

# **VAX 6000/SF7x/SF3x Embedded Storage Installation Guide**

Order Number EK-EMBED-IN-003

This manual describes how to install and operate the SF7x-HA/JA and SF3x-BA/HA/JA DSSI disk storage enclosures as embedded storage in the VAX 6000 Series Processor Cabinet.

**Digital Equipment Corporation  
Maynard, Massachusetts**

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**Third Edition, July 1992**

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This document was prepared using VAX DOCUMENT, Version 2.1.

# Contents

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## Preface

v

## Chapter 1 Safety Precautions

---

1.1	Introduction . . . . .	1-1
1.2	Hazards and Safety Precautions . . . . .	1-1
1.3	ESD Precautions . . . . .	1-2
1.4	System Grounding Precautions . . . . .	1-2

## Chapter 2 VAX 6000/SF7x/SF3x Embedded Storage Options

---

2.1	Introduction . . . . .	2-1
2.2	DSSI Disk Storage Enclosure Supported Options . . . . .	2-1
2.2.1	SF72-HA/JA Embedded Storage Options . . . . .	2-3
2.2.2	SF73-HA/JA Embedded Storage Options . . . . .	2-3
2.2.3	SF35-BA/HA/JA Embedded Storage Options . . . . .	2-3
2.2.4	SF31T-BA/HA/JA Embedded Storage Options . . . . .	2-3
2.2.5	SF72-UK Upgrade Kit . . . . .	2-7
2.2.6	SF73-UK Upgrade Kit . . . . .	2-7
2.2.7	SF35-UK Upgrade Kit . . . . .	2-7
2.2.8	SF31T-UK Upgrade Kit . . . . .	2-8
2.2.9	62X34-UA/UB Upgrade Kits . . . . .	2-8
2.3	Storage Enclosure Overview . . . . .	2-9

2.3.1	SF3x Storage Enclosure . . . . .	2-9
2.3.2	SF7x Storage Enclosure . . . . .	2-10

## Chapter 3 Preparing the VAX 6000 System Cabinet

---

3.1	Introduction . . . . .	3-1
3.2	Installing the 62X34-UA/UB Upgrade Kit . . . . .	3-1
3.2.1	Replacing the VAX 6000 Front Door . . . . .	3-2
3.2.2	Installing the Logo/Nameplate . . . . .	3-6
3.2.3	Replacing the H405-E/F VAX 6000 Power Controller . . . . .	3-6
3.2.3.1	Determining if H405-E/F Replacement is Necessary . . . . .	3-7
3.2.3.2	H405-E/F VAX 6000 Power Controller Removal and Replacement . . . . .	3-8
3.2.4	Installing the KFMSA Module for VAX 6000/SF7x/SF3x Embedded Storage Applications . . . . .	3-8
3.2.4.1	Installing the KFMSA Module for VAX 6000/SF7x/SF3x Embedded Storage . . . . .	3-9
3.2.4.2	Locating the I/O Bulkhead Panel for VAX 6000/SF7x/SF3x Embedded Storage . . . . .	3-9
3.2.4.3	Using KFMSA Ports with the SF7x/SF3x options . . . . .	3-10

## Chapter 4 Installing the SF7x/SF3x Embedded Storage Options

---

4.1	Introduction . . . . .	4-1
4.2	Unpacking the SF7x-HA/-JA and SF3x-BA/HA/JA Embedded Storage Options . . . . .	4-2
4.3	Powering Down the VAX 6000 System Cabinet . . . . .	4-3
4.4	Installing the EMI/RFI BeCu <sup>1</sup> Spring Clips . . . . .	4-4
4.4.1	Installing the 74-39405-01 Spring Clips . . . . .	4-4
4.4.2	Installing the 12-20580-08 BeCU Spring Clips . . . . .	4-7
4.5	Installing the Guide Rail . . . . .	4-9
4.6	Installing the SF7x/SF3x Storage Enclosure into the Cabinet . . . . .	4-12
4.7	Preparing the SF7x Enclosure for Operation . . . . .	4-18

4.7.1	Configuring the SF7x OCP . . . . .	4-18
4.7.1.1	Removing and Adjusting the SF7x OCP . . . . .	4-18
4.7.1.2	Checking the SF7x DSSI ID Switches on the OCP . . . . .	4-18
4.7.1.3	Installing the SF7x OCP . . . . .	4-22
4.7.2	Preparing the SF7x for Power Up . . . . .	4-23
4.8	Preparing the SF3x Enclosure for Operation . . . . .	4-27
4.8.1	Configuring the SF3x OCP . . . . .	4-27
4.8.1.1	Adjusting the SF3x OCP . . . . .	4-27
4.8.2	SF3x DSSI Node Numbers . . . . .	4-29
4.8.2.1	Changing the SF3x Node Numbers . . . . .	4-30
4.8.3	Preparing the SF3x for Power Up . . . . .	4-34

## Chapter 5 Cabling the SF7x Enclosure in the VAX 6000 Series Cabinet

---

5.1	Introduction . . . . .	5-1
5.2	Cabling the Right Position . . . . .	5-1
5.3	Cabling the Left Position . . . . .	5-4
5.4	Powering On the SF7x . . . . .	5-7
5.5	Labeling the DSSI Cables and OCP . . . . .	5-8
5.5.1	Filling Out the Labels . . . . .	5-8
5.5.2	Adhering the Labels . . . . .	5-8
5.5.2.1	Labeling the OCP . . . . .	5-9
5.6	Final Verification . . . . .	5-10

## Chapter 6 Cabling the SF3x Enclosure in the VAX 6000 Series Cabinet

---

6.1	Introduction . . . . .	6-1
6.2	Cabling Right Position . . . . .	6-1
6.2.1	Cabling the SF3x-BA/-HA Storage Enclosures . . . . .	6-1
6.2.2	Cabling the SF3x-JA Storage Enclosure . . . . .	6-5
6.3	Cabling the Left Position . . . . .	6-8
6.4	Installing the Power Cords . . . . .	6-10
6.5	Powering On the SF3x Enclosure . . . . .	6-11

6.6	Labeling the DSSI Cables . . . . .	6-14
6.6.1	Filling Out the Labels . . . . .	6-14
6.6.2	Adhering the Labels . . . . .	6-14
6.7	Final Verification . . . . .	6-15

## Chapter 7 Installation Troubleshooting the SF7x/SF3x Enclosures

---

7.1	Introduction . . . . .	7-1
7.2	Troubleshooting the SF7x/SF3x Storage Enclosures . . . . .	7-2
7.3	Removing an RF Disk ISE from an SF3x Storage Enclosure . . . . .	7-7
7.3.1	Bringing the RF3x Disk ISE On-Line . . . . .	7-10
7.3.2	Removing an RF7x Disk ISE from an SF7x Storage Enclosure . . . . .	7-12
7.3.3	Bringing the RF7x Disk ISE On-Line . . . . .	7-21

## Appendix A Split-Bus/Disk Striping VAX 6000/SF7x/SF3x Embedded Storage Systems

---

A.1	Disk Striping Overview . . . . .	A-1
A.2	VAX 6000/SF7x Split-Bus/Disk Striping Operation . . . . .	A-2
A.2.1	Configuring the System for Split-Bus/Disk Striping . . . . .	A-2
A.2.2	Installing the Second KFMSA . . . . .	A-3
A.2.3	Converting the SF7x enclosure to Split-Bus Mode . . . . .	A-3
A.2.4	Setting the DSSI Node Switches . . . . .	A-9
A.2.5	Cabling the VAX 6000/SF7x Embedded Storage for Split-Bus/Disk Striping . . . . .	A-11
A.3	VAX 6000/SF3x Split-Bus/Disk Striping Operation . . . . .	A-14
A.3.1	Configuring the System for Split-Bus/Disk Striping . . . . .	A-14
A.3.2	Installing the Additional KFMSA Modules . . . . .	A-15
A.3.3	Converting the SF3x enclosure to Split-Bus/Disk Striping Mode . . . . .	A-15
A.3.4	Cabling the VAX 6000/SF3x Embedded Storage for Split-Bus/Disk Striping . . . . .	A-24

## Appendix B VAX 6000/SF7x/SF3x Embedded Storage in DSSI VAXcluster Configurations

---

B.1	VAX 6000/SF7x/SF3x Embedded Storage Installed in DSSI VAXcluster Configurations.....	B-1
B.1.1	Additional Hardware Required .....	B-1
B.1.2	Installing the KFMSA Modules .....	B-2
B.1.3	Cabling a Two System VAX 6000/SF7x Embedded Storage DSSI VAXcluster .....	B-3
B.1.4	Cabling a Two System VAX 6000/SF3x Embedded Storage DSSI VAXcluster .....	B-7
B.1.5	Configuring System Parameters for Two System VAX 6000/SF7x/SF3x Embedded Storage DSSI VAXcluster ..	B-9

## Appendix C Related Documentation

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### Index

---

### Figures

---

2-1	SF7x Disk Storage Enclosure .....	2-4
2-2	SF3x Disk Storage Enclosure .....	2-5
2-3	SF3x Series Storage Enclosure .....	2-11
2-4	SF7x Series Storage Enclosure .....	2-12
3-1	VAX 6000 Control Panel/H405 Main Circuit Breaker.....	3-3
3-2	Front View of VAX 6000 Series Cabinet .....	3-5
3-3	KFMSA I/O Panel Location (-LJ Cab Kit) .....	3-11
4-1	Installing the BeCu Spring Clips (74-39405-01) on the VAX 6000 Enclosure.....	4-6
4-2	Installing the BeCu Spring Clips (12-20580-08) on the VAX 6000 Enclosure.....	4-8
4-3	Installing the Guide Rail .....	4-11
4-4	Installing the Shims.....	4-13
4-5	Securing the SF7x/SF3x Enclosure in the Chassis Retainers .....	4-15
4-6	Rear Clamping Assembly .....	4-17

4-7	Adjusting the SF7x OCP .....	4-19
4-8	DSSI ID Switch Settings .....	4-21
4-9	Installing the OCP on the SF7x Enclosure.....	4-22
4-10	Drive DC Power Switches .....	4-24
4-11	AC Power Switch, Voltage Selections, and Power Cord ..	4-26
4-12	Adjusting the SF3x OCP .....	4-28
4-13	SF3x Transition Module DSSI Node ID Switches.....	4-33
4-14	Drive DC Power Switches .....	4-35
4-15	AC Power Switch, Voltage Selections, and Power Cord ..	4-37
5-1	Installing the DSSI Cable for the Right (from the Front) Position .....	5-3
5-2	Installing the DSSI Cable for the Left (From the Front) Position .....	5-6
5-3	Adhering a Cable Label .....	5-8
5-4	Adhering an OCP Label .....	5-9
6-1	Cabling an SF3x-BA/-HA in the Right (from the front) Position .....	6-4
6-2	Cabling an SF3x-JA in the Right (from the front) Position	6-6
6-3	SF3x Cable Tray .....	6-7
6-4	Cabling an SF3x DSSI Cable in the Left (from the Front) Position .....	6-9
6-5	SF3x Enclosure DC Power Switches .....	6-12
6-6	Adhering a Cable Label .....	6-14
7-1	Disk ISE Removal .....	7-9
7-2	Installing the ISE .....	7-11
7-3	Powering Down the SF7x Storage Enclosure .....	7-13
7-4	Removing the SF7x Front Cover .....	7-14
7-5	Disconnecting the Cables .....	7-15
7-6	Removing the RF7x Disk ISE .....	7-16
7-7	RF7x Wedges and Skid Plate .....	7-17
7-8	RF7x Disk ISE Orientation .....	7-18
7-9	Cabling the RF7x Disk ISE .....	7-19
7-10	Replacing the SF7x Front Cover .....	7-20
A-1	SF7x Disk Enclosure (Front View) .....	A-5
A-2	SF7x Disk Enclosure (Rear View) .....	A-7
A-3	Converting an SF7x enclosure to Split-Bus Mode .....	A-8
A-4	DSSI ID Switch Settings .....	A-10

A-5	Cabling the VAX 6000/SF7x Embedded Storage for Split-Bus/Disk Striping . . . . .	A-13
A-6	SF3x Drive DC Power Switches . . . . .	A-16
A-7	AC Power Switch . . . . .	A-17
A-8	SF3x Backplane Connectors . . . . .	A-19
A-9	SF3x Transition Module DSSI Node ID Switches . . . . .	A-23
A-10	Cabling for Split-Bus/Disk Striping . . . . .	A-25
A-11	SF3x Cable Tray (Fully Cabled) . . . . .	A-26
A-12	SF3x Cable Dressing . . . . .	A-27
B-1	VAX 6000/SF7x Cabling Scheme . . . . .	B-5
B-2	VAX 6000/SF3x Cabling Scheme . . . . .	B-8

## Tables

---

2-1	Options for Embedded Storage . . . . .	2-2
2-2	SF7x/SF3x Cab Kit 70-22845-01 Parts List . . . . .	2-6
2-3	62X34-UA/UB Upgrade Kit Parts List . . . . .	2-8
2-4	SF3x Storage Enclosure Specifications . . . . .	2-13
2-5	SF7x Storage Enclosure Specifications . . . . .	2-15
4-1	SF7x DSSI ID Switch Settings . . . . .	4-20
4-2	SF3x Factory-set DSSI Node IDs . . . . .	4-29
4-3	DSSI Node ID Switch Settings for SF3x Storage Enclosure . . . . .	4-31
7-1	Disk ISE OCP Fault Codes . . . . .	7-2
7-2	Troubleshooting Chart . . . . .	7-4
A-1	SF7x Additional Hardware . . . . .	A-3
A-2	SF7x DSSI ID Verification (Front View) . . . . .	A-11
A-3	SF3x Additional Hardware . . . . .	A-14
A-4	CK-SF35A-AA Split-Bus/Disk Striping Kit . . . . .	A-15
A-5	SF3x Split-Bus/Disk Striping DSSI Node IDs . . . . .	A-20
A-6	DSSI Node ID Switch Settings for SF3x Storage Enclosure . . . . .	A-21
B-1	Additional Hardware for VAX 6000/SF7x Systems . . . . .	B-2
B-2	Additional Hardware for VAX 6000/SF3x Systems . . . . .	B-2
C-1	Related Documentation . . . . .	C-1

# Preface

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## About This Manual

The purpose of this manual is to provide a step-by-step procedure from which a Customer Service Engineer will be able to install The SF7x and SF3x DSSI disk storage enclosures as embedded storage into the VAX 6000 Series Processor cabinet . In addition, the guide includes an overview concerning the installation of VAX 6000/SF7x/SF3x embedded storage systems in a DSSI VAXcluster environment and Split-Bus/Disk Striping operation.

General information and field acceptance procedures concerning the VAX 6000 Series Processor Cabinet, DSSI Options, and software products referenced in this manual, are not part of this document. Refer to the specific document when additional information is necessary. See Appendix C.

This installation guide includes seven chapters and three appendices. They provide the following information on the SF7x-HA/JA and SF3x-BA/HA/JA DSSI disk storage enclosures as embedded storage in the VAX 6000 Series Processor Cabinet.

**Chapter 1, Safety Precautions**, describes safety precautions for Digital Services engineers working with the VAX 6000 Series Processor Cabinet.

**Chapter 2, VAX 6000/SF7x/SF3x Embedded Storage Options**, describes the SF7x/SF3x options available to be installed as embedded storage in the VAX 6000 Series Processor Cabinet.

**Chapter 3, Preparing the VAX 6000 System Cabinet**, describes preparing the VAX 6000 cabinet into which the SF7x/SF3x enclosures will be installed as embedded storage.

**Chapter 4, Installing the SF7x/SF3x Embedded Storage Options**, provides the procedures for installing the SF7x-HA/-JA and SF3x-BA/-HA/-JA DSSI disk enclosures into an installed VAX 6000 Series Processor Cabinet

**Chapter 5, Cabling the SF7x Enclosure in the VAX 6000 Series Cabinet**, provides the procedure to cable the SF7x enclosure to the DSSI bus configuration of the system cabinet.

**Chapter 6, Cabling the SF3x Enclosure in the VAX 6000 Series Cabinet**, provides the procedure to cable the SF3x enclosure to the DSSI bus configuration of the system cabinet.

**Chapter 7, Installation Troubleshooting the SF7x/SF3x Enclosures**, describes what to do if problems result during SF7x/SF3x enclosure installation.

**Appendix A, Split-Bus/Disk Striping VAX 6000/SF7x/SF3x Embedded Storage Systems**, provides the procedure to convert SF7x/SF3x options to split-bus mode and describes disk striping as an option for VAX 6000/SF7x/SF3x Embedded Storage Systems.

**Appendix B, VAX 6000/SF7x/SF3x Embedded Storage in DSSI VAXcluster Configurations**, describes DSSI VAXcluster Bus Configurations for VAX 6000 Embedded Storage Systems

**Appendix C, Related Documentation**, lists reference documents to be used when installing DSSI options as Embedded Storage in the VAX 6000 cabinet.

## Intended Audience

The guide is intended for all Digital Customer Service engineers installing SF7x-HA/-JA and SF3x-BA/HA/JA DSSI disk storage enclosures as embedded storage into a VAX 6000 Series Processor Cabinet. Reading this manual is necessary for proper installation.

# Chapter 1

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## Safety Precautions

### 1.1 Introduction

This chapter discusses hazards and safety precautions. The Digital Services engineer should be aware of these hazards and precautions when installing SF7x/SF3x disk storage enclosure options as embedded storage in a VAX 6000 Series Processor cabinet.

#### **WARNING**

Only qualified Digital Services engineers can perform installation and maintenance of any equipment described or referred to in this manual.

Digital customer access to VAX 6000 embedded storage options is limited to SF7x/SF3x enclosure operator control panels (OCPs) through openings in the system cabinet front door. Digital customer access to embedded storage options by opening system cabinet front or rear doors is prohibited.

### 1.2 Hazards and Safety Precautions

The front and rear doors of a VAX 6000 series processor cabinet are considered safety barriers. High voltages and the blower assembly are accessible once the front door is opened and high voltages are accessible once the rear door is opened.

Both cabinet doors are locked and cannot be opened without a 5/32 hex key. Only Digital Services engineers can open the front or rear door without violating Digital safety measures.

### 1.3 ESD Precautions

Only Digital Service engineers with training in electrostatic discharge (ESD) procedures should install VAX 6000/SF7x/SF3x embedded storage options and hardware or work with the processor cabinet.

Digital Services engineers must wear proper ESD protective ground straps connected to a good ground when accessing, installing, or repairing embedded storage options or VAX 6000 series processor cabinets.

ESD kits, containing protective ground straps, are behind the front and rear doors of the processor cabinet. Use these ground straps when performing services on the processor cabinet. When installing or servicing an option, use a separate ground strap, connected directly to the option.

### 1.4 System Grounding Precautions

Proper grounding is required between the VAX 6000 system and any enclosures connected via a common DSSI bus.

#### **WARNING**

If the enclosures are not connected to a common ground, a personal safety hazard could result.

If the ground offset voltages generated in the power distribution system exceed allowable limits, data transmission across the DSSI bus can be affected. System(s) performance could be degraded significantly and data could be corrupted.

For a DSSI installation, the maximum ground offset voltage differential allowed between enclosures is:

<b>DSSI Bus Length<sup>1</sup></b>		<b>Allowable Offset</b>	
<b>Meters</b>	<b>Feet</b>	<b>DC</b>	<b>AC</b>
Up to 20	Up to 65	200 mv	70 mv (rms)
20-25	65-82	40 mv	14 mv (rms)

<sup>1</sup>The total length includes all DSSI cable lengths, internal and external to the enclosures.

Ensure that the power distribution systems meet local codes prior to DSSI system installation. In a properly wired power distribution system(s) connected to properly functioning (no ground faults) equipment, generally no further attention to grounding is needed. The power distribution system provides a satisfactory path between enclosures.

To ensure proper grounding, perform a power system survey before installation by answering the following questions:

1. Do any outlets being used not have power ground connections?
2. Is the grounding prong missing on any of the computer equipment power cords?
3. Are any of the power outlet neutral connections actually ground connections?
4. Are the grounds for any of the power distribution circuits (outlets) not connected to the same power distribution panel?
5. Are any devices not UL or IEC approved connected to the same breaker as any of the DSSI computer equipment?

If the answers to all of the above questions are "no", then the grounding should be adequate for DSSI operation.

It is recommended that the ground offset voltage between any two enclosures be measured. However, this only provides data for that particular moment in time. Ground offset values may change as additional devices are connected to the same power source.

If the installation shows ground offset voltages between interconnected enclosures exceeding the allowable limits, use one of the following solutions:

- a. Have an electrician correct any deficiencies detected during the power system survey. This solution is recommended.
- b. Install grounding cables between enclosures. Grounding cables, available from Digital, come with the necessary hardware for installation.

Installation of additional grounding cables normally reduces the ground voltage offset sufficiently to meet the requirements. In severe cases, however, the cables may not be large enough. This is revealed by the ground offset voltage measurements.

If the additional grounding cables are not adequate, trace the source of the ground offset voltage, which should be reduced or eliminated.

## Chapter 2

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# VAX 6000/SF7x/SF3x Embedded Storage Options

### 2.1 Introduction

This chapter:

- Describes DSSI disk storage enclosure options that can be installed as embedded storage in the VAX 6000 Series Processor cabinet
- Describes kits needed to install these options and gives the parts lists
- Gives a storage enclosure overview with specifications

#### NOTE

See Appendix C for related documents with more detailed information on DSSI devices.

### 2.2 DSSI Disk Storage Enclosure Supported Options

Table 2–1 describes the DSSI disk storage enclosure options supported as embedded storage in the VAX 6000 Series Processor cabinet.

**Table 2-1: Options for Embedded Storage**

<b>Option</b>	<b>Description</b>
SF72-HA	SF72-HK Storage Enclosure with 2 GB (2 RF72 ISEs) Disk Storage capacity and SF72 Cab Kit (70-22845-01)
SF72-JA	SF72-JK Storage Enclosure with 4 GB (4 RF72 ISEs) Disk Storage capacity and SF72 Cab Kit (70-22845-01)
SF73-HA	SF73-HK Storage Enclosure with 4 GB (2 RF73 ISEs) Disk Storage capacity and SF72 Cab Kit (70-22845-01)
SF73-JA	SF73-JK Storage Enclosure with 8 GB (4 RF73 ISEs) Disk Storage capacity and SF72 Cab Kit (70-22845-01)
SF35-BA	SF35-BK Storage Enclosure with 1.76 GB (2 RF35 ISEs) Disk Storage capacity and SF72 Cab Kit (70-22845-01)
SF35-HA	SF35-HK Storage Enclosure with 5.1 GB (6 RF35 ISEs) Disk Storage capacity and SF72 Cab Kit (70-22845-01)
SF35-JA	SF35-JK Storage Enclosure with 10.2 GB (12 RF35 ISEs) Disk Storage capacity and SF72 Cab Kit (70-22845-01)
SF31T-BA	SF31T-BK Storage Enclosure with .762 GB (2 RF31T ISEs) Disk Storage capacity and SF72 Cab Kit (70-22845-01)
SF31T-HA	SF31T-HK Storage Enclosure with 2.29 GB (6 RF31T ISEs) Disk Storage capacity and SF72 Cab Kit (70-22845-01)
SF31T-JA	SF31T-JK Storage Enclosure with 4.58 GB (12 RF31T ISEs) Disk Storage capacity and SF72 Cab Kit (70-22845-01)
SF72-UK	2 GB (2 RF72 ISEs) Upgrade for SF72-HK Storage Enclosure
SF73-UK	4 GB (2 RF73 ISEs) Upgrade for SF73-HK Storage Enclosure
SF35-UK	.852 GB (1 RF35 ISE) Upgrade for SF35-HK Storage Enclosure
SF31T-UK	.381 GB (1 RF31T ISE) Upgrade for SF31T-HK Storage Enclosure
62X34-UA	Upgrade kit including VAX 6000 cabinet front door with operator access panel and H405 Power Controller with unswitched power outlets, 60 Hz

**Table 2–1 (Cont.): Options for Embedded Storage**

<b>Option</b>	<b>Description</b>
62X34-UB	Upgrade kit Including VAX 6000 cabinet front door with operator access panel and H405 Power Controller with unswitched power outlets, 50 Hz

### **2.2.1 SF72-HA/JA Embedded Storage Options**

The SF72-HA/JA Embedded Storage Options include either an SF72-HK Disk Storage Enclosure with 2GB (2 RF72 ISEs) disk storage capacity or an SF72-JK Disk Storage Enclosure with 4GB (4 RF72 ISEs) disk storage capacity (Figure 2–1).

### **2.2.2 SF73-HA/JA Embedded Storage Options**

The SF73-HA/JA Embedded Storage Options include either an SF73-HK Disk Storage Enclosure with 4GB (2 RF73 ISEs) disk storage capacity or an SF73-JK Disk Storage Enclosure with 8GB (4 RF73 ISEs) disk storage capacity (Figure 2–1).

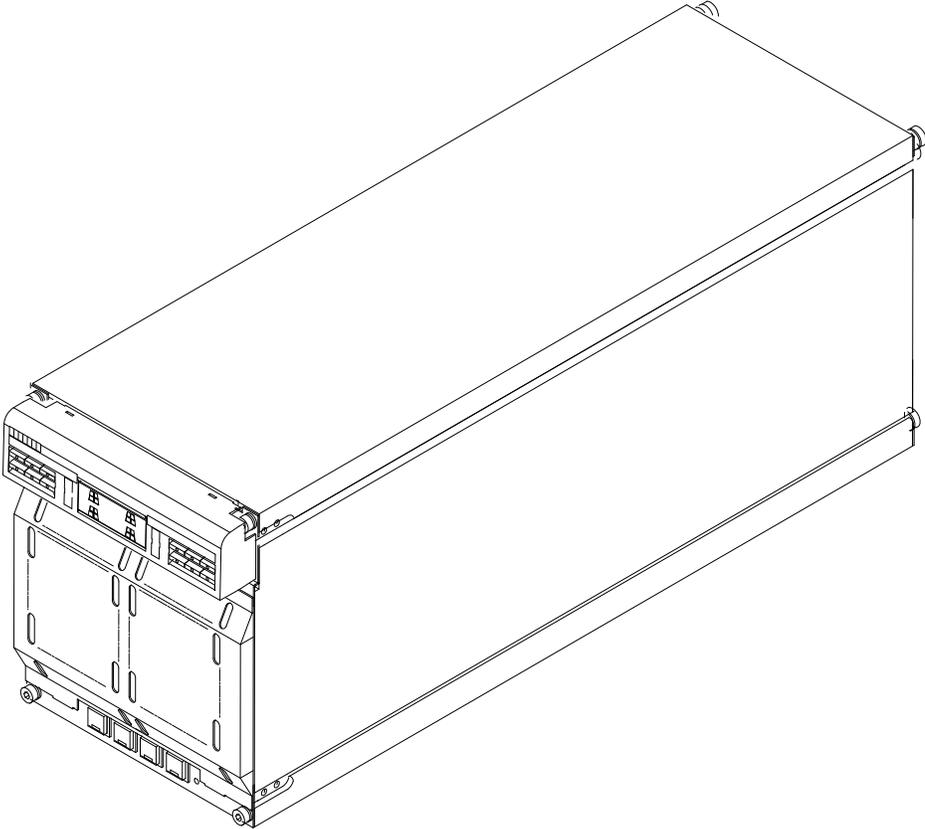
### **2.2.3 SF35-BA/HA/JA Embedded Storage Options**

The SF35-BA/HA/JA Embedded Storage Options include either an SF35-BK Disk Storage Enclosure with 1.76GB (2 RF35 ISEs) disk storage capacity, an SF35- HK Disk Storage Enclosure with 5.1GB (6 RF35 ISEs) disk storage capacity, or an SF35-JK Disk Storage Enclosure with 10.2GB (12 RF35 ISEs) disk storage capacity (Figure 2–2).

### **2.2.4 SF31T-BA/HA/JA Embedded Storage Options**

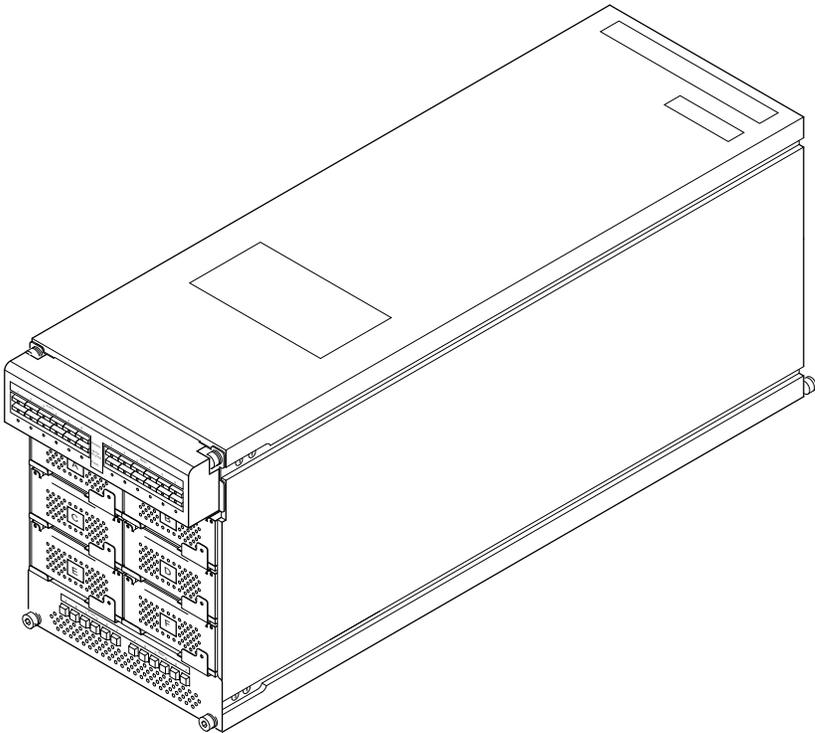
The SF31T-BA/HA/JA Embedded Storage Options include either an SF31T-BK Disk Storage Enclosure with .762 GB (2 RF31T ISEs) disk storage capacity, an SF31T- HK Disk Storage Enclosure with 2.29 GB (6 RF31T ISEs) disk storage capacity, or an SF31T-JK Disk Storage Enclosure with 4.58 GB (12 RF31T ISEs) disk storage capacity (Figure 2–2).

**Figure 2-1: SF7x Disk Storage Enclosure**



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**Figure 2-2: SF3x Disk Storage Enclosure**



MA-0432-92.DG

Each option contains an SF7x/SF3x Cab Kit (70-22845-01) which is used with the parts found in the SF7x-HK/JK and SF3x-BK/HK/JK for proper installation of the options as embedded storage in the VAX 6000 Series Cabinet.

**NOTE**

Each SF7x-HA/JA and SF3x-BA/HA/JA to be installed as embedded storage in the VAX 6000 Series Processor Cabinet requires one 70-22845-01 SF7x/SF3x Cab Kit.

The SF7x/SF3x Cab Kit 70-22845-01 includes the following materials needed to properly install the SF7x-HA/JA or SF3x-BA/HA/JA options:

**Table 2-2: SF7x/SF3x Cab Kit 70-22845-01 Parts List**

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
12-20580-08	Shield, EMI/RFI Fingers 8POS .760N	9
17-00442-27	PWR Cord, Term 3FT LG	1
17-02382-01	Cable Assy, Molded	1
74-35857-01	Bracket, Chassis Retaining, TOP	1
74-35857-02	Bracket, Chassis Retaining, BOT	1
74-35860-01	Bracket, Chassis Retaining, REAR	2
74-36160-01	Block, Wedge	2
74-39395-01	Shim	2
74-39405-01	Clip, Spring	2
90-00001-21	Standoff, Male/Female HEX 10-32 X1	1
90-00063-41	Screw, Sems 10-32 Pan .625 XRCS	2
90-06074-02	Screw, Mach 10-32 FLT .625 XRCS	2
90-06078-01	Screw, Mach. 10-32 PAN XRCS	2
90-06664-00	Washer, Flat SST .221ID X .051THK	2
90-07083-00	Clamp, Cable, Screw Mtd. 3/8"	1
90-07089-00	Clamp, Cable, Screw Mtd. 3/4"	1
90-07091-00	Clamp, Cable, Screw Mtd. 1"	1

**Table 2-2 (Cont.): SF7x/SF3x Cab Kit 70-22845-01 Parts List**

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
90-07880-00	Tie, Cable Bundl Dia 0-1.14"=101	4
90-07906-00	Washer, Helical Split Steel	2
90-08264-00	Mount, Cable Tie, Adhesive Backed	2

**NOTE**

The SF7x/SF3x Cab Kit 70-22845-01 does not contain all parts needed for complete installation of the SF7x-HA/JA and SF3x-BA/HA/JA options. Use the kit with parts received in your SF7x-HK/JK or SF3x-BK/HK/JK DSSI Storage Enclosure options.

To ensure completeness, take inventory of the kit and the SF7x-HK/JK or SF3x-BK/HK/JK enclosure options before beginning installation.

**2.2.5 SF72-UK Upgrade Kit**

The SF72-UK Upgrade Kit includes two RF72 ISEs and is only installed as an upgrade to the SF72-HK. Installation of the SF72-UK option does not require a 70-22845-01 kit. This manual does not discuss the installation of the SF72-UK. Refer to Appendix C for a list of documents pertaining to a specific option installation.

**2.2.6 SF73-UK Upgrade Kit**

The SF73-UK Upgrade Kit includes two RF73 ISEs and is only installed as an upgrade to the SF73-HK. Installation of the SF73-UK option does not require a 70-22845-01 kit. This manual does not discuss the installation of the SF73-UK. Refer to Appendix C for a list of documents pertaining to a specific option installation.

**2.2.7 SF35-UK Upgrade Kit**

The SF35-UK Upgrade Kit includes one RF35 ISE and is installed only as an upgrade to the SF35-BK or SF35-HK. Installation of the SF35-UK option does not require a 70-22845-01 kit. This manual does not discuss the installation of the SF35-UK. Refer to Appendix C for a list of documents pertaining to a specific option installation.

## 2.2.8 SF31T-UK Upgrade Kit

The SF31T-UK Upgrade Kit includes one RF31T ISE and is installed only as an upgrade to the SF31T-BK or SF31T-HK. Installation of the SF31T-UK option does not require a 70-22845-01 kit. This manual does not discuss the installation of the SF31T-UK. Refer to Appendix C for a list of documents pertaining to a specific option installation.

## 2.2.9 62X34-UA/UB Upgrade Kits

The 62X34-UA/UB Upgrade Kits contain parts to be installed on the VAX 6000 System cabinet. The parts give the customer access to the Operator Control Panel(s) (OCPs) of the SF7x-HA/JA and SF3x-BA/HA/JA embedded storage disk drive(s).

The 62X34-UA/UB Upgrade Kits contain:

**Table 2-3: 62X34-UA/UB Upgrade Kit Parts List**

Part Number	Description	-UA	-UB
70-26931-01	VAX 6000 Front Door with OCP Access	1	1
H405-E	VAX 6000 Power Controller, 120V/60Hz	1	-
H405-F	VAX 6000 Power Controller, 240V/50Hz	-	1
74-31616-02	Corporate Logo	1	1
74-39700-XX	Slug, Nameplate, VAX	1	1
36-26123-07	Ship Return Label	1	1
EK-62X34-CL	6000 Series Embedded Cover Letter	1	1

### NOTE

The -XX denotation for the slug/nameplate part numbers listed in Table 2-3 indicates each 62X34-UA/UB kit includes more than one variation. Choose the appropriate slug/nameplate and install it on the front door for the appropriate system.

The VAX 6000 front door included in these kits allows the customer access to the OCPs of the SF7x/SF3x Disk Storage enclosures through a slot that can be opened or closed.

### NOTE

Customer access to the OCP of the SF7x/SF3x disk storage enclosure is restricted to the slot located on the VAX 6000

cabinet front door. A qualified Digital Services engineer should perform any maintenance, repair, or installation procedures requiring alternative access to components.

It may be necessary to replace the H405 power controller installed in the VAX 6000 cabinet to properly install DSSI embedded storage devices. The 62X34-UA/UB Upgrade Kit contains the appropriate H405 power controller to be added. See Chapter 3 to determine if the replacement procedure is necessary.

## 2.3 Storage Enclosure Overview

The SF-series storage enclosures are available as follows::

- SF3x enclosure, which contains up to twelve half-height, 3-1/2" ISEs
- SF7x enclosure, which contains up to four full-height, 5-1/4" ISEs.

Each disk ISE within an SF-series enclosure is independently controlled from the operator control panel (OCP) on the front of the enclosure. A power supply in the enclosure provides the DC power and cooling for all disk ISEs installed in the enclosure.

### 2.3.1 SF3x Storage Enclosure

The SF3x storage enclosure (Figure 2–3) holds up to twelve RF3x series ISEs. Six slots are in the front of the enclosure and six slots are in the rear. Disk ISEs installed in these slots plug directly into a backplane, which is cabled to a connector tray on the top rear of the storage enclosure.

The SF3x enclosure can be configured in:

- Through-bus mode
- Split-bus mode

In through-bus mode, the six ISEs in the front of the SF3x enclosure are connected to a single DSSI bus, and the six ISEs on the rear of the SF3x enclosure are connected to a second DSSI bus.

In split-bus mode, each end of the enclosure (front and rear) is further divided into left-side ISEs and right-side ISEs, each connected to a separate DSSI bus. Thus, in split-bus mode there are four DSSI buses, each with three drives connected to it.

### 2.3.2 SF7x Storage Enclosure

The SF7x series storage enclosure (Figure 2–4) holds either two or four RF7x series ISEs. The ISEs in the SF7x storage enclosure can also be configured in:

- Through-bus mode
- Split-bus mode

In through-bus mode, all four disk ISEs are connected to a single DSSI bus.

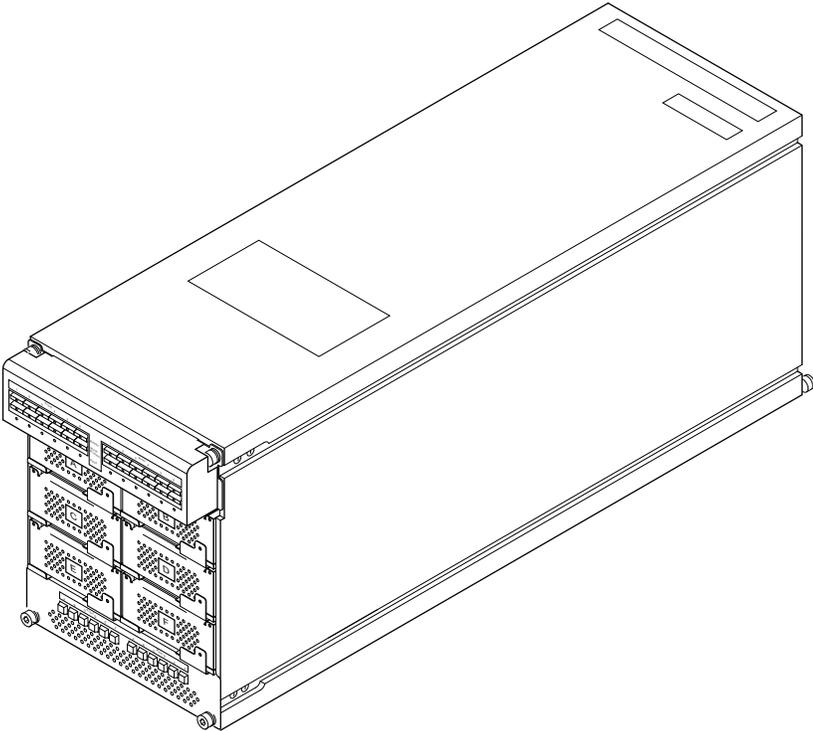
In split-bus mode, the left-side ISEs are connected to one DSSI bus, while the right-side ISEs are connected to a second DSSI bus.

Both SF-series storage enclosures have the following features:

- Operate in one of two modes: through-bus or split-bus.
- Each disk ISE has its own set of switches and indicators on the OCP.
- The enclosure power supply provides operating power to all disk ISEs and other subassemblies in the enclosure.
- The drive DC power switches for the disk ISEs are on the front panel of the storage enclosure.

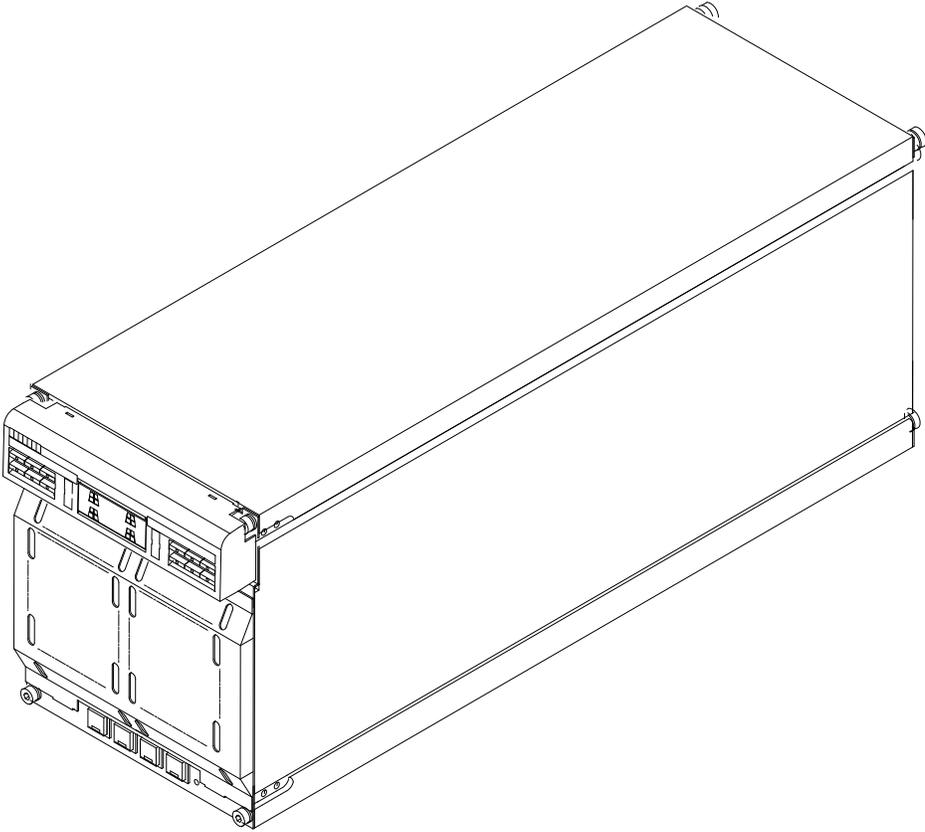
Specifications for the SF3x series storage enclosure are shown in Table 2–4. Specifications for the SF7x series storage enclosure are shown in Table 2–5.

**Figure 2-3: SF3x Series Storage Enclosure**



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**Figure 2-4: SF7x Series Storage Enclosure**



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**Table 2-4: SF3x Storage Enclosure Specifications**

<b>Characteristic</b>	<b>Specification</b>
Formatted storage capacity	
SF35-BK <sup>1</sup>	1.7 GBytes
SF35-HK <sup>2</sup>	5.1 GBytes
SF35-JK <sup>3</sup>	10.2 GBytes
SF31T-BK <sup>1</sup>	.762 GBytes
SF31T-HK <sup>2</sup>	2.3 GBytes
SF31T-JK <sup>3</sup>	4.6 Gbytes
Dimensions	H = 26.7 cm (10.5 inches) W = 22.2 cm (8.75 inches) D = 71.1 cm (28 inches)
Weight	
SF3x-BK <sup>1</sup>	26 kg (58 lb)
SF3x-HK <sup>2</sup>	33 kg (73 lb)
SF3x-JK <sup>3</sup>	40 kg (88 lb)
Agency compliance	FCC, UL, IEC, CSA, and VDE
Temperature	+10°C to +40°C (+50°F to +104°F). Decrease the rating 1.8°C for each 1000 meters altitude (1.0°F for each 1000 feet altitude)
Humidity	10% to 85% @ maximum wet bulb temperature of +32°C (+90°F) and minimum dew point of +2°C (+36°F)

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**Recommended Environmental Limits<sup>4</sup>**

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Operating environment	
Temperature	18°C to 24°C (64.4°F to 75.2°F) with an average rate of change of 3°C/hour maximum and a step change of 3°C or less

---

<sup>1</sup>The SF3x-BK contains two disk ISEs.

<sup>2</sup>The SF3x-HK contains six disk ISEs.

<sup>3</sup>The SF3x-JK contains twelve disk ISEs.

<sup>4</sup>These limits are for optimum equipment performance and reliability.

**Table 2-4 (Cont.): SF3x Storage Enclosure Specifications**

<b>Characteristic</b>	<b>Specification</b>
<b>Recommended Environmental Limits<sup>4</sup></b>	
Relative humidity	40% to 60% (noncondensing) with a step change of 10% or less (noncondensing)
Altitude	Up to 2400 meters (8000 feet)
Air quality (maximum particle count)	Not to exceed 500,000 particles per cubic foot of air at a size of 0.5 micron or larger
Air volume (at inlet)	50 cubic feet per minute (0.026 cubic meters per second)
Nonoperating environment	
Temperature	-40°C to +66°C (-40°F to +151°F)
Relative humidity	10% to 80%, noncondensing
Altitude	4900 meters (16,000 feet)
SF3x enclosure acoustic noise	7.0 bels
Nominal airflow through enclosure	45 to 65 cubic feet/minute
SF3x Input power requirements (47 to 63 Hz normal operation)	3.0 A @ 100 to 120 Vac (60 Hz), 1.5 A @ 220 to 240 Vac (50 Hz)
SF3x Power requirements during disk ISE spinup	4.5 A @ 100 to 120 Vac (60 Hz), 2.3 A @ 220 to 240 Vac (50 Hz)

<sup>4</sup>These limits are for optimum equipment performance and reliability.

**Table 2-5: SF7x Storage Enclosure Specifications**

<b>Characteristic</b>	<b>Specification</b>
Number of disk ISE positions	4 (RF series disk ISEs)
Formatted storage capacity	
SF72-HK <sup>1</sup>	2 GBytes
SF72-JK <sup>2</sup>	4 GBytes
SF73-HK <sup>1</sup>	4 GBytes
SF73-JK <sup>2</sup>	8 GBytes
Dimensions	H = 26.7 cm (10.5 inches) W = 22.2 cm (8.75 inches) D = 71.1 cm (28 inches)
Weight	
SF72-HK <sup>1</sup>	35 kg (72 lb)
SF72-JK <sup>2</sup>	41 kg (91 lb)
SF73-HK <sup>1</sup>	35 kg (72 lb)
SF73-JK <sup>2</sup>	41 kg (90 lb)
Agency compliance	FCC, UL, IEC, CSA, and VDE
Temperature	+10°C to +40°C (+50°F to +104°F). Decrease rating 1.8°C for each 1000 meters altitude (1.0°F for each 1000 feet altitude)
Humidity	10% to 85% @ maximum wet bulb temperature of +32°C (+90°F) and minimum dew point of +2°C (+36°F)

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**Recommended Environmental Limits<sup>3</sup>**

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Operating environment

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<sup>1</sup>The SF72-HK contains two RF72 disk ISEs. The SF73-HK contains two RF73 disk ISEs

<sup>2</sup>The SF72-JK contains four RF72 disk ISEs. The SF73-JK contains four RF73 disk ISEs.

<sup>3</sup>These limits are for optimum equipment performance and reliability.

**Table 2-5 (Cont.): SF7x Storage Enclosure Specifications**

<b>Characteristic</b>	<b>Specification</b>
<b>Recommended Environmental Limits<sup>3</sup></b>	
Temperature	18°C to 24°C (64.4°F to 75.2°F) with an average rate of change of 3°C/hour maximum and a step change of 3°C or less
Relative humidity	40% to 60% (noncondensing) with a step change of 10% or less (noncondensing)
Altitude	Up to 2400 meters (8000 feet)
Air quality (maximum particle count)	Not to exceed 500,000 particles per cubic foot of air at a size of 0.5 micron or larger
Air volume (at inlet)	50 cubic feet per minute (0.026 cubic meters per second)
Nonoperating environment	
Temperature	-40°C to +66°C (-40°F to +151°F)
Relative humidity	10% to 80%, noncondensing
Altitude	4900 meters (16,000 feet)
SF72 enclosure acoustic noise	6.2 bels
SF73 enclosure acoustic noise	6.0 bels
Nominal airflow through enclosure	45 to 65 cubic feet/minute
SF72 Input power requirements (47 to 63 Hz normal operation)	2.70 A @ 100 to 120 Vac (60 Hz), 1.20 A @ 220 to 240 Vac (50 Hz)
SF72 Power requirements during disk ISE spinup	3.50 A @ 100 to 120 Vac (60 Hz), 3.25 A @ 220 to 240 Vac (50 Hz)
SF73 Input power requirements (47 to 63 Hz normal operation)	2.4 A @ 100 to 120 Vac (60 Hz), 1.3 A @ 220 to 240 Vac (50 Hz)

<sup>3</sup>These limits are for optimum equipment performance and reliability.

**Table 2-5 (Cont.): SF7x Storage Enclosure Specifications**

<b>Characteristic</b>	<b>Specification</b>
<b>Recommended Environmental Limits<sup>3</sup></b>	
SF73 Power requirements during disk ISE spinup	4.7 A @ 100 to 120 Vac (60 Hz), 2.4 A @ 220 to 240 Vac (50 Hz)

<sup>3</sup>These limits are for optimum equipment performance and reliability.

## Chapter 3

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# Preparing the VAX 6000 System Cabinet

### 3.1 Introduction

This chapter describes:

- Steps necessary to prepare the VAX 6000 System Cabinet for properly installing DSSI embedded storage options
- Restrictions and considerations when installing the KFMSA (XMI-based DSSI Controller Module) and associated cable kits

### 3.2 Installing the 62X34-UA/UB Upgrade Kit

To install the 62X34-UA/UB Upgrade Kit:

1. Replace VAX 6000 front door with new door that allows customer access to Operator Control Panel (OCP) of the SF7x Embedded Storage Enclosure
2. Install appropriate logo/nameplate to front door
3. Replace H405-E/F VAX 6000 Power Controller with new H405-E/F power controller with unswitched AC power outlets.

#### **WARNING**

The following procedures should only be performed by a qualified Digital Services engineer. Digital customer access to the VAX 6000 system cabinet is limited through openings in the cabinet's front door.

### 3.2.1 Replacing the VAX 6000 Front Door

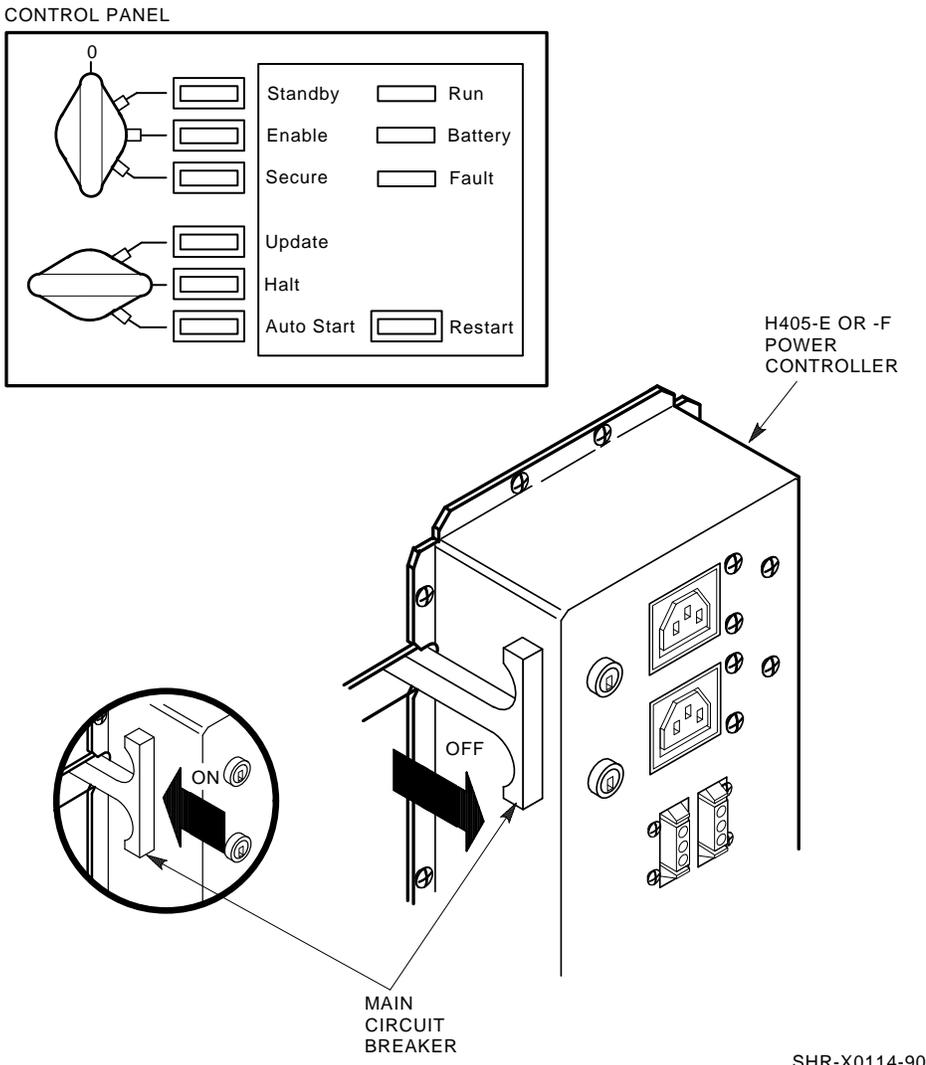
Most installations of VAX 6000/SF7x/SF3x embedded storage options require replacing the existing VAX 6000 system cabinet front door with the door included in the 62X34-UA/UB Upgrade Kit.

The new door will allow customer access through a slot to the SF7x-HA/JA, and SF3x-BA/HA/JA OCPs.

To remove the front door:

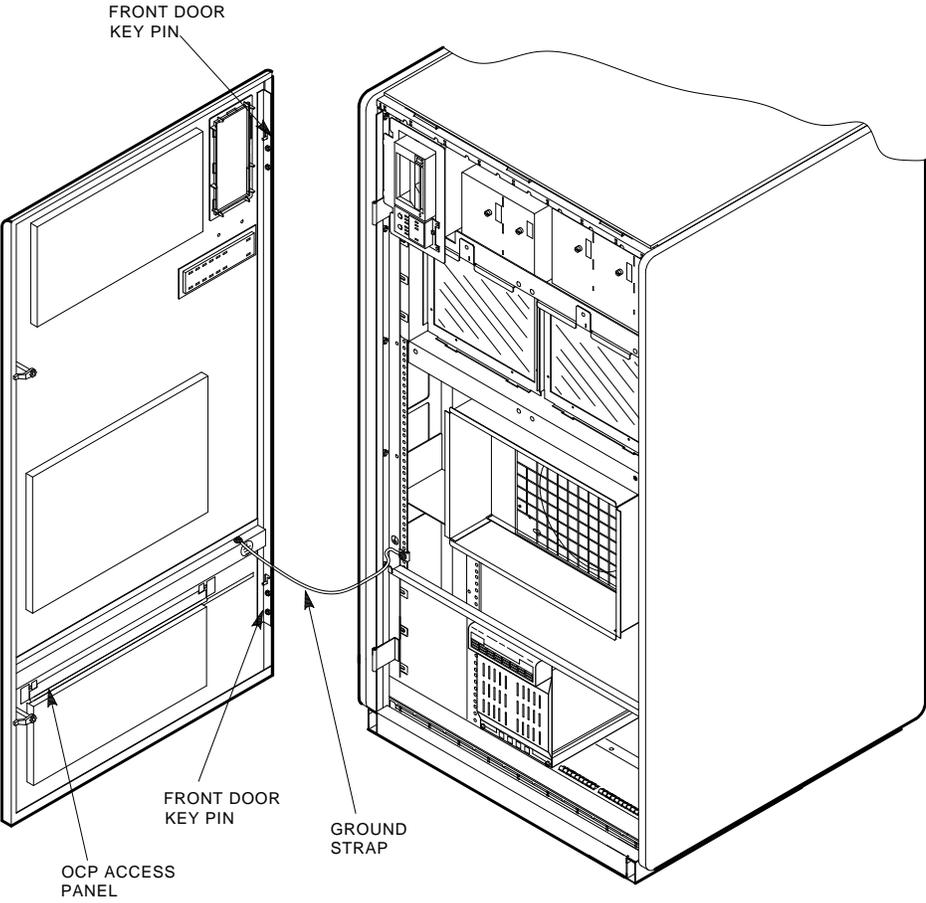
1. Perform an orderly shutdown of the system.
2. Turn the upper key switch on the front control panel to the "0" position (Figure 3-1).
3. From the rear of the VAX 6000 system cabinet, locate the H405 power controller (lower right corner) and remove power by means of the main circuit breaker (Figure 3-1).

**Figure 3-1: VAX 6000 Control Panel/H405 Main Circuit Breaker**



4. Unplug the system power cord from its receptacle.
5. Wait 2 minutes for all components to discharge.
6. Open the cabinet front door using a 5/32 hex key.
7. Remove the front door ground strap using a 3/8 inch nutdriver (Figure 3-2).
8. Pull up the pin in the top hinge of the front door and lock in place (Figure 3-2).
9. Swing the top of the door away from the cabinet and lift the bottom of the door up and out of the bottom hinge.
10. Remove the door and set it aside.

**Figure 3-2: Front View of VAX 6000 Series Cabinet**



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To install the new door:

1. Remove the new door from its packaging.
2. Ensure the top front door key pin is in its upper position (Figure 3–2).
3. Align bottom front door key pin with the bottom cabinet (Figure 3–2).
4. Swing the new door into position and release the top front door key pin into the top cabinet hinge, locking the door into position.
5. Reattach the front door ground strap with a 3/8 inch nutdriver.
6. Close and lock front door with 5/32 hex key if desired.

**NOTE**

Do not discard the packaging of the new VAX 6000 front door. The packaging may be reused to store the old front door.

### **3.2.2 Installing the Logo/Nameplate**

With the 62X34-UA/UB Upgrade Kit are a number of logos/ nameplates to be installed on the VAX 6000 System Cabinet front door. The replacement front door contains slots in which you install these logos/nameplates.

To properly install the logos/nameplates:

1. On the VAX 6000 System Cabinet front door, locate the two through holes directly below the opening for the tape drive option.
2. Install the corporate logo 74-31616-02 in the holes provided.
3. Select the appropriate nameplate that reflects the VAX 6000 system designation from the remaining slugs/nameplates provided, 74-39700-XX
4. Install the selected nameplate in the cutout directly below the corporate logo.

### **3.2.3 Replacing the H405-E/F VAX 6000 Power Controller**

**NOTE**

Replacing the H405-E/F VAX 6000 Power Controller may be necessary for VAX 6000/SF7x/SF3x embedded storage installations. To determine if this procedure is necessary, carefully follow the instructions in this section.

Installing the SF7x-HA/JA and SF3x-BA/HA/JA DSSI embedded storage options may require replacing the H405-E/F VAX 6000 Power Controller.

Some VAX 6000 System Cabinets may contain H405 Power Controllers with switched AC outlets. Replace any of these H405-E/F Power Controllers with the H405-E/F Power Controllers in the 62X34-UA/UB Upgrade Kits.

The H405-E/F power controller in the 62X34-UA/UB Upgrade Kit provides: Unswitched AC outlets with some electrical enhancements for proper operation installation of the SF7x-HA/JA and SF3x-BA/HA/JA DSSI options as embedded storage in the VAX 6000 cabinet.

### **3.2.3.1 Determining if H405-E/F Replacement is Necessary**

To determine if the H405-E/F replacement is necessary:

1. Perform an orderly system shutdown.
2. Turn the upper key switch on the front control panel to the "0" position (Figure 3–1).
3. From the rear of the VAX 6000 system cabinet, locate the H405 power controller (lower right corner) and remove power using the main circuit breaker (Figure 3–1).
4. Unplug the system power cord from its receptacle.
5. Wait 2 minutes for all components to discharge.
6. Locate the revision label on the side of the H405 Power Controller (Figure 3–1) and check revision. If the H405-E/F revision level is:
  - a. Revision H07 or above for H405-E, Revision J07 or above for H405-F:
    - The H405-E/F Power Controller contains unswitched AC outlets
    - Replacement of the H405-E/F is unnecessary
    - Go to Section 3.2.4.
  - b. Below revision H07 for H405-E, below Revision J07 for H405-F:
    - The H405-E/F Power Controller contains switched AC outlets
    - Replacement of the H405-E/F is necessary
    - Continue this procedure

7. Replace H405-E/F Power Controller with the one in the 62X34-UA/UB Upgrade Kit.

### 3.2.3.2 H405-E/F VAX 6000 Power Controller Removal and Replacement

To remove and replace the H405-E/F VAX 6000 Power Controller, refer to the *VAX 6000 Platform Service Manual*, EK-600EA-MG.

### 3.2.4 Installing the KFMSA Module for VAX 6000/SF7x/SF3x Embedded Storage Applications

#### NOTE

Digital Services engineers should review KFMSA module installation and cabling procedures before applying the concepts found in this section. Refer to the KFMSA Module Installation and User Manual *EK-KFMSA-IM* supplied with the KFMSA Module.

This section discusses:

- Regulations and restrictions for installing the KFMSA (XMI based) DSSI Controller Module
- Associated cable kits when applied to VAX 6000/SF7x/SF3x embedded storage configurations.

The following procedures include regulations and restrictions:

- Installing the KFMSA Module for VAX 6000/SF7x/SF3x embedded storage
- Locating the I/O bulkhead panel in the VAX 6000 system cabinet
- Using KFMSA ports for external DSSI Devices

This section does not include the following information about KFMSA module installation:

- General information about the KFMSA module
- Installing the KFMSA Module in the XMI backplane
- KFMSA Module Power-On Self-Test (POST)
- KFMSA Module verification procedures

#### NOTE

Please read the following sections completely before installing the KFMSA Module and cable kit. Special regulations and

restrictions apply to installing the KFMSA module when used for VAX 6000/SF7x/SF3x embedded storage.

#### **3.2.4.1 Installing the KFMSA Module for VAX 6000/SF7x/SF3x Embedded Storage**

To install the KFMSA module, follow the procedures described in the KFMSA Module Installation and User Manual (EK-KFMSA-IM). Use existing cable kits described in the manual. *DO NOT* mount the I/O Bulkhead Panel into the VAX 6000 cabinet until reading the following sections.

#### **3.2.4.2 Locating the I/O Bulkhead Panel for VAX 6000/SF7x/SF3x Embedded Storage**

Locating the I/O Bulkhead Panel is restricted to:

- Sections B1-B4 and C1-C4 of the VAX 6000 System Cabinet back panel insert locations (Figure 3-3).
- The I/O Bulkhead Panel in the rightmost available slot in the insert locations.
- The DSSI port located furthest to the right, which should be connected to:
  - The KFMSA Module with the lowest XMI node number (in the case of multiple KFMSA controllers)
  - Port 1 of that KFMSA (section D1-D2 of the XMI backplane)

### 3.2.4.3 Using KFMSA Ports with the SF7x/SF3x options

After installing the KFMSA, use the two available DSSI ports in the following manner:

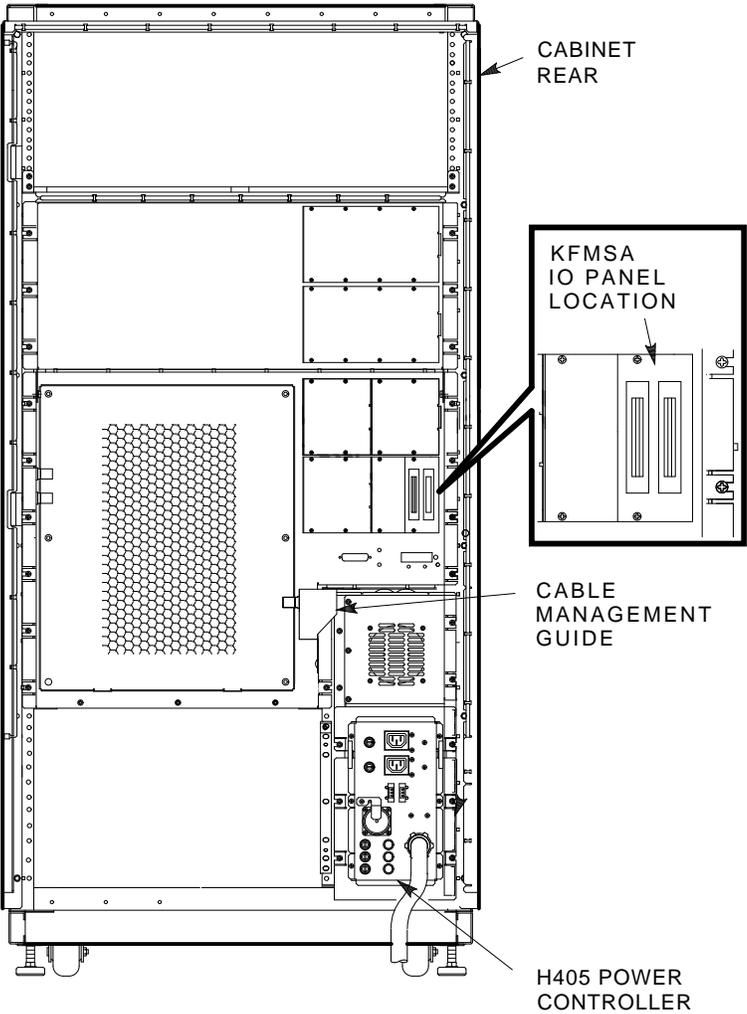
- For SF7x embedded storage options:
  1. Connect the first SF7x embedded storage option installed to Port 1 of the KFMSA with the lowest XMI node number, as described in Section 3.2.4.2.
  2. If a second SF7x option is installed, connect to Port 2 of the same KFMSA module.
  3. If a second SF7x option is not installed, Port 2 may be used for connection to external DSSI storage devices.
- For SF3x embedded storage options:
  1. Connect the DSSI bus located in the front section of the first SF3x storage enclosure installed to Port 1 of the KFMSA with the lowest XMI node number as described in Section 3.2.4.2.
  2. Connect the DSSI bus located in the rear section of the first SF3x storage enclosure installed to Port 2 of the KFMSA with the lowest XMI node number as described in Section 3.2.4.2.
  3. Connect a second SF3x embedded storage option in the same way as listed in the previous step using the 2 ports of the next KFMSA module installed.

#### NOTE

Each fully loaded SF3x embedded storage option requires 2, KFMSA port connections, that is, one KFMSA module. A VAX 6000 cabinet with 2, fully loaded SF3x embedded storage options (-JA variations) installed requires (4) KFMSA port connections (two KFMSA modules) for proper configuration.

KFMSA port uses discussed in the previous sections are guidelines only. When using the KFMSA ports in other configurations, follow general DSSI rules and regulations for bus length, number of nodes, etc.

Figure 3-3: KFMSA I/O Panel Location (-LJ Cab Kit)



LJ-00958-T10

## Chapter 4

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# Installing the SF7x/SF3x Embedded Storage Options

### 4.1 Introduction

This chapter lists the following procedures:

- Unpacking the SF7x-HA/-JA and SF3x-BA/-HA/-JA embedded storage options
- Powering Down the VAX 6000 system
- Installing the EMI/RFI BeCu spring clips
- Installing the guide rail plate assembly
- Preparing the SF7x/SF3x enclosures for installation
- Installing the SF7x/SF3x enclosures into the VAX 6000 System Cabinet

## 4.2 Unpacking the SF7x-HA/-JA and SF3x-BA/HA/JA Embedded Storage Options

The SF72-HA/-J and SF3x-BA/HA/JA embedded storage options are each packaged as self-contained units. Each unit should include the following material:

### SF7x Embedded Storage Options

Part Number	Description	-HA	-JA
SF72-HK	SF72 Enclosure w/2 GB Storage Cap.	1	-
SF72-JK	SF72 Enclosure w/4 GB Storage Cap.	-	1
SF73-HK	SF73 Enclosure w/4 GB Storage Cap.	1	-
SF73-JK	SF73 Enclosure w/8 GB Storage Cap.	-	1
70-22845-01	SF72 Cab Kit	1	1
	Mounting Hardware and Manuals	1	1

### SF3x Embedded Storage Options

Part Number	Description	-BA	-HA	-JA
SF35-BK	SF35 Enclosure w/1.7 GB Storage Cap.	1	-	-
SF35-HK	SF35 Enclosure w/5.1 GB Storage Cap.	-	1	-
SF35-JK	SF35 Enclosure w/10.2 GB Storage Cap.	-	-	1
SF31T-BK	SF31T Enclosure w/.762 GB Storage Cap.	1	-	-
SF31T-HK	SF31T Enclosure w/2.29 GB Storage Cap.	-	1	-
SF31T-JK	SF31T Enclosure w/4.6 GB Storage Cap.	-	-	1
70-22845-01	SF72 Cab Kit	1	1	1
17-02382-01	Cable Assy, Molded, Shielded	1	1	1
	Mounting Hardware and Manuals	1	1	1

#### **NOTE**

Unpack the unit and ensure all parts are present before attempting installation.

### **4.3 Powering Down the VAX 6000 System Cabinet**

To power down the VAX 6000 System Cabinet:

#### **WARNING**

The following procedures should be performed only by a qualified Digital Services engineer. Digital customer access to the VAX 6000 system cabinet is limited through openings in the cabinet front door.

1. Perform an orderly shutdown of the system.
2. Turn the upper key switch on the front control panel to the "0" position (Figure 3-1).
3. From the rear of the VAX 6000 system cabinet, locate the H405 power controller (lower right corner) and remove power through the main circuit breaker (Figure 3-1).
4. Unplug the system power cord from its receptacle.
5. Wait 2 minutes for all components to discharge.
6. Open the front and rear doors of the VAX 6000 system cabinet using 5/32 hex key.

#### NOTE

All procedures in these sections apply to installing the SF7x or SF3x disk storage enclosure into either side of the cavity in the VAX 6000 cabinet.

However, when installing only one SF7x or SF3x disk storage enclosure, install the enclosure into the right side of the cavity first (facing the front of the VAX 6000 system).

1

## 4.4 Installing the EMI/RFI BeCu<sup>1</sup> Spring Clips

Two types of BeCu spring clips are included in the SF7x/SF3x Cab Kit **70-22845-01**:

- 74-39405-01 /Qty 2
- 12-20580-08 /Qty 9

Use the following procedures to install these spring clips into the VAX 6000 cabinet.

### 4.4.1 Installing the 74-39405-01 Spring Clips

To install the **74-39405-01** BeCu spring clips into the VAX 6000 cabinet:

1. Locate the (2) **74-39405-01** spring clips in the SF7x/SF3x Cab Kit.
2. From the front of the VAX 6000 cabinet, locate the area in which the SF7x/SF3x disk storage enclosure is to be installed.

---

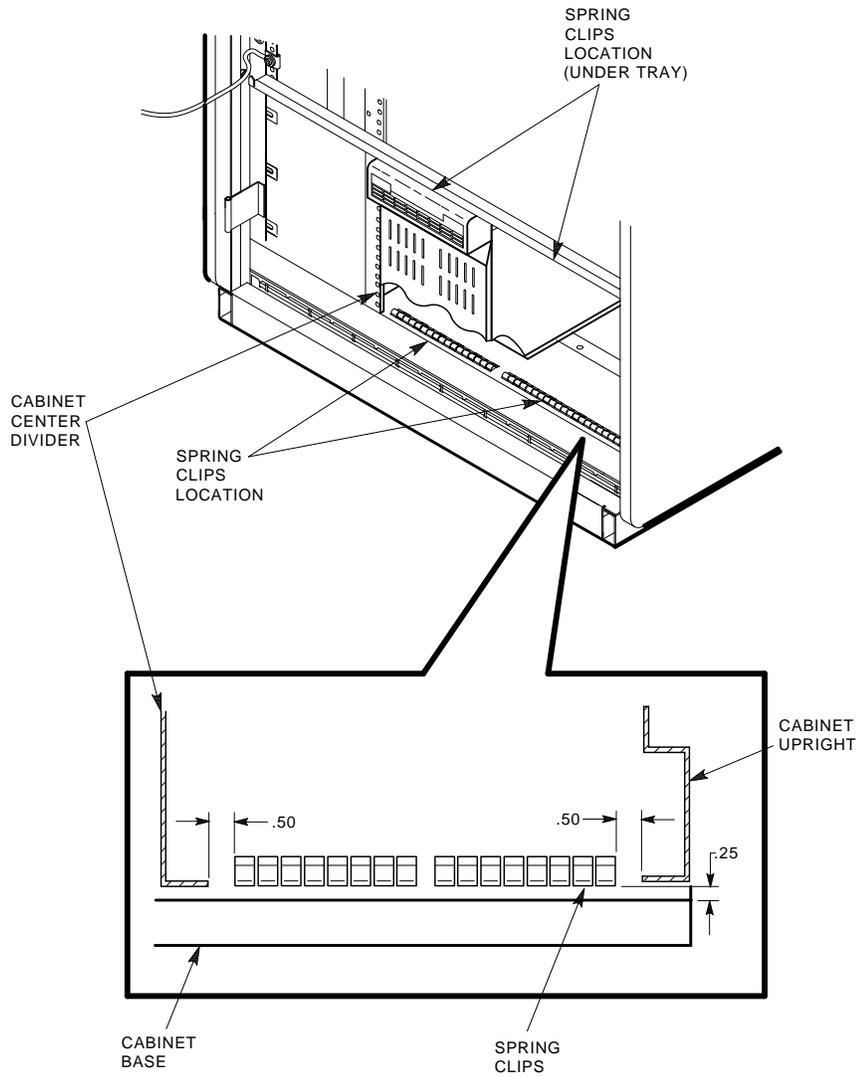
<sup>1</sup> BeCu = Beryllium Copper

3. With the spring clip hem facing the front of the VAX 6000 cabinet, remove the adhesive backing strip and install one spring clip along the bottom front rail .25 inches from the cabinet upright and .50 inches from the front of the cabinet base (Figure 4-1).
4. Install the second spring clip **74-39405-01** in the same way as previously stated to the underside of the shielding panel (Figure 4-1).

**CAUTION**

Only apply as much pressure as necessary to securely adhere the springs clips. Excessive pressure may bend or crack the clips, reducing their purpose.

**Figure 4-1: Installing the BeCu Spring Clips (74-39405-01) on the VAX 6000 Enclosure**



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*4-6 Installing the SF7x/SF3x Embedded Storage Options*

#### 4.4.2 Installing the 12-20580-08 BeCu Spring Clips

To install the **12-20580-08** BeCu spring clips into the VAX 6000 cabinet (Figure 4-2):

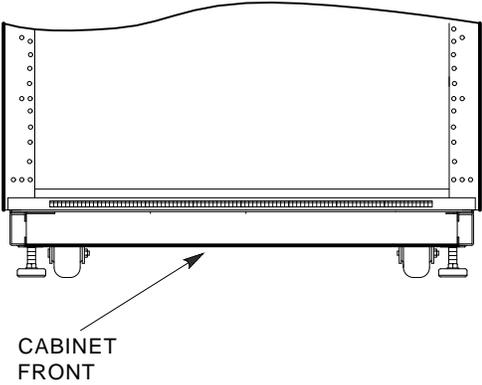
1. Locate the (9) **12-20580-08** spring clips in the SF7x/SF3x Cab Kit.
2. From the front of the VAX 6000 cabinet, locate the bottom front rail, which has holes along it (Figure 4-2).

#### NOTE

Some VAX 6000 cabinets may have a braided FCC gasket installed on this rail. Remove this braided gasket and replace with the supplied BeCu spring clips.

3. Remove gasket material if necessary.
4. Locate the approximate center of the front rail.
5. Remove the adhesive backing strip from the **12-20580-08** spring clip to be installed.
6. Install the first spring clip so the middle of the clip aligns with the center of the front rail of the cabinet (Figure 4-2).
7. Install the remaining (8) spring clips on both sides of the middle spring clip. (Four spring clips on each side (Figure 4-2)).

**Figure 4-2: Installing the BeCu Spring Clips (12-20580-08) on the VAX 6000 Enclosure**



LJ-00959-T10a

*4-8 Installing the SF7x/SF3x Embedded Storage Options*

## 4.5 Installing the Guide Rail

This section lists the procedure to install an SF7x/SF3x storage enclosure in a VAX 6000 series cabinet (Figure 4–3). Do not attempt this procedure unless you have performed the previous procedure.

### NOTE

When installing SF7x/SF3x embedded storage options into the VAX 6000 cabinet, the first options should be located in the right side (from the front) of the cabinet. If this location is already occupied, install the option in the remaining space.

When installing the SF7x/SF3x option into the left side (from the front) of the VAX 6000 cabinet, remove 2 screws (top and bottom) holding the transformer shield plate to the cabinet rail Figure 4–3.

The guide rail includes two parts:

- The "adjustable" end
- The "slotted" end

The adjustable end has four screws. When the screws are loosened, place the guide rail in the cabinet and then extend the guide rail to fit securely (Figure 4–3).

To install the guide rail:

1. Loosen the four screws in the adjustable end.

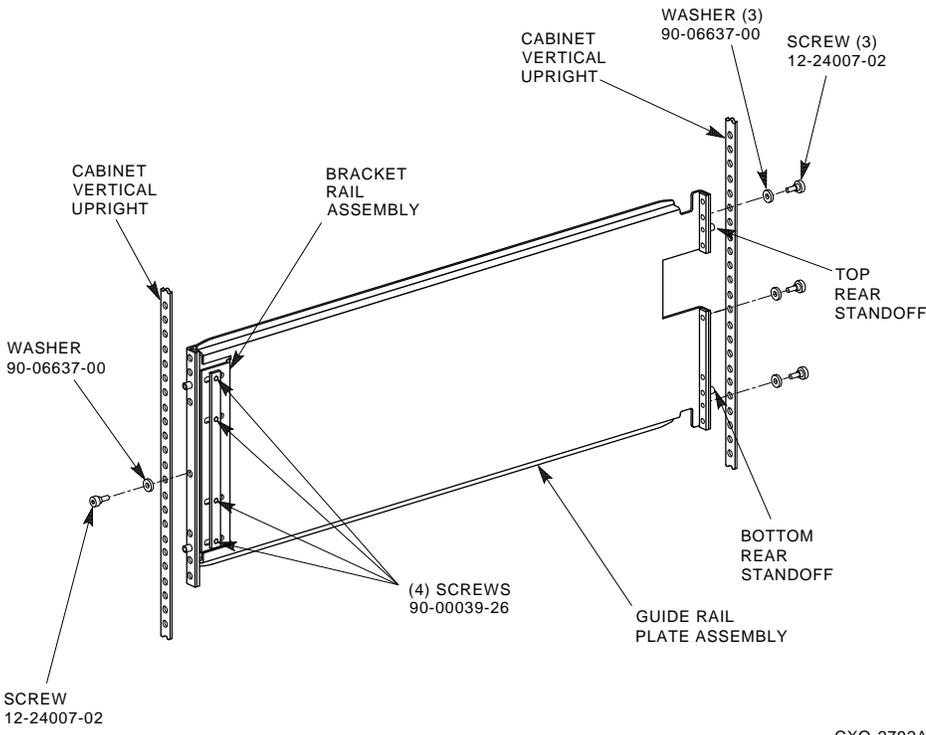
### NOTE

Each guide rail is stamped with the word "UP" and an arrow to indicate proper placement into the cabinet. These indicators should always be visible and in the correct position for proper installation of the guide rail.

2. From the front of the cabinet, place the guide rail in the cabinet so that the word "UP" and arrow are visible.

3. Go to the back of the cabinet. Count four (4) holes up from the bottom of the cabinet upright.
4. Insert the bottom guide pin through hole 4.
5. Insert the top rear guide pin through hole 15 of the rear cabinet upright. Install washer (90-06673-00) and shoulder screw (12-24007-02) into the center hole of the guide rail through hole 9 of the rear cabinet upright to hold the rail from falling (Figure 4–3).
6. Go to the front of the cabinet. Install washers (90-06637-00) and shoulder screw (12-24007-02) into the front center hole of the guide rail and through hole 9 of the cabinet upright (Figure 4–3).
7. Go to the rear of the cabinet. Install two washers (90-06637-00) and two shoulder screws (12-24007-02) into the following rear holes of the guide rail, securing the guide rail to the cabinet:
  - Hole 3 (hole below guide pin)
  - Hole 16

**Figure 4-3: Installing the Guide Rail**



CXO-2792A

8. Install the top shim (74-39395-01) over the top front standoff on the slide mount (hole 15). Place the bottom hole of the shim over the top front standoff (Figure 4-4).
9. Install the bottom shim (74-39395-01) over the bottom front standoff on the guide rail (hole 4). Place the bottom hole of the shim over the bottom front standoff.
10. Install the top front chassis retaining bracket (74-35857-01) over the top shim.
11. Install washers (90-06637-00) and shoulder screw (12-24007-01) through the top hole of the top chassis retaining bracket and into the middle hole of the shim (hole 16 of the cabinet upright). The shoulder screw is torqued to 30-inch pounds.
12. Install the bottom front chassis retaining bracket (74-35857-02) over the bottom shim.
13. Install washers (90-06637-00) and shoulder screw (12-24007-01) through the bottom hole of the top chassis retaining bracket and into the middle hole of the shim (hole 3 of the cabinet upright). The shoulder screw is torqued to 30-inch pounds.
14. Torque the three rear screws on the guide rail to 30-inch pounds.
15. Torque the four screws (90-00039-26) on the guide rail to 30-inch pounds (Figure 4-3).

## 4.6 Installing the SF7x/SF3x Storage Enclosure into the Cabinet

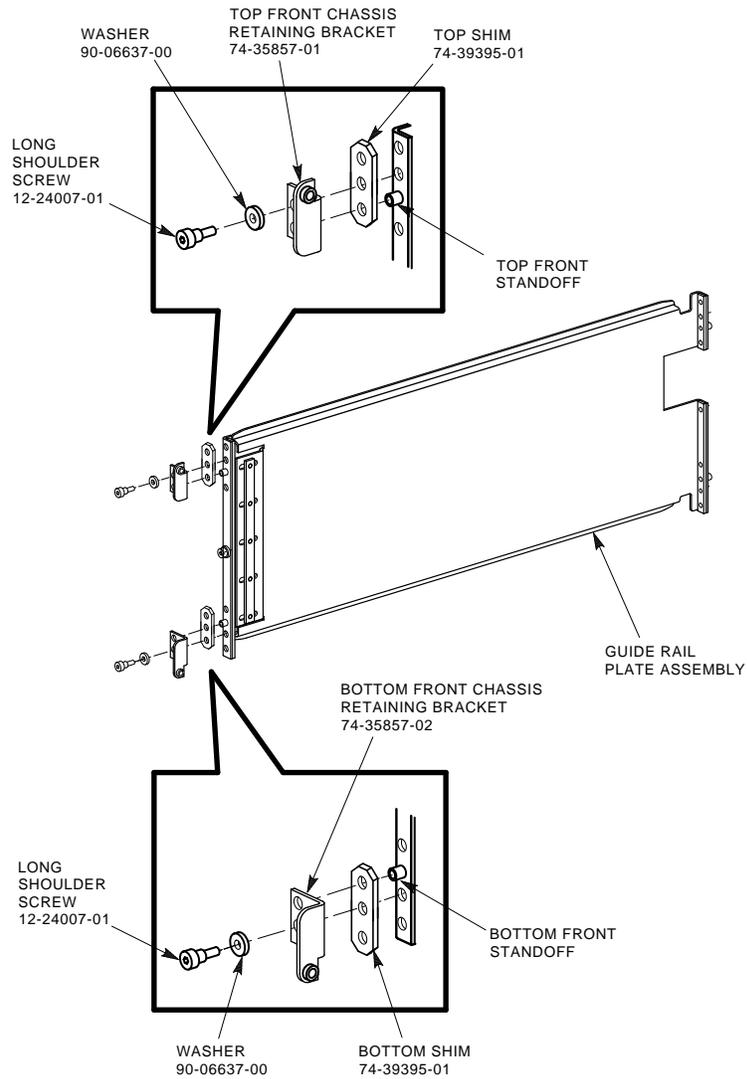
To install the SF7x/SF3x storage enclosure into the VAX 6000 cabinet:

1. Install both chassis retainers on the front, right, or left side of the SF7x/SF3x extrusion tube (top and bottom, (Figure 4-5).

### **WARNING**

Do not attempt to pick up, pull, or support the enclosure by the handle located in the rear of the enclosure. This will result in physical injury to the person attempting the installation or damage to the power supply.

**Figure 4-4: Installing the Shims**



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2. At the front of the cabinet, hoist the SF7x/SF3x assembly, using the lifting device or three people, to lift the SF7x/SF3x storage enclosure

up and onto the guide rail.

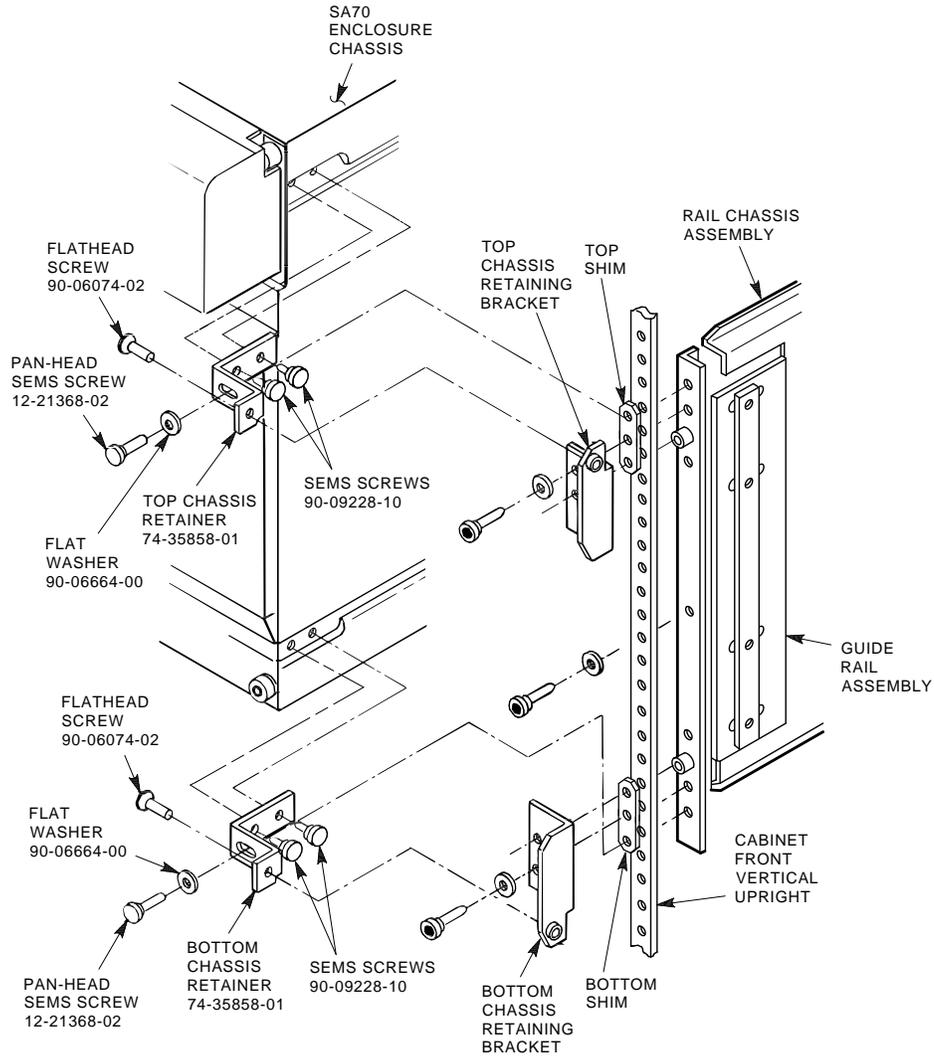
3. Push the SF7x/SF3x assembly all the way onto the guide rail until the chassis retainers contact the brackets.
4. Secure the enclosure to the guide rail by installing 10-32 x 5/8 inch flathead Phillips screws (90-06074-02) through the top and bottom chassis retainers and into the top and bottom chassis retainer brackets (Figure 4-5).

**NOTE**

Loosening the top and bottom chassis retainer brackets may ease screw installation. Be sure to retighten these screws.

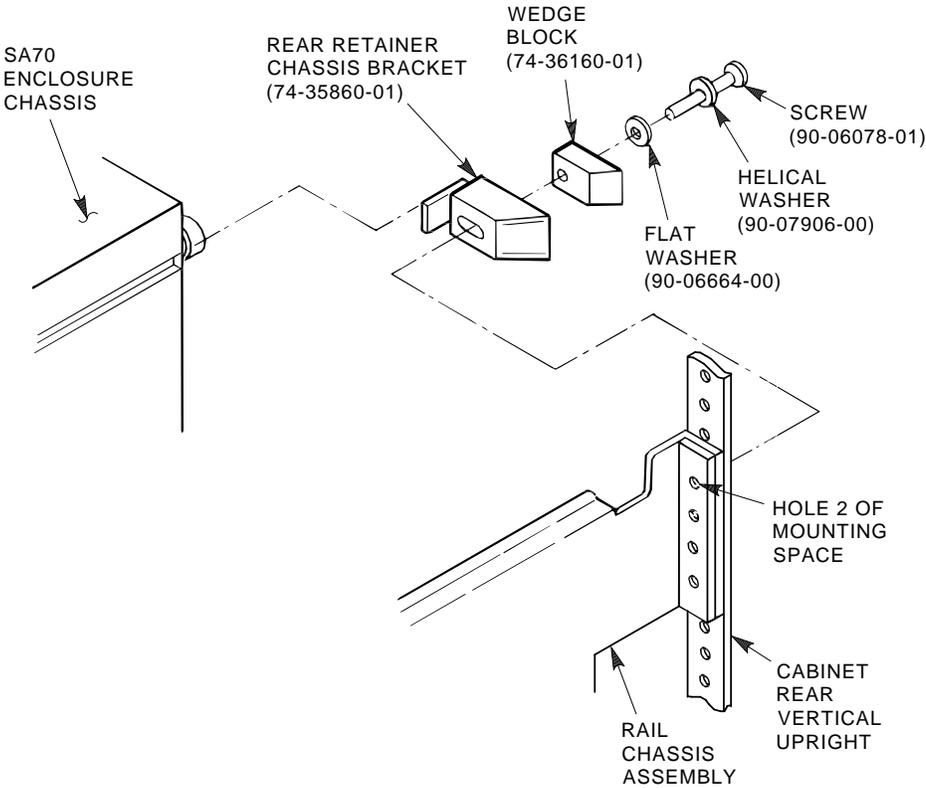
5. Secure the SF7x/SF3x enclosure to the guide rail with screws (12-21368-02) (Figure 4-5).

**Figure 4-5: Securing the SF7x/SF3x Enclosure in the Chassis Retainers**



6. Install the rear clamping assembly as follows:
  - a. Slide the rear retainer chassis bracket (74-35860-01) into the enclosure chassis (Figure 4–6).
  - b. Insert the following parts, in order listed, through the retainer chassis bracket and into hole 17 of the cabinet upright:
    - White nylon wedge block (74-36160-01)
    - Flat washer (90-06664-00)
    - Helical washer (90-07906-00)
    - Pan–head Phillips screw (90-06078-01)
  - c. Tighten the pan–head screws to secure the rear of the enclosure to the cabinet upright.
  - d. Repeat these steps for the bottom rear clamping assembly, installing the assembly through hole 3 of the cabinet upright.

**Figure 4-6: Rear Clamping Assembly**



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## 4.7 Preparing the SF7x Enclosure for Operation

### NOTE

Ensure that power has not been applied to the enclosure before performing the following procedures.

### 4.7.1 Configuring the SF7x OCP

#### CAUTION

Observe all ESD precautions and procedures. An antistatic wrist strap can be found inside the front and rear of the VAX 6000 cabinet.

#### 4.7.1.1 Removing and Adjusting the SF7x OCP

To remove and adjust the SF7x OCP for proper installation and operation in the VAX 6000 cabinet:

1. Remove the SF7x OCP by grasping with both hands and carefully pulling straight away from the SF7x enclosure.
2. Adjust the SF7x OCP mount (Figure 4–7) to the **LEFT** position for the embedded storage option located in the right side (from the front) of the VAX 6000 cabinet.
3. Adjust the SF7x OCP mount (Figure 4–7) to the **RIGHT** position for the embedded storage option located in the left side (from the front) of the VAX 6000 cabinet.

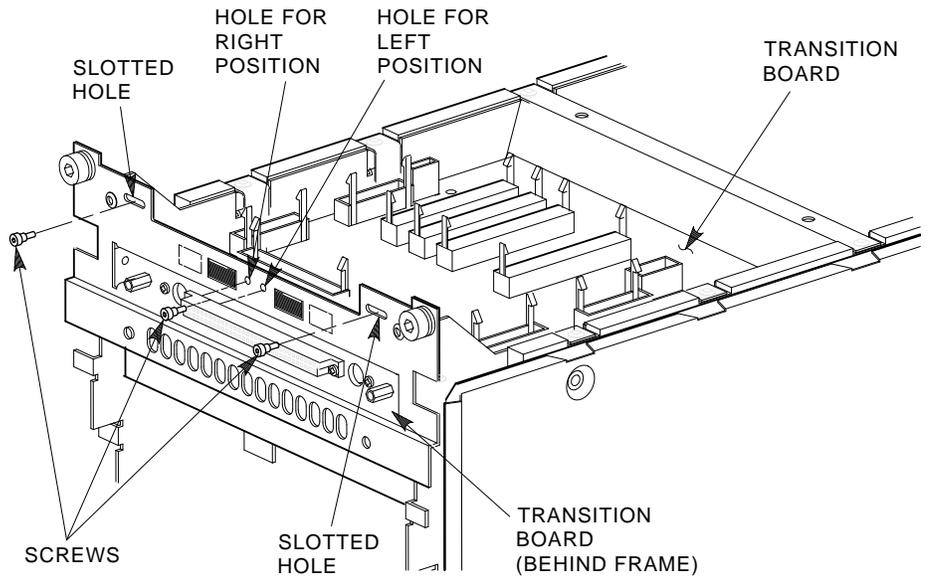
#### 4.7.1.2 Checking the SF7x DSSI ID Switches on the OCP

### NOTE

Perform the following steps with the SF7x OCP removed from the storage enclosure.

1. Open the door on the front of the OCP.
2. Ensure that the DSSI ID switches (the three right-most switches) are set according to Figure 4–8.

**Figure 4-7: Adjusting the SF7x OCP**



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3. If they are not, then use a pointed instrument to set the switches to their proper configuration (Table 4-1).

**CAUTION**

Do not use a mechanical pencil to set the SF7x OCP switches.

**NOTE**

The MSCP switch should be in the down or enabled position at all times unless you are instructed to change it to the up or disabled position.

**Table 4-1: SF7x DSSI ID Switch Settings**

---

<b>Both Positions<sup>1</sup></b>	
Left Rear (LR)	001
Left Front (LF)	010
Right Front (RF)	011
Right Rear (RR)	100

---

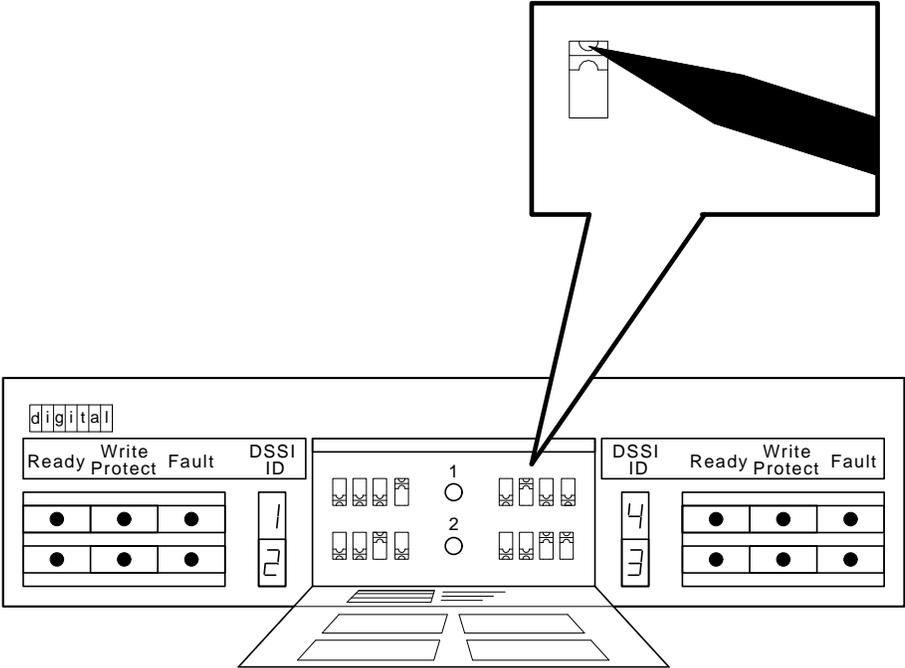
<sup>1</sup>"0" = down and "1" = up.

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**NOTE**

If the SF7x is to be used with a stripeset configuration, refer to Appendix A.

Figure 4–8: DSSI ID Switch Settings

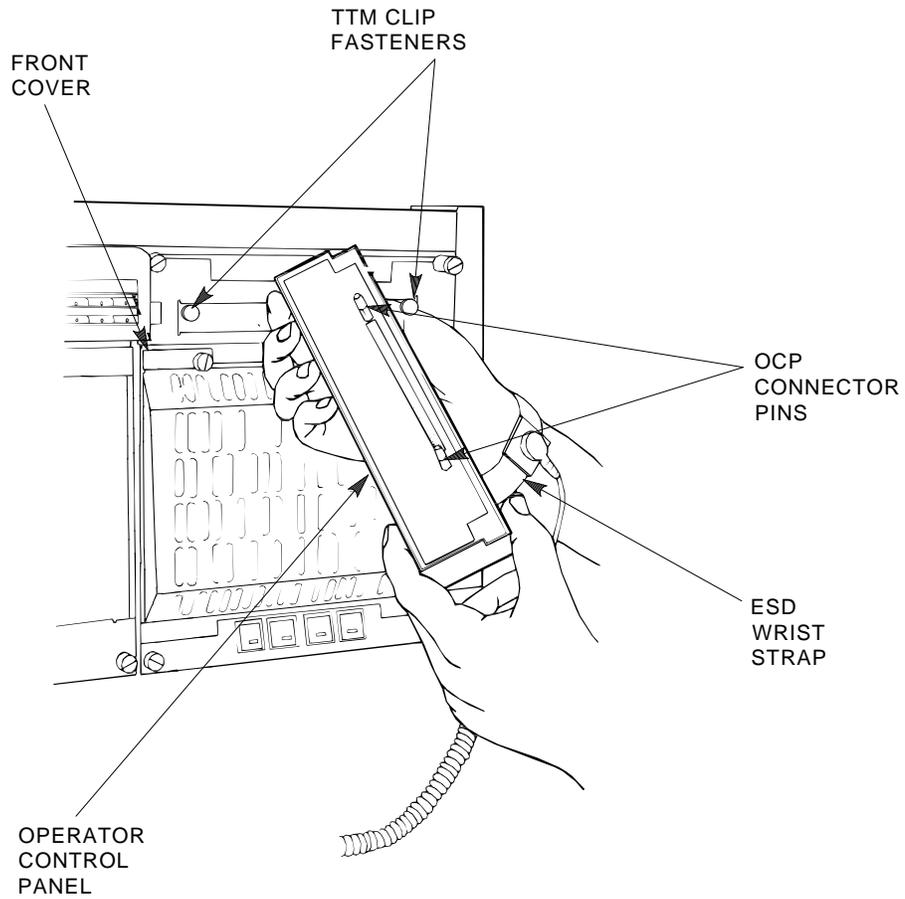


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### 4.7.1.3 Installing the SF7x OCP

Reverse the SF7x OCP removal procedure to install the properly configured SF7x OCP onto the storage enclosure (Figure 4–9).

**Figure 4–9: Installing the OCP on the SF7x Enclosure**



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## 4.7.2 Preparing the SF7x for Power Up

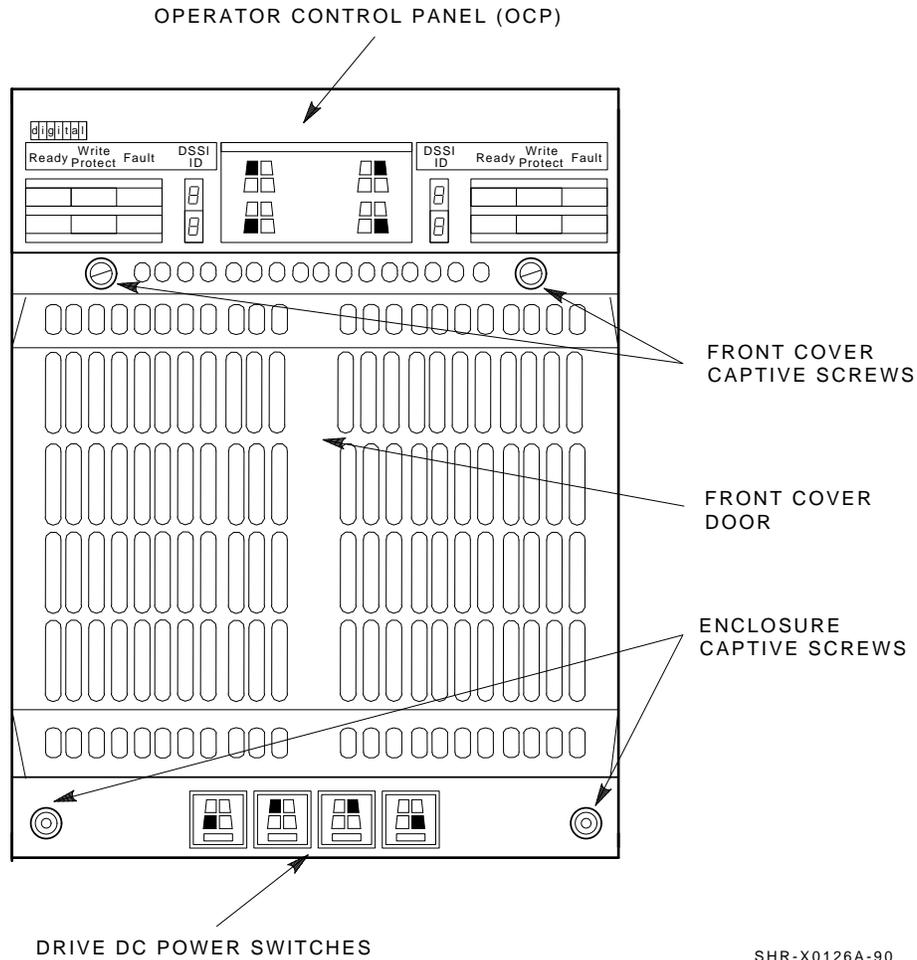
Perform the following steps to prepare the SF7x embedded storage option for proper installation and operation in the VAX 6000 cabinet.

### **WARNING**

Ensure that power has not been applied to the SF7x enclosure at this time. Do not connect or apply power to the option until instructed to do so.

1. At the front of the SF7x enclosure, make sure all four (4) drive DC power switches are out (Figure 4–10).

**Figure 4–10: Drive DC Power Switches**

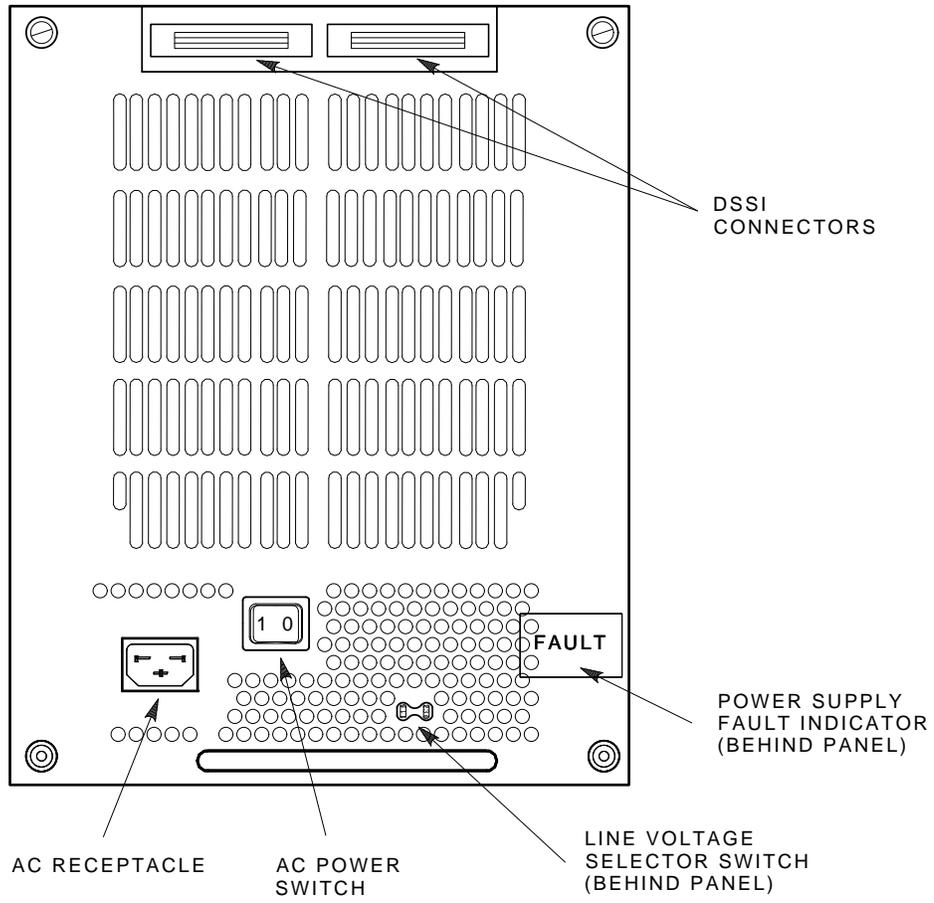


2. At the rear of the SF7x enclosure, make sure that the ac power switch is off or in the "0" position (Figure 4–11).
3. Check the select line voltage. Set it to the proper setting for your application.
4. Connect the ac power cord to the SF7x enclosure.

**CAUTION**

Do not apply power to the SF7x storage enclosure at this time.

**Figure 4–11: AC Power Switch, Voltage Selections, and Power Cord**



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## 4.8 Preparing the SF3x Enclosure for Operation

### NOTE

Ensure power has not been applied to the enclosure before performing the following procedures.

### 4.8.1 Configuring the SF3x OCP

#### CAUTION

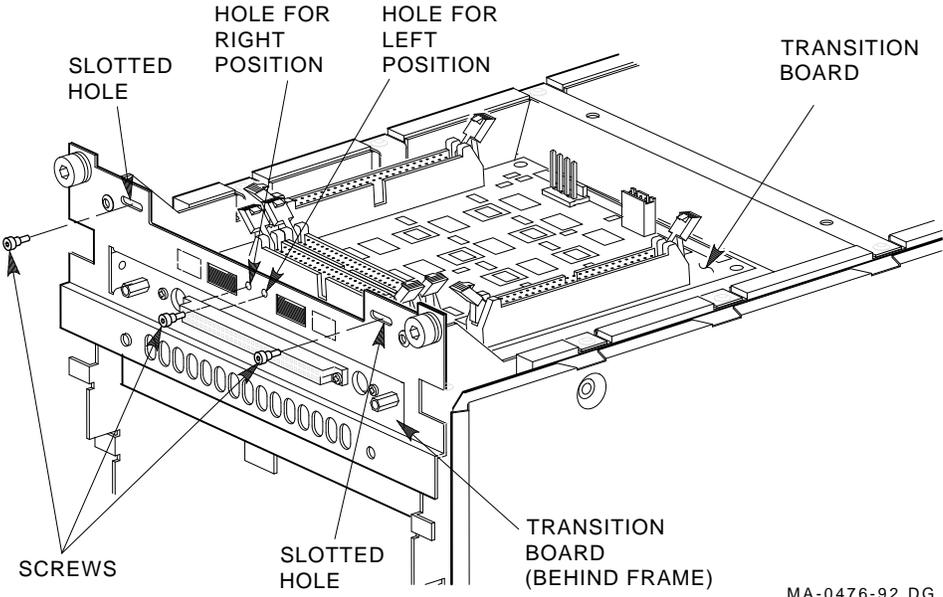
Observe all ESD precautions and procedures. An antistatic wrist strap can be found inside the front and rear of the VAX 6000 system cabinet.

#### 4.8.1.1 Adjusting the SF3x OCP

To adjust the SF3x OCP for proper installation and operation in the VAX 6000 cabinet:

1. Remove the SF3x OCP by grasping with both hands and carefully pulling straight away from the SF3x enclosure.
2. Adjust the SF3x OCP mount (Figure 4–12) to the **LEFT** position for the embedded storage option located in the right side (from the front) of the VAX 6000 cabinet.
3. Adjust the SF3x OCP mount (Figure 4–12) to the **RIGHT** position for the embedded storage option located in the left side (from the front) of the VAX 6000 cabinet.
4. Reverse the SF3x OCP removal procedure to install the properly configured SF3x OCP onto the storage enclosure.

**Figure 4-12: Adjusting the SF3x OCP**



## 4.8.2 SF3x DSSI Node Numbers

The SF3x embedded storage enclosure DSSI node numbers are preset at the factory as nodes 0-5. Table 4–2 lists the DSSI node IDs set at the factory:

**Table 4–2: SF3x Factory-set DSSI Node IDs**

Position	Backplane Location	DSSI Node ID
A	upper left slot	0
B	upper right slot	1
C	middle left slot	2
D	middle right slot	3
E	lower left slot	4
F	lower right slot	5

In some installations, SF3x DSSI node numbers may have to be changed to accommodate other devices configured on the same DSSI bus.

To determine if it is necessary to change the node numbers, consider:

1. The number of RF3x ISEs installed in the SF3x enclosure
  - If this is a (2) drive option (SF3x-BA), only node 0 and 5 will be used leaving nodes 1-4 for other devices.
  - If this is a (6) drive option (SF3x-HA), nodes 0-5 inclusive will be used. The rear half (DSSI bus 1) of the SF3x Option will be fully populated.
  - If this is a (12) drive option (SF3x-JA), nodes 0-5 inclusive will be used on both DSSI buses (front and rear of the SF3x enclosure are fully populated).
2. KFMSA DSSI node numbers
  - DSSI node numbers assigned to the KFMSA XMI Adapter Module(s) should not conflict with the DSSI node numbers of the ISEs within the SF3x enclosure.
  - Installing the SF3x Embedded Storage Option in a DSSI VAX-Cluster environment may produce conflicting DSSI node numbers.

### 3. TF85B-AA Embedded Tape Drive Node number

- The TF85B-AA embedded tape drive subsystem is preset at the factory as DSSI node number 0. If you are connecting the SF3x option to the same DSSI bus as that of the TF85B-AA, ensure each DSSI node number is unique.

If it is necessary to change the SF3x DSSI node numbers, follow Section 4.8.2.1.

#### 4.8.2.1 Changing the SF3x Node Numbers

You can change the DSSI node ID for an ISE in any given slot position by using DIP switches provided on the SF3x enclosure's transition module. Figure 4–13 shows the location of the switches for each slot position. Table 4–3 shows what the switches must be set to for each slot position.

To set the SF3x DSSI node numbers, use the following tables. Refer to Figure 4–13 for switch pack location of each RF3x ISE within the SF3x storage enclosure.

#### **NOTE**

In SF3x enclosure options not fully populated (-BA and -HA variations), empty RF3x ISE slots do not occupy a DSSI node on that specific bus. To prepare for upgrades to these SF3x enclosures, switch settings may be set at initial installation.

**Table 4-3: DSSI Node ID Switch Settings for SF3x Storage Enclosure**

Slot Position	Front Switch	Rear Switch	DSSI Node ID	Switch Positions <sup>1</sup>			
				1	2	3	4
A	S3	S10	0	X	1	0	0
			1	X	0	0	0
			2	X	1	1	0
			3	X	0	1	0
			4	X	1	0	1
			5	X	0	0	1
			6	X	1	1	1
			7	X	0	1	1
B	S1	S9	0	X	0	1	0
			1	X	1	1	0
			2	X	0	0	0
			3	X	1	0	0
			4	X	0	1	1
			5	X	1	1	1
			6	X	0	0	1
			7	X	1	0	1
C	S6	S7	0	X	1	1	0
			1	X	0	1	0
			2	X	1	0	0
			3	X	0	0	0
			4	X	1	1	1
			5	X	0	1	1
			6	X	1	0	1
			7	X	0	0	1

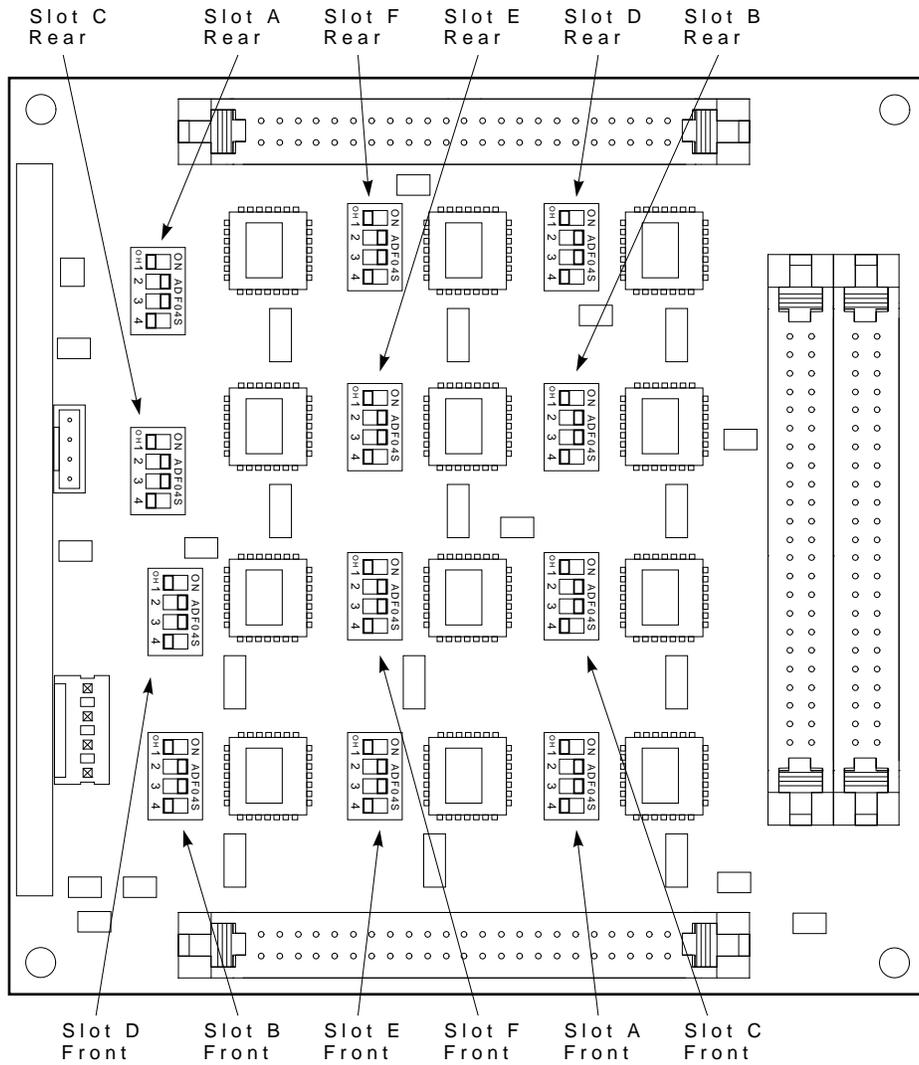
<sup>1</sup> 1 = On, 0 = Off, X = Does not matter

**Table 4-3 (Cont.): DSSI Node ID Switch Settings for SF3x Storage Enclosure**

Slot Position	Front Switch	Rear Switch	DSSI Node ID	Switch Positions <sup>1</sup>			
				1	2	3	4
D	S4	S12	0	X	0	0	1
			1	X	1	0	1
			2	X	0	1	1
			3	X	1	1	1
			4	X	0	0	0
			5	X	1	0	0
			6	X	0	1	0
			7	X	1	1	0
E	S2	S8	0	X	1	0	1
			1	X	0	0	1
			2	X	1	1	1
			3	X	0	1	1
			4	X	1	0	0
			5	X	0	0	0
			6	X	1	1	0
			7	X	0	1	0
F	S5	S11	0	X	0	1	1
			1	X	1	1	1
			2	X	0	0	1
			3	X	1	0	1
			4	X	0	1	0
			5	X	1	1	0
			6	X	0	0	0
			7	X	1	0	0

<sup>1</sup> 1 = On, 0 = Off, X = Does not matter

**Figure 4–13: SF3x Transition Module DSSI Node ID Switches**



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### 4.8.3 Preparing the SF3x for Power Up

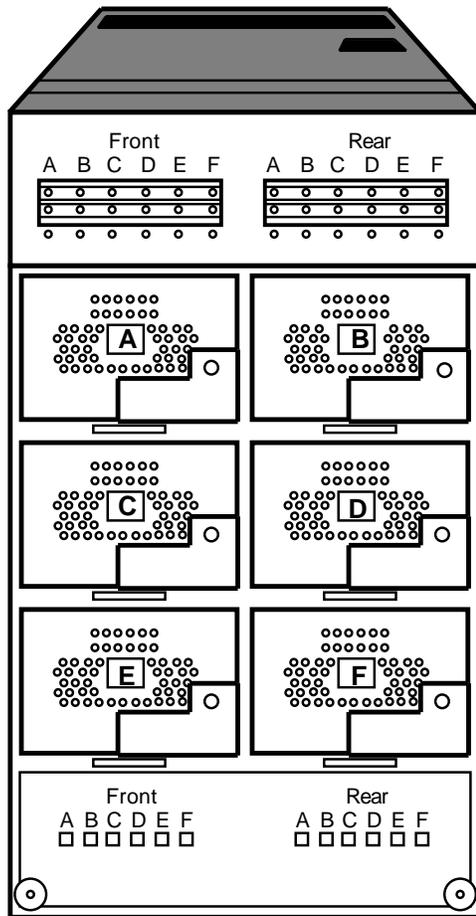
To prepare the SF7x embedded storage option for proper installation and operation in the VAX 6000 cabinet:

#### **WARNING**

Ensure that power has not been applied to the SF3x storage enclosure at this time. Do not connect or apply power to the option until instructed to do so.

1. At the front of the SF3x enclosure, make sure all four (12) drive DC power switches are out (Figure 4-14).

**Figure 4-14: Drive DC Power Switches**



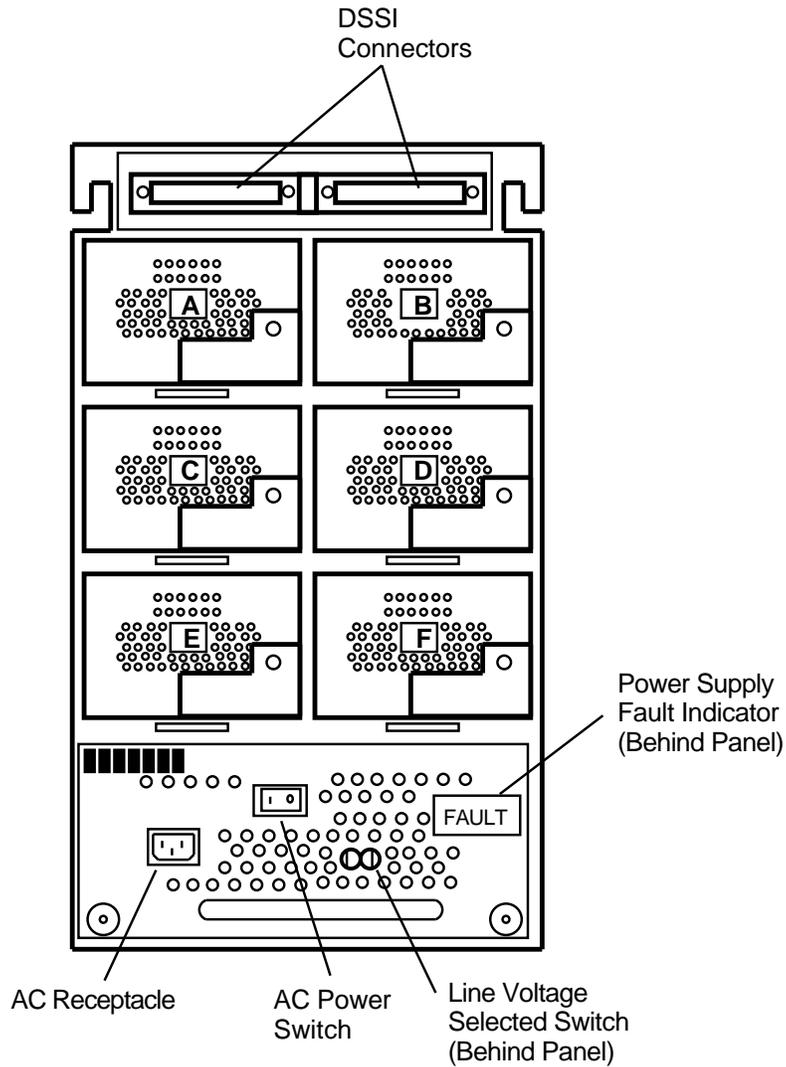
MA-0434-92.GRA

2. At the rear of the SF3x enclosure, ensure that the ac power switch is off or in the "0" position (Figure 4–15).
3. Check the select line voltage. Set it to the proper setting for your application.
4. At this time, connect the ac power cord to the SF3x enclosure.

**CAUTION**

Do not apply power to the SF3x storage enclosure at this time.

Figure 4–15: AC Power Switch, Voltage Selections, and Power Cord



MA-0430-92.GRA

## Chapter 5

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# Cabling the SF7x Enclosure in the VAX 6000 Series Cabinet

### 5.1 Introduction

This chapter lists the procedure for cabling the SF7x storage enclosure to the DSSI bus configuration of the VAX 6000 series cabinet. Refer to Appendix A for disk striping.

### 5.2 Cabling the Right Position

#### CAUTION

Before doing any of the following steps, refer to the system documentation for the proper steps to an orderly shutdown of the system to which the storage enclosure is connected. Failure to do so will result in system user problems.

The following lists the steps to cable the SF7x storage enclosure into the right position of the VAX 6000 series cabinet.

#### NOTE

The right position refers to the storage position in the VAX 6000 series cabinet on the right when viewing the front of the system cabinet.

1. At the rear of the system cabinet, locate the DSSI I/O panel.

### CAUTION

Do not disturb or damage any existing cables connected to or near the DSSI I/O panel.

2. Install a 42-inch DSSI cable (BC21Q-3F) to the right-most available DSSI connector on the DSSI I/O panel.
3. Route this DSSI cable through the cable management guide (Figure 5–1).
4. Plug the other end of this cable into the left-most DSSI connector located at the rear of the SF7x enclosure.
5. Remove the screw holding the H7206 and replace with a standoff (90-00001-21).
6. Secure the DSSI cable with a cable clamp (90-07083-00) using the same screw that was removed.

### NOTE

If installing more than one SF7x enclosure, use a larger cable clamp (90-07089-00) to hold both DSSI cables.

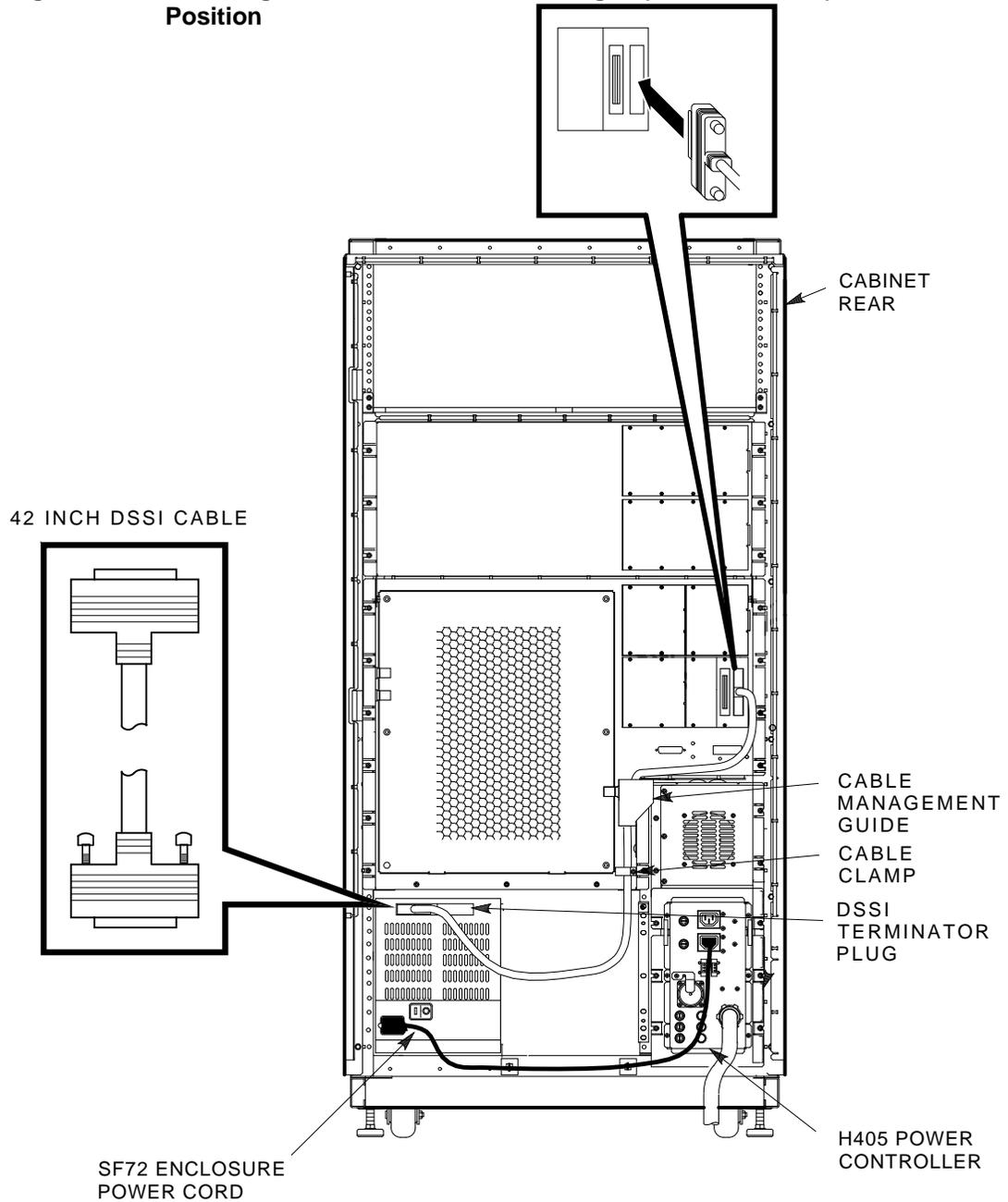
7. Install a DSSI terminator in the right-most DSSI connector located at the rear of the SF7x storage enclosure.

### CAUTION

Do not apply power to the SF7x storage enclosure at this time.

8. Plug the three-foot power cord (17-00442-27) into the SF7x enclosure AC receptacle (Figure 4–11).
9. Plug the other end of the power cord to either available AC outlet at the rear of the H405 Power Controller (Figure 5–1).
10. Install two stick-ons (90-08264-00) along the bottom rail (just below the SF7x enclosure) and secure the power cord with tie-wraps (90-07880-00) (Figure 5–1).
11. Apply system power.

**Figure 5-1: Installing the DSSI Cable for the Right (from the Front) Position**



## 5.3 Cabling the Left Position

### CAUTION

Before doing any of the following steps, refer to the system documentation for the proper steps to an orderly shutdown of the system to which the storage enclosure is connected. Failure to do so will result in system user problems.

The following section lists the steps for cabling the SF7x storage enclosure into the left position of the VAX 6000 series cabinet:

### NOTE

The left position refers to the storage position in the VAX 6000 series cabinet on the left when viewing the front of the system cabinet.

1. At the rear of the system cabinet, locate the DSSI I/O panel.

### CAUTION

Do not disturb or damage any existing cables connected to or near the DSSI I/O panel.

2. Install a 42-inch DSSI cable (BC21Q-3F) to the left DSSI connector on the DSSI I/O panel.
3. Route this DSSI cable under the cable management guide on the appropriate side of the cabinet (Figure 5-2).
4. Plug the other end of this cable into the left-most DSSI connector located at the rear of the SF7x enclosure.
5. Install a DSSI terminator in the right-most DSSI connector located at the rear of the SF7x storage enclosure.

### NOTE

If installing more than one SF7x enclosure, use a larger cable clamp (90-07089-00) to hold both DSSI cables.

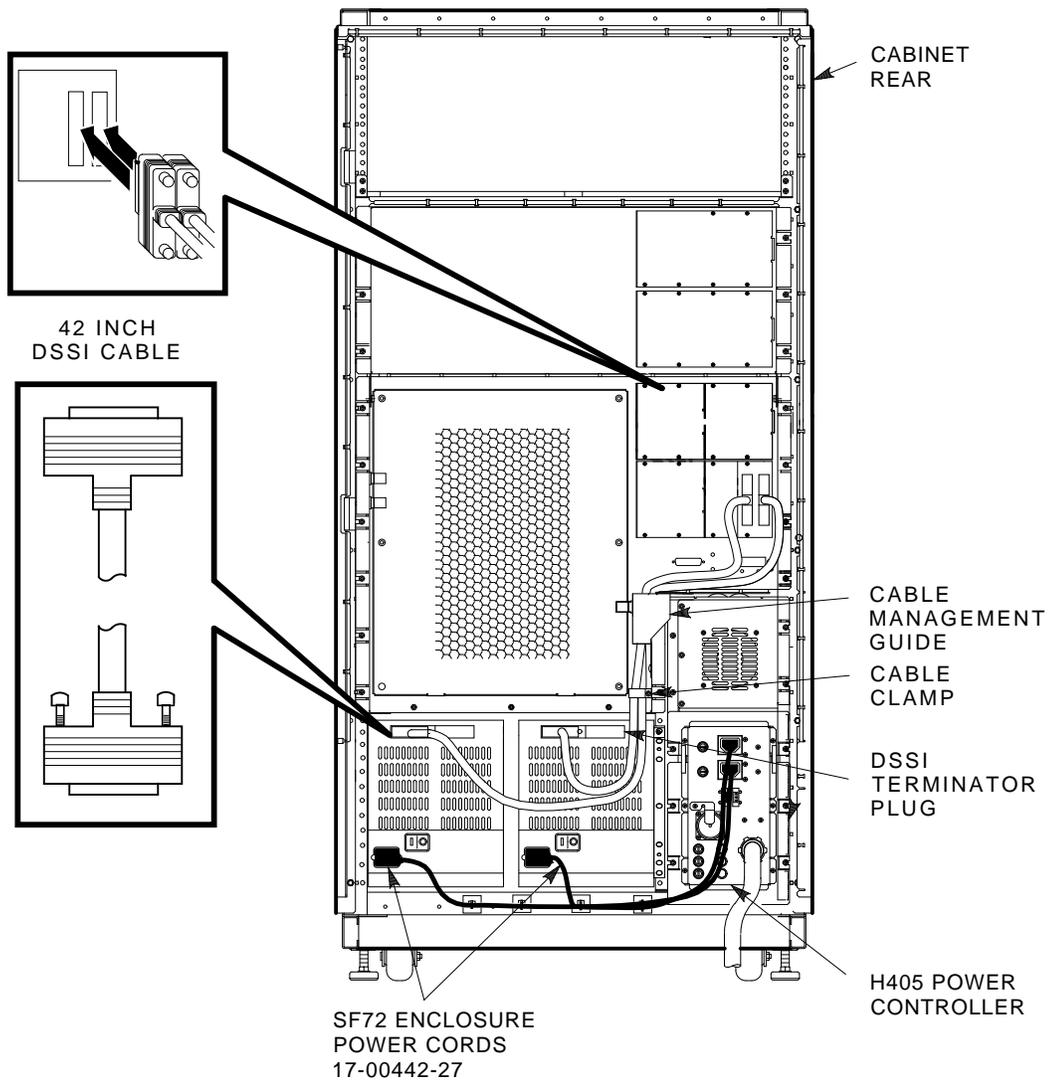
6. Plug the three-foot power cord (17-00442-27) into the SF7x enclosure AC receptacle (Figure 4-11).
7. Plug the other end of the power cord into either available AC outlet at the rear of the H405 Power Controller (Figure 5-1).

8. Install two stick-ons (90-08264-00) along the bottom rail (just below the SF7x enclosure) and secure the power cord with tie-wraps (90-07880-00) (Figure 5–1).
9. Apply system power.

**CAUTION**

Do not apply power to the SF7x storage enclosure at this time.

**Figure 5-2: Installing the DSSI Cable for the Left (From the Front) Position**



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## 5.4 Powering On the SF7x

To apply power to a newly installed SF7x storage enclosure:

1. Turn the ac power switch, located at the rear of the enclosure, on or to the "1" position. If the power supply fault green LED is lit, refer to Chapter 7.
2. Conduct Power-On Self-Test (POST).

To start POST:

- a. Depress EACH of the four (4) drive dC power switches one at a time on the front of the SF7x enclosure. If the green LED on the drive dC power switch does not light, refer to Chapter 7.
- b. Depress EACH of the four (4) READY buttons, one at a time. The READY LED should be on and stay on, with the FAULT LED remaining off. If the fault LED lights, refer to Chapter 7.

After completing these steps and the drive has passed POST, then and only then should you proceed to the next section.

## 5.5 Labeling the DSSI Cables and OCP

A specific scheme exists for color labeling the DSSI cable:

- The color BLUE signifies the tape and disk ISEs on DSSI BUS 1.
- The color RED signifies the tape and disk ISEs on DSSI BUS 2.

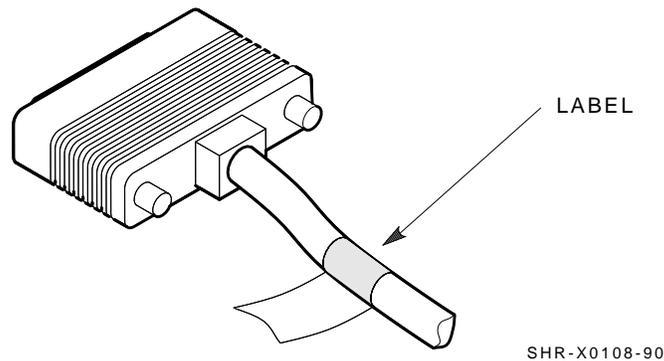
### 5.5.1 Filling Out the Labels

Follow the steps on the inside of the *SF Family Label Booklet* (36-32882-01) to fill out the labels for the DSSI cables and SF7x operator control panels.

### 5.5.2 Adhering the Labels

Take the label for each cable installed and adhere the labels around the cables (Figure 5-3).

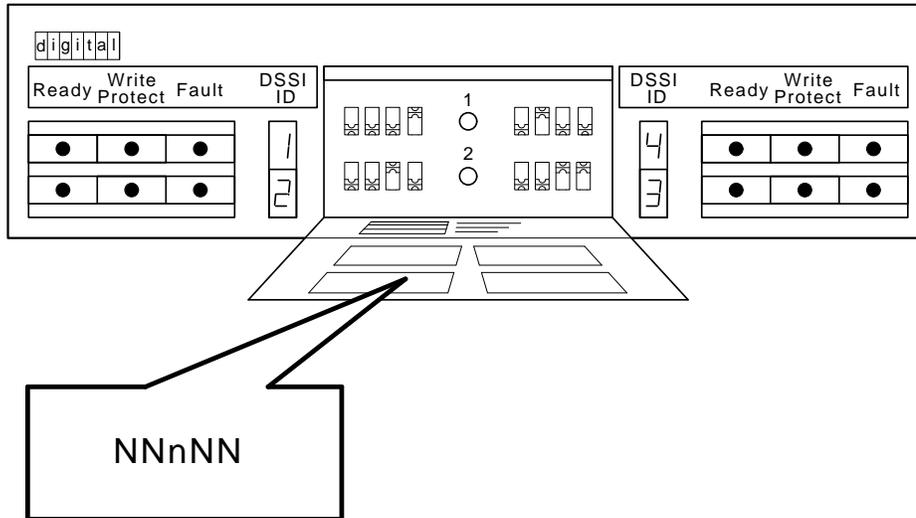
**Figure 5-3: Adhering a Cable Label**



### 5.5.2.1 Labeling the OCP

Take the labels for each OCP on each SF7x installed and adhere them to the front door (Figure 5-4).

**Figure 5-4: Adhering an OCP Label**



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## 5.6 Final Verification

Now that you have finished:

- Hardware installation
- POST steps
- Cabling
- Labeling

You are ready to:

- Configure the DSSI subsystem
- Verify the proper operation of each ISE in the host system

Refer to the *KFMSA Module Installation and User Guide*, EK-KFMSA-IM, for detailed information on how to verify the proper operation of each installed ISE.

In this manual, you will find the procedures to:

- Establish the communications between the ISEs, the adapter module, and the system
- Re-configure the system with its newly installed DSSI devices

You can refer to the *RF Series Integrated Storage Element User Guide*, EK-RF72D-UG, for detailed information on the local programs contained within the ISEs.

**REMEMBER**, each SF7x enclosure can contain 2 or 4 disk ISEs.

If at any time you detect a failure, refer to Chapter 7.

Once you complete the verification, the system is ready to be turned over to the system manager.

## Chapter 6

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# Cabling the SF3x Enclosure in the VAX 6000 Series Cabinet

### 6.1 Introduction

This chapter lists the procedures for cabling the SF3x storage enclosure to the DSSI bus configuration of the VAX 6000 series cabinet.

### 6.2 Cabling Right Position

#### CAUTION

Before doing any of the following steps, refer to the system documentation for the proper steps to an orderly shutdown of the system to which the storage enclosure is connected. Failure to do so will result in system user problems.

#### 6.2.1 Cabling the SF3x-BA/-HA Storage Enclosures

The following section lists the steps to cable the SF3x-BA/-HA storage enclosures into the right position of the VAX 6000 series cabinet.

#### NOTE

The right position refers to the storage position in the VAX 6000 series cabinet on the right when viewing the front of the system cabinet.

1. At the rear of the system cabinet, locate the KFMSA I/O Bulkhead panel.

#### **CAUTION**

Do not disturb or damage any existing cables connected to or near the DSSI I/O panel.

2. Install a 42-inch DSSI cable (BC21Q-3F) to the right-most available DSSI port connection on the KFMSA I/O Bulkhead panel.
3. Route this DSSI cable through the cable management guide (Figure 6–1).

#### **NOTE**

When connecting cables to the SF3x cable tray, the front two connections (which are not accessible unless the cable tray is pulled out) are for the (6) drive locations physically in the front of the storage enclosure.

The rear SF3x cable tray connections (accessible without pulling out the cable tray) are for the (6) drive locations in the rear of the storage enclosure.

For SF3x Storage Enclosure options not fully populated (-BA and -HA variations), RF3x disk drives are present in the rear section of the SF3x enclosure.

A fully populated SF3x Storage Enclosure (-JA variation) includes:

- 6 RF3x drives in the rear section of the enclosure
- 6 RF3x drives in the front section of the enclosure

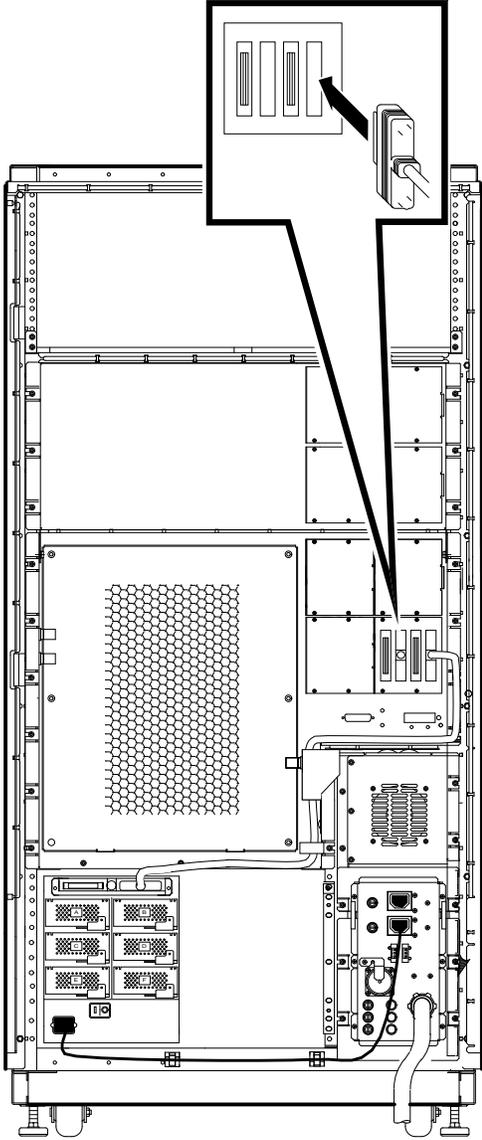
When cabling the installed SF3x storage enclosure, refer to Figure 6–1 for cable routing and placement within the VAX 6000 cabinet. Cables should not loop at the rear of the SF3x storage enclosure.

4. At the rear of the installed SF3x enclosure, connect the free end of the BC21Q-3F cable to the right DSSI connection (accessible without removing the cable tray).
5. Insert a DSSI terminator (12-31281-01) onto the left DSSI connector at the rear of the SF3x enclosure (accessible without removing the cable tray).
6. Remove the screw holding the H7206 (Figure 6–1) and replace with a standoff (90-00001-21).

**NOTE**

Do not discard the screw that was removed in the preceding step. Use this screw to secure the cable clamp to be installed later in the procedure.

**Figure 6-1: Cabling an SF3x-BA/HA in the Right (from the front) Position**



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#### **NOTE**

If installing an SF3x-BA/-HA storage enclosure, perform the following step. If installing the SF3x-JA storage enclosure variation, go to Section 6.2.2.

7. Secure the DSSI cable using the 3/8" cable clamp (90-07083-00) at the stand-off that was installed in a previous step (refer to Figure 6-1). Use the screw that was removed to secure the cable clamp.

### **6.2.2 Cabling the SF3x-JA Storage Enclosure**

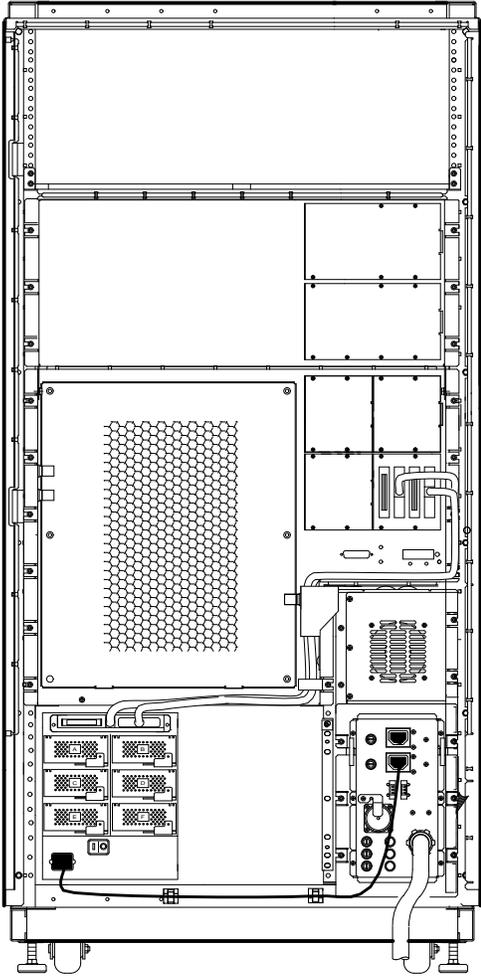
This section lists the procedure to cable the SF3x-JA Storage Enclosure into the VAX 6000 Series Cabinet.

#### **NOTE**

Installing the SF3x-JA storage enclosure includes the steps performed when installing the SF3x-BA/-HA variation. Do the steps in (Section 6.2.1), then continue this procedure.

1. Install a 42-inch DSSI cable (BC21Q-3F) to the right-most available DSSI port connection on the KFMSA I/O Bulkhead panel.
2. Route this DSSI cable through the cable management guide (Figure 6-2).

**Figure 6-2: Cabling an SF3x-JA in the Right (from the front) Position**

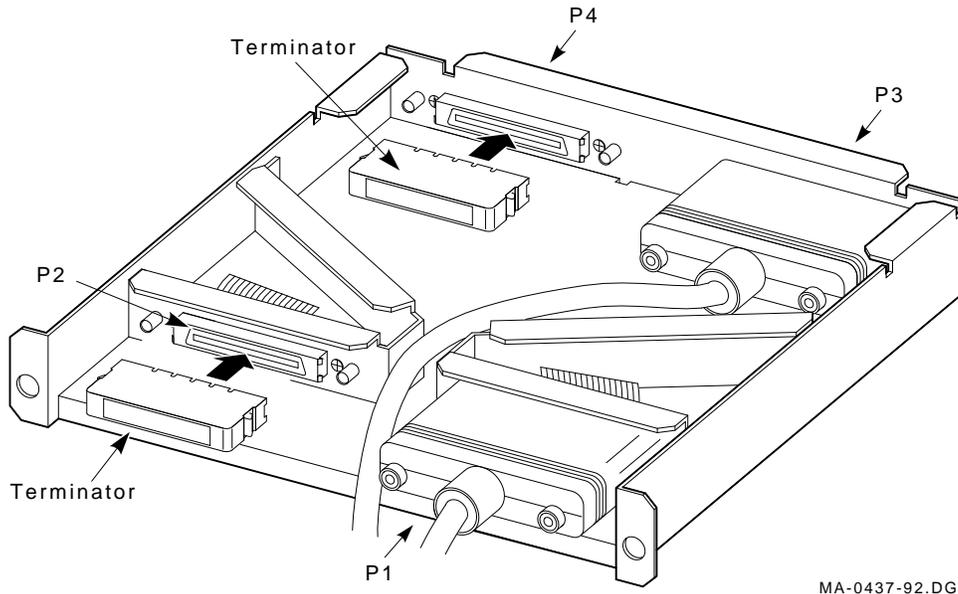


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*6-6 Cabling the SF3x Enclosure in the VAX 6000 Series Cabinet*

3. From the rear of the SF3x enclosure, remove the (2) 6-32 panhead screws holding the cable tray in place (Figure 6-3).

**Figure 6-3: SF3x Cable Tray**



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4. Slide the cable tray out of the SF3x enclosure far enough to expose the inner DSSI connectors.
5. Connect the free end of the 42-inch DSSI cable (BC21Q-3F installed in previous step) to the inner right DSSI connector of the SF3x-JA cable tray (Figure 6-3).
6. Install a DSSI terminator (12-31281-01) to the inner left DSSI connector of the cable tray (Figure 6-3).
7. Slide the SF3x storage enclosure cable tray back to its original position and secure.

### **CAUTION**

Do not use excessive force when sliding the cable tray back to its original position. Doing so may damage internal cabling.

8. Secure the DSSI cable(s) with a 3/4" cable clamp (90-07089-00) using the same screw that was removed in a previous step.

### **NOTE**

When cabling the installed SF3x enclosure, refer to Figure 6-2 for cable routing and placement within the VAX 6000 cabinet. Cables should not loop at the rear of the SF3x storage enclosure.

## **6.3 Cabling the Left Position**

### **NOTE**

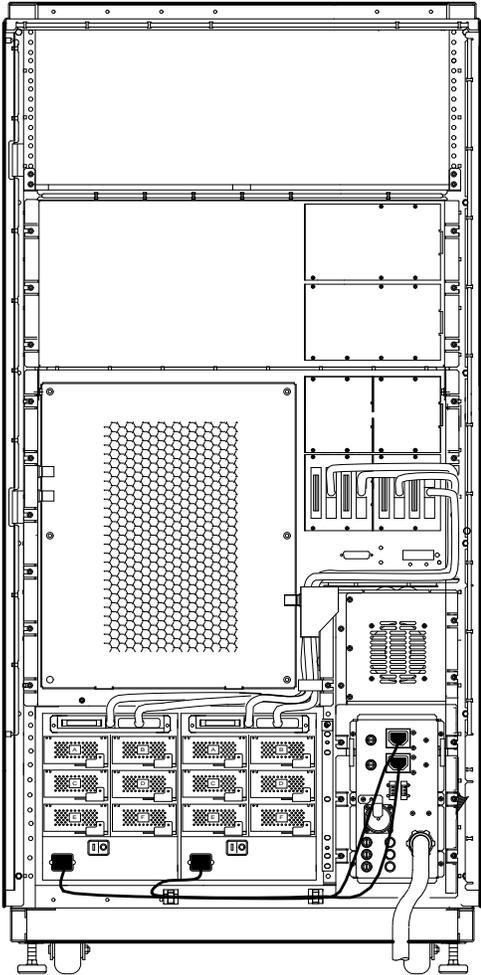
The left position refers to the storage position in the VAX 6000 series cabinet on the left when viewing the front of the system cabinet.

Procedures to cable the SF3x options into the left and right positions are similar. Follow the procedures in the preceding sections for proper cabling. Refer to Figure 6-4 for cable routing and placement within the VAX 6000 system cabinet.

### **NOTE**

Use the proper cable clamp (provided in the 70-22845-01 kit) for the number of DSSI cables being installed.

**Figure 6-4: Cabling an SF3x DSSI Cable in the Left (from the Front) Position**



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### CAUTION

Do not apply power to the SF3x storage enclosure at this time.

## 6.4 Installing the Power Cords

1. Plug the three-foot power cord (17-00442-27) into each installed SF3x enclosure AC receptacle (Figure 4–11).
2. Plug the other end of the power cord(s) into either available AC outlet at the rear of the H405 Power Controller (Figure 6–2).
3. Install two stick-ons (three stick-ons for systems with (2) SF3x enclosures installed) (90-08264-00) along the bottom rail (just below the SF3x enclosure) and secure the power cord(s) with tie-wraps (90-07880-00) (Figure 6–2).
4. Apply system power.

## 6.5 Powering On the SF3x Enclosure

To apply power to a newly installed SF3x storage enclosure:

1. Turn the ac power switch, located at the rear of the enclosure, on or to the "1" position. If the power supply fault green LED is lit, refer to Chapter 7.
2. Conduct Power-On Self-Test (POST) .

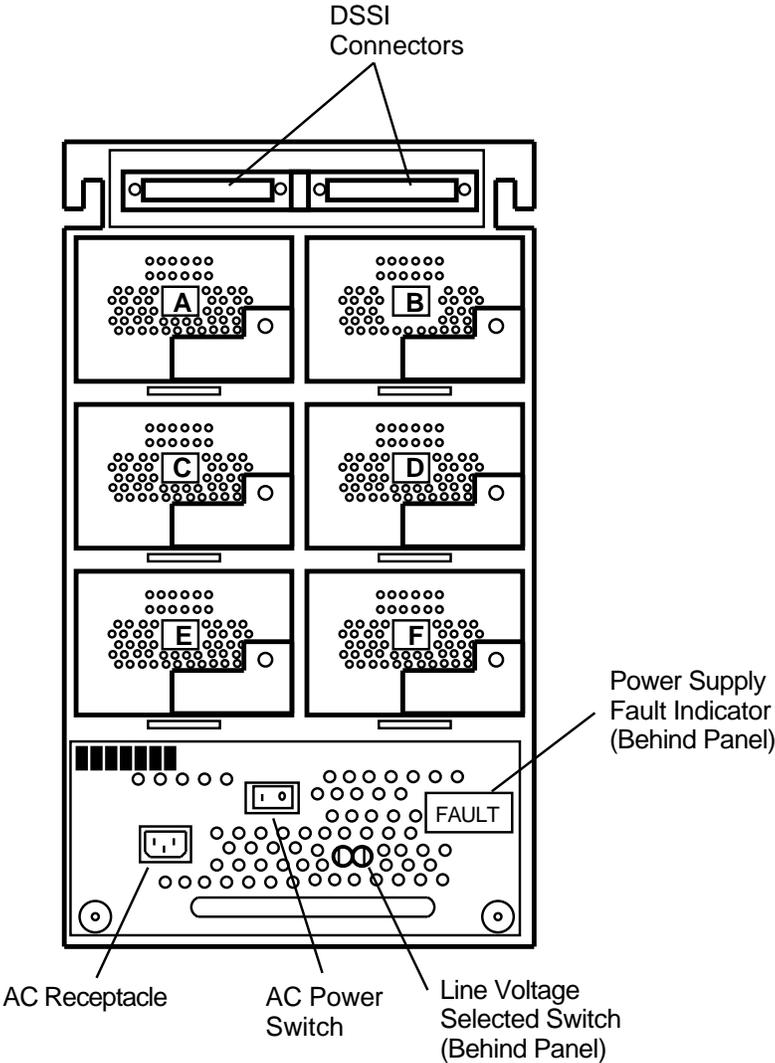
To start POST:

- a. Depress EACH of the twelve (12) drive dC power switches (depending on which variation of the option) one at a time on the front of the SF3x enclosure. If the green LED on the drive dC power switch does not light, refer to Chapter 7.

### NOTE

Only depress the dC power switches for SF3x slots that have RF3x ISEs installed. DC power switch 1 correlates to RF3x slot A, switch 2 to B, and so on. Refer to Figure 6-5.

Figure 6-5: SF3x Enclosure DC Power Switches



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- b. Depress each of the twelve (12) READY buttons, one at a time. The READY LED should be on and stay on, with the FAULT LED remaining off. If the fault LED lights, refer to Chapter 7.

After completing these steps and the drive has passed POST, then and only then should you proceed to the next section.

## 6.6 Labeling the DSSI Cables

A specific scheme exists for color labeling the DSSI cable:

- The color BLUE signifies the tape and disk ISEs on DSSI BUS 1.
- The color RED signifies the tape and disk ISEs on DSSI BUS 2.

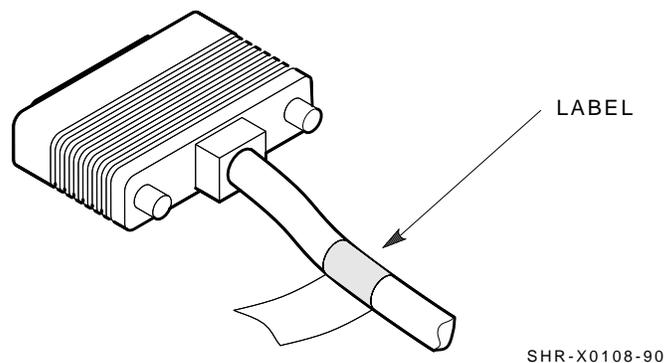
### 6.6.1 Filling Out the Labels

Follow the steps on the inside of the *SF Family Label Booklet* (36-32882-01) to fill out the labels for the DSSI cables and SF3x operator control panels.

### 6.6.2 Adhering the Labels

Take the label for each cable installed and adhere the labels around the cables (Figure 6-6).

**Figure 6-6: Adhering a Cable Label**



## 6.7 Final Verification

Now that you have finished:

- Hardware installation
- POST steps
- Cabling
- Labeling

You are ready to:

- Configure the DSSI subsystem
- Verify the proper operation of each ISE in the host system

Refer to the *KFMSA Module Installation and User Guide*, EK-KFMSA-IM, for detailed information on how to verify the proper operation of each installed ISE.

In this manual, you will find the procedures to:

- Establish the communications between the ISEs, the adapter module, and the system
- Re-configure the system with its newly installed DSSI devices

You can refer to the *RF Series Integrated Storage Element User Guide*, EK-RF72D-UG, for detailed information on the local programs contained within the ISEs.

REMEMBER, each SF3x enclosure can contain 2, 6, or 12 disk ISEs.

If at any time you detect a failure, refer to Chapter 7.

Once you complete the verification, the system is ready to be turned over to the system manager.

## Chapter 7

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# Installation Troubleshooting the SF7x/SF3x Enclosures

### 7.1 Introduction

This chapter explains what to do if you detect problems while installing the SF7x/SF3x storage enclosure.

The procedures in this chapter involve taking devices on and offline. Devices affected can have communication failure, resulting in potential user problems.

To avoid problems, the system manager should perform an orderly shutdown of all DSSI ISEs before troubleshooting. Refer to the service or maintenance manuals for the device information.

## 7.2 Troubleshooting the SF7x/SF3x Storage Enclosures

This section includes:

- Symptoms of a failed device
- Probable cause(s) of the failure
- Action to correct the failure

Much of the corrective action includes:

- Taking a device or devices offline
- Removing power from the enclosure containing the failed device

### WARNING

Take all ESD and safety precautions when handling the devices, especially when taking a device offline or when removing a device. Failure to do so will damage the device.

Do the following basic steps for all troubleshooting on the RF7x/RF3x disk ISE in an SF7x/SF3x storage enclosure:

1. Inspect the ISE operator control panel (OCP). Is a Fault indicator lit? If so, press the Fault button and read the error code. Record the error code before attempting recovery from the fault condition (Table 7–1).

**Table 7–1: Disk ISE OCP Fault Codes**

<b>READY</b>	<b>WRITE PROTECT</b>	<b>FAULT</b>	<b>Disk ISE FRU</b>
Off	Off	On	HDA
Off	On	Off	Drive module
Off	On	On	Drive module, then HDA

2. Access the ISE in question. Open the front or rear of the SF7x/SF3x enclosure to gain access to the various ISE cables. Check that each cable is seated correctly.
3. Run various tests on the ISE by using DUP.

4. According to the findings from the error codes and results from DUP, repair or replace the ISE.
5. Run EVCXE configuration programs, EVCXF configuration programs, or both.
6. Verify the repair or replacement of the ISE with DRVTST and DRVEXR under DUP.
7. Return the system to the user.

Use Table 7–2 to isolate a failure in an SF3x/SF7x storage enclosure.

**Table 7–2: Troubleshooting Chart**

Symptom(s)	Probable Cause(s)	Corrective Action(s)
No OCP indicators are lit.	<ol style="list-style-type: none"> <li>Storage enclosure is not plugged in or not turned on.</li> <li>Drive dc power switch is off.</li> <li>OCP is not plugged in or seated firmly.</li> <li>Bad OCP.</li> <li>Bad transition module.</li> </ol>	<ol style="list-style-type: none"> <li>Plug in the ac power cord or turn on the AC power.</li> <li>Turn on the drive dc power switch.</li> <li>Press the OCP firmly in place.</li> <li>Configure and replace a new OCP.</li> <li>Configure and replace a new transition module.</li> </ol>
Single Fault indicator lit on OCP.	<ol style="list-style-type: none"> <li>Faulty disk ISE.</li> <li>Conflicting DSSI ID numbers.</li> </ol>	<ol style="list-style-type: none"> <li>Press lit Fault button. Read fault code<sup>1</sup>. Replace failed FRU.</li> <li>Verify correct DSSI node ID settings for that bus.</li> </ol>
Multiple Fault indicators lit on OCP.	<ol style="list-style-type: none"> <li>Conflicting DSSI ID numbers.</li> <li>Bad OCP.</li> <li>Bad DSSI cable(s).</li> </ol>	<ol style="list-style-type: none"> <li>Verify correct DSSI node ID settings for that bus.</li> <li>Configure and install a new OCP.</li> <li>Isolate with DSSI bus meter<sup>2</sup> and replace.</li> </ol>

<sup>1</sup>This step only applies to SF7x storage enclosures.

<sup>2</sup>The DSSI bus meter, or DBM, is used to look at bus signals in real-time as well as to verify DSSI ID numbers. The DBM can quickly locate faulty cables or duplicate DSSI ID numbers on a given DSSI bus. The DSSI bus meter part number is 29–28008–01.

**Table 7–2 (Cont.): Troubleshooting Chart**

<b>Symptom(s)</b>	<b>Probable Cause(s)</b>	<b>Corrective Action(s)</b>
One or more indicators continue to cycle.	1. Conflicting DSSI ID numbers.	1. Verify correct DSSI node ID settings for that bus.
One ISE is not accessible.	1. DC power to ISE is not on. 2. Bad ISE drive module. 3. Bad DSSI cable(s). 4. Bad OCP cable. 5. Bad power harness.	1. Turn on dc power switch. 2. Replace ISE drive module. 3. Isolate with DSSI bus meter <sup>2</sup> and replace. 4. Replace cable. 5. Replace power harness.
ISE is not seen or seen at unexpected DSSI ID value.	1. Cables are not plugged in the transition module or ISE. 2. Bad OCP ID switch. 3. Bad OCP cable.	1. Check that both ends of OCP cables are plugged in. 2. Reconfigure and replace OCP. 3. Replace appropriate OCP cable.

<sup>2</sup>The DSSI bus meter, or DBM, is used to look at bus signals in real-time as well as to verify DSSI ID numbers. The DBM can quickly locate faulty cables or duplicate DSSI ID numbers on a given DSSI bus. The DSSI bus meter part number is 29–28008–01.

**Table 7–2 (Cont.): Troubleshooting Chart**

<b>Symptom(s)</b>	<b>Probable Cause(s)</b>	<b>Corrective Action(s)</b>
Fan is not spinning and power supply LED is lit.	1. Bad power supply.	1. Replace power supply.
	2. Bad fan.	2. Replace fan.
	3. Bad transition module.	3. Configure a new transition module and replace.
Fan is not spinning and power supply LED is not lit, but storage enclosure is on.	1. Bad power supply.	1. Replace power supply.
	2. Bad power cord.	2. Replace cord.
	3. Bad transition module.	3. Configure a new transition module and replace.

**Table 7–2 (Cont.): Troubleshooting Chart**

<b>Symptom(s)</b>	<b>Probable Cause(s)</b>	<b>Corrective Action(s)</b>
In a DSSI VAXcluster installation, one or more of the following symptoms are observed: -unexplained virtual circuit (VC) closures -unexplained VMS crashes -performance degradation	1. Excessive ground offset voltage between DSSI VAXcluster cabinets.	1. Refer to Chapter 1.  Measure ground offset voltage between cabinets.  Correct faults in power distribution system.  Install cabinet grounding wire between all cabinets sharing DSSI buses.
	2. Loose or missing DSSI terminators.	2. Tighten or replace DSSI terminators.
	3. Low terminator power voltage.	3. Replace fuses.
	4. Bus length too long.	4. Shorten bus.
	5. Non DEC devices on bus.	5. Replace with DEC devices.
	6. Terminated mid-bus adapters	6. Remove terminators from mid-bus adapters.

### 7.3 Removing an RF Disk ISE from an SF3x Storage Enclosure

This section lists the procedure for removing an RF Disk ISE from an SF3x storage enclosure.

#### **WARNING**

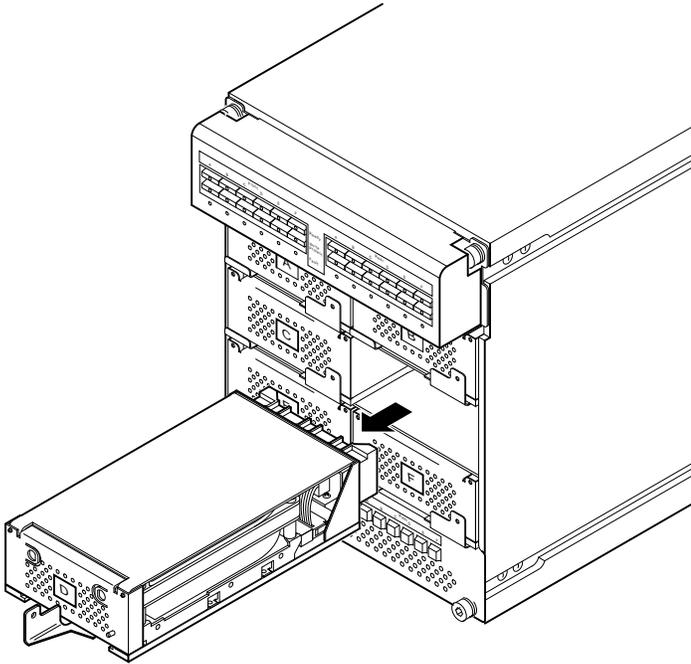
Take all possible ESD precautions when unpacking the disk ISEs. Wear a correctly grounded ESD strap.

Perform an orderly shutdown of the SF3x enclosure containing the disk ISE. Refer to the system documentation.

1. Power down the SF3x enclosure.
  - a. Take the failed disk ISE on that DSSI bus off-line by pressing and releasing each Ready button on the operator control panel (OCP). The button indicators go out.
  - b. Press and release the drive dc power switches for all the ISEs on that DSSI bus.

2. Remove the disk ISE from the SF3x enclosure (Figure 7-1).
  - a. Remove the screw from the ISE carrier lever.
  - b. Pull the lever forward and slide the carrier out of the slot.

**Figure 7-1: Disk ISE Removal**



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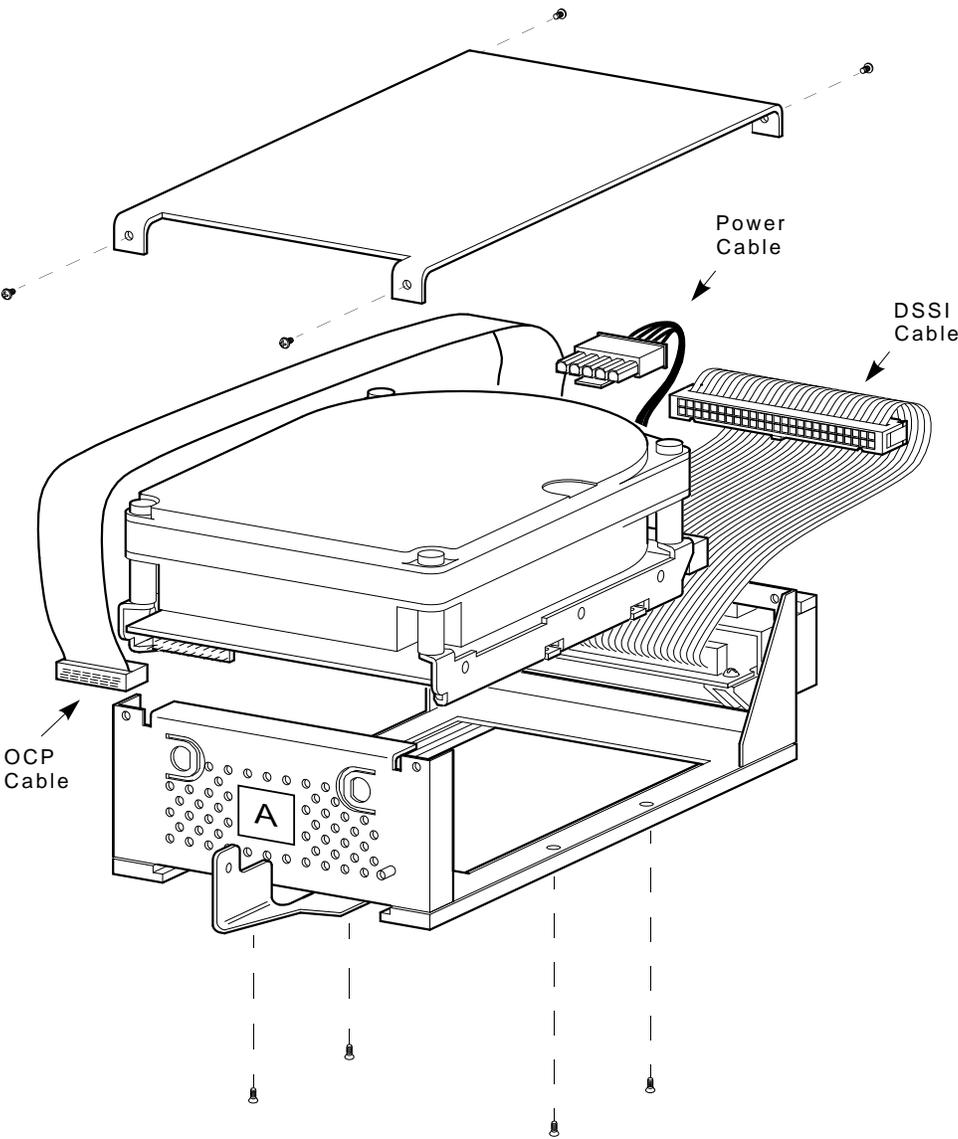
3. Unpack the replacement RF disk ISE:
  - a. Open the shipping carton.
  - b. Remove the disk ISE wrapped in the protective wrapper.
  - c. Open the protective wrapper and remove the disk ISE.
  - d. Place the disk ISE on the protective wrapper.
4. Remove the four screws holding the top cover on the carrier and remove the cover.
5. Remove the faulty ISE from the carrier by removing the two screws on each side of the bottom of the carrier (Figure 7-2).
6. Lift the ISE out of the carrier and disconnect the DSSI bus, OCP, and power connectors from the ISE.
7. Plug the DSSI bus, power, and OCP connectors into the replacement ISE.
8. Attach the ISE to the carrier.
9. Replace the top cover.
10. Install the disk ISE in the enclosure.

### **7.3.1 Bringing the RF3x Disk ISE On-Line**

This section lists the procedure for bringing all the ISEs in the SF3x enclosure on-line.

1. Place the ac power switch at the rear of the SF3x enclosure to the 1 or on position.
2. Press all drive dc power switches.
3. Press all twelve (depending on option variation) Ready buttons on that OCP, one at a time.
4. If no Fault indicators are lit, then continue. If a Fault indicator is lit, recycle the dc power once. If the failure appears again, refer to Section 7.3.2.
5. Run the EVCXE or EVCXF programs to add the new disk ISE to the configuration and to change any disk ISE internal parameters, if necessary.

**Figure 7-2: Installing the ISE**



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6. Update the system configuration sheet.
7. Run DRVTST and DRVEXR (under DUP) to verify the correct operation of the new disk ISEs.
8. Return the system to the user.

### 7.3.2 Removing an RF7x Disk ISE from an SF7x Storage Enclosure

This section describes the procedure for removing an RF7x disk ISE from an SF7x storage enclosure.

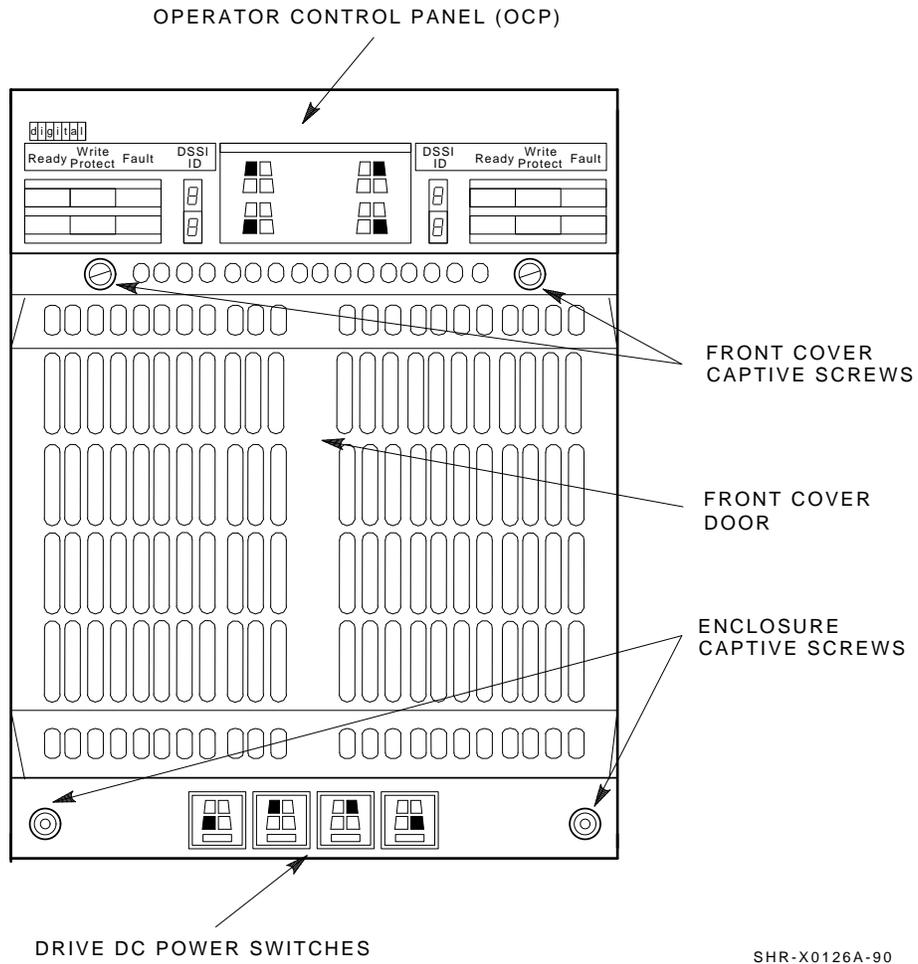
#### **WARNING**

Take all possible ESD precautions when unpacking the RF7x disk ISEs. Wear a correctly grounded ESD strap.

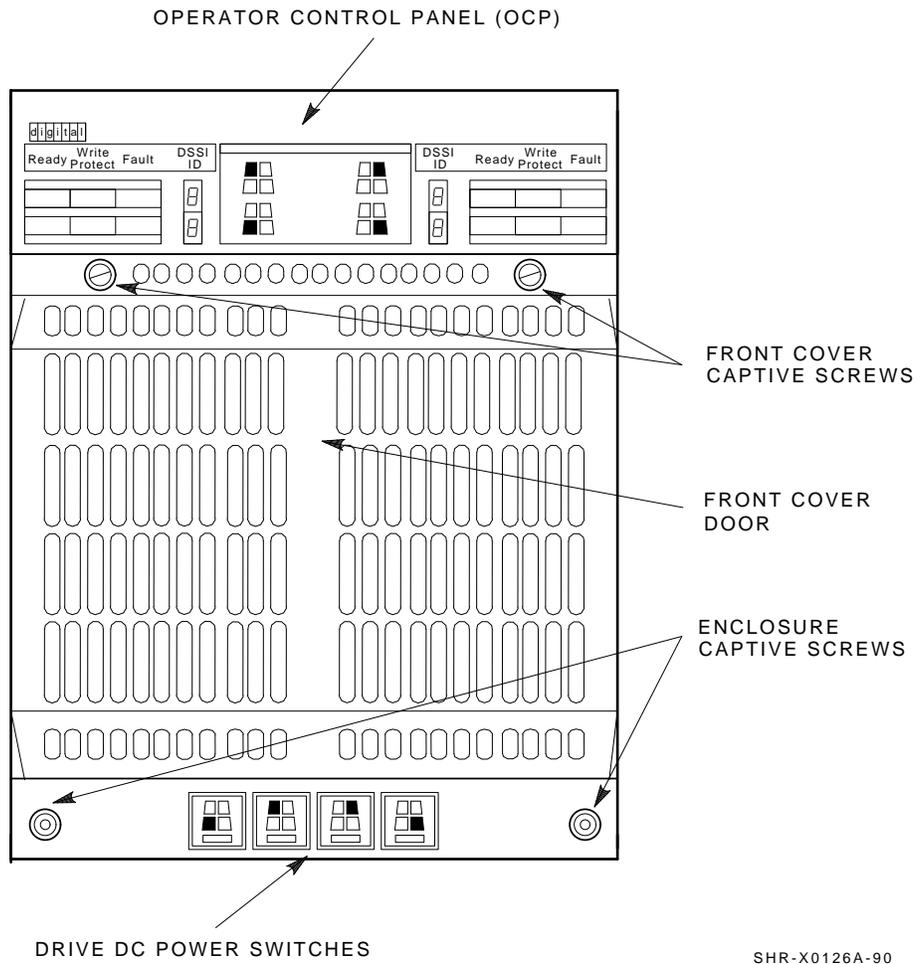
Do an orderly shutdown of the SF7x enclosure containing the disk ISE. Refer to the system documentation.

1. Power down the SF7x enclosure.
  - a. Take each existing RF7x disk ISE on that DSSI bus off-line (Figure 7-3) by pressing and releasing each Ready button on the operator control panel (OCP). The button indicators go out.
  - b. Press and release the drive dc power switches for all the ISEs on that DSSI bus.
  - c. Set the ac power switch on the rear of the enclosure to 0.
2. Remove the RF7x disk ISE.
  - a. Remove the SF7x enclosure front cover (Figure 7-4). Loosen the screws and lift off the covers.
  - b. Loosen the wedges on the disk ISE.

**Figure 7-3: Powering Down the SF7x Storage Enclosure**



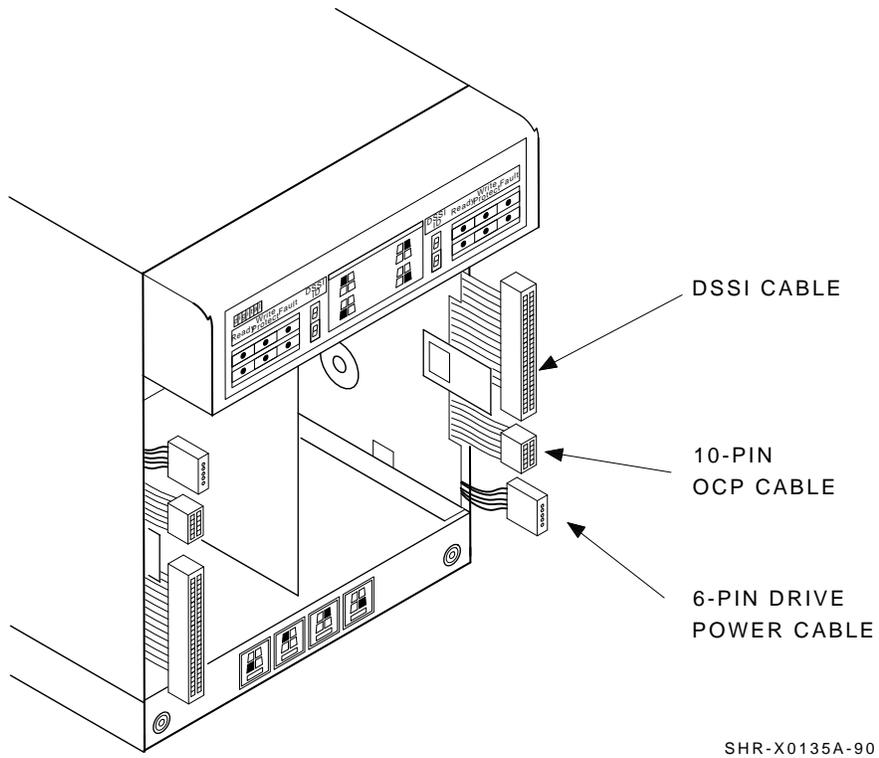
**Figure 7-4: Removing the SF7x Front Cover**



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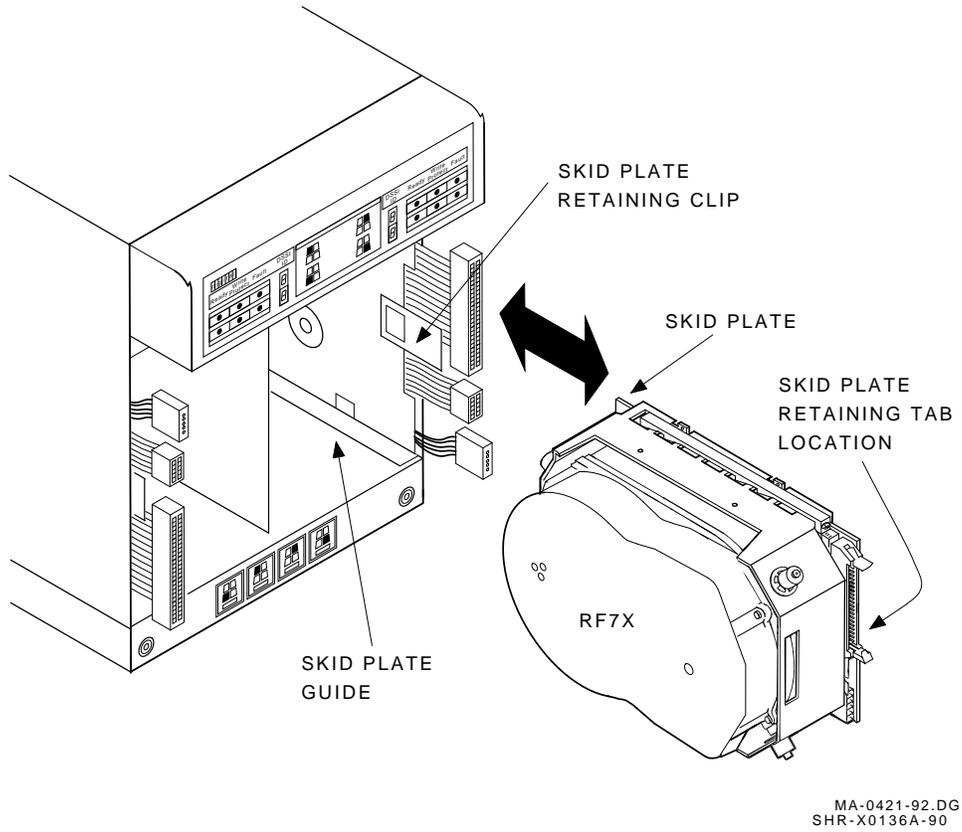
c. Disconnect all cables to the disk ISE as shown in Figure 7-5.

**Figure 7-5: Disconnecting the Cables**



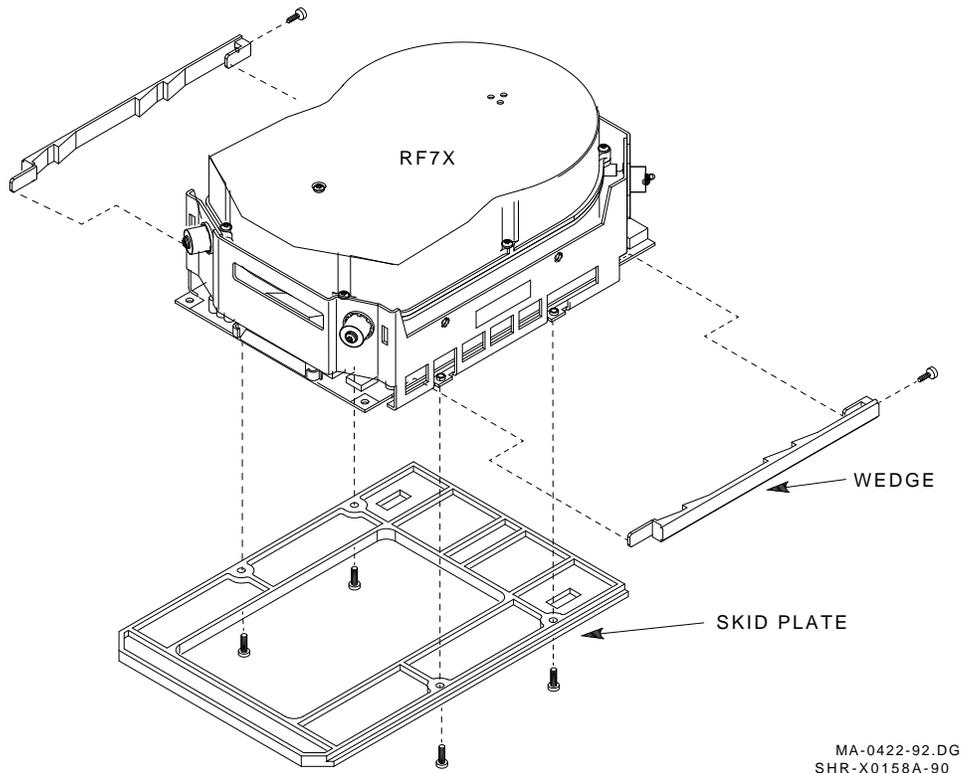
- d. Remove the RF7x disk ISE as shown in Figure 7-6. Slide out the disk ISE gently, while holding all cables out of the way. Do not force the disk ISE.

**Figure 7-6: Removing the RF7x Disk ISE**



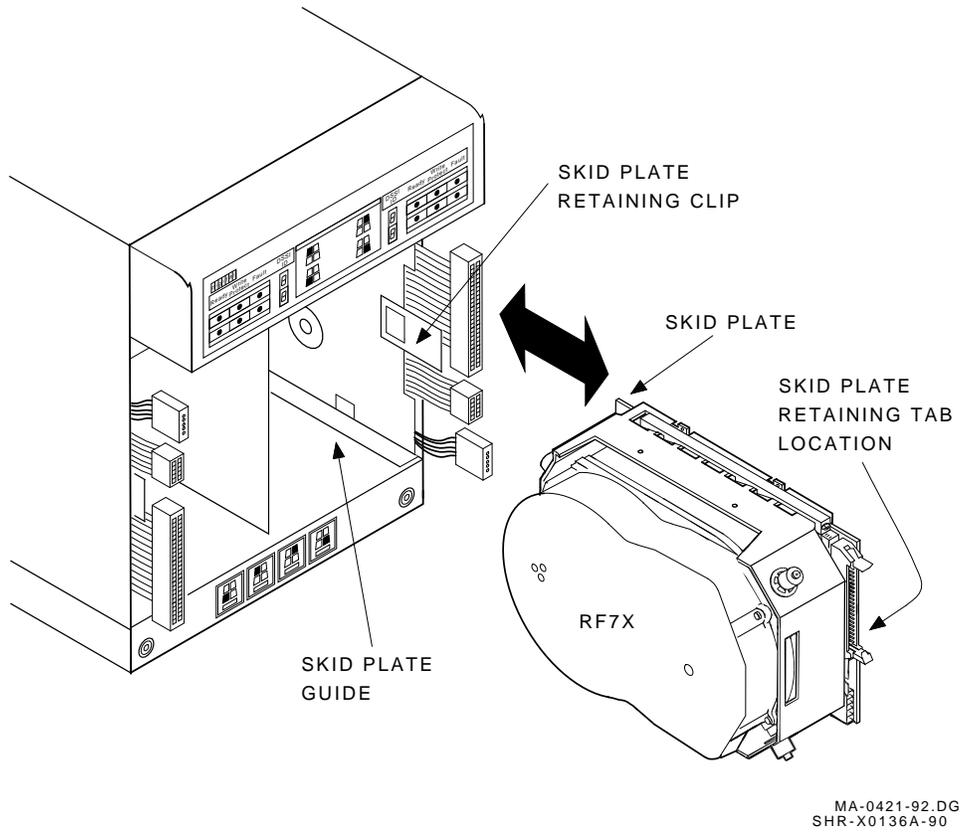
3. Unpack the replacement RF7x disk ISE:
  - a. Open the shipping carton.
  - b. Remove the disk ISE wrapped in the protective wrapper.
  - c. Open the protective wrapper and remove the disk ISE. Discard the desiccant bags.
  - d. Place the disk ISE on the protective wrapper.
4. Remove the skid plate and wedges from the faulty disk ISE and install them on the replacement disk ISE (Figure 7-7).

**Figure 7-7: RF7x Wedges and Skid Plate**



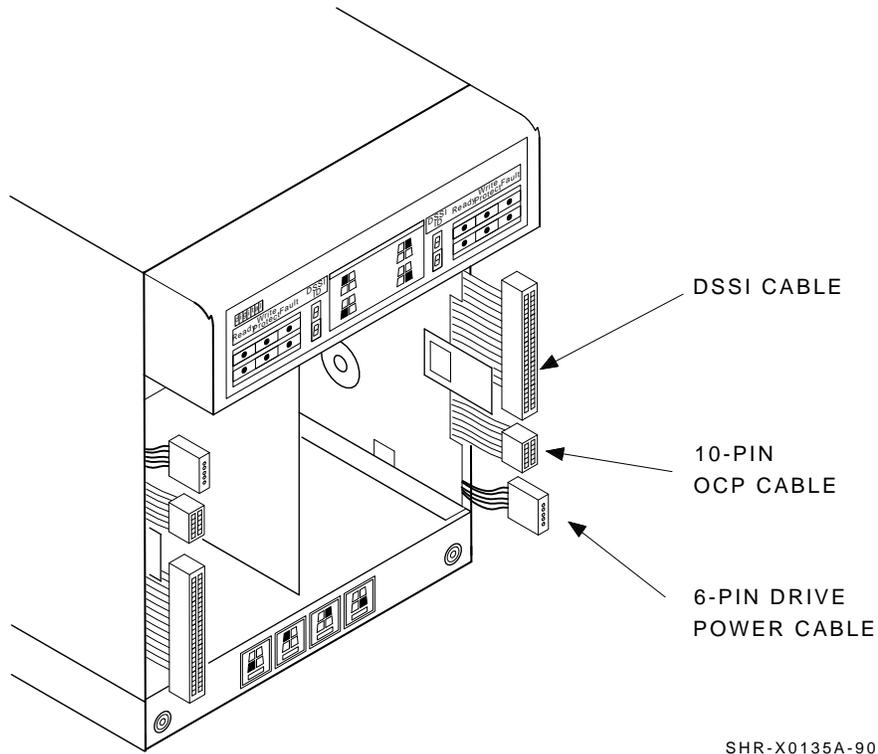
5. Place the RF7x disk ISE as shown in Figure 7–8 and install in the enclosure. Slide the disk ISE gently into place, while holding all cables out of the way. Do not force the disk ISE.

**Figure 7–8: RF7x Disk ISE Orientation**



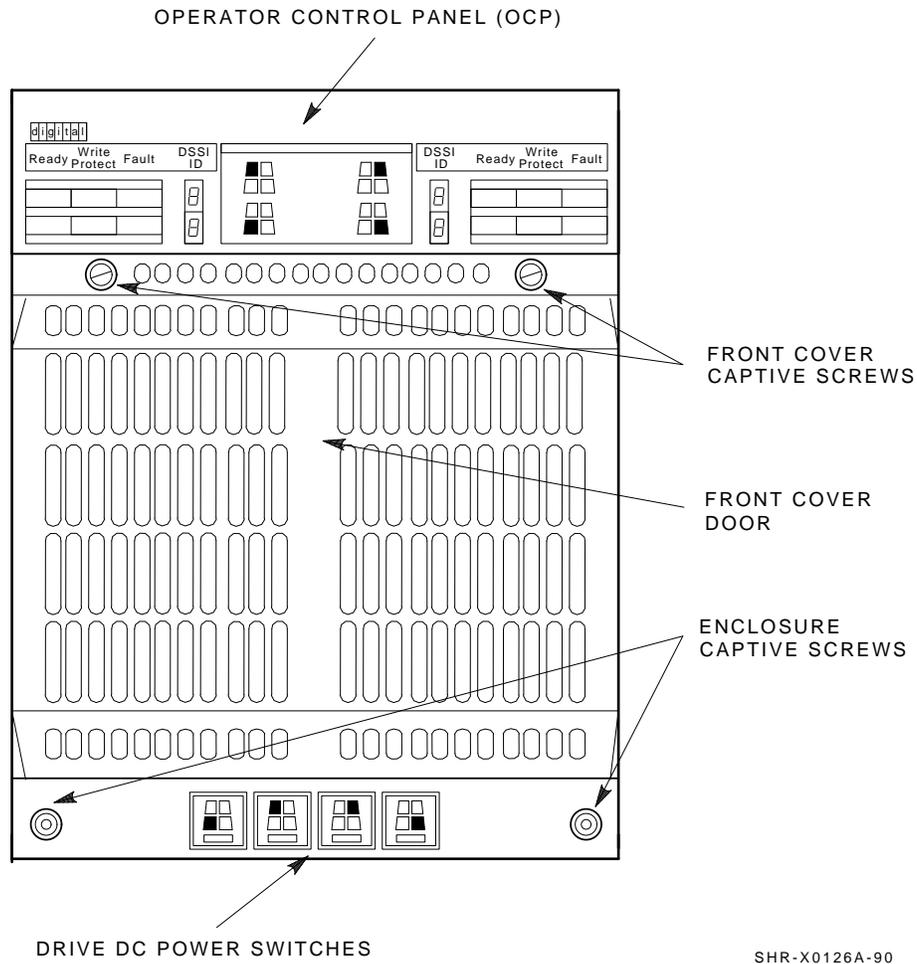
6. Verify that the disk ISE is locked into place and tighten the wedges.
7. Connect all cables (Figure 7–9). Connectors are keyed to ensure cables are installed correctly.

**Figure 7–9: Cabling the RF7x Disk ISE**



8. Replace the front cover on the SF7x enclosure (Figure 7-10).

**Figure 7-10: Replacing the SF7x Front Cover**



Proceed to Section 7.3.3.

### 7.3.3 Bringing the RF7x Disk ISE On-Line

This section lists the steps for bringing all the ISEs in the SF7x enclosure on-line and for setting DSSI ID numbers.

1. Ensure that the DSSI ID switches (behind the door on the OCP) are set correctly. The nodes are LR:1, RR:4, LF:2, RF:3.
2. Place the ac power switch at the rear of the SF7x enclosure to the 1 or on position.
3. Press all drive dc power switches.
4. Press all four Ready buttons on that OCP, one at a time.
5. If no Fault indicators are lit, then continue. If a Fault indicator is lit, recycle the dc power once. If the failure reappears, refer to Section 7.3.2.
6. Run the EVCXE or EVCXF programs to add the new disk ISE to the configuration and to change any disk ISE internal parameters, if necessary.
7. Update the system configuration sheet.
8. Run DRVTST and DRVEXR (under DUP) to verify the correct operation of the new disk ISEs.
9. Return the system to the user.

## Appendix A

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# Split-Bus/Disk Striping VAX 6000/SF7x/SF3x Embedded Storage Systems

### A.1 Disk Striping Overview

The software, VAX Disk Striping Driver, implements disk striping for the VMS Operating System. Disk Striping interleaves multiple disks to improve I/O performance in the same way high-performance memory systems interleave memory banks.

In each case, data requests are decomposed and distributed to storage components processing those requests in parallel.

Disk Striping is a layered product that can relieve three types of I/O performance problems:

- Applications requiring very high data transfer rates
- Systems in which static disk load balancing is ineffective
- Applications prohibited from distributing data across multiple disks, but need higher throughput than is available from a single disk

The VAX Disk Striping Driver software is furnished under the licensing provisions of Digital Equipment Corporation's Standard Terms and Conditions. For more information, refer to *Software Product Description*, SPD 31.66.01, (AE-NZ29B-TE) and SSA 31.66.01-A, (AE-NZ30B-TE), April 1991.

In VAX 6000/SF7x/SF3x Embedded Storage Disk Striping applications, the Disk Enclosures are normally set to Split-Bus mode in order to maximize disk capabilities. The following sections of this appendix demonstrate examples of configuring fully loaded, Single System, VAX 6000 Embedded Storage (either SF7x or SF3x storage) devices for optimum Disk Striping capabilities.

## A.2 VAX 6000/SF7x Split-Bus/Disk Striping Operation

The following sections describe the procedures necessary to install additional hardware, reconfigure the SF7x Storage Enclosure from Through Bus mode to Split-Bus mode, and system cabling procedures for split-bus/disk striping operation. Refer to *DECarray Owner's Manual EK-SF7XS-OM* for a description of split-bus mode operation.

### A.2.1 Configuring the System for Split-Bus/Disk Striping

#### NOTE

All references to Split-Bus/Disk Striping in this section refer to a fully configured (2 SF7x-JA), Single System, VAX 6000/SF7x Embedded Storage System. The configuration in this section depicts a typical Disk Striping Configuration.

The following steps are necessary to configure the VAX 6000/SF7x Embedded Storage System for Split-Bus/Disk Striping operation:

- Install KFMSA XMI to DSSI Adapter Module(s) and cable kit(s) into the XMI Backplane Table A-1.
- Convert the (2) SF7x-JA Storage Enclosures to split bus mode.
- Reroute the DSSI cables from the I/O panels to the SF7x enclosures.

The following table lists additional hardware required to configure a fully loaded (2 SF7x-JA), single system, VAX 6000/SF7x Embedded Storage System for proper split-bus/disk striping operation.

**Table A–1: SF7x Additional Hardware**

<b>Option</b>	<b>Description</b>	<b>Quantity</b>
KFMSA	XMI to DSSI Adapter Module	1
CK-KFMSA-LJ/LN	Cable Kit	1
BC21Q-3F	DSSI Cable	2

### **A.2.2 Installing the Second KFMSA**

Install the second KFMSA DSSI Controller Module and CK-KFMSA-LJ/LN cable kit as per the *KFMSA Module Installation and Users Manual* EK-KFMSA-IM.

#### **NOTE**

Install the I/O Panel for the additional KFMSA(s) as noted in Chapter 3 Section 3.2.4.

### **A.2.3 Converting the SF7x enclosure to Split-Bus Mode**

Do the following procedure to convert the SF7x enclosure to split-bus mode:

#### **CAUTION**

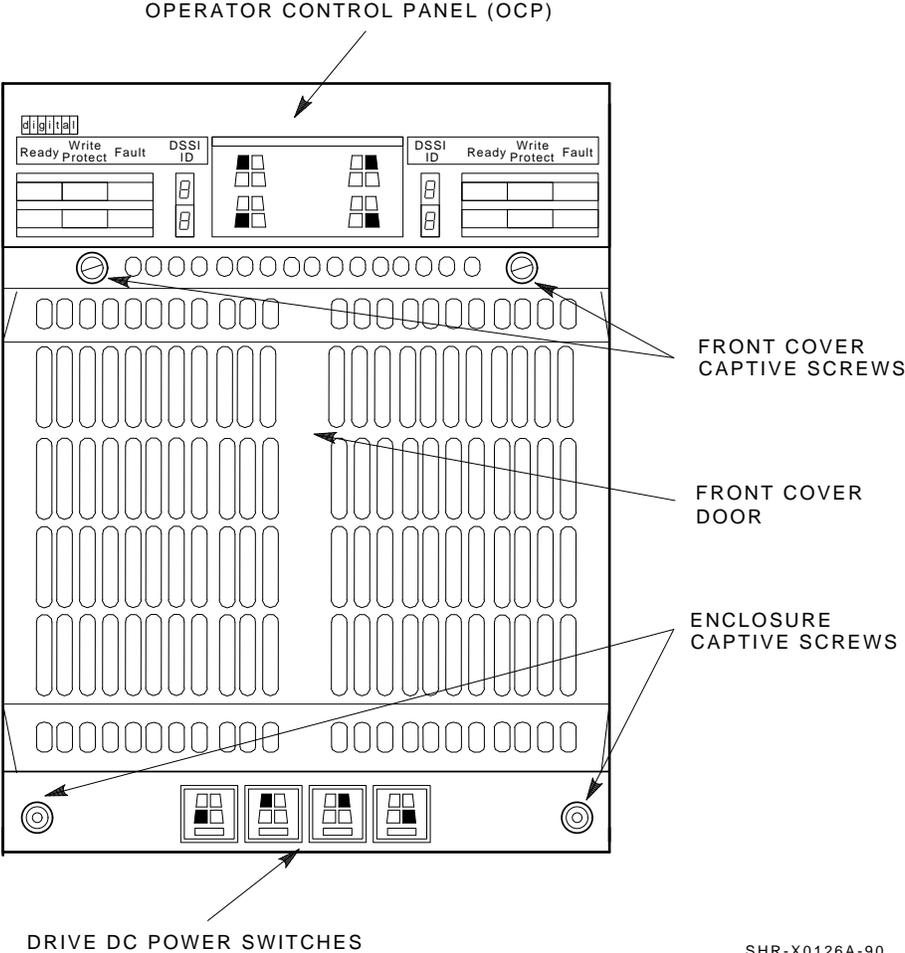
To maintain stability, extend only one SF7x storage enclosure on the slide mounts at a time.

1. Perform an orderly shutdown of the system
2. Remove power to the drives by depressing the (4) Drive DC Power Switches in the front of the SF7x Storage Enclosure Figure A–1.
3. Set the AC Power switch in the rear of the SF7x enclosure to the 0 position Figure A–2.
4. Disconnect the DSSI cable attached to the DSSI connector at the rear of the SF7x Storage Enclosure.
5. Remove the SF7x OCP.
6. Loosen the four captive slide assembly screws Figure A–1.

#### **NOTE**

Two of the captive slide assembly screws are only visible after removing the SF7x OCP. They are located in the upper left and upper right corners of the SF7x Enclosure

**Figure A-1: SF7x Disk Enclosure (Front View)**



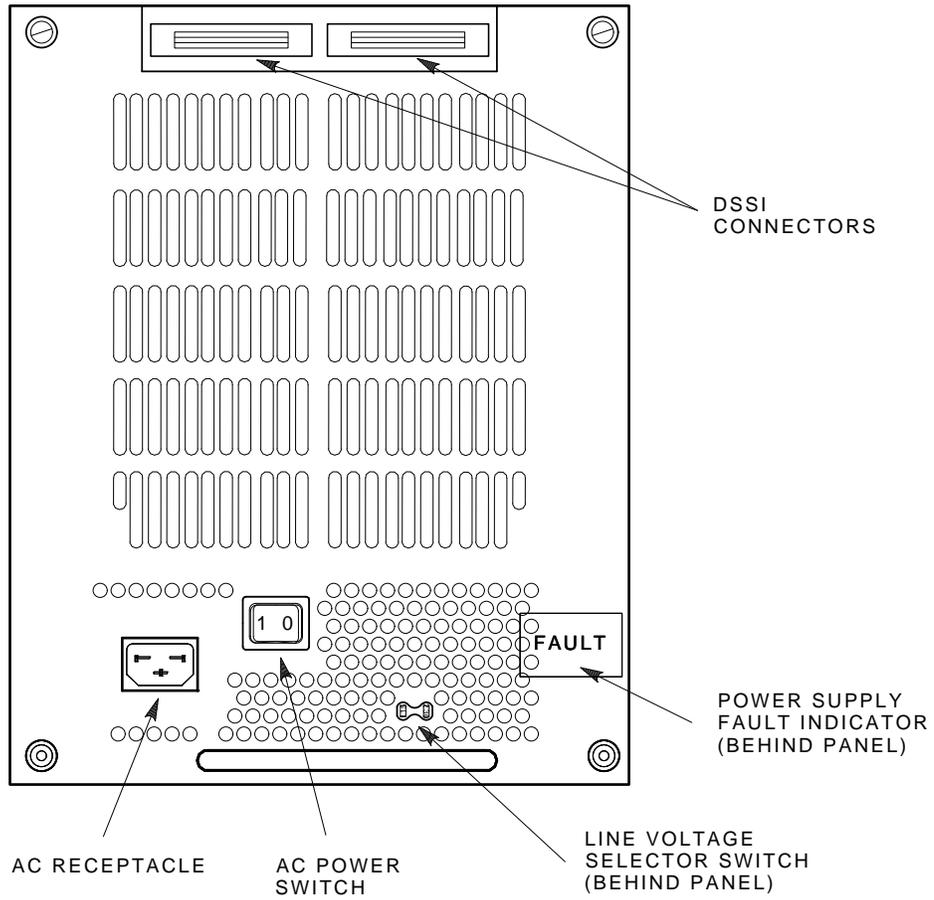
SHR-X0126A-90

7. Push the inner assembly forward from the rear.

**CAUTION**

Do NOT completely remove the SF7x inner drawer assembly from the extrusion tube. The drawer should lock into its service position. Extend only one disk drive enclosure at a time.

**Figure A-2: SF7x Disk Enclosure (Rear View)**



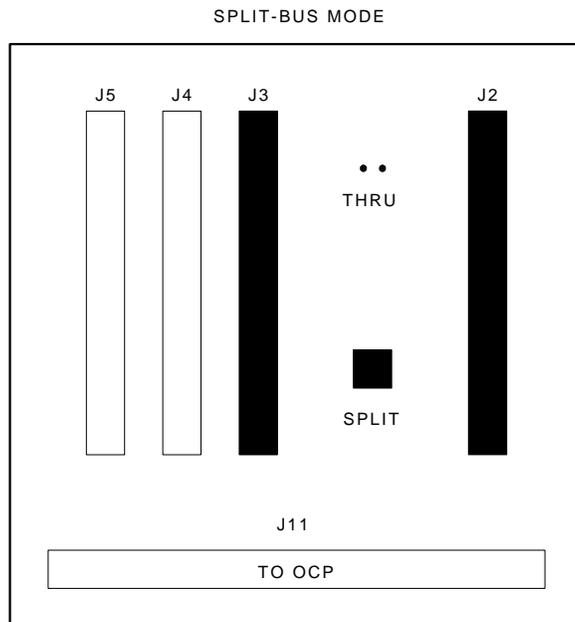
SHR-X0127A-90

8. Reconfigure the TTM for split-bus mode by first moving the small black jumper to the split-bus terminals, then moving cable connectors to the right pair of sockets Figure A-3.
9. Push the SF7x inner drawer back in, replace the front cover door, and tighten the four front door screws.

**CAUTION**

To prevent pinching any cables, be sure all cables are dressed correctly.

**Figure A-3: Converting an SF7x enclosure to Split-Bus Mode**



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## A.2.4 Setting the DSSI Node Switches

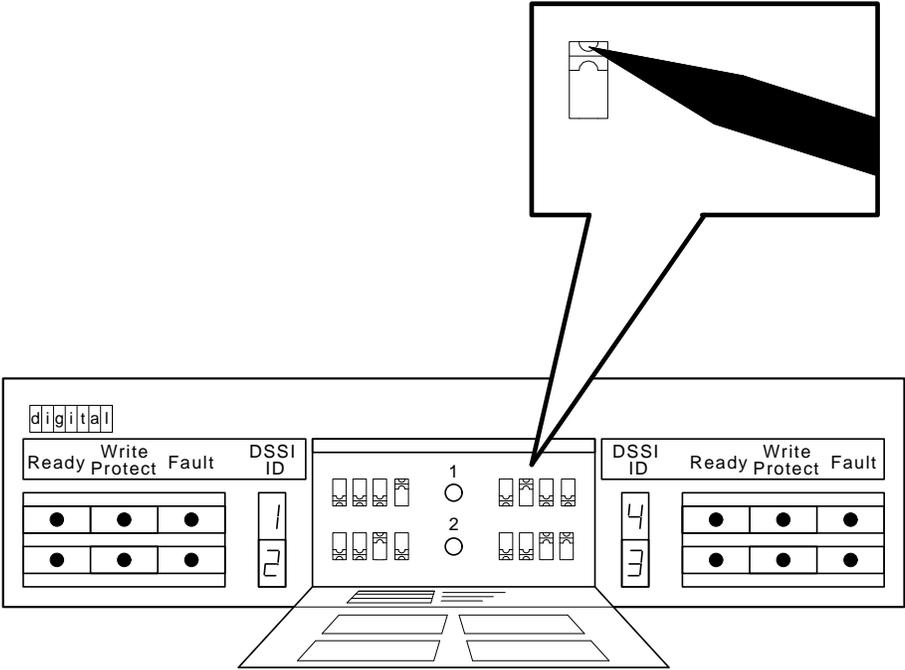
Perform the following steps to set the SF7x DSSI Node switches for Split-Bus/Disk Striping applications.

### NOTE

Switch settings shown in the following tables and figures are used as example only information. Customer configurations may vary and DSSI Node assignments should be selected within DSSI rules and guidelines.

1. Open the door on the front of the OCP (Figure A-4).
2. Use a pointed instrument to set the switches to their correct configuration. Refer to Table A-2.

Figure A-4: DSSI ID Switch Settings



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## NOTE

The leftmost switch (MSCP) should be in the down or enabled position at all times, unless you are instructed to change it to the up or disabled position.

**Table A-2: SF7x DSSI ID Verification (Front View)**

Left and Right Positions <sup>1</sup>	MSCP	Switch Settings	Corresponding DSSI ID Number
Left Rear (LR)	0	001	1
Left Front (LF)	0	010	2
Right Front (RF)	0	010	2
Right Rear (RR)	0	001	1

<sup>1</sup>The switch settings for OCPs in these positions are 0 = down and 1 = up.

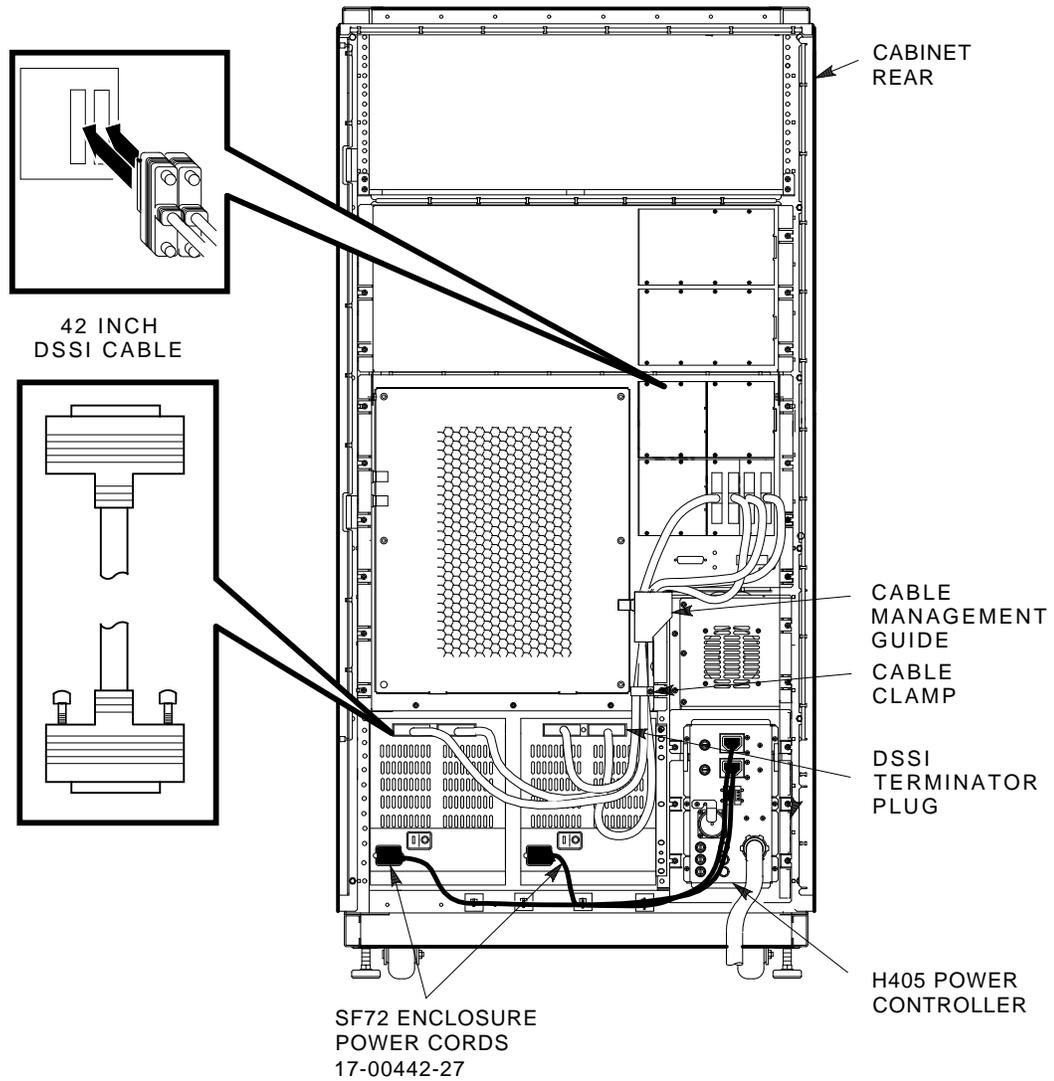
### A.2.5 Cabling the VAX 6000/SF7x Embedded Storage for Split-Bus/Disk Striping

Perform the following steps to cable a fully configured, Single Host, VAX 6000/SF7x Embedded Storage System for a Split-Bus/Disk Striping Environment (Figure A-5):

1. From the rear of the cabinet, remove the DSSI terminator plugs from each of the SF7x storage enclosures.
2. Connect the BC21Q-3F cable from the right (port 1) DSSI port connection of the first KFMSA I/O panel (this cable should still be attached at the I/O panel) to leftmost SF7x DSSI connection (from the rear of the cabinet) of the left SF7x enclosure.
3. Connect the BC21Q-3F cable from the left (port 2) DSSI port connection of the first KFMSA I/O panel (this cable should still be attached at the I/O panel) to the rightmost SF7x DSSI connection (from the rear of the cabinet) of the left SF7x enclosure (Figure A-5).
4. Install (2) BC21Q-3F cables as in Steps 2 and 3 using the I/O panel port locations for the second KFMSA module and connect them to the right SF7x (from the rear of the cabinet) in the same manner (Figure A-5).
5. Label the cables accordingly.
6. Apply to the disk enclosure.

7. Apply system power.

**Figure A-5: Cabling the VAX 6000/SF7x Embedded Storage for Split-Bus/Disk Striping**



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## A.3 VAX 6000/SF3x Split-Bus/Disk Striping Operation

The following sections describe the procedures necessary to install additional hardware, reconfigure the SF3x Storage Enclosure from Through Bus mode to Split-Bus mode, and system cabling procedures for split-bus/disk striping operation. Refer to *DECarray Owner's Manual EK-SF7XS-OM* for a description of split-bus operation.

### A.3.1 Configuring the System for Split-Bus/Disk Striping

#### NOTE

All references to Disk Striping in this section refer to a fully configured (2 SF3x-JA), Single System, VAX 6000/SF3x Embedded Storage System. The configuration in this section depicts a typical Disk Striping Configuration.

The following steps are necessary to configure the VAX 6000/SF3x Embedded Storage System for Split-Bus/Disk Striping operation:

- Install additional KFMSA XMI to DSSI Adapter Modules and cable kits into the XMI Backplane Table A-3.
- Convert the (2) SF3x-JA Storage Enclosures to split bus mode.
- Reroute the DSSI cables from the I/O panels to the SF3x enclosures.

The following table lists additional hardware required to configure a fully loaded (2 SF3x-JA), single system, VAX 6000/SF7x Embedded Storage System for proper split-bus/disk striping operation.

**Table A-3: SF3x Additional Hardware**

Option	Description	Quantity
KFMSA	XMI to DSSI Adapter Module	2
CK-KFMSA-LJ/LN	Cable Kit	2
CK-SF35A-AA	SF3x Split-Bus/Disk striping Kit	2

Following is a list of material that is included in the CK-SF35A-AA Split-Bus/Disk Striping kit:

**Table A-4: CK-SF35A-AA Split-Bus/Disk Striping Kit**

Part #	Description	Quantity
12-28976-01	Conn, Terminator, Filtered	4
BC21Q-3F	Cable Assy, Molded, Shielded	2
90-07091-00	Clamp, Cable, Screw Mtd 1"	1

### A.3.2 Installing the Additional KFMSA Modules

Install the additional KFMSA-AA XMI to DSSI Adapter Modules and CK-KFMSA-LJ/LN cable kit as per the *KFMSA Module Installation and User s Manual* EK-KFMSA-IM.

#### NOTE

Install the I/O Panel for the additional KFMSA modules as noted in Chapter 3 Section 3.2.4.

### A.3.3 Converting the SF3x enclosure to Split-Bus/Disk Striping Mode

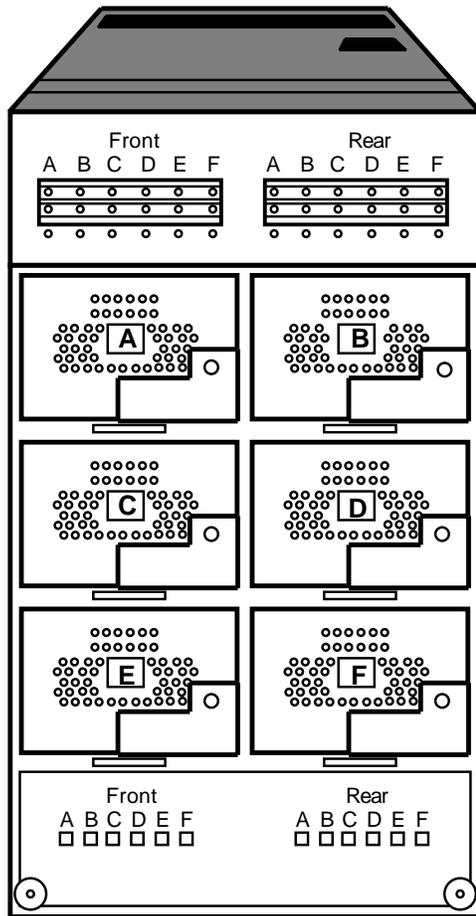
Follow the procedure below to convert the SF3x Disk Storage Enclosure from Through-Bus mode to Split-Bus mode.

#### NOTE

This procedure should be performed on both SF3x Disk Storage Enclosures in a fully loaded VAX 6000/SF3x Embedded Configuration.

1. Perform an orderly shutdown of the system
2. Remove power to the drives by depressing the (12) Drive DC Power Switches in the front of the SF3x Storage Enclosure Figure A-6.
3. Set the AC Power switch in the rear of the SF3x enclosure to the 0 position Figure A-7.

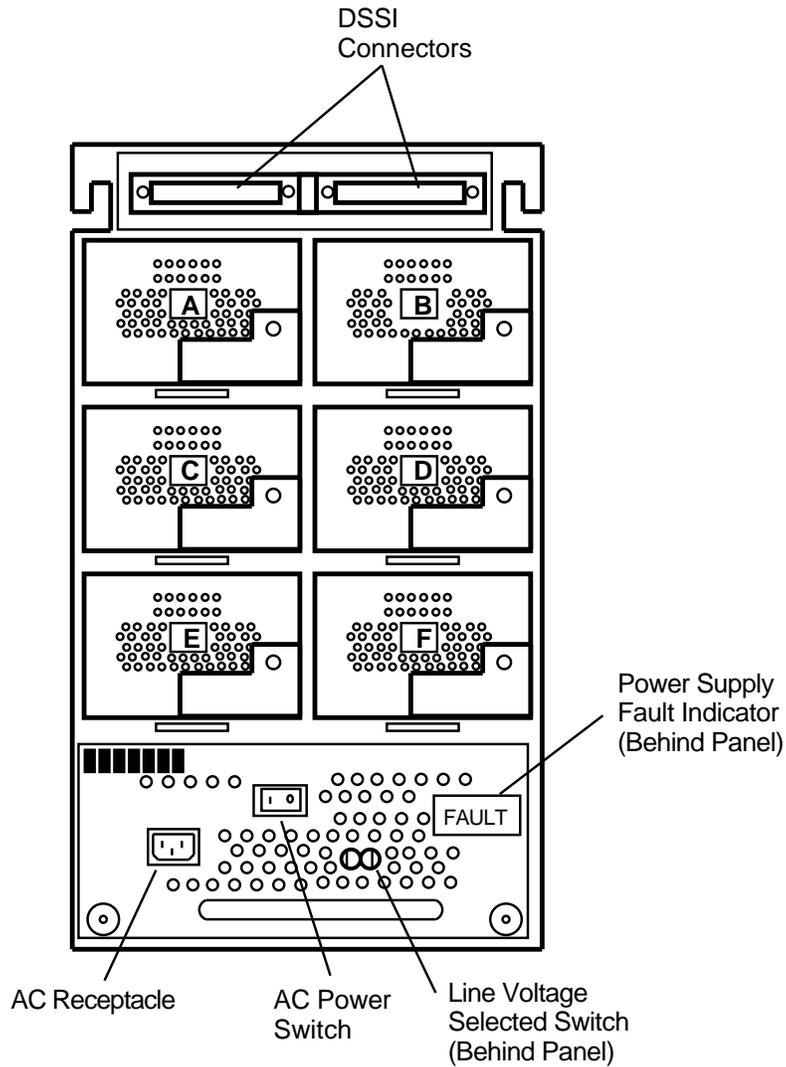
Figure A-6: SF3x Drive DC Power Switches



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4. From the rear of the disk enclosure, remove the two screws that hold the cable tray in place and slide the cable tray out.

Figure A-7: AC Power Switch



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5. Disconnect any DSSI cables or terminators presently installed in the cable tray.

6. Remove the OCP from the front of the SF3x enclosure.
7. Remove the four screws from the front corners of the SF3x Disk Enclosure.
8. Push the inner assembly forward from the rear of the disk enclosure until the drawer locks in the service position.

**NOTE**

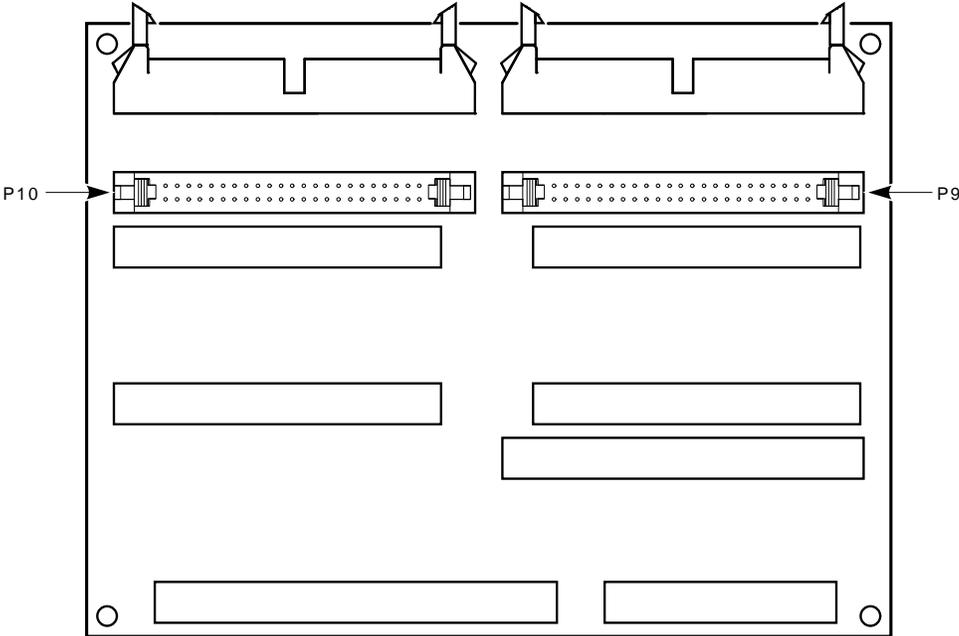
Do NOT completely remove the inner chassis from the extrusion tube, and extend only one storage enclosure at a time.

9. Remove the fan assembly cover by loosening the four knurled screws that hold it to the chassis.
10. Carefully spread the cables and remove the fan assembly.
11. Remove the jumper cables from the front connectors J9 and J10 of the backplane (see Figure A-8).
12. Install DSSI terminators (part number 12-28976-01) Table A-4 on J9 and J10.
13. Replace the fan assembly and cover.
14. Set the DSSI node ID switches for each ISE in that side of the enclosure (see Table A-6).

**NOTE**

Refer to Table A-5 for suggested DSSI Node Id setting in Split-Bus/Disk Striping Mode. Be sure to set the switches for both the front and rear sections of the enclosure when necessary.

Figure A-8: SF3x Backplane Connectors



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**Table A-5: SF3x Split-Bus/Disk Striping DSSI Node IDs**

<b>Position</b>	<b>Backplane Location</b>	<b>DSSI Node ID</b>
A	upper left slot	0
B	upper right slot	0
C	middle left slot	1
D	middle right slot	1
E	lower left slot	2
F	lower right slot	2

Use Table A-6 to set the SF3x DSSI Node switches for Split-Bus/Disk Striping. Refer to Figure A-9 for switch placement on the SF3x Transition Module.

**Table A-6: DSSI Node ID Switch Settings for SF3x Storage Enclosure**

Slot Position	Front Switch	Rear Switch	DSSI Node ID	Switch Positions <sup>1</sup>			
				1	2	3	4
A	S3	S10	0	X	1	0	0
			1	X	0	0	0
			2	X	1	1	0
			3	X	0	1	0
			4	X	1	0	1
			5	X	0	0	1
			6	X	1	1	1
			7	X	0	1	1
B	S1	S9	0	X	0	1	0
			1	X	1	1	0
			2	X	0	0	0
			3	X	1	0	0
			4	X	0	1	1
			5	X	1	1	1
			6	X	0	0	1
			7	X	1	0	1
C	S6	S7	0	X	1	1	0
			1	X	0	1	0
			2	X	1	0	0
			3	X	0	0	0
			4	X	1	1	1
			5	X	0	1	1
			6	X	1	0	1
			7	X	0	0	1

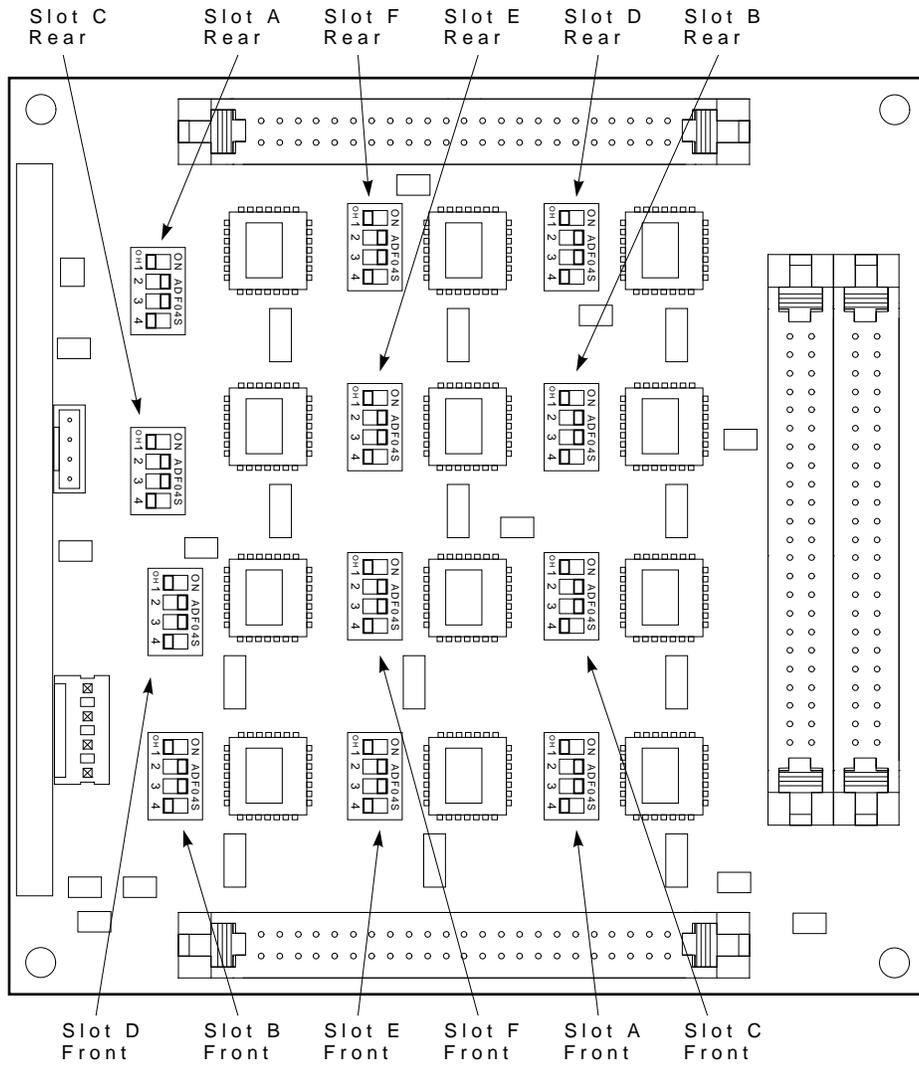
<sup>1</sup> 1 = On, 0 = Off, X = Does not matter

**Table A-6 (Cont.): DSSI Node ID Switch Settings for SF3x Storage Enclosure**

Slot Position	Front Switch	Rear Switch	DSSI Node ID	Switch Positions <sup>1</sup>			
				1	2	3	4
D	S4	S12	0	X	0	0	1
			1	X	1	0	1
			2	X	0	1	1
			3	X	1	1	1
			4	X	0	0	0
			5	X	1	0	0
			6	X	0	1	0
			7	X	1	1	0
E	S2	S8	0	X	1	0	1
			1	X	0	0	1
			2	X	1	1	1
			3	X	0	1	1
			4	X	1	0	0
			5	X	0	0	0
			6	X	1	1	0
			7	X	0	1	0
F	S5	S11	0	X	0	1	1
			1	X	1	1	1
			2	X	0	0	1
			3	X	1	0	1
			4	X	0	1	0
			5	X	1	1	0
			6	X	0	0	0
			7	X	1	0	0

<sup>1</sup> 1 = On, 0 = Off, X = Does not matter

**Figure A-9: SF3x Transition Module DSSI Node ID Switches**



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15. Push the inner chassis back in place and replace the four front door screws.

**CAUTION**

Be sure to dress cables properly when pushing the inner chassis back in place to avoid damage.

### **A.3.4 Cabling the VAX 6000/SF3x Embedded Storage for Split-Bus/Disk Striping**

The following procedure and diagrams demonstrate the steps necessary to cable a fully configured (2 SF3x-JA) VAX 6000/SF3x Embedded Storage system for Split-Bus/Disk Striping operation.

1. At the rear of the system, remove the cable clamp holding any existing DSSI cables already installed in the cabinet.

**NOTE**

Save the screw to be reinstalled after cabling procedures are complete.

2. Cut and remove any tie wraps holding existing cables.
3. At the rear of the disk enclosure, slide the cable tray out to expose all four DSSI connections.

**NOTE**

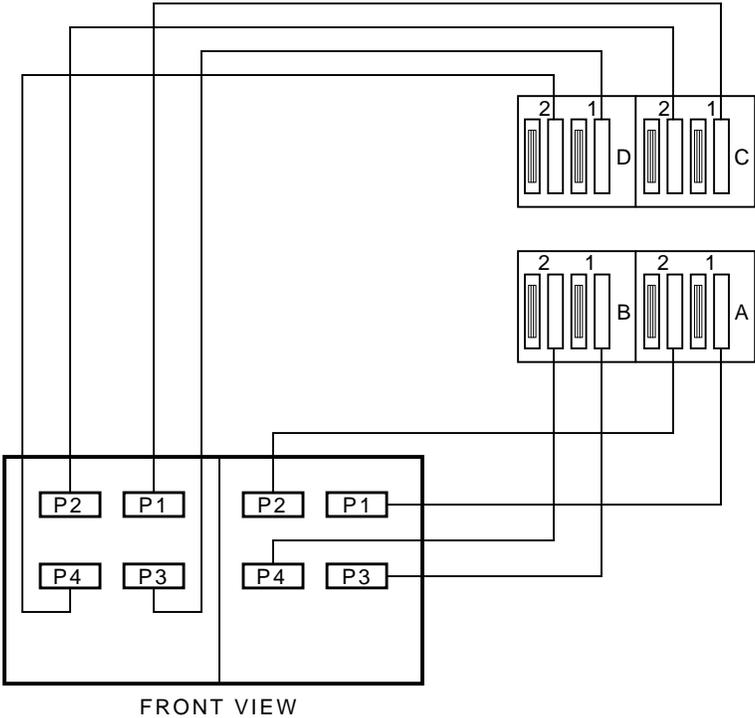
The cable tray should already be loose from the preceding procedure.

4. Refer to Figure A-10 and connect the DSSI Cables (BC21Q-3F) to the KFMSA I/O ports as shown.
5. Attach the other end of the cables to the cable tray of the corresponding SF3x Disk Enclosure as shown in Figure A-11.

**Note**

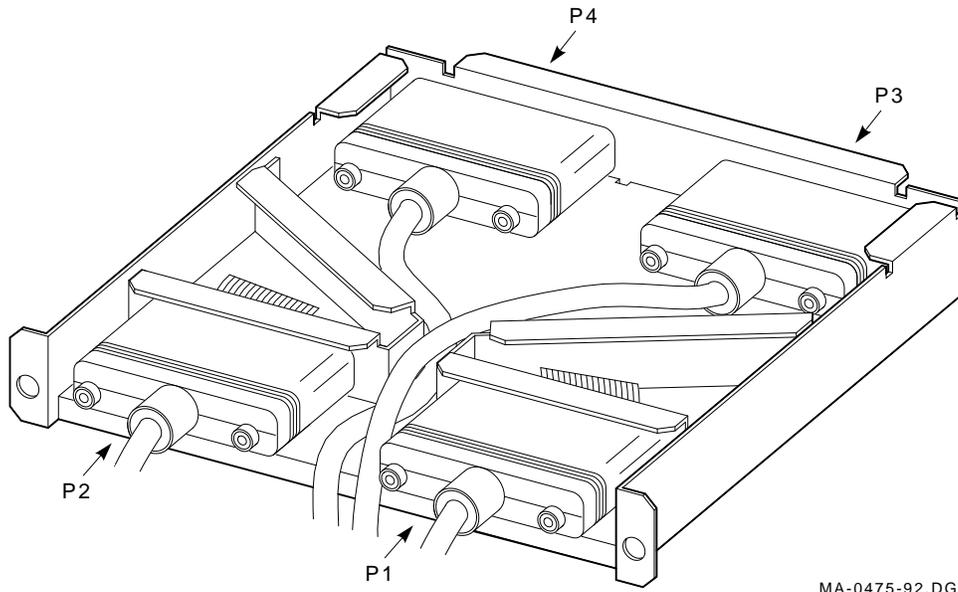
References to P1-P4 in Figure A-10 correspond to references in Figure A-11. Connectors P1 and P2 are for the rear ISEs. Connectors P3 and P4 are for the front ISEs.

**Figure A-10: Cabling for Split-Bus/Disk Striping**



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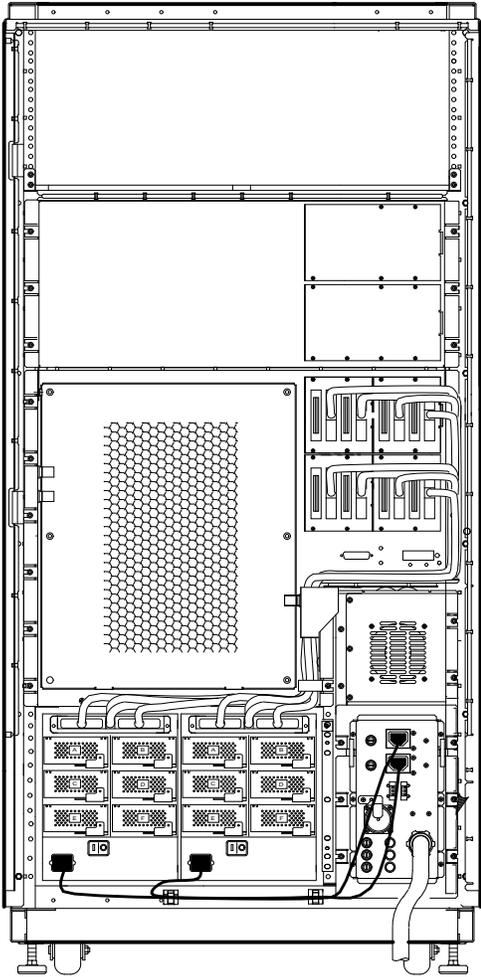
**Figure A-11: SF3x Cable Tray (Fully Cabled)**



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6. Replace the cable tray.
7. Dress the cables as shown in Figure A-12.

**Figure A-12: SF3x Cable Dressing**



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8. Reattach the cable clamp(s) to the standoff using the screw that was removed in the preceding procedures.

**NOTE**

When cabling a fully configured VAX 6000/SF3x Embedded Storage System for Split-Bus/Disk Striping, it is necessary to use two 1" cable clamps to secure the cables properly. This can be accomplished by placing the two clamps back-to-back then securing them to the standoff.

9. Secure cables with tie wraps wherever necessary.
10. Label the cables accordingly.
11. Apply power to the disk enclosure.
12. Apply system power.

## Appendix B

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# VAX 6000/SF7x/SF3x Embedded Storage in DSSI VAXcluster Configurations

This appendix describes:

- Additional hardware necessary to install VAX 6000/SF7x/SF3x Embedded Storage Systems as DSSI VAXcluster configurations.
- Steps to properly install two fully configured (2 SF7x-JA) VAX 6000/SF7x Embedded Storage Systems in a DSSI VAXcluster configuration.
- Steps to properly install two fully configured (2 SF3x-JA) VAX 6000/SF3x Embedded Storage Systems in a DSSI VAXcluster configuration.

### B.1 VAX 6000/SF7x/SF3x Embedded Storage Installed in DSSI VAXcluster Configurations.

#### B.1.1 Additional Hardware Required

VAX 6000/SF7x/SF3x Embedded Storage options may be included as part of a DSSI VAXcluster where two or more systems can share the disk storage enclosures. To accomplish this, additional hardware needs to be installed in each system.

## NOTE

Additional hardware listed includes only the hardware necessary to configure a two system VAX 6000/SF7x/SF3x DSSI VAXcluster. These procedures are for reference purposes only and may not reflect actual configuration requirements.

To configure two fully loaded VAX 6000/SF7x Embedded Storage (2 SF7x-JA) Systems in a two system DSSI VAXcluster, you will need the following additional equipment:

**Table B–1: Additional Hardware for VAX 6000/SF7x Systems**

Option	Description	Quantity
KFMSA-AA/BA	XMI to DSSI Adapter Module	2 (1 per CPU)
CK-KFMSA-LJ/LN	Cable Kit	2 (1 per CPU)
CK-SF2xx-Lx <sup>1</sup>	DSSI Cable Kit	4

<sup>1</sup>Do not exceed DSSI maximum bus length

To configure two fully loaded VAX 6000/SF3x Embedded Storage (2 SF3x-JA) Systems in a two system DSSI VAXcluster, you will need the following additional equipment:

**Table B–2: Additional Hardware for VAX 6000/SF3x Systems**

Option	Description	Quantity
KFMSA-AA/BA	XMI to DSSI Adapter Module	4 (2 per CPU)
CK-KFMSA-LJ/LN	Cable Kit	4 (4 per CPU)
CK-SF2xx-Lx <sup>1</sup>	DSSI Cable Kit	8

### B.1.2 Installing the KFMSA Modules

Install the additional KFMSA-AA/BA XMI to DSSI Adapter Modules and CK-KFMSA-LJ/LN cable kits into each VAX 6000 System as per the KFMSA Module Installation and User Manual, *EK-KFMSA-IM*.

## NOTE

Install the I/O Panel for the additional KFMSA options as described in Chapter 3 Section 3.2.4.

### **B.1.3 Cabling a Two System VAX 6000/SF7x Embedded Storage DSSI VAXcluster**

Since each system has been configured as a fully loaded single system VAX 6000/SF7x Embedded Storage System, it is not necessary to remove any of the existing cables from the I/O panels or from the rear of the SF7x storage enclosures.

Perform the following steps to add the necessary cables to configure the two individual systems into a two system DSSI VAXcluster:

#### **NOTE**

All procedures in this appendix refer to configuring two fully loaded single system VAX 6000/SF7x Embedded Storage configurations (2 SF7x-JA) as a two system VAX 6000/SF7x DSSI VAXcluster. The configuration shown throughout this section utilizes the CK-KFMSA-LJ cable kits and cables the SF7x Storage Enclosures in a mid-node position.

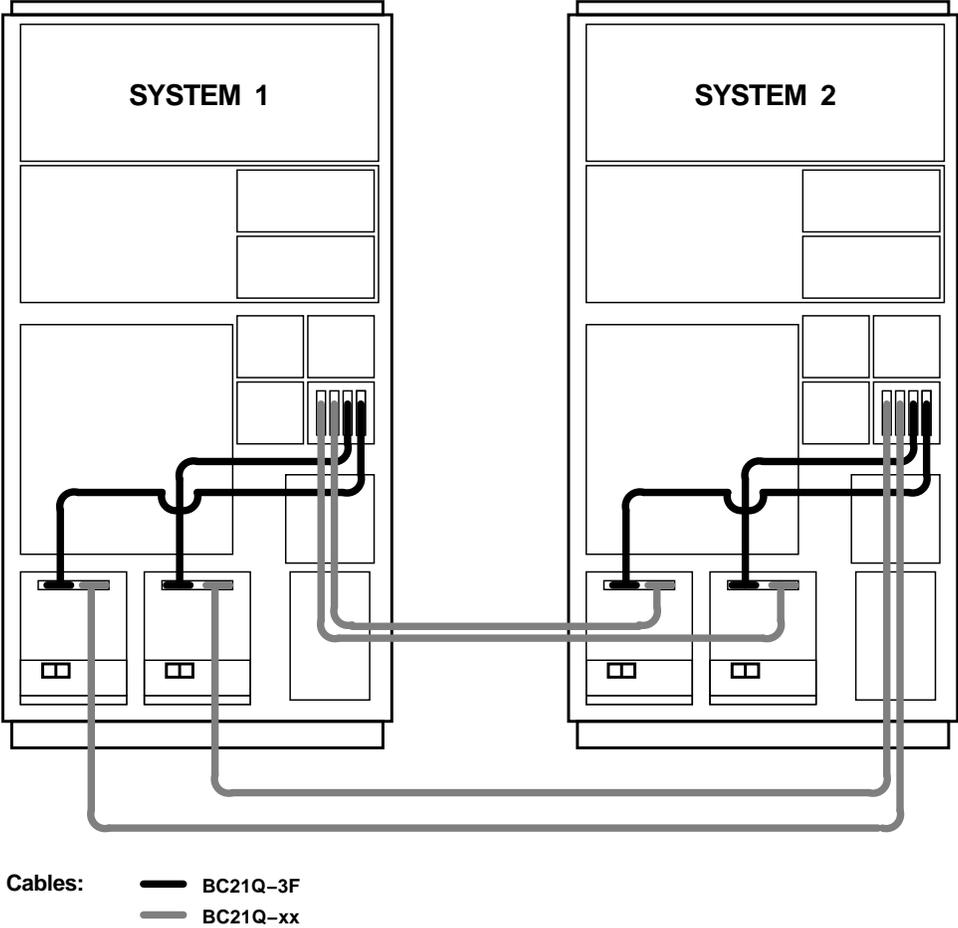
#### **CAUTION**

Ensure proper shutdown and power down procedures have been followed before continuing.

1. From the rear of the systems, open the door to each cabinet using a 5/32 hex key.
2. Remove the terminator plugs from the SF7x enclosures in each system (four terminator plugs total).
3. Connect a BC21Q-xx cable to port 1 (right side) of the empty I/O panel located in System 1 (Figure B-1). Route this cable through the cable management guide.
4. Connect the other end of the cable to the open DSSI connection of the SF7x Storage Enclosure in the left side (from the rear) of System 2 (Figure B-1).
5. Install the remaining BC21Q-xx cables in the same manner to/from the following points (Figure B-1).
  - Port 2 of System 1 (should be empty) to the open DSSI connection of the SF7x Storage Enclosure in the right side (from the rear) of System 2.
  - Port 1 of System 2 (should be empty) to the open DSSI connection of the SF7x Storage Enclosure in the left side (from the rear) of System 1.

- Port 2 of System 2 (should be empty) to the open DSSI connection of the SF7x Storage Enclosure in the right side (from the rear) of System 1.

Figure B-1: VAX 6000/SF7x Cabling Scheme



SHR-XR0126-91

6. Close rear doors on both systems.
7. Apply power to both systems.

### **B.1.4 Cabling a Two System VAX 6000/SF3x Embedded Storage DSSI VAXcluster**

Since each system has been configured as a fully loaded single system VAX 6000/SF3x Embedded Storage System, it is not necessary to remove any of the existing cables from the I/O panels or from the rear of the SF3x storage enclosures.

Perform the following steps to add the necessary cables to configure the two individual systems as a two system DSSI VAXcluster.

#### **NOTE**

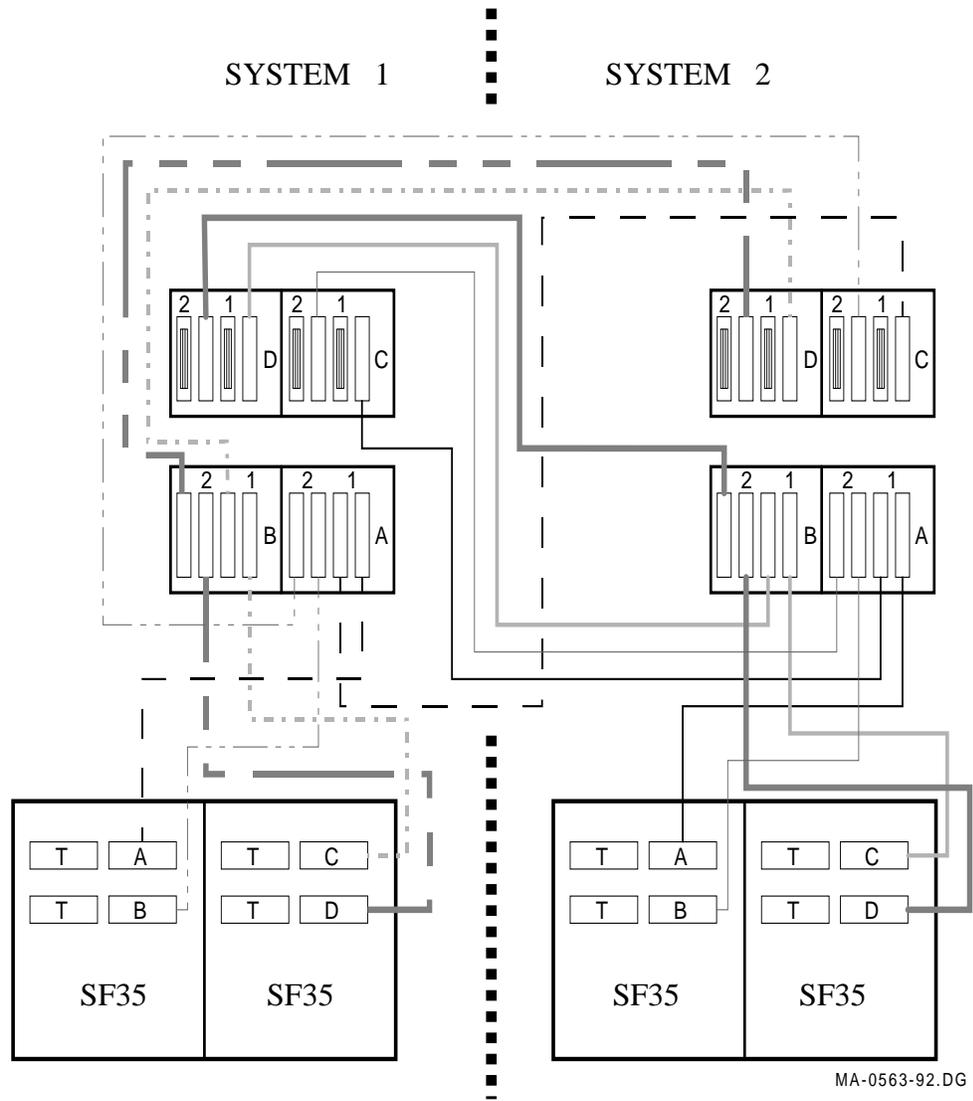
All procedures in this appendix refer to configuring two fully loaded single system VAX 6000/SF3x Embedded Storage configurations (2 SF3x-JA) as a two system VAX 6000/SF3x Embedded Storage DSSI VAXcluster. The configuration shown throughout this section utilizes the CK-KFMSA-LN cable kits and cables the SF3x Storage Enclosures in an end-node position.

#### **CAUTION**

Ensure proper shutdown and power down procedures have been followed before continuing.

1. From the rear of the systems, open the door to each cabinet using a 5/32 hex key.
2. Remove the terminators from the KFMSA I/O panels from each of the systems.
3. Connect a BC21Q-xx cable to port 1 of the I/O panel (A) located in System 1 (Figure B-2). Route this cable through the cable management guide of System 1.
4. Route the other end of the BC21Q-xx cable through the cable management guide in System 2.
5. Connect the other end of the BC21Q-xx cable to port 1 of the I/O panel (C) located in System 2 (Figure B-2).
6. Install a terminator (Part # 12-31261-01) on the empty connection at port 1 of I/O panel (C) located in System 2 (Figure B-2).

Figure B-2: VAX 6000/SF3x Cabling Scheme



7. Install the remaining BC21Q-xx cables and terminators in the same manner to/from the following points. Refer Figure B-2).
  - Port 2 of the I/O panel (A) in System 1 to port 2 of the I/O panel (C) in System 2. Install a terminator at the open DSSI connection of port 2 of I/O panel (C) in System 2.
  - Port 1 of the I/O panel (B) in System 1 to port 1 of the I/O panel (D) in System 2. Install a terminator at the open DSSI connection of port 1 of I/O panel (D) in System 2.
  - Port 2 of the I/O panel (B) in System 1 to port 2 of the I/O panel (D) in System 2. Install a terminator at the open DSSI connection of port 2 of I/O panel (D) in System 2.
  - Port 1 of the I/O panel (A) in System 2 to port 1 of the I/O panel (C) in System 1. Install a terminator at the open DSSI connection of port 1 of I/O panel (C) in System 1.
  - Port 2 of the I/O panel (A) in System 2 to port 2 of the I/O panel (C) in System 1. Install a terminator at the open DSSI connection of port 2 of I/O panel (C) in System 1.
  - Port 1 of the I/O panel (B) in System 2 to port 1 of the I/O panel (D) in System 1. Install a terminator at the open DSSI connection of port 2 of I/O panel (D) in System 1.
  - Port 2 of the I/O panel (B) in System 2 to port 2 of the I/O panel (D) in System 1. Install a terminator at the open DSSI connection of port 2 of I/O panel (D) in System 1.

### **B.1.5 Configuring System Parameters for Two System VAX 6000/SF7x/SF3x Embedded Storage DSSI VAXcluster**

Refer to the KFMSA Module Installation and User Manual, *KFMSA Module Installation and Users Guide* EK-KFMSA-IM for procedures to configure a two system DSSI VAXcluster system.

## Appendix C

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### Related Documentation

This appendix lists reference documents to be used when installing DSSI options as Embedded Storage in the VAX 6000 Series Processor cabinet.

#### NOTE

**The documentation listed here may or may not be included with material received for Embedded Storage installation**

**Table C-1: Related Documentation**

<b>Manual</b>	<b>Description</b>
<i>EK-600EA-MG</i>	VAX 6000 Platform Service Manual
<i>EK-600EA-OM</i>	VAX 6000 Series Owner's Manual
<i>EK-KFMSA-IM</i>	KFMSA Module Installation and User Manual
<i>EK-RF72D-UG</i>	RFxx Series Integrated Storage Element User Guide
<i>EK-SF7xS-OM</i>	DECarray Owner's Manual
<i>EK-SF2xx-IG</i>	DECarray Installation Guide

# Index

---

## A

---

Adhering the Labels, 5–8, 6–14

## B

---

Bringing on-line  
disk ISE, 7–10, 7–21

## C

---

Cabling the SF3x  
for Split-Bus/Disk Striping, A–24  
Cabling the SF3x storage enclosure  
-JA variation, 6–5  
Cabling the SF3x storage enclosures,  
6–1  
-BA and -HA Variations, 6–1  
left position, 6–8  
right position, 6–1  
Cabling the SF7x storage enclosures,  
5–1  
left position, 5–4  
right position, 5–1  
Converting to split-bus mode, A–15

## D

---

Disk Striping, A–1  
SF7x DSSI Node Switches, A–9  
Documentation, related, C–1  
DSSI bus meter, 7–4, 7–5

DSSI ID  
switch settings  
SF3x, 4–30

## F

---

Filling out the labels, 5–8, 6–14  
Final verification, 5–10, 6–15

## G

---

Guide rail  
installation, 4–9

## H

---

H405-E/F VAX 6000 Controller  
replacing the, 3–6  
H405 power controller, 2–9  
Hazards and safety precautions, 1–1

## I

---

Installation  
troubleshooting, 7–1  
Installing the additional KFMSA(s),  
A–15  
Installing the second KFMSA, A–3

## K

---

### KFMSA

- installing the additional KFMSA(s), A-15
- installing the second KFMSA, A-3

### KFMSA Module

- installation, 3-8

## L

---

Labeling the DSSI cables, SF3x installation, 6-14

Labeling the DSSI cables, SF7x installation, 5-8

Labeling the operator control panel, 5-8, 5-9, 6-14

## P

---

Powering on the SF3x storage enclosure, 6-11

Powering on the SF7x storage enclosure, 5-7

## R

---

Related documentation, C-1

### RF3X disk ISE

- bringing on-line, 7-10

### RF7x disk ISE

- bringing on-line, 7-21
- removal from SF7x storage enclosure, 7-12

### RF disk ISE

- removal from SF3x storage enclosure, 7-7

## S

---

Safety precautions and hazards, 1-1

### SF31T

- SF31T-UK Upgrade Kit, 2-8

### SF35

- SF35-UK Upgrade Kit, 2-7

### SF3x

- DSSI Node Numbers, 4-29
- Node Number Switches, A-20

### SF3x OCP

- Adjustment, 4-27
- installation, 4-27
- Removal, 4-27

### SF3x storage enclosure

- recommended environmental limits, 2-13
- removing the RF disk ISE, 7-7

### SF72

- SF72-UK Upgrade Kit, 2-7

### SF73

- SF73-UK Upgrade Kit, 2-7

### SF7x/SF3x

- Cab Kit, 2-6
- options, 2-1

### SF7x/SF3x enclosure

- installing the, 4-12

### SF7x/SF3x options

- installation, 4-1
- unpacking, 4-2

### SF7x OCP

- Adjustment, 4-18
- installation, 4-22
- Removal, 4-18
- Switch Settings, 4-18

### SF7x storage enclosure

- recommended environmental limits, 2-15
- removing the RF7x disk ISE, 7-12

Split-Bus/Disk Striping configurations, A-2, A-14

Split bus mode, A-15

Split-bus mode, A-3

Split-bus mode

- converting to, A-15

Spring clips

- installation, 4-4

Storage enclosure overview, 2-9 to 2-17

## T

---

- Tools, required
  - for troubleshooting
    - DSSI bus meter, 7-4
- Troubleshooting
  - basic steps, 7-2
  - installation, 7-1
  - SF3x storage enclosure, 7-2

## U

---

- Upgrade kits, 2-7
- Upgrade Kits
  - installation, 3-1

## V

---

- VAX 6000
  - DSSI VAXclusters, B-1
  - installing logo/nameplate, 3-6
  - powering down, 4-3
  - replacing front door, 3-2