
B400X

B400X Expander Installation

Order Number EK–400AA–MG–001

Digital Equipment Corporation
Maynard, Massachusetts

First Printing, December 1990

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation.

Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

The software, if any, described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license. No responsibility is assumed for the use or reliability of software or equipment that is not supplied by Digital Equipment Corporation or its affiliated companies.

Restricted Rights: Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013.

Printed in U.S.A.

The Reader's Comments form at the end of this document requests your critical evaluation to assist in preparing future documentation.

FCC NOTICE: The equipment described in this manual generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense may be required to take measures to correct the interference.

S1462

This document was prepared using VAX DOCUMENT, Version 1.2.

Contents

Examples

Figures

Tables

Preface

This manual provides installation information for the B400X Q-bus and mass storage expander on the BA400-series enclosure-based systems. The B400X mass storage expander holds up to four integrated storage elements (ISEs) and can expand the system Q-bus by up to 11 additional slots to provide mass storage expansion for any BA400-series enclosure-based system.

The manual provides information for installing both factory-configured expanders and add-ons.

The B400X expander supports both Digital Storage System Interconnect (DSSI) and Small Computer System Interconnect (SCSI) mass storage devices.

NOTE: *VAX 4000 systems do not support RZ-series ISEs.*

In this manual, the term *system* is used as an abbreviation for the full description of the system, which is a BA400-series enclosure-based system.

Intended Audience

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

Organization

This manual has two chapters and five appendixes:

- Chapter 1 provides a system overview.
- Chapter 2 provides step-by-step installation procedures.
- Appendix A explains the programming of the KFQSA.
- Appendix B explains how to program parameters for RF-series ISEs.
- Appendix C lists related documentation.
- Appendix D contains maintenance notes.
- Appendix E lists field replaceable units (FRUs).

Warnings, Cautions, and Notes

Warnings, cautions, and notes appear throughout this guide. They have the following meanings:

WARNING Provides information to prevent personal injury.

CAUTION Provides information to prevent damage to equipment or software.

NOTE Provides general information about the current topic.

The following symbols appear on the system power supply. Please review their definitions below.

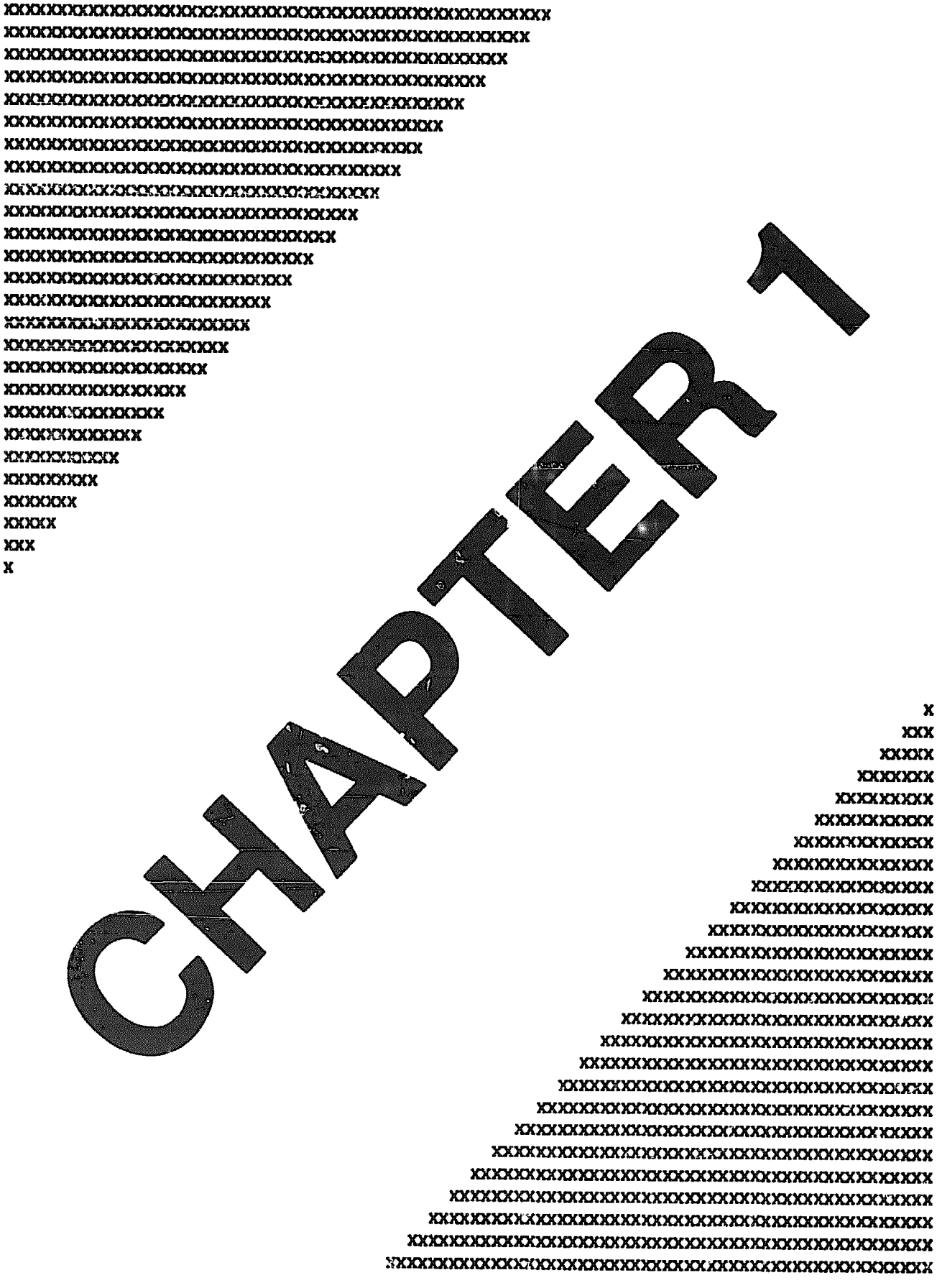
This warning symbol indicates risk of electrical shock.

Warning. To reduce the risk of injury, do not remove modules, Integrated Storage Elements (ISEs), or the power supply. No user-serviceable parts are inside. Refer servicing questions to your Digital Customer Services representative or to your qualified self-maintenance personnel.

This equipment has not been designed for connection to a power system (a power system without a directly grounded neutral conductor).

This equipment should be plugged into a properly grounded receptacle only.

This system contains an automatic voltage select power supply. Voltage selection is not required prior to installation.

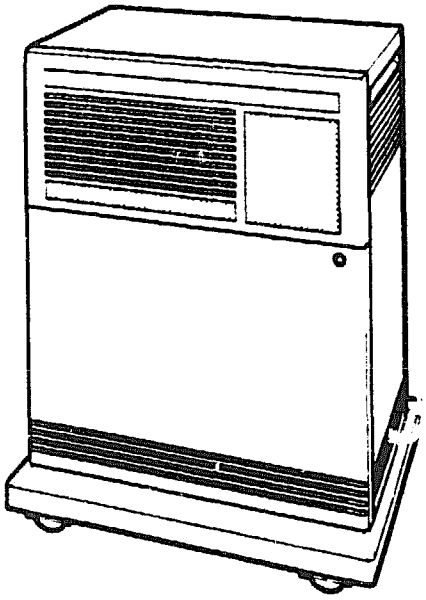

CHAPTER 1

Chapter 1
System Overview

1.1 Introduction

This chapter describes the B400X expander, which is a member of the BA400 series of enclosures. The B400X expander is shown in Figure 1–1.

Figure 1–1: B400X Expander



MLO-004032

The B400X expander allows you to expand the mass storage capacity of BA400-series enclosure-based systems by up to four RF/RZ-series integrated storage elements (ISEs) or by one tape drive (TK-series tape drive or TLZ04) and up to three ISEs.

NOTE: *VAX 4000 systems do not support RZ-series ISEs.*

The B400X can also expand the system Q-bus by up to 11 additional slots.

Installation procedures vary depending on whether the B400X is factory-configured or an addition to an existing system.

1.2 Factory-Configured Installations

If you are installing a factory-configured system with a B400X expander, install the system first, up to the point of attaching additional devices. See Section 2.2 to install the B400X expander.

1.3 Add-On Installations

This manual provides instructions for adding B400X expanders to existing systems. To install the B400X as an add-on unit, you will need to complete all sections of this manual.

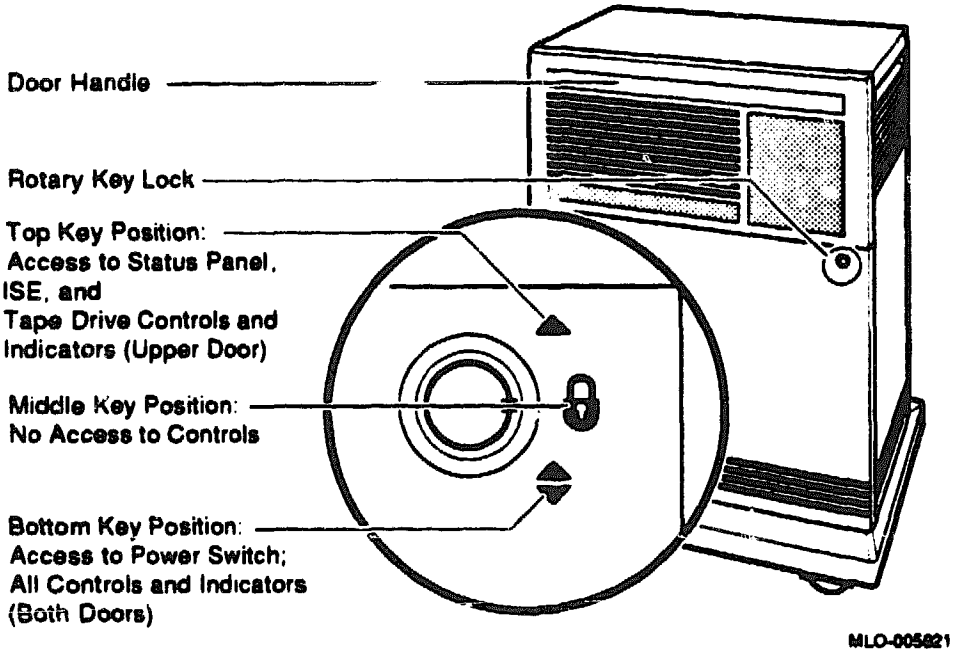
See Appendix A for instructions on programming the KFQSA module and Appendix B for instructions on setting ISE parameters.

1.4 Opening the Front Door

The front of the expander has a divided door that can be locked to prohibit or restrict access to ISE, tape drive, and expander controls. A three-position rotary lock allows you to lock both the upper and lower doors or to lock just the lower door. Opening the upper door allows you to access the storage device controls in the mass storage area and the status panel. Opening the entire door allows you to access all expander and storage device controls.

Figure 1–2 shows the three key positions and the controls accessible in each position.

Figure 1–2: Key Positions



Opening and Closing the Divided Door

Open and close the door as follows:

1. Insert the key in the lock on the front door. Turn the key to the top position to open just the upper portion of the door or to the bottom position to open the entire door.

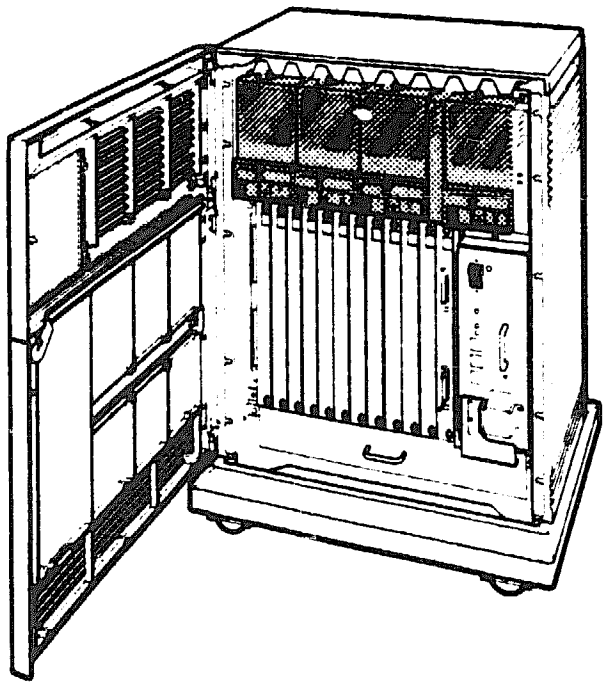
   With the key in the bottom position, the upper and lower portions of the door will open together.

2. Swing the door open.
3. To close the door, simply reverse the procedure. When pushing the doors closed, push gently at the top right of the upper door and bottom right of the lower door.

1.5 Mass Storage

The B400X expander provides room for up to four RF/RZ-series ISEs (see Figure 1–3) or one tape drive (TK-series or TLZ04) and up to three ISEs. Each RF/RZ-series ISE has its own built-in controller. A special hardware assembly is mounted to the ISE when it is installed in a BA400-series enclosure. This allows the ISE device to plug into the BA400-series backplane with no cables.

Figure 1–3: B400X Mass Storage Area



Each RF-series ISE has its own front panel with controls and indicators, and a DSSI bus node ID plug, (see Figure 1–4). Front panels for RZ-series ISEs have no controls or indicators, only a SCSI bus node ID plug (Figure 1–5).

NOTE: *All B400X expanders have panels for four ISEs. If the expander has less than four ISEs, the ISE cavity is covered by a blank panel with no controls or indicators. The front panels are required to meet international regulatory standards and to maintain proper airflow.*

Figure 1–4: RF-Series ISE Front Panel

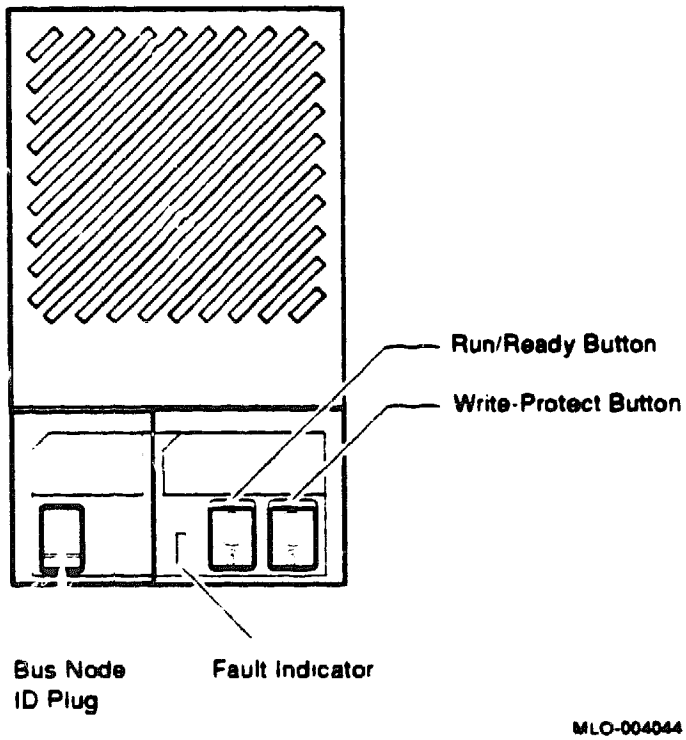
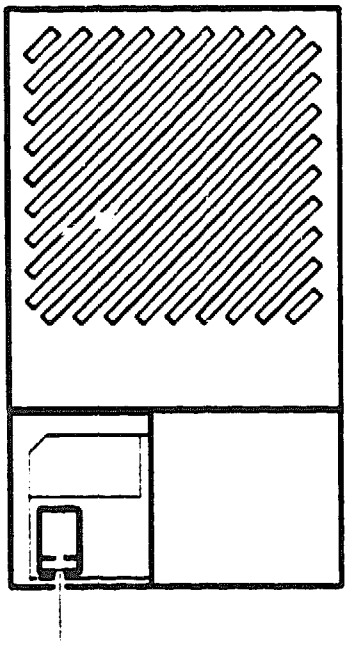


Table 1–1 describes the RF-series ISE front panel controls and indicators.

Table 1–1: RF-Series ISE: Controls and Indicators

OCP Description	Control or Indicator	Setting	Function
Bus Node ID	Bus Node ID plug	Installed	Identifies the bus node number of the ISE to the system as well as the unit number by default. ISEs are usually provided bus node numbers 0 through 6.
		Removed	DSSI address undefined. If drive is present, drive-faults LED lights.
Fault	Red LED	On	Indicates a faulty drive or an undefined DSSI address.
		Off	Drive functioning correctly and DSSI address defined (normal operating condition).
		Flashing (5 Hz)	Module-to-host calibrations being performed.
		Flashing (10 Hz)	Front panel failure or bus node ID plug is missing.
Ready/Run	Switch LED	In LED on	ISE is on line (normal operating condition). System can read from and write to the ISE. Under normal operation, the green LED flashes as seek operations are performed.
		Out LED off	ISE is off line. System cannot read from or write to the ISE.
Write Protect	Switch LED	Out LED off	System can read from and write to the ISE (normal operating condition).
		In LED on	System cannot write to the ISE but can read from the ISE.

Figure 1–5: RZ-Series ISE Front Panel



RZ-series ISEs have a SCSI bus node ID plug that identifies the bus node number of the ISE to the system. ISEs are usually provided bus node numbers 0 through 6.

1.6 Backplane

The backplane for the B400X expander consists of four layers: two signal layers, a power layer, and a ground layer. The etch for the DSSI bus, SCSI bus, and Q22-bus distributes power and signals to the ISE through high-density connectors on the backplane. Two power connectors allow the power supply to plug into the backplane. The backplane distributes a +5.1 V and +12.1 V to all the mass storage connectors.

1.7 Power Supply

The B400X expander uses the H7874 power supply.

1.7.1 General Description

The H7874 power supply has two mechanically floating connectors that plug directly into the backplane. All power supply control signals and dc power connections to the power supply are made through these connectors. The power supply contains autovoltage circuitry that senses input ranges and will automatically configure itself to operate over 100–120 Vac or 220–240 Vac. The power supply is a complete power unit that contains the IEC input connector and the EMI filter.

The power supply is capable of delivering approximately 650 watts of dc power split among +5.1, +12.1, -12.1, and +3.3 volts (the -12.1 and +3.3 volt outputs are not used in the B400X expander).

To prevent damage due to overheating, the power supply monitors the internal temperature of the enclosure and the speed of the fans. If the power supply detects overheating or a fan failure, the power supply will shut down the system.

If the enclosure's internal temperature approaches levels that may cause components to overheat, an Over Temperature Warning indicator on the status panel flashes and an alarm sounds (see Figure 1–8).

When the system shuts down due to overheating, the Over Temperature Condition indicator on the power supply remains lit. To recover from a shutdown, set the power switch to off (0) and wait 5 minutes before turning on the system.

To prevent an over temperature condition, use the following precautions:

- Make sure your system is away from heat sources.
- Check that the system's air vents are not blocked.
- Check that the room temperature is within acceptable limits as specified in the system *Site Preparation* manual contained in the customer hardware information binder.

NOTE: *A system manager may request that you override the power supply's temperature sensor so that the fans run at maximum speed. This action increases overall system reliability, as the expander's internal temperature will be lower. Before disabling the factory setting, be sure that the increased fan noise is not objectionable to the users. Refer to the BA430/BA440*

Enclosure Maintenance manual for instructions on overriding the power supply temperature sensor.

1.7.2 Shutdown Sequence

The power supply enters and completes a shutdown sequence whenever the BPOK H signal is negated. The following conditions negate BPOK H:

- Temperature sensor triggered
- An overcurrent condition on the supply dc voltage outputs
- An overvoltage condition on the supply dc voltage outputs
- Input voltage greater than 264 Vrms or less than 176 Vrms (240 Vac)
- Input voltage greater than 132 Vrms or less than 88 Vrms (120 Vac)
- Fan failure
- Loss of ac input

Figure 1–6 shows the controls and indicators on the power supply. Table 1–2 describes the functions of the power supply controls and indicators.

Figure 1–6: Power Supply Controls and Indicators

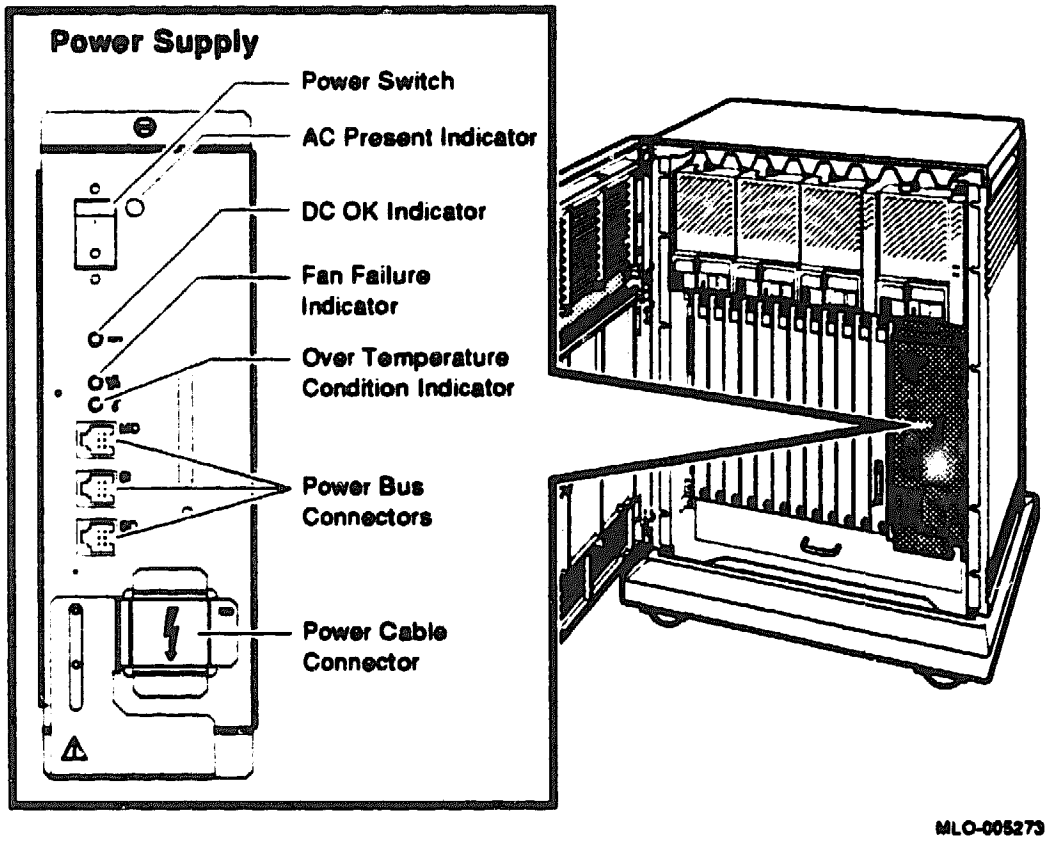


Table 1–2: Power Supply Controls and Indicators

Control/Indicator	Function
AC Present indicator (orange)	Lights when the power switch is set to on (1), and the ac voltage is present at the input of the power supply.
Power switch	The power switch is used to turn system power on and off. The off position is indicated by a 0; the on position is indicated by a 1. The power switch also functions as the expander circuit breaker. In the event of a power surge, the breaker will trip causing the power switch to return to the off position (0). Turning the system on resets the circuit breaker. If the circuit breaker trips, wait one minute before turning the expander back on.
DC OK indicator (green)	When the DC OK indicator is lit, the voltages are within the correct operating range. An unlit DC OK indicator shows a problem with the power supply.
Fan Failure indicator (amber)	The Fan Failure indicator lights if either of the two cooling fans stops working. The power supply will automatically shut down the system as a precautionary measure when a fan failure is detected.
Over Temperature Condition indicator (amber)	The Over Temperature lights if the expander has shut down due to an over temperature condition.
Power bus connectors	Three power bus connectors allow you to configure a power bus for systems expanded with the B400X expander. The power bus allows you to turn power on and off for the system and expander through one power supply designated as the main power supply: this way one power switch can control power for an expanded system. Figure 2–25 illustrates a possible power bus configuration.
MO (main out)	The main out connector of the system power supply sends the power control bus signal to the expander. One end of a power bus cable is connected here, the other end is connected to the SI (secondary in) connector of the expander power supply.

Table 1–2 (Cont.): Power Supply Controls and Indicators

Control/Indicator	Function
SI (secondary in)	The secondary in connector receives the power bus control signal from the system's power supply. In a power bus with more than one expander, the power bus signal is passed along using the secondary in and out connectors as shown in Figure 2–25.
SO (secondary out)	The secondary out connector sends the signal down the power bus for configurations of more than one expander. Figure 2–25 shows a power bus for an expanded system.

1.8 Fan Tray

The fan tray at the bottom of the enclosure houses two 15.0-cm (6-in) dc fans. The fans draw air through the top of the enclosure and exhaust the air through the bottom of the enclosure.

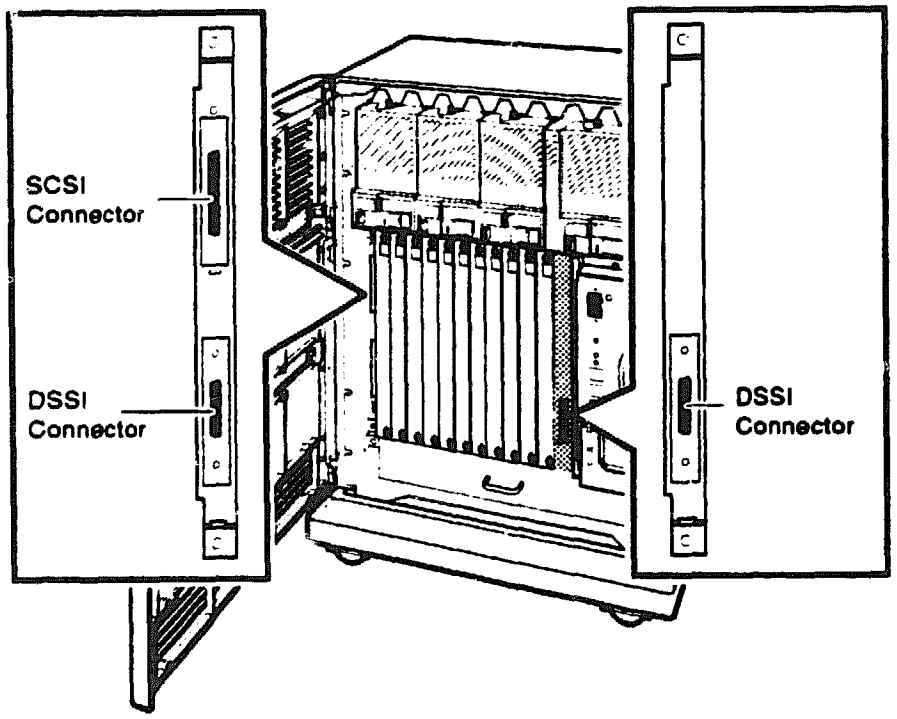
A temperature sensor located in the power supply adjusts the fan speed by varying the fan voltage based on the air temperature in the expander. Power for the fans is provided through a connector that plugs into the backplane at the rear of the fan tray. If either fan fails, the system shuts down and the fan failure indicator on the power supply remains lit.

1.9 DSSI and SCSI Connector Panels

Two panels, one on either side of the card cage, provide connectors for the DSSI and SCSI busses (Figure 1–7). Two DSSI connectors allow you to extend the system's DSSI bus to the expander: the expander can be part of a dual-host system or a system with multiple expanders. The single SCSI connector allows you to extend the system's SCSI bus (embedded SCSI controller or KZQSA storage adapter) to the expander.

NOTE: *The KZQSA storage adapter may reside in the B400X expander.*

Figure 1–7: DSSI and SCSI Connector Panels

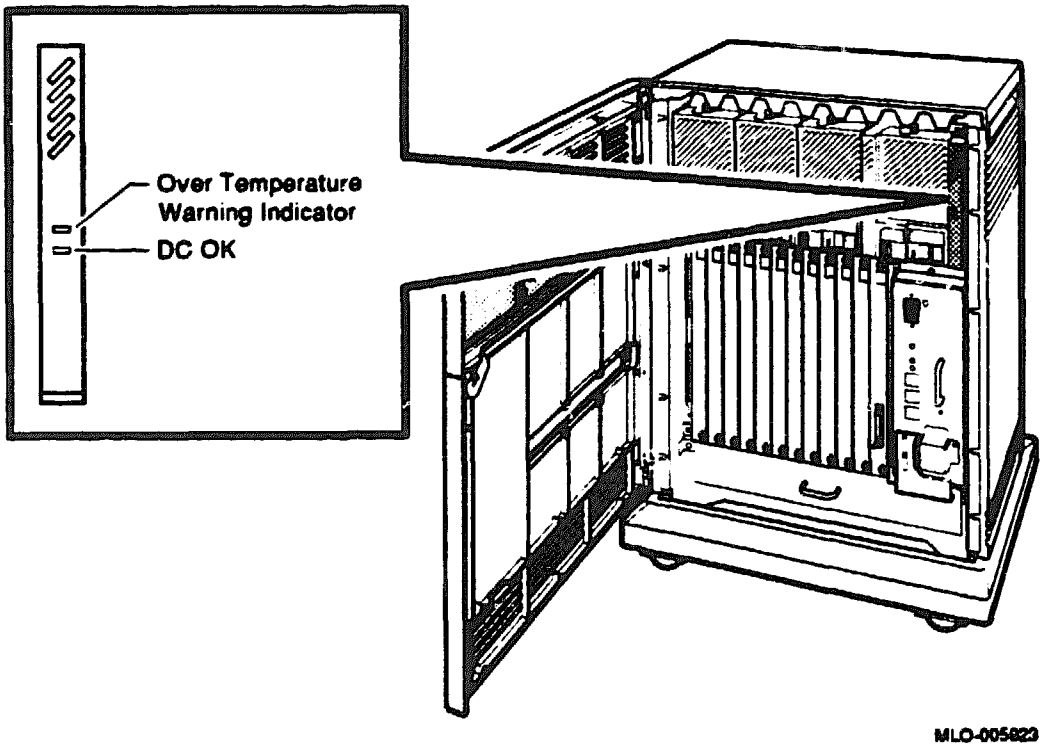


1.10 Status Panel

A status panel in the upper right corner of the enclosure provides two indicator lights (Figure 1–8). A red Over Temperature Warning indicator flashes to indicate that the expander's internal temperature is approaching a level that may cause components to overheat. In addition to the flashing Over Temperature Warning indicator, an audible alarm also provides warning of a possible over temperature condition. If the components continue to heat, the system will automatically shut down.

A green DC OK indicator shows that voltages are within the correct operating range.

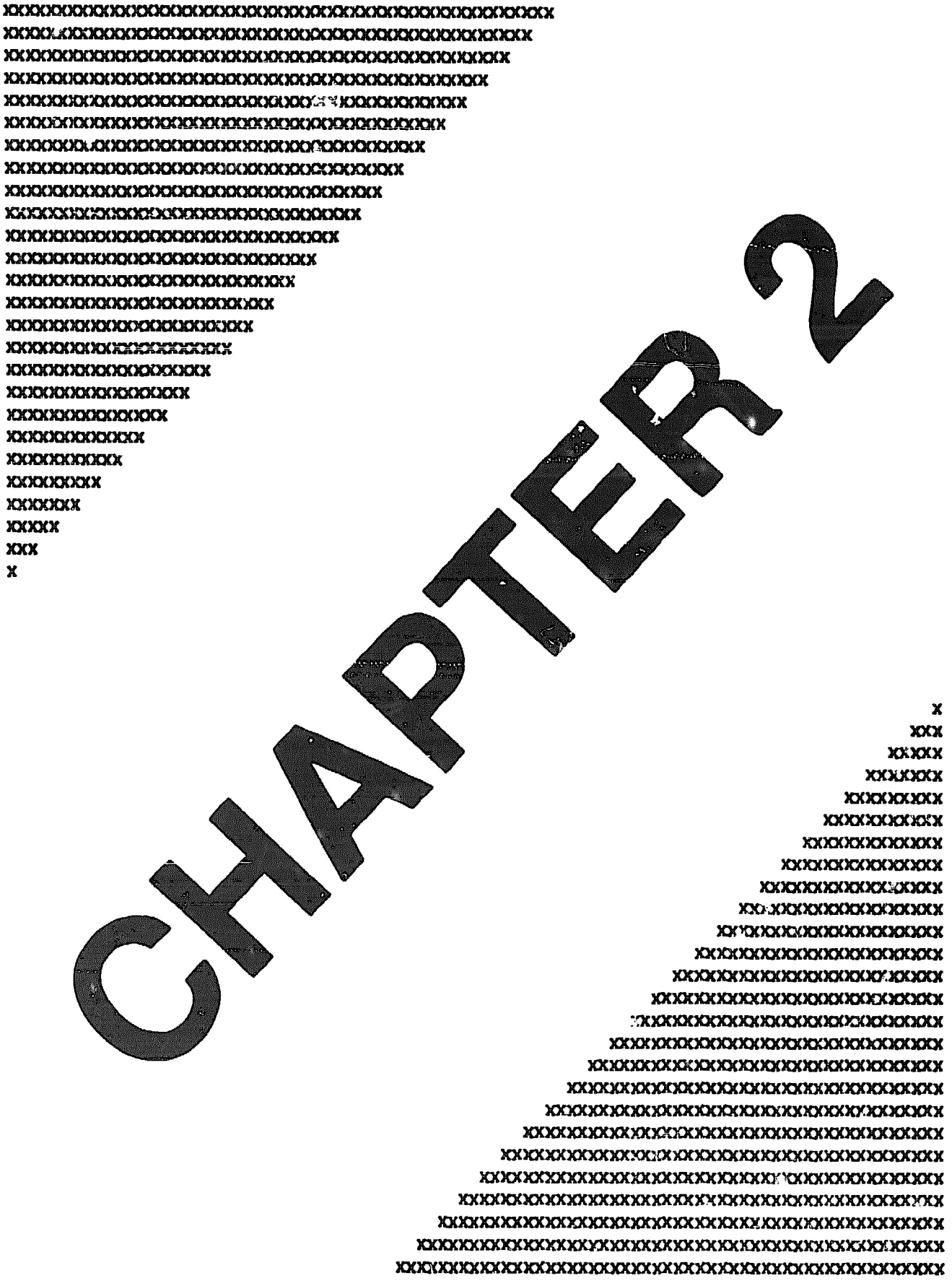
Figure 1–8: Status Panel



1.11 FCC and EOS Clips

Wherever you find bulkheads, covers, and ISE front panels on the B400X expander, you also find electrostatic (EOS) and/or FCC clips. The function of these clips is to suppress radio frequency output to meet various agency requirements.

CAUTION: *Be careful not to damage or deform the clips.*


CHAPTER 2

Chapter 2
Installation

2.1 Introduction

This chapter provides step-by-step instructions for installing a B400X expander, either as part of a factory-configured system, or as an add-on to an existing system.

2.2 Installing Factory-Configured Expanded Systems

If you are installing a factory-configured system, use the portions of this manual indicated below to perform the following steps. If you have an add-on expander, go to Section 2.3.

- Verifying site preparation (Section 2.3.2)
- Unpacking the shipment (Section 2.3.7 and Table 2–1)
- Positioning the system (Section 2.3.8)
- Installing the Q-bus cables (Section 2.7.3)
- Installing the DSSI cable (Section 2.8)
- Installing the SCSI cable (Section 2.9)
- Connecting power bus cables (Section 2.10)
- Connecting ground cables (Section 2.11)
- Connecting power cables (Section 2.12)
- Verifying system operation (Section 2.14)

2.3 Installing Expanders to Existing Systems

If you are installing this expander as an add-on to a previously installed system, complete all the instructions provided in this chapter.

2.3.1 Preparing the System for Expansion

Before you install a B400X add-on expander, you will need to perform the following preparation procedures:

- Verify that the site meets installation requirements.
- Back up the software (customer responsibility).
- Shut down the operating system (customer responsibility).
- Run the MicroVAX Diagnostic Monitor (MDM) on the existing host.
- Run the Configure utility to prepare for reprogramming any KFQSA storage adapter that may be present or (see Appendix A).

If the expanded system is part of a cluster, you must also check that the allocation class of the added ISEs matches the allocation class of the system (see Appendix B).

The following sections describe each of these procedures.

NOTE: *It is the customer's responsibility to perform a software backup. Make sure the customer has performed a software backup before you begin the installation procedures.*

2.3.2 Verifying Site Preparation

The *System Site Preparation Guide* includes a section on site preparation requirements. Such requirements include the physical, environmental, and electrical requirements to operate expanders, such as the B400X expander, which uses the BA430 enclosure.

Environmental and Power Requirements

The environmental and power requirements specified for the B400X expander are identical to those required for the BA400-series system enclosure. In addition, the B400X expander requires connecting a ground cable (see Section 2.11).

2.3.3 Backing Up the Software

Software backup is the customer's responsibility. Be sure the customer has backed up the software before you begin installation.

2.3.4 Shutting Down the Operating System

It is the customer's responsibility to shut down the operating system software.

Make sure the customer shuts down the operating system software before you continue. Have the customer leave the system power on.

2.3.5 Testing the Existing System

For add-on installations, before expanding the system, run the MicroVAX Diagnostic Monitor (MDM) and ROM-based diagnostics.

2.3.6 Running the Configure Utility to Configure Added Devices

When you add or relocate modules on the backplane, you must reconfigure the modules you relocate, and configure the new modules you are adding. The Configure Utility determines the new CSR addresses and interrupt vectors for the modules. Appendix A provides an example on running the configure utility, as well as instructions on programming the KFQSA storage adapter.

For KFQSA-based DSSI, if the total number of ISEs in the expanded system is greater than that in the original system, you must reprogram the KFQSA module.

IMPORTANT: *If any modules in the Q-bus floating address space are to be added to the expanded backplane, you may need to reprogram the KFQSA module. Refer to Appendix A now to configure the KFQSA before you unpack the B400X expander.*

2.3.7 Unpacking the B400X Shipment

WARNING: *The system weighs between 50 kg (110 lb) and 68 kg (150 lb), depending on the options installed. Use two or more people to maneuver the system.*

NOTE: *Save all packing materials if you plan to reship the system.*

When delivered, the B400X expander is packed in a cardboard container attached to a shipping skid or pallet. Depending on the customer's order, the shipment may also include additional terminals, printers, modems, module options, and RF-series ISEs. To unpack the shipment, follow the steps below.

1. Before unpacking the equipment, check for external shipping damage. Report any damage to the customer's sales representative and contact the customer's delivery agent. Keep all packing material and receipts when filing a damage claim.

2. Unpack the B400X expander according to the instructions on the carton. Check the contents against the shipping list to ensure that you have received everything you ordered. Figure 2–1 shows the contents of the shipping carton for an add-on system. The contents of the carton vary depending on the customer's order; that is, depending on what modules and integrated storage elements the customer orders. Table 2–1 and Table 2–2 list the contents for factory-configured and add-on systems.

3. Check the contents of the remaining cartons against the shipping list to make sure the order is complete.

Figure 2–1: Shipping Carton Contents (Add-On Expander)

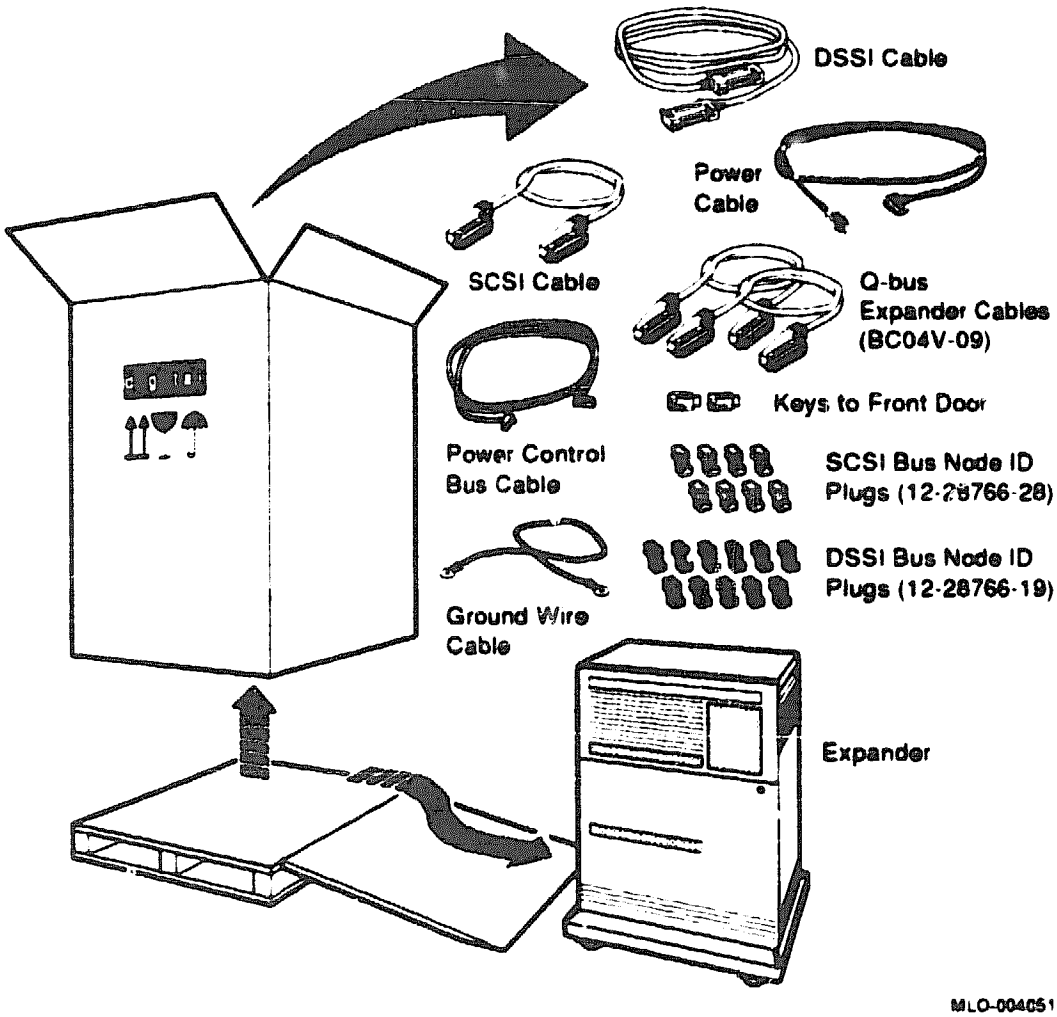


Table 2–1: Factory-Configured B400X Shipment Contents

Description	Quantity	Part No.
Q-bus expander cables	2	BC04V–09
External DSSI cable	1	BC21M–09
Power cables	1 (120 Vac)	17–00083–43
		BNxx–xx[1] (country-specific)
DSSI ID plugs	11	12–28766–19
SCSI ID plugs	11	12–28766–28
Ground cable	1	12–13756–A8
Power bus cable	1	17–02638–01 (BC09F–10)
External SCSI cable	1	BCO6P–06
Installation checklist	1	EK–V4000–IN
Postal card	1	36–30422–52 (Europe only)

Table 2–2: Add-On B400X Shipment Contents

Description	Quantity	Part No.
Q-bus expander kit	1	BA21X–SF
Q-bus expander cables	2	BC04V–09
Expansion module	1	M9404–PA
Expansion module	1	M9405–PA
Filler kit	1	70–24505–01
External DSSI cable	1	BC21M–09
Power cables	1 (120 Vac)	17–00083–43
Power cables	1	BNxx–xx[1]
Bus grant continuity cards[2]	3	M9047–SA
Load module[3]	1	M9060–YA
External SCSI cable	1	BCO6P–06
DSSI plugs	11	12–28766–19
SCSI plugs	11	12–28766–28
Ground cable	1	12–13756–A8
Power bus cable	1	17–02638–01
Installation checklist	1	EK–V4000–IN
Postal card	1	36–30422–52 (Europe only)

[1]Orderable country-specific power cable

[2]The B400X expander enclosure is shipped with grant cards occupying Q-bus slots 2, 3, and 4.

[3]The B400X expander enclosure is shipped with a load module occupying Q-bus slot 12.

2.3.8 Positioning the System

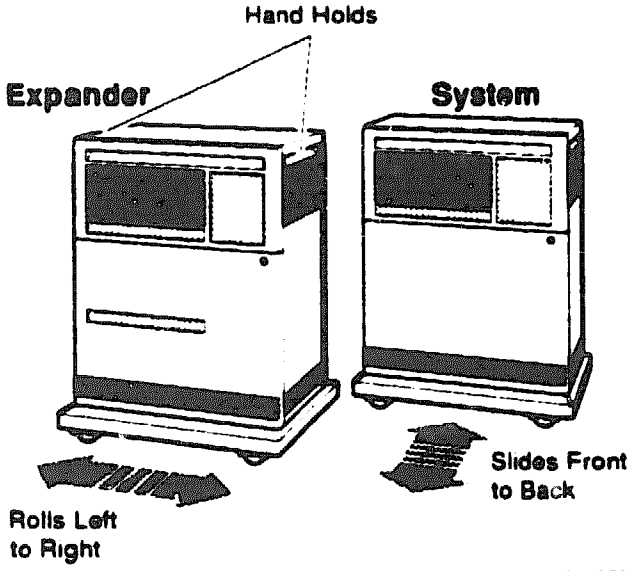
After unpacking your system, you can move it into position at 90-degree angles—sideways or backward and forward—as shown in Figure 2–2.

Position the B400X expander to the left of the system.

During installation, leave a few inches of space behind the system for routing cables beneath the system enclosure. Once installation is complete, you can place the base directly against a wall. No rear ventilation is required.

Figure 2–2 shows how to slide the system into place.

Figure 2–2: Moving the Expander into Place



2.3.9 Modifying the System for Expansion

The installation instructions that follow assume that the site meets all the installation requirements listed in the *System Site Preparation Guide*. The instructions also assume all terminal data lines, telephone lines, and network lines that you plan to connect to your system are in place and clearly labeled.

NOTE: *This section is applicable for add-on expanders only. When a system and its companion B400X expander are ordered together, the modifications*

described in this section are made at the factory. If you are installing a factory-configured system, see Section 2.2.

To expand systems that are already installed in the field, you must make several modifications to the system. To modify the system for expansion, you must do the following:

- Remove four single in-line package resistors (SIPs) from the backplane of the host system.
- Install Q-bus expansion module M9404–PA in the system.

The next sections describe these modifications to the system.

2.3.10 Preparing to Remove the Backplane Termination SIPs from the System

To remove the four termination resistor SIPs from the backplane, you must remove the outside handles from the last four Q-bus slots. Follow the procedures below to complete the necessary modifications to the backplane of the system.

2.3.11 Removing Modules from Slots 9, 10, 11, and 12 in the System

Remove the modules and module covers from the last four Q-bus slots. This step ensures easy access to the backplane termination SIPs.

NOTE: *Make sure you are wearing a grounded antistatic wrist strap when you remove or install modules. Place modules only on a grounded antistatic mat. The groundstrap and antistatic mat are found in the Antistatic Kit (29–26246). The Antistatic Kit is part of the Customer Services tool kit, not the option kit.*

Use the following procedures to remove modules with blank covers or modules with handles from slots 9 through 12.

Removing Modules with Blank Covers

1. Release the two quarter-turn captive screws that hold the blank cover to the card cage.
2. Pull the blank cover away from the card cage.
3. If a module is present, note the orientation of any internal cables connected to the module. Some connectors are not keyed. Carefully label and disconnect the internal cables.

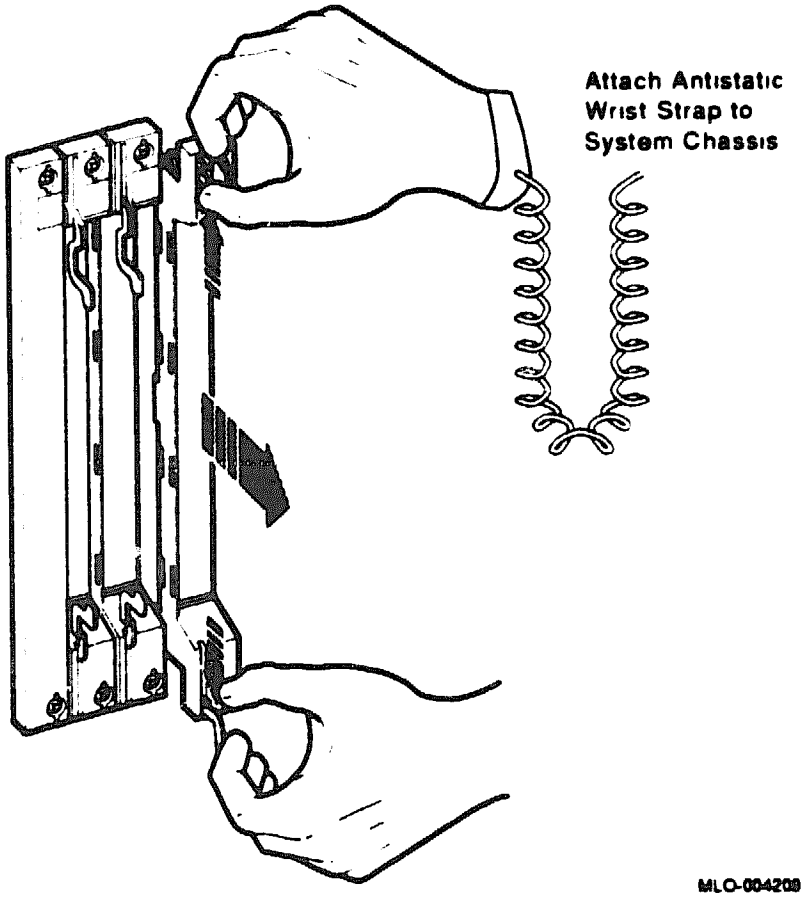
4. Unlock the module's release levers by simultaneously pulling up on the top lever and pulling down on the bottom lever (Figure 2–3). If the module has a plastic handle, pull out on the plastic handle.
5. Carefully pull the module out of the card cage. Be careful not to disturb any switchpacks on the module.
6. Set the module on a grounded antistatic mat.

Removing Modules with Handles

Use the following procedure to remove a module with handles:

1. Note the orientation of external cables connected to the module. Carefully label and then disconnect the cables.
2. Release the two quarter-turn captive screws that hold the cover to the card cage.
3. Unlock the module's release levers by simultaneously pulling up on the top lever and pulling down on the bottom lever (Figure 2–3).
4. Pull out on the module's handle and remove the module from the card cage. Be careful not to disturb any switchpacks on the module.
5. Set the module on a grounded antistatic mat.

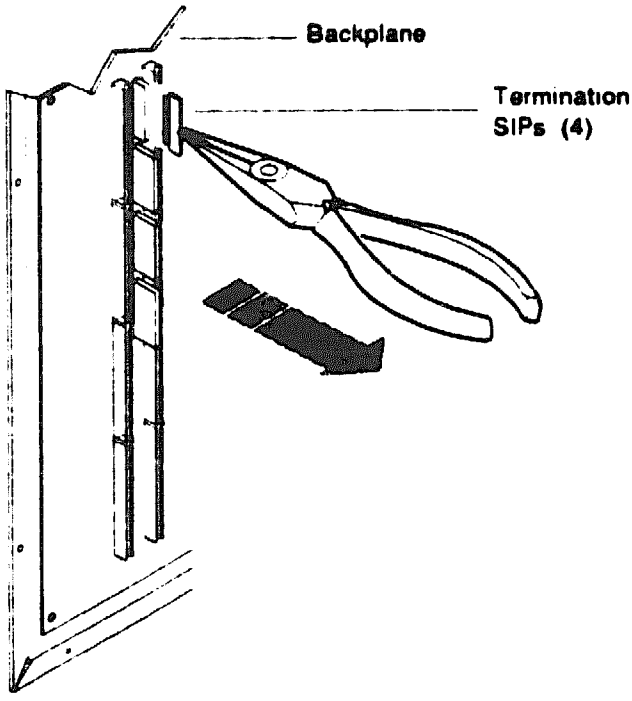
Figure 2–3: Removing Modules with Handles



2.3 12 Removing the Termination Resistor SIPs from the Backplane

Use needlenose pliers to carefully pull the four termination resistor SIPs out of their backplane sockets (Figure 2–4). When all four SIPs have been removed, discard them.

Figure 2–4: Removing Backplane Termination SIPs (System Only)



MLO-005276

2.3.13 Installing the Q-Bus Expansion Module in the System

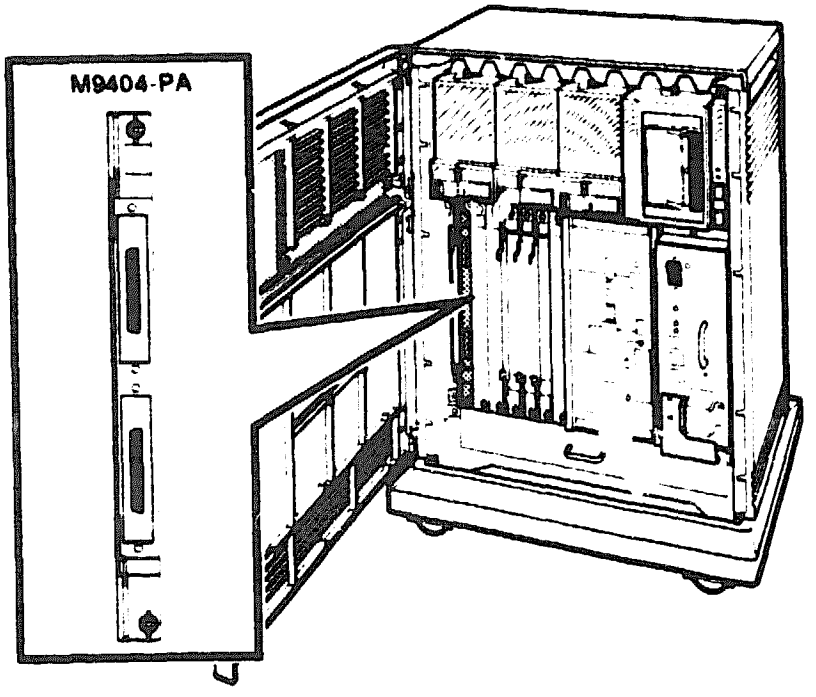
Install the Q-bus expansion module M9404–PA in slot 12 (last slot) of the system. See Figure 2–5.

NOTE: *Be careful not to snag the module's components on the card guides or adjacent modules.*

1. Insert the Q-bus expansion module M9404–PA into slot 12 of the system.
2. Grasp the module's top and bottom release levers. Lock the module in place by simultaneously pushing the top lever down and pulling the bottom lever up.
3. It is not recommended that you fasten the quarter-turn captive screws that hold the module at this time.

Figure 2–5 shows the correct placement of the Q-bus expansion modules.

Figure 2–5: Placement of Q-Bus Modules



2.4 Modifying the Expander Before Cabling to the System

This section shows you how to modify the expander before cabling to the system. The section is organized as follows:

- Installing Storage Devices
- Making external DSSI connections

2.4.1 Installing Storage Devices

In an add-on system, the integrated storage elements (ISEs) and TK-series or TLZ04 tape drive are shipped with the expander, but are not yet installed. See the *Storage Device(s) Add-On Procedure (BA400 Series) Installation Guide* included with the device for installation.

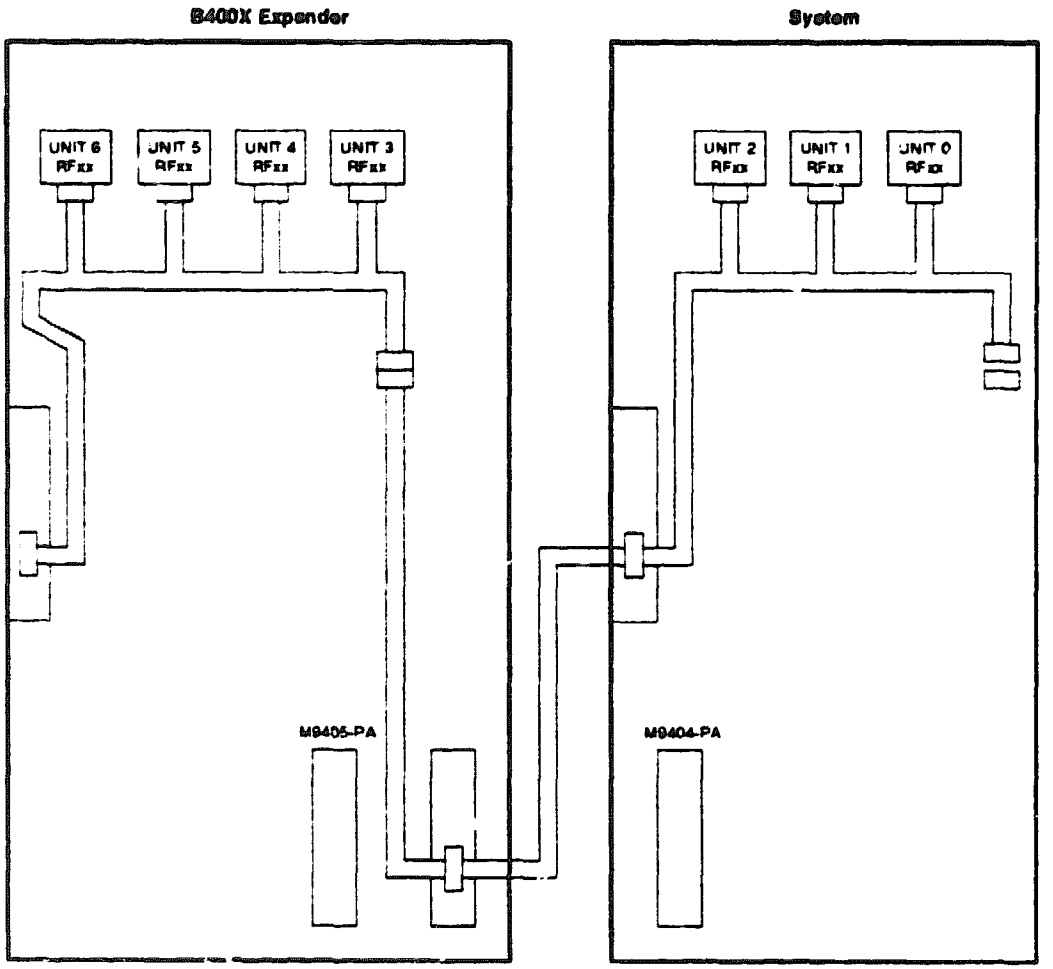
The B400X expander has room for up to four RF/RZ-series ISEs or up to three ISEs and one tape drive (TK-series or TLZ04).

NOTE: *VAX 4000 systems do not support RZ-series ISEs.*

2.4.1.1 Configuring Bus Node ID Plugs

Figure 2–6 shows the mass storage potential for an expanded system, including the recommended numbering scheme for the bus nodes in a system expanded to six ISEs.

Figure 2–6: Recommended Bus Node Identities



Spare bus node ID plugs are supplied with your expander. The DSSI plugs for RF-series ISEs are dark gray (PN 12–28766–19). The SCSI plugs for RZ-series ISEs and the TLZ04 tape drive are lighter gray (PN 12–28766–28).

Bus node ID plugs have prongs on the back that identify the bus node number (and by default, the unit number) of the ISEs to the system. Bus node ID plugs are shipped with the system and expander.

To insert a bus node ID plug, align the two center prongs with the two center slots on the ISE front panel as shown in Figure 2–7. To remove a bus node ID plug, grasp it firmly and pull it straight out.

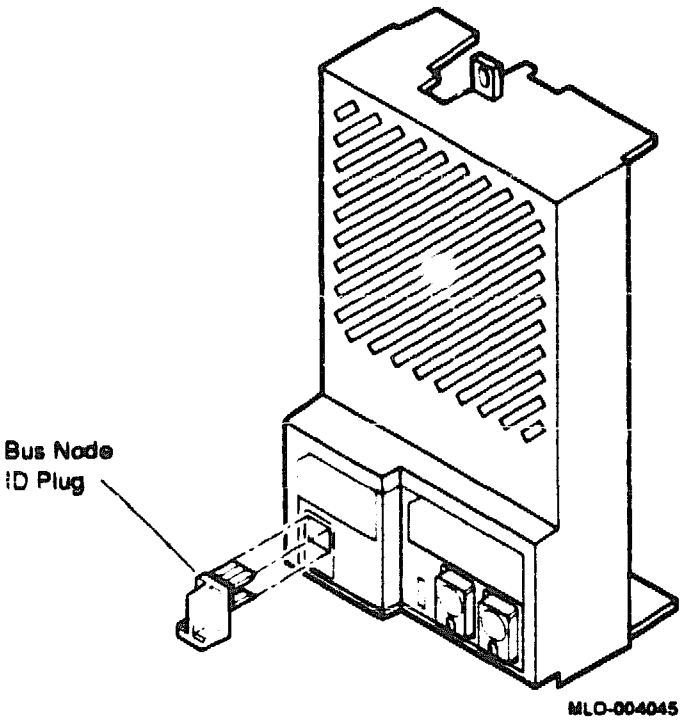
Use the rules below for numbering bus node IDs for ISEs:

- For each DSSI or SCSI bus, do not duplicate bus node numbers for storage elements. You can have only one storage element on bus 0 identified as bus node 0, one storage element as bus node 1, and so on; you can have only one storage element on bus 1 identified as bus node 0, one storage element as bus node 1, and so on.
- By convention, the ISEs are numbered in increasing order from right to left starting with 0.

Bus nodes 0–6 are typically used for storage devices, while node 7 is reserved for the adapter and is the default bus node ID for the KZQSA and KFQSA adapters.

NOTE: *DSSI bus node ID plugs are also used to supply node numbers for the two DSSI host adapters on VAX 4000 Model 300 systems.*

Figure 2–7: Inserting Bus Node ID Plugs



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

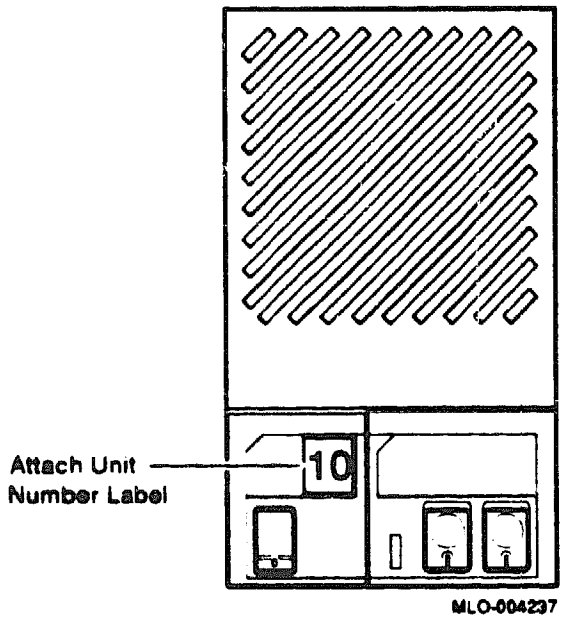
2.4.1.2 Labeling RF-Series ISEs for Systems with Multiple DSSI Busses

VAX 4000 Model 300 systems have two separate DSSI adapters built into the CPU. Other systems may have more than one DSSI bus using the KFQSA storage adapter. Using expanders you can fill up to four DSSI busses for a total of 28 RF-series ISEs. Each bus can have up to seven ISEs (bus nodes 0–6). When there are devices on more than one bus and the system's allocation class is not zero, you need to program new unit numbers for ISEs, as the unit numbers for ISEs throughout the system must be unique. Instructions provided in Appendix B describe procedures for programming new unit numbers and overriding default values.

With devices on two or more busses and a nonzero system allocation class, the ISE unit numbers will not match the bus node numbers on the bus node ID plugs. Unit number labels are provided with each ISE to identify

unit numbers for the user. The labels stick onto the recessed label area on the ISE front panel as shown in Figure 2–8.

Figure 2–8: Attaching a Unit Number Label to the ISE Front Panel



2.5 Configuring Modules on the Expanded Q-Bus Backplane

This section describes the guidelines for configuring modules on a Q-bus backplane expanded with a B400X expander.

Before you change the system configuration, you must consider module order, power supply capacity, and module configuration.

2.5.1 Factors That Determine Module Order

While certain modules are restricted to specific slots on the backplane, the order of modules on the backplane generally depends on the following four factors:

- Relative use of devices in the system
- Expected performance of each device relative to other devices

- Ability of a device to tolerate delays between bus requests and bus grants (delay tolerance)
- Tendency of a device to prevent other devices farther from the CPU from accessing the bus

2.5.2 Required Module Order

Table 2–3 and Table 2–4 list those modules that require specific placement on the Q-bus backplane of the BA430 and BA440 enclosures.

Table 2–3: Required Module Placement on the BA430 Enclosure

Module	Q-Bus Slot
System	
M9715–AA	0 of system
CPU module	1 of system
Memory module	2, 3, 4, and 5 of system (or fewer, depending upon memory)
M9404–PA	12 of system
B400X Expander	
M9715–AA	0 of expander
M9405–PA	1 of B400X expander
KFQSA	Last module in the expanded Q-bus. (May occupy any slot in the expander from 2 through 12, provided it is the last module on the bus.)

Table 2–4: Required Module Placement on the BA440 Enclosure

Module	Q-Bus Slot
System	
CPU module	5 of system
Memory module	1, 2, 3, and 4 of system (or fewer depending on memory)
M9404–PA	12 of system
B400X Expander	
M9715–AA	0 of expander
M9405–PA	1 of B400X expander
KFQSA	Last module in the expanded Q-bus. (May occupy any slot in the expander from 2 through 12, provided it is the last module on the bus.)

2.5.3 Recommended Relative Module Order

The recommended relative order of modules on the Q-bus backplane is:

AAV11–SA
ADV11–SA
AXV11–SA
KWV11–SA
DRV1J–SA
KMV1A–SA/SB/SC
DMV11–SA
LNV21–SF
DELQA/DESQA–SA
DPV11–SA
DIV11–SA
DIV32–SA
VCB02–J/H/K
DZQ11–SA
DFA01–AA
CXM04–M
CXA16–AA
CXY08–AA
CXB16–AA
CXF32–AA/AB
LPV11–SA
DRV1W–SA
KRQ50–SA
IEQ11–SA
ADQ32–SA
DRQ3B–SA
DSV11–SA
KLESI–SA
IBQ01–SA
TSV05–SA
KDA50–SE
KFQSA–SE
KZQSA–SA
TQK50–SA
TQK70–SA
M9060–YA

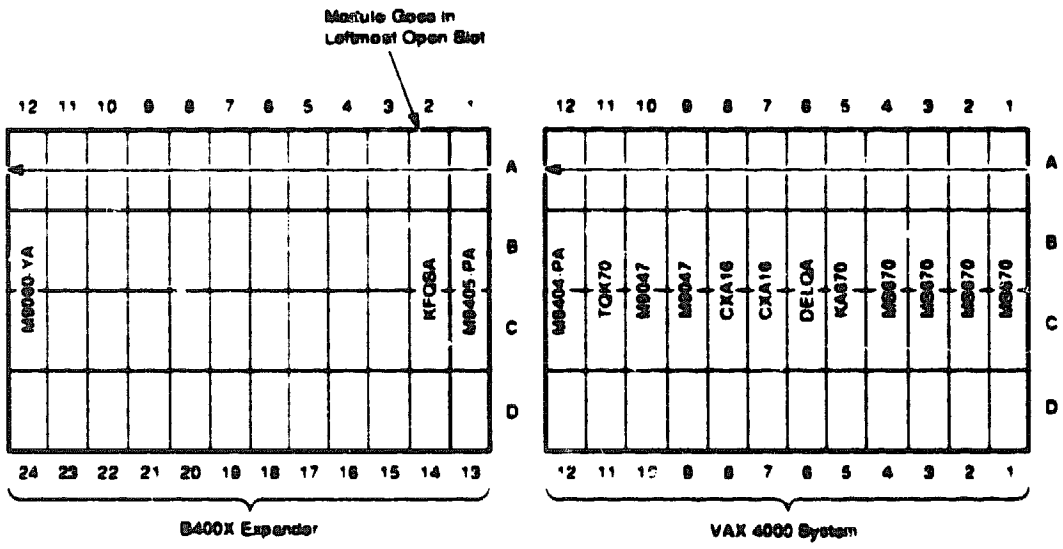
Using Bus Grant Continuity Cards

Bus grant signals pass through each installed module, using the A connectors of each slot. Figure 2–9 shows the path of the bus grant signals for a sample configuration. To ensure the continuity of this path, use bus

grant continuity cards (M9047–SA) in any empty slots in the expanded backplane to the right of the KFQSA module.

NOTE: ***For add-ons only**: The B400X expander is shipped from the factory with three bus grant continuity cards. The cards occupy Q-bus slots 2, 3, and 4. Use the cards in the system as needed to fill the slots up to the Q-bus expansion module (M9404–PA), which is located in slot 12 of the system.*

Figure 2–9: Bus Grant Continuity Path and Sample Configuration



Calculating Expander Power Supply Loads

Each B400X enclosure contains a 650 watt power supply. To stay turned on, the power supply in the enclosure must have a 5 A minimum load on the 5 V output. If the power supply load does not meet the minimum load requirement, you must install an M9060–YA load module in one of the open backplane slots powered by the power supply. Otherwise, the power supply enters an error mode and shuts down the system. If the load on the power supply (+5 V) meets the minimum load requirement and a load module is installed, you should remove the existing load module. See Section 2.6 for procedures on installing or removing modules.

NOTE: ***For add-ons, check the appropriate system and expander worksheets (Figures 2–10 through 2–12) to determine if the expander requires the M9060–YA load module. Remember to factor in storage devices.***

- *If the combined load from slots 2 through 12 is 5 A or greater, then the M9060-YA load module is not required.*
- *If the combined load from slots 2 through 12 is less than 5 A, then install the M9060-YA load module in slot 12 of the expander.*

2.5.4 Checking System Configuration Worksheets

This section provides configuration worksheets for expanded systems (see Figures 2–10 through Figure 2–12). Use the worksheets to make sure the configuration does not exceed the system's limits for power and bus loads.

Table 2–5 lists power and bus load information for supported devices. Follow the steps below to complete the worksheets and check the system configuration.

1. List all the devices to be installed in the system on the appropriate worksheet.
2. Fill in the information from Table 2–5 for each device.
3. Add up the columns. Make sure the totals are within the limits specified. Check that the power supply has a 5-A minimum load.

Table 2–5: Power and Bus Load Data

		Current (Amps) (Max)		Power (Max)	Bus Loads	
Option	Module	+5 V	+12 V	Watts	AC	DC
AAV11-SA	A1009-PA	2.10	0.00	10.50	2.5	0.5
ADV11-SA	A1008-PA	2.00	0.00	10.00	2.3	0.5
ADQ32-SA	A030	4.45	0.00	22.25	2.5	0.5
AXV11-SA	A026-PA	2.00	0.00	10.00	1.2	0.3
CXA16-M	M3118-YA	1.60	0.20	10.40	3.0	0.5
CXB16-M	M3118-YB	2.00	0.00	10.00	3.0	0.5
CXY08-M	M3119-YA	1.64	0.395	12.94	3.0	0.5
DESQA-SA	M3127-PA	2.40	0.22	14.64	2.2	0.5
DFA01-AA	M3121-PA	1.97	0.04	10.30	3.0	1.0
DPV11-SA	M8020-PA	1.20	0.30	9.60	1.0	1.0
DRQ3B-SA	M7658-PA	4.50	0.00	22.50	2.0	0.5
DRV1J-SA	M8049-PA	1.80	0.00	9.00	2.0	1.0
DSV11	M3108	5.43	0.69	35.43	3.9	1.0
DRV1W-SA	M7651-PA	1.80	0.00	9.00	2.0	1.0
DTQNA-BC	M7130	6.00	2.00	54.00	3.9	0.5

Table 2–5 (Cont.): Power and Bus Load Data

Option	Module	Current (Amps) (Max) +5 V	Current (Amps) (Max) +12 V	Power (Max) Watts	Bus Loads AC	Bus Loads DC
H3604[1]	–	1.70	0.50	14.50	–	–
IBQ01–SA	M3125–PA	5.00	0.30	28.60	4.6	1.0
IEQ11–SA	M8634–PA	3.50	0.00	17.50	2.0	1.0
KA670–A/B[2]	L4000–A/B	7.40	0.35	41.20	4.0	1.0
KA660–A/B[3]	M7626–A/B	7.40	0.35	42.60	4.0	1.0
KDA50–SE	M7164	6.93	0.00	34.65	3.0	0.5
–	M7165	6.57	0.03	33.21	–	–
KFQSA–SE	M7769	5.50	0.00	27.50	4.4	0.5
KLESI–SA	M7740–PA	4.00	0.00	20.00	0.5	1.0
KMV1A–SA	M7500–PA	2.60	0.20	15.40	3.0	1.0
KN220–SA	M7637–AA	7.8	0.14	39	0.0	0.0
KN220–SA	M7638–AA	6.2	0.23	31	3.5	1.0
KRQ50–SA	M7552	2.70	0.00	13.50	2.7	1.0
KWV11–SA	M4002–PA	2.20	0.013	11.15	1.0	0.3
KZQSA–SA	M5976–SA	5.4	0.0	27	4.75	1.4
LPV11–SA	M8086–PA	2.80	0.00	14.00	1.8	0.5
MRV11–D	M8578	1.60[3]	0.00	8.00	3.0	0.5
MS670–BA	L4001–BA	3.25	0.00	16.25	–	–
MS650–BA	M7621	1.1	0.0	5.5	0.0	0.0
MS650–BB	M7621	3.9	0.0	19.53	0.0	0.0
RF31E–AA	–	1.25	2.21	27.4	–	–
RF71E–AA	–	1.25	1.64	25.93	–	–
RF72E–AA	–	TBS	TBS	TBS	–	–
TK70E–AA	–	1.25	1.64	25.93	–	–
TLZ04–JA	–	2.20	0.35	15.2	–	–
TQK70–SA	M7559	3.50	0.00	17.50	4.3	0.5
TSV05–SA	M7530	6.50	0.00	32.50	1.5	1.0
TSV05–SA	M7206	6.50	0.00	32.50	2.4	1.0

[1]Also include –12 Vdc @ 0.25 A, 3 W.

[2]Also include 3.3 Vdc @ 0.27 A, 0.9 W and –12 Vdc @ 0.04 A, 0.5 W.

[3]Value is for the unpopulated module only.

Figure 2–10: Expanded System Configuration Worksheet for the BA430 Enclosure: VAX 4000 Model 200 or DECsystem 5500

Slot	Module	Current (Amps) +5 Vdc	+12 Vdc	-3.3 Vdc	-12 Vdc	Power (Watts)	Bus Load AC	DC
0	M9715	0 1	1 0	0 0	0 0	12 5	—	—
CPU 1								
Q-bus 2								
Q-bus 3								
Q-bus 4								
Q-bus 5								
Q-bus 6								
Q-bus 7								
Q-bus 8								
Q-bus 9								
Q-bus 10							—	—
Q-bus 11								
Q-bus 12	M9404-PA	—	—		—	—	—	—
Mass Storage:								
0 Tape/RF/RZ							—	—
1 RF/RZ								
2 RF/RZ								
3 RF/RZ								
Total these columns								
Must not exceed		60 0 A	22 0 A	15.0 A	3.0 A	584 0 W	22	—

Note Total output power from +3 3 Vdc and +5 Vdc must not exceed 330 W

MLO-005925

Figure 2–11: Expanded System Configuration Worksheet for the BA440 Enclosure: VAX 4000 Model 300

Slot	Module	Current (Amps) +5 Vdc	+12 Vdc	-2.1 Vdc	-12 Vdc	Power (Watts)	Bus Load AC	DC
1								
2								
3								
4	MS670-BA	3.25	0.00	0.0	0.0	16.25	—	—
5	KA670	7.4	0.35	0.0	0.0	41.20	4.0	1.0
Q-bus 6								
Q-bus 7								
Q-bus 8								
Q-bus 9								
Q-bus 10								
Q-bus 11								
Q-bus 12	M9404-PA	—	—		—	—	—	—
	H3604	1.70	0.50	0.0	0.0	14.50	—	—
Mass Storage:								
0	Tape/RF						—	—
1	RF							
2	RF							
3	RF							
Total these columns								
Must not exceed		60.0 A	18.0 A	15.0 A	3.0 A	594.0 W	22	—

MLO-005926

Figure 2–12: Expanded System Configuration Worksheet for the B400X Expander

Slot	Module	Current (Amps) +5 Vdc	+12 Vdc	-3.3 Vdc	-12 Vdc	Power (Watts)	Bus Load AC	DC
0	M9715	0.1	1.0	0.0	0.0	12.5	—	—
1	M9405	—	—	—	—	—	—	—
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12	M9060-YA	—	—	—	—	—	—	—
Mass Storage:								
0	Tape/RF/RZ							
1	RF/RZ							
2	RF/RZ							
3	RF/RZ							
Total these columns								
Must not exceed		60.0 A	18.0 A		3.0 A	584.0 W	22	—

Total limit System plus Expander						1168	44	20

MLO-005876

2.6 Relocating Modules

Refer to Section 2.5.1 to determine where to relocate modules in both the system and B400X expander. Be sure to leave slot 12 of the system and slot 1 of the expander available for the Q-bus expander modules. The KFQSA module is to be relocated from the system to the first open slot at the end of the Q-bus in the expander.

2.7 Installing New Modules

Install new modules according to the documentation shipped with the module. See Section 2.5.1 to determine in which positions to install modules in both the system and B400X expander.

2.7.1 Module Identity Labels and External Cables

Each module cover has a label at the top that contains the option number and module number. Table 2–6 lists the labels for those modules that require connections.

Table 2–6: Module Identity Labels

Module Number	Option Number	Cable
M7516	DELQA	Ethernet cable
M3118–YA	CXA16	BC16D, H3104 cable concentrator (RS–423–A, no modem support)
M3118–YB	CXB16	BC16D, H3104 cable concentrator (RS–422, noise immune)
M3119–YA	CXY08	BC19N–12 (full modem support)
M3121	DFA01	Telephone line
M8020	DPV11	BC22E or BC22F
M8086–SA	LPV11	BC27L–30
M7500	KMV1A	BC22E or BC22F
M7769	KFQSA	BC21M–09
M5976–SA	KZQSA	BC06P–06 or BC06P–2F

2.7.2 Installing the Q-Bus Expansion Module in the Expander

Install the Q-bus expansion module M9405–PA into the expander as follows, being careful not to snag the module's components on the card guides or adjacent modules.

1. Insert the expander module M9405–PA into slot 1 of the expander.
2. Grasp the module's top and bottom release levers. Lock the module in place by simultaneously pushing the top lever down and pulling the bottom lever up.
3. Tighten the quarter-turn captive screws that hold the module.

2.7.3 Connecting Q-Bus Expansion Cables

Two cables connect the system and the B400X expander. This connection expands the Q-bus to 22 usable Q-bus slots.

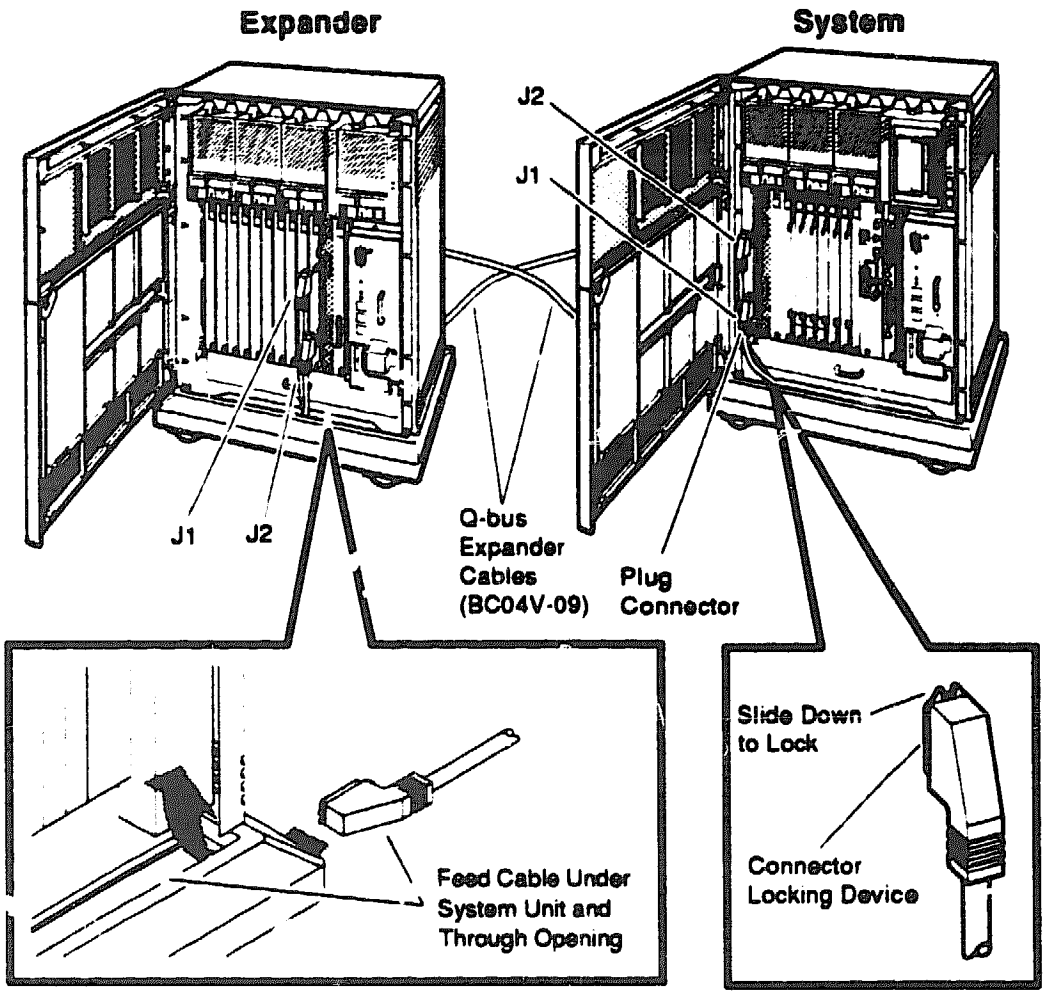
The two expansion modules, M9404–PA, located in slot 12 of the system, and M9405–PA, located in slot 1 of the B400X expander, are connected using the two cables in the expander kit carton.

Connect the Q-bus expansion cables as follows (Figure 2–13):

1. Locate the two 2.74 m (9 ft) cables labeled BC04V–09 in the expander kit carton that was shipped with the B400X expander .
2. Check that the sliding lock on each of the four connectors is up.
3. Feed the plug end of one of the cables under the system from the back and insert it into the socket connector labeled J1 on expansion module M9404–PA. Lock the connector by sliding down the lock.
4. Feed the socket end of the same cable under the B400X expander from the back or side and insert it into the plug connector labeled J1 on expansion module M9405–PA. Lock the connector in place by sliding down the lock.
5. Feed the socket end of the second cable under the system from the back and insert it into the plug connector labeled J2 on expansion module M9404–PA. Lock the connector by sliding down the lock.
6. Feed the plug end of the same cable under the B400X expander from the back or side and insert it into the socket connector labeled J2 on expansion module M9405–PA. Lock the connector by sliding down the lock.

Figure 2–13 shows how to connect the Q-bus expansion cables.

Figure 2–13: Connecting Q-Bus Cables



2.7.4 Relocating Modules

You can connect additional devices at this time, or you can complete the installation of the power cables and load software before connecting other devices.

For information on how to configure modules, refer to *Microsystems Options*, which includes a complete listing of all supported options along with the following information for each module:

Ordering information
Operating system support
Diagnostic support
Option description
CSR addresses and interrupt vectors
LEDs
Loopback connectors
Self-tests
FRUs (if applicable)
Related documentation

Use the following procedures for relocating modules.

Modules with Blank Covers

Use the following procedure to remove and install modules with blank covers:

CAUTION: *Make sure you are wearing a grounded antistatic wrist strap when you remove or install modules. Place modules only on a grounded antistatic mat. The wrist strap and antistatic mat are found in the Antistatic Kit (29–26246).*

1. Release the two quarter-turn captive screws that hold the blank cover to the card cage.
2. Pull the blank cover away from the card cage.
3. Note the orientation of any internal cables connected to the module. Some connectors are not keyed. Carefully label and disconnect the internal cables.
4. Unlock the module's release levers by simultaneously pulling up on the top lever and pulling down on the bottom lever. If a module has a plastic handle, pull out on the plastic handle.
5. Carefully pull the module out of the card cage. Be careful not to disturb any switchpacks on the module.
6. Check the module's CSR address and interrupt vector (see Appendix A). If necessary, change the module's jumper or switch settings.
7. Install the module in its new location by reversing the steps in this procedure. It is not recommended that you fasten the quarter-turn captive screws that hold the blank cover at this time.

Modules with Handles

Use the following procedure to remove and install modules with handles:

CAUTION: *Make sure you are wearing a grounded antistatic wrist strap when you remove or install modules. Place modules only on a grounded antistatic mat. The wrist strap and antistatic mat are found in the Antistatic Kit (29–26246).*

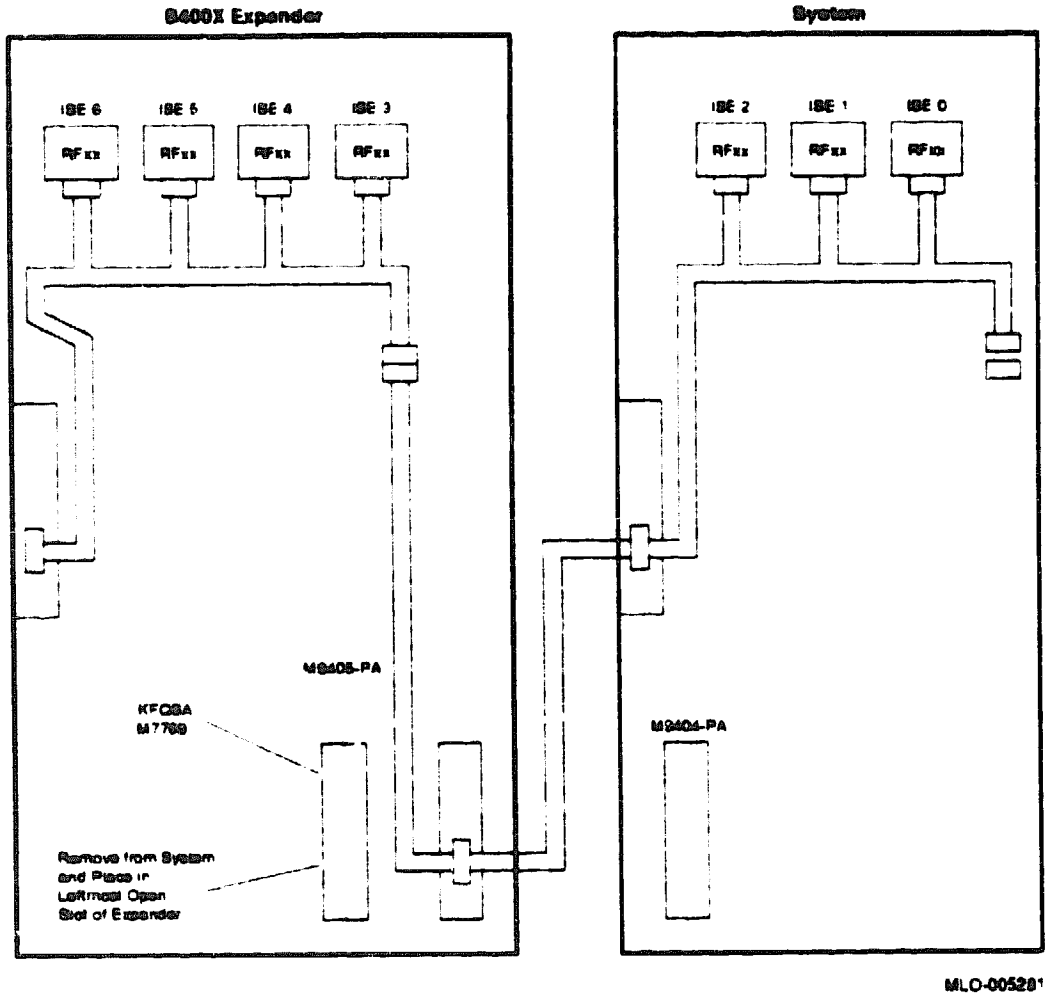
1. Note the orientation of external cables connected to the module. Carefully label and then disconnect the cables.
2. Release the two quarter-turn captive screws that hold the module's handle to the card cage.
3. Unlock the release levers by simultaneously pulling up on the top lever and pulling down on the bottom lever.
4. Pull out on the module's handle and remove the module from the card cage. Be careful not to disturb any switchpacks on the module.
5. Check the module's CSR address and interrupt vector (see Appendix A). If necessary, change the module's jumper or switch settings.
6. Install the module in its new location by reversing the steps in this procedure. It is not recommended that you fasten the quarter-turn captive screws that hold the module's handle at this time.

2.7.5 Installing the KFQSA Module in the Expander

Install the KFQSA module (M7769) as the last module on the Q-bus, as follows:

1. Install the KFQSA module as the last module in the Q-bus (Figure 2–14).
2. Connect the end of the KFQSA cable to the KFQSA module.

Figure 2–14: KFQSA Module Relocated in the Expander



2.8 Connecting the DSSI Cable

A Digital Storage System Interconnect (DSSI) cable connects the DSSI mass storage devices in the system with the B400X expander. If the expander contains no DSSI devices, proceed to Section 2.9.

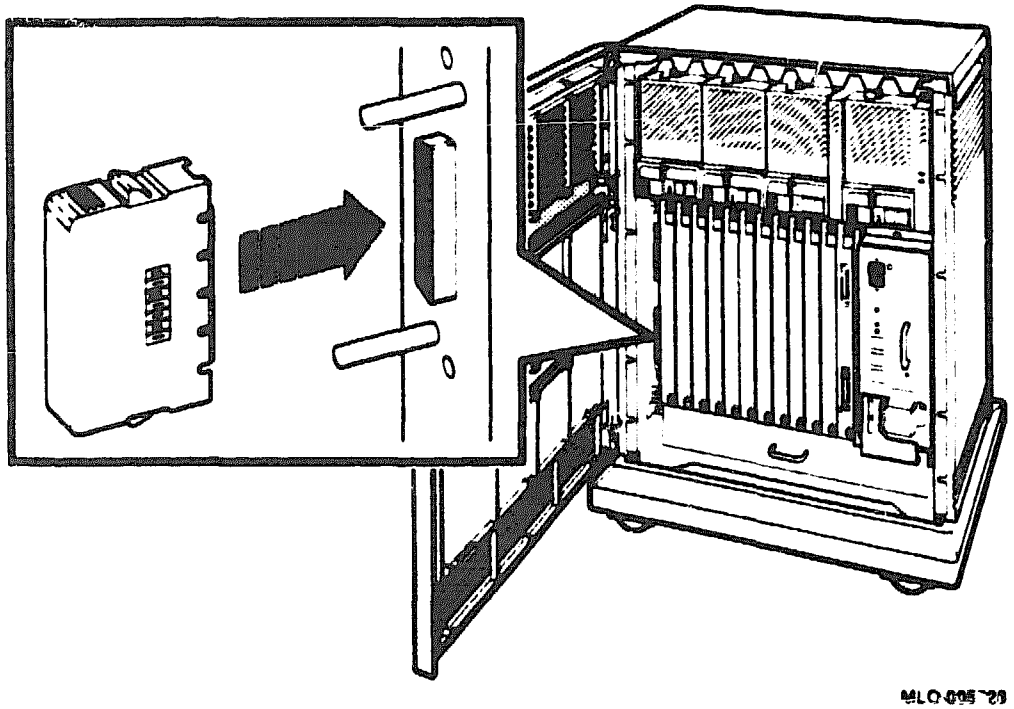
1. Locate the 2.74 m (9 ft) cable labeled BC21M–09 that was shipped with the B400X expander.

NOTE: *The external DSSI ports are static sensitive. Make sure you are wearing a grounded antistatic wrist strap when you remove or install DSSI connectors. The groundstrap is found in the Antistatic Kit (29–26246). The Antistatic Kit is part of the Customer Services tool kit, not the option kit.*

2. Remove the external DSSI terminator from the DSSI connector to the left of the card cage on the system.
3. Attach the terminator to the DSSI connector to the left of the card cage on the B400X expander (Figure 2–15).

NOTE: *Before attaching DSSI terminators or cables, you may need to remove the plastic protective covers from the DSSI connectors.*

Figure 2–15: Attaching the DSSI Terminator



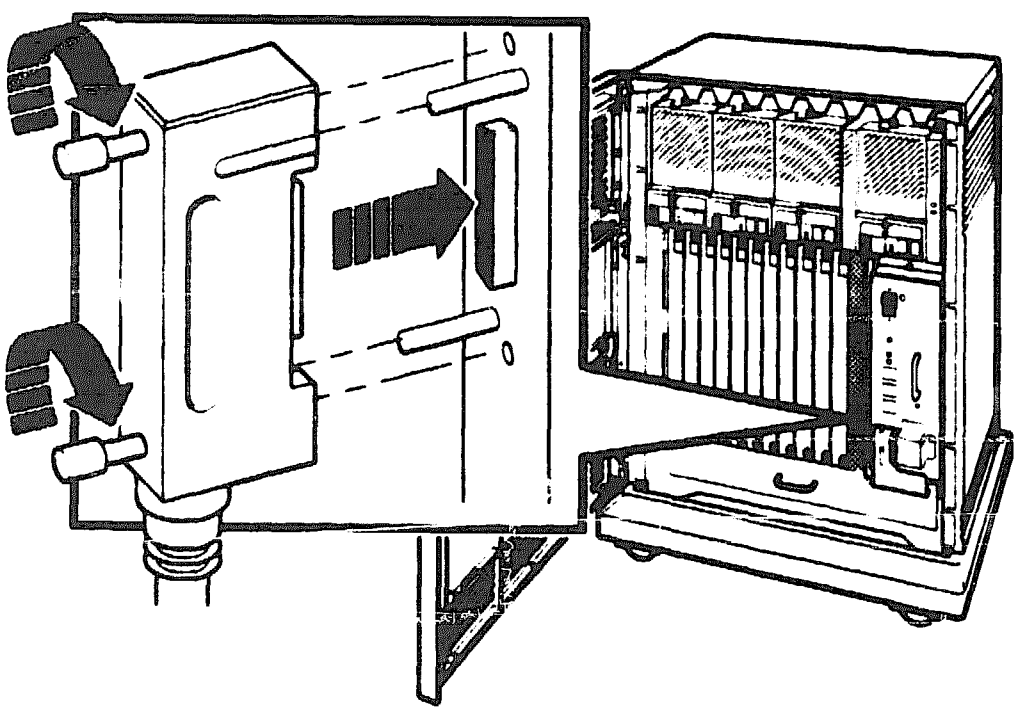
MLO-005720

4. Feed either end of the cable under the system from the back or side. Plug the cable into the DSSI connector to the left of the card cage. For systems with multiple DSSI busses, you may attach the cable to a KFQSA storage adapter.

Fit the cable connector over the two pins on the DSSI port (Figure 2–16). First tighten by hand, then use a screwdriver to firmly secure the connection.

5. Feed the opposite end of the cable under the B400X expander from the back or side. Attach the cable to the DSSI connector to the right of the card cage (Figure 2–16).

Figure 2–16: Connecting the DSSI Cable to the B400X Expander

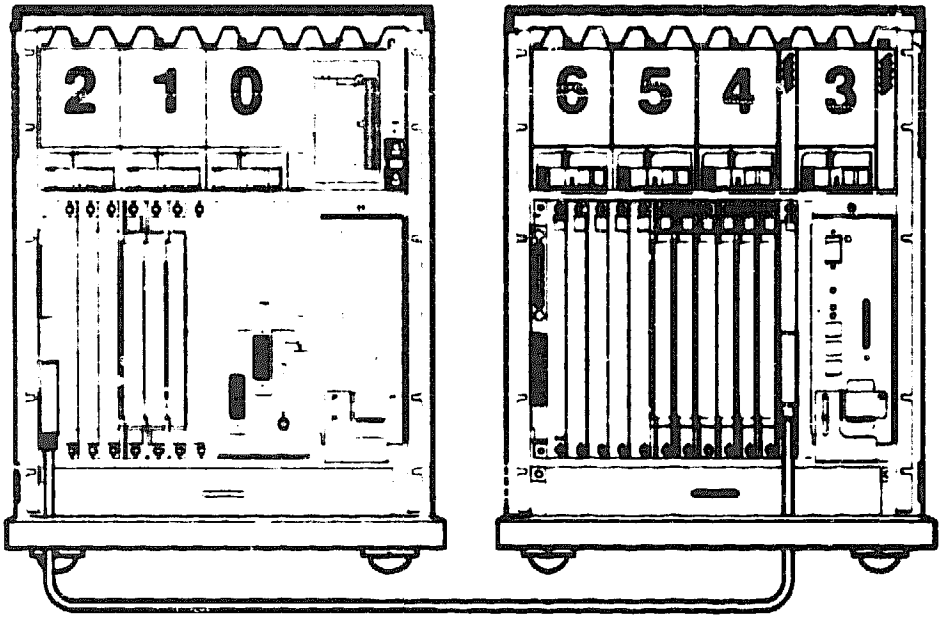


MLO-005929

Figure 2–17 shows the DSSI cabling for a VAX 4000 Model 300 system expanded with the B400X expander. Figure 2–18 shows the DSSI cabling for a VAX 4000 Model 200 or DECsystem 5500 system expanded with the B400X expander.

NOTE: *If you need to remove a DSSI cable, loosen the screws at the connector and remove the cable by pulling the two screw heads simultaneously to prevent breaking the ground studs.*

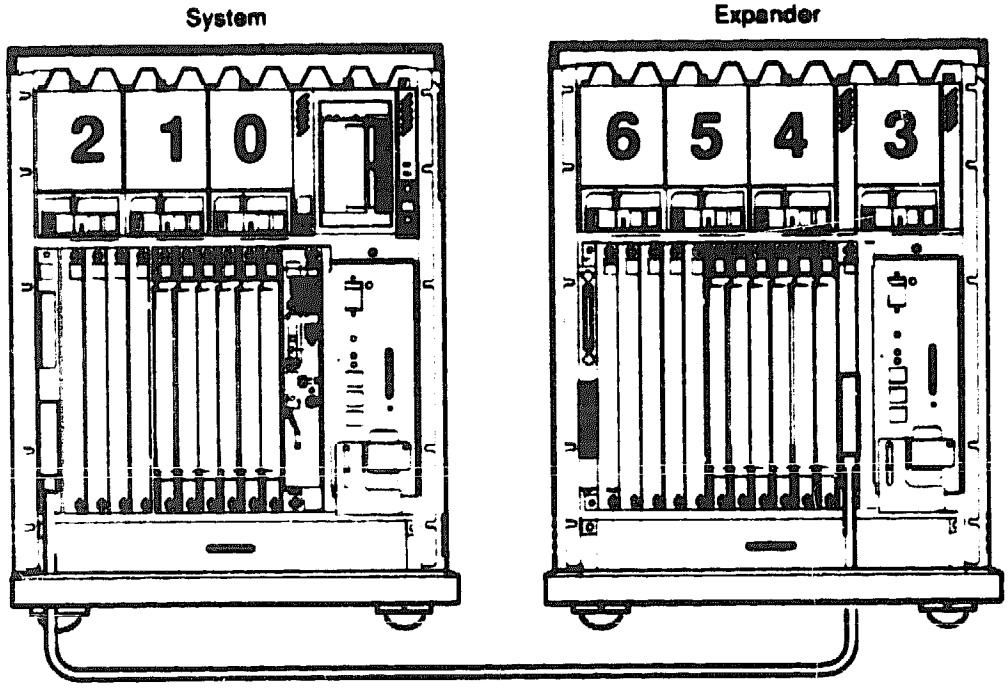
Figure 2–17: DSSI Cabling for Expanded VAX 4000 Model 300



DSSI Terminator Locations

MLO-005690

Figure 2–18: DSSI Cabling for Expanded VAX 4000 Model 200 or DECsystem 5500



2.9 Connecting SCSI Cables

A 1.8 m (6 ft) SCSI cable labeled BC06P–06 is used to extend the system's SCSI bus to the RZ-series ISEs or TLZ04 tape drive in the B400X expander. If the expander contains a KZQSA storage adapter, a 0.91 m (3 ft) cable (BC06P–2F) shipped with the system can be used to connect the KZQSA to the expander's storage devices.

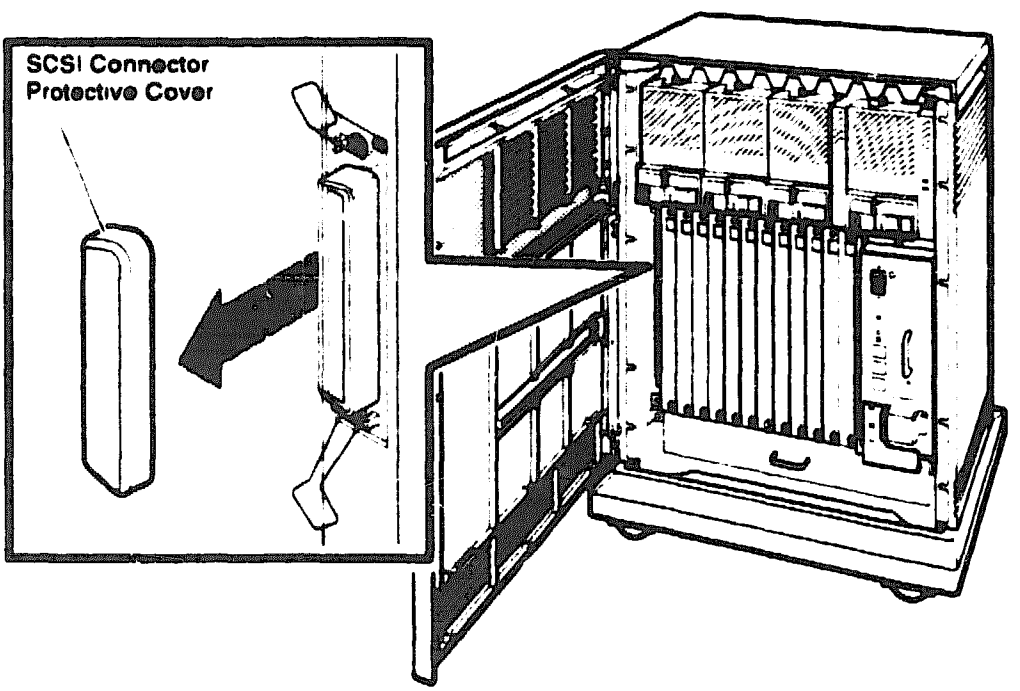
If the expander contains no SCSI devices, proceed to Section 2.10.

2.9.1 Connecting a SCSI Cable from the System to the B400X Expander

To extend a SCSI bus from the system to the expander, use the following instructions:

1. Find the 1.8 m (6 ft) SCSI cable labeled BC06P–06 that came with the expander.
2. Remove the SCSI connector protective cover from the upper SCSI connector located on the left side of the expander (Figure 2–19).

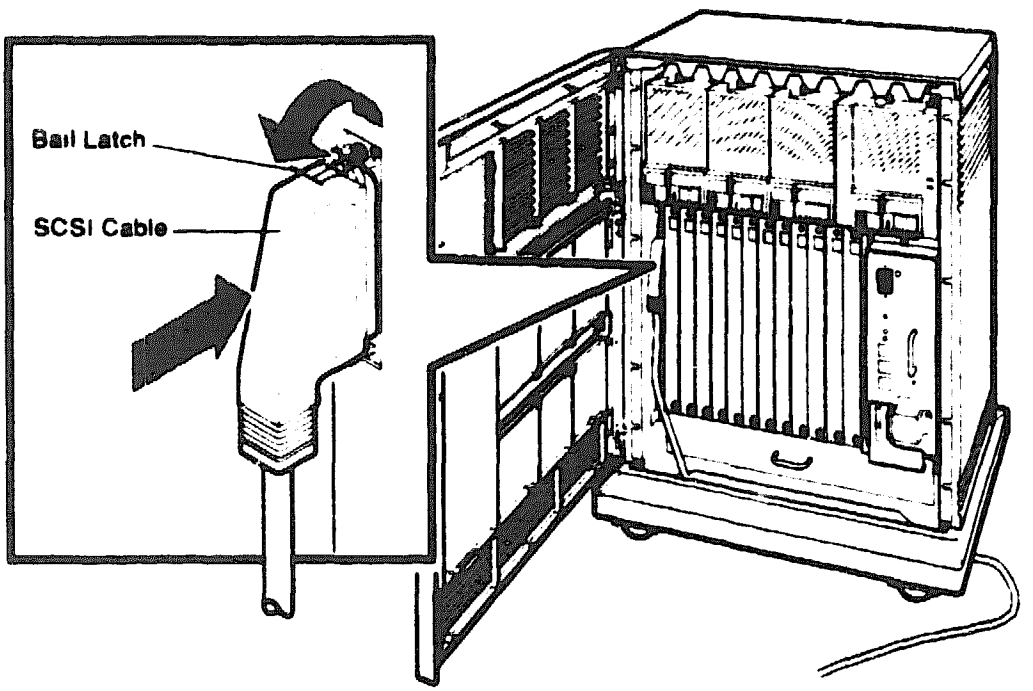
Figure 2–19: Removing the SCSI Connector Protective Cover



3. To connect the SCSI cable to the expander, feed either end of the SCSI cable under the expander from the back or side. Connect the SCSI cable to the SCSI connector from which you removed the protective cover.

   Secure the cable connection by pressing the bail latches into place (Figure 2–20).

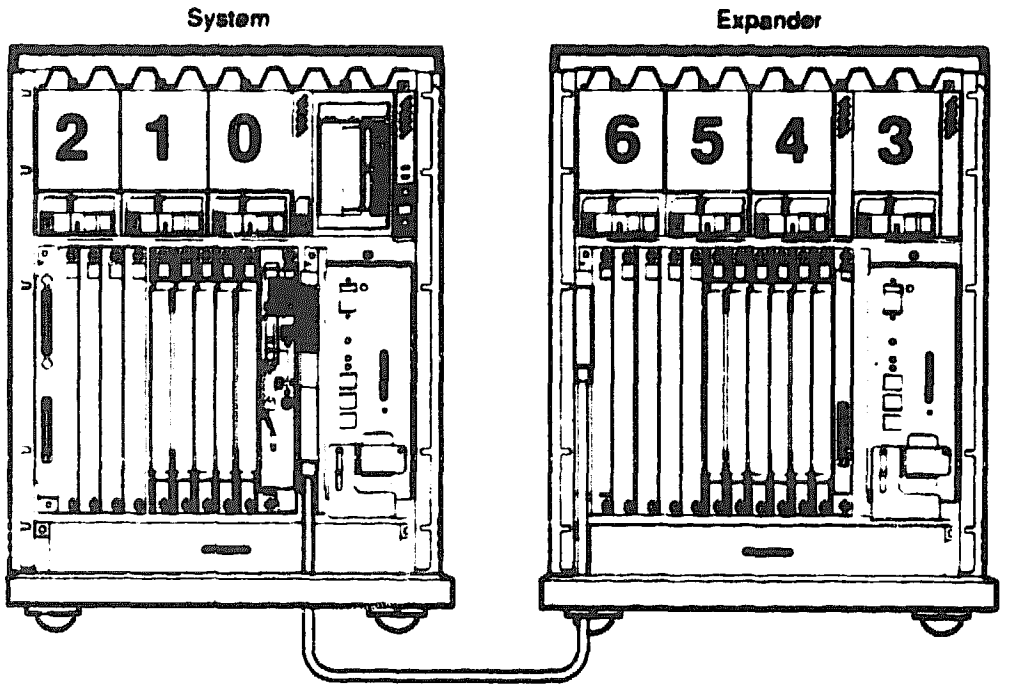
Figure 2–20: Connecting the SCSI Cable to the Expander



4. Connect the other end of the SCSI cable to the appropriate connector on the system:
   - If you are connecting to a DECsystem 5500, remove the SCSI terminator from the lower SCSI connector to the right of the card cage, then attach the SCSI cable.
   - If you are connecting to a KZQSA module in the system, first remove the SCSI terminator on the lower connector, then attach the cable.

Figure 2–21 shows SCSI cable connections for an expanded DECsystem 5500. Figure 2–22 show the SCSI cable connections for an expanded VAX 4000 system.

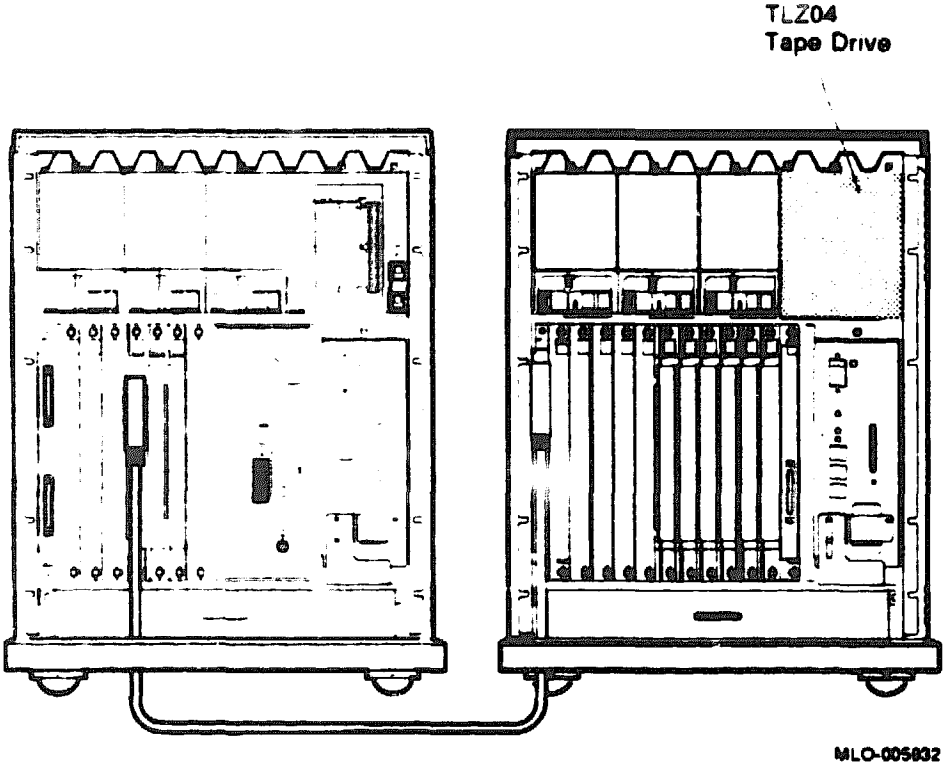
Figure 2–21: SCSI Cabling for Expanded DECsystem 5500



SCSI Terminator Locations

MLO-005943

Figure 2–22: SCSI Cabling for Expanded VAX 4000

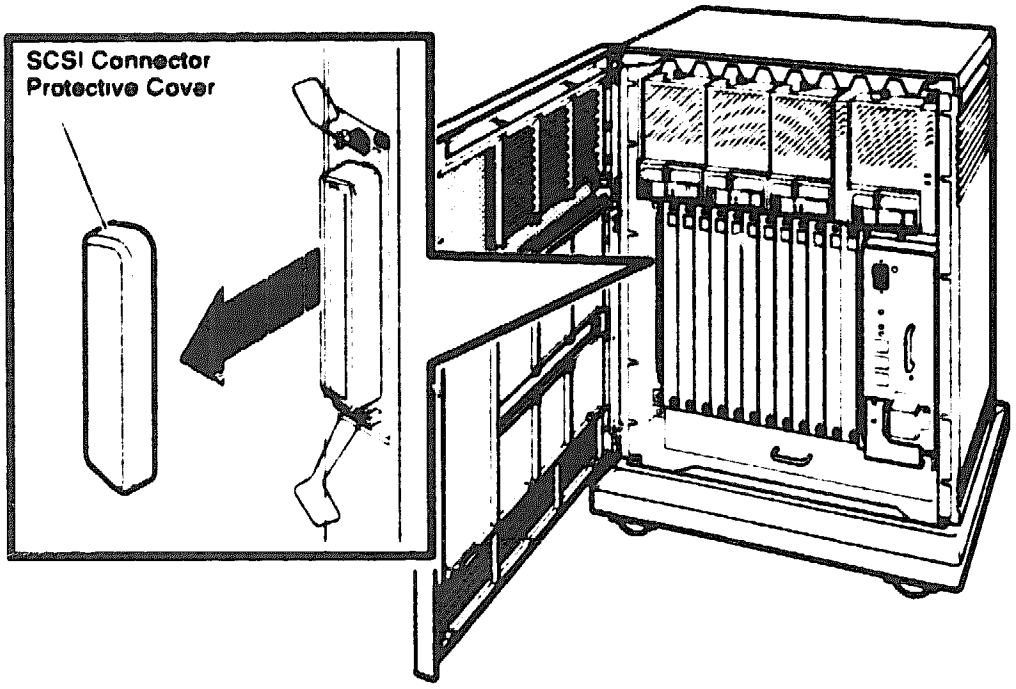


2.9.2 Connecting the SCSI Cable to a KZQSA Module Internal to the Expander

To connect a SCSI cable to a KZQSA module installed in the B400X expander, use the following instructions:

1. Find the 0.91 m (3 ft) SCSI cable labeled BC03P–03 that came with the system.
2. Remove the SCSI connector protective cover from the upper SCSI connector located on the left side of the expander (Figure 2–23).

Figure 2–23: Removing the SCSI Connector Protective Cover

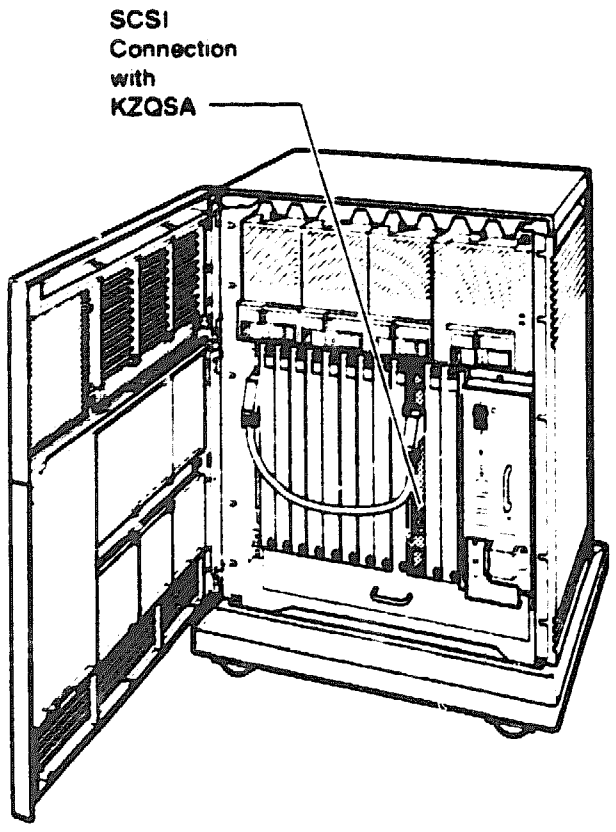


3. Remove the SCSI terminator from the upper SCSI connector on the KZQSA module.
4. Connect one end of the SCSI cable to the connector from which you removed the protective cover. Connect the other end of the SCSI cable to the connector from which you removed the SCSI terminator.

   Secure the cable connection by pressing the bail latches into place

Figure 2–24 shows 0.91 m (3 ft) SCSI cable connections for an expander with an internal KZQSA storage adapter.

Figure 2–24: 0.91 m (3 ft) SCSI Cable Connection to Internal KZQSA Storage Adapter



2.10 Connecting Power Bus Cables

Power bus cables (BC09F–10) allow you to configure a power bus for expanded systems. The power bus allows you to turn the power on and off for the entire expanded system at one main power supply on the system.

NOTE: *Expanders configured in a dual-host system should not be configured with a power bus. Inadvertently shutting down the expander when shutting down a system defeats the higher availability of a dual-host system.*

To set up a power bus, complete the following instructions:

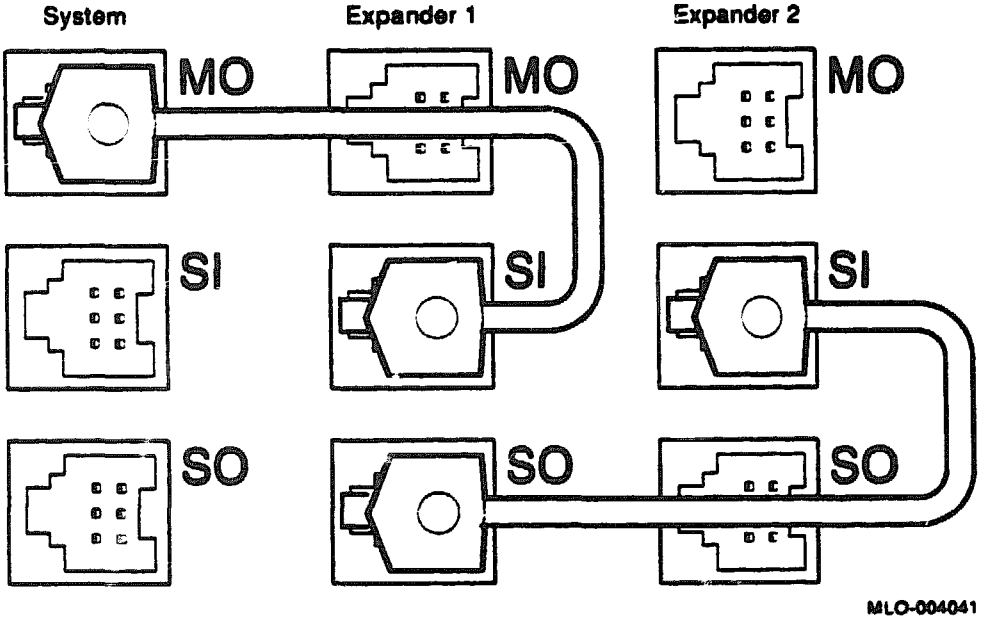
1. Find the power bus cable, labelled 17–02638–01, shipped with the expander.

2. To attach the first power bus cable, feed the ends of the cable under the system and expander from the back or side. Plug one end of the cable into the system power supply receptacle labeled MO (main out) on the system box. This power supply will supply the power bus signal to the expander(s). Plug the other end of the cable into the expander power supply receptacle labeled SI (secondary in).

3. To extend the power bus to a second expander, plug one end of a power bus cable into the power supply receptacle labeled SO (secondary out) on the first expander. Plug the other end of the power bus cable into the power supply receptacle labeled SI in the second expander. The power bus can be extended in this way to several expanders. Figure 2–25 shows a sample power bus configuration.

With the power switch on the expander(s) set to on, the entire expanded system will power up when you set the power switch on the system power supply to on (1).

Figure 2–25: Sample Power Bus Configuration



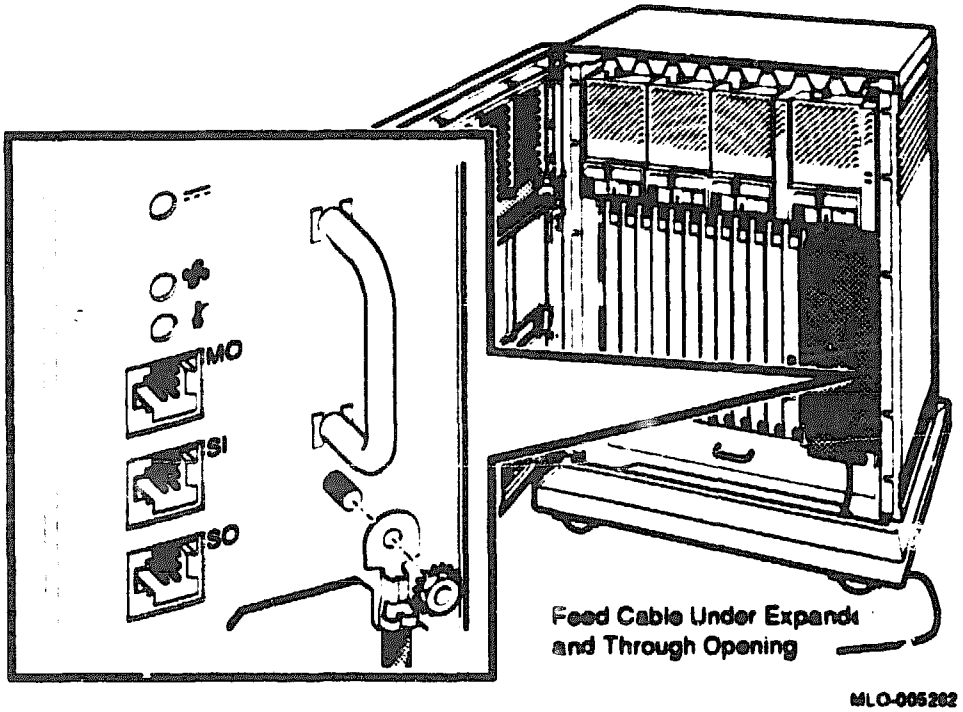
2.11 Connecting Ground Cables

The ground cable (12–13756–A8) provides a common ground for systems with two or more enclosures. Ground cables are daisy-chained for systems with multiple enclosures. Connect a ground cable as follows:

1. Find the ground cable, which has lugs on each end (12–13756–A8).
2. Remove the nuts on the ground terminals of the system and expander power supplies.
3. Slide the ground cable lug over the ground terminal stud and replace the nut (Figure 2–26).

NOTE: *No more than two ground cables should be attached per ground terminal.*

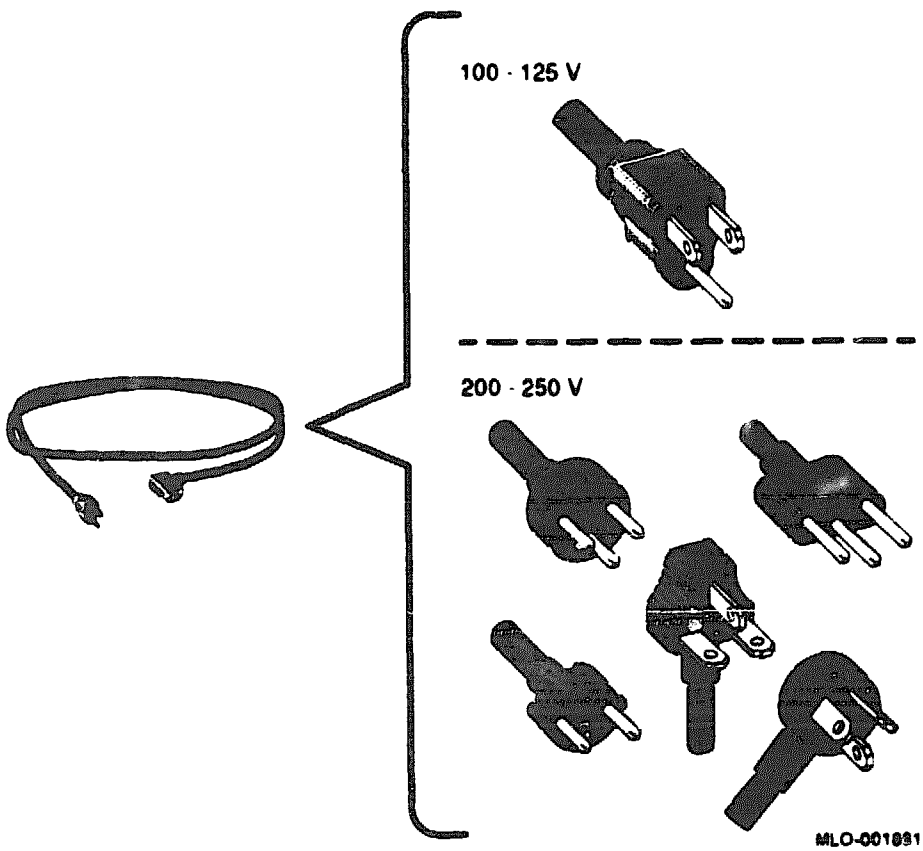
Figure 2–26: Connecting a Ground Cable



2.12 Connecting Power Cables

1. Make sure the power switches on the system and the expander are set to off (0), and all devices connected to the system are turned off.
2. Find the power cables for the system and the expander.
3. Make sure the plug end of each power cable matches its receptacle. Several types of power cables are shown in Figure 2–27.

Figure 2–27: Power Cables



4. Feed the socket end of the B400X power cable under the expander enclosure from the back or side and connect the cable as shown in Figure 2–28.

Feed the socket end of the system power cable under the system enclosure from the back or side and connect the cable as shown in Figure 2–29.

Figure 2–28: Connecting the Power Cable to the B400X Expander

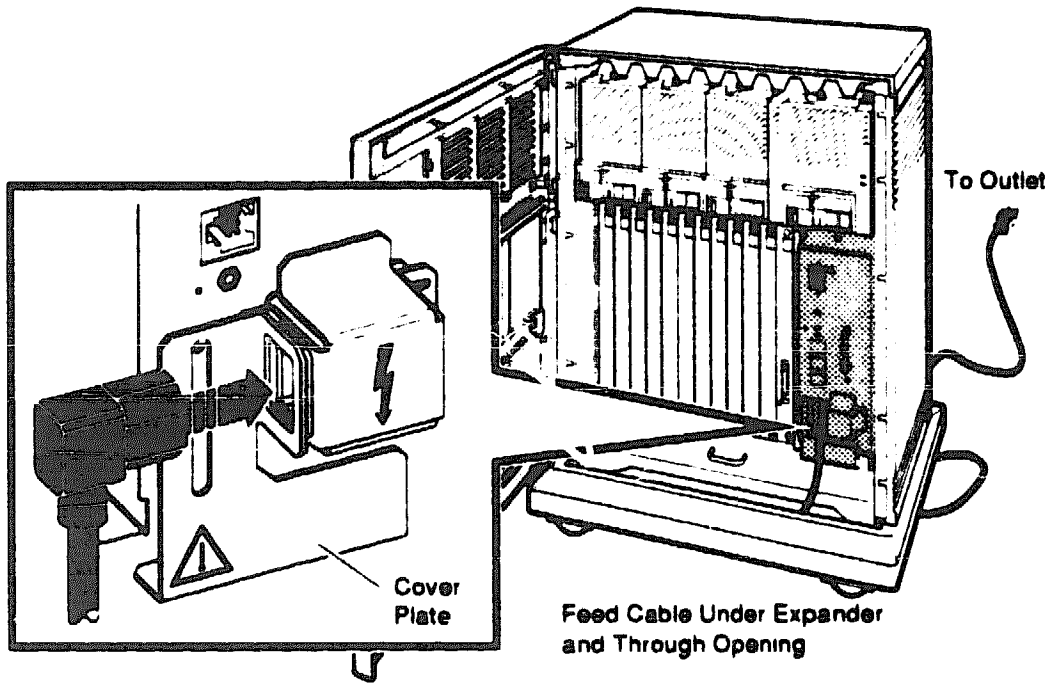
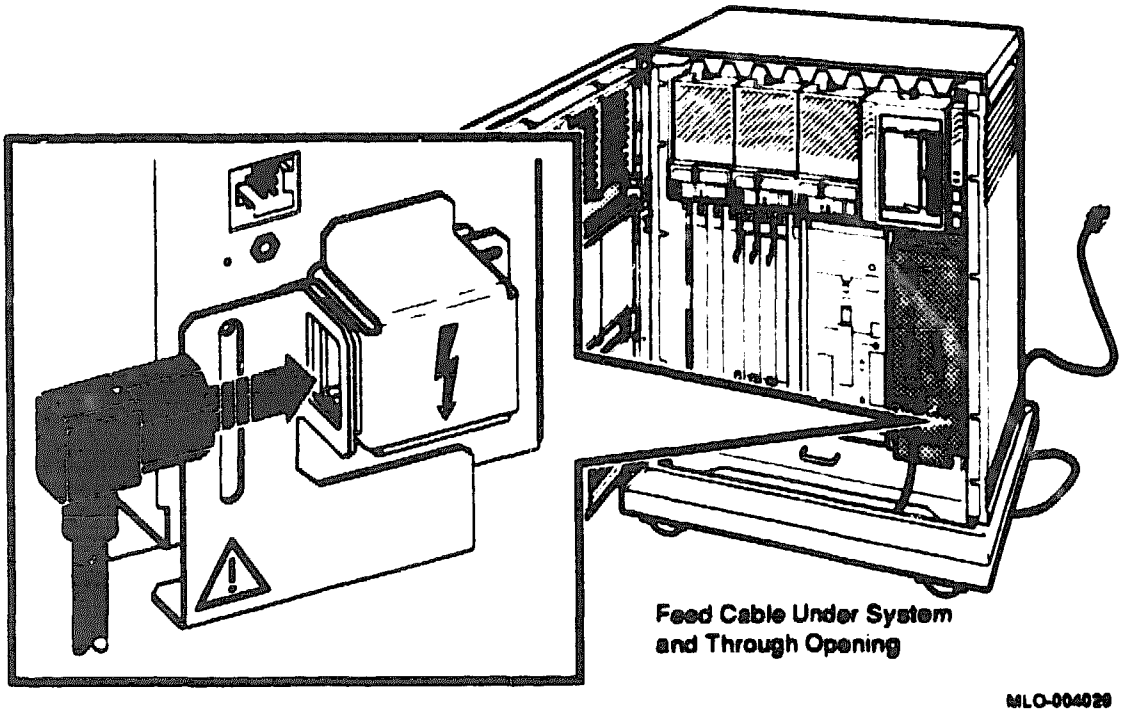


Figure 2–29: Connecting the Power Cable to the System



2.13 Turning On an Expanded System

Turn on the system as described in the following sections:

1. Turn on the console terminal and wait until it has performed its self-tests successfully.
2. Set the power switch on the B400X expander to on (1).

   NOTE: *The power switch on the B400X expander should always remain in the on position (1). Power is supplied to both the system and the B400X expander when you turn on the system.*

3. Turn on your expanded system by setting the power on the system to on (1). Both power switches should glow orange.
4. If you are installing a new system, see the appropriate CPU maintenance documentation for information on the power-up self-tests and language selection.

2.14 Verifying System Operation

Use the MicroVAX Diagnostic Monitor (MDM) to verify system operation. See the *MDM User's Guide* for information on how to run the tests.

The test should complete without error. If an error occurs, see Appendix B, or consult the appropriate system maintenance manual for troubleshooting procedures.

Use the *BA430/BA440 Enclosure Maintenance* manual and illustrated parts breakdown for information on removal and replacement of field replaceable units (FRUs). The maintenance information provided for the BA430 enclosure also applies to the B400X expander.

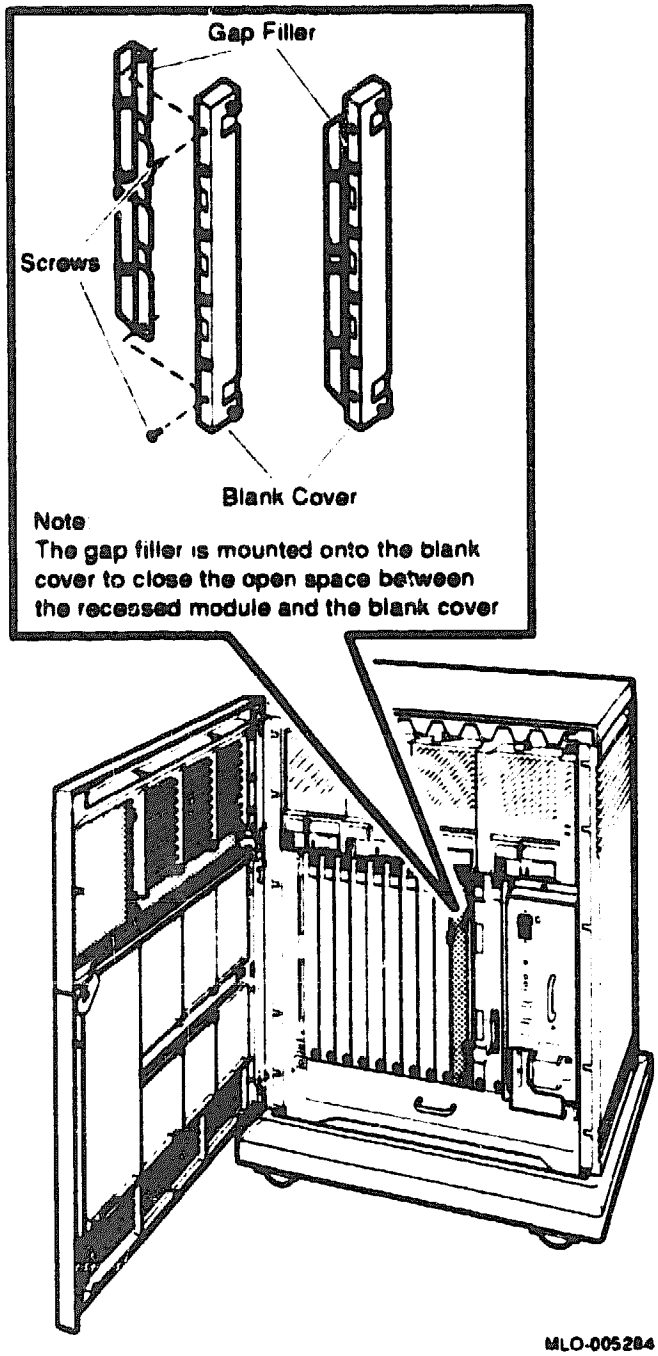
2.15 Replacing Handles and Covers

After tests complete successfully and all modules have been successfully installed, replace all module handles and covers.

2.16 Verifying the Ground Connections of New Modules

If you install a module with a blank cover or flush handle next to a module with a recessed handle, you must install a gap filler assembly between the modules to comply with EMI regulations. Without the gap filler, circuitry on the flush-handle module is exposed. The gap filler is mounted onto the blank cover to close the open space between the recessed module and the blank cover, thus producing a ground connection (see Figure 2–30).

Figure 2–30: Making Ground Connections with Gap Fillers



Two gap filler assemblies (70–24505–01) are provided with the Q-bus expander kit. Each gap filler assembly includes one gap filler and two screws.

Check that the ground connections are correctly in place as follows:

1. Identify any cases where a recessed-handle module is located next to a module with a blank cover or a flush handle. There should be no open spaces between the modules in the backplane.
2. Make sure a gap filler assembly is installed on the side of the blank cover or flush handle that is located next to the module with the recessed handle.
3. If needed, install a gap filler assembly as follows:
   a. Fit the gap filler (70–24505–01) onto the side of the blank cover or flush-handle module that is located next to the recessed-handle module. Make sure the gap filler's tabs fit into the tab indentations on the blank cover or flush handle (Figure 2–30). Use the two screws that come with the assembly to attach the gap filler at the top and bottom.
   b. If you have a blank cover, place the blank cover with the gap filler over the card cage slot.

      If you have a module with a flush handle, insert the module into the backplane slot.
   c. Make sure there is no open space between the two modules.
4. Fasten the quarter-turn captive screws on all handles and covers in the backplane.

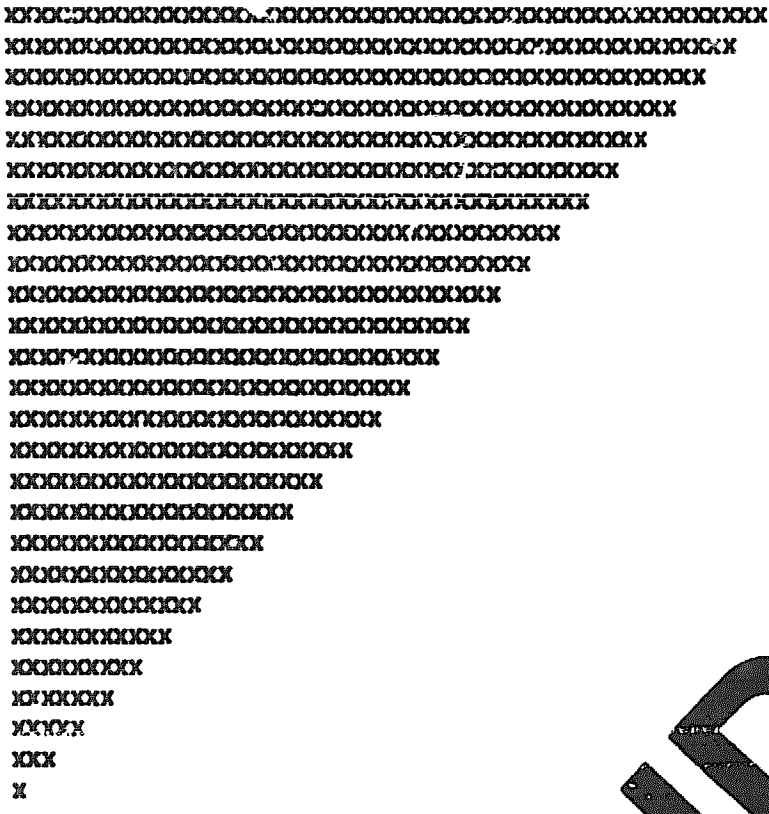
2.17 Closing the Door

The final step of the installation is:

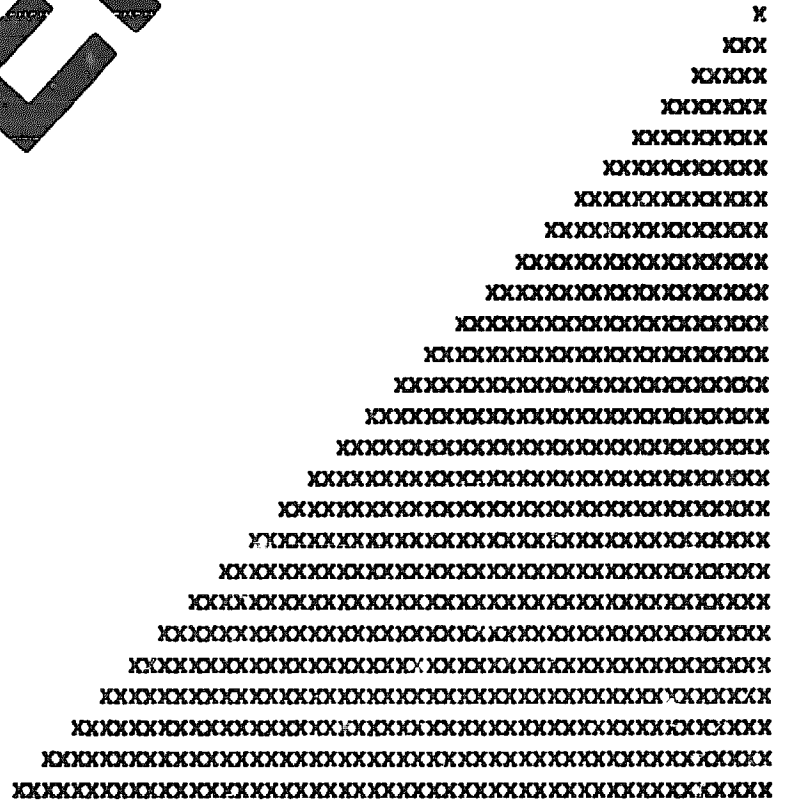
- Closing the door on the system enclosure
- Closing the door on the expander

Close the door on the system enclosure as described in the system operation manual. You can find that manual in the system *Customer Hardware Information* binder.

Close the front doors of the B400X expander by setting the door key to the lowest position and closing the upper and lower doors. When pushing the doors closed, push gently at the top right of the upper door and the bottom right of the lower door. To lock the doors, turn the key to the middle position.



APPENDIX A



Appendix A
Configuring the KFQSA

This appendix describes the KFQSA storage adapter and explains how to:

- Set the mode switches
- Configure the KFQSA storage adapter at installation
- Enter console I/O mode
- Run the Configure utility
- Program the EEROM on the KFQSA
- Reprogram the EEROM on the KFQSA
- Change the ISE's allocation class and unit number

A.1 KFQSA Overview

The KFQSA module is a storage adapter that allows Q-bus systems that support the KFQSA module to communicate with storage peripherals based on the Digital Storage Architecture (DSA), using the Digital Storage System Interconnect (DSSI). In a DSSI-based VAX 4000 system, one KFQSA module can connect up to seven RF-series integrated storage elements (ISEs) to the system, using a single DSSI bus cable.

The KFQSA contains the addressing logic required to make a connection between the system and a requested ISE on the DSSI bus. Each ISE has its own controller, which contains the intelligence and logic necessary to control data transfers over the DSSI bus. The KFQSA presents a mass storage control protocol (MSCP) U/Q port for each ISE.

The EEROM on the KFQSA contains a configuration table. After you install the KFQSA, you program the EEROM with the CSR address for each ISE in the system.

A.2 For Add-On Expanders: Configuring the KFQSA at Installation

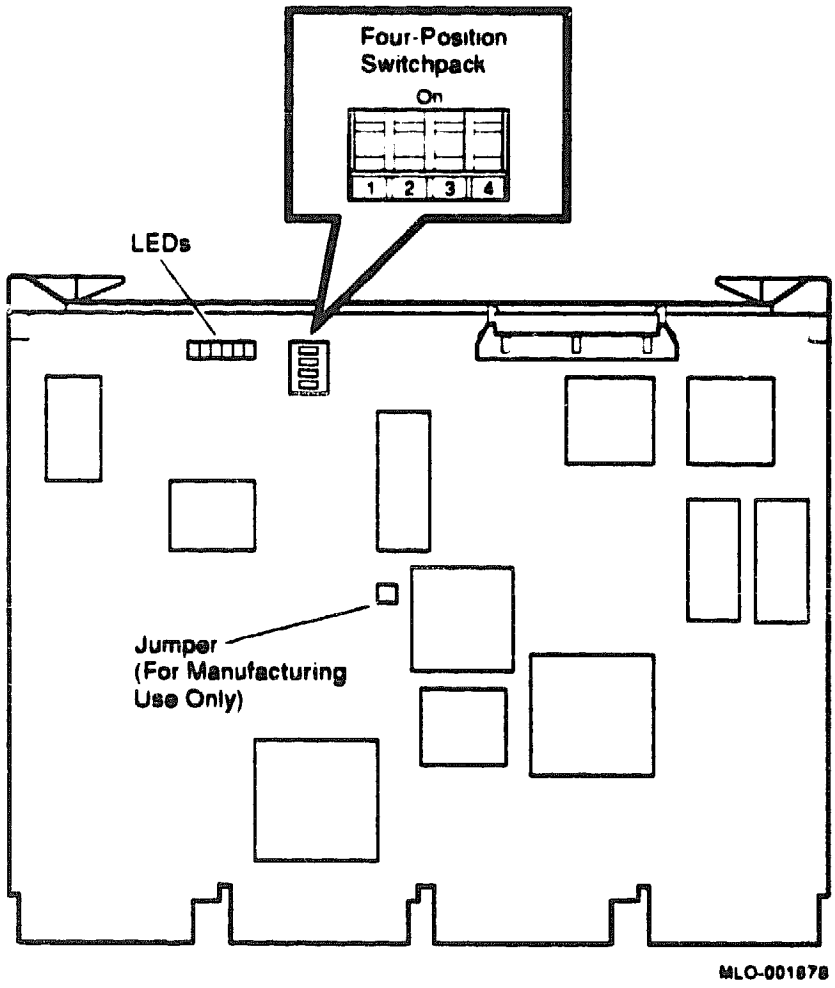
Even before you unpack the expander you can configure the devices that will be included in the final expanded system. At installation, configure the KFQSA as follows:

CAUTION: *Static electricity can damage integrated circuits. Use the wrist strap and antistatic mat found in the Antistatic Kit (29–26246) when you work with the internal parts of a computer system.*

1. Release the handles of the KFQSA module and pull the module out.
2. Check the KFQSA module for the presence of a jumper, whose location is shown in Figure A–1. This jumper is for the manufacturing test only. Remove the jumper, if present, and discard.

   NOTE: *The module will not operate if this jumper is present.*

Figure A–1: KFQSA Module Layout (M7769)



3. Use the four-position DIP switchpack shown in Figure A–1 as follows to set a temporary CSR address that enables you to access the EEROM:

   a. Set switches 1, 2, 3, and 4 to reflect a fixed CSR address to allow the KFQSA to be programmed. Example A–1 shows the correct switch settings.

   b. Install the KFQSA adapter module into the backplane.

Example A–1: KFQSA (M7769) Service Mode Switch Settings

KFQSA Four-Position Switchpack

	S/N Mode	Fx/Fl	MSB	LSB
Switches:	1	2	3	4
	0	1	0	0

S/N = Service mode/Normal operating mode
Fx/Fl = fixed/floating CSR address
1 = off (down), 0 = on (up)

A.2.1 Entering Console I/O Mode

After installing the KFQSA, you issue a series of commands to the system at the console prompt (>>>) to program the EEROM on the KFQSA. You may enter these commands in either uppercase or lowercase letters. Unless otherwise specified, enter each command, then press Return.

Enter the console I/O mode as follows:

1. Set the Break Enable/Disable switch on the CPU cover panel (on the console module for VAX 4000 Model 300 systems) to the enable position (up).
2. Set the power off power switch to on (1).

3. When the power-up self-tests complete, the console prompt appears, as shown in Example A–2.

Example A–2: Entering Console Mode Display

```
Performing normal system tests.
40..39..38..37..36..35..34..33..32..31..30..29..28..27..26..25..
24..23..22..21..20..19..18..17..16..15..14..13..12..11..10..09..
08..07..06..05..04..03..
Tests completed.

>>>
```

A.2.2 Displaying Current Addresses

Enter SHOW QBUS to display the current Q22-bus addresses (Example A–3). Note that the KFQSA adapter appears in service mode as KFQSA #0.

Example A–3: SHOW QBUS Display

```
>>> SHOW QBUS
Scan of Qbus I/O Space
-20001910 (774420) = 0000 (000) KFQSA #0
-20001912 (774422) = 0AA0
-20001920 (774440) = FF08 (120) DELQA/DEQNA/DESQA
-20001922 (774442) = FF00
-20001924 (774444) = FF2B
-20001926 (774446) = FF09
-20001928 (774450) = FFA3
-2000192A (774452) = FF96
-2000192C (774454) = 8000
-2000192E (774456) = 1030
-20001940 (774500) = 0000 (260) TQK50/TQK70/TU81E/RV20/KFQSA-TAPE
-20001942 (774502) = 0BC0
-20001F40 (777500) = 0020 (004) IPCR

Scan of Qbus Memory Space
>>>
```

CAUTION: *If the KFQSA does not appear as #0 at this point, check the position of the KFQSA switches. They should be set as shown in Example A–1. Also check that the KFQSA jumper shown in Figure A–1 has been removed. Repeat Section A.2.1 and Section A.2.2.*

A.2.3 Running the Configure Utility

Since you are adding ISEs to the system, you must run the Configure utility to find the correct address for each device and module in the system. The Configure utility uses floating address space rules.

Run the Configure utility as follows. Refer to Example A–4.

1. At the console prompt, enter `CONFIGURE`, then enter `HELP` at the `Device,Number?` prompt for a list of devices that can be configured.

   NOTE: *Some of the devices listed in the HELP display may not be supported by the CPU.*

2. For each device in the system, enter the device name at the `Device,Number?` prompt. If you have more than one of the same type, enter a comma followed by the total number of that device. In Example A–4, the system contains one KFQSA with six ISEs.

   Be sure you list *all* the devices: those already installed and those you plan to install.

3. Enter `EXIT`. The Configure utility displays an address and vector assignment for each device entered in step 2. Example A–4 shows the address and vector assignments and the device input.

   Record the address and vector assignments for each device displayed.

4. At the console prompt, enter `SHOW QBUS`.

   For all modules except the KFQSA, verify that the CSR addresses are set correctly by comparing the addresses listed in the SHOW QBUS command with those recorded in step 3.

   The CONFIGURE command provides correct addresses for the options. The addresses listed by the SHOW QBUS command should match these assignments.

   If necessary, remove modules from the backplane and reset switches or jumpers to the addresses in your Configure display, using the module removal and replacement procedures in the *BA430/BA440 Enclosure Maintenance* manual.

Example A–4: Configure Display

```
>>> CONFIGURE
Enter device configuration, HELP, or EXIT
Device,Number? help
Devices:
 LPV11    KXJ11        DLV11J       DZQ11     DZV11     DFA01
 RLV12    TSV05        RXV21        DRV11W    DRV11B    DPV11
 DMV11    DELQA        DEQNA        DESQA     RQDX3     KDA50
 RRD50    RQC25        KFQSA-DISK   TQK50     TQK70     TU81E
 RV20     KFQSA-TAPE   KMV11        IEQ11     DHQ11     DHV11
 CXA16    CXB16        CXY08        VCB01     QVSS      LNV11
 LNV21    QPSS         DSV11        ADV11C    AAV11C    AXV11C
 KWV11C   ADV11D        AAV11D       VCB02     QDSS      DRV11J
 DRQ3B    VSV21        IBQ01        IDV11A    IDV11B    IDV11C
 IDV11D   IAV11A       IAV11B       MIRA      ADQ32     DTC04
 DESNA    IGQ11
Numbers:
 1 to 255, default is 1
Device,Number? kfqsa-disk,6
Device,Number? dfsqa
Device,Number? tqk70
Device,Number? exit

Address/Vector Assignments
-774440/120 DESQA
-772150/154 KFQSA-DISK     ! Node 0 (assigned in order, 0 to n)
-760334/300 KFQSA-DISK     ! Node 1
-760340/304 KFQSA-DISK     ! Node 2
-760344/310 KFQSA-DISK     ! Node 3
-760350/314 KFQSA-DISK     ! Node 4
-760354/320 KFQSA-DISK     ! Node 5
-774500/260 TQK70
```

A.3 Programming the KFQSA

Program the configuration table in the EEROM of the KFQSA to include all ISEs on the DSSI bus, as follows. See Example A–5.

1. Determine the DSSI node plug address for each ISE you are configuring. Start with node 0 for the first ISE in the system, then continue incrementally for each ISE in the expanded system. You will insert these plugs into the OCP sockets during the physical installation of the ISEs. In Example A–4, nodes 0, 1, 2, 3, 4, and 5 are used; node 6 is unused; and node 7 is reserved for the KFQSA module.
2. At the console prompt, enter `SET HOST/UQSSP/MAINT/SERV 0` to set host to the KFQSA.
3. Enter `HELP` to display a list of supported commands.
4. Program the KFQSA to include each DSSI device in the system:
   a. For each ISE: Enter `SET`, followed by the node number, the CSR address (from the list of addresses you obtained from the Configure utility), and the model number (disk ISEs are model 21). See Example A–5.
   b. Enter `SHOW` to display the configuration table you just programmed.
   c. Check the display to make sure the addresses are correct.
   d. Enter `EXIT` to save the configuration table or `QUIT` to return to the console prompt without changing the table.

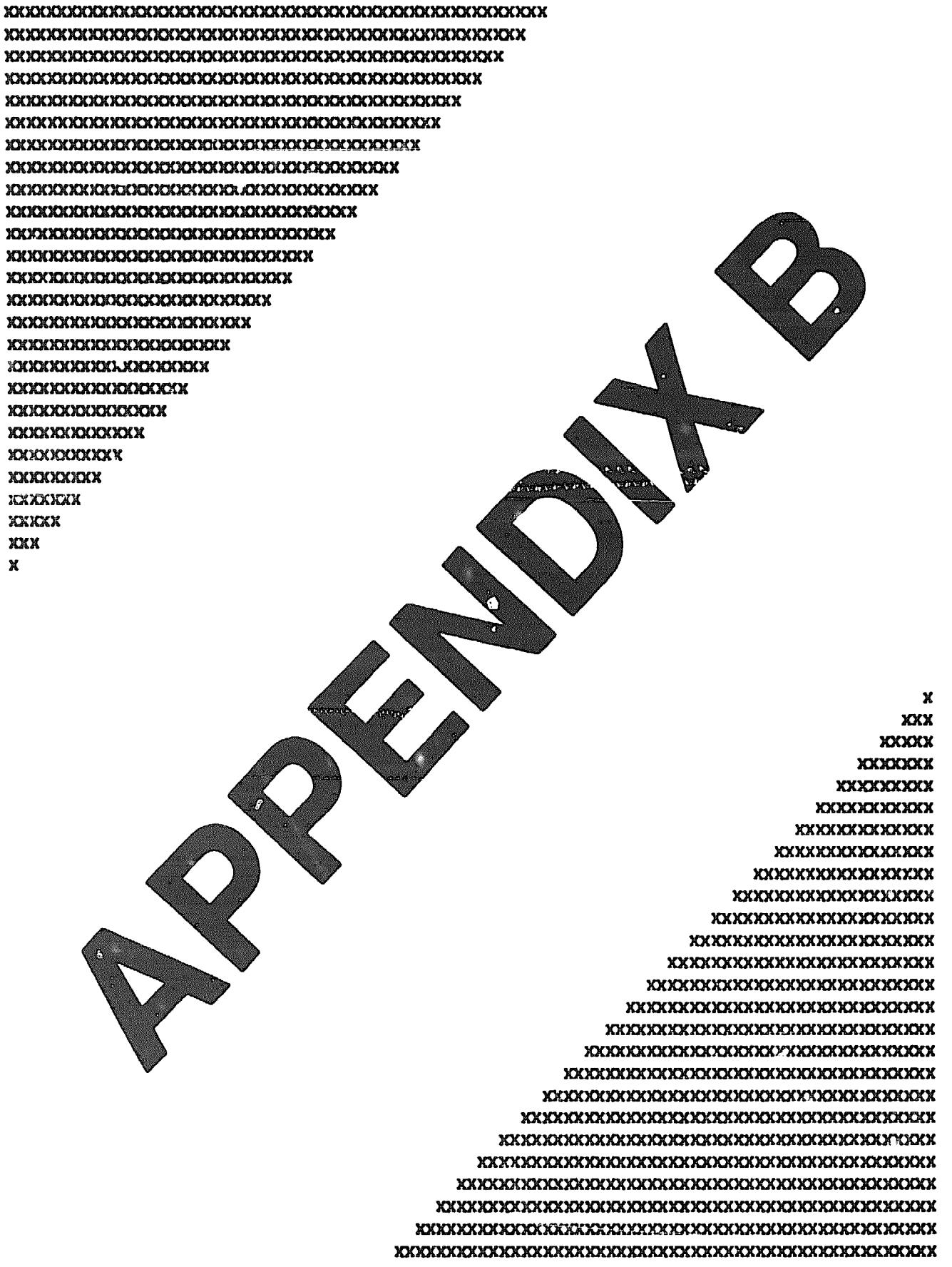
Example A–5: Display for Programming the KFQSA

```
>>> SET HOST/UQSSP/MAINT/SERV 0        !0 refers to the KFQSA

UQSSP Controller (772150)

Enter SET, CLEAR, SHOW, HELP, EXIT, or QUIT

Node     CSR Address      Model
 7       ------- KFQSA -------
? help
Commands:
     SET <node> /KFQSA                  !Sets KFQSA DSSI node
                                        !number
     SET <node> <CSR_address> <model>   !Enables a DSSI device
     CLEAR <node>                       !Disables a DSSI device
     SHOW                               !Displays current
                                        !configuration
     HELP                               !Displays this display
     EXIT                               !Saves the KFQSA program
     QUIT                               !Does not save the KFQSA
                                        !program
Parameters:
     <node>                             !0 through 7
     <CSR_address>                      !760010 to 777774
     <model>                            !21 (disk) or 22 (tape)
? set 0 772150 21
? set 1 760334 21
? set 2 760340 21
? set 3 760344 21
? set 4 760350 21
? set 5 760354 21
? show
Node     CSR Address     Model
 0         762105         21
 1         760334         21
 2         760340         21
 3         760344         21
 4         760350         21
 5         760354         21
 7       ------ KFQSA -------
? exit
Programming the KFQSA...                !Note from the system that
                                        !the KFQSA is being programmed.
```

5. To allow the new program to take effect, turn the system power off by setting the power switch to off (0).
6. Remove the KFQSA from the backplane.
7. On the KFQSA, set switch 1 on the four-position switchpack to off (1). (Figure A–1 shows the location and position of the switchpack.) This action sets the KFQSA to the normal programming mode; switches 2, 3, and 4 are disabled and the DSSI addresses are read from the EEROM.
8. Reinstall the KFQSA in the backplane.
9. Power up the system by setting the power switch to on (1). Wait for the self-tests to complete.
10. At the console prompt, enter `SHOW QBUS` to verify that all addresses are present and correct, as shown in Example A–6.
11. Return to Section 2.3.7 to unpack the expander.

Example A–6: SHOW QBUS Display

```
>>> SHOW QBUS
Scan of Qbus I/O Space
-200000DC (760334)=0000 (300) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-200000DE (760336)=0AA0
-200000E0 (760340)=0000 (304) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-200000E2 (760342)=0AA0
-200000E4 (760344)=0000 (310) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-200000E6 (760346)=0AA0
-200000E8 (760350)=0000 (314) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-200000EA (760352)=0AA0
-200000EC (760354)=0000 (320) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-200000EE (760356)=0AA0
-20001468 (772150)=0000 (154) RQDX3/KDA50/RRD50/RQC25/KFQSA-DISK
-2000146A (772152)=0AA0
-20001920 (774440)-FF08 (120) DELQA/DEQNA/DESQA
-20001922 (774442)=FF00
-20001924 (774444)=FF2B
-20001926 (774446)=FF09
-20001928 (774450)=FFA3
-2000192A (774452)=FF96
-2000192C (774454)=0050
-2000192E (774456)=1030
-20001940 (774500)=0000 (260) TQK50/TQK70/TU81E/RV20/KFQSA-TAPE
-20001942 (774502)=0BC0
-20001F40 (777500)=(004) IPCR

Scan of Qbus Memory Space
>>>
```


APPENDIX B

Appendix B
Programming Parameters for RF-Series ISEs

This appendix describes the procedures for setting and examining parameters for RF-series ISEs.

Two types of DSSI storage adapters are available for VAX 4000, MicroVAX 3000-series, MicroVAX II, and DECsystem systems: an embedded DSSI host adapter that is part of the CPU and the KFQSA storage adapter.

Each storage adapter provides a separate DSSI bus that can support up to seven RF-series ISEs (six ISEs for a dual-host configuration). The adapters make a connection between the CPU and the requested ISE on their respective DSSI bus. Each ISE has its own controller and server that contain the intelligence and logic necessary to control data transfers over the DSSI bus.

B.1 RF-Series ISE Parameters

Six principal parameters are associated with each RF-series ISE:

- Bus Node ID
- ALLCLASS
- UNITNUM
- FORCEUNI
- NODENAME
- SYSTEMID

NOTE: *Each of the above ISE parameters, with the exception of the Bus Node ID, is programmed and examined using the console-based Diagnostic and Utility Protocol (DUP) driver utility. The ISE Bus Node ID is physically determined by the numbered bus node ID plug that inserts into the ISE front panel.*

A brief description of each parameter follows.

The Bus Node ID parameter is provided by the bus node ID plug on the ISE front panel. Each DSSI bus can support up to seven ISEs, bus nodes 0 through 6 (0 through 5 for dual-host systems). Refer to your *Operation* manual for instructions on changing bus node ID plugs.

The ALLCLASS parameter determines the device allocation class. The allocation class is a numeric value from 0 to 255 that is used by the VMS operating system to derive a path-independent name for multiple access paths to the same ISE. RF-series ISEs are shipped from the factory with a default allocation class of zero. Each RF-series ISE to be served to the cluster should have an allocation class that matches the allocation class of the host system. Refer to the *VMS VAXcluster* manual for rules for specifying allocation class values.

The UNITNUM parameter determines the unit number of the ISE. By default, the ISE unit number is supplied by the bus node ID plug on the ISE front panel. Certain multiple bus configurations, described later in this section, require that the default values be replaced with unique ISE unit numbers. To set unit numbers and override the default values, you use the console-based DUP driver utility to supply values to the UNITNUM parameter and to set a value of zero to ISE parameter FORCEUNI.

The FORCEUNI parameter controls the use of UNITNUM to override the default ISE unit number supplied by the bus node ID plug. When FORCEUNI is set to a value of zero, the operating system uses the value assigned to the UNITNUM parameter; when FORCEUNI is set to a value of one, the operating system uses the value supplied by the bus node ID plug.

The NODENAME parameter allows each ISE to have an alphanumeric node name of up to eight characters. RF-series ISEs are shipped from the factory with a unique identifier, such as R7CZZC, R7ALUC, and so on. You can provide a node name of your choosing if you prefer.

The SYSTEMID parameter provides a number that uniquely identifies the ISE to the operating system. This parameter is modified only when replacing an ISE. Only Customer Services representatives and qualified self-maintenance customers can remove an ISE.

The following describes how the operating system uses the ISE parameters to form unique identifiers for each ISE. Configurations that require you to assign new unit numbers for ISEs are also described.

With an allocation class of zero, the operating system can use the default parameter values to provide each ISE with a unique device name. The operating system uses the node name along with the device logical name in the following manner:

NODENAME$DIA*u*

where:

NODENAME is a unique node name and *u* is the unit number.

With a nonzero allocation class, the operating system relies on unit number values to create a unique device name. The operating system uses the allocation class along with the device logical name in the following manner:

$ALLCLASS$DIA*u*

where:

ALLCLASS is the allocation class for the system and ISEs, and *u* is a unique unit number.

Using the KFQSA storage adapter and mass storage expanders, you can fill multiple DSSI busses. Each bus can have seven ISEs (bus nodes 0–6). When a second bus is added to the system, and your system is using a nonzero allocation class, you need to assign new unit numbers for ISEs on one of the busses, as the unit numbers for ISEs throughout the system must be unique. Table B–1 illustrates the need to program unit numbers for a system using both more than one DSSI bus and a nonzero allocation class. In the case of the nonzero allocation class, the operating system sees the ISEs as having duplicate device names.

Table B–1: How the VMS Operating System Identifies the ISEs

Allocation Class=0	Nonzero Allocation Class (Example: ALLCLASS=1)
R7CZZC$DIA0	1DIA0*
R7ALUC$DIA1	1DIA1*
R7EB3C$DIA2	1DIA2*
R7IDFC$DIA0	1DIA0*
R7IBZC$DIA1	1DIA1*
R7IKJC$DIA2	1DIA2*
R7ID3C$DIA3	1DIA3
R7XA4C$DIA4	1DIA4
R7QIYC$DIA5	1DIA5
R7DA4C$DIA6	1DIA6

*Indicates duplicate device names. For one of the DSSI busses, the unit numbers need to be reprogrammed to avoid this error.

The following instructions describe how to change ISE parameters using the DUP driver utility. In the sample procedures, the allocation class will be set to 2, the ISEs will be assigned new unit numbers, and the system disk will be assigned a new node name.

1. Enter the console mode.

   The procedure for programming internal parameters for RF-series ISEs requires that you issue commands to those RF-series ISEs at the console prompt (>>>). You may enter these commands in either uppercase or lowercase letters. Unless otherwise instructed, enter each command, then press Return.

   Enter console mode as follows:

   a. Set the Break Enable/Disable switch on the CPU cover panel to the enable position.

   b. Set the power switch for each unit (both hosts for a dual-host system, and any expanders for expanded systems) to on (1).

   Wait for the system to display the console prompt (>>>).

2. Make sure the ISEs for which you want to set parameters are on line and are not write protected. The Run/Ready button should be (lit), and the Write-Protect button should be out (not lit).

3. For systems with embedded DSSI, enter `SHOW DSSI` at the console prompt for a display of all DSSI devices in your expanded system. For KFQSA-based DSSI, enter `SHOW UQSSP`.

   The firmware displays two lines of information for each ISE. The first line contains the node number and node name. The second line contains the device name and unit number followed by the device type in parentheses.

   For embedded DSSI, the device name consists of the letters DIA*n* and the DSSI host adapter is identified by an asterisk (*). For KFQSA-based DSSI, the device name consists of the letters DU*cn*, where *c* is the controller letter and *n* is a unique unit number.

The following examples show a system with three RF31 ISEs. Example B–1 shows a system with embedded DSSI and Example B–2 shows a system with KFQSA-based DSSI.

Example B–1: SHOW DSSI Display (Embedded DSSI)

```
>>>SHOW DSSI
DSSI Node 0 (R7CZZC)
-DIA0 (RF31)
DSSI Node 1 (R7ALUC)
-DIA1 (RF31)
DSSI Node 2 (R7EB3C)
-DIA2 (RF31)
DSSI Node 7 (*)
>>>
```

Example B–2: SHOW UQSSP Display (KFQSA-Based DSSI)

```
>>>SHOW UQSSP
UQSSP Disk Controller 0 (772150)
-DUA0 (RF31)
UQSSP Disk Controller 1 (760334)
-DUB1 (RF31)
UQSSP Disk Controller 2 (760340)
-DUC2 (RF31)
UQSSP Tape Controller 0 (774500)
-MUA0 (TK70)
```

In this example, each ISE will be assigned an allocation class of 2, and the system disk will be given a new node name. Also, ISEs DIA0, DIA1, and DIA2 (or DUA0, DUB1, and DUC2) will be assigned unit numbers 10, 11, and 12, respectively.

B.2 Entering the DUP Driver Utility

To examine and change internal RF-series ISE parameters, you must first activate the DUP driver utility by setting host to the specific ISE for which you want to modify or examine parameters.

Use the following commands for embedded DSSI:

For VAX 4000 Model 300 systems:

```
SET HOST/DUP/DSSI/BUS:<bus_number> <node_number> PARAMS
```

where:

<bus_number> is the DSSI bus number (0 or 1), and <node_number> is the bus node ID (0–6) for the ISE on the bus.

For all other systems with an embedded DSSI bus:

```
SET HOST/DUP/DSSI <node_number> PARAMS
```

where:

<node_number> is the bus node ID (0–6) for the ISE on the bus.

Use the following command for KFQSA-based DSSI:

```
SET HOST/DUP/UQSSP/DISK <node_number> PARAMS
```

where:

<node_number> is the bus node ID (0–6) for the ISE on the bus.

The following examples show the commands entered at the console prompt to start the DUP server for the ISE at node 0. In Example B–3, you enter `SET HOST/DUP/DSSI 0 PARAMS` **for embedded DSSI. In Example B–4, you enter** `SET HOST/DUP/UQSSP/DISK 0 PARAMS` **for KFQSA-based DSSI.**

Example B–3: Starting the DUP Driver Utility (Embedded DSSI)

```
>>>SET HOST/DUP/DSSI 0 PARAMS
Starting DUP server...
Copyright (c) 1990  Digital Equipment Corporation

PARAMS>
```

Example B–4: Starting the DUP Driver Utility (KFQSA-Based DSSI)

```
>>>SET HOST/DUP/UQSSP/DISK 0 PARAMS
Starting DUP server...
Copyright (c) 1990  Digital Equipment Corporation

PARAMS>
```

B.3 Setting Allocation Class

After entering the DUP driver utility for a specified ISE, you can examine and set the allocation class for the ISE as follows:

1. **At the** `PARAMS>` **prompt, enter** `SHOW ALLCLASS` **to check the allocation class of the ISE to which you are currently connected.**
2. **Enter** `SET ALLCLASS 2` **(or enter the allocation class you desire).**
3. **Enter** `SHOW ALLCLASS` **to verify the new allocation class.**

Example B–5 shows the steps for examining and changing the allocation class for a specified ISE. In the example, the allocation class is changed from an allocation class of 0 to an allocation class of 2.

Example B–5: Setting Allocation Class for a Specified ISE

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

PARAMS>SET ALLCLASS 2
PARAMS>SHOW ALLCLASS

Parameter      Current           Default          Type      Radix
---------  ---------------  ---------------  --------  -----
ALLCLASS                 2                0      Byte      Dec    B
```

B.4 Setting Unit Number

After entering the DUP driver utility for a specified ISE, you can examine and set the unit number for the ISE as follows:

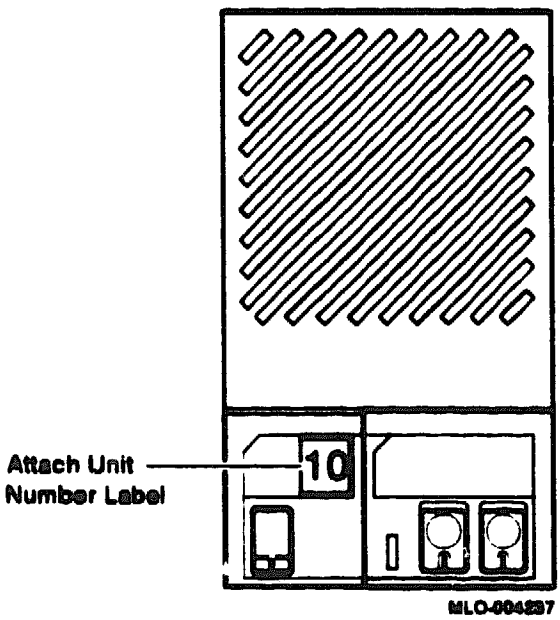
1. At the PARAMS> prompt, enter SHOW UNITNUM to check the unit number of the ISE to which you are currently connected.
2. Enter SET UNITNUM 10 (or enter the unit number you desire).
3. Enter SET FORCEUNI 0 to override the default unit number value supplied by the bus node ID plug.
4. Enter SHOW UNITNUM to verify the new unit number.
5. Enter SHOW FORCEUNI to verify that the current value for the FORCEUNI parameter is 0.

   Example B–6 shows the steps for changing the unit number of a specified ISE from unit number 0 to unit number 10.
6. Label the ISE with its unit number, using the unit number labels shipped with your system. Figure B–1 shows where to affix a unit number label on the ISE front panel.

Example B–6: Setting a Unit Number for a Specified ISE

```
PARAMS>SHOW UNITNUM
Parameter      Current           Default         Type      Radix
---------  ---------------  ---------------  --------  -----
UNITNUM                  0                0      Word      Dec    U

PARAMS>SET UNITNUM 10
PARAMS>SET FORCEUNI 0
PARAMS>SHOW UNITNUM

Parameter      Current           Default         Type      Radix
---------  ---------------  ---------------  --------  -----
UNITNUM                 10                0      Word      Dec    U

PARAMS>SHOW FORCEUNI
Parameter      Current           Default         Type      Radix
---------  ---------------  ---------------  --------  -----
FORCEUNI                 0                1   Boolean     0/1    U
```

Figure B–1: Attaching a Unit Number Label to the ISE Front Panel



B.5 Setting Node Name

After entering the DUP driver utility for a specified ISE, you can examine and set the node name for the ISE as follows:

1. At the PARAMS> prompt, enter SHOW NODENAME to check the node name of the ISE to which you are currently connected.
2. Enter SET NODENAME SYSDSK (or enter the desired alphanumeric node name of up to eight characters).
3. Enter SHOW NODENAME to verify the new node name.

Example B–7 shows the steps for changing the node name of a specified ISE from the factory-supplied name to SYSDSK.

Example B–7: Changing a Node Name for a Specified ISE

```
PARAMS>SHOW NODENAME
Parameter      Current            Default          Type      Radix
---------  ---------------  ---------------  --------  -----
NODENAME          R7CZZC            RF31        String  Ascii   B
PARAMS>SET NODENAME SYSDSK
PARAMS>SHOW NODENAME
Parameter      Current            Default          Type      Radix
---------  ---------------  ---------------  --------  -----
NODENAME          SYSDSK            RF31        String  Ascii   B
```

B.6 Setting System ID

NOTE: *This parameter is modified only when replacing an ISE. Only Customer Services representatives and qualified self-maintenance customers should remove an ISE. All parameters for the replacement ISE should be programmed to match those of the original ISE. When replacing an ISE, be sure to set the SYSTEMID parameter to match that of the original.*

After entering the DUP driver utility for a specified ISE, you can examine and set the system ID for the ISE as follows:

1. At the PARAMS> prompt, enter SHOW SYSTEMID to check the system ID of the ISE to which you are currently connected.
2. Enter SET SYSTEMID *System ID* (enter the desired serial number-based system ID).

3. Enter SHOW SYSTEMID to verify the new system ID.

Example B–8 shows the steps for changing the system ID of a specified ISE from the factory-supplied system ID to 1402193310841 (the system ID for the replacement ISE is programmed to match that of the original ISE).

Example B–8: Changing a System ID for a Specified ISE

```
PARAMS>SHOW SYSTEMID
Parameter      Current            Default          Type      Radix
---------  ---------------  ---------------  --------  -----
SYSTEMID     0402193310841     0000000000000  Quadword    Hex    B

PARAMS>SET SYSTEMID 1402193310841

PARAMS>SHOW SYSTEMID

Parameter      Current            Default          Type      Radix
---------  ---------------  ---------------  --------  -----
SYSTEMID     1402193310841     0000000000000  Quadword    Hex    B
```

B.7 Exiting the DUP Server Utility

After you have completed setting and examining internal ISE parameters, enter the WRITE command at the PARAMS> prompt to save the ISE parameters you have changed using the SET command. The changes are recorded to nonvolatile memory.

If you have changed the allocation class or node name of an ISE, the DUP driver utility will ask you to initialize the controller. Answer Yes (Y) to allow the changes to be recorded and to exit the DUP driver utility.

If you have not changed the allocation class or node name, enter the EXIT command at the PARAMS> prompt to exit the DUP driver utility for the specified ISE. Example B–9 shows the procedure for saving parameter changes. In the example, the controller is initialized.

Example B–9: Exiting the DUP Driver Utility for a Specified ISE

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

Stopping DUP server...
>>>
```

NOTE: *You must repeat the procedures in this chapter for each ISE for which you want to change parameters.*

Example B–10 shows the display for the SHOW DSSI command for a system with embedded DSSI after the unit numbers for the ISEs have been changed from 0, 1, and 2 to 10, 11, and 12. Notice that the bus 0 device names are now DIA10, DIA11, and DIA12.

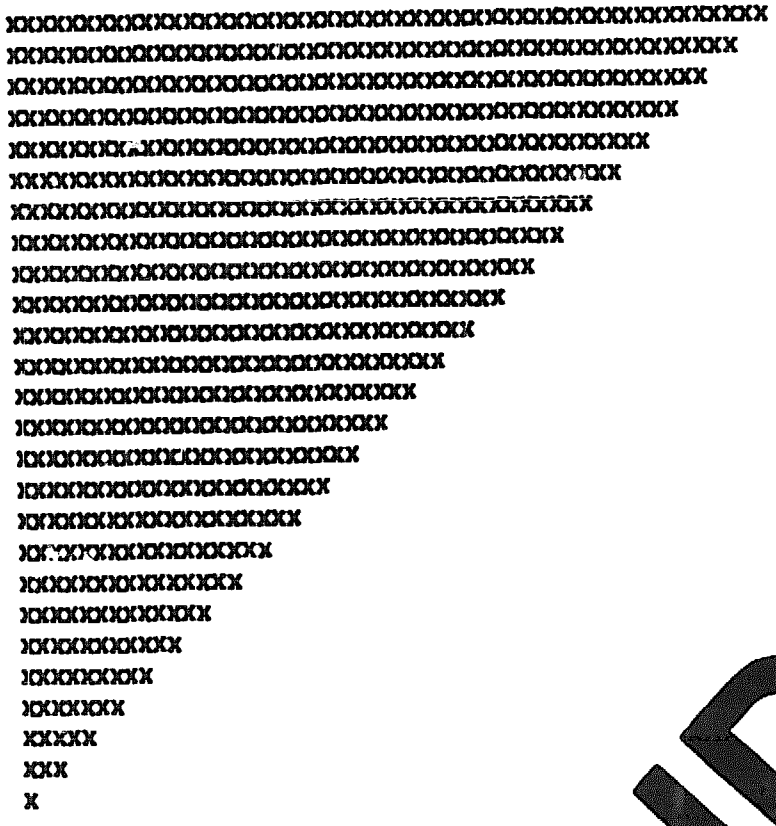
Example B–10: SHOW DSSI Display

```
>>>SHOW DSSI
DSSI Node 0 (SYSDSK)
-DIA10 (RF31)
DSSI Node 1 (R7ALUC)
-DIA11 (RF31)
DSSI Node 2 (R7EB3C)
-DIA12 (RF31)
DSSI Bus 0 Node 7 (*)
>>>
```

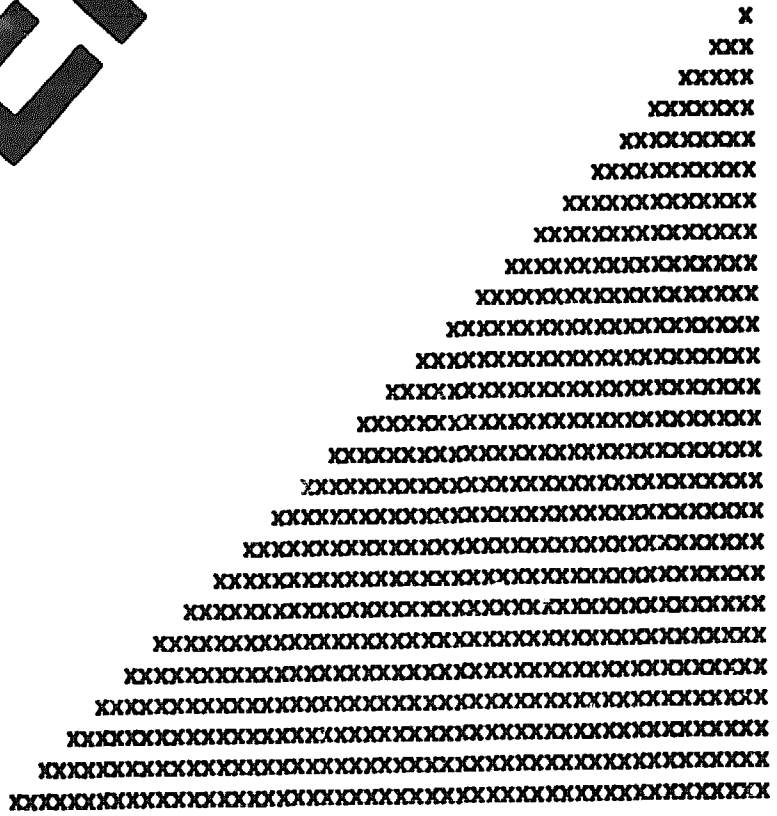
Example B–11 shows the display for the SHOW UQSSP command for a system with KFQSA-based DSSI.

Example B–11: SHOW UQSSP Display (KFQSA-Based DSSI)

```
>>>SHOW UQSSP
UQSSP Disk Controller 0 (772150)
-DUA0 (RF31)
UQSSP Disk Controller 1 (760334)
-DUB1 (RF31)
UQSSP Disk Controller 2 (760340)
-DUC2 (RF31)
UQSSP Tape Controller 0 (774500)
-MUA0 (TK70)
```



APPENDIX C



Appendix C
Related Documentation

The following documents contain information relating to the B400X expander.

Document Title	Order Number
BA430/BA440 Enclosure Maintenance	EK–348AB–MG
KFQ Storage Adapter Installation and User Manual	EK–KFQSA–IN
Microsystems Options	EK–192AC–MG
RF71 Disk Drive Installation Manual	EK–RF71D–IM


APPENDIX D

Appendix D
Maintenance Notes

This appendix contains notes for installing and maintaining the B400X expander.

Q-Bus Signal Termination: Do Not Operate Without Q-Bus Module

The M9404–PA module holds termination resistors for the Q-bus backplane in the system. The original terminations on the system backplane are removed during the installation of the expander. The M9404–PA module that resides in the system is a Q-bus termination point; as a result, operating an expanded system without the M9404–PA module installed causes a change in the Q-bus signal termination that may result in unpredictable system operation.

To separate the system Q-bus from the B400X expander Q-bus, unlock and remove the two Q-bus cables at the M9404–PA module (in the host). Do not remove the M4904–PA from the backplane. Proper system Q-bus termination will be maintained.

Q-Bus Signals C and D: Confined Within Respective Enclosure

This Q-bus expansion interface carries the Q-22 backplane signals (sections A and B of each Q-bus slot) from the system to the B400X expander. However, the CD signals (sections C and D of each Q-bus slot) are not carried from the system to the expander and thus remain confined within the respective enclosure.

Q-Bus Cable Intersection: Part of Cable Strategy

The two 50-pin Q-bus cables, when connected to the system and the B400X expander correctly, physically cross one another. Unlike typical parallel cabling, these cables intersect as part of the cable interconnect strategy to eliminate the possibility of connecting the Q-bus interface incorrectly.

System Minimum Load Requirements

The B400X expander comes with one power supply, as is standard in BA400-series enclosures. DC load module M9060–YA is required for minimum loading on the power supply in the B400X expander, depending on option module configuration. The +5 Vdc output of the supply must have a minimum 5 A of current load to keep the supply operating, or the system will shut down.

Wire-ORed Power Signals

Q-bus signals DC OK and P OK are now "wire-ORed" between the system enclosure and the B400X expander, as well as between the two power supplies within each enclosure. Functionally, the DC OK and P OK signals continue as before, except that now two power supplies are involved. Failure at DC OK or P OK in either the system enclosure or the B400X expander negates the corresponding DC OK or P OK in both the system enclosure and the B400X expander enclosure simultaneously, forcing a halt of the entire system. As before, if one of the power supplies initiates this action, that power supply turns off its indicator while the remaining power supply indicators remain illuminated.


APPENDIX E

Appendix E
B400X Expander FRUs

This appendix lists the major field replaceable units for the B400X expander. The FRUs for the B400X expander are the same as for the B\1430 enclosure. Table E–1 lists the part number for each B400X expander FRU. Table E–2 lists the expander external cables and Table E–3 lists the expander miscellaneous components.

Table E–1: B400X Expander FRUs

Part Number	FRU Description
H7874–00	Power supply assembly
54–20181–01	B400X backplane
12–31500–01	Fan, 6" 24 Vdc
70–27044–02	Indicator panel
17–02493–01	Panel cable
70–28083–01	Bulkhead assembly
17–00083–43	Power cable, 120 Vac
70–27458–01	Internal DSSI cable
70–27459–01	Internal SCSI cable
M9715–AA	Interface module

Table E–2: B400X Expander External Cables

17–02154–03	DSSI 50 conductor cable
17–02659–02	SCSI cable (BC06P–06)
17–02638–01	Power control cable, BA400–BA400
17–02637–01	Power control cable, BA200–BA400
17–13756–A8	Ground Cable

Table E–3: B400X Expander Miscellaneous Components

12–28766–19	DSSI unit ID plugs (11)
12–28766–28	SCSI unit ID plugs (11)
12–33902–01	DSSI port protector

Table E–3 (Cont.): B400X Expander Miscellaneous Components

12–33377–01	SCSI port cover
M9404–PA	Q-Bus expansion module
M9405–PA	Q-Bus expansion module
17-02048-01	Q-Bus expansion cable
M9060–YA	+5V/12V load module
M9047	Grant Card
74–33507–01	Dual blank panel (spacer for grant card)
12–26922–01	Finger, grounding


INDEX

Index

S

U

W