RF31 Integrated Storage Element Installation Manual for BA200-Series Enclosures

Order Number   EK-RF31D-IM-001

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About This Manual

This manual provides information and procedures for installing the RF31 integrated storage element (ISE) into the BA213, BA215, and R215F enclosures

Intended Audience

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

For the Customer

It is the customer's responsibility to perform a software backup prior to the arrival of Digital Customer 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 RF31 ISE, call Digital Customer Services to schedule an installation.

To install the RF31 ISE, follow the instructions and procedures outlined in this manual for your system. If you have any difficulty performing the installation, call Digital Customer Services for assistance.

Customers may order hardcopy documents from:

> Digital Equipment Corporation
> Peripherals and Supplies Group
> P.O. Box CS2008
> Nashua, NH 03061

For Customer Services

The RF31 ISE can be used on 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.

To install the RF31 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.

Digital personnel may order hardcopy documents from:

> Digital Equipment Corporation
> 444 Whitney Street
> Northboro, MA 01532
> Attn: Publishing and Circulation Services
> (NRO3/W3) Order Processing Section

CHAPTER 1

1
General Information

This chapter describes the RF31 integrated storage element (ISE) and the enclosures into which it can be installed

1.1 RF31 ISE Overview

The RF31 ISE (Figure 1-1) is a half-height, 5-1/4-inch fixed-disk mass storage device. It is one of a family of storage devices based on the Digital Storage Architecture (DSA) utilizing the Digital Storage System Interconnect (DSSI) bus and interface The term "integrated storage element" (ISE) applies to any DSSI storage device An ISE contains an on-board DSSI bus controller and MSCP server, in addition to the drive and the control electronics

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, non-embedded modules, such as the KFQSA adapter
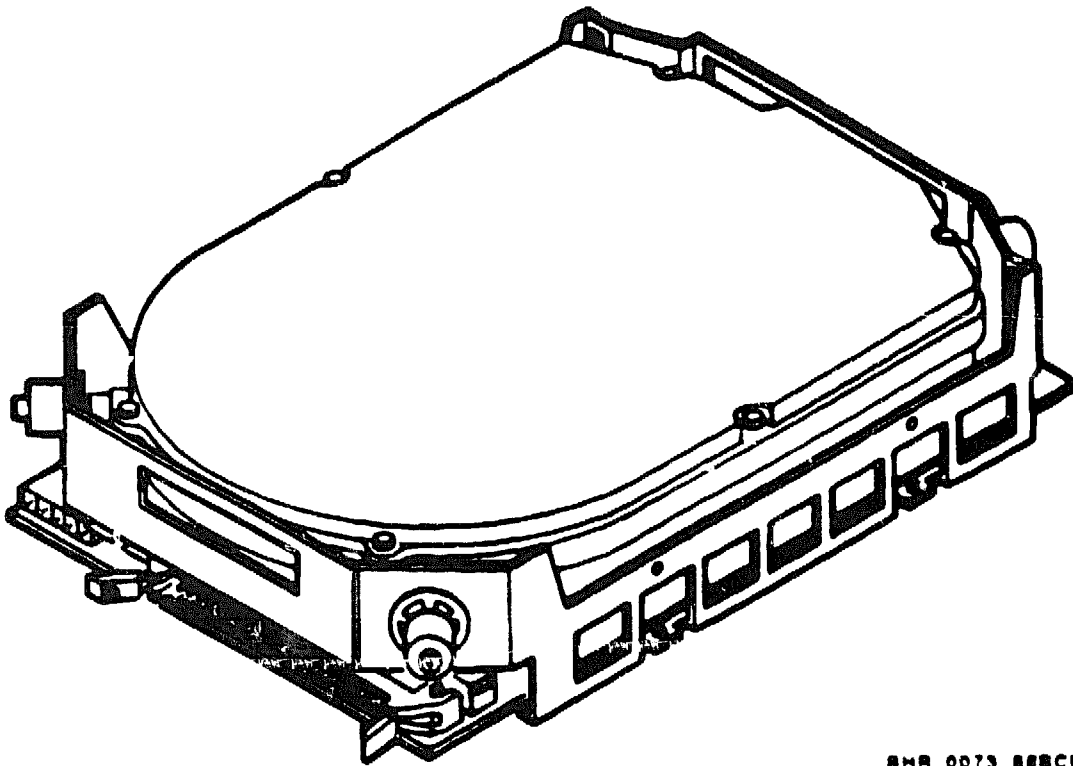
SHR_0073_88SCN
SHR_X1075_88_SCN

Figure 1-1   The RF31 Integrated Storage Element

1.2 The BA213 Enclosure

The BA213 enclosure (Figure 1-2) has a mass storage bay above the card
cage that contains a TK70 or TK50 tape drive, and up to three DSSI ISEs.

Mass storage devices are mounted sideways on shock-mounting hardware,
with a sliding track attached to each side of the device. One shock-
resistant support attaches to the top of the mass storage area, and
the other support attaches to the bottom of the device. The supports
are attached by two screws enclosed in rubber shock bushings. The
shock-mounting hardware varies for each ISE model.
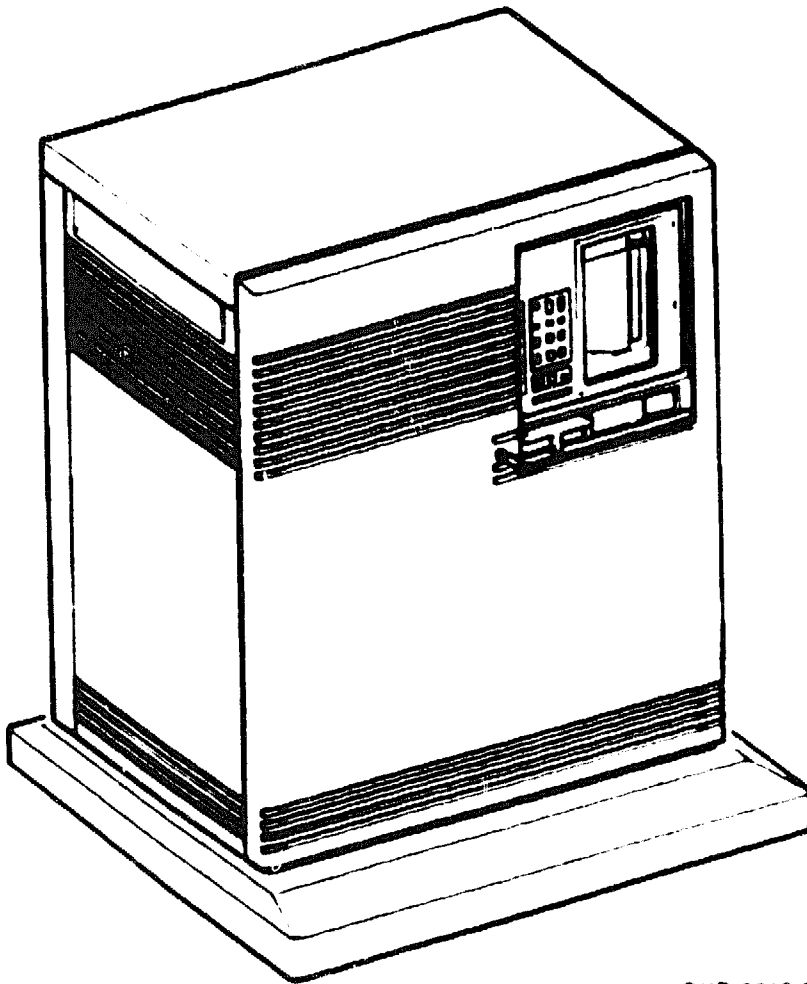
SHR 0215 88
SHR-X0080-90-RCN

Figure 1-2   The BA213 Enclosure

1.3 The BA215 Enclosure

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

Mass storage devices are mounted sideways on shock-mounting hardware, with a sliding track attached to each side of the device. One shock-resistant support attaches to the top of the mass storage area, and the other support attaches to the bottom of the device. The supports are attached by two screws enclosed in rubber shock bushings. The shock-mounting hardware varies for each ISE model.
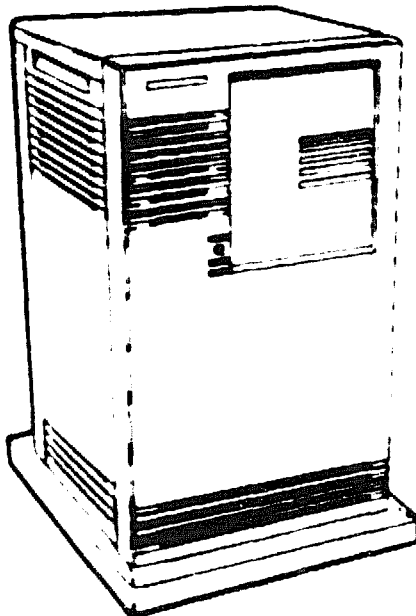
Figure 1–3   The BA215 Enclosure

1.4   The R215F Enclosure

The R215F enclosure is a BA215 enclosure with the card cage removed,
and an additional mass storage bay. It has three mass storage bays:
two bays in the top of the cabinet, and a third bay in the middle of the
cabinet. Each mass storage bay can hold one ISE. Figure 1–4 is a typical
configuration that includes an R215F enclosure and a MicroVAX 3400 in a
BA213 enclosure.

Mass storage devices are mounted sideways on shock-mounting hardware,
with a sliding track attached to each side of the device. One shock-
resistant support attaches to the top of the mass storage area, and
the other support attaches to the bottom of the device. The supports
are attached by two screws enclosed in rubber shock bushings. The
shock-mounting hardware varies for each ISE model.
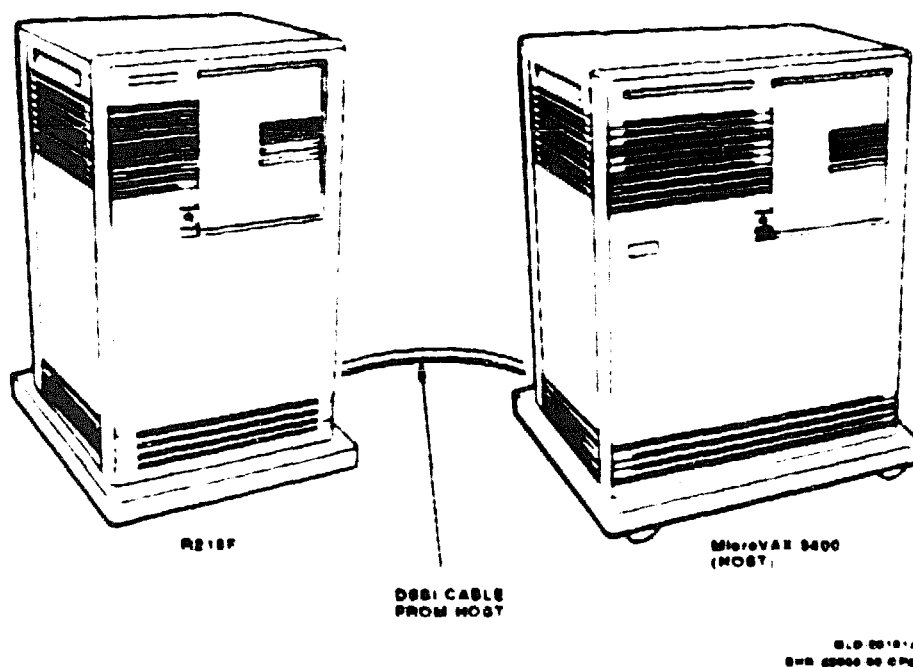
Figure 1–4   R215F Configuration (Example)

CHAPTER 2

2
Unpacking Information

Unpacking the RF31 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

2.1 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 RF31 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 HDA.

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

Figure 2–1 illustrates the parts included in the RF31E-SF Option Kit.
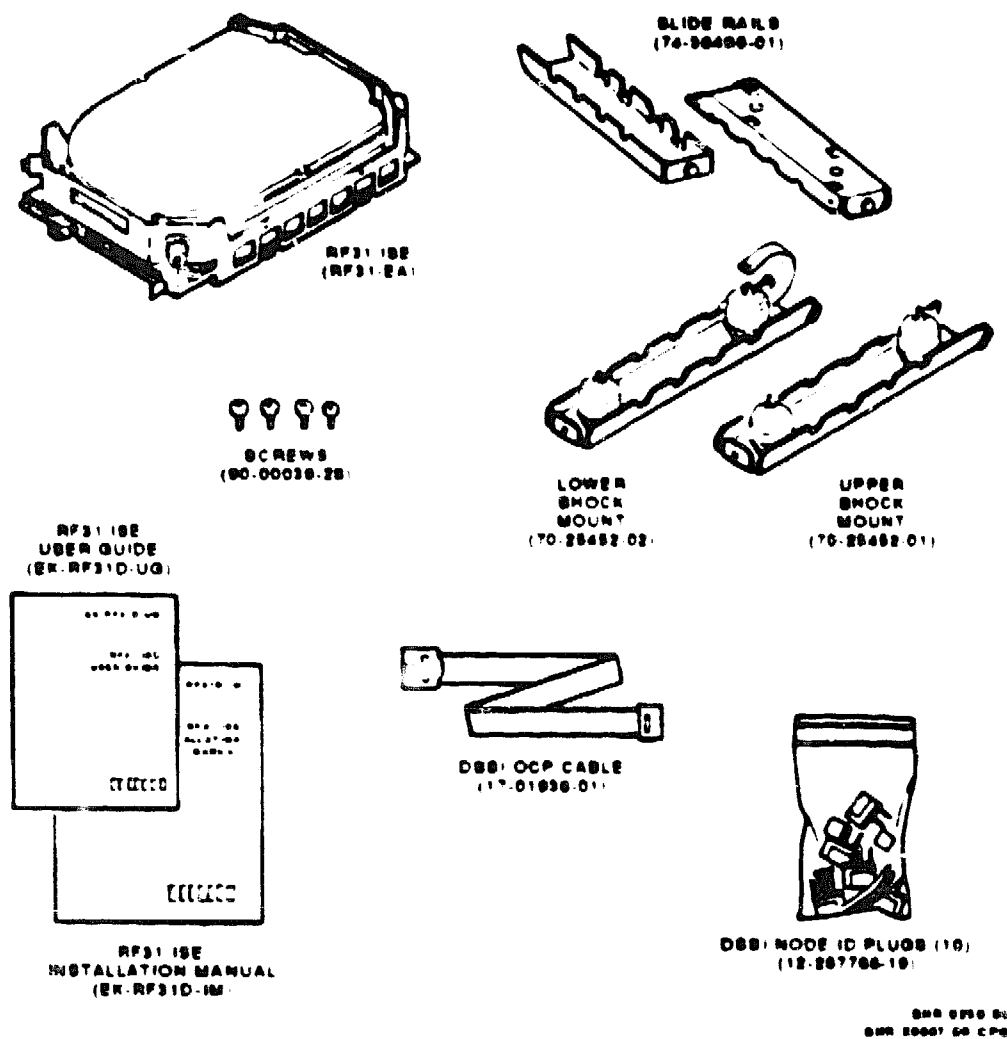
Figure 2–1   RF31E-SF Option Kit

2.2 Inspection

1. Inspect the RF31 ISE for physical damage.

2. Check the contents against the bill of materials. Table 2–1 lists the parts supplied with the RF31E-SF (field installed) option kit.

Table 2–1   Parts List for the RF31E-SF Option Kit

Part Number	Quantity	Description
RF31-EA	1	RF31 ISE without skid plate
70-25452-01	1	Upper shock mount
70-25452-02	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)
12-287766-19	10	DSSI node ID plugs
EK-RF31D-IM	1	RF31 ISE Installation Manual
EK-RF31D-UG	1	RF31 ISE User Guide

CHAPTER 3

3
Controls and Indicators

This chapter describes the controls and indicators associated with the operation of the RF31 ISE. These controls and indicators are located in two places:

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

3.1 RF31 ISE Switches and LEDs

Two LEDs and a DIP switch pack containing three switches are located on the ISE drive module. The LEDs indicate ISE operational status (ready and fault), and the switches are used to set the DSSI node ID if an OCP is not connected to the ISE. Figure 3-1 shows the location of the switches and LEDs on the RF31 ISE drive module.

3.1.1 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 to the binary equivalent of the desired ID number (see Table 3-1).

NOTE
These switches are ignored when the RF31 ISE is connected to an operator control panel (OCP). In this case, refer to Section 3.3 for instructions on assigning the DSSI node ID.

FAULT
LED

READY
LED

DSSI
NODE ID
SWITCHES

MA X0067 88
SHR X1069 89
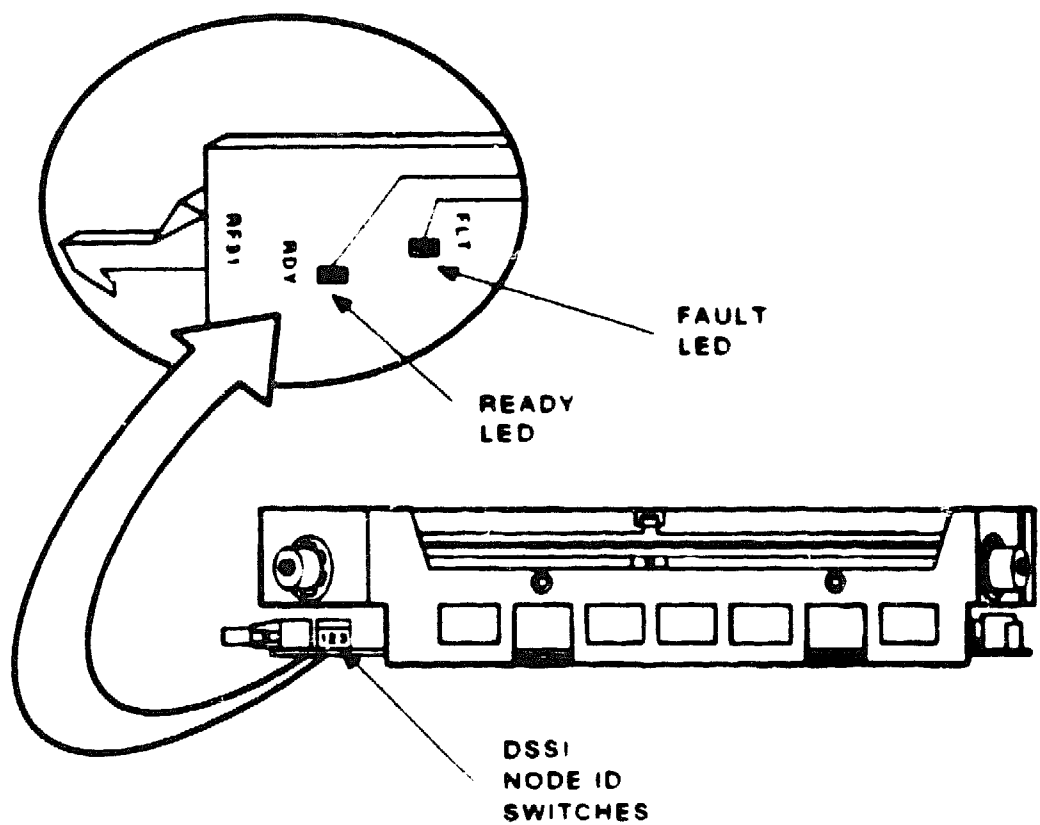
Figure 3–1   RF31 ISE Switch and LED Locations

Table 3-1 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

3.1.2 READY LED

The READY LED is green. When the ISE is powered up, this LED lights. 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 lights again for as long as the heads remain on track. Thus, during read or write operations, the READY LED flickers on and off rapidly

3.1.3 FAULT LED

The FAULT LED is red. It lights when a read/write error or serious physical error condition is detected. Initially, when the ISE is powered up, this LED lights. Upon the successful completion of POST, this LED turns off.

3.2 Operator Control Panel

When the RF31 ISE is installed in a BA213, BA215, or R215F enclosure, the operator interface is a control panel on the enclosure. Figure 3-2 shows the BA200-series operator control panel (OCP) for DSSI devices. Its functions are described in Table 3-2. Each RF-series ISE is connected to the OCP through a 10-conductor ribbon cable.

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 re-initializing 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.
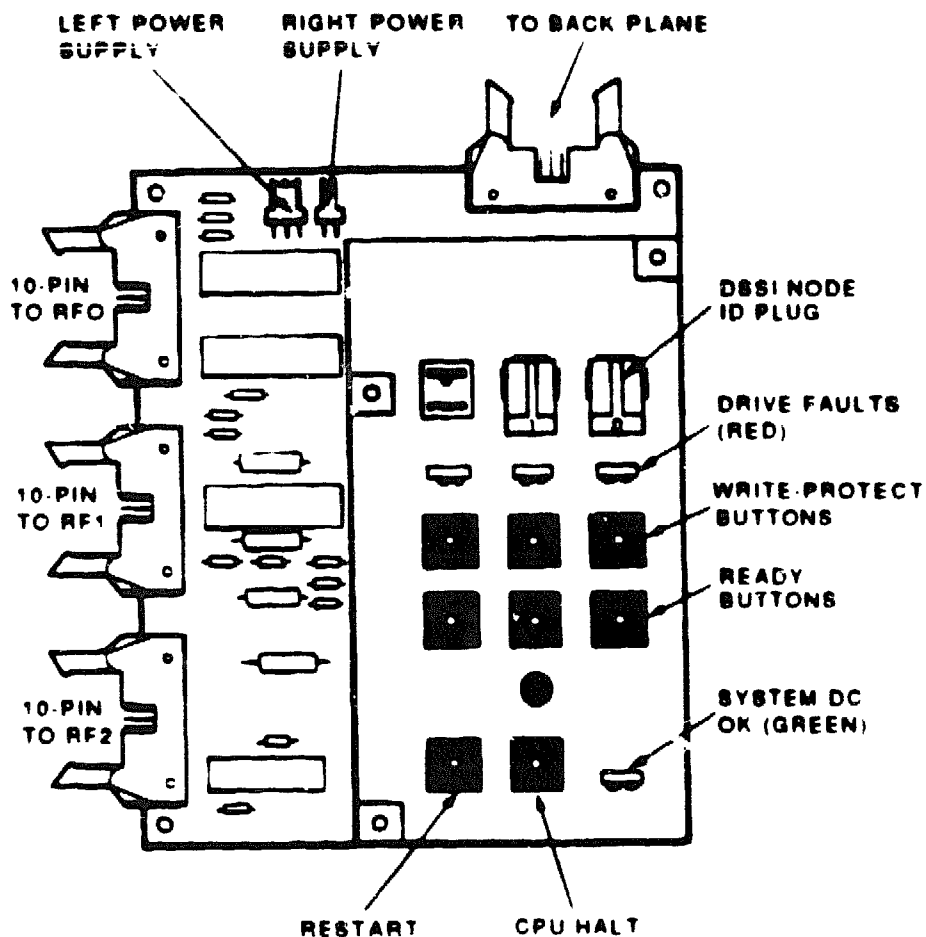
Figure 3-2   BA200-Series Operator Control Panel for DSSI ISEs

Table 3-2 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.

3.3 Assigning the DSSI Node ID

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

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

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.

- 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.

CHAPTER 4

4

Installation Procedure

This chapter explains how to install the RF31 ISE into a BA200-series enclosure

NOTE
Only qualified service personnel should attempt 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.

4.1 The BA213 Enclosure

The BA213 enclosure can contain up to three RF31 ISEs and a tape storage device Figure 4 1 shows a standard DSSI configuration into a BA213 enclosure

To install an RF31 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 to adapter documentation for instructions on installing these devices

4.1.1 Opening the Enclosure

The front door has a 3-position lock that limits access to system controls The controls are located behind a smoked plastic window Open the door as follows

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

2. Slide the window all the way down

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

DSSI EXTERNAL TERMINATOR
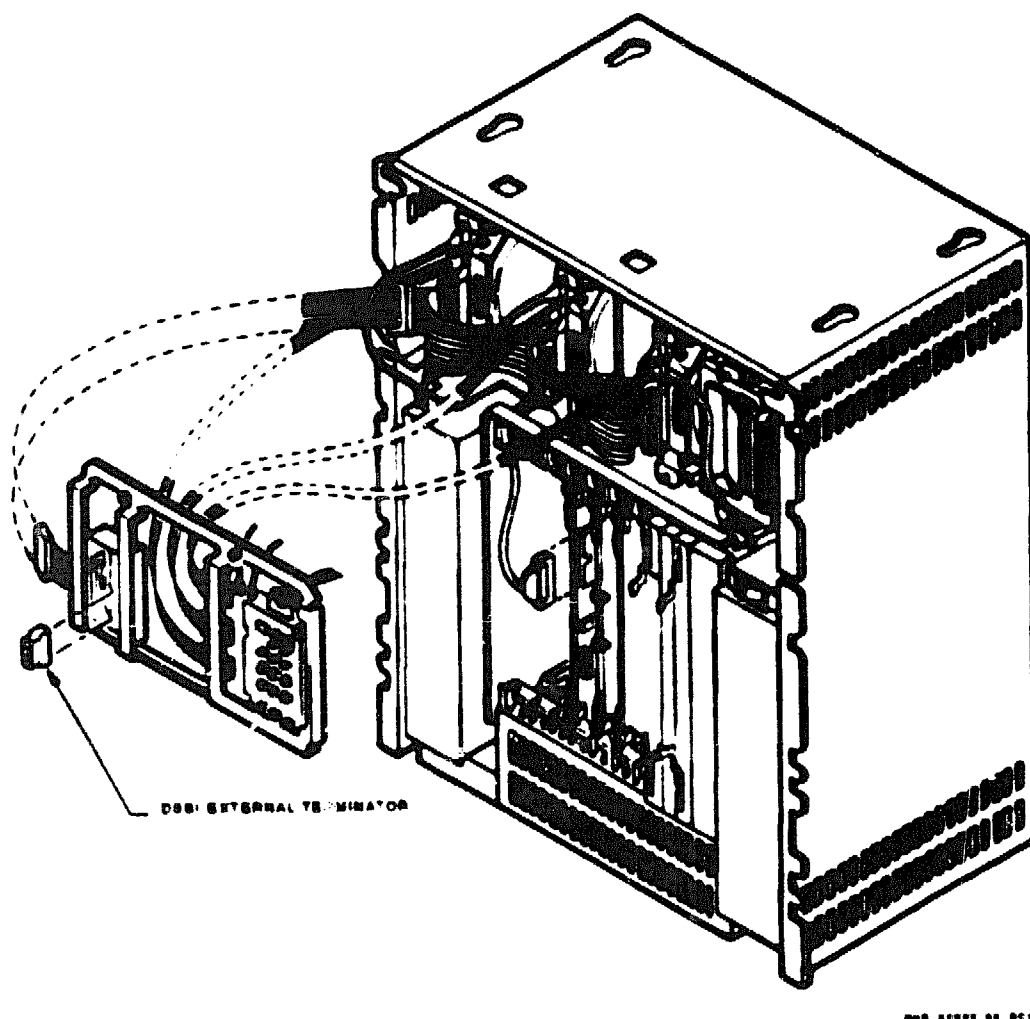
Figure 4-1   The BA213 Enclosure with DSSI ISEs

4. Pull the release latch outward. lift the front door and remove it from the system (see Figure 4-2).

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

IMPORTANT
PULL LATCH OUT
BEFORE LIFTING DOOR
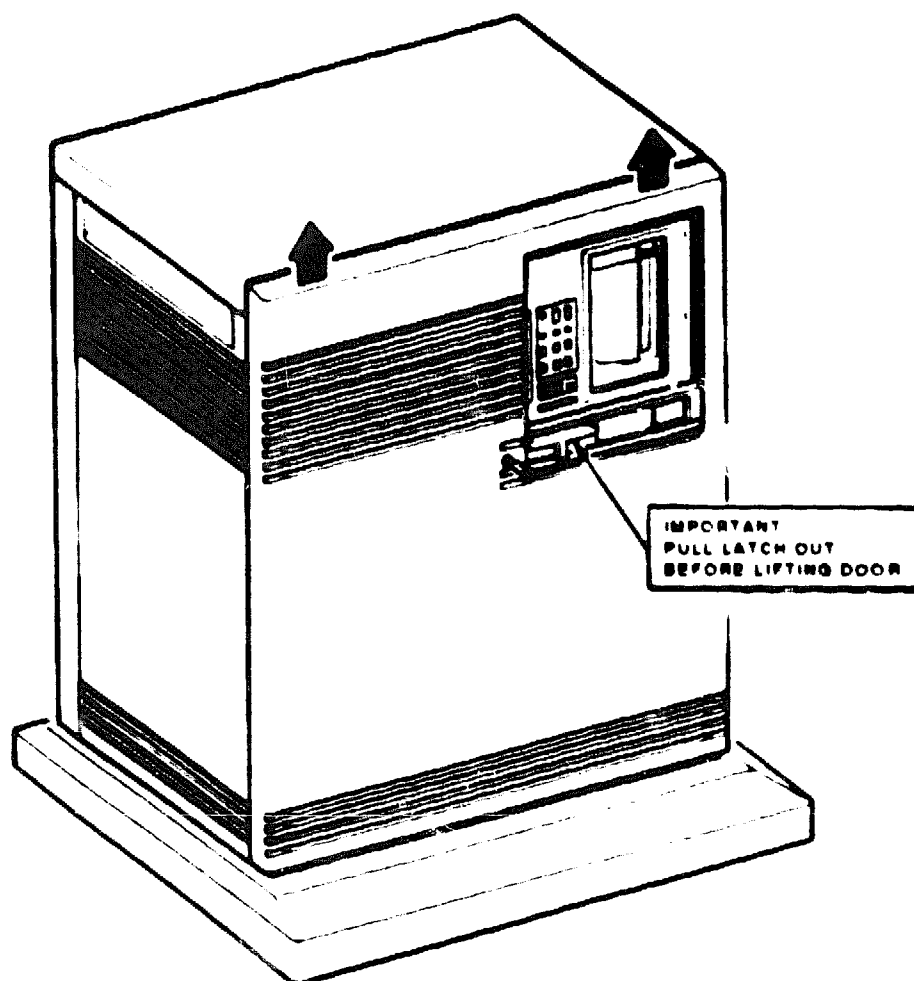
MA-X0964-88
BHR X0061-90 BCN

Figure 4–2   BA213 Front Cover Removal
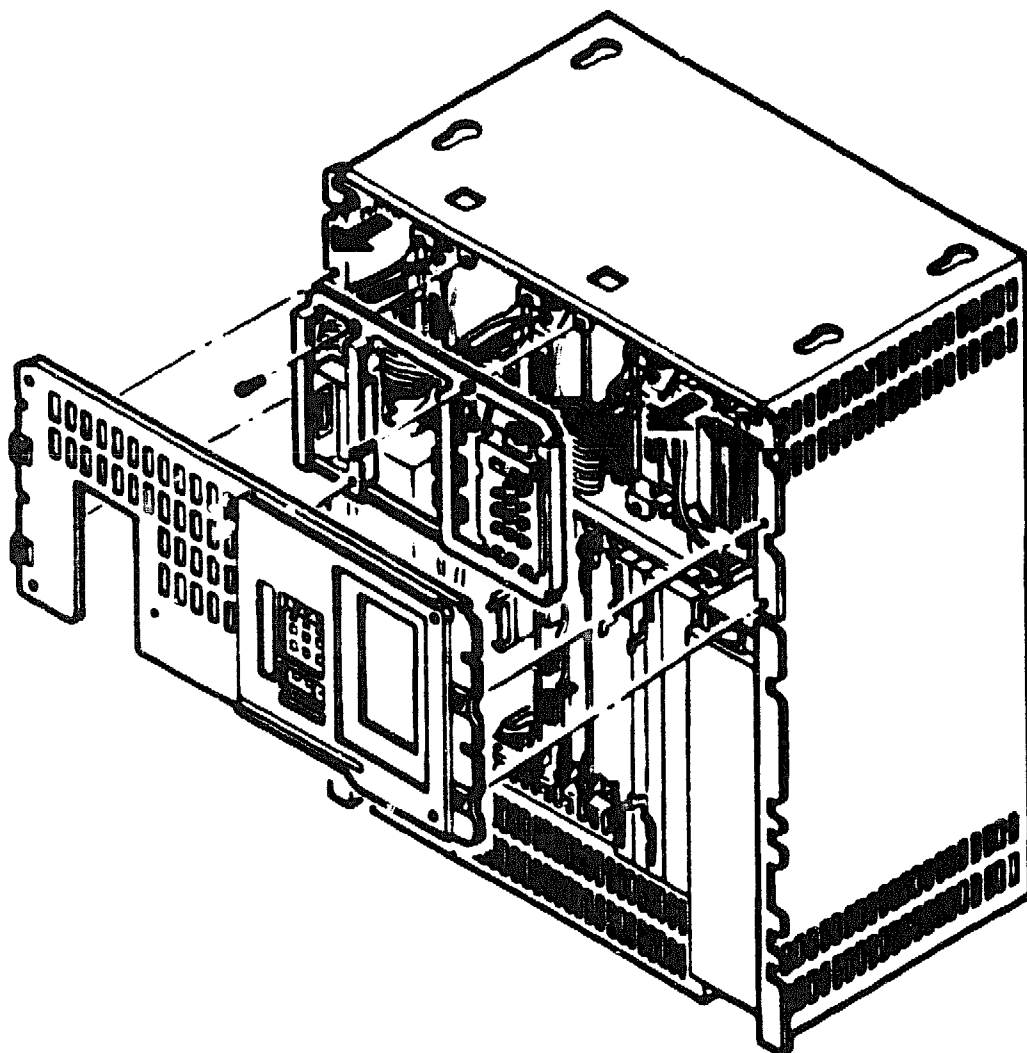
MA-X0003-88
SHR-X0002-90-SCN

Figure 4-3   Removing the Media Face Plate and OCP

4.1.2 Gaining Access to the Mass Storage Bays

1. Remove the media face plate from the front of the mass storage bays
    by releasing the five captive screws. Pull the cover off of the enclosure
    (see Figure 4-3).

2. Remove the screw from the top of the operator control panel chassis
    and lift the OCP out of the enclosure.

4.1.3 Installing the Mass Storage Shock Mounts

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

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

1. Carefully disconnect any cables that are impeding installation and mark them for re-installation later

2. Make sure the metal shipping brackets are in the "released" position. Instructions for releasing the shipping brackets are printed on a sticker attached to the front of the operator control panel (OCP)

CAUTION
Release the shipping brackets before operating the ISEs or they may be damaged.

3. Using a short, flat-head screwdriver, attach the top bracket assembly to the screw holes in the top of the appropriate mass storage bay. Make sure the open end of the bracket is facing the rear of the mass storage bay

4. Holding the bottom bracket 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).

5. Using a short flat-head screwdriver, attach the bottom bracket assembly to the two screw holes in the bottom of the appropriate mass storage bay Make sure the open end of the bracket is facing the rear of the mass storage bay
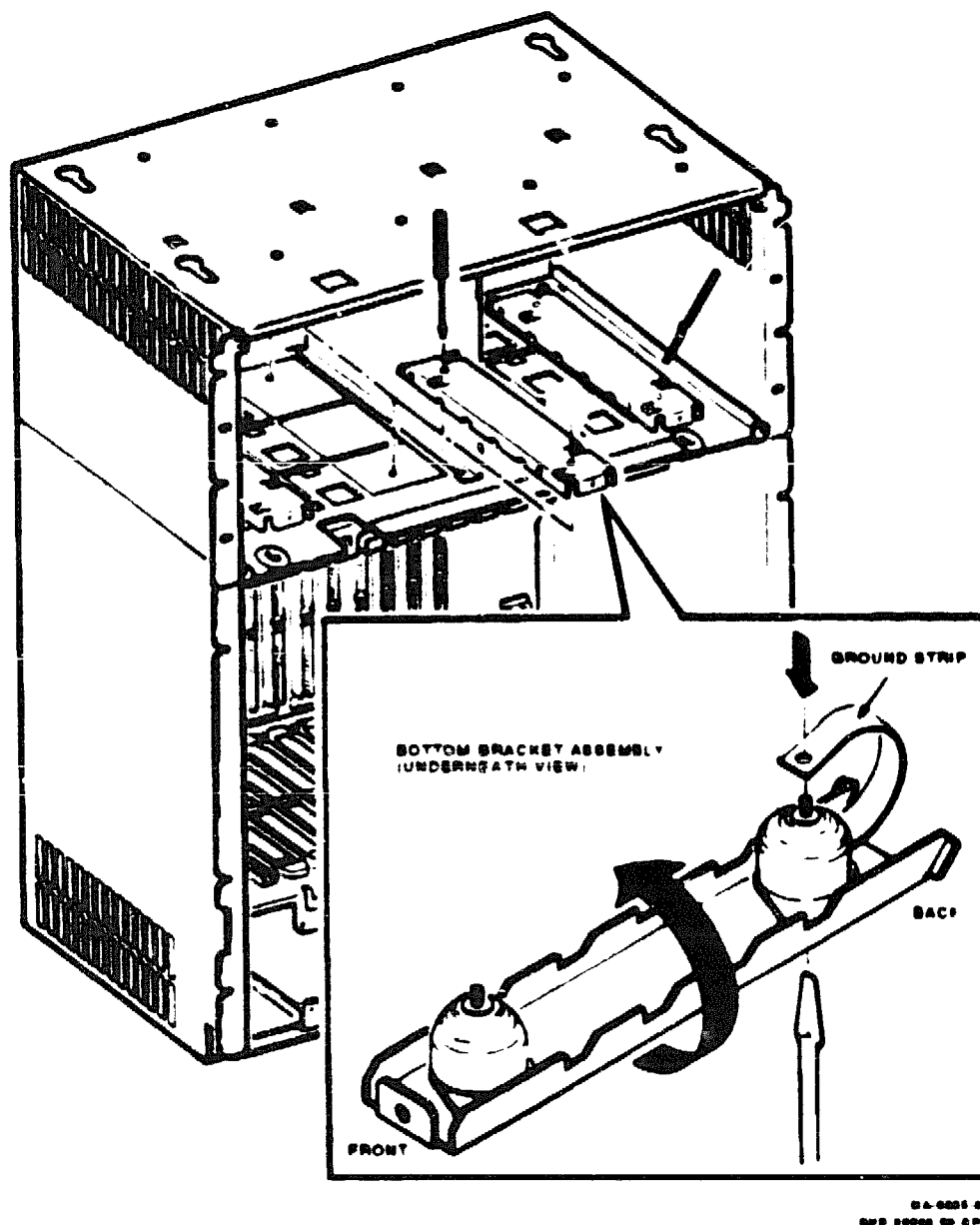
Figure 4—4   Attaching the Metal Ground Strip

4.1.4 Installing the ISE into the Enclosure

CAUTION
Do not handle the RF31 ISE unless you are wearing an antistatic
wrist strap that is properly grounded. When working on the ISE,

place it on an antistatic pad. Use the static-protective field service
kit (PN 29-26246).

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

1. Install the slide rails using the four screws provided (see Figure 4-5).

CAUTION
Make sure you use the screws provided. Longer screws may
damage the ISE.
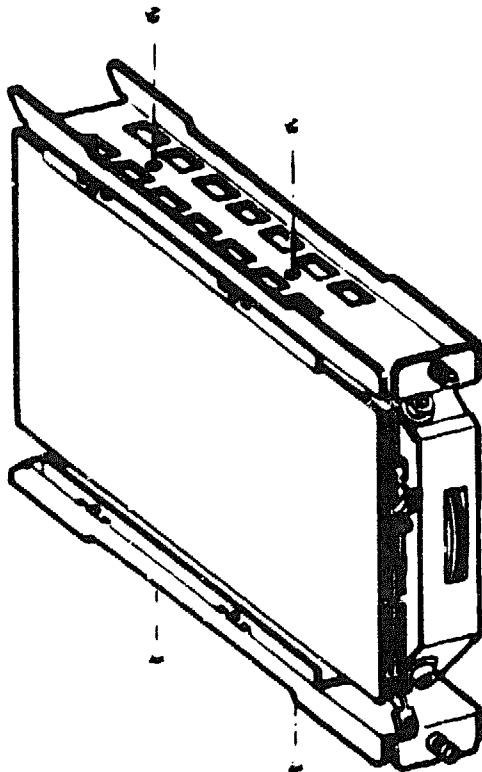
Figure 4-5 Installing the Slide Rails

2. Slide the ISE into the mass storage bay (drive module to the left) and hand tighten the slide rail screws.

3. Connect the power cable to the ISE.

4. Use the 10-conductor cable provided to connect the ISE to the ⌐   ator control panel (OCP).

5. Connect the DSSI cable to the ISE.

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

7. Replace the operator control panel and the media face plate.

8. Replace all panels on the enclosure

9. Insert the correct DSSI node ID plug on the OCP, as explained in Section 3.3. Make sure each ISE is assigned a unique DSSI node ID.

4.2 The BA215 Enclosure

The BA215 enclosure holds one or two RF31 ISEs, and a TK70 tape drive or TK50 tape drive.

4.2.1 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 door Turn the key to the bottom position (fully clockwise)

2. Slide the window all the way down.

3. Turn the [I O] 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 door and remove it from the system.

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

4.2.2 Gaining Access to the Top Mass Storage Bays

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

1. Release the four captive screws that hold the media face plate to the BA215 frame and remove the faceplate.

2. Remove the screw from the top of the operator control panel chassis and 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 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 prior to use may result in damage to the ISEs.

4. Remove the terminator and DSSI cable

4.2.3 Installing the RF31 ISE

CAUTION
Do not handle the RF31 ISE unless you are wearing an antistatic wrist strap that is properly grounded. When working on the ISE, place it on an antistatic pad. Use the static-protective field service kit (PN 29-26246).

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

1. Install the upper and lower shock mounts in the mass storage bay using the procedure outlined in Section 4.1.3.

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

2. Install the slide rails using the four screws provided (see Figure 4-5).

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

3. Slide the ISE into the mass storage bay (drive module to the left) and
    hand tighten the slide rail screws.

4. Connect the power cable to the power connector on the ISE (see
    Figure 4–6).

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

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

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

8. Replace the operator control panel and the media face plate.

9. Replace all panels on the enclosure.

10. Install the correct DSSI node ID plug on the OCP, as explained in
    Section 3.3. Make sure each ISE is assigned a unique DSSI node ID.

POWER
CONNECTOR

OCP
CONNECTOR
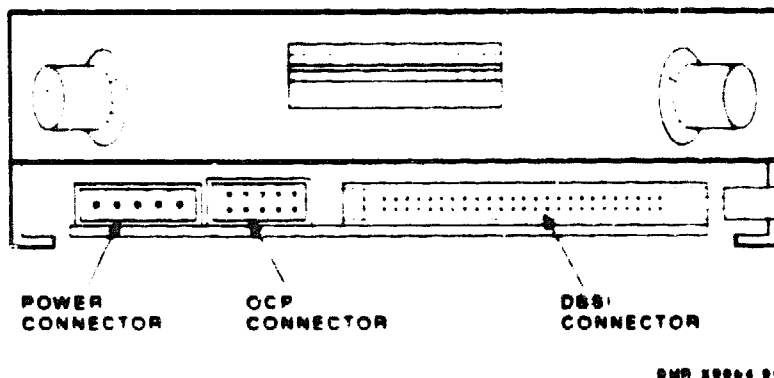
DSSI
CONNECTOR

Figure 4–6   DSSI Bus, Power, and OCP Connectors

4.3 The R215F Enclosure

The R215F expansion enclosure holds up to three RF31 ISEs.

4.3.1 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 door. 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 [O] power switch 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. Loosen the two, slotted, captive screws attaching the DSSI cable to the R215F bus connector (immediately to the left of the OCP) and remove the cable

6. Pull the release latch outward, lift the front door and remove it from the system

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

4.3.2 Gaining Access to 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 top media face plate to the R215F frame and remove the faceplate (see Figure 4-7).
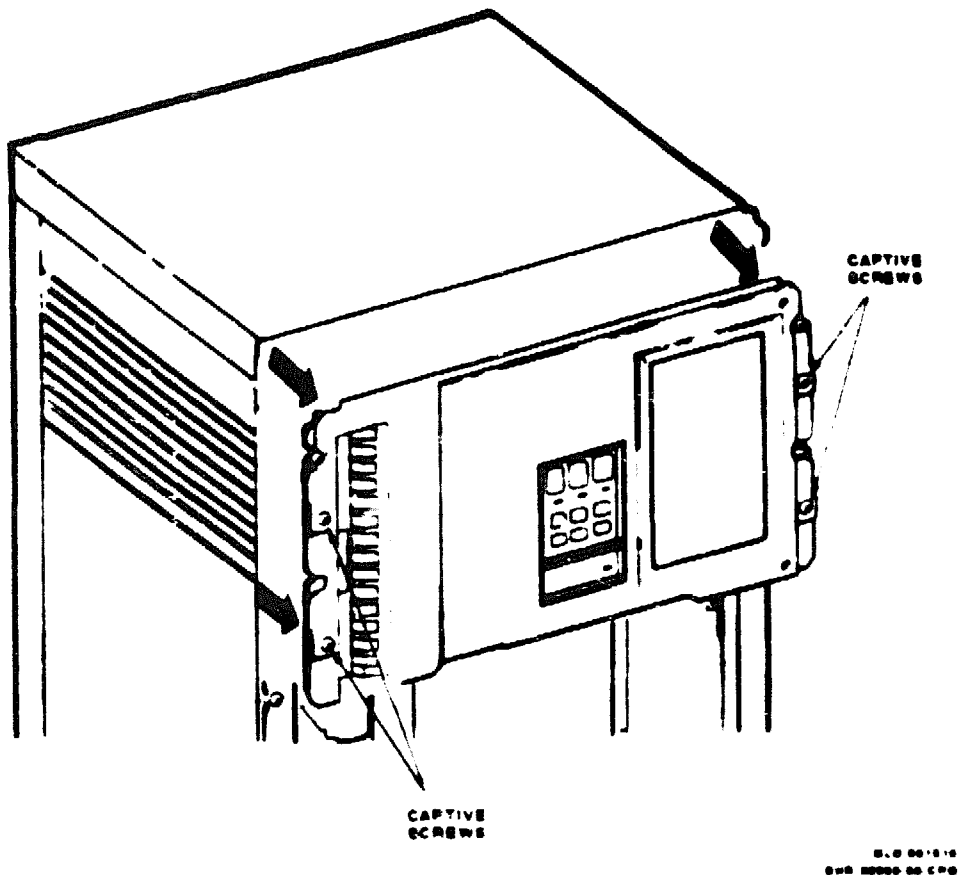
Figure 4–7   Removing the Top Media Faceplate

2   Remove the screw from the top of the operator control panel chassis
    and lift the OCP out of the enclosure.

3. The shipping brackets inside the mass storage bay(s) should already
    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 (see Figure 4–8).

CAUTION
Failure to release the shipping brackets prior to use may result in
damage to the ISEs.
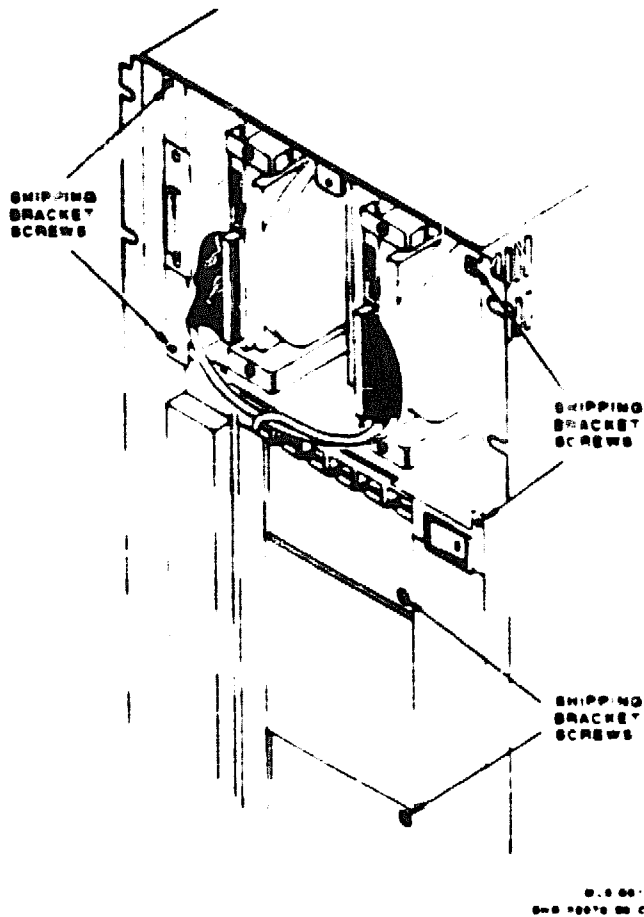
Figure 4-8 R2^5F Shipping Bracket Screws

4.3.3 Gaining Access to the Bottom 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 faceplate to
the R215F frame and remove the faceplate (see Figure 4–9).

CAPTIVE
SCREWS

CAPTIVE
SCREWS
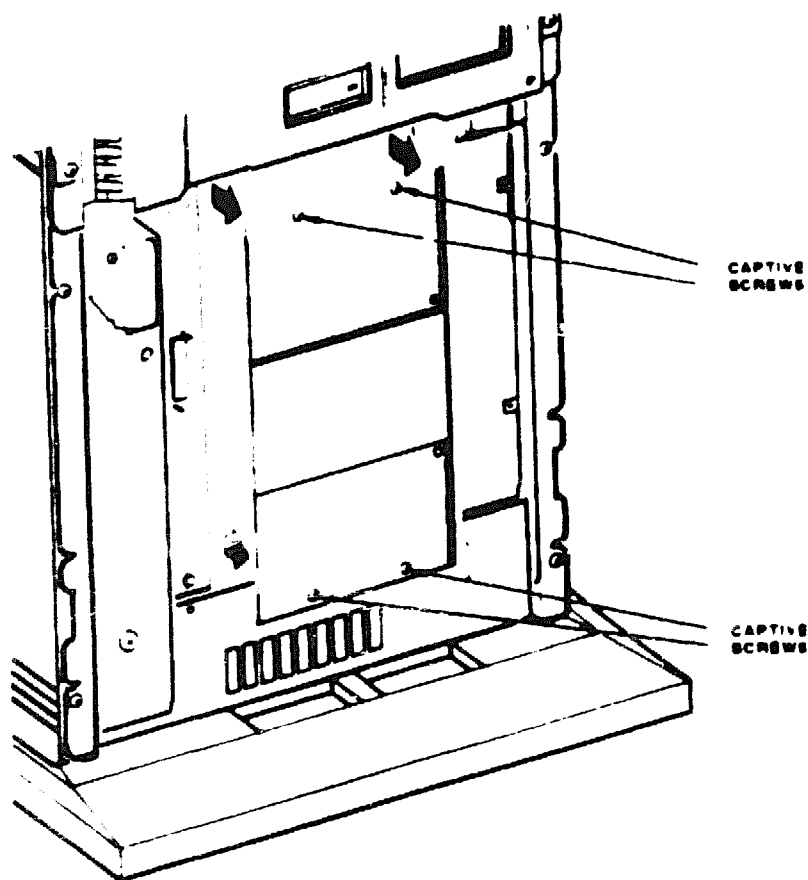
Figure 4–9   Removing the Bottom Media Faceplate

4.3.4 Installing the RF31 ISE

CAUTION
Do not handle the RF31 ISE unless you are wearing an antistatic wrist strap that is properly grounded. When working on the ISE, place it on an antistatic pad. Use the static-protective field service kit (PN 29-26246).

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

1. Install the upper and lower shock mounts in the mass storage bay using the procedure outlined in Section 4.1.3

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

2. Install the slide rails using the four screws provided. Refer to Figure 4–5 for the location of the screws.

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

3. Slide the ISE into the mass storage bay (drive module to the left) and hand tighten the slide rail screws

4. Connect the power cable to the ISE

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

6. Connect the DSSI cable to the ISE.

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

8. Replace the signal distribution assembly and the media face plate.

9. Replace all panels on the enclosure.

10. Install the correct DSSI node ID plug on the OCP, as explained in Section 3.3. Make sure each ISE is assigned a unique DSSI node ID.

CHAPTER 5

5
Completing the Installation

This chapter explains how to apply power, set the device parameters, and verify the correct operation of the ISE once it is installed

5.1   Power-On Self-Test (POST)

Apply power to the host and to the expansion box (if applicable) The RF31 ISE, like other devices in the system, goes through a power-on self-test (POST).

POST is executed whenever power is applied If it is executed successfully, the green READY and red FAULT LEDs go through the following sequence

1   Both LEDs are lit for approximately 5 seconds

2   Both LEDs go out for approximately 10 seconds

3   The green LED flickers for about 25 seconds

4   The green LED remains lit steadily, the red LED remains out

Once this sequence occurs, the ISE is ready to be used   If POST fails, the red LED remains lit and the green LED does not light, or both indicators remain on   If this occurs, refer to Chapter 6 for troubleshooting instructions

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 there is more than one ISE on the system, spindle spin-up is staggered to limit the starting current drawn from the power supply for this function.

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 can't establish a logical connection to the host. Controller errors cause the red FAULT LED to light

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 go out for
    about 1 second, then the red FAULT LED lights.

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 Sales or Customer Services
representative for instructions on replacing the ISE

5.2 Setting the ISE Parameters

Once installed and powered up, the ISE parameters must be set. This
is done through the use of the local program PARAMS. The following
procedures should be used when performing an ISE installation. If
further information on the use of PARAMS is desired, refer to the
RF31 Integrated Storage Element User Guide (EK-RF31D-UG-001) for
a complete description of the PARAMS utility

5.2.1 Accessing PARAMS

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

*   Through VMS, using the SET HOST command

*   From the console, using the SET HOST command

*   Through MDM, using the Device Resident Programs menu

5.2.1.1 Using VMS

To access PARAMS on a system running VMS version 5.3 or greater, the
command is:

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

Where "nodename" is the node name of the ISE.

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

To produce a file in your directory of what appears on the screen, append
the qualifier /log=filename.ext (where filename.ext is what you want to
name the file) to the above command.

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

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

5.2.1.2 Using Console Commands

Some systems allow you to access ISE local programs using console commands. The command syntax depends upon 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
```

Where # is the port number of the ISE.

Embedded Adapters

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

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

Where n = the bus number where the ISE is located
and # = DSSI node number of the ISE

NOTE
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.

5.2.1.3 Using MDM

If neither VMS nor console commands are 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:

   • Service menu

   • Device menu

   • KFQSAA-KFQSA subsystem menu

- Device Utilities menu

- 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.

5.2.2 Setting the ISE Allocation Class

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

In multi-host 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.

Use the following procedure to set the allocation class.

1. Find out what the allocation class should be set to by reading it from another ISE which was already working on the system. Use one of the procedures outlined in Section 5.2.1 to access PARAMS on the ISE from which you want to read this information.

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

Parameter	Current	Default	Type	Radix	
ALLCLASS	1	0	Byte	Dec	B

PARAMS>

3. 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).

4. Access PARAMS on the the newly installed ISE, using one of the procedures outlined in Section 5.2.1.

5. Type SHOW ALLCLASS. The system responds with:

Parameter	Current	Default	Type	Radix	
ALLCLASS	0	0	Byte	Dec	B

PARAMS>

6. Type SET ALLCLASS 1 (for our example). In reality, you want to set the ISE to the same allocation class as all the other ISEs on the DSSI bus.

7. 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>

8. Type WRITE. The system responds with:

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

9. Type Y to save the new allocation class value.

5.2.3 Setting the MSCP Unit Number

The RF31 ISE is set at 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.

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 u itnum
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
```

5.2.4 Setting the ISE Node Name

Setting the ISE node name is an optional step. All DSSI ISEs come with
a computer-generated node name. There may be a desire on the part of
the user to set this node name to a more recognizable character string.

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
```

5.3   Testing the ISE

Once the ISE parameters are set, test the drive by using the local
program DRVTST. DRVTST is accessed in the same way as PARAMS,
using one of the procedures outlined in Section 5.2.1. In this case, instead
of specifying PARAMS, you specify 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 will indicate either that the test passed, or that a
failure occurred.

Once the ISE has passed DRVTST, the installation is complete. If
further information on the use of DRVTST is desired, refer to the
RF31 Integrated Storage Element User Guide (EK-RF31D-UG-001) for
a complete description of the DRVTST local program.

5.3.1   DRVTST Example

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

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

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 answering
yes (1), you select a read-write test, and DRVTST prompts you with
another query.

In this case, type 1 [Return], selecting a read-write test. DRVTST then
displays the following:

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

This query gives you the chance to reconsider. If you answer no (0), then
your reponse to the first query is overridden, and a read-only test is
executed. If you answer yes (1), DRVTST begins executing a read-write
test of the ISE.

In this case, type 1 [Return]. During the test, the program displays the
following message:

```
    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 do abort the test, the
informational message Operation aborted by user will be displayed.

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

```
Test passed.
```

5.3.2 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 which
are corrected during the operation of the ISE; and fatal errors which
prevent the ISE from functioning.

The following table indicates the error messages you may see and what they mean.

Message	Description
Soft read error on head xx track yyyy. Soft write error on head xx track yyyy. Soft compare error on head xx track yyyy.	These are soft error messages which 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 are corrected during normal operation.
xxxx - Unit diagnostics failed.	This is a fatal error. xxxx is the MSCP error code.
xxxx - Unit read/write test failed	This is a fatal error. 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 Sales or Customer Services representative for instructions on replacing the ISE.

CHAPTER 6

Performing Troubleshooting Procedures

This chapter describes what you should do in the event that the RF31 ISE fails to function as it should.

6.1 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 green READY LED is on and the red FAULT LED is off	the operating condition is normal	may use the ISE
The red FAULT and green READY LEDs light and remain lit	the ISE is unable to execute POST	power down the system, check DSSI cable, and try again.
Neither LED lights	power is not getting to the ISE	check power supply and DSSI cable.
The red FAULT LED lights and remains lit	a fault condition exists	run DRVTST to isolate the failure If unable to access DRVTST, check DSSI node ID.

6.2   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 your system maintenance guide for panel removal procedures. **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 air flow.**
2	Check to make sure the green LED on the external terminator is lit. 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
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	refer to Section 3.3 to make sure the DSSI node ID plug is correctly installed
No OCP is connected	check the node ID select switches on the drive module to make sure they are set properly, as explained in Section 3.1.

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 ...
The red FAULT LED and the green READY LED light, and then the FAULT LED turns off while the READY LED remains lit	the drive is ready for operation
The red FAULT LED remains lit, or the green READY LED does not light, or both LEDs remain lit	the ISE is faulty. Replace the ISE with another and complete the installation.

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