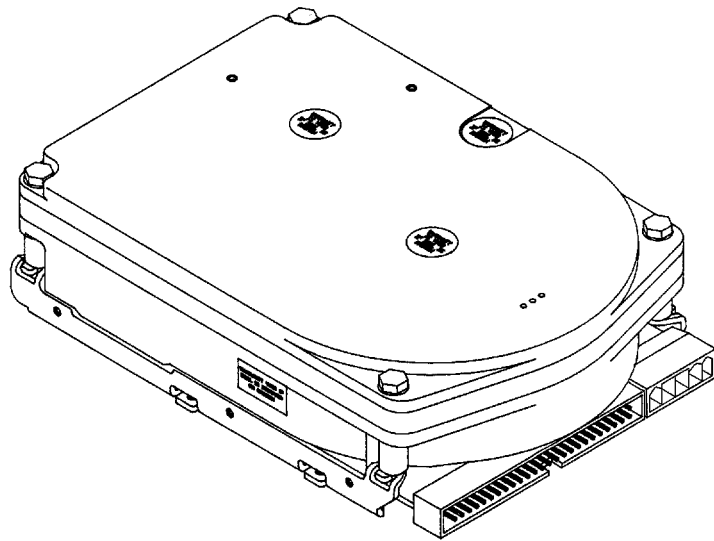
RF72, RF73, RF74 ISE

Figure 1–3 is an illustration of the RF72/RF73/RF74 integrated storage element:

Figure 1–3 RF72/RF73/RF74 Integrated Storage Element
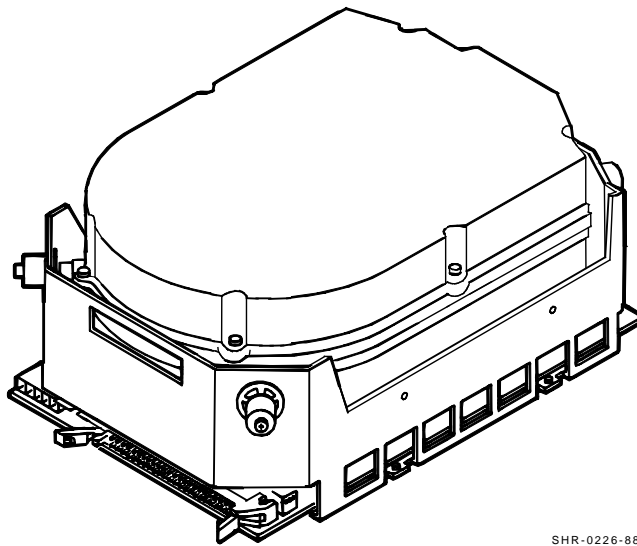
SHR-0226-88
SHR_X1074_89_SCN

Enclosures

Overview

The remainder of the manual covers the installation of the ISE into the BA213, BA215, and R215F enclosures.

Mounting Mass Storage Devices

Mass storage devices are mounted sideways on shock-mounting hardware, with a sliding track attached to each side of the mass storage device. One shock-resistant support attaches to the top of the mass storage area, and the other support attaches to the bottom of the mass storage area. The supports are attached by two screws enclosed in rubber shock bushings. The shock-mounting hardware varies for each ISE model.

_____ **Note** _____

Read the screw length warning labels on the ISE.

_____

BA213
Enclosure

The BA213 enclosure (Figure 1–4) has a mass storage bay above the card cage that contains a TK70 or TK50 tape drive and up to three DSSI ISEs.

Figure 1–4   BA213 Enclosure
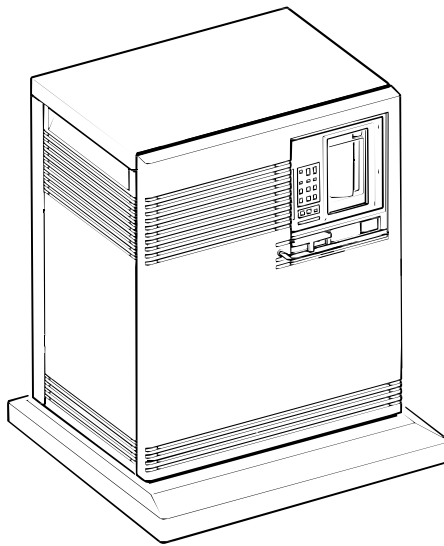
SHR-0215-88
SHR-X0060-90-SCN

**BA215
Enclosure**

The BA215 enclosure (Figure 1–5) has a mass storage bay that extends across the top of the enclosure. It contains a TK70 or TK50 tape drive, and one full-height, or two half-height, or two 3 ½-inch ISEs.

Figure 1–5   BA215 Enclosure
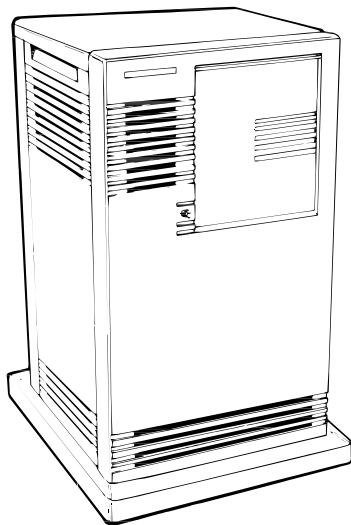
MLO-001812
SHR-X0065-90-CPG

R215F Enclosure

The R215F enclosure is a BA215 enclosure with the card cage removed, and an additional mass storage bay in its place. It has three mass storage bays:

- Two bays in the top of the cabinet

- One bay in the middle of the cabinet

Each mass storage bay can hold one ISE. Figure 1–6 is a typical configuration that includes an R215F enclosure and a MicroVAX 3400 in a BA213 enclosure.

Figure 1–6   R215F Configuration (Example)

R215F

DSSI CABLE
FROM HOST

MicroVAX 3400
(HOST)

MLO-001814
SHR-X0066-90-CPG
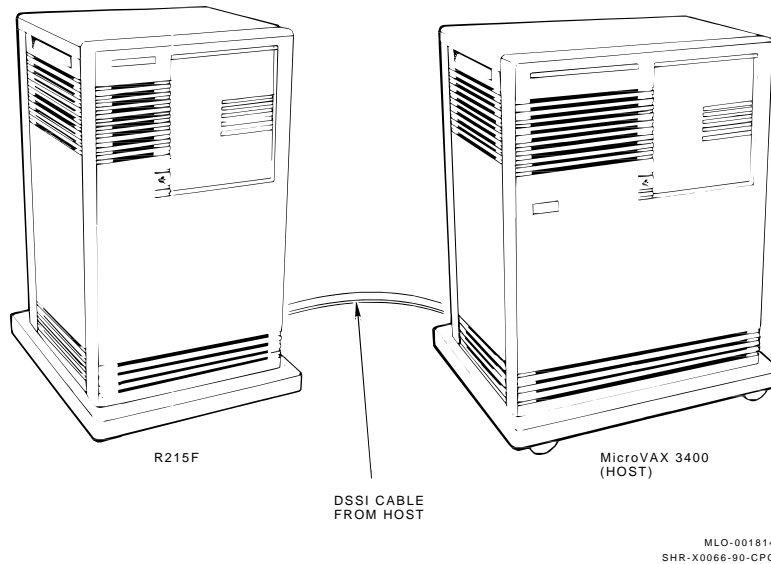
2

Unpacking Information

Unpacking and Inspecting

In this Chapter   This chapter covers unpacking and inspecting the ISE.

Checking for Damage   Unpacking the ISE consists of removing it from the shipping container and inspecting it for damage. Report any damage to the shipper, and notify your Digital Equipment Corporation representative.

Unpacking Instructions

1. Before opening any container, check for external damage such as dents, holes, or crushed corners.

2. Open and unpack the shipping container. Remove the ISE from the conductive plastic bag.

_____ **Caution** _____

When handling the ISE, observe all precautions to be sure that you do not damage the device by accidental electrostatic discharge. Handle the ISE with care. Excessive shock can cause damage to the ISE.

_____

_____ **Note** _____

Shipping containers and packing materials should be retained for future use.

_____

RF31E-SF,
RF31F-SF
Option Kits

Figure 2–1 shows the parts included in the RF31E-SF option kit. The parts can be checked against the parts list found in Table 2–1.

RF31T-SF,
RF35E-SF,
RF36E-SF
Option Kits

The RF31T-SF, RF35E-SF, and RF36E-SF (Figure 2–2) option kit contains the same parts except for:

- Adapter bracket
- Screws for above
- OCP cable

The parts can be checked against the parts list found in Table 2–2.

Figure 2–1 RF31E-SF Option Kit

SLIDE RAILS
(74-36498-01)

RF31 ISE OR RF31F ISE
(RF31-EA)   (RF31F-EA)

SCREWS
(90-00039-28)

LOWER
SHOCK
MOUNT
(70-25452-01)

UPPER
SHOCK
MOUNT
(70-25452-02)

RF SERIES ISE
USER GUIDE
(EK-RF72D-UG)

EK-RF31D-UG

RF SERIES ISE
USER GUIDE

-RF31D-IM

ERIES ISE
ALLATION
MANUAL

DSSI OCP CABLE
(17-01936-01)

DSSI NODE ID PLUGS (11)
(12-28766-19)

RF SERIES ISE
INSTALLATION MANUAL
(EK-RF72D-IM)

SHR-0238-88
SHR-X0067A-93-CPG

Figure 2–2   RF35E-SF/RF36E-SF Option Kit

SLIDE RAILS
(74-36498-01)

RF31T ISE OR RF35 ISE OR RF36 ISE
(RF31T-EA)   (RF35-EA)   (RF36-EA)

LOWER
SHOCK
MOUNT
(70-25452-01)

UPPER
SHOCK
MOUNT
(70-25452-02)

DSSI OCP CABLE
(17-03413-01)

FLAT HEAD SCREWS
(90-00039-07)

RF SERIES ISE
USER GUIDE
(EK-RF72D-UG)

PAN HEAD SCREWS
(90-09701-00)

EK-RF72D-UG

RF SERIES ISE
USER GUIDE

-RF72D-IM

ERIES ISE
ALLATION
MANUAL

RF SERIES ISE
INSTALLATION MANUAL
(EK-RF72D-IM)

DSSI NODE ID PLUGS (11)
(12-28766-19)

ADAPTER PLATE
(74-44531-01)

SHR-X0067S-93-CPG

**RF72E-SF,
RF73E-SF,
RF74E-SF
Option Kits**

Figure 2–3 shows the parts included in the RF72E-SF, RF73E-SF, and RF74E-SF option kit. The parts can be checked against the parts list found in Table 2–1.

Figure 2–3   RF72E-SF, RF73E-SF, and RF74E-SF Option Kit

SLIDE RAILS
(74-36498-01)

RF72 ISE
(RF72-EA)

SCREWS
(90-00039-28)

LOWER
SHOCK
MOUNT
(70-25452-03)

UPPER
SHOCK
MOUNT
(70-25452-04)

RF SERIES ISE
USER GUIDE
(EK-RF72D-UG)

EK-RF31D-UG

RF SERIES ISE
USER GUIDE

-RF31D-IM

ERIES ISE
ALLATION
MANUAL

DSSI OCP CABLE
(17-01936-01)

RF SERIES ISE
INSTALLATION MANUAL
(EK-RF72D-IM)

DSSI NODE ID PLUGS (11)
(12-28766-19)
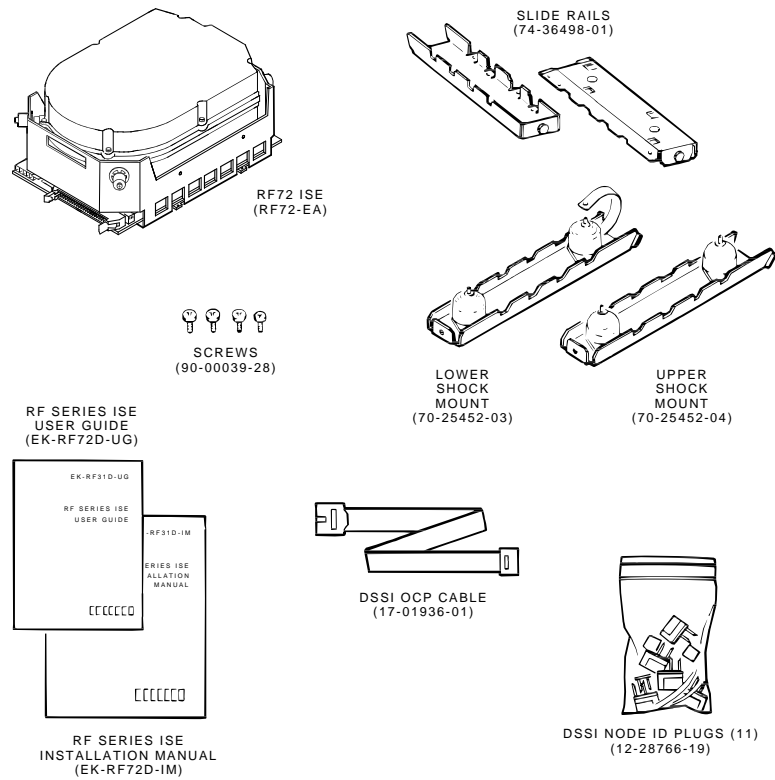
SHR-X0169-93

Inspection

1. Inspect the ISE for physical damage.

2. Check the contents against the bill of materials. Table 2–1 lists the parts supplied with the RF31E-SF, RF72E-SF, RF73E-SF, and RF74E-SF (field installed) option kits. Table 2–2 lists the parts supplied with the RF31T-SF, RF35E-SF, and RF36E-SF (field installed) option kits.

Table 2–1 Parts List for the RF31E-SF and RF72/73/74E-SF Option Kits

Part Numbers			
	RF72E-SF RF73E-SF		
RF31E-SF	RF74E-SF	Quantity	Description
RF31-EA[1]	RF7x-EA	1	ISE without skid plate
70-25452-02	70-25452-04	1	Upper shock mount
70-25452-01	70-25452-03	1	Lower shock mount
	74-36498-01	2	Slide rails
	90-00039-28	4	Slide rail mounting screws
	17-01936-01	1	DSSI OCP cable (10-conductor)
	12-28766-19	10	DSSI node ID plugs
	EK-RF72D-IM	1	Installation Manual
	EK-RF72D-UG	1	User Guide

[1]RF31F-EA for the RF31F ISE

Table 2–2 Parts List for the RF35E-SF/RF36E-SF/RF31T-SF Option Kits

RF35E-SF	Part Numbers RF36E-SF	RF31T-SF	Quantity	Description
RF35-EA	–	–	1	ISE without skid plate
–	RF36-EA	–	1	ISE without skid plate
–	–	RF31T-EA	1	ISE without skid plate
	70-25452-02		1	Upper shock mount
	70-25452-01		1	Lower shock mount
	74-44531-01		1	3.5-inch plate adapter
	74-36498-01		2	Slide rails
	90-00039-07		4	Slide rail mounting screws
	90-09701-00		4	Adapter plate mounting screws
	17-03413-01		1	OCP cable (10-conductor)
	12-28766-19		11	DSSI node ID plugs
	EK-RF72D-IM		1	Installation Manual
	EK-RF72D-UG		1	User Guide

3

Controls and Indicators

ISE Controls and Indicators

In this Chapter   This chapter describes:

- Controls and indicators associated with the operation of the ISE
- Assigning the DSSI Node ID

These controls and indicators are located in two places:

1. On the ISE drive module
2. On the system enclosure operator control panel (OCP)

Controls and Indicators on the Drive Module

Switches and LEDs

The RF31/31F RF72, RF73, RF74 ISEs have two LEDs and a DIP switchpack, containing three switches, mounted on the edge of the drive module.

The RF35, RF36, and RF31T ISEs have two LEDs and an options connector mounted on the edge of the drive module. Jumpers are inserted into this connector. This connector is located at the opposite end of the DSSI connector.

The switches on the RF31/31F/72/73/74 and option connector on the RF35/36/31T provide a means of setting the DSSI node ID if an OCP is not connected to the drive, or if the OCP fails.

Figure 3–1 shows the location of the switches and LEDs on the RF31/31F/72/73/74 drive module. Figure 3–2 shows the location of the connectors and jumpers on the RF35/36/31T drive module.

DSSI Node ID Switches

Each device on the DSSI bus must be assigned a unique DSSI node ID during installation. This is done by setting the 3-position DIP switch (Table 3–1) or the jumpers (Table 3–2) to the binary equivalent of the desired ID number.

_____ **Note** _____

The DIP switches are ignored when the ISE is connected to an operator control panel (OCP).

_____

**Figure 3–1 RF31/72/73/74 Drive Module Switch and LED
Locations**

RF31

RDY

FLT

FAULT
LED

READY
LED

DSSI
NODE ID
SWITCHES

1 2 3
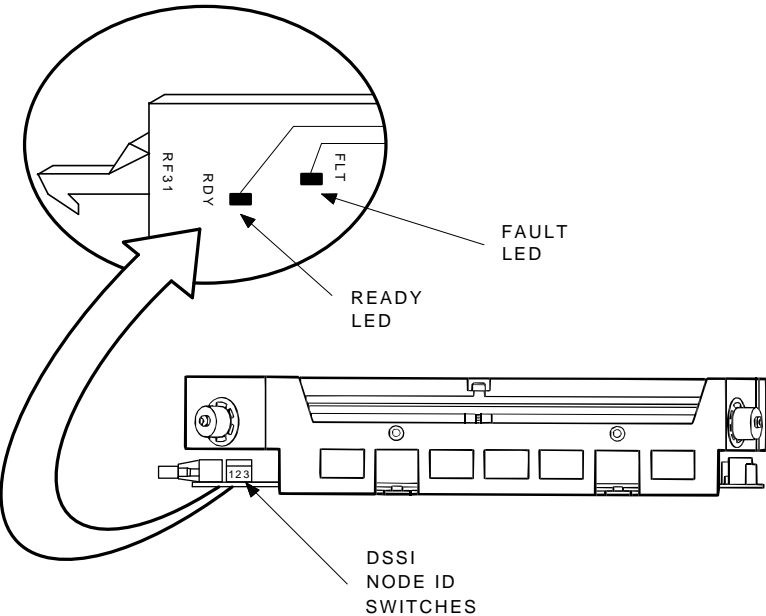
MA-X0967-88

SHR_X1065_89

Figure 3–2 RF35/36/31T Drive Module Option Connector and LED Locations

FRONT VIEW OF A RF35/36 DISK DRIVE

Remote Panel

2   20

Fault LED

Ready LED

1   19

0 1 2

DSSI ID

REAR VIEW OF A RF35/RF36 DISK DRIVE

50

2

1

DSSI Interface Connector   Power

49   1   5
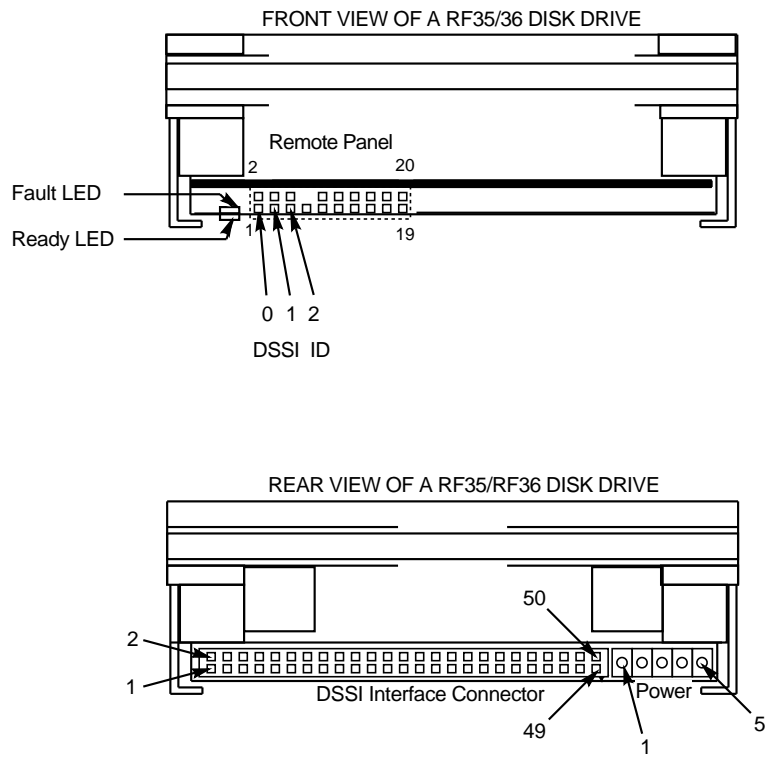
RF3x_front_back–rags

Table 3–1 RF31/31F, RF72, RF73, and RF74 DSSI Node ID Selection

DSSI Node ID Address	Switch Positions[1]		
	1	2	3
0	Down	Down	Down
1	Down	Down	Up
2	Down	Up	Down
3	Down	Up	Up
4	Up	Down	Down
5	Up	Down	Up
6	Up	Up	Down
7[2]	Up	Up	Up

[1]Up is toward the HDA, down is toward the module.

[2]DSSI address 7 is normally assigned to a host adapter.

Table 3–2 RF35/36/31T DSSI IDs

DSSI Node ID Address	Jumper[1]		
	ID2	ID1	ID0
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[2]	In	In	In

[1]In = inserted, Out = removed

[2]DSSI address 7 is normally assigned to a host adapter.

READY LED	The READY LED is green. When the ISE is powered up, this LED is lit. After successful completion of the power-on self-test (POST), the LED turns off until the ISE is read/write ready.

The READY LED turns off during a seek until the drive heads are on cylinder and read/write ready. Then the LED is lit again for as long as the heads remain on track. Therefore, during read or write operations, the READY LED flashes on and off rapidly.

FAULT LED	The FAULT LED is red for RF31/31F and yellow for RF35, RF36, RF31T, RF72, RF73, and RF74. It is lit when a read/write error or serious physical error condition is detected. Initially, when the ISE is powered up, this LED is lit. Upon the successful completion of POST, this LED turns off.

Controls and Indicators on the OCP

OCP When the ISE is installed in a BA213, BA215, or R215F enclosure, the operator interface is a control panel on the enclosure. Figure 3–3 shows the BA200 series OCP for DSSI devices. Its functions are described in Table 3–3. Each RF series ISE is connected to the OCP through a 10-conductor ribbon cable.

Determining the DSSI Address The OCP has three columns of controls and indicators. The standard convention is to use the right column for ISE 0, the center column for ISE 1, and the left column for ISE 2. Note, however, that the DSSI node ID address is determined by the DSSI node ID plug rather than its position on the OCP. The address that will be assigned to the ISE is labeled on the plug.

_____ **Note** _____

The DSSI address assigned by the plug is read only during the power-up sequence. If you change plugs without reinitializing the ISE by a power-up or reset, the new DSSI address is not recognized.

_____ **Caution** _____

Do not install two plugs with the same number on the OCP.

BA200 Series OCP

The following shows the BA200 series OCP for DSSI ISEs:

Figure 3–3   BA200 Series Operator Control Panel for DSSI ISEs
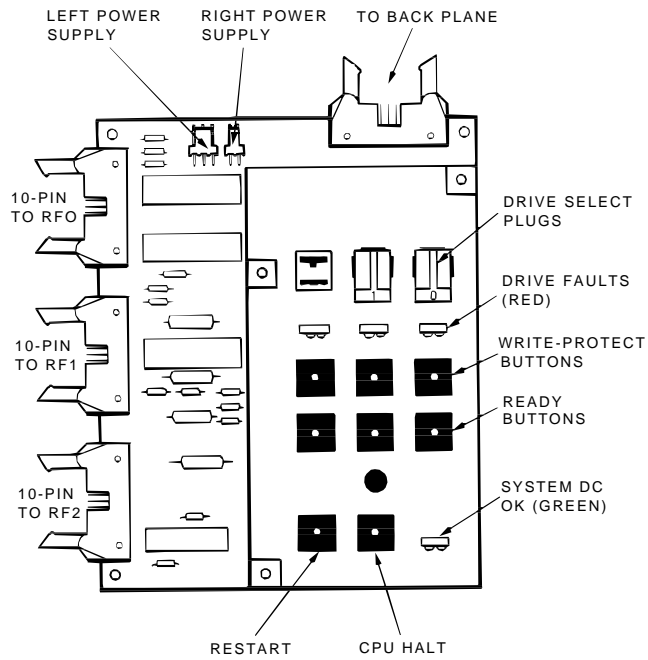
OCP Indicators and Switches

The following table describes the function of OCP indicators and switches:

Table 3–3 Description of OCP Indicators and Switches

Control/Indicator	Setting	Function
System DC OK	On	DC power is within regulation.
	Off	DC power not present or not within regulation.
DSSI node ID plug	Installed	Sets DSSI node ID to the number specified on the plug (normal operating position). Plug *must* be installed if ISE is connected to the OCP.
	Removed	DSSI address undefined. If ISE is present, FAULT LED flashes rapidly.
FAULT LED	On	Fault condition is present.
	Off	No fault (normal operating condition).
	Flashing (5 Hz)	Module-to-HDA calibrations are being performed.
	Flashing (10 Hz)	OCP failure or DSSI node ID plug missing.
Write-Protect	Out LED off	The system can read and write to the disk (normal operating position).
	In LED on	The system cannot write to the disk. The system can still read from the disk.
Ready	Out LED on	ISE is on line (normal operating position). The system can read from and write to the disk.
	In LED off	ISE is off line. The system cannot read from or write to the disk.
CPU Halt	In LED on	The CPU is in console I/O mode. The console emulation program is running.
	Out LED off	The CPU can run system software (normal operating position).
Restart	Pressed	Reinitializes system state. Work in progress is lost.

Assigning the DSSI Node ID

Spare Plugs

Spare DSSI node ID plugs are supplied with your system. Use these spare plugs to renumber your DSSI system if you need to reconfigure due to adding or removing ISEs, or if you create a multihost configuration.

Removal

The DSSI node ID plugs have prongs on the back that indicate the bus node number (and by default, the unit number) of the ISE. To remove a DSSI node ID plug, grasp it firmly and pull it straight out.

Insertion

To insert a new plug, align the two center prongs with the two center slots and press the plug into the slots.

Rules When Assigning IDs

Use the following rules when assigning DSSI node IDs:

- For each DSSI bus, each ISE on the bus must have a unique DSSI node ID.

- By convention, ISEs are numbered in increasing order from right to left, and from top to bottom.

- Use a blank DSSI node ID plug where no ISE is present.

_____ **Note** _____

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

4

Installation Procedure

Installing the ISE

In this Chapter   This chapter describes how to install the ISE into the following
enclosures:

- BA213
- BA215
- R215F

_____ **Note** _____

Only qualified service personnel should perform this
installation procedure. Before beginning the installation,
make sure that the system manager has backed up all
files. Have the system manager perform a shutdown of
the operating system before turning power off.

_____

Installation Procedure, BA213 Enclosure

BA213 Enclosure

The BA213 enclosure can contain up to three ISEs and a tape storage device. Figure 4–1 shows a standard DSSI configuration in a BA213 enclosure.

To install an ISE in a BA213 enclosure, use the following procedure. This procedure is written on the assumption that either a KA640 module or a KFQSA adapter module is already installed in the system, and that DSSI cabling is in place. Refer to your system or adapter documentation for instructions on installing these devices.

Figure 4–1 BA213 Enclosure with DSSI ISEs
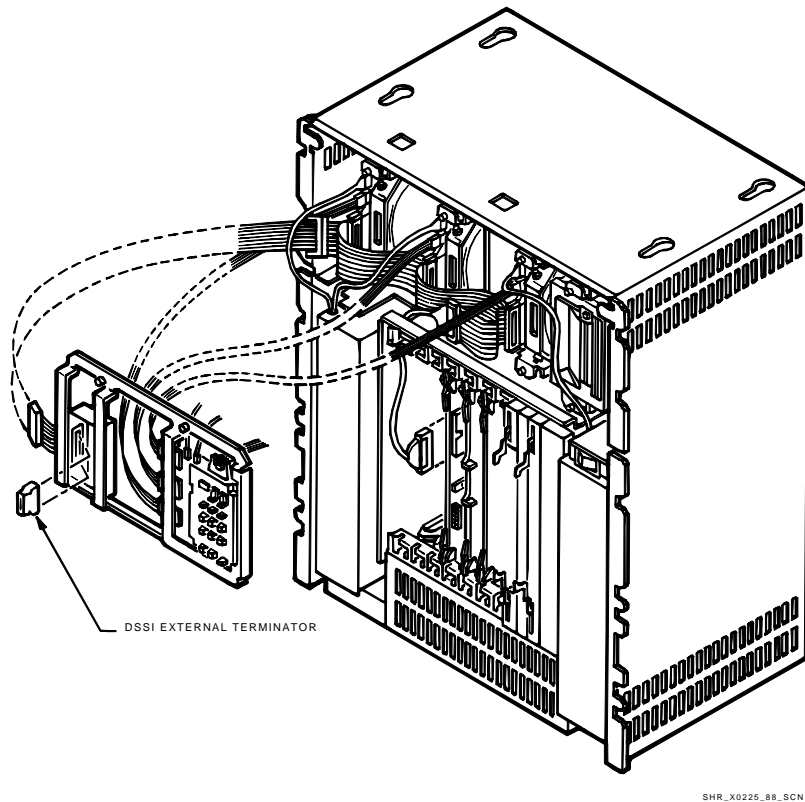
DSSI EXTERNAL TERMINATOR

SHR_X0225_88_SCN

Removing the Front Panel

The front panel has a 3-position lock that limits access to system controls. The controls are located behind a smoked plastic window.

Remove the front panel as follows:

1. Insert the key into the lock on the front panel. Turn the key to the bottom position (fully clockwise).

2. Slide the window all the way down.

3. Turn the power switch ⌐I O⌐ off (to the right) and unplug the ac power cord from the wall outlet.

4. Pull the release latch outward, lift the front panel, and remove it from the system (Figure 4–2).

_____ **Caution** _____

Do not use a screwdriver or other tool to pry open the release latch. This may damage the latch.

Figure 4–2   BA213 Front Cover Removal

IMPORTANT:
PULL LATCH OUT
BEFORE LIFTING DOOR
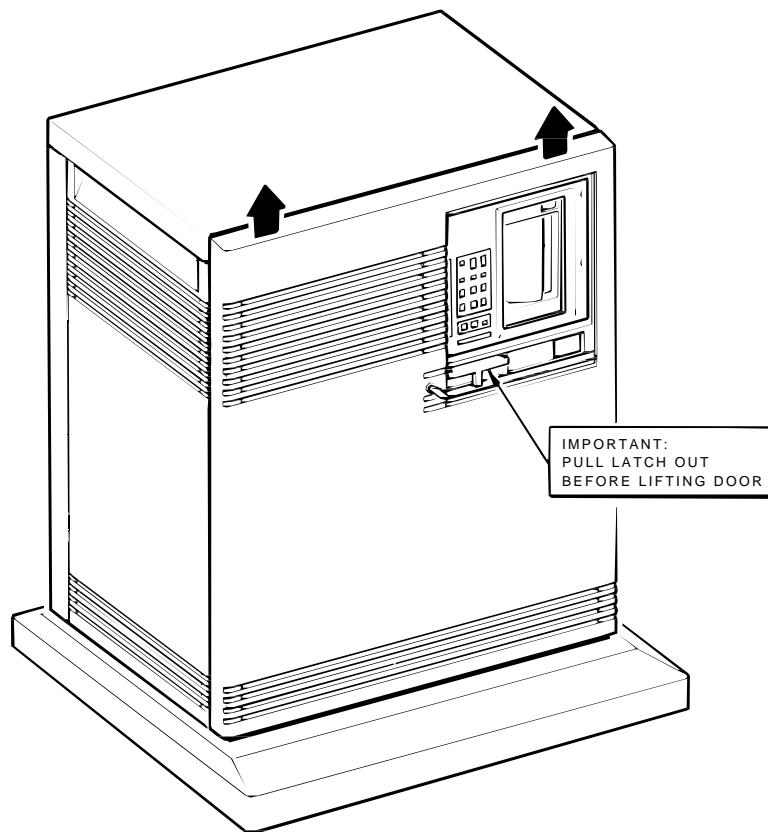
MA-X0964-88
SHR-X0061-90-SCN

Accessing the Mass Storage Bays

Use the following procedure to access the mass storage bays:

1. Remove the DSSI external terminator or DSSI cable.

2. Remove the media face plate from the front of the mass storage bays by releasing the five captive screws. Remove the faceplate from the enclosure (Figure 4–3).

3. To remove the operator control panel assembly on the BA213, follow these steps:

    a. Release the two captive screws that hold the panel to the enclosure, tilt the panel forward, and label and unplug all cables connected to the OCP.

    _____ **Caution** _____

    To prevent cable damage, do not allow the panel to drop free and hang suspended by its attached cables.

    _____

    b. The internal DSSI ribbon cable is connected to the external DSSI port by means of a black plastic stud. This stud is located behind the external DSSI port on the upper left of the panel (Figure 4–3). Pull out on the stud to release it, and disconnect the internal DSSI ribbon cable.

    c. Lift out the panel, and set it aside.

Figure 4–3 Removing the Media Face Plate and OCP

EXTERNAL
DSSI PORT
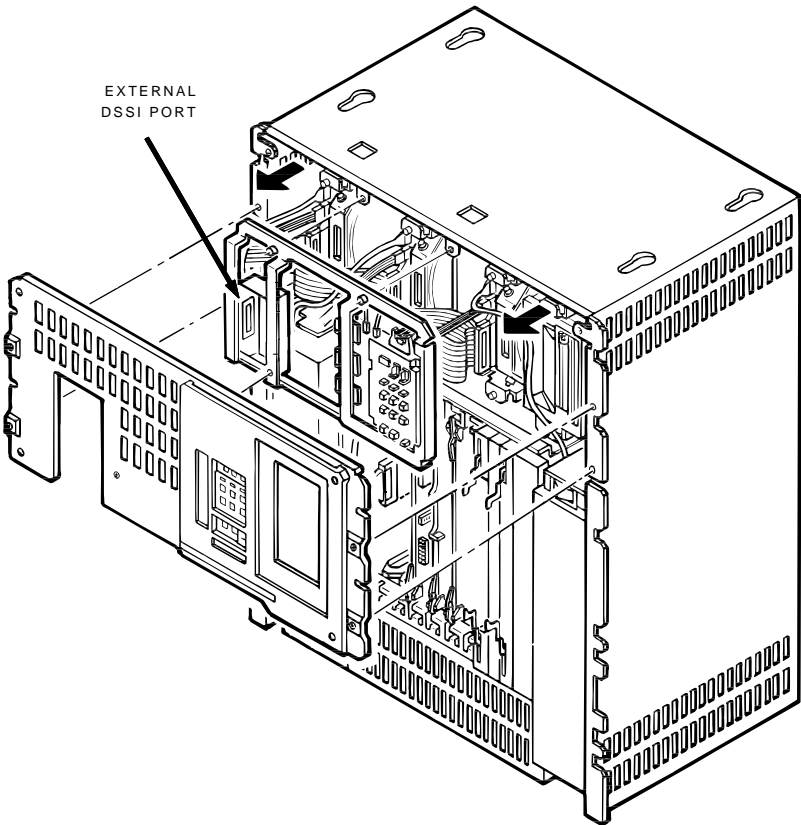
MA-X0963-88
SHR-X0062-93-SCN

Installing Shock Mounts

Install the upper and lower shock mounts in the mass storage bay using the following procedure:

—————————————— **Caution** ——————————————

Make sure you install the shock mounts shipped with the option kit. Check the part number against Table 2–1 and Table 2–2. Installing the wrong shock mounts may result in damage to the ISE.

——

1. The shipping brackets inside the mass storage bay(s) should have been released during installation of the unit. If they were not released, make sure the four orange, plain-slotted screws are loosened to release the shipping brackets. Retighten the screws against the frame after the brackets are released.

—————————————— **Caution** ——————————————

Failure to release the shipping brackets before use may result in damage to the ISEs.

——

2. Using a short Phillips screwdriver, attach the upper shock mount assembly to the screw holes in the top of the appropriate mass storage bay. Make sure the open end of the shock mount is facing the rear of the mass storage bay.

3. Holding the lower shock mount assembly, place the hole on the metal ground strip (located on the rear of the assembly) over the exposed threads of the rear screw (Figure 4–4).

4. Using a short Phillips screwdriver, attach the lower shock mount assembly to the two screw holes in the bottom of the appropriate mass storage bay. Make sure the open end of the shock mount is facing the rear of the mass storage bay.

Figure 4–4 Attaching the Metal Ground Strip

GROUND STRIP

LOWER SHOCK MOUNT ASSEMBLY
(UNDERNEATH VIEW)

BACK

FRONT
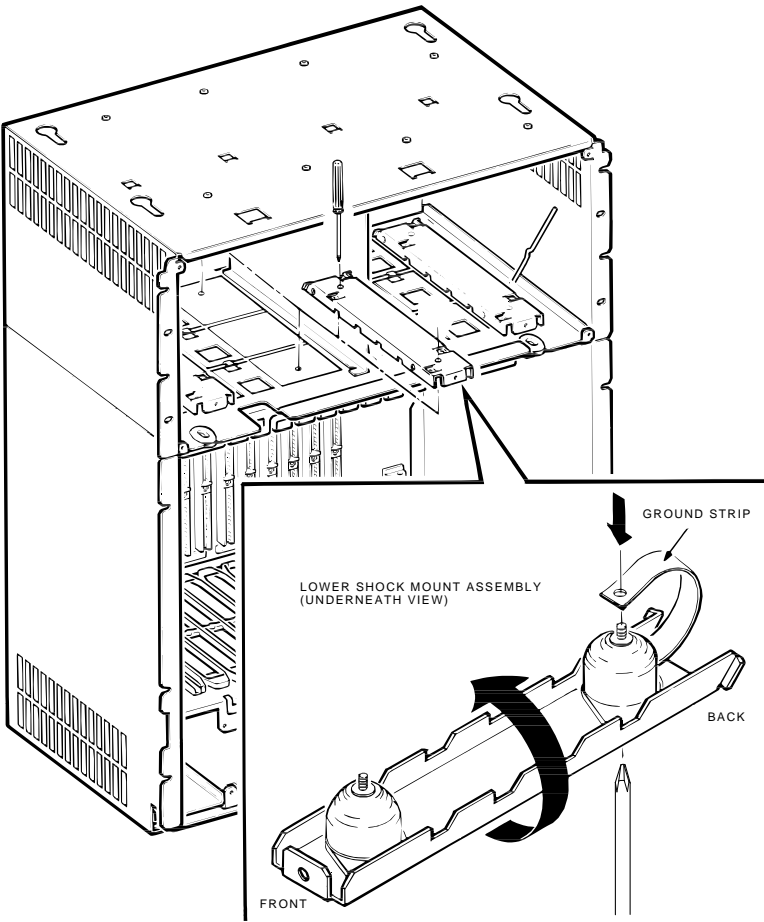
MA-0585-87
SHR-X0063-90-CPG

Installing the ISE

The RF35/RF36/RF31T ISE must be fitted with an adapter plate (PN 74-44531-01) before it can be installed in a BA200 series enclosure. To install this adapter plate:

1. Orient the drive (1A) (Figure 4–5). Then connect the 20-pin end of the front panel cable (2) (PN 17-03413-01) into the 20-pin socket on the drive module.

2. With the front panel cable between the drive HDA and the inside of the adapter plate (3), slide the drive in the adpater plate as shown. Secure with the four panhead screws (4) (PN 90-09701-00). Be sure not to twist or bend the front panel cable.

3. Attach the top and bottom slide rails (5) to the adapter plate with the four flathead screws (6) (PN 90-00039-07).

4. Now orient the drive so that the power connector (1B), while facing you, is at the top. Also be sure that the drive module is facing right. This is the opposite of the way that 5 ¼-inch drives are installed in the enclosure.

Use the following procedure to install the ISE:

1. If you are installing an RF35, RF36, or RF31T, go to step 2. In all other cases, install the slide rails using the four screws provided (Figure 4–6).

Figure 4–5 RF35/RF36/RF31T, Installing the Adapter Plate
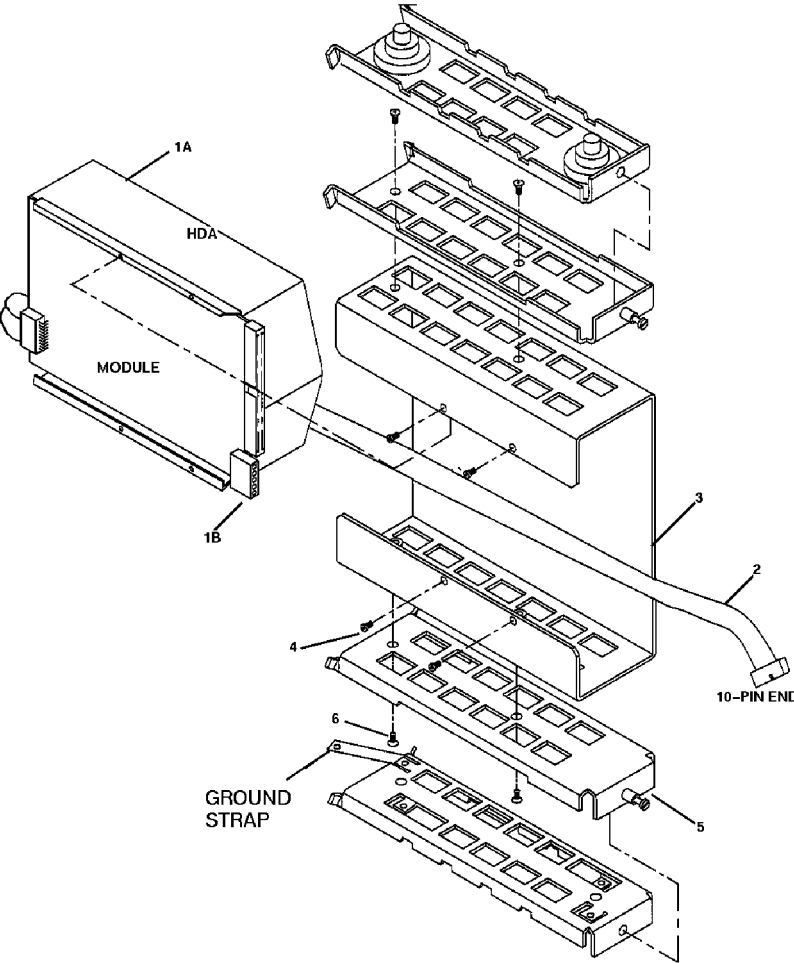
Figure 4–6   RF31, Installing the Slide Rails
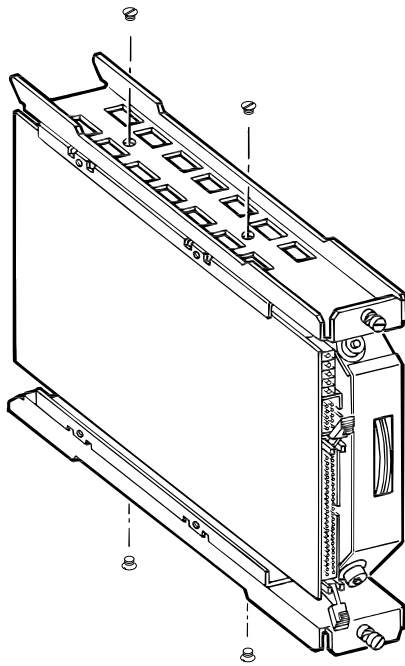
SHR-0167-88
SHR-X0068-90-CPG

2. Slide the ISE into the mass storage bay (drive module to the left; drive module to the right for the RF35, RF36, or RF31T) and tighten the slide rail screws.

   For the following steps, refer to Figure 4–7 and Figure 4–8.

3. Connect the power cable from the power supply to the power connector on the ISE.

4. Connect the DSSI cable to the DSSI connector on the ISE.

5. Use the 10-conductor cable provided to connect the ISE to the operator control panel (OCP).

6. Recheck all cable connections to the ISE. Make sure all connectors are seated correctly and that there is an appropriate amount of slack in the DSSI cable to allow for vibration of the ISE.

7. Reattach all control panel cables to the operator control panel. Reconnect the 50-pin DSSI cable to the external DSSI port, and then replace the operator control panel and the media face plate.

8. Replace the external DSSI cable or terminator.

9. Replace the front panel on the enclosure, and then plug in the power cord.

10. Insert the correct DSSI node ID plug on the OCP. Make sure each ISE is assigned a unique DSSI node ID.

Installation Procedure, BA215 Enclosure

BA215 Enclosure

The BA215 enclosure holds one or two ISEs, and a TK70 tape drive or TK50 tape drive.

Removing the Front Panel

The front panel has a 3-position lock that limits access to system controls. The controls are located behind a smoked plastic window.

Remove the front panel as follows:

1. Insert the key into the lock on the front panel. Turn the key to the bottom position (fully clockwise).

2. Slide the window all the way down.

3. Turn the power switch ⎅ off (to the right), and unplug the ac power cord from the wall outlet.

4. Pull the release latch outward, lift the front panel, and remove it from the system.

_____ **Caution** _____

Do not use a screwdriver or other tool to pry open the release latch. This may damage the latch.

_____

Accessing the Top Mass Storage Bays

Use the following procedure to access the top mass storage bays:

––––––––––––––––– **Caution** –––––––––––––––––

Static electricity can damage integrated circuits. Use an antistatic wrist strap and pad when performing this procedure.

––

1. Remove the external terminator or DSSI cable.

2. Refer to Figure 4–9. Loosen the four captive screws that hold the media face plate to the BA215 frame and remove the face plate.

3. Release the captive screw that holds the panel to the enclosure, tilt the panel forward, and label and unplug all cables connected to the OCP.

––––––––––––––––– **Caution** –––––––––––––––––

To prevent cable damage, do not allow the panel to drop free and hang suspended by its attached cables.

––

4. The shipping brackets inside the mass storage bay(s) should have been released during installation of the unit. If they were not released, make sure the four orange, plain-slotted screws are loosened to release the shipping brackets. Retighten the screws against the frame after the brackets are released.

––––––––––––––––– **Caution** –––––––––––––––––

Failure to release the shipping brackets before use may result in damage to the ISEs.

––

Installing the ISE

Use the following procedure to install the ISE:

_____ **Caution** _____

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

Do not handle the ISE unless you are wearing an antistatic wrist strap that is correctly grounded. When working on the ISE, place it on an antistatic pad. Use the static-protective field service kit (PN 29-26246).

_____

1. Install the upper and lower shock mounts in the mass storage bay. Refer to Installation Procedure, BA213 Enclosure for details on installing shock mounts and to Figure 4–4, which shows how to attach the metal ground strip when installing lower mass storage mounts.

_____ **Caution** _____

Make sure you install the shock mounts shipped with the device. Check the part number against Table 2–1 and Table 2–2. Installing the wrong shock mounts may result in damage to the ISE.

_____

2. Install an adapter plate for the RF35/RF36/RF31T ISE (see Installation Procedure, BA213 Enclosure).

3. Install the slide rails using the four screws provided (Figure 4–6).

_____ **Caution** _____

Make sure you use the screws provided. Longer screws may damage the ISE.

_____

4. Slide the ISE into the mass storage bay (drive module to the left; drive module to the right for the RF35, RF36, or RF31T) and tighten the slide rail screws.

5. Connect the power cable from the power supply to the power connector on the ISE (Figure 4–7 and Figure 4–8).

6. Connect the DSSI cable to the DSSI connector on the ISE (Figure 4–7 and Figure 4–8).

7. Use the 10-conductor cable provided to connect the ISE to the operator control panel (OCP).

8. Recheck all cable connections to the ISE. Make sure all connectors are seated correctly and that there is an appropriate amount of slack in the DSSI cable to allow for vibration of the ISE.

9. Reattach all control panel cables to the OCP and then replace the OCP and the media face plate.

10. Replace the external DSSI cable or terminator.

11. Replace the front panel on the enclosure, and then plug in the power cord.

12. Install the correct DSSI node ID plug on the OCP. Make sure each ISE is assigned a unique DSSI node ID.

**DSSI Bus,
Power, OCP
Connectors**

The following shows the DSSI bus, power, and OCP connectors on the ISE.

**Figure 4–7   DSSI Bus, Power, and OCP Connectors
(RF31/RF31F and RF72/RF73/RF74)**

POWER
CONNECTOR

OCP
CONNECTOR
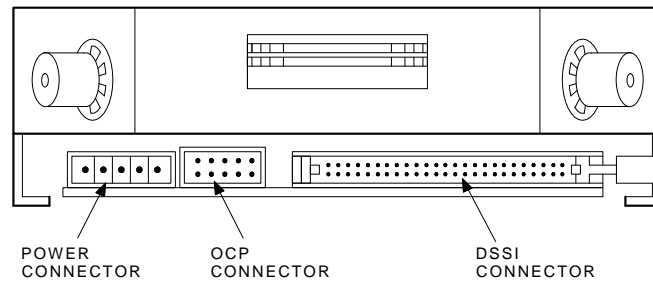
DSSI
CONNECTOR

SHR-X0064-90

**Figure 4–8   DSSI Bus, Power, and OCP Connectors
(RF35/RF36/RF31T)**

FRONT VIEW OF A RF35/36 DISK DRIVE

Remote Panel

Fault LED

Ready LED

0 1 2

DSSI ID

REAR VIEW OF A RF35/RF36 DISK DRIVE

50

2

1

DSSI Interface Connector

Power

49

1

5
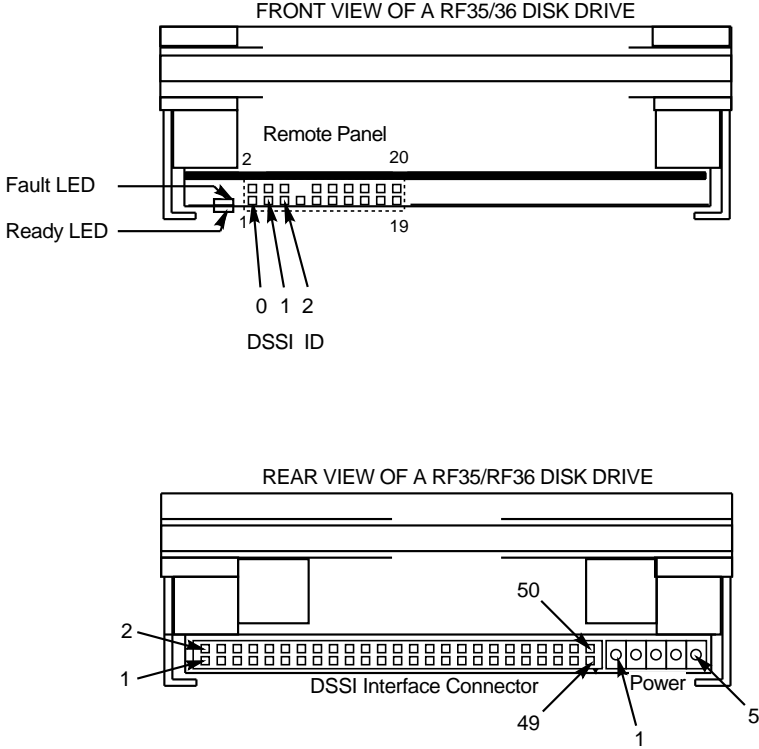
RF3x_front_back–rags

Installation Procedure, R215F Enclosure

R215F Enclosure

The R215F expansion enclosure holds up to three ISEs.

Removing the Front Panel

The front panel has a 3-position lock that limits access to system controls. The controls are located behind a smoked plastic window.

Remove the front panel as follows:

1. Insert the key into the lock on the front panel. Turn the key to the bottom position (fully clockwise).

2. Slide the window all the way down.

3. Halt any bus activity on the host system. Then, remove the DSSI expansion cable.

4. Turn the power switch ⌶O off (to the right) and unplug the ac power cord from the wall outlet.

_____ **Caution** _____

Make sure you stop any bus activity before removing the DSSI expansion cable to prevent high error rates.

_____

5. Pull the release latch outward, lift the front panel, and remove it from the system.

_____ **Caution** _____

Do not use a screwdriver or other tool to pry open the release latch. This may damage the latch.

_____

6. Loosen the two slotted, captive screws attaching the DSSI cable to the R215F bus connector (to the left of the OCP), and remove the cable.

Accessing the Top Mass Storage Bays

Use the following procedure to access the top mass storage bays:

─────────────────── **Caution** ───────────────────

Static electricity can damage integrated circuits. Use an antistatic wrist strap and pad when performing this procedure.

───

1. Loosen the four captive screws that hold the media face plate to the R215F frame and remove the face plate (Figure 4–9).

2. Loosen the captive screw on the top of the operator control panel frame, tilt the panel forward, and label and unplug all cables connected to the OCP. Lift the OCP out of the enclosure.

3. The shipping brackets inside the mass storage bay(s) should have been released during installation of the unit. If they were not released, make sure the six orange, plain-slotted screws are loosened to release the shipping brackets. Retighten the screws against the frame after the brackets are released (Figure 4–10).

─────────────────── **Caution** ───────────────────

Failure to release the shipping brackets before use may result in damage to the ISEs.

───

Figure 4–9   Removing the Top Media Face Plate

CAPTIVE
SCREWS

CAPTIVE
SCREWS

MLO-001819
SHR-X0069-90-CPG

Figure 4–10 R215F Shipping Bracket Screws

SHIPPING
BRACKET
SCREWS

SHIPPING
BRACKET
SCREWS

SHIPPING
BRACKET
SCREWS
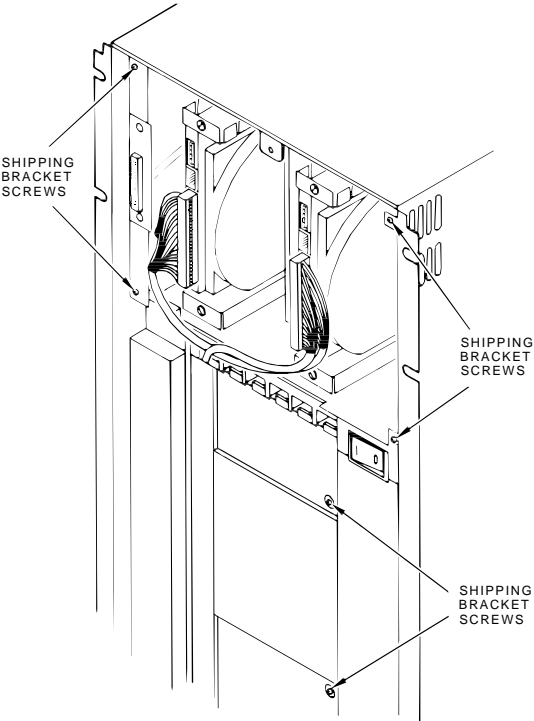
ML0-001821
SHR-X0070-90-CPG

Accessing the Bottom Mass Storage Bay

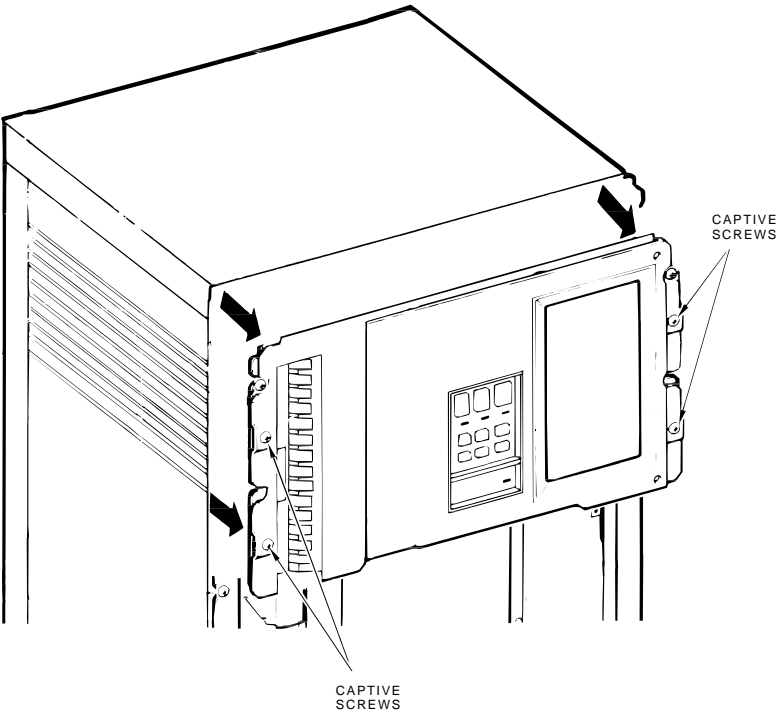---------------- **Caution** ----------------

Static electricity can damage integrated circuits. Use an antistatic wrist strap and pad when performing this procedure.

Loosen the four captive screws that hold the bottom media face plate to the R215F frame, and remove the face plate (Figure 4–11).

Figure 4–11   Removing the Bottom Media Face Plate

CAPTIVE
SCREWS

CAPTIVE
SCREWS
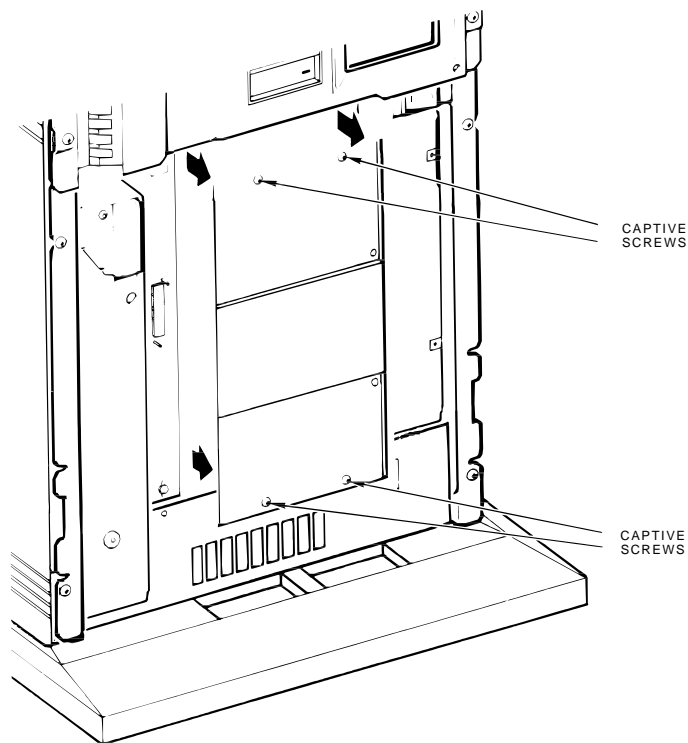
MLO-001820
SHR-X0071-90-CPG

Installing the ISE

Use the following procedure to install the ISE:

_____ **Caution** _____

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

Do not handle the ISE unless you are wearing an antistatic wrist strap that is correctly grounded. When working on the ISE, place it on an antistatic pad. Use the static-protective field service kit (PN 29-26246).

_____

1. Install the upper and lower shock mounts in the mass storage bay. Refer to Installation Procedure, BA213 Enclosure for details on installing shock mounts and to Figure 4–4, which shows how to attach the metal ground strip when installing lower mass storage mounts.

_____ **Caution** _____

Make sure you install the shock mounts shipped with the device. Check the part number against Table 2–1 and Table 2–2. Installing the wrong shock mounts may result in damage to the ISE.

_____

2. Install an adapter plate for the RF35/RF36/RF31T ISE (see Installation Procedure, BA213 Enclosure).

3. Install the slide rails using the four screws provided (Figure 4–6).

_____ **Caution** _____

Make sure you use the screws provided. Longer screws may damage the ISE.

_____

4. Slide the ISE into the mass storage bay (drive module to the left, to the right for RF35/RF36/RF31T) and tighten the slide rail screws.

5. Connect the power cable from the power supply to the power connector on the ISE (Figure 4–7 and Figure 4–8).

6. Connect the DSSI cable to the DSSI connector on the ISE (Figure 4–7 and Figure 4–8).

7. Use the 10-conductor cable provided to connect the ISE to the operator control panel (OCP).

8. Recheck all cable connections to the ISE. Make sure all connectors are seated correctly and that there is an appropriate amount of slack in the DSSI cable to allow for vibration of the ISE.

9. Reattach all control panel cables to the OCP and then replace the OCP and the media face plate.

10. Replace the external DSSI cable or terminator.

11. Replace the front panel on the enclosure, and then plug in the power cord.

12. Install the correct DSSI node ID plug on the OCP. Make sure each ISE is assigned a unique DSSI node ID.

5

Completing the Installation

ISE Checks

In this Chapter   This chapter describes:

- Executing the power-on self-test (POST)
- Setting the device parameters
- Verifying the correct operation of the ISE once it is installed

POST

Executing POST

Apply power to the host and to the expansion box (if applicable). The ISE, like other devices in the system, goes through a power-on self-test (POST).

POST is executed whenever power is applied.

When POST Succeeds

During a successful POST, the LEDs go through the following sequence:

1. All LEDs turn on for about 5 seconds.

2. All LEDs turn off for about 10 seconds.

3. READY LEDs flash for about 25 seconds.

4. The READY LED stays on steadily; the FAULT LED stays off.

The ISE is ready for use.

When POST Fails

The following lists the sequence the READY and FAULT LEDs go through when POST fails:

1. The FAULT LED stays on; the READY LED does not turn on.

2. The FAULT and READY LEDs stay on.

Refer to Chapter 6 for troubleshooting instructions.

Starting POST

When POST begins, the first action it takes is to start the spindle spin-up sequence. Other tests are performed while the spindle is spinning up. When more than one ISE is on the system, spindle spin-up is staggered (BA213 and R215F only) to limit the starting current drawn from the power supply for this function.

POST Errors

POST detects the following types of error conditions:

1. *Controller errors* — These are errors caused by the hardware associated with the controller function of the drive module. These errors are fatal to the operation of the ISE since the controller cannot establish a logical connection to the host. Controller errors cause the FAULT LED to turn on.

2. *Device errors* — These are errors caused by the hardware associated with the device control function of the drive module. These errors are not fatal since the ISE can establish a logical connection and report the error to the host. Device errors cause both LEDs to turn off for about 1 second, and then the FAULT LED turns on.

Resolving a Problem

If the ISE passes POST, continue to the next section. If the ISE fails POST, refer to Chapter 6. If the steps outlined in the troubleshooting section fail to locate the problem, do not complete the installation. Contact your Digital Equipment Corporation representative for instructions on replacing the ISE.

_____ **Note** _____

The formatted capacity of the RF73 is 2 GB. The formatted capacity of the RF74 is 3.5 GB. If the system uses versions of VMS earlier than V5.4, the default parameters of the INITIALIZE command do not work. You will receive an error stating that the cluster size is not suitable. Until the software is upgraded to VMS V5.5 or later, specify an explicit cluster size with the INITIALIZE command. A cluster value of 4 or greater is required.

For example, initialize your new RF73/RF74 with the command line:

INIT/CLUSTER=4 7DIA3: NEWDISK

Likewise, if a BACKUP operation is done to the new RF73/RF74 with VMS V5.4 or earlier, first initialize the ISE with the VMS INITIALIZE command, then do a BACKUP/NOINIT.

_____

Using PARAMS

Setting ISE Parameters

After executing the POST, you set the ISE parameters using the local program PARAMS. The following procedures should be used when performing an ISE installation. For further information on the use of PARAMS, refer to the *RF Series Integrated Storage Element User Guide* (EK-RF72D-UG). It contains a complete description of the PARAMS utility.

Accessing PARAMS

PARAMS can be accessed in one of three ways, depending on the system you are using:

- Through VMS, using the SET HOST command

- From the console, using the SET HOST command

- Through MDM, using the Device Resident Programs menu

Using VMS

To access PARAMS on a system running VMS Version 5.3-2 or later, the command is:

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

The *nodename* is the node name of the ISE.

To find the node name, type SHOW DEVICES or SHOW CLUSTER at the $ prompt.

To create a file in your directory of what appears on the screen, append the qualifier:

```
/log=filename.ext
```

The *filename.ext* is the name of the file and its extension.

Once you are in PARAMS, control is turned over to the utility. All interaction is through the use of commands and responses.

Exiting PARAMS

To exit PARAMS, type EXIT at the PARAMS> prompt, or press one of the following: Ctrl/C , Ctrl/Y , or Ctrl/Z .

Using Console Commands

Some systems allow you to access ISE local programs using console commands. The command syntax depends on whether your system uses a Q–bus adapter like the KFQSA module, or an embedded adapter such as the KA640 module.

Q–bus Adapters

To access PARAMS from a system with a Q–bus adapter, type:

```
>>> SET HOST/UQSSP/DUP/DISK # PARAMS
```

The *#* is the controller number of the ISE.

To find the controller number, type SHOW UQSSP at the console prompt (>>>). An example of the SHOW UQSSP command is:

```
>>> show uqssp
UQSSP Disk Controller 0 (772150)
-DUA0 (RF31)

UQSSP Disk Controller 1 (760334)
-DUB1 (RF31)

UQSSP Disk Controller 2 (760340)
-DUC2 (RF31)

UQSSP Tape Controller 0 (774500)
-MUA0 (TK70)
>>>
```

Embedded Adapters

To access PARAMS from a system with an embedded adapter, type:

```
>>> SET HOST/DUP/DSSI/BUS:n # PARAMS
```

The *n* is the bus number where the ISE is located, and the *#* is the DSSI node number of the ISE.

To find the DSSI bus number and node number, type SHOW DSSI at the console (>>>) prompt.

To exit PARAMS, type EXIT at the PARAMS> prompt, or press one of the following: Ctrl/C , Ctrl/Y , or Ctrl/Z .

Using MDM

If VMS or console commands are not available on your system, you can access PARAMS through MDM using the following procedure:

1. Boot MDM.

2. Enter the date and time.

3. Select the menus in the following order:

   a. Service menu

   b. Device menu

   c. KFQSAA-KFQSA subsystem menu

   d. Device Utilities menu

   e. Device Resident Programs menu

When you select the Device Resident Programs menu, the
following is displayed:

```
RUNNING A UTILITY SERVICE TEST

To halt the test at any time and return to the previous menu,
type  Ctrl/C .

KFQSAA started.
KFQSAA pass 1 test number 3 started.
Copyright 1988 Digital Equipment Corporation
Completed.
EXIT                    DRVEXR                  DRVTST
HISTRY                  ERASE                   PARAMS
DIRECT                  DKUTIL                  PRFMON
VERIFY

Please choose a local program or press <RETURN> to continue.
```

4. Type PARAMS and press Return .

5. Once you are in PARAMS, control is turned over to the
   utility. All interaction is through the use of commands and
   responses.

6. To exit PARAMS, type EXIT at the PARAMS> prompt, or
   press one of the following: Ctrl/C , Ctrl/Y , or Ctrl/Z .

7. To exit MDM, press the Break key.

Setting the ISE Allocation Class

Overview

All DSSI ISEs are shipped with the allocation class set to 0. To determine what allocation class you should use, first access a different ISE on the system and then set the one you are installing to the same allocation class.

Multihost Systems

In multihost systems, you must assign the same allocation class to both host systems and all connected ISEs. This allocation class must be different from that of other systems or other hierarchical storage controllers (HSCs) in a cluster.

Procedure

Use the following procedure to set the allocation class:

1. At the PARAMS> prompt, type SHOW ALLCLASS. The system displays the following:

```
Parameter    Current        Default     Type    Radix
---------    -----------    -----------  ------  -------
ALLCLASS           1              0      Byte    Dec   B

PARAMS>
```

2. Make a note of the allocation class. In this example, the allocation class has been set to 1. Exit PARAMS and return to the root prompt (VMS, console, or MDM).

3. Access PARAMS on the newly installed ISE.

4. Type SHOW ALLCLASS. The system responds with:

```
Parameter      Current        Default      Type      Radix
---------    -----------    -----------    ------    -------
ALLCLASS           0              0        Byte      Dec    B

PARAMS>
```

5. **In this example, you would type SET ALLCLASS 1. You want to set the ISE to the same allocation class as all the other ISEs on the DSSI bus.**

6. **Type SHOW ALLCLASS to check the new allocation class.**

   The system responds with the following display:

```
Parameter      Current        Default      Type      Radix
---------    -----------    -----------    ------    -------
ALLCLASS           1              0        Byte      Dec    B

PARAMS>
```

7. **Type WRITE. The system responds with:**

```
Changes require controller initialization, ok? [Y/ (N)]
```

8. **Type Y to save the new allocation class value.**

Setting the MSCP Unit Number

Overview   The ISE is set during manufacturing to read the DSSI node ID as the MSCP unit number. In some cases, it may be desirable to assign a different MSCP unit number, as in the case of a system with more than one DSSI bus.

Procedure   When assigning a different unit number, you must also set the FORCEUNI parameter to 0. This allows the unit number you have set to be used. The factory setting for FORCEUNI is 1, forcing the DSSI node ID to be used as the MSCP unit number.

The following example shows how to change the MSCP unit number.

```
PARAMS> sh unitnum
Parameter   Current      Default        Type      Radix
---------  ------------  -------------  ---------  -----
UNITNUM            5             0      Word      Dec   U

PARAMS> set unitnum 21

PARAMS> sh unitnum
Parameter   Current      Default        Type      Radix
---------  ------------  -------------  ---------  -----
UNITNUM           21             0      Word      Dec   U

PARAMS> sh forceuni
Parameter   Current      Default        Type      Radix
---------  ------------  -------------  ---------  -----
FORCEUNI           1             1      Boolean   0/1   U

PARAMS> set forceuni 0

PARAMS> sh forceuni
Parameter   Current      Default        Type      Radix
---------  ------------  -------------  ---------  -----
FORCEUNI           0             1      Boolean   0/1   U

PARAMS> write
```

Setting the ISE Node Name

Overview　　Setting the ISE node name is an optional step. All DSSI ISEs come with a computer-generated node name. The user may want to set this node name to a more recognizable character string.

Example　　The following example changes the node name from the default (R1EJAA) to the new string, SUSAN. When entering ASCII strings, you may use single quotes, double quotes, or no quotes at all.

```
PARAMS> show node
Parameter     Current        Default     Type     Radix
---------  -------------  ------------  -------  -----
NODENAME      R1EJAA         RF31       String   Ascii  B

PARAMS> set node "susan"
PARAMS> show node
Parameter     Current        Default     Type     Radix
---------  -------------  ------------  -------  -----
NODENAME      SUSAN          RF31       String   Ascii  B

PARAMS> write
```

Testing the ISE

Accessing DRVTST

Once the ISE parameters are set, test the drive by using the local program DRVTST. You access DRVTST the same way you access PARAMS. Use one of the procedures outlined in the PARAMS section of this chapter, but instead of specifying PARAMS, specify DRVTST.

Running DRVTST

DRVTST is a comprehensive hardware test. Once invoked, it will prompt you to specify whether the test should be a read/write test or a read-only test. After you specify the type of test, it will run for 5 minutes. After 5 minutes, DRVTST indicates that the test passed or that a failure occurred.

Once the ISE has passed DRVTST, the installation is complete. For further information on the use of DRVTST, refer to the *RF Series Integrated Storage Element User Guide* (EK-RF72D-UG). It contains a complete description of the DRVTST local program.

DRVTST Example

The following example shows how to run DRVTST. In this example, DRVTST is accessed through VMS on an ISE with the node name R1EJAA.

```
$ set host/dup/server=mscp$dup/task=drvtst r1ejaa
```

The program displays the following:

```
Copyright © 1989 Digital Equipment Corporation
Write/read anywhere on the medium? [1=Yes/(0=No)]
```

You must respond to the query for the program to continue. By typing 1 Return , you select a read/write test. DRVTST then displays the following:

```
User data will be corrupted. Proceed? [1=Yes/(0=No)]
```

The query gives you a chance to reconsider. By typing 0 Return , you override your response to the first query and a read-only test is executed. If you type 1 Return again, DRVTST begins executing a read/write test of the ISE.

If you type 1 Return , the program displays the following message during the test:

```
5 minutes to complete.
```

_____ **Note** _____

You may abort the test at any time by pressing one of the following: Ctrl/C , Ctrl/Y , or Ctrl/Z . If you abort the test, the following informational message is displayed:

```
Operation aborted by user.
```

_____

If DRVTST is executed successfully, the following message is displayed:

```
Test passed.
```

Error Messages   If an error condition is found during the execution of DRVTST, an error message is displayed. Two types of errors are reported:

- Soft errors that are corrected during the operation of the ISE

- Fatal errors that prevent the ISE from functioning

Error Descriptions   The following table describes the error messages you may see and what they mean:

Message	Description
Soft read error on head xx track yyyy.	Soft error messages indicate that an operation succeeded, but that the error recovery firmware was invoked. These messages may indicate a forced-error flag or correctable ECC error, or that the read/write head was temporarily off track. These errors are corrected during normal operation.
Soft write error on head xx track yyyy.	
Soft compare error on head xx track yyyy.	
xxxx — Unit diagnostics failed.	This is a fatal error, where xxxx is the MSCP error code.
xxxx — Unit read/write test failed.	This is a fatal error, where xxxx is the MSCP error code.

Make note of any soft error messages that are displayed for possible future reference. If you encounter a fatal error, do not complete the installation. Contact your Digital Equipment Corporation representative for instructions on replacing the ISE.

6

Troubleshooting Procedures

Performing Troubleshooting Procedures

In this Chapter

This chapter describes what you should do if an ISE fails to function.

Failure Indications

An ISE may fail during initial power up or during normal operation. The following table describes the states of the LEDs, what these states mean, and what actions you should take.

When . . .	It means . . .	And you . . .
The READY LED is on and the FAULT LED is off	The operating condition is normal	May use the ISE.
The FAULT and READY LEDs turn on and stay on	The ISE is unable to execute POST	Power down the system, check DSSI cable, and try again.
Neither LED turns on	Power is not getting to the ISE	Check power cable and DSSI cable.
The FAULT LED turns on and stays on	A fault condition exists	Run DRVTST to isolate the failure. If unable to access DRVTST, check DSSI node ID.

Troubleshooting Procedure

If a failure occurs during the installation process, perform the following checks to make sure that the failure is within the ISE:

Step	Action
1	Remove the outside panels from the system enclosure as needed to access the ISE. Refer to Chapter 4 for the panel removal procedures specific to your system enclosure.

> _____ **Caution** _____
>
> Do not operate the ISE for more than 10 minutes with the outside panels removed. Overheating and subsequent damage may result due to changes in airflow.
> _____

Step	Action
2	Check to make sure the READY LED on the external terminator is on. If it is not on, there is no power on the DSSI bus cable. Check for a bad cable connection or a blown fuse on the DSSI adapter module.
3	Power down the system.
4	Check for correct power cable connections to the ISEs.
5	Make sure the DSSI cable is connected correctly to all DSSI ISEs and to the host adapter.

Step	Action
6	Make sure the ISE has the correct DSSI node ID and that no other device on the DSSI bus has the same node ID. The following table explains how to do this.

If . . .	Then . . .
An OCP is connected to the ISE	Make sure the DSSI node ID plug is correctly installed.
No OCP is connected	Check the node ID select switches or jumpers on the drive module to make sure they are set correctly.

_____ **Note** _____

When the OCP is disconnected, the ISE defaults to no write-protect and on line.

_____

Step	Action
7	Make sure the terminators are correctly inserted at the ends of the DSSI bus cable. Refer to your system or adapter documentation for details on the DSSI bus cable and the terminators.
8	Reapply power. Watch the status of the READY and FAULT LEDs. The following table explains what you should do.

When . . .	Then . . .
Both the FAULT LED and the READY LED are on, and then the FAULT LED turns off	The drive is ready for operation.
The FAULT LED stays on, or the READY LED does not turn on, or both LEDs stay on	The ISE is faulty. Replace the ISE and then complete the installation.

Index