KFMSA Module
Installation and User Manual

Order Number   EK-KFMSA-IM-004

Digital Equipment Corporation

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About This Manual

This manual explains how to install one or more KFMSA modules in an XMI based host system. It includes hardware installation, cabling, diagnostics, and configuration of the DSSI integrated storage elements (ISEs) attached to the KFMSA module's two DSSI buses.

Manual Structure

The manual includes the following chapters:

- Chapter 1, General Information, describes the KFMSA module, the XMI card cage and backplane, and the DSSI cables used in the installation.

- Chapter 2, Unpacking Instructions, provides unpacking instructions.

- Chapter 3, KFMSA Module Installation, explains how to install the KFMSA module and DSSI cables in an XMI based host enclosure.

- Chapter 4, Power-On Self-Test, describes the power-on self-test (POST) that runs when power is applied to the KFMSA module.

- Chapter 5, Configuration Concepts describes the configuration concepts required to properly set DSSI subsystem parameters.

- Chapter 6, Configuration Using EVCXE, describes how to set device parameters for the KFMSA module and the DSSI ISEs using EVCXE.

- Chapter 7, Configuration Using EVCXF, describes how to set device parameters for the KFMSA module and DSSI ISEs, using EVCXF. It also contains descriptions of EVCXF tests and commands.

- Chapter 8, Booting VMS from a DSSI Device, discusses the procedure for booting the VMS operating system from a DSSI device through the KFMSA module.

- Chapter 9, EEPROM Update Utility, describes the EEPROM update utility (EVUCM).

Intended Audience

This manual is intended for use by Digital Customer Services personnel or qualified self-maintenance customers. If you have not been trained to install the KFMSA module, you should call Digital Customer Services to schedule an installation.

For the Customer

The customer must back up the software before Digital Customer Services personnel arrive at the site. This is important because it ensures that data is not lost during the installation.

The KFMSA module is susceptible to damage by static electricity. Wear an antistatic wrist strap and use an antistatic mat whenever you handle a KFMSA module.

To install the KFMSA module, follow the procedures outlined in this manual. If you have any difficulty installing the module, call Digital Customer Services for help.

For Digital Customer Services Personnel

The KFMSA module is susceptible to damage by static electricity. Wear an antistatic wrist strap and use an antistatic mat whenever you handle a KFMSA module.

To install the KFMSA module, follow the procedures outlined in this manual. When you have installed the module, submit a labor activity reporting system (LARS) form. If you need help completing this form, contact your unit manager.

1
General Information

This chapter provides an overview of the KFMSA module, the XMI card cage and backplane, and the DSSI cables used for this installation.

1.1 KFMSA Module

The KFMSA module (Figure 1–1) is an extended memory interconnect (XMI) storage adapter that connects the host to DSSI based integrated storage elements (ISEs). The KFMSA has two DSSI buses, each capable of supporting up to seven DSSI devices. Each DSSI bus has its own support hardware, including the DSSI bus drivers, bus protocol controller, host port controller, memory, and RISC processor.

Figures 1–2 and 1–3 illustrate the relationships between the host, the KFMSA module, and the DSSI ISEs.

There are two different versions of the KFMSA module; KFMSA-AA and KFMSA-BA. The KFMSA-AA module has terminators embedded in the module, while the KFMSA-BA module has socketed terminators which can be removed to allow the module to be used in the middle of the DSSI bus in a DSSI VAXcluster. The KFMSA-AA module is supported by VMS Version 5.4-2 or higher. The KFMSA-BA module is supported by VMS Version 5.4-3 or higher.

NOTE
If you are using VMS 5.4-2 and creating an RF series VMS system disk on a VAX 6000 series system, you must first install VMS Version T5.4-0K on the RF ISE, and then update to VMS Version 5.4-2.

If you are using VMS Version 5.4.3, you must also install Version T5.4-0K first if you are installing VMS from a tape. If you are installing it from a CD, Version T5.4-0K is included.

NOTE
The KFMSA module is not compatible with the CIBCA-AA module. Upgrade to the CIBCA-BA module or other CI interface before you install a KFMSA module.

NOTE
The following error message may appear when you add the KFMSA module to a system that has a KLESI module.

```
Maintenance sanity timer expired.
```

Ignore this message. It does not indicate a malfunction in either module.
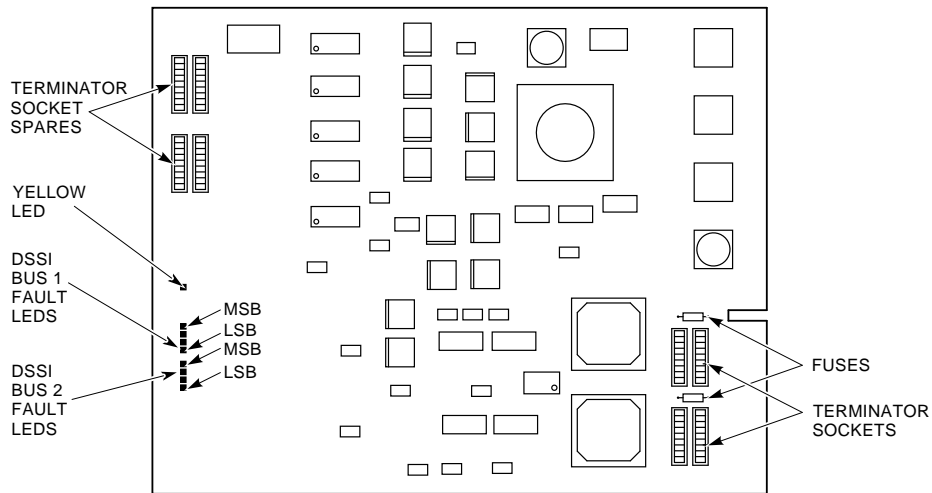
LJ-00986-TI0

Figure 1–1   KFMSA (-BA) Module
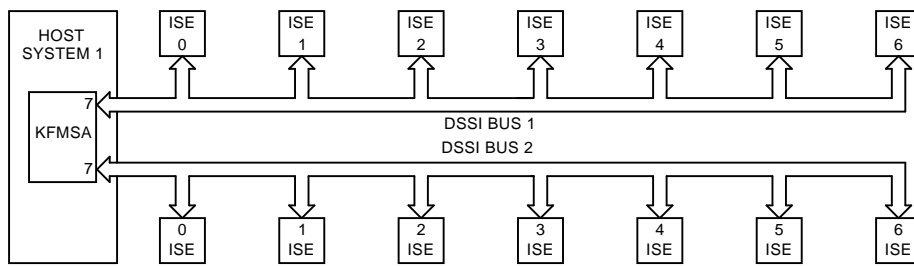
SHR-XR0049-90

Figure 1–2   Single System DSSI Configuration
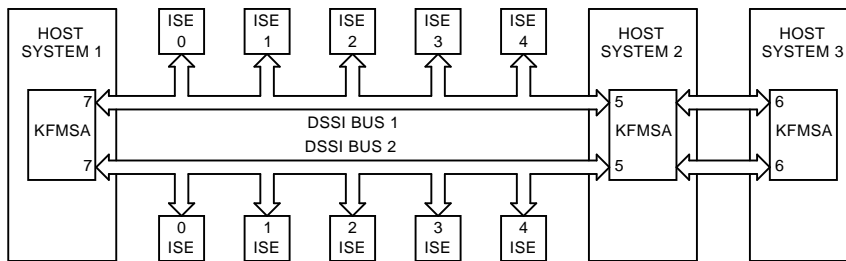
LJ-00984-TI0

Figure 1–3   DSSI VAXcluster Configuration

Table 1–1   Functional Specifications

Specification	Value
Throughput	>1000 QIO/second >2.5 Mbytes/second sustained on either DSSI bus >4.5 Mbytes/second aggregate
Latency	<1.5 millisecond contribution to transfer time for a single-sector QIO
Power consumption	15 W nominal
Power requirements	10 A at +5.0 V

Table 1–2   Environmental Specifications

Specification	Value
Temperature	+10 to +40°C (+50 to +104°F), operating -40 to +66°C (-40 to +151°F), non-operating
Humidity	10% to 90% with no condensation
Altitude	2,438 meters (8,000 feet), operating 9,142 meters (30,000 feet), non-operating

1.2   VAX 6000 Series System

The VAX 6000 series system has configurations that support many different applications. It functions as a standalone system, a VAXcluster member, a local area VAXcluster boot node, or as a file server for workstations. It supports a full range of VAX applications and operating systems.

The VAX 6000 series system cabinet is shown in Figure 1–4. The 60-inch cabinet contains:

• An XMI card cage (which contains the processors, memories, and I/O adapters)

• Two optional VAXBI card cages

• Two storage bays for optional storage devices and battery backup

• A tape backup device

• Control panel switches, status indicators, and restart controls

In the system shown in Figure 1–4, multiple KFMSA modules connect the VAX 6000 to DSSI disk and tape ISEs in two SF200 storage arrays. The SF200 storage array holds up to six SF72 enclosures and two tape devices.
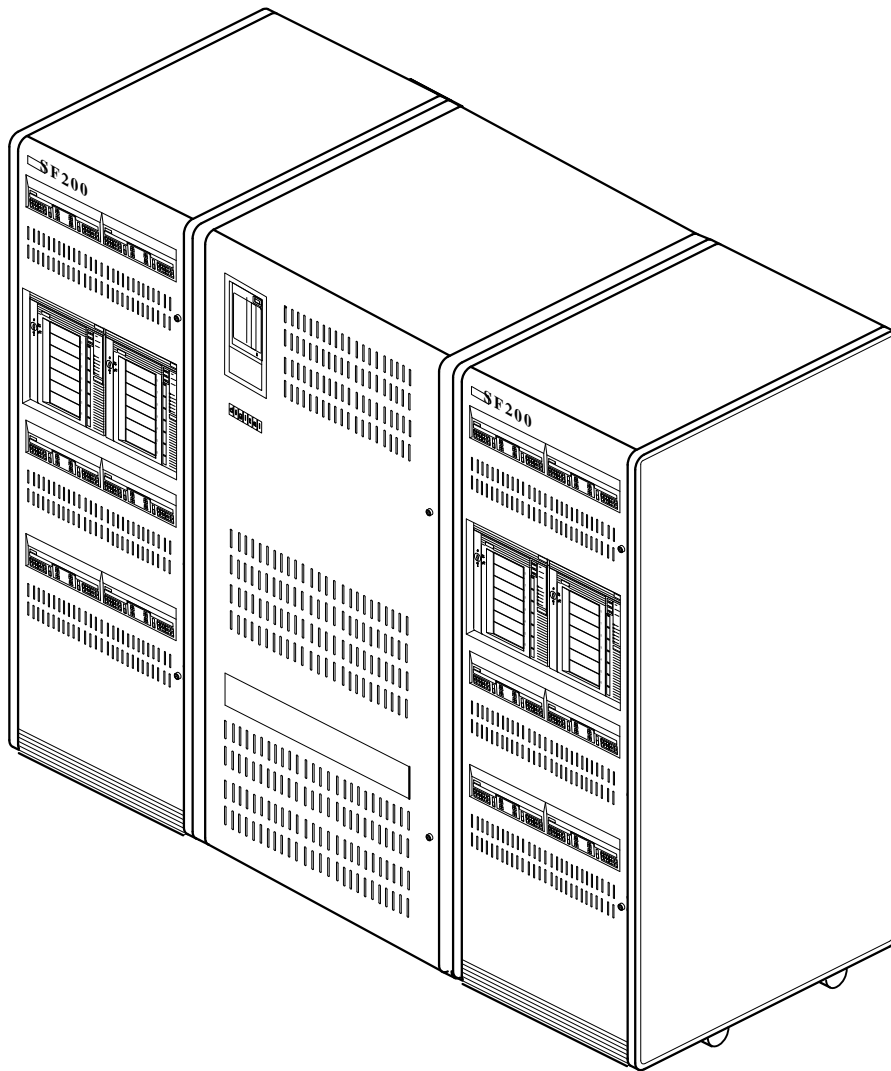
SHR-X0123-90

Figure 1–4   VAX 6000 Series System

1.3   VAX 9000 Series System

The VAX 9000 series systems come in two basic models; the model 200 and the model 400. Both models are built from the same or similar components, the differences are mainly in packaging. The VAX 9000 system uses a system control unit (SCU) to interconnect single or multiple processors, memory, and I/O subsystems. The I/O subsystem uses the XMI bus to support the corporate interconnect architectures: BI, CI and NI.

Typical VAX 9000 series system configurations are shown in Figure 1–5 and Figure 1–6. The basic components of the VAX 9000 system are:

- System Control Unit (SCU) — provides the interconnect between the service processor unit (SPU), CPU, I/O subsystem, and main memory arrays.

- Central Processing Unit (CPU) — contains the CPU planar module and associated power, cooling, and logic components.

- I/O Cabinet — contains the XMI card cage(s) and power components. The model 200 system has a Front End Cabinet (FEC) that contains one XMI card cage. Model 400 systems have one or two I/O cabinets (IOA and IOB), each containing two XMI card cages.

- Storage Enclosure (SF200) — contains DSSI based disk and tape storage devices. The SF200 cabinet holds up to six SF72 enclosures (24 disk ISEs maximum) and two tape devices.

SCU   CPU   I/O   SF200

UPC
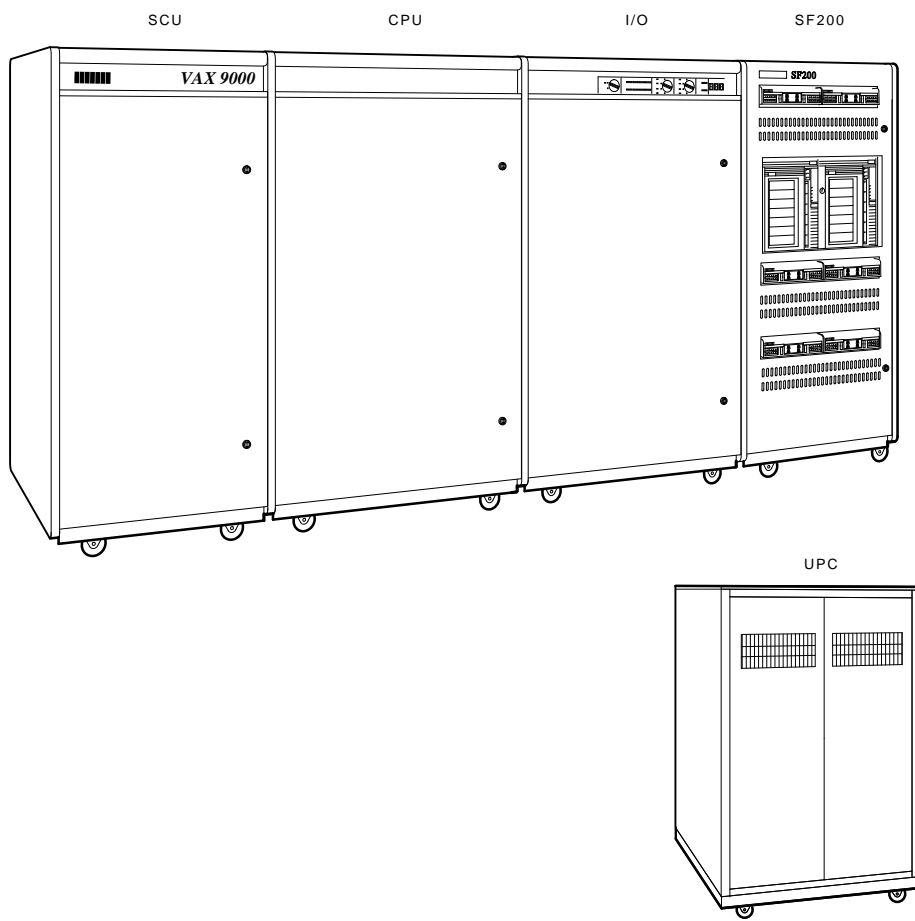
LJ-00832-TI0

Figure 1–5   VAX 9000 Model 200 System
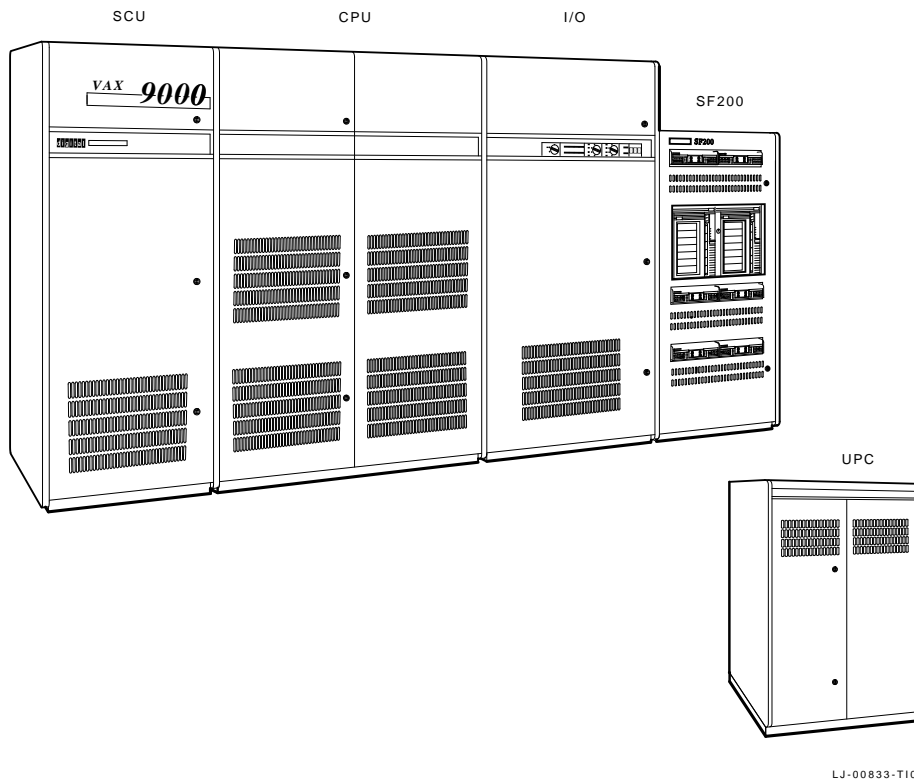
Figure 1–6   VAX 9000 Model 400 System

1.4 XMI Card Cage

The KFMSA module is used in systems that have an XMI card cage,
shown in Figure 1–7. The XMI card cage contains a 14-slot backplane,
that handles the transfer of signals and power to the components inside
the card cage.

E   D   C   B   A   9   8   7   6   5   4   3   2   1

SHR-X0173-90
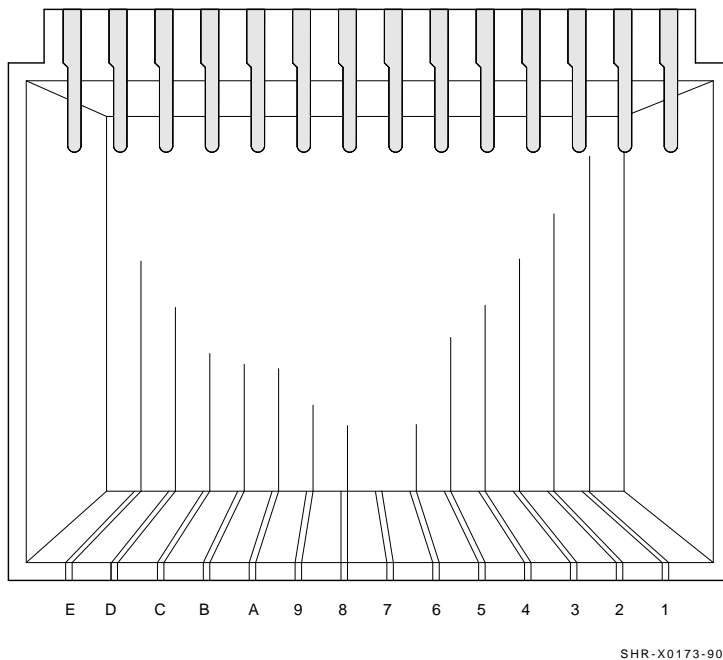
Figure 1–7   XMI Card Cage

CAUTION
Install only XMI modules in the XMI card cage. If you install non-XMI modules in the card cage, you may damage the modules or the XMI backplane.

Modules in the XMI card cage are called *nodes* on the XMI bus. An
XMI node takes its node number from the slot in which it resides. Each
slot has a 4-bit, hardwired, node number that identifies the slot and
the adapter in the slot. XMI adapters match the node number against
selected address bits to determine if an XMI transaction is directed to
their node.

1.4.1 VAX 6000 Series XMI Card Cage Restrictions

Do not install the KFMSA module in slots 6 through 9. These four slots have no I/O connectors, which the KFMSA module requires.

Furthermore, some VAX 6000 series XMI backplanes do not carry the interrupt signals that allow the KFMSA module to operate in slots 5 and A. The VAX 6000-500 and VAX 6000-600 systems carry these signals to slots 5 and A. Other VAX 6000 models do not.

Also, the first slot or the last slot in the card cage must contain a non-memory module. If a non-memory module is not present in one of these two slots, the XMI backplane will not function.

Memory modules must **never** be placed in slots 1 and E. If slot E is occupied, it must contain an I/O adapter module such as the KFMSA.

1.4.2 VAX 9000 Series XMI Card Cage Restrictions

In the VAX 9000 series XMI card cage, slot 7 is dedicated to housing the clock/arbiter module (CCARD) and slot 8 is dedicated to housing the XJA adapter module.

XMI configuration rules require that the first XMI adapter installed be placed in either slot 1 or slot 14. If a module is not present in one of these two slots, the XMI backplane will not function. Other adapters should be installed in alternate slots, for example: 2, 13, 3, 12, and so on. Adapters in the higher numbered slots have a higher arbitration priority than those in the lower numbered slots.

1.5 XMI Backplane

After you place the KFMSA module in a slot in the XMI card cage, you connect the cables between the XMI backplane and the I/O panel. The XMI backplane (Figure 1–8 and Figure 1–9) provides two connectors for each XMI slot in the card cage.

SLOTS
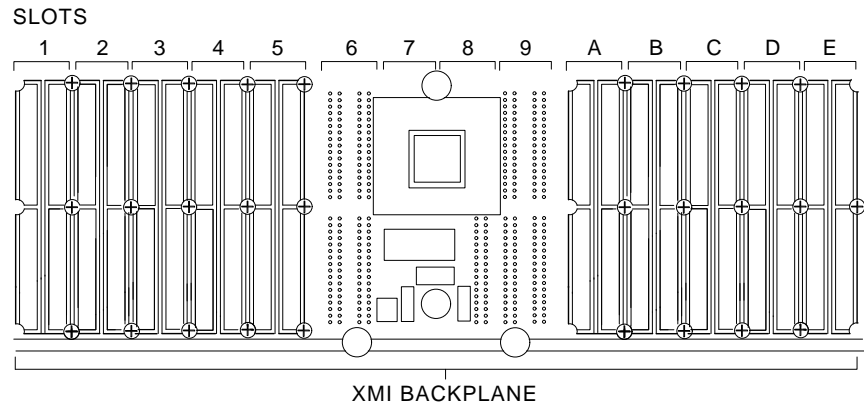
SHR-X0171-90

Figure 1–8   XMI Backplane (VAX 6000 Series)
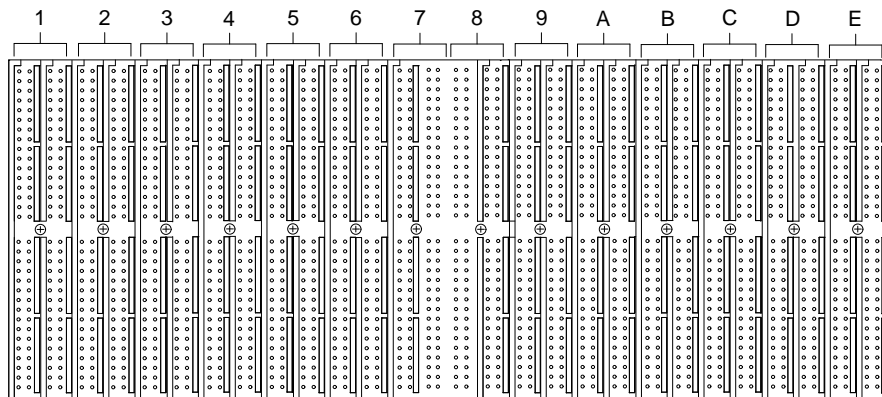
LJ-00872-TI0

Figure 1–9   XMI Backplane (VAX 9000 Series)

1.6   KFMSA Cable Kits

The KFMSA cable kit contains the cables and hardware you need to route the DSSI buses from the XMI backplane to the system I/O panel. Available KFMSA cable kits are listed in Table 1–3.

NOTE
The KFMSA module package does *not* include a cable kit. Order one KFMSA cable kit for each KFMSA module you install in the system.

Table 1–3   KFMSA Cable Kits

Part Number	Used For	Contents of Kit
CK-KFMSA-LJ	VAX 6000 series systems; single-system or DSSI VAXcluster[1]	Two 48-inch DSSI cables One bulkhead adapter plate One bulkhead filler plate Two DSSI bus terminators
CK-KFMSA-LK	VAX 9000 series systems; single-system	Two 48-inch DSSI cables One bulkhead adapter plate Two DSSI bus terminators
CK-KFMSA-LN	VAX 6000 series systems; single-system or DSSI VAXcluster	Two 48-inch DSSI "Y" cables One bulkhead adapter plate, with DSSI node ID switches Four DSSI bus terminators
CK-KFMSA-LP	Rack-mounted VAX 6000 series systems; single-system or DSSI VAXcluster[1]	Two 108-inch DSSI cables One bulkhead adapter plate One bulkhead filler plate Two DSSI bus terminators
CK-KFMSA-LR	VAX 6000 series systems with embedded DSSI tape ISE; single-system	One 48-inch DSSI cable One 125-inch DSSI cable One bulkhead adapter plate One bulkhead filler plate Two DSSI bus terminators

[1]Using this cable kit in a DSSI VAXcluster limits the configuration to two hosts only.

All of the cable kits listed in Table 1–3 are for connection between the XMI backplane and the I/O bulkhead. The type of cable you install with the KFMSA module depends on the configuration you want to end up with.

For applications where the KFMSA module(s) will be physically configured on the end(s) of the DSSI bus, use the straight cable; CK-KFMSA-LJ for VAX 6000 series systems and CK-KFMSA-LK for VAX 9000 series systems. The bulkhead adapter for this type of cable has two DSSI connectors on it, one for each of the module's two DSSI ports (see Figure 3–1).

For applications where it is desirable to configure a KFMSA with a DSSI node ID in the middle of the DSSI bus, or to terminate the bus off the module, use the Y-cables; CK-KFMSA-LN for VAX 6000 series systems.

The bulkhead adapter for this type of cable has four DSSI connectors on it, plus a rotary switch for setting the DSSI node ID for each of the module's two DSSI ports (see Figure 3–2). The rotary switch allows you to override the DSSI node ID set by the VAX/DS diagnostics EVCXF or EVCXE.

Configurations using the straight cable kit are restricted to one or two hosts. The Y-cable kit allows KFMSA modules to be used in the middle nodes of the DSSI bus, enabling three or more hosts to be used in a DSSI VAXcluster configuration.

In DSSI VAXcluster configurations using the CK-KFMSA-LN cable kit, putting the terminators on the bulkhead rather than on the KFMSA module makes it possible to replace a faulty KFMSA module by only powering down the system that contains the module, while leaving the rest of the DSSI devices on the bus(es) active.

The CK-KFMSA-LP is for connecting between XMI backplane and the I/O bulkhead on rack-mounted VAX 6000 series systems.

The CK-KFMSA-LR is for connecting the KFMSA module to a TF series DSSI tape device which is internally mounted in a VAX 6000 system. This kit includes one 48" cable that runs between the backplane and the bulkhead and one 108" cable that runs from the backplane to the tape device and then to the bulkhead.

2
Unpacking Instructions

Before you open the package, look for external damage. Report dents, holes, or crushed corners to the shipper and to your Digital representative.

Open the package. It contains the KFMSA module and a user manual.

CAUTION
Static electricity can damage integrated circuits. Wear an antistatic wrist strap and use an antistatic mat whenever you handle a KFMSA module. An antistatic mat is part of the antistatic kit (part number 29-26246).

The KFMSA module is wrapped in antistatic material. Do **not** unpack the module unless you are wearing an antistatic wrist strap and using an antistatic mat.

Inspect the KFMSA module for damage. Report the damage to your Digital representative, and ask for further instructions. If you do not see any damage, continue with the installation.

3

KFMSA Module Installation

This chapter tells you how to install the KFMSA module into the XMI card cage, and how to connect the DSSI cables between the XMI backplane and the I/O bulkhead.

Before you start the KFMSA module installation, make sure the system manager has backed up all files. Have the system manager shut down the operating system. Make sure these steps have been taken before you remove any panels from the cabinet.

CAUTION
Only qualified service personnel should install the KFMSA module. Incorrect installation could damage the module or the XMI backplane.

CAUTION
Static electricity can damage integrated circuits. Wear an antistatic wrist strap and use an antistatic mat whenever you handle a KFMSA module. An antistatic mat is part of the antistatic kit (part number 29-26246).

3.1   Before the Installation

Before you start the KFMSA module installation, test the system to verify its operation. We recommend the following procedure, but you may alter the procedure as necessary for your site.

1. Have the system manager shut down the operating system.

   CAUTION
   Make sure the system manager has backed up all files.

2. Initiate the system power-on self-test and be sure it is successful. Refer to your system documentation for these procedures.

3. Boot the VAX diagnostic monitor and perform a complete system-level diagnostic test. Be sure that these diagnostics are successful.

3.2   Installation in VAX 6000 Systems

CAUTION
You must power down the system before you remove or install any XMI module.

3.2.1   Module Installation

1. Turn the upper keyswitch on the front control panel to the 0 position.

2. Open the rear door of the logic compartment and push the T switch on the ac box to the OFF position.

3. Unplug the system from the electrical outlet.

   WARNING
   After you unplug the system, wait at least 5 minutes before you touch the XMI card cage. The 300 Vdc bus discharges slowly. If you touch the card cage too soon, you may be hurt and you may also damage the XMI modules in the card cage.

4. Open the front door of the logic compartment.

5. Open the clear plastic door in front of the XMI card cage.

   CAUTION
   Wear an antistatic wrist strap that is attached to the cabinet whenever you install modules.

6. If you must remove a module from the slot in which you are installing the KFMSA module, firmly lift the release lever from the zero insertion force (ZIF) connection on the backplane and carefully slide the module out of the card cage slot.

7. If you are installing a KFMSA-BA module in a configuration which does not require termination at the module, remove the DSSI bus terminators from their sockets on the connector end of the module and put the terminators in the sockets on the LED end of the module (see Figure 1–1).

   NOTE
   The previous step is only necessary in DSSI VAXcluster configurations where the KFMSA module is used in one of the middle nodes, or in configurations where the DSSI bus is terminated at the bulkhead rather than at the module.

8. Place the KFMSA module in the slot and secure the ZIF lever to close the backplane contacts against the module edge connector contacts.

9. Close the doors to the XMI card cage and logic compartment.

3.2.2 Connecting the DSSI Cables

This section describes how to install the DSSI cables between the XMI backplane and the host I/O bulkhead.

1. Open the rear door of the cabinet.

2. Decide where on the bulkhead I/O panel or the bulkhead tray you want the DSSI cable connectors to be installed and remove the blank filler plate from that position.

3. Remove the six screws that secure the bulkhead tray to the cabinet chassis.

4. Swing the bulkhead tray down to expose the XMI backplane.

5. Feed the end of the DSSI cables that attaches to the XMI backplane through the opening created in step 2 and secure the cable I/O panel.

6. If you are using cable kit CK-KFMSA-LJ, the cable I/O panel is only half-width, and has one connector for each of the two DSSI buses. You must install the bulkhead filler plate from the cable kit over the opening left by the installation of the bulkhead I/O panel.
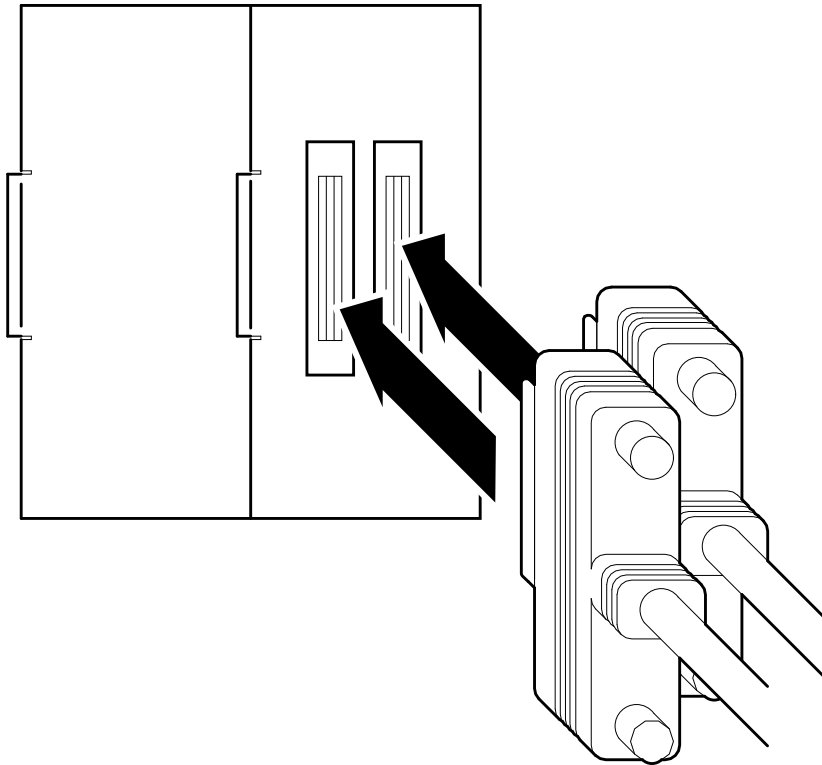
LJ-01100-TI0

Figure 3–1   CK-KFMSA-LJ Cable I/O Panel

If you are using cable kit CK-KFMSA-LN, the cable I/O panel is full width, so there is no need for a filler plate. On this version of the cable kit there are two connectors plus a DSSI node ID select rotary switch for each DSSI bus.

LJ-00983-TI0
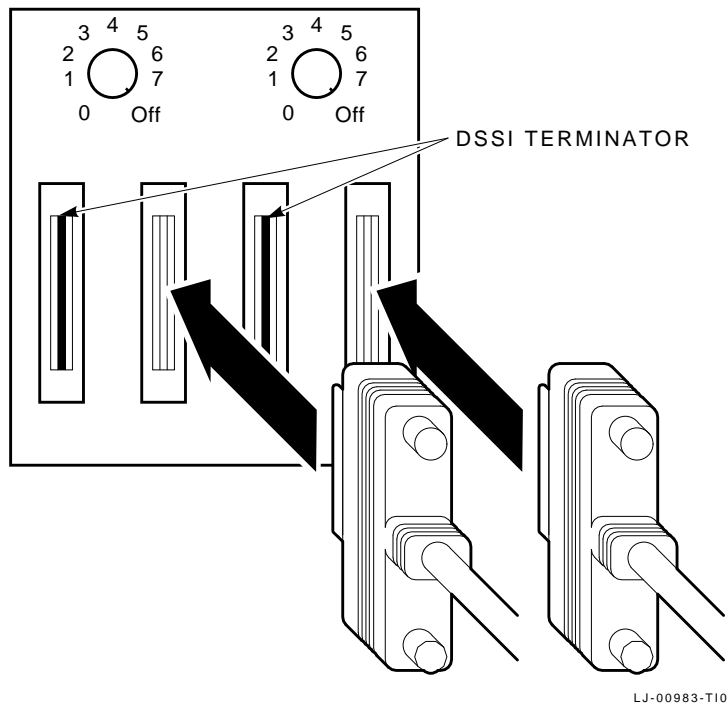
Figure 3–2   CK-KFMSA-LN Cable I/O Panel

LJ-00987-TI0
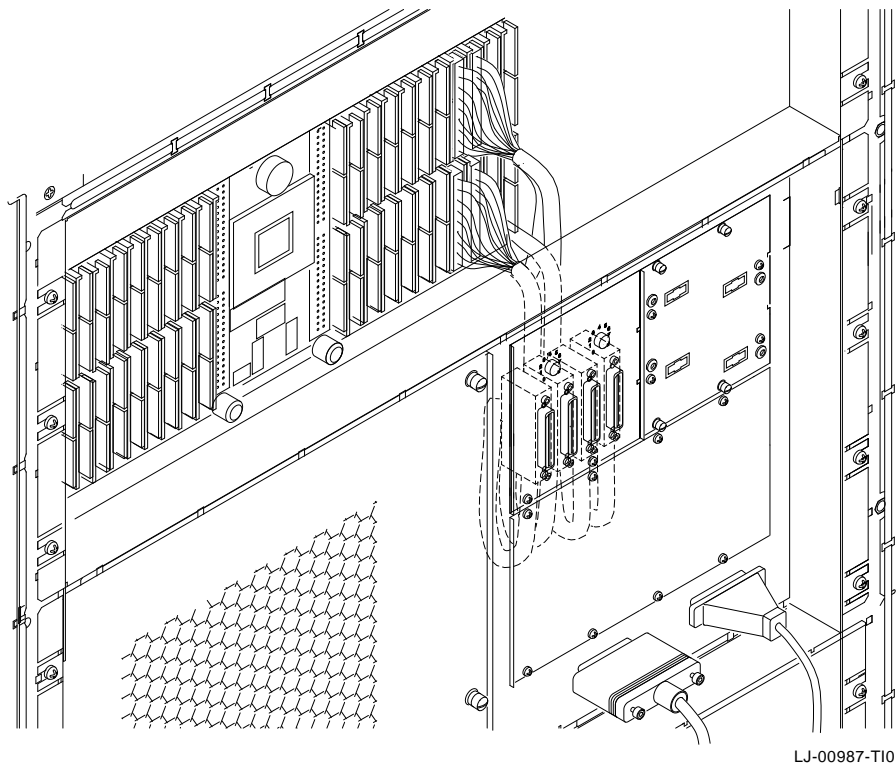
Figure 3–3   VAX 6000 Backplane to I/O Panel Cabling

7. Connect the DSSI cables to the XMI backplane connectors that
correspond to the XMI slot in which the KFMSA module was installed.

Each slot in the backplane has four connectors. The top two are D1
and D2, and the bottom two are E1 and E2.

The top two I/O connectors (D1 and D2) connect to DSSI bus 1 on the
KFMSA module. Connect J1 and J2 from one of the DSSI cables to
D1 and D2, respectively. The other end of this cable connects to the
rightmost connector(s) on the cable I/O panel.

The bottom two I/O connectors (E1 and E2) connect to DSSI bus 2 on
the KFMSA module. Connect J1 and J2 from the other DSSI cable to
E1 and E2, respectively. The other end of this cable connects to the
leftmost connector(s) on the cable I/O panel.

NOTE
**Notice that the orientation of pin 1 is marked on both cable
connectors, and make sure you install the cables accordingly
on the backplane.**

NOTE
**In some rackmounted systems the backplane is mounted
upside down. Make sure to note the orientation of pin 1 before
installing the cables.**

When you install more than one KFMSA module in a system, you
must follow the cabling conventions described in the preceding
paragraphs. Use the color-coded labels at each connector end of a
cable to facilitate maintenance. Be sure to record the label colors on a
configuration sheet.

8. Close the I/O bulkhead tray and replace the six screws.

9. Connect the DSSI cables between the I/O panel connectors and the
   DSSI devices (if any) you are connecting to the KFMSA module. Refer
   to your system or option documentation for these procedures.

   NOTE
   **Unused DSSI buses must be terminated with the DSSI bus
   terminator from the cable kit.**

10. Close and lock the rear door of the cabinet.

11. Power on the system. This initiates the power-on self-test (POST)
    described in the next chapter.

3.3   Installation in VAX 9000 Systems

CAUTION
You must power down the system before you remove or install any XMI module.

3.3.1   Module Installation

Prior to opening the I/O cabinet, perform the normal operating system shutdown procedures. Power off the system, disconnect power, and lock out the system from the ac power source.

Make sure the three keys on the OCP are set in the following position:

Key	Position
Power	Off
Startup	Halt
Service Processor Access	Local/SPU

WARNING
This procedure may expose you to line voltage on the Auxiliary Power circuit breaker (CB1) located in the lower rear section of the I/O cabinet if the UPC is not properly shut down and locked out. This voltage will be present even if CB1 is in the off position.

1. Open front door of the cabinet, and the clear plastic door in front of the XMI card cage.

    CAUTION
    Wear an antistatic wrist strap that is attached to the cabinet whenever you install modules.

2. If you must remove a module from the slot in which you are installing the KFMSA module, firmly lift the release lever from the zero insertion force (ZIF) connection on the backplane and carefully slide the module out of the card cage slot.

3. If you are installing a KFMSA-BA module in a configuration which does not require termination at the module, remove the DSSI bus terminators from their sockets on the connector end of the module and put the terminators in the sockets on the LED end of the module (see Figure 1–1).

NOTE
The above step is only necessary in DSSI VAXcluster configurations where the KFMSA module is used in one of the middle nodes, or in configurations where the DSSI bus is terminated at the bulkhead rather than at the module.

4. Place the KFMSA module in the slot and secure the ZIF lever to close the backplane contacts against the module edge connector contacts.

3.3.2 Connecting the DSSI Cables

This section describes how to install the DSSI cables between the XMI backplane and the host I/O bulkhead.

1. Open the rear door of the cabinet.

2. Remove one of the blank panels from the I/O bulkhead assembly. In the VAX 9000 model 400 I/O cabinet, there is more than one XMI card cage. If the KFMSA is installed in XMI0, remove a panel from the left side of the bulkhead assembly. If the KFMSA is installed in XMI1, remove a panel from the right side of the bulkhead assembly.

3. Feed the DSSI cables through the hole in the bulkhead assembly, and screw the cable I/O panel to the assembly.

4. Coil the excess length of the DSSI cables behind the I/O bulkhead assembly in the model 400. In the model 200 (FEC), coil the excess cable around the plastic bar behind the XMI backplane.

5. Connect the two DSSI cables to the XMI backplane connectors that correspond to the card cage slot in which the KFMSA module was installed.

   Each slot in the backplane has four connectors. The top two are D1 and D2, and the bottom two are E1 and E2.

   The top two I/O connectors (D1 and D2) connect to DSSI bus 1 on the KFMSA module. Connect J1 and J2 from one of the DSSI cables to D1 and D2, respectively. The other end of this cable connects to the rightmost connector the cable I/O panel.
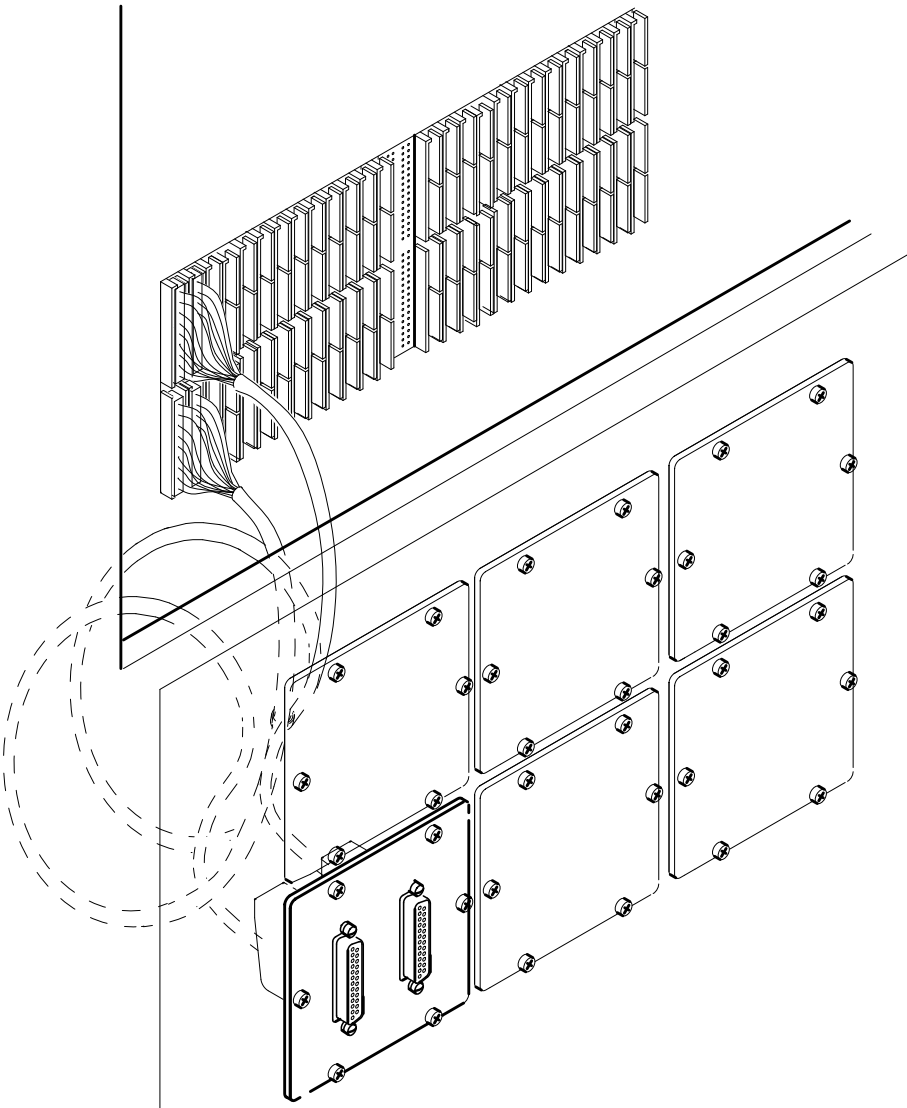
LJ-00873-TI0

Figure 3–4   VAX 9000 Model 400 Backplane to I/O Bulkhead Cabling
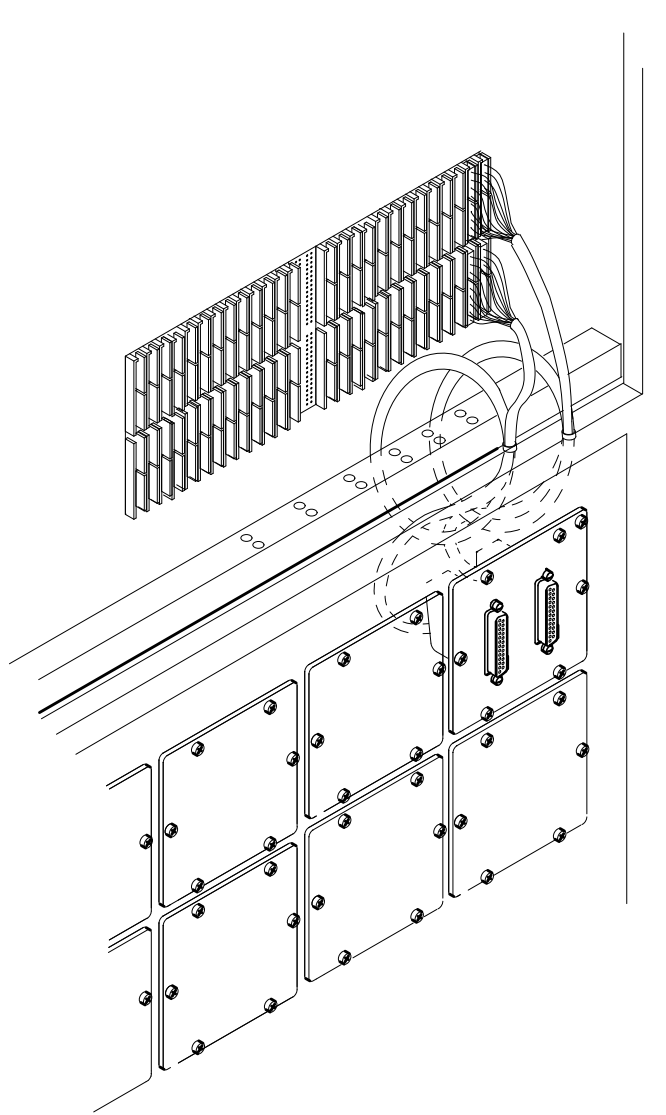
LJ-00874-TI0

Figure 3–5   VAX 9000 Model 200 Backplane to I/O Bulkhead Cabling

The bottom two I/O connectors (E1 and E2) connect to DSSI bus 2 on the KFMSA module. Connect J1 and J2 from the other DSSI cable to E1 and E2, respectively. The other end of this cable connects to the leftmost connector on the cable I/O panel.

Notice that the orientation of pin 1 is marked on both cable connectors, and make sure you install the cables accordingly on the backplane.

When you install more than one KFMSA module in a system, you **must** follow the cabling conventions described in the preceding paragraphs. Use the color-coded labels at each connector end of a cable to facilitate maintenance. Be sure to record the label colors on a configuration sheet.

6. Connect the DSSI cables between the I/O bulkhead connectors and the DSSI devices (if any) you will connect to the KFMSA module. Refer to your system or option documentation for these procedures.

NOTE
Unused DSSI buses must be terminated with the DSSI bus terminator from the cable kit.

7. Close all cabinet doors.

8. Plug in and power on the system. This initiates the power-on self-test (POST) described in the next chapter.

4
Power-On Self-Test

The KFMSA module has a power-on self-test (POST). It performs a comprehensive set of logic tests when power is applied to the module, or when the host invokes a node reset.[1] The POST provides test coverage for about 98% of the module logic and takes about 10 seconds to run.

The KFMSA module has one yellow LED and eight red LEDs. (Four red LEDs correspond to each DSSI port on the module.) The LEDs are mounted on the module edge, as shown in Figure 1–1.

When power is first applied, all red LEDs should turn on. Each port on the module is tested independently. When a port passes the tests, its four red LEDs turn off. If the POST detects no errors, all eight red LEDs turn off and the yellow LED turns on.

When the POST detects a fatal error, the red LEDs display the error code(s), but the yellow LED remains off. Table 4–1 defines the POST LED fatal error codes.

When one port fails and the other port passes the POST, the red LEDs that correspond to the DSSI port that failed display an error code, the module runs in single-port mode, and the yellow LED remains on.

---

[1] Node reset does not effect other modules in the XMI system. It does reinitialize both ports of the KFMSA module and rerun the POST.

Table 4–1   POST LED Fatal Error Codes

Red LEDs*				Error Code Meaning
MSB			LSB	
●	●	●	●	Never got started or failed ROM tests
○	○	○	●	CP bus timeout test failure
○	○	●	○	CAM test failure
○	○	●	●	Interrupt register test failure
○	●	○	○	XPC test failure
○	●	○	●	Parity test failure
○	●	●	○	PBM test failure
○	●	●	●	Extended HIS DMA channel test failure
●	○	○	○	XPC self-directed command failure
●	○	○	●	PBM self-directed command failure
●	○	●	○	DASHAC self-directed command failure
●	○	●	●	CP bus/octaword NACK self-directed command failure
●	●	○	○	DASHAC-to-DASHAC interrupt test failure
●	●	○	●	Contention test failure
●	●	●	○	DSSI loopback test failure
○	○	○	○	This port passed POST

*   ● LED lit   ○ LED unlit

5
Configuration Concepts

After you install the KFMSA module and the POST has run successfully, you must configure the DSSI subsystem.

This chapter describes the physical address requirements and the software parameters of the DSSI subsystem. It explains the naming conventions used by the VMS operating system, and gives you some guidelines to follow.

Be sure you understand the concepts described in this chapter before you configure a DSSI subsystem, using the procedures detailed in Chapter 6 or Chapter 7.

5.1 Physical Address Requirements

Each component in the DSSI subsystem has an address. Part of the address is determined by the physical location of the component in the DSSI subsystem, and part of the address is set during the KFMSA module installation. Fill in the information on a configuration sheet (see Figures 5–1 through 5–3) when you install the KFMSA module. When you have a configuration sheet that includes this information, the configuration process is easier.

KFMSA/DSSI Single-host Configuration Sheet

KFMSA XMI Node # _____

Bus 1
DSSI ID # _____

Bus 2
DSSI ID # _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Device Type _____   ALLO_CLASS _____
DSSI ID #   _____   SF200 Box # _____
Node Name _____   UNITNUM _____
         System ID _____

Color Code
on Cables _____

Color Code
on Cables _____

SHR-X0109-90

Figure 5–1   Single System KFMSA/DSSI Configuration Sheet

KFMSA/DSSI Dual-host Configuration Sheet

KFMSA XMI Node # _____

| Bus 1 | Bus 2 |
| DSSI ID # _____ | DSSI ID # _____ |

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

| Bus 1 | Bus 2 |
| DSSI ID # _____ | DSSI ID # _____ |

KFMSA XMI Node # _____

Color Code   Color Code
on Cables _____   on Cables _____

SHR-X0133-90

Figure 5–2   KFMSA/DSSI VAXcluster Configuration Sheet (2 Host)

KFMSA/DSSI VAXcluster Configuration Sheet

```
┌─────────────────────────────────────────────────────┐
│         KFMSA XMI Node # _____                    │
│  ┌─────────────────────┐  ┌─────────────────────┐    │
│  │ Bus 1               │  │ Bus 2               │    │
│  │ DSSI ID # _____  │  │ DSSI ID # _____  │    │
│  └─────────────────────┘  └─────────────────────┘    │
└─────────────────────────────────────────────────────┘

┌─────────────────────────────────────────────────────┐
│         KFMSA XMI Node # _____                    │
│  ┌─────────────────────┐  ┌─────────────────────┐    │
│  │ Bus 1               │  │ Bus 2               │    │
│  │ DSSI ID # _____  │  │ DSSI ID # _____  │    │
│  └─────────────────────┘  └─────────────────────┘    │
└─────────────────────────────────────────────────────┘
```

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

Device Type _____	ALLO_CLASS _____
DSSI ID # _____	SF200 Box # _____
Node Name _____	UNITNUM _____
System ID _____	

```
┌─────────────────────────────────────────────────────┐
│  ┌─────────────────────┐  ┌─────────────────────┐    │
│  │ Bus 1               │  │ Bus 2               │    │
│  │ DSSI ID # _____  │  │ DSSI ID # _____  │    │
│  └─────────────────────┘  └─────────────────────┘    │
│                                                       │
│         KFMSA XMI Node # _____                    │
└─────────────────────────────────────────────────────┘
```

Color Code
on Cables _____   Color Code
on Cables _____

LJ-00982-TI0

Figure 5–3   KFMSA/DSSI VAXcluster Configuration Sheet (3 Host)

5.1.1 XMI Node Number

The XMI node number is hardwired in the XMI backplane. You set the
XMI node number when you insert the KFMSA module in one of the
valid I/O slots in the XMI card cage. XMI node numbers are hexadecimal
numbers. They start with 1 at the rightmost slot of the backplane, and
they proceed to the left.

Make note of the XMI node number for the KFMSA module on the
configuration sheet.

5.1.2 DSSI Bus Number

The KFMSA module has two separate DSSI buses (ports). Each of the
buses presents a discrete set of registers to the host. For communication
to occur, the host software must "know" which DSSI bus is attached to
which ISE. The DSSI buses are called bus 1 and bus 2.

You do not set the DSSI bus numbers in the KFMSA module or in
the ISEs. They are determined by the cable connections from the
XMI backplane, through the bulkhead connectors, to the SFxx storage
enclosure(s).

The cable connected to the top pair of I/O connectors on the XMI
backplane is DSSI bus 1. The cable connected to the lower pair of I/O
connectors is DSSI bus 2.

Use the color-coded labels at each connector end of a cable to facilitate
maintenance. Be sure to record the label colors on the configuration sheet.

NOTE
**Some rackmounted VAX 6000 systems have the backplane
mounted upside down. Check proper orientation before labelling
the DSSI buses.**

NOTE
**The DSSI bus numbers are not cumulative across the system. For
each KFMSA module in a system, the DSSI buses are called bus 1
and bus 2.**

5.1.3 DSSI Node ID

Each ISE or module connected to a DSSI bus must have a unique bus
address. This address is called the DSSI node ID. It is always in the
range of 0 to 7.

5.1.3.1 Setting the DSSI Node ID for an ISE

The user sets the DSSI node IDs for the ISEs. If the ISEs are in an SFxx
enclosure, the user sets the switches on the SFxx operator control panel
(OCP). An LED display next to the switchpack shows you the values you
have selected.

NOTE
**The ISE does not use the new value you selected until the next
time it is powered up.**

In addition to the switches on the OCP, ISEs have switches mounted
on their electronics modules. The user sets the switches on the ISE
electronics module **only** if the ISE is **not** connected to an OCP. When
the ISE is connected to an OCP, the switches on the OCP override the
switches on the electronics module.

Be sure you write the DSSI node ID for every ISE in your system on the
configuration sheet.

5.1.3.2 Setting the DSSI Node ID for a KFMSA Module

The DSSI node IDs for the KFMSA modules are factory set to 7. Both
ports have the same DSSI node ID. You should never need to reset the
DSSI node IDs for a single system DSSI system.

To set the DSSI node ID for a KFMSA module, use the software tools
described in Section 5.6. If using a cable kit with a remote select switch
on the bulkhead I/O panel, such as the CK-KFMSA-LN, you can set
the DSSI node ID by setting the rotary switch on the I/O panel to the
appropriate number for each DSSI bus.

NOTE
**The CK-KFMSA-LN rotary switch setting overrides the software
setting.**

NOTE
A node reset is required before the new DSSI node ID can be read.

For a DSSI VAXcluster configurations, you reset the DSSI node ID of all but one of the KFMSA modules on the shared bus. Make sure that every device, including each KFMSA module, has a unique DSSI node ID on each DSSI bus. We recommend that you set the DSSI node number for the second KFMSA module to 6, the third KFMSA module to 5, etc.

5.2 DSSI Software Parameters

In addition to the physical address requirements, the ISEs and operating system (OS) software use software parameters to communicate with each other.

NOTE
The ISEs require the following software parameters. These parameters do *not* apply to the KFMSA module.

- **System ID** — Also called the SCA system address, the node address, or the SCA system ID. This 48-bit numeric value must be unique across the entire system topology in which the device is configured.

  A DSSI device takes the most unique part of its serial number as its system ID. In most cases, this default value is a unique number within the system.

- **Node name** — Also called the SCA node name, or (SCA) system name. This 8-character ASCII value must be unique across the system topology in which the device is configured.

  A DSSI device generates its node name as follows. It takes two characters from its device type (for example, an RF72 takes R7), and adds four alpha-numeric characters from a compaction of its serial number. In most cases, this default value is a unique number within the system.

- **MSCP or TMSCP unit number** — This is a 16-bit numeric value. A DSSI device uses the ISE's DSSI node ID as its default value. Under software control, the user can set a unique value. The operating system requirements for this value vary, depending on the state of other parameters.

- **Allocation class** — This 8-bit numeric value indicates whether an ISE is to be *served* by its host to other members of a cluster. The default value is 0, which indicates the ISE is not to be served.

To enable the device to be served, set this value to match the allocation class value of the host system. (The allocation class value of the host system is a VMS SYSGEN parameter called ALLOCLASS. Refer to VMS documents for more information on SYSGEN parameters.)

- **Force name** — The default value for this 1-bit control field is 0. When you set this value to 1, the ISE uses its option name (for example, RF72) as its node name, rather than a value derived from its serial number.

- **Force unit** — The default value for this 1-bit control field is 1. When you set this value to 0, the ISE uses a unique, user-set value as its MSCP or TMSCP unit number, rather than its DSSI node ID.

5.3   VMS Naming Conventions

The VMS operating system builds unique device names from information the ISE or module presents and some generic naming conventions.

NOTE
The following paragraphs provide some background information. They explain how the VMS naming conventions are currently used for DSSI storage devices. Some of the naming conventions have different uses in other storage families or classes of products.

5.3.1   Device Naming Conventions for ISEs

The DSSI disk ISE format for a device name is DIA**n**, where **n** is the MSCP unit number of a specific ISE. Some examples of DSSI disk names are DIA0, DIA1, and DIA2. The VMS operating system adds either the node name or the allocation class to this part of the device name.

The DSSI tape ISE format for a device name is MIA**n**.

When the allocation class for a device is a nonzero value, the VMS operating system uses it as part of the device name. Thus, the format for the device name is **$allocation_class$DIAn**. So, for an ISE with an allocation class of 1, an example device name is 1DIA4.

Note that when the allocation class is set to a nonzero value for some or all of the ISEs in a configuration, unique MSCP or TMSCP unit numbers must be assigned to all of them, and the force unit field must be set to 0.

When the allocation class is 0, the VMS operating system uses the ISE's node name as part of its unique device name. In this case, the format for the device name is **Node_name$DIAn**.

So, if the ISE's node name is R7XRMA, its allocation class is 0, and its force unit field is 1, the device name is R7XRMA$DIA4.

5.3.2 Port Naming Conventions for KFMSA Modules

The KFMSA module does not use software parameters. However, the VMS operating system generates names for the ports that the KFMSA module presents to the host system. These names appear in a SHOW DEVICE display.

The format for a port name is PA**x**0, where **x** is a letter. Some examples of port names are PAA0, PAB0, and PAC0. Notice that the letters are assigned in sequential order. A is used for the first DSSI bus of the first KFMSA module (that is, the lowest XMI node number), B is used for the second bus of the same KFMSA module, and so on. Remember that the KFMSA uses the CI port architecture for communications with its local host. The presence of a CI adapter in the system may affect the order of the KFMSA port names.

5.4 Recommended Parameter Settings

Use the following guidelines for the configuration process. Keep in mind that the DSSI subsystem configuration parameters (as used by the VMS operating system) may be interdependent. Also, different system configurations have different requirements.

- Verify or change all the parameters **before** you boot the operating system software. This reduces the time it takes to install a new KFMSA module in a system.

  If a parameter that must be unique matches another parameter, the operating system does not "recognize" any of the device names that use those parameters. Also, the operating system does not use the new values you selected for certain static parameters (such as the allocation class) until the next time the software is booted.

- Use unique MSCP or TMSCP unit numbers for all the ISEs in the system. Start the numbering sequence with DSSI node ID 0 on bus 1 of the first KFMSA module in the system. Remember to set the force unit field to 0.

- If the DSSI subsystem is part of a VAXcluster (either DSSI or LAVC), set the allocation class of the ISEs to a cluster-unique nonzero value. Remember, all the ISEs must have the same value.

Be sure that the host system's allocation class matches the allocation class of the ISEs. If necessary, set the host system's allocation class to the same value with SYSGEN. If the DSSI subsystem is part of a VAXcluster configuration, set all host systems to the same allocation class.

NOTE
The TF837 tape ISE does not use the allocation class parameter.

- Make sure you have used unique node names for all the ISEs in the cluster. Unique node names are a requirement, even when the allocation class is a nonzero value.

- Do not change the force name.

- Make sure the system IDs of all ISEs are unique, and change the system IDs only when you detect a duplicate name.

We suggest that you write the node names on color-coded labels that come with SF**xx** enclosures. Affix the labels on the access door(s) of the operator control panel(s). Be sure you place the labels where they correspond to the correct ISE. Also, use the color-coded labels at each connector end of the cables at the rear of the enclosure to facilitate maintenance.

5.5   Recommended Formats for Node Names

If you use the following formats, the possibility of duplicate node names is lessened.

<div align="center">RFcxbd or TFcxbd</div>

Where:	RF and TF	=	the first two letters of the option type. RF is for disk; TF is for tape.
	c	=	0 for VAX 6000 series systems, XJA# for VAX 9000 series systems.
	x	=	the hexadecimal value of the XMI slot in which the KFMSA module is installed.
	b	=	1 or 2. The number represents the DSSI bus on which the device is installed.
	d	=	the DSSI node ID of the ISE.

5.6   Configuration Management Tools

This section describes the software tools you will use when you configure the DSSI subsystem.

5.6.1   PARAMS Utility

All DSSI devices have a utility progam called PARAMS, which allows you to see the current parameter values of an ISE and change them. When you invoke PARAMS, the program displays a prompt and waits for user input. If you type HELP at the prompt, the program lists all the PARAMS commands. More information on the PARAMS utility program is available in the ISE user documentation.

PARAMS runs on line by means of DCL commands, or standalone by means of the VAX diagnostic supervisor (VAX/DS). When you install a KFMSA module, or when you add a DSSI device, use the standalone VAX/DS configuration programs.

The three PARAMS commands you will use most often are SHOW, SET, and WRITE. With these three commands, you can see the current parameter values of all the devices, one parameter at a time, and change them as necessary.

Table 5–1 lists the keywords that correspond to the parameters. To find the value of any one of the device parameters (Section 5.2), type SHOW followed by the corresponding keyword.

Table 5–1   Parameter Keywords

Keyword	Parameter
ALLCLASS	Allocation class
UNITNUM	MSCP or TMSCP unit number
FORCEUNI	Force unit number flag
SYSTEMID	System ID
NODENAME	Node name
FORCENAM	Force node name to default flag

For example, to see the current parameter value of an ISE's allocation
class, type the following command:

```
PARAMS>  show allclass
Parameter    Current          Default         Type     Radix
--------    ------------    ------------     ------   -------
ALLCLASS            0                0         Byte     Dec

PARAMS>
```

In response to your command input, PARAMS shows the current and
default values, the type of parameter, and the radix that applies to the
allocation class. To change the value of the allocation class to 5, use the
SET command:

```
PARAMS>  set allclass 5
```

Note that the SET command includes the new parameter value, and
remember that this new value is temporary. So if you reset the device,
the new value will be erased and the previous value will be used.

To make the change permanent, use the WRITE command:

```
PARAMS> set allclass 5
PARAMS> write
```

Note that no arguments are used with WRITE. After you enter the
WRITE command, PARAMS displays the following message:

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

Type Y[es] to store the new values for the ISE. Controller initialization
breaks the PARAMS connection to the ISE, so PARAMS must be invoked
again. Type N[o], and the values you entered with the SET command are
temporary. However, the connection to the ISE remains intact and the
PARAMS> prompt returns.

The WRITE command need only be issued once, after all the changes for
a device have been entered.

5.6.2 VAX/DS Configuration Programs

Two utility programs, both of which run standalone under the VAX/DS, can be used to configure the DSSI subsystem.

EVCXE, which is distributed as part of the diagnostic/utility kit that is shipped with the VAX 6000 series system, lets you access the PARAMS utility in each ISE and use the PARAMS commands to check or change the parameter values. It also lets you change the DSSI node IDs of the two ports on the KFMSA module.

NOTE
EVCXE is not recommended for use on VAX 9000 systems.

EVCXF, the DSSI configuration and DUP diagnostic, is distributed as part of the diagnostic/utility kit that is shipped with the VAX 9000 series systems. Or it can be purchased as part of the VAX/DS diagnostic software license from Digital Equipment Corporation.

EVCXF lets you change the parameter values on all the ISEs in the system, and it uses only a few commands. It also communicates transparently with the PARAMS utility in the ISEs. You control these communications through a metacommand set defined within EVCXF.

5.6.3 VAX/DS Diagnostic Programs

Some installations require that you run diagnostic programs to check the integrity of the KFMSA module and the DSSI ISEs attached to it. Refer to the *KFMSA Module Service Guide*, part number EK-KFMSA-SV, for details on how to run those diagnostics. Table 5–2 lists the VAX/DS diagnostics that apply to the KFMSA module and DSSI ISEs.

Table 5–2   VAX/DS Diagnostics for DSSI devices

Diagnostic	Description
EVCXD	Repair-level KFMSA diagnostic
EVRAE	Online DSSI disk exerciser
EVMDA	Online DSSI tape exerciser

6
Configuration Using EVCXE

EVCXE is a utility that lets you access the PARAMS local program
in each ISE and use the PARAMS commands to check or change the
parameter values. It also lets you change the DSSI node IDs of the two
ports on the KFMSA module.

NOTE
**Although EVCXE will work on VAX 9000 systems, it is
recommended that you use EVCXF instead.**

Before you begin, you must:

- complete the physical installation of the DSSI subsystem,

- verify the cabling,

- make sure that all the power-on tests were successful,

- run the recommended VAX 6000 CPU and memory diagnostics.

Be sure that the KFMSA/DSSI subsystem configuration sheet shows the
correct physical configuration and planned parameter values. Refer to
Chapter 5 for the recommended parameter values. Check off each unit
after you set its parameter values.

6.1   Single System Configuration Procedure

1. Boot VAX/DS. Refer to your system documentation or to the *VAX Diagnostic Supervisor User Guide*, order number AA-FK66A-TE for the appropriate procedures.

2. After you load VAX/DS, the program returns a DS> prompt.

   Attach the KFMSA module(s) using one of the following two methods. If you intend to test the KFMSA module(s) only, use the manual method. If you intend to test other devices as well, use the automated method.

   Manual method:

   Attach the KFMSA module(s) with the following command:

   ```
   DS> ATTACH KFMSA HUB generic_name XMI_node_number DSSI_bus_number
   ```

   In this command, the generic_name is in the format PA**x**0. Use a different letter in place of the **x** for each DSSI bus in the system. The XMI_node_number is a numeric value that indicates which XMI backplane slot contains the KFMSA module. So, a typical attach sequence for a system with a KFMSA module installed in slot 4 looks like this:

   ```
   DS> ATTACH KFMSA HUB PAA0 4 1
   DS> ATTACH KFMSA HUB PAB0 4 2
   ```

   Automated Method:

   At the DS> prompt, type the following:

   ```
   DS> set flag quick
   DS> run evsba/section:selftest
   ```

   This activates the AUTOSIZER, which prompts you for command input.

   a. At the COMMAND? prompt, type SIZE.

      The AUTOSIZER begins to scan the XMI bus, locating the devices. A series of ATTACH commands appears on the console terminal. Some of these will correspond to the KFMSA(s) installed in the system.

The following is an example of the display:

```
DS> ATTACH KFMSA HUB PAA0 4 1
DS> ATTACH KFMSA HUB PAB0 4 2
DS> ATTACH KFMSA HUB PAC0 B 1
DS> ATTACH KFMSA HUB PAD0 B 2
```

Note that each KFMSA module is listed twice because of the two DSSI ports on the module. Verify that all the KFMSAs were found, and that the XMI node number associated with each module is correct. (The XMI node number is the number immediately following the PA**x**0.) You do not need to verify the attach sequence for the ISEs connected to the KFMSA module DSSI ports.

b. When the COMMAND? prompt returns, type ATTACH and press Return .

c. Exit from AUTOSIZER by typing EXIT at the COMMAND? prompt.

3. Select the KFMSA(s) you will configure, as shown in the following example:

```
DS> Select PAA0,PAB0...
```

Be sure you include all the generic names associated with the selected KFMSA modules.

4. Enter the following command:

```
DS> Run EVCXE
```

The program prints several lines of identification information, and then it displays the following message:

```
Enter XMI Node #, DSSI bus, DSSI node ID # or <CR> to exit test:
```

At this point, you type the numeric values for the KFMSA port you attached in step 2. If this is the first time an XMI node number or DSSI bus number is recognized by EVCXE (new installations), the program displays the following message:

```
Enter new KFMSA DSSI Node ID # [(7), 0, 7] or <CR> to keep present value:
```

For most single system configurations, you do not need to change this value. Simply press Return .

The EVCXE program establishes a DUP connection to the ISE and invokes the resident PARAMS utility. (The PARAMS> prompt appears.)

NOTE
For more information on the PARAMS utility, refer to the appropriate ISE User Guide.

5. Use the SHOW command to find the values of the ISE's system ID and allocation class. Then write these parameter values on the configuration sheet.

6. Use the SET command to change the parameter values. For example, to change the node name to RF0416, type:

```
PARAMS> set nodename RF0416
```

If you set MSCP or TMSCP unit numbers for the ISEs, remember to change the Force Unit Flag as well. For example:

```
PARAMS> set unitnum 10
PARAMS> set forceuni 0
```

7. To make the changes permanent, use the WRITE command. The following message appears.

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

Type Y[es] to store the new values for the ISE. Controller initialization breaks the EVCXE connection to the ISE, but after a brief delay EVCXE prompts you to select another unit. If you type N[o], the values you entered with the SET command are not stored. However, the connection to the ISE remains intact and the PARAMS> prompt returns.

The WRITE command need only be issued once, after all the changes for an ISE have been entered.

6.2   DSSI VAXcluster Configuration Procedure

DSSI ISEs have a built-in ability to maintain simultaneous connections with two or more KFMSA modules in separate host systems. All host systems must be in the same local area VAXcluster (LAVC) system. Each host system can directly access all ISEs connected to it.

The following restrictions apply to DSSI VAXcluster configurations:

- All host systems must use VMS Version 5.4-2 or higher for KFMSA-AA modules, or VMS Version 5.4-3 or higher for KFMSA-BA modules.

- All host systems must form a VAXcluster system configuration.

- All cabinets must be powered by the same ac circuit, or if they are powered by different circuits, those circuits:

    - Must not power any other equipment

    - Must share a single ground point

    - Must have a dedicated ground wire between the outlet and the single ground point

- Each ISE must be assigned the same device name and allocation class on all host systems.

When you install two or more systems in a DSSI VAXcluster configuration, install each system individually and test it to make sure it is working correctly. Then remove the terminators and connect the DSSI extension cable(s) between the systems and/or the expander cabinet(s).

The DSSI VAXcluster procedure is similar to the single system procedure, with some additional steps.

NOTE
The following steps *must* be performed in order. Do *not* perform any steps in parallel.

6.2.1   Perform the following steps on all systems

1. Boot VAX/DS. Refer to your system documentation or the *VAX Diagnostic Supervisor User's Guide*, order number AA-FK66A-TE, for the appropriate procedures.

2. After you load VAX/DS, the program returns a DS> prompt.

Attach the KFMSA module(s) using one of the following two methods. If you intend to test the KFMSA module(s) only, use the manual method. If you intend to test other devices as well, use the automated method.

Manual method:

Attach the KFMSA module(s) with the following command:

```
DS> ATTACH KFMSA HUB generic_name XMI_node_number DSSI_bus_number
```

In this command, the generic_name is in the format PA**x**0. Use a different letter in place of the **x** for each DSSI bus in the system. The XMI_node_number is a numeric value that indicates which XMI backplane slot contains the KFMSA module. So, a typical attach sequence for a system with a KFMSA module installed in slot 4 looks like this:

```
DS> ATTACH KFMSA HUB PAA0 4 1
DS> ATTACH KFMSA HUB PAB0 4 2
```

Automated Method:

At the DS> prompt, type the following:

```
DS> set flag quick
DS> run evsba/section:selftest
```

This activates the AUTOSIZER, which prompts you for command input.

a. At the COMMAND? prompt, type SIZE.

The AUTOSIZER begins to scan the XMI bus, locating the devices. A series of ATTACH commands appears on the console terminal. Some of these will correspond to the KFMSA(s) installed in the system. The following is an example of the display:

```
DS> ATTACH KFMSA HUB PAA0 4 1
DS> ATTACH KFMSA HUB PAB0 4 2
DS> ATTACH KFMSA HUB PAC0 B 1
DS> ATTACH KFMSA HUB PAD0 B 2
```

Note that each KFMSA module is listed twice because of the two DSSI ports on the module. Verify that all the KFMSAs were found, and that the XMI node number associated with each module is correct. (The XMI node number is the number immediately following the PA**x**0.) You do not need to verify the attach sequence for the ISEs connected to the KFMSA module DSSI ports.

b. When the COMMAND? prompt returns, type ATTACH and press
    Return .

c. Exit from AUTOSIZER by typing EXIT at the COMMAND?
    prompt.

3. Select the KFMSA(s) you will configure, as shown in the following
    example:

    ```
    DS> Select PAA0,PAB0...
    ```

    Be sure you include all the generic names associated with the selected
    KFMSA modules.

4. Enter the following command:

    ```
    DS> Run EVCXE
    ```

    The program prints several lines of identification information, and
    then it displays the following message:

    ```
    Enter XMI Node #, DSSI bus, DSSI node ID # or <CR> to exit test:
    ```

6.2.2 Perform the following steps from any host system

The following steps can be performed from any system on the DSSI
VAXcluster. They need only be performed once, on one system.

1. Type the numeric values for XMI node number, DSSI bus, and DSSI
    node ID of the ISE you want to attach to.

    If this is the first time an XMI node number or DSSI bus number is
    recognized by EVCXE (new installations), the program displays the
    following message:

    ```
    Enter new KFMSA DSSI Node ID # [(7), 0, 7] or <CR> to keep present value:
    ```

    Type in the DSSI node ID number you want to set the KFMSA module
    to. If you want it to remain at the factory setting of 7, simply press
    Return .

    For DSSI VAXcluster configurations, you reset the DSSI node ID of
    all but one of the KFMSA modules on the shared bus. Make sure that
    every device, including each KFMSA module, has a unique DSSI node
    ID on each DSSI bus. We recommend that you set the DSSI node
    number for the second KFMSA module to 6, the third KFMSA module
    to 5, etc.

Once you have responded to the KFMSA node ID query, the EVCXE program establishes a DUP connection to the ISE you selected and invokes the resident PARAMS utility. (The PARAMS> prompt appears.)

NOTE
For more information on the PARAMS utility, refer to the appropriate ISE user documentation.

2. Use the SHOW command to find the value of the ISE's system ID, and write it on the configuration sheet.

3. Use the SET command to change the parameter values. For example, to change the node name to 10SEJD, type:

```
PARAMS> set nodename 10SEJD
```

If you set MSCP or TMSCP unit numbers for the ISEs, remember to change the force unit as well. For example:

```
PARAMS> set unitnum 10
PARAMS> set forceuni 0
```

You must set the allocation class for the ISE to a nonzero value in the range 1 through 255. Give all ISEs and systems the same allocation class value. For example, to set the allocation class to 1, type:

```
PARAMS> set allclass 1
```

4. Repeat steps 2 and 3 for each ISE in the system.

5. To make the changes permanent, use the WRITE command. The following message appears.

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

Type Y[es] to store the new values for the ISE. Controller initialization breaks the EVCXE connection to the ISE, but after a brief delay EVCXE prompts you to select another unit. If you type N[o], the values you entered with the SET command are not stored. However, the connection to the ISE remains intact and the PARAMS> prompt returns.

The WRITE command need only be issued once, after all the changes for an ISE have been entered.

6.2.3 Perform the following on all remaing systems

After you have completed the steps in the previous section for all ISEs, invoke EVCXE on each of the other systems in the DSSI VAXcluster, one system at a time.

Once invoked, the program prints several lines of identification information, and then displays the following message:

```
Enter XMI Node #, DSSI bus, DSSI node ID # or <CR> to exit test:
```

1. At this point, you type the numeric values you wish to set each port on the KFMSA module to. Make sure to set each value to a unique DSSI node ID number.

2. If this system has some ISEs that are not shared, you must set parameter values for them as though for a single system configuration. It is not necessary to set parameter values for ISEs that are shared on the DSSI VAXcluster.

3. To verify the communication path for the shared ISEs, use the SHOW command to read any one of the parameters (for example, SHOW NODENAME). Verify each of the shared ISEs in this manner. Then type EXIT at the PARAMS> prompt.

7
Configuration Using EVCXF

The EVCXF program:

- Sizes the DSSI configuration

- Reads and verifies the parameter values stored in the DSSI devices attached to the KFMSA module

- Lets you change the parameter values

- Establishes a DUP connection to a device (or to all selected devices), which lets you run DRVTST or DRVEXR concurrently

The EVCXF sizing function scans for devices at all nodes and displays a configuration map of all the DSSI devices attached to the KFMSA module. Compare this configuration map to the KFMSA/DSSI configuration sheet(s) you filled out during installation. If you find any differences, you must resolve them before you change any parameter values.

After you resolve any differences, use EVCXF to configure the ISEs. It reads and verifies each ISE's parameter values and stores this data in a structure called a local working buffer. Then you can manipulate the data in several ways. You can display the contents of the buffer, search for conflicts, or change the stored parameter values.

EVCXF starts reading at DSSI node ID 0 on bus 1 of the first KFMSA module at the lowest numbered XMI node, continues through the higher DSSI node numbers, and then reads bus 2 at node 0. The process continues across all the KFMSA modules at higher XMI node numbers.

EVCXF can significantly reduce the amount of user input required during a DSSI configuration.

Before you begin, you must complete the physical installation of the DSSI subsystem, verify the cabling, make sure that all power-on tests were successful, and run the recommended CPU and memory diagnostics.

Be sure that the KFMSA/DSSI configuration sheet shows the correct physical configuration and any pre-planned parameter values. Refer to Chapter 5 for the recommended parameter values. Check off each unit after you set its parameter values.

7.1   Single System Configuration Procedure

1. Boot VAX/DS. Refer to your system documentation or to the *VAX Diagnostic Supervisor User Guide*, order number AA-FK66A-TE for the appropriate procedures.

2. After you load VAX/DS, the program returns a DS> prompt.

   Attach the KFMSA module(s) using one of the following two methods. If you intend to test the KFMSA module(s) only, use the manual method. If you intend to test other devices as well, use the automated method.

   Manual Method:

   Attach the KFMSA module(s) with the appropriate command.

   For VAX 6000 systems:

   ```
   DS> ATTACH KFMSA HUB generic_name XMI_node_number DSSI_bus_number
   ```

   The generic_name is in the format PA**x**0. Use a different letter in place of the **x** for each DSSI bus in the system. The XMI_node_number is a hexadecimal value that indicates which XMI backplane slot contains the KFMSA module.

   A typical attach sequence for a VAX 6000 system with a KFMSA module installed in slot 4 looks like this:

   ```
   DS> ATTACH KFMSA HUB PAA0 4 1
   DS> ATTACH KFMSA HUB PAB0 4 2
   ```

   For VAX 9000 systems:

   ```
   DS> ATTACH XJA HUB XJA_generic_name XJA_number
   DS> ATTACH KFMSA XJA_generic_name generic_name XMI_node_number DSSI_bus_number
   ```

   The XJA_generic_name is a number between XJA0 and XJA3, depending on your configuration. It is similar to the device generic_name, in that the first XJA the system sees will be XJA0, the second XJA1, and so on.

   The XJA_number is a number between 0 and 3. It refers to the card cage in which the KFMSA module you are attaching to is installed.

The generic_name is in the format PA**x**0. Use a different letter in place of the **x** for each DSSI bus in the system. The XMI_node_ number is a numeric value that indicates which XMI backplane slot contains the KFMSA module.

An example attach sequence for a VAX 9000 system with KFMSA modules installed in slots 1 and E of XMI 1 looks like this:

```
DS> ATTACH XJA HUB XJA0 1
DS> ATTACH KFMSA XJA0 PAA0 1 1
DS> ATTACH KFMSA XJA0 PAB0 1 2
DS> ATTACH KFMSA XJA0 PAC0 E 1
DS> ATTACH KFMSA XJA0 PAD0 E 2
```

Automated method:

At the DS> prompt, type the following:

```
DS> set flag quick
DS> run evsba/section:selftest
```

This activates the AUTOSIZER, which prompts you for command input.

a. At the COMMAND? prompt, type SIZE.

   The AUTOSIZER begins to scan the XMI bus, locating the devices. A series of ATTACH commands appears on the console terminal. Some of these will correspond to the KFMSA(s) installed in the system.

   The following is an example of the display for a VAX 6000 system.

```
DS> ATTACH KFMSA HUB PAA0 4 1
DS> ATTACH KFMSA HUB PAB0 4 2
DS> ATTACH KFMSA HUB PAC0 B 1
DS> ATTACH KFMSA HUB PAD0 B 2
```

   The following is an example of the display for a VAX 9000 system.

```
DS> ATTACH XJA HUB XJA0 1
DS> ATTACH KFMSA XJA0 PAA0 1 1
DS> ATTACH KFMSA XJA0 PAB0 1 2
DS> ATTACH KFMSA XJA0 PAC0 E 1
DS> ATTACH KFMSA XJA0 PAD0 E 2
```

Note that each KFMSA module is listed twice because of the two DSSI ports on the module. Verify that all the KFMSAs were found, and that the XMI node number associated with each module is correct. (The XMI node number is the number immediately following the PA**x**0.) You do not need to verify the attach sequence for the ISEs connected to the KFMSA module DSSI ports.

   b. When the COMMAND? prompt returns, type ATTACH and press Return .

   c. Exit from AUTOSIZER by typing EXIT at the COMMAND? prompt.

3. Select the KFMSA(s) you will configure, as shown in the following example:

```
DS> Select PAA0,PAB0...
```

Be sure you include all the generic names associated with the selected KFMSA modules.

4. Enter the following command:

```
DS> run EVCXF/sec=test2
```

The program prints several lines of identification information, and then it returns the CONFIG> prompt.

5. Type SIZE.

The EVCXF sizing function scans all DSSI buses for responding devices.

When the sizing is complete, EVCXF displays a configuration map that shows what devices were found. The following is a sample configuration map.

```
            XJA # 03     XJA # 03      XJA # 03      XJA # 03
            XMI node 01  XMI node 01   XMI node 0E   XMI node 0E
DSSI ID     Bus 1/UUN    Bus 2/UUN     Bus 1/UUN     Bus 2/UUN

   0        TF857  1     ****          ****          TF857 18
   1        RF72   2     RF72    6     RF72    12     RF72  19
   2        RF72   3     RF72    7     RF72    13     RF72  20
   3        RF72   4     RF72    8     RF72    14     ????
   4        RF72   5     RF72    9     RF72    15     RF72  21
   5        ****         RF72    10    RF72    16     ****
   6        ****         RF72    11    RF72    17     ****
   7        KFMSA        KFMSA         KFMSA         KFMSA
```

In this configuration map, two KFMSA modules are present in XMI card cage 3, as indicated by the XJA # 03 on the top line of the configuration map, at XMI nodes 1 and E.

NOTE
The XJA # parameter does not appear in VAX 6000 series applications.

The leftmost column of numbers lists the DSSI node IDs. Asterisks indicate that there was no response at that node number. The numbers to the right of the device type are the logical unit numbers assigned by the utility. These numbers are used only with the SELECT command, and are referred to as utility unit numbers (UUNs).

Dashes indicate that an unknown or unsupported device type was found at that node number. Question marks indicate that a device is present at that node number, but is not able to communicate (that is, it is broken). Note that in many cases, the UUNs will be the same as the MSCP or TMSCP unit number.

Look carefully at your configuration map. Compare it with the information on your configuration sheet(s). If you find any differences, you must resolve them before you continue with this installation.

6. Type the following command:

```
CONFIG> MODIFY NAME_NUMBER 0
```

This command changes the node name used by the operating system software when it communicates with the DSSI devices. It assigns parameter values automatically and sequentially until all selected devices have a new system name.

The format for this name is:

RF**cxbd**

Where:	RF	=	the first two letters of the option type. RF is for disk.
	c	=	0 for VAX 6000 series systems and XJA# for VAX 9000 series systems.
	x	=	the hexadecimal value of the XMI slot in which the KFMSA module is installed.
	b	=	1 or 2. The number represents the DSSI bus on which the device is installed.
	d	=	the DSSI node ID of the ISE.

When you use the MODIFY command, an implied READ command is also performed and the following message appears.

```
Reading configuration parameters, please wait ...
```

The following is an example of what the utility displays for the first two devices in the configuration shown previously.

```
Node name  RF3110
Unit number     0

Node name  RF3111
Unit number     1
```

The process continues for all selected devices.

This command also assigns unique MSCP or TMSCP unit numbers to all the DSSI devices starting with the value you typed (in this example, 0) in the command string. It generates SCS node names based on physical path information as well.

You may not need to change the device's default settings in all installations. However, this program yields a set of parameters that is more cohesive than relying on defaults and should facilitate system management.

7. At the CONFIG> prompt, type:

```
CONFIG> MODIFY FORCE_UNI 0
```

This instructs the ISE to use the unit number(s) created in the
previous step.

8. At the CONFIG> prompt, type:

```
CONFIG> STORE
```

The STORE command may take some time, particularly in large
configurations. EVCXF displays the following message during
execution of the STORE command.

```
Writing parameters to EEPROM, please wait ...
```

The STORE command writes the information generated by the
MODIFY command to the devices. We suggest that you write the
node names on color-coded labels that come with SF**xx** enclosures.
Affix the labels on the access door(s) of the operator control panel(s).
Be sure you place the labels where they correspond to the correct ISE.

9. When the parameters are stored, the CONFIG> prompt reappears.
Type EXIT. The EXIT command returns you to the DS> prompt.

10. Verify all the DSSI devices. First, make sure that all DSSI disks are
"ready" (not write protected). Previously recorded media should be
installed in any DSSI tape ISEs. Then type the following command:

```
DS> run EVCXF/sec=test3
```

The DRVTST diagnostic in each DSSI device runs. The test is
performed concurrently on all devices, but total runtime is a function
of the number and type of devices present. Most configurations take
10 to 15 minutes to run. Refer to your ISE documentation if errors
are reported.

7.2   DSSI VAXcluster Configuration Procedure

DSSI ISEs have a built-in ability to maintain simultaneous connections with two or more KFMSA modules in separate host systems. All host systems must be in the same local area VAXcluster (LAVC) system. Each host system can directly access all ISEs connected to it.

The following restrictions apply to DSSI VAXcluster configurations:

- All host systems must use VMS version 5.4-3 or higher.

- All host systems must form a VAXcluster system configuration.

- All cabinets must be powered by the same ac circuit, or if they are powered by different circuits, those circuits:

  - Must not power any other equipment

  - Must share a single ground point

  - Must have a dedicated ground wire between the outlet and the single ground point

- Each ISE must be assigned the same device name and allocation class on all host systems.

When you install two or more systems in a DSSI VAXcluster configuration, install each system individually and test it to make sure it is working correctly. Then remove the terminators and connect the DSSI extension cable(s) between the systems and/or the expander cabinet(s).

The DSSI VAXcluster procedure is similar to the single system procedure, with some additional steps.

NOTE
The following steps *must* be performed in order. Do *not* perform any steps in parallel.

7.2.1   Perform the following steps on each host system

1. Boot VAX/DS. Refer to your system documentation or the *VAX Diagnostic Supervisor User's Guide*, order number AA-FK66A-TE, for the appropriate procedures.

2. After you load VAX/DS, the program returns a DS> prompt.

   Attach the KFMSA module(s) using one of the following two methods. If you intend to test the KFMSA module(s) only, use the manual method. If you intend to test other devices as well, use the automated method.

Manual method:

Attach the KFMSA module(s) with the appropriate command.

For VAX 6000 systems:

```
DS> ATTACH KFMSA HUB generic_name XMI_node_number DSSI_bus_number
```

The generic_name is in the format PA**x**0. Use a different letter in place of the **x** for each DSSI bus in the system. The XMI_node_ number is a numeric value that indicates which XMI backplane slot contains the KFMSA module.

A typical attach sequence for a VAX 6000 system with a KFMSA module installed in slot 4 looks like this:

```
DS> ATTACH KFMSA HUB PAA0 4 1
DS> ATTACH KFMSA HUB PAB0 4 2
```

Automated method:

At the DS> prompt, type the following:

```
DS> set flag quick
DS> run evsba/section:selftest
```

This activates the AUTOSIZER, which prompts you for command input.

a. At the COMMAND? prompt, type SIZE.

    The AUTOSIZER begins to scan the XMI bus, locating the devices. A series of ATTACH commands appears on the console terminal. Some of these will correspond to the KFMSA(s) installed in the system.

    The following is an example of the display for a VAX 6000 system.

    ```
    DS> ATTACH KFMSA HUB PAA0 4 1
    DS> ATTACH KFMSA HUB PAB0 4 2
    DS> ATTACH KFMSA HUB PAC0 B 1
    DS> ATTACH KFMSA HUB PAD0 B 2
    ```

    Note that each KFMSA module is listed twice because of the two DSSI ports on the module. Verify that all the KFMSAs were found, and that the XMI node number associated with each module is correct. (The XMI node number is the number immediately following the PA**x**0.) You do not need to verify the attach sequence for the ISEs connected to the KFMSA module DSSI ports.

b. When the COMMAND? prompt returns, type ATTACH and press Return .

c. Exit from AUTOSIZER by typing EXIT at the COMMAND? prompt.

3. Select the KFMSA(s) you will configure, as shown in the following example:

```
DS> Select PAA0,PAB0...
```

Be sure you include all the generic names associated with the selected KFMSA modules.

4. Enter the following command:

```
DS> run EVCXF/sec=test2
```

The program prints several lines of identification information, and then it returns the CONFIG> prompt.

5. Reset the KFMSA ports on all but one KFMSA for each shared bus.

All of the KFMSA ports on shared DSSI buses must have unique DSSI node IDs. Since both ports on all KFMSA modules come factory set with a DSSI node ID of 7, you must change all but one KFMSA port on each bus. We recommend that you use DSSI node ID 6 for the second KFMSA module physically configured on a shared DSSI bus, DSSI node ID 5 for the third, etc.

NOTE
If you are using a CK-KFMSA-LN cable kit, you can select the DSSI node ID using the rotary select switch on the bulkhead I/O panel. (see Figure 3–2). The switch setting overrides the DSSI node ID set in software by using the command shown below.

If all KFMSA modules in your configuration use this type of cable kit, set all KFMSA port DSSI node ID's using the rotary switches and skip steps 5 and 6 of this procedure.

To change the KFMSA module DSSI node ID in software, use the following command at the CONFIG> prompt.

```
CONFIG> set nodeid XMI_node_number,DSSI_bus_number,new_DSSI_node_ID
```

In this command, the XMI_node_number is a numeric value that indicates which XMI backplane slot contains the KFMSA. The DSSI_bus_number is 1 or 2 (for bus 1 or bus 2 on the KFMSA). The new_DSSI_node_ID is a numeric value you assign to the KFMSA on that bus.

6. Repeat the command for all KFMSA ports on DSSI buses that are shared by the VAXcluster.

   If any KFMSA ports are connected to local DSSI buses (i.e. DSSI buses that are not part of the DSSI VAXcluster), they should remain at the default DSSI node ID setting of 7.

7. Type SIZE. The EVCXF sizing function scans all DSSI buses for responding devices.

   When the sizing is complete, EVCXF displays a configuration map that shows what devices were found. The following is a sample configuration map:

```
            XMI node 01   XMI node 01   XMI node 0E   XMI node 0E
DSSI ID     Bus 1/UUN     Bus 2/UUN     Bus 1/UUN     Bus 2/UUN

   0          TF857  1      ****          ****          TF857 14
   1          RF72   2      RF72   6      RF72   10     RF72  15
   2          RF72   3      RF72   7      RF72   11     RF72  16
   3          RF72   4      RF72   8      RF72   12     RF72  17
   4          RF72   5      RF72   9      RF72   13     RF72  18
   5          ****          ****          ****          ****
   6          KFMSA         KFMSA         KFMSA         KFMSA
   7          KFMSA         KFMSA         KFMSA         KFMSA
```

   In this configuration map, two KFMSA modules are present in the system at XMI nodes 1 and E. The leftmost column of numbers lists the DSSI node IDs. Asterisks indicate that there was no response at that node number. The numbers to the right of the device type are the logical unit numbers assigned by the utility. These numbers are used only with the SELECT command, and are referred to as utility unit numbers (UUNs).

   Dashes indicate that an unknown or unsupported device type was found at that node number. Question marks indicate that a device is present at that node number, but is not able to communicate (that is, it is broken). Note that in many cases, the UUNs will be the same as the MSCP or TMSCP unit number.

Look carefully at your configuration map. Compare it with the information on your configuration sheet(s). If you find any differences, you must resolve them before you continue with this installation. Make sure that all shared ISEs are visible on all host systems to which they are connected. Make note of any asymmetries that may exist due to buses being connected to different ports and/or XMI nodes on different systems.

7.2.2 Perform the following steps on one system

1. Type the following command:

    ```
    CONFIG> MODIFY NAME_NUMBER 0
    ```

    This command changes the node name used by the operating system software when it communicates with the DSSI devices. It assigns parameter values automatically and sequentially until all selected devices have a new system name.

    The format for this name is:

    <div align="center">RFcxbd</div>

Where:	RF	=	the first two letters of the option type. RF is for disk.
	c	=	0 for VAX 6000 series systems, XJA# for VAX 9000 series systems.
	x	=	the hexadecimal value of the XMI slot in which the KFMSA module is installed.
	b	=	1 or 2. The number represents the DSSI bus on which the device is installed.
	d	=	the DSSI node ID of the ISE.

    When you use the MODIFY command, an implied READ command is also performed and the following message appears.

    ```
    Reading configuration parameters, please wait ...
    ```

    The following is an example of what the utility displays for the first two devices. The process continues for all selected devices.

```
Node name  RF0110
Unit number     0

Node name  RF0111
Unit number     1
```

This command also assigns unique MSCP or TMSCP unit numbers
to all the DSSI devices starting with the value you typed (in this
example, 0) in the command string. It generates SCS node names
based on physical path information as well.

Remember that you may not need to change the device's default
settings in all installations. However, this program yields a set of
parameters that is more cohesive than relying on defaults and should
facilitate system management.

2. At the CONFIG> prompt, type:

```
CONFIG> MODIFY FORCE_UNI 0
```

This instructs the ISE to use the unit number(s) created in the
previous step.

3. Set the allocation class for all shared ISEs to a nonzero value in the
range 1 through 255.

```
CONFIG> modify allocation_class nnn
```

Remember, when you bring up the VMS operating system in each
of the host systems, you must also set the ALLOCLASS SYSGEN
parameter to the same value.

NOTE
**Do not repeat the MODIFY steps on the other systems unless
some DSSI devices are not shared by the DSSI VAXcluster.
When this is the case, perform the MODIFY step on the other
systems only for those devices that are not shared.**

CAUTION
**Setting up a share/local population of DSSI ISEs may result
in a duplication of device names. Plan your configuration and
parameter modifications carefully before making any changes.**

4. Type STORE.

```
CONFIG> STORE
```

The STORE command may take some time, particularly in large
configurations. EVCXF displays the following message during
execution of the STORE command.

```
Writing parameters to EEPROM, please wait ...
```

The STORE command writes the information generated by the
MODIFY command to the devices. We suggest that you write the
node names on color-coded labels that come with SF**xx** enclosures.
Affix the labels on the access door(s) of the operator control panel(s).
Be sure you place the labels where they correspond to the correct ISE.

7.2.3 Perform the following steps on all systems

1. At the CONFIG> prompt type EXIT. The EXIT command returns you
   to the DS> prompt.

2. Verify all the DSSI devices. First, make sure that all DSSI disks are
   "ready" (not write protected). Previously recorded media should be
   installed in any DSSI tape ISEs. Then type the following command:

```
DS> run EVCXF/sec=test3
```

The DRVTST diagnostic in each DSSI device runs. The test is
performed concurrently on all devices, but total runtime is a function
of the number and type of devices present. Most configurations take
10 to 15 minutes to run. Refer to your ISE documentation if errors
are reported.

NOTE
**When DSSI VAXcluster installations have only shared DSSI
devices, you may perform the verify step from any host system.
You do not need to repeat the step from any other system.**

**When the host systems have both local and shared devices,
perform the verify step on all host systems. Any host system
may be used to test the shared devices and its own local
devices concurrently. The other system(s) should be set to test
non-shared devices only.**

7.3   EVCXF Program Tests

The EVCXF program consists of four tests. Table 7–1 describes them.

Table 7–1   EVCXF Diagnostic Tests

Test	Description
1	Execute DUP device-resident program PARAMS
2	Interactive configuration and DUP utility
3	Concurrent DRVTST on all devices on all DSSI buses
4	Interactive device test on individual DSSI devices, using either DRVTST or DRVEXR

7.3.1   Test 1 — Execute PARAMS

Test 1 establishes a connection to the DUP server in any DSSI ISE. This connection lets you invoke the device-resident PARAMS utility. PARAMS allows you to see the current parameter values of an ISE and change them. This test establishes a DUP connection to one DSSI ISE at a time (that is, no concurrent connections are possible).

Test 1 also lets you change the KFMSA DSSI node ID for a DSSI bus that you specify.

You must supply the XJA number (VAX 9000 systems only), the XMI node number, DSSI bus number, and DSSI node ID of the device to be connected. If you change the DSSI node ID, you must also supply a new parameter value for it.

Test 1 checks to be sure that a device responds on the bus at the new DSSI node ID. If a device responds, test 1 notifies you that a device is already present at the new DSSI node ID. Otherwise, the new DSSI node ID is assigned to the bus you specified.

Since you cannot be sure that the slot is empty (a device may be present, but unable to communicate on the bus because it is powered off or broken), you *must* verify that the new DSSI node ID is not used by any other device on the bus.

The following example shows you how to change the MSCP unit number and KFMSA DSSI node ID.

NOTE
The XJA parameter only applies to VAX 9000 series systems. This does not appear in VAX 6000 system applications.

```
Enter XJA #, XMI Node #, DSSI bus, DSSI Node ID # or <CR> to exit:  0,1,1,0

Enter new KFMSA DSSI Node ID # [(7), 0, 7] or <CR> to keep present value:  7

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PARAMS>  SHOW UNITNUM
Parameter   Current   Default   Type     Radix
---------   -------   -------   -------   -----
UNITNUM           0         0   BOOLEAN     DEC  U
PARAMS>  SET UNITNUM 1
PARAMS>  SHOW .
Parameter   Current   Default   Type     Radix
---------   -------   -------   -------   -----
UNITNUM           1         0   BOOLEAN     DEC  U
PARAMS>  WRITE
Changes require  controller initialization, o.k. ? [Y/N] Y
PARAMS>  EXIT
Enter XJA #, XMI Node #, DSSI bus, DSSI Node ID # or <CR> to exit:
```

7.3.2 Test 2 — Interactive Configuration and DUP Utility

Test 2 lets you change the device-resident parameter values as well as invoke device-resident diagnostics through DUP. This test requires a program-specific command language, which accepts abbreviated commands. You must supply enough characters to make the commands unique.

If you make a mistake, the program displays the command again, indicating the point of failure.

Table 7–2 lists the commands used with test 2. The shortest abbreviated commands are shown in **bold** letters.

Table 7–2   Configuration Utility Command Summary

Command	Description
Help	Displays information on how to use the configuration and DUP utility commands
SIze	Determines and displays the configuration of KFMSA/DSSI devices in the system
SELect	Lets you select the DSSI device(s) to be acted upon by subsequent commands
Read	Accesses the selected device's parameter values and saves them for later use
Display	Displays the information from a READ or SIZE command
Verify	Verifies unique parameter values of DSSI devices in the configuration
Modify	Lets you change parameter values
STore	Stores the information from a MODIFY command in the device
SET	1. Establishes a DUP connection to a device, which lets you run a device-resident program
	2. Changes a KFMSA DSSI node ID
Exit	Stops the test

Refer to Section 7.4 for more information on EVCXF program commands.

7.3.3 Test 3 — Concurrent DRVTST

Test 3 invokes the device-resident DRVTST diagnostic on all DSSI devices attached to the selected KFMSA module(s). It establishes multiple concurrent DUP connections. DRVTST runs a quick, pass/fail test on the DSSI devices.

Test 3 issues the commands to DRVTST, so no user intervention is required. The default values, which are device-specific runtime and read-only testing, are used.

DRVTST may take some time. It displays the following message while it is running:

```
DRVTST starting on XJA #x XMI Node #n, DSSI bus #m, DSSI Node Id #u...
5 minutes to complete.
```

NOTE
The XJA # parameter only applies to VAX 9000 series systems. This does not appear in VAX 6000 series applications.

7.3.4 Test 4 — Interactive Device Test

Test 4 invokes the device-resident programs, DRVTST or DRVEXR, on all selected devices. It is like test 3 because it allows concurrent testing. However, test 4 lets you select a set of devices and use a more comprehensive device test, DRVEXR. Note that the device test you select runs on all the devices you select.

Test 4 requires you to select the devices to be tested and the ASCII name of the test to be run. Type ALL to test all the DSSI devices in the system. To select a set of devices, type a list of the device utility unit numbers (UUNs) separated by commas. Use a hyphen to show a range of numbers, such as 1-6,8,10-20. The UUNs are listed on the KFMSA/DSSI configuration map.

Test 4 also prompts you to input the parameter values for the devices you select. Type Y[es] to use your next inputs as the defaults for all selected devices. Type N[o], and the test prompts you to input the parameter values one device at a time.

The following example shows the user interface of test 4.

NOTE
The XJA # parameter only applies to VAX 9000 series systems.
This does not appear in VAX 6000 series applications.

```
            XJA # 03      XJA # 03       XJA # 03      XJA # 03
            XMI node 01   XMI node 01    XMI node 0E   XMI node 0E
DSSI ID     Bus 1/UUN     Bus 2/UUN      Bus 1/UUN     Bus 2/UUN

   0        TF857   1     ****           ****          TF857 20
   1        RF72    2     RF72    8      RF72    14     RF72  21
   2        RF72    3     RF72    9      RF72    15     RF72  22
   3        RF72    4     RF72    10     RF72    16     RF72  23
   4        RF72    5     RF72    11     RF72    17     RF72  24
   5        RF72    6     RF72    12     RF72    18     ****
   6        RF72    7     RF72    13     RF72    19     ****
   7        KFMSA         KFMSA          KFMSA         KFMSA


Enter the UUN's of the devices to be tested : 2-19, 21-24

Enter the name of the test to be run [(DRVEXR), DRVTST]:  DRVTST

       ********************************************************
       ***                    WARNING                      ***
       ***  PROTECT user data if executing READ/WRITE test ***
       ********************************************************

Use the next set of user inputs as defaults for all selected devices?[(Y)/N]

DRVTST starting in UUN 2...

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Write/read anywhere on the medium ? [1=Yes/(2=No)]  1
User data will be corrupted. Proceed?) [1=Yes/(0=No)]  1
  5 minutes to complete.

DRVTST starting in UUN 3...

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Write/read anywhere on the medium ? [1=Yes/(2=No)]  1
User data will be corrupted. Proceed?) [1=Yes/(0=No)]  1
  5 minutes to complete.

Device testing completed successfully, on UUN 2
Complete
Local program terminated on XJA #03, XMI node #01, DSSI Bus #1, DSSI Node ID #1
```

7.4   EVCXF Program Commands

In the following command descriptions, the arguments are defined in
several ways. If an argument is enclosed in parentheses (( )), it is a
generic definition. The value you use for that argument is described
within the parentheses. Arguments enclosed in brackets ([ ]) and braces
({ }) use keywords. One of these keywords must be used as the argument.
Brackets are used when an argument is mandatory; braces are used when
an argument is optional. An asterisk (*) after a keyword indicates that it
is the default value.

When you see the CONFIG> prompt, the utility requires one of the
following commands.

7.4.1   HELP Command

The HELP command displays more information about all commands
or about a command that you specify. The HELP display lists all the
command formats used by the utility. The HELP **(command)** display
includes a description of the specified command and options.

7.4.2   SIZE Command

The SIZE command scans all DSSI buses for responding devices. When
the sizing is complete, EVCXF displays a configuration map that shows
what devices were found. The command has the following format:

$$\text{SIZE} \left\{ \begin{array}{l} \textbf{ALL*} \\ \textbf{XJA \#, XMI node \#,DSSI bus \#;(XJA \#, XMI node \#...)} \end{array} \right\}$$

NOTE
**The XJA parameter only applies to VAX 9000 series systems. It
does not apply to VAX 6000 series applications.**

To select one or more of the KFMSA modules, type the XJA number
(VAX 9000 systems only), and the XMI node number(s) that correspond
to the KFMSA module(s). You may also specify which bus or buses will
be sized on the specified KFMSA module(s). If you type ALL or omit the
argument, EVCXF scans for devices on all KFMSA modules "known" to
the diagnostic environment.

7.4.2.1 Messages Displayed During SIZE

The SIZE command may take some time. EVCXF displays the following message:

```
DSSI sizing underway; please wait...
```

Error messages that may appear during SIZE include the following:

```
Timeout occurred trying to access KFMSA at XJA m XMI Node n
```

```
Option at XJA m XMI Node n is not a KFMSA
```

NOTE
The XJA parameter only applies to VAX 9000 systems. It will not appear in these error messages in VAX 6000 system applications.

When the sizing is complete, EVCXF displays a configuration map that shows what devices were found. The following is a sample configuration map:

```
             XJA # 03      XJA # 03       XJA # 03      XJA # 03
             XMI node 01  XMI node 01   XMI node 0E  XMI node 0E
DSSI ID      Bus 1/UUN    Bus 2/UUN     Bus 1/UUN    Bus 2/UUN

  0          TF857   1    ****          ****          TF857 18
  1          RF72    2    RF72    6     RF72    12    RF72  19
  2          RF72    3    RF72    7     RF72    13    RF72  20
  3          RF72    4    RF72    8     RF72    14    ????
  4          RF72    5    RF72    9     RF72    15    RF72  21
  5          ****         RF72   10     RF72    16    ****
  6          ****         RF72   11     RF72    17    ****
  7          KFMSA        KFMSA         KFMSA         KFMSA
```

In this configuration map, two KFMSA modules are present in XMI card cage 3, as indicated by the XJA # 03 on the top line of the configuration map, at XMI nodes 1 and E.

NOTE
The XJA # parameter does not appear in VAX 6000 series applications.

The leftmost column of numbers lists the DSSI node IDs. Asterisks indicate that there was no response at that node number. The numbers to the right of the device type are the logical unit numbers assigned by the utility. These numbers are used only with the SELECT command, and are referred to as utility unit numbers (UUNs).

Dashes indicate that an unknown or unsupported device type was found at that node number. Question marks indicate that a device is present at that node number, but is not able to communicate (that is, it is broken). Note that in many cases, the UUNs will be the same as the MSCP or TMSCP unit number.

The SIZE information is saved and can be recalled to the screen by the DISPLAY command.

7.4.3 SELECT Command

The SELECT command lets you select which DSSI devices will be acted upon by subsequent commands. The SELECT command has the following format:

$$\textbf{SELECT} \left\{ \begin{array}{l} \textbf{ALL*} \\ \textbf{(list of DSSI devices)} \end{array} \right\}$$

To specify a set of devices, type a list of the device UUNs separated by commas. Use a hyphen to show a range of numbers, such as 1-6,8,10-20. If you type ALL or omit the argument, EVCXF performs the subsequent commands on all the DSSI devices in the system.

7.4.4 READ Command

The READ command accesses each selected device through DUP and invokes the device-resident PARAMS program(s). Then EVCXF issues the PARAMS commands that read the critical parameter values and store them in a local working buffer.

The READ command takes no arguments. The parameter values read and stored are:

    System ID
    Node name
    MSCP or TMSCP unit number
    Force unit
    Force name
    Allocation class

The READ command may take some time. EVCXF displays the following message at 30-second intervals:

```
Reading device parameters; please wait...
```

7.4.5 DISPLAY Command

The DISPLAY command displays the parameter values for each KFMSA module on the terminal screen. The DISPLAY command has the following format:

DISPLAY $\left\{ \begin{array}{l} \textbf{ALL*} \\ \textbf{(list of KFMSA devices)} \end{array} \right\}$

To select one or more KFMSA module(s), you type the XJA number (VAX 9000 systems only), and XMI node number(s) that correspond to the KFMSA module(s). Separate the XMI node numbers with commas. EVCXF displays the parameter values stored in the local working buffer.

If the local working buffer is empty, an implied READ command is performed. The DISPLAY command does not check the validity of the parameters; it merely displays them.

The following is a sample command and display:

```
CONFIG>  display 3, D
                              XJA # 03
                             XMI node D
DSSI ID                  Bus 1/UUN              Bus 2/UUN

0                        RF72  1                RF72  8

   System ID       543091046214           711308600728
   Node Name          R3KLE2                 R7EW30
   Unit Number          0                      0
   Force Unit # Flag    0                      0
   Force Name Flag      0                      0
   Allocation Class     0                      0

1                        RF72  2                RF72  9
   System ID       660302114876           250240376419
   Node Name          R3QZTI                 R7ZIAA
   Unit Number          1                      1
   Force Unit # Flag    0                      0
   Force Name Flag      0                      0
   Allocation Class     0                      0

2                        RF72  3                RF72 10
   System ID       410675142904           961021185879
   Node Name          R1EJAA                 RLDHLL
   Unit Number          2                      2
   Force Unit # Flag    0                      0
   Force Name Flag      0                      0
   Allocation Class     0                      0

3                        RF72  4                RF72 11
   System ID       015589683211           938405811950
   Node Name          RUTZAB                 R72LT3
   Unit Number          3                      3
   Force Unit # Flag    0                      0
   Force Name Flag      0                      0
   Allocation Class     0                      0

Press <CR> to continue.
```

The DISPLAY command recalls the information saved by the SIZE
command. This information includes the DSSI node IDs, the device
types, and the UUNs. Refer to Section 7.4.2 for more information.

7.4.6 VERIFY Command

The VERIFY command checks for duplicate parameter values where the values should be unique in the configuration. The VERIFY command checks all selected devices by comparing the stored parameter values. The command has the following format:

$$\textbf{VERIFY} \left\{ \begin{array}{l} \textbf{System\_ID} \\ \textbf{Node\_name} \\ \textbf{Unit\_number} \\ \textbf{ALL}^* \end{array} \right\}$$

The optional argument lets you specify one parameter or all three of the parameters which must be unique. Note that the keyword list does not include allocation class because that parameter need not be unique.

If the local working buffer is empty, an implied READ command is performed. The VERIFY command does not resolve any conflicts; it merely detects and reports them.

7.4.6.1 Messages Displayed During VERIFY

If VERIFY finds no conflicts, EVCXF displays one of the following messages:

```
No conflicts found for System_ID (Node_name or Unit_number)

No conflicts found on any parameter
```

If VERIFY finds conflicts, they are displayed as shown in the following example:

```
Unit_number 5 found on:

UUN 1, XJA #03, XMI Node #01  DSSI bus #1   DSSI Node ID #5
UUN 1, XJA #03, XMI Node #01  DSSI bus #2   DSSI Node ID #5
UUN 1, XJA #03, XMI Node #0E  DSSI bus #1   DSSI Node ID #5
UUN 1, XJA #03, XMI Node #0E  DSSI bus #2   DSSI Node ID #5
```

NOTE
The XJA # parameter only applies to VAX 9000 series systems. This does not appear in VAX 6000 series applications.

Conflicts are displayed on the screen one report at a time. If more than one conflict is found, press Return to see the next report.

7.4.7 MODIFY Command

The MODIFY command lets you change the parameter values for one
or more of the selected devices. If the local working buffer is empty, an
implied READ command is performed. You can select one of two modes:
manual or auto. The command has the following format:

$$\textbf{MODIFY \{MANUAL\}} \begin{bmatrix} \textbf{System\_ID} \\ \textbf{Node\_name} \\ \textbf{Unit\_number} \\ \textbf{Allocation\_class} \\ \textbf{Name\_number} \\ \textbf{Force\_unit\_flag} \\ \textbf{Force\_name\_flag} \end{bmatrix} \textbf{(seed value)}$$

With the first four argument keywords, you change the corresponding
individual parameters for all selected devices. The name_number keyword
lets you change two of the parameters with one command line. The
System_ID and Force_name_flag parameters are used only in manual
mode. The seed value is used only in auto mode.

7.4.7.1 Manual Mode

When MODIFY is used with the MANUAL switch, you can sequence
through the selected devices, displaying the stored value for the specified
parameter(s) and then change the parameter(s).

You must type a new value for the displayed parameter, or press Return to
keep the stored value and go on to the next parameter. In manual mode,
the seed value has no meaning and is ignored. A typical manual mode
dialogue for a single parameter change might look like this:

```
CONFIG> Modify Manual node_name
UUN 1, XJA #03, XMI Node #01,  DSSI Bus #1  DSSI Node ID #1
     Node_name   [RF3111]  ???   DISK00
UUN 3, XJA #03, XMI NODE #0E   DSSI BUS #2  DSSI Node ID #1
     Node_name   [RF3E21]  ???   DISK01
```

7.4.7.2 Auto Mode

When MODIFY is used in auto mode (that is, without the MANUAL
switch), EVCXF provides semiautomatic generation of one or more
parameters when you supply a seed value. The seed value is always a
decimal number, unless you have entered the node_name as the first
argument. In that case, the seed value must be six characters or less in
length. The first four characters must be ASCII alphanumeric, and the
last two characters must be numeric. The node name that is generated
reflects the physical address of the device.

The format for this default assignment is:

RF**cxbd** or TF**cxbd**

Where:	RF and TF	=	the first two letters of the option type. RF is for disk; TF is for tape.
	c	=	0 for VAX 6000 series systems and XJA# for VAX 9000 series systems.
	x	=	the hexadecimal value of the XMI slot in which the KFMSA module is installed.
	b	=	1 or 2. The number represents the DSSI bus on which the device is installed.
	d	=	the DSSI node ID of the ISE.

Auto mode assigns the seed value to the specified parameter of the first selected device. Then the seed value is incremented and assigned to the specified parameter of the second device, and so on. When you change multiple parameters, the seed value is used to generate a unique value for each of the specified parameters. Then the seed value is incremented and assigned to the specified parameters of the second device, and so on.

The following is a sample command and display:

```
 CONFIG>  Modify name_number 0<CR>

Node name   RF0E11
Unit number       0

Node name   RF0E12
Unit number       1
```

In this display, the node name uses the default format of two alpha characters for the device designator followed by four alpha-numeric characters representing the XJA number (0), the KFMSA XMI node (E), the DSSI bus (1) and the DSSI node number (1 and 2).

The Allocation_class and Force_unit_flag parameters are handled differently. The seed value is the exact value that will be used for all selected devices, and no incrementing occurs.

7.4.8 STORE Command

The STORE command copies any changed parameter values from the local working buffer to the appropriate devices. Only parameter values that have been changed are written to the devices.

The STORE command takes no arguments. While STORE is executing, EVCXF displays the following message:

```
Writing parameters to EEPROM, please wait ...
```

7.4.9 SET Command

The SET command has two specific uses. The SET HOST DUP command lets you establish a connection to the DUP server in one device that you specify. This command is **not** affected by the SELECT command. The SET HOST DUP command has the following format:

SET HOST DUP XJA #,XMI node #,DSSI bus #,DSSI node ID TASK

NOTE
The XJA # parameter only applies to VAX 9000 series systems. This does not appear in VAX 6000 series applications.

The arguments are required and specify one device. TASK is the name of a device-resident program you want to run. If this argument is omitted, the default displays a directory of the device-resident programs.

For the SET HOST DUP command, EVCXF provides pass-through terminal communication. The user dialogue is defined by the device-resident program.

The SET command also lets you change the DSSI node ID of a KFMSA module. The format for this command is:

SET NODEID XJA #, XMI node #,DSSI bus #, new DSSI node ID #

NOTE
The XJA # parameter only applies to VAX 9000 series systems. This does not appear in VAX 6000 series applications.

In this command, the XMI_node_number is a numeric value that indicates which XMI backplane slot contains the KFMSA. The DSSI_bus_number is 1 or 2 (for bus 1 or bus 2 on the KFMSA). The new_DSSI_node_ID is a numeric value you assigned to the KFMSA on that bus.

EVCXF checks to be sure that a device responds on the bus at the new DSSI node ID. If a device responds, EVCXF notifies you that a device is already present at the new DSSI node ID. Otherwise, the new DSSI node ID is assigned to the bus you specified.

NOTE
A node reset is required before the new DSSI node ID can be read.

Since you cannot be sure that the slot is empty (a device may be present, but unable to communicate on the bus because it is powered off or broken), you *must* verify that the new DSSI node ID is not used by any other device on the bus.

7.4.10 EXIT Command

The EXIT command terminates the DUP connections with all the DSSI devices. Then EVCXF returns to the diagnostic monitor.

The EXIT command may take some time. EVCXF displays the following message at 30-second intervals:

```
Resetting devices, please wait...
```

8
Booting VMS from a DSSI Device

To boot VMS from a DSSI device through the KFMSA, the following conditions must first be met:

- The DSSI subsystem must be configured according to the procedures described in Chapter 6 or Chapter 7.

- The proper revision level of VMS must be installed on the ISE. See Section 1.1 for VMS revision level information.

8.1 VAX 6000 System Booting Procedures

To boot from an RF series ISE on a VAX 6000 series system, the CPU console ROMs must be at the minimum revision level specified in Table 8–1. If the console ROMs are not at the minimum revision specified, they must be updated. To update the console ROMs, refer to the *VAX 6000 EEPROM Utility Document* (part number AA-PIVBA-TF).

Table 8–1 Minimum Console Code Revisions

CPU Type	Scalar	Vector	PLEN[1]
6000-200 series	3.8	-	5.1
6000-300 series	4.7	-	6.1
6000-400 series	1.03	2.02	3.01
6000-500 series	2.02	2.02	2.02
6000-600 series	1.00	N/A	N/A

[1]Platform Enhancements (PLEN) are hardware upgrades to the backplane of your system. If you are not sure whether your system includes PLEN, see your sales or customer service representative. If your system includes PLEN, your console microcode must be upgraded to at least the version listed in this column.

8.1.1 Boot Command for 6000-500 and 6000-600 Systems

For 6000-500 and 6000-600 series systems, the boot command syntax is:

```
>>> b /xmi:# /port:# /dssi:# di#
```

The /XMI qualifier specifies which slot in the backplane the KFMSA is located. Valid backplane slots where KFMSA may be installed are 1-5 and A-E. The syntax for the /XMI qualifier is /XMI:<slot number>. For example /XMI:4.

The /PORT qualifier specifies the DSSI port (bus) which connects the boot device to the KFMSA module. The valid options are /PORT:2 for booting a device connected to DSSI bus 2 or /PORT:1 for booting a device on DSSI bus 1.

The /DSSI qualifier specifies the DSSI node ID for the boot device. A DSSI device may have an ID in the range of 0 to 7, for example /DSSI:5. Refer to section Section 5.1.3 for information on how to determine the DSSI node ID number of the boot device.

The di# is the device number (MSCP or TMSCP unit number) of the boot device. Refer to Section 5.3.1 for device naming information.

NOTE
The # variable is expressed in HEXADECIMAL. For example, VMS may see a device as 1DIA11, but to boot the device, you must type "DIB".

The following is an example of booting a DSSI device with device name DIA5, a DSSI node ID of 4, connected to port 2 through a KFMSA located in slot 4 of the XMI backplane.

```
>>> b /xmi:4 /port:2 /dssi:4 DI5
```

8.1.2 Boot Command for 6000-200, -300, and -400 Systems

For 6000-200, 6000-300 and 6000-400 series systems the boot command
syntax is:

```
>>> b /xmi:# /node:x000n di#
```

The /XMI qualifier specifies which slot in the backplane the KFMSA is
located. Valid backplane slots where KFMSA may be installed are 1-4
and B-E. The syntax for the /XMI qualifier is /XMI:<slot number>. For
example /XMI:4.

The /NODE qualifier specifies both the DSSI bus ID and the DSSI port
number (DSSI bus) of the boot device. The format for the /NODE qualifier
is /NODE:x000n.

where:

    x = 2 or 3; 2 = KFMSA port 1, 3 = KFMSA port 2
    n = DSSI node ID

The di# is the device number (MSCP or TMSCP unit number) of the boot
device. Refer to Section 5.3.1 for device naming information.

NOTE
**The # variable is expressed in HEXADECIMAL. For example, VMS
may see a device as 1DIA11, but to boot the device, you must
type "DIB".**

The following is an example of booting a DSSI device with device name
DIA5, a DSSI node ID of 4, connected to port 2 through a KFMSA located
in slot 4 of the XMI backplane.

```
>>> b /xmi:4 /node:30004 DI5
```

8.2   VAX 9000 System Booting Procedure

VAX 9000 series systems execute a boot file when issued the command:

```
>>> b kfmsa
```

The boot file must be set up during the installation. An example boot
file, which may be modified to your specific use, is provided on the next
page. To use this boot file, you must modify R1, R2, and R3 to match your
system configuration.

- R1 defines the XMI backplane and XMI node for the boot device.

- R2 defines the boot device's DSSI node ID, device type, and DSSI bus
  number.

- R3 defines the boot device's MSCP or TMSCP unit number.

It may be easiest to create this file by editing the KDMBOO.CMD file
already resident in the boot disk and renaming it to KFMSABOO.CMD.

NOTE
**If you are always going to boot through the KFMSA, rename the
file DEFBOO.CMD. Then you only need to type "b" at the console
prompt.**

NOTE
**The CPU console code ROMs must be at a minimum revision level
of BL14.2.**

```
!                   K F M S A B O O . C M D
!     (c) 1990 Digital Equipment Corp.
!
!         Boot a DSSI-based System Disk
!
! Inputs:
!
!       P1 - "TRUE" for /START "FALSE" otherwise
!       P2 - Unit number (disk unit plug number; decimal)
!       P3 - Boot flags (/R5 value) or 0
!       P4 - BI node ID (hex)
!       P5 - XMI node ID (hex)
!     <3:0> XMI node number
!     <5:4> XMI number
! P6 - HSC CI node number (hex)
!
! R1 - Device node address (XJA<1:0> | XMI<3:0> | BI<3:0>).
! R2 - Path Definition
!          R2(0:7)  : DSSI boot device node #.
!          R2(8:11) : 00(zero).
!          R2(12)   : Must be set if Tape(TF85) boot.
!          R2(13)   : Must be set if not disk boot.
!          R2(14:15): 00(zero).
!          R2(16)   : 0 for port 0, 1 for port 1(port 0 and port 1 can also
!                     be referred to as port 1 and port2 respectively).
!          R2(17)   : Must be set, this is port bit valid flag(port #
!                     specified).
!          R2(18:19): Must be set if booting off of Tape
! R3 - Device unit (same as passed in P2)
! R5 - BOOT flags (same as passed in P3)
! R6 - Memory bitmap address
! R7 - SPU memory area address
! AP - 3
! SP - Address of second good page of memory
! PC - Address of second good page of memory
! All other GPRs are clear

EXAMINE/SYMBOL=START_ADDRESS PC          ! Get the start address
LOAD/START:'START_ADDRESS' VMB9AQ        ! Load primary bootstrap

DEPOSIT R0 %X20                          ! Set device type (KFMSA)
DEPOSIT R1 %x050                         ! KFMSA on xmi0 at node 5
DEPOSIT R2 %X20002                       ! Node 2, port 0
DEPOSIT R3 %D105                         ! Unit number 105

IF P1 THEN START/NOLOG 'START_ADDRESS'
```

9
EEPROM Update Utility

EVUCM is a loadable utility program that lets you access and update the
contents of the KFMSA module EEPROM.

9.1 Overview

EVUCM is a standalone program that runs under the control of the VAX
Diagnostic Supervisor. The program uses the diagnostic macro library
(DIAG.MLB) and interfaces with any VAX Diagnostic Supervisor.

You use EVUCM to update the KFMSA device-resident firmware and
diagnostics. It supports system configurations that contain up to thirteen
KFMSA modules.

The KFMSA EEPROM stores duplicates of all the critical sections during
the update. The update occurs one section at a time. If the first section is
corrupted, you can power up the module through the other section. Before
EVUCM writes to the EEPROM, it reads the contents and compares them
to the data that the user wants to program into the EEPROM. EVUCM
only executes the write if the current EEPROM data does not match the
desired EEPROM data. The write operation is performed on a longword
by longword basis.

Upon initialization, EVUCM determines whether the system is under
console control (the operating system is not running). If the system is not
under console control, EVUCM aborts.

If the system is under console control, EVUCM establishes a connection
to the appropriate device register physical addresses and tests the
accessibility of those registers. If the registers are not accessible, EVUCM
displays the following error message before it aborts:

```
Device is unavailable.
Register offset:<REG>
```

If the registers are accessible, EVUCM reads the device types. If EVUCM finds a device that is not a KFMSA module, it displays the following message before it aborts:

```
KFMSA device not found at XMI node x.
```

The **x** is the XMI node number you supplied when you attached the device.

If EVUCM finds a KFMSA module, it displays the following message:

```
KFMSA at NODE: 0C
Initiating KFMSA self-test, wait 10 seconds ...
```

The program resets the module, invoking the power-on self-test (POST). If the POST is unsuccessful, pertinent error information is output and you are asked if you would like to continue anyway. It is likely that POST will fail when the EEPROM is corrupted, in which case you want to continue updating the EEPROM to restore it's contents to a valid state.

9.2 Using EVUCM

To use the EVUCM utility program, you must first access the VAX diagnostic supervisor. Follow the instructions in your system documentation.

NOTE
For EVUCM to operate on a VAX 6000, the three-position switch on the operator control panel must be in the UPDATE position.

NOTE
For EVUCM to operate on a VAX 9000, the XMI_update switch must be enabled. To do this, type the following at the console prompt:

```
>>> SET XMI_UPDATE/XMI:n ON (OFF)
```

The value *n* is the number of the XMI backplane in which the KFMSA module is installed.

1. At the DS> prompt, load the program and attach the KFMSA module.

2. At the DS> prompt, initiate one of the program tests using the START command.

    ```
    DS> start/section=section_name
    ```

    The section_name is the name of the test section you initiate.

The EVUCM program must be run in sections. EVUCM test sections are listed in Table 9–1. When you specify a section, all the tests associated with that section are executed.

Table 9–1   EVUCM Test Sections

Section	Description
PARAM	Displays the current state of the EEPROM firmware revision level, date, and port-specific parameters. Allows you to change the port-specific parameters.
UPDATE	Automatically programs the EEPROM with the data contained in the image file EVUCM3.BIN or EVUCM5.BIN, depending on the hardware revision of your module. If the program is unable to determine the hardware revision (which is often the case if the EEPROM image is corrupted), you are asked for the file name. Refer to the revision matrix to determine the correct file.
	The EEPROM is reprogrammed in sections. After each section is reprogrammed, a checksum and data integrity check are done for that section. Programming of subsequent sections continues only if no errors are detected.
VERIFY	Allows you to load an EEPROM data image into main memory. After the image is loaded, VERIFY prints a summary of the revision information for the data image and for the EEPROM. Then VERIFY performs a checksum and data integrity check between EEPROM and memory.
ERRORLOG	Allows you to examine the status of error logs stored in EEPROM.
DEFAULT	Runs the UPDATE test section by default if you do not name a section with the START command.

EVUCM runs 'clean-up' code at the end of a test section to determine whether or not anything has been written to the EEPROM. If the EEPROM was updated, it resets the module, invoking POST, and the following message is displayed:

```
Initiating KFMSA self-test, wait 10 seconds ...
```

EVUCM then returns the DS> prompt.

Glossary

ADAPTER

A module that connects one or more device controllers to the host bus and hides many of the host bus requirements from the controller. The KFMSA module is an XMI to DSSI bus adapter.

ALLOCATION CLASS

A numerical value assigned to the ISE to indicate which host(s) on a cluster it will be served by.

BAD BLOCK

An address on a disk or tape that is determined by the device controller to be bad and, therefore, in need of replacement.

BAD BLOCK REPLACEMENT

The procedure used to locate a replacement block, mark the bad block as replaced, and move the data from the bad block to the replacement block.

BLOCK

The smallest data unit addressable on a disk. Also called a sector. In DSSI ISEs, a block contains 512 bytes of customer data, EDC, ECC, flags, and the block's address header.

DEVICE NAME

A unique name given to each device by the VMS operating system. The device name generally includes either the allocation class and MSCP unit number assigned to the device (if the allocation class is not zero), or the node name and MSCP unit number (if the allocation class is zero).

DMA

Direct memory access.

DRVTST

A local program resident on the ISE. It is a comprehensive hardware test used to verify ISE operation.

DSSI

Digital Storage System Interconnect. A DSA-based storage interconnect used by the KFMSA adapter and the RF- and TF-series integrated storage elements to transfer data and to communicate with each other.

DSSI VAXCLUSTER

Storage configuration where DSSI ISEs are shared between two or more DSSI adapters and host systems.

DUP

Diagnostic and utility protocol. A SYSAP-level protocol by which a host computer directs a storage device controller to run internal diagnostics or utility functions. DUP is implemented as a class driver on the host side, and a corresponding class server on the storage controller side.

EEPROM

Electrically erasable programmable read only memory. Used by the KFMSA adapter to store configuration, manufacturing, and error information in a nonvolatile location.

FCT

Factory control tables. Where factory found bad blocks are recorded.

ISE

Integrated storage element. All DSSI storage devices are ISEs.

KFMSA

XMI bus to DSSI bus adapter.

LBN

Logical block number. A logical block number is a volume-relative address of a block on a mass storage device. A block is a physical sector on the storage media that can contain customer data.

LTN

Logical track number. The actual data track in the customer data area.

MAGAZINE TAPE SUBSYSTEM

A DSSI tape ISE with tape loader.

MSCP

Mass Storage Control Protocol. An application layer protocol used by the host to perform disk I/O operations and I/O control functions.

NODE NAME

A 6-character (maximum) value that is assigned to each DSSI ISE. The node name of each ISE must be unique across the system topology.

OCP

Operator control panel. An enclosure interface that allows remote control of DSSI node ID selection and ISE operating status.

PARAMS

A local program resident on the ISE. PARAMS is used to view and modify current device parameter settings on an ISE.

PATH

A channel from the host to a device.

RBN

Replacement block number. The last sector on each track of the host accessible area reserved for bad block replacement.

RCT

Replacement and caching table. Used to store pointers to replaced blocks in the RBN area.

RF72

A 1-gigabyte capacity DSSI disk ISE.

RLL

Run length limited. The format used in the DSSI ISE to record data.

SF72

A DSSI storage enclosure that houses either two or four RF72 ISEs.

SF200

DSSI storage array that houses up to six SF72 enclosures and up to two DSSI magazine tape subsystems.

SINGLE SYSTEM CONFIGURATION

Storage configuration where DSSI ISEs are connected to only one DSSI adapter and host system.

SPLIT-BUS

A mode of operation where the ISEs in the right side of an SF72 enclosure are connected to a different DSSI bus than those on the left side. In this mode, the DSSI buses are terminated by the TTM.

THROUGH-BUS

A mode of operation where all the ISEs in an SF72 enclosure are connected to the same DSSI bus. In this mode, the DSSI bus is terminated using an external terminator.

TMSCP

Tape Mass Storage Control Protocol. Application layer protocol that is used by the host to perform tape I/O operations and I/O control functions.

TTM

Transition termination module. A PC board that provides connection between the SF72 OCP and RF72 ISE, and also provides DSSI bus termination when in split-bus mode.

UNIT NUMBER

Also called the MSCP/TMSCP unit number. Default value is the ISE's DSSI node ID. A unique value can be selected using PARAMS.

VAXCLUSTER

See DSSI VAXcluster.

VAX DIAGNOSTIC SUPERVISOR

A diagnostic environment that allows access to DSSI tests and programs in VAX 6000 series systems.

VIRTUAL CIRCUIT

A logical point-to-point link between nodes.

XBN

External block number. The blocks located in the external block area contain the FCT. They are not visible to the host operating system.

XMI

Extended Memory Interconnect. The system bus for the VAX 6000 series systems.

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