BA430/BA440 Enclosure Maintenance

Order Number EK–348AB–MG–002

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Preface

This manual provides reference, installation, and maintenance information for the BA430 and BA440 enclosures.

Intended Audience

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

Organization

This manual has three chapters and one appendix.

Chapter 1 provides an overview of the system enclosures, describing controls, mass storage area and capacity, backplane, signal distribution, power distribution, I/O connections, and configuration guidelines.

Chapter 2 lists site preparation considerations and shows how to install the BA430/BA440 office pedestal configuration.

Chapter 3 describes how to remove and replace field replaceable units (FRUs). This chapter contains a list of the BA430/BA440 FRUs.

Appendix A contains a list of related documentation.

Warnings, Cautions, and Notes

Warnings, cautions, and notes appear throughout this manual. 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 electric 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

BA430/BA440 Enclosure Description

1.1 Introduction

The BA430/BA440 pedestal enclosure shown in Figure 1–1 is used in a free standing pedestal for use in an office environment.

The BA430/BA440 consists of the following:

- Pedestal system
- Dual front door access
- Mass storage shelf for tape and disk integrated storage devices
- System control panel (SCP)
- Enclosure card cage
- Power supply
- Fan tray
- Backplane
- Power cord

Figure 1–1: BA430/BA440 Pedestal Enclosure
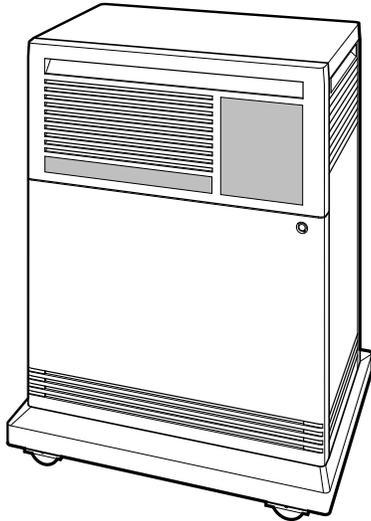
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1.2 Enclosure Keylock Access

To gain access to the BA430/BA440 enclosure, there is a three-position lock that determines which controls you can access (Figure 1–2). The level of access is as follows:

1. Top position opens the upper door only.

2. Middle position locks both doors.

3. Bottom position opens both doors together.

Figure 1–2: Keylock Positions

Top Key Position

Bottom Key Position
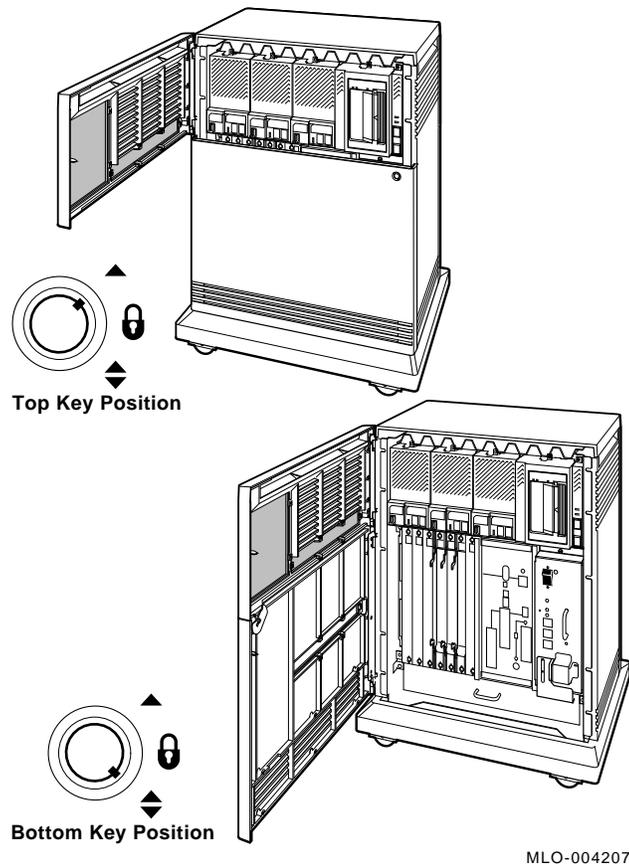
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1.3 Module Handles and Covers

The BA400-series and the BA200-series enclosures provide front access to the CPU and memory and option modules, making it easier to access them. The two main differences between modules used in the BA200-series and the BA400-series enclosures and those used in other system enclosures are:

•   Modules that connect to external devices have bulkhead handles with the I/O connector on the handle. The handles replace the insert panels

and internal cabling found in other enclosures. This design is easier to maintain since it eliminates problems caused by faulty internal cabling.

- Modules that do not have external I/O connections have blank bulkhead covers.

The module handles and blank covers form an electrical noise seal that complies with requirements for electromagnetic interference (EMI) by (1) keeping radio frequency interference generated by the system in the enclosure and (2) keeping external radio frequencies from entering the enclosure. The module handles and blank covers also help guarantee proper airflow.

Each handle or cover has two captive quarter-turn Phillips screws to hold the module in the card cage. Module handles also use levers to help install or remove a module from the card cage.

The five basic types of handles and covers or panels used for BA400-series compatible modules are:

- Single-width flush handle

- Single-width recessed handle

- Single-width ratchet ejector handle (BA440 CPU and memory only)

- Single-width blank cover

- Double-width console panel (BA430 only)

1.3.1 Filler Panel Between Flush and Recessed Handles

When you use a flush-handle module next to a recessed-handle module, you must install a metal filler panel (Figure 1–3) between the modules. Without the filler panel, circuitry on a flush-handle module adjacent to the recessed-handle module is exposed. The filler panel (70–24505–01) has four sets of finger stock that provide an effective chassis ground between the handles. Flush handles and covers have screw holes at the top and bottom of each side for the installation of this filler panel.

Ratchet ejector handles are only used with some CPU and memory modules (Figure 1–3). To install a module with ratchet ejector handles, insert the module into the guide slot and position the ratchet ejector fingers into the latching slots at the top and bottom. Press the ratchet levers in until the module is seated in the backplane. Latch the ratchet ejectors when a positive feel of the bottom is realized. This removes any slack that may exist between the module fingers and the backplane. These handles are used to ensure a positive connection of the module in the backplane.

Figure 1–3: BA400-series Module Handles and Covers

Captive Screw

Filler
Panel

Single-Width
Blank Cover

Double-Width
Blank Cover

Single-Width
Flush Cover
with Handles

Single-Width
Recessed Cover
with Handles

Stiffner with
Ratchet Handles
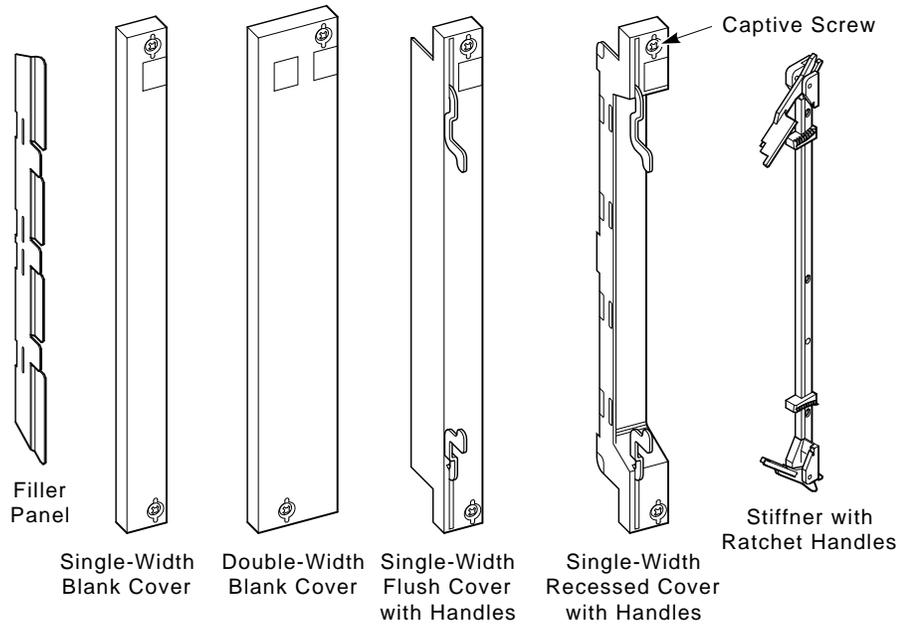
MLO-005413

Some modules have special configurations, such as the BA440's H3604 console module, which is a hinged module cover that covers the CPU and four memory modules. The H3604 console module also provides an I/O connector for the CPU. Table 1–1 describes the common handle variations.

Table 1–1: BA400-Series Module Handles and Cover Types

Part	Description
Single-width blank cover	Covers a standard Q22-bus module that does not have external I/O connectors (for example, a TQK70). If you install this type of cover next to a module with a recessed handle, you must add a metal filler panel to maintain FCC compliance.
Single-width ratchet ejector handle	The CPU module is equipped with ratchet ejector handles to keep the right amount of tension against the backplane connector. This ratchet arrangement causes the CPU and memory to make a tighter contact with the backplane bus and provides better system reliability.
Single-width recessed handle	The handle is riveted to the module. This style is the preferred handle for all BA200-series and BA400-series modules with external I/O connectors. The CXA16 and CXY08 communication modules use this type of handle.
Single-width flush handle	Used when a recessed handle would interfere with the module circuitry or I/O connector. The flush handle is also riveted to the module.
Hinged console module (BA440 only) with I/O (H3604)	The H3604 console module is a hinged I/O panel that covers the CPU module and four memory modules.

NOTE: *The H3604 console module interfaces with the CPU module through a short ribbon cable that connects the CPU and the H3604 console module.*

1.4 Mass Storage Shelf

The BA430/BA440 enclosure has a mass storage shelf that extends across the top of the enclosure. See Figure 1–4. The shelf may contain:

- RZ-series ISEs
- RF-series ISEs
- TK-series tape drive
- TLZ04 tape drive
- System Control Panel (SCP)

Figure 1–4: BA430/BA440 Chassis and Mass Storage Area
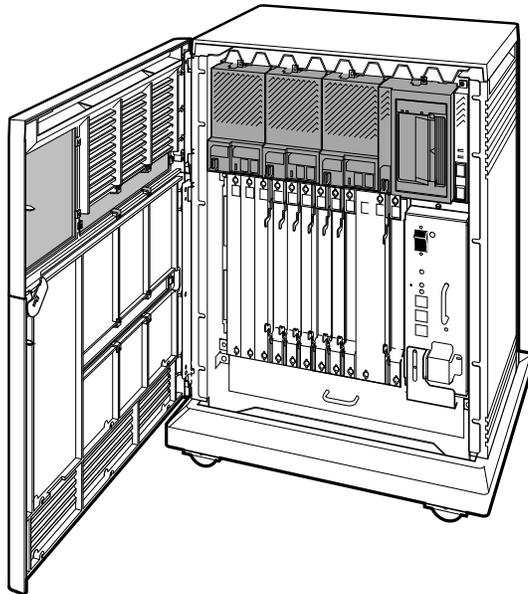
■ Mass Storage Shelf

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1.5 RF-Series ISE

An RF-series Integrated Storage Element (ISE) is a Digital Storage System Interconnect (DSSI) contains bracket/slides designed for mounting in the BA430/BA440 enclosure. The RF-series ISE has a front panel that contains controls and indicators Figure 1–5.

As an example, three RF71s can be installed, giving the system a total disk capacity of 1.2 Gbytes (400 Mbytes each).

Mass storage devices are mounted from the front of the enclosure with shock-mounting hardware. This shock-mounting hardware is different, depending on the type of device being used.

Figure 1–6 shows the RF-series ISEs in the BA400-series where Bracket/ slides are mounted on the ISE for easier installation and removal.

Figure 1–5:   RF-series ISE Front Panel

Run/Ready Button

Write-Protect Button

Bus Node
ID Plug

Fault Indicator
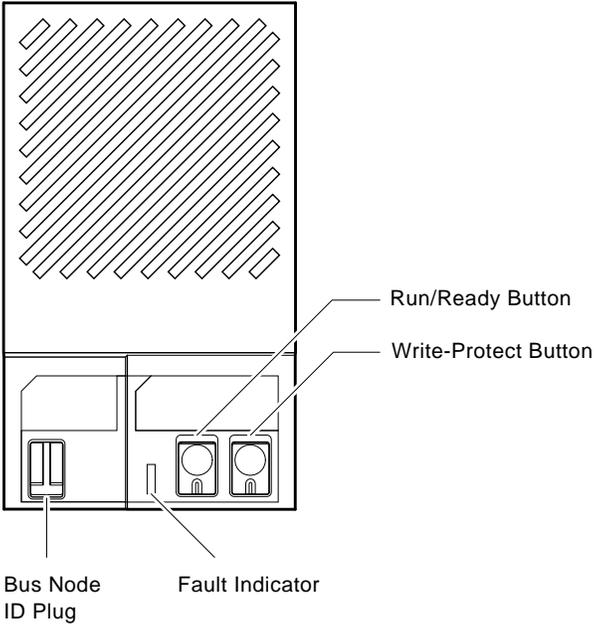
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Figure 1–6: Bracket Slides, used on BA430/BA440 Compatible ISEs

Bracket Slides

MLO-004200
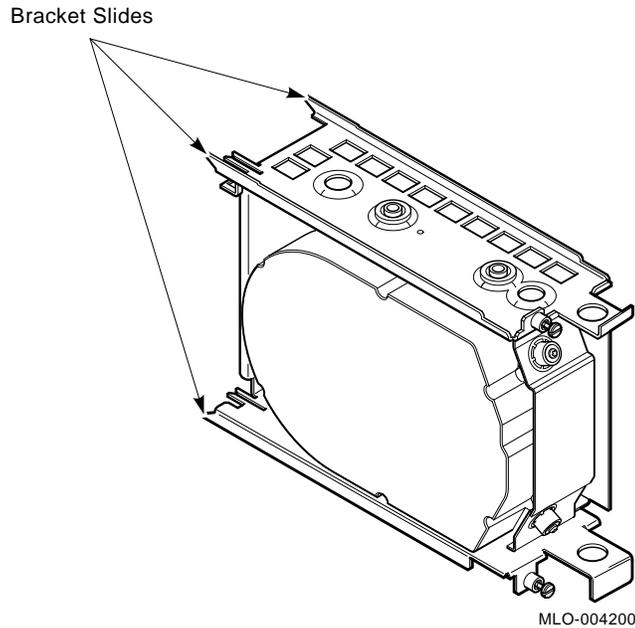
1.6 RZ-Series ISE

An RZ-series ISE is a Small Computer System Intergration (SCSI) drive that is typically configured in the first three spaces on the left side of the mass storage area (Figure 1–7).

NOTE: *VAX 4000 systems do not support RZ-series ISEs.*
However, an RZ-series drive can be mounted in the space to the far right on the storage area and when a tape drive is not present in the system enclosure a spacer is used to fill the extra space. Bracket/slides are mounted on the ISE for easier installation and removal.

Figure 1–7: RZ-series ISE Front Panel
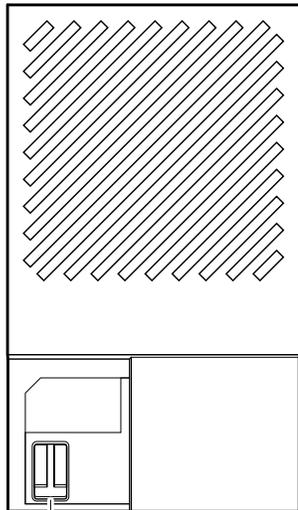
Bus Node
ID Plug

MLO-005185

1.7 Tape Drives

Two types of tape drives are shown here and must be installed in the space on the far right of the storage area.

1.7.1 TK70 Tape Cartridge

The top right compartment of the BA430 enclosure can contain an ISE (RF or RZ), a TK70 tape drive or an Rdat (TLZ04 controller) device. The TK70 tape drive holds one removable tape cartridge. The ISA can read data written on either a CompacTape II or CompacTape cartridge. You may use a CompacTape II or CompacTape cartridge as an input device to load software or data into your system. You should use a CompacTape II as an output device to make copies or backups of software or data. Section 3.6 shows an example of a TK70 tape ISE with controls and indicator lights labeled.

Figure 1–7: TK-series Tape Drive

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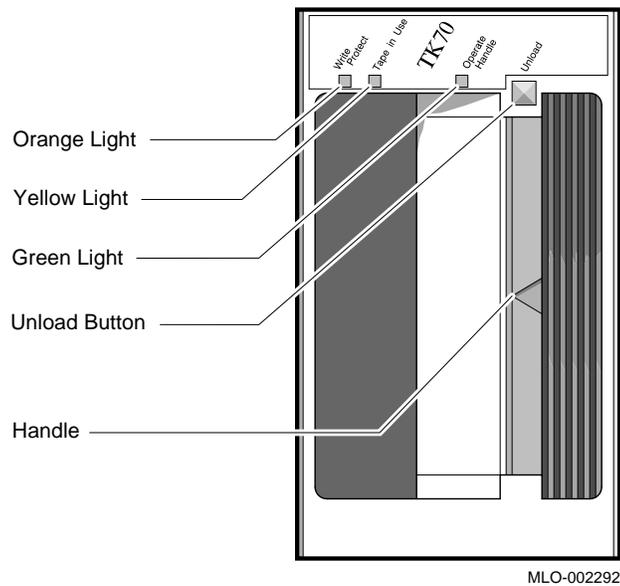
1.7.2 TLZ04 Cassette Tape Drive

The TLZ04 cassette tape drive can store up to 1.2 Gbytes of data on a TLZ04–CA cassette tape Figure 1–9. The TLZ04 tape drive is installed on the far right of the storage area.

1.8 System Control Panel (SCP)

The BA430/BA440 SCP has the following indicators and buttons (Figure 1–10):

- Temperature warning indicator
- DC OK indicator
- Halt button/indicator
- Restart button/indicator

Figure 1–9: TLZ04 Tape Drive

Unload
Button

Yellow Indicator

Green Indicator
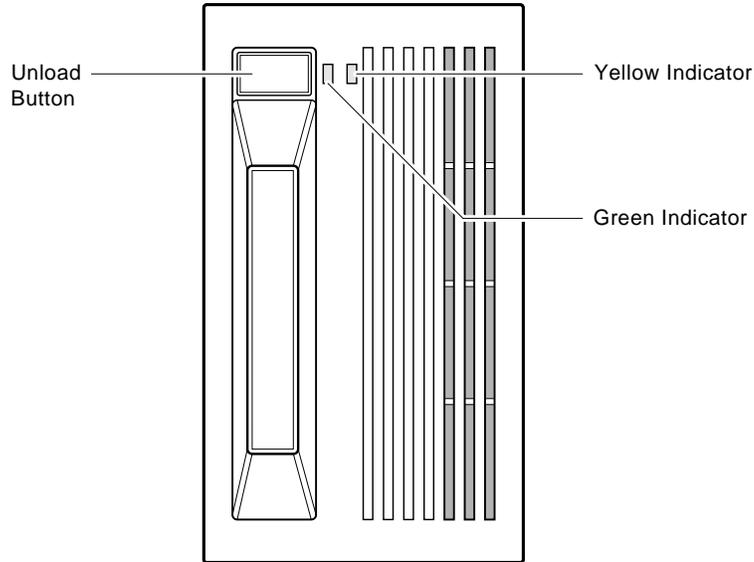
MLO-005328

Figure 1–10: SCP Identification

Temperature
Warning Indicator

DC OK Indicator

Halt Button
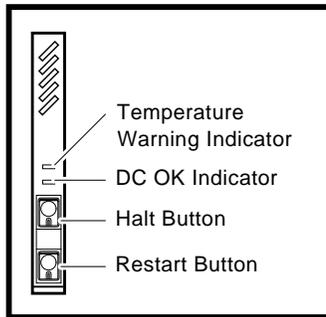
Restart Button

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NOTE: *The board behind the system's SCP contains switches that can be set to off to prevent accidental activation of the Halt and Restart buttons. See Figure 1–11.*

The temperature warning indicator shows that the system's internal temperature is approaching a level that may cause system components to overheat. If the internal temperature raises unacceptably, you will hear an audible pulsing sound and the temperature warning indicator will flash. The sound and visual marker are warning you of a possible temperature condition, before the system automatically shuts down. This feature allows you time to take corrective action. You could lower the room's temperature, remove airflow obstructions, or perform an orderly system shutdown to prevent data loss.

The green DC OK indicator shows that the voltages are within the correct operating range. If the DC OK indicator is not lit when the system power is on, then a problem exists with the power supply.

Below the DC ok indicator are the Halt and Restart button indicators. The Halt button is a two-position button. When pressed, the system halts and the Halt LED is lit as the console mode prompt (>>>) is displayed on the terminal screen. Before you can enter console commands, press the Halt button again to return it to the out position. Now you can enter console commands. If by mistake you press the Halt button, type C and press Return to continue.

CAUTION: *Pressing the Halt button halts the system unconditionally, in spite of setting the Break Enable/Disable switch on the console module.*

The Run/Restart button/indicator is located below the Halt button indicator. When pressed, the system returns to a run or reboot condition. If you have specified a device as the boot device and if the Break Enable/Disable switch is set to Disable, the system will reboot the system software.

1.9 Enclosure Modification

A system manager may request the following modifications to the SCP and fan speed control.

Switches located on the SCP board can be used to disable the SCP button functions. For example, if you were going to leave the access doors open when training new people on the system this could prevent accidental system shutdown.

When a system is located in an area where fan noise is more tolerable to users, the speed of the fans can be increased. This action would take advantage of a potential increase in system reliability, because the system components function in a cooler environment.

1.9.1 Halt and Restart Switch Disable

There are four switches located on the top of the system control panel. These switches, when positioned off, disable the Halt and Restart button functions on the SCP. This could be used as a safety feature. When the upper door is open, these switches protect the system from accidentally being halted or restarted. Figure 1–11 shows the location of the switch pack, which allows the disabling of the SCP buttons. The factory configuration is always set to halt and restart enabled (switches on).

Figure 1–11: SCP Enable/Disable Switch Location

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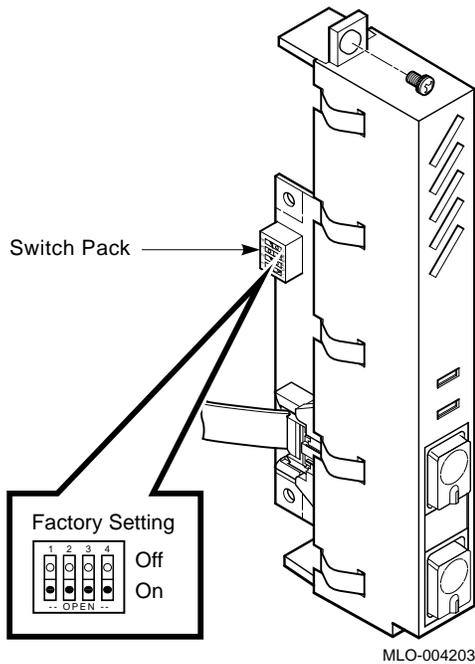
Switch position identifications are listed in Table 1–2.

Table 1–2: SCP Switches and Functions

Switch	State	Function
1	—–	Unused
2	on	Halt Switch Enable
3	on	Halt Indicator Enable
4	on	Restart Switch Enable

1.10 Enclosure Card Cage

The order of modules is different for the BA430 and the BA440 enclosures. Open the lower access door and listed from right to left are the option modules and other elements that make up each enclosure.

1.10.1 Components Specific to the BA430 Enclosure

The modules comprising the BA430 enclosure are listed here with their backplane slot location:

- Interface module (M9715–AA), slot 0

- I/O module (M7638) slot 1

- Hinged CPU module (slot 2)

- Console module (H3602) covers the CPU module and one memory module, slots 2 and 3

- Memory slots 3 through 6 (4 slots)

- Option slots, slots 7 - 12

1.10.2 Components Specific to the BA440 Enclosure

The module comprising the BA440 enclosure are listed here with their backplane slot location:

- CPU module, slot 5

- Memory slots, slots 1 - 4

- Hinged console module (H3604) hinged module (covers four memory slots and one CPU slot)

- Option slots (slots 6 - 12)

1.11 Console Modules and I/O Panel

The BA430 enclosure uses the H3602 console module which is installed over slot 2 and slot 3 (the CPU module and one memory module). The I/O Panel contains two SCSI I/O connectors.

The BA440 enclosure uses the hinged H3604 console module which is installed on hinge mounted over the CPU and the four memory modules Figure 1–13.

1.11.1 H3602 Console Module (Used in BA430)

The H3602 console module is used on the BA430 enclosure system. This module covers two backplane slots (slot 2 and 3). Connect the console terminal and additional devices as follows:

1.11.2 H3604 Console Module (Used in BA440)

\ Figure 1–13)
The H3604 console module is a multifunction module that covers the CPU and memory locations (4) and is shown in Figure 1–13. The four memory modules occupy the first four slots on the right side, left of the memory modules is the CPU, which must occupy the fifth slot.

The H3604 console module Figure 1–13 allows the CPU to interface to a serial line console device, a DSSI device, and to the Ethernet with the use of either a ThinWire BNC connector or a standard Ethernet 15-pin transceiver connector. The hinged H3604 console module has the following controls, ports, and indicators:

- 100-pin CPU module interface connector

- Baud rate select switch

- Language inquiry switch

- Hexadecimal display

- Halt/Enable switch

- Console serial MMJ connector

- Ethernet selector switch

- Ethernet port features

    - Standard Ethernet connector (15-pin)

Figure 1–12:   H3602 CPU Cover and H3605 I/O panel (Used in BA430)

SCSI In/Out

SCSI In/Out

CPU Cover Panel

Function Switch

Standard Ethernet Connector

LED Display

Operation Switch

Modified Modular Jack

Ethernet Connector Switch

ThinWire Ethernet Connector
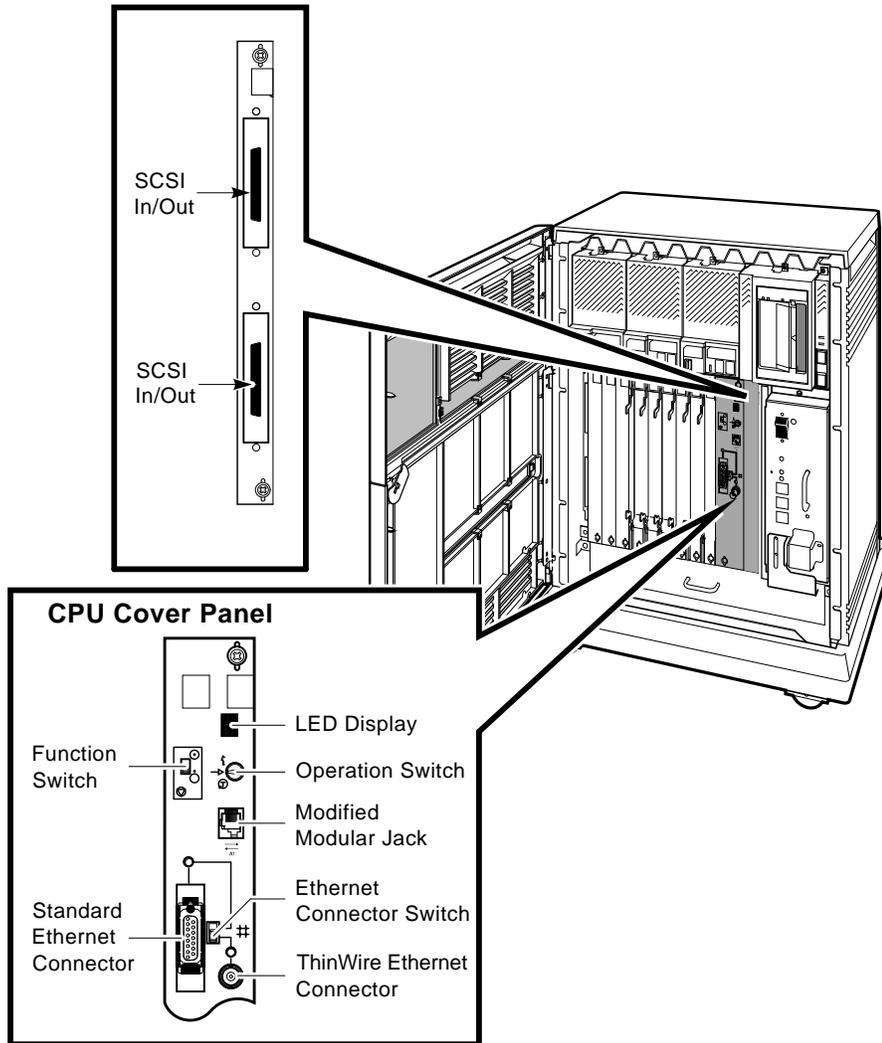
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- ThinWire Ethernet BNC connector
- Standard/ThinWire select with indicator LEDs and switch
- Fused current surge protection

- Ethernet serial transceiver chip (SIA)
- Daisy chain DSSI port
  - Two external (50-pin) Honda connectors (X = in/out, Y = in/out)
  - Two DSSI bus node ID select plugs
  - DSSI terminator (fuse protected)
  - -9 V DC/DC converter
  - TOY clock oscillator (25.6 Khz)
  - Ethernet selection LEDs (2)

Figure 1–13:   H3604 Console Module (Used in BA440)
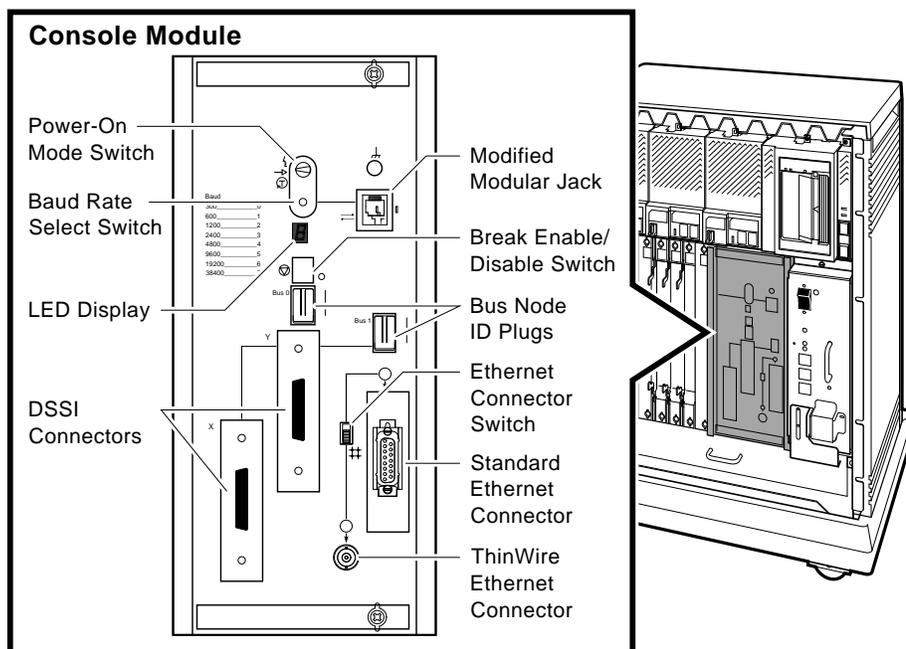
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Figure 1–14 shows the location of the time of year (TOY) clock battery pack, fuses and power connector.

Figure 1–14: H3604 Rear View (Used in BA440)

Battery Unit

J1 = TOY Clock Battery
J5 = H3604 Power
J6 = CPU Interface
W2 = Not Used
W4 = Not Used

F1 = ThinWire Ethernet Power, .5A
        P/N = 12-09159-00
F2 = -12V Power, .062A
        P/N = 90-09122-00
F3 = DSSI Terminator Power, 2.0A
        P/N = 12-10929-06
F4 = Standard Ethernet Power, 1.5A
        P/N = 12-10929-08

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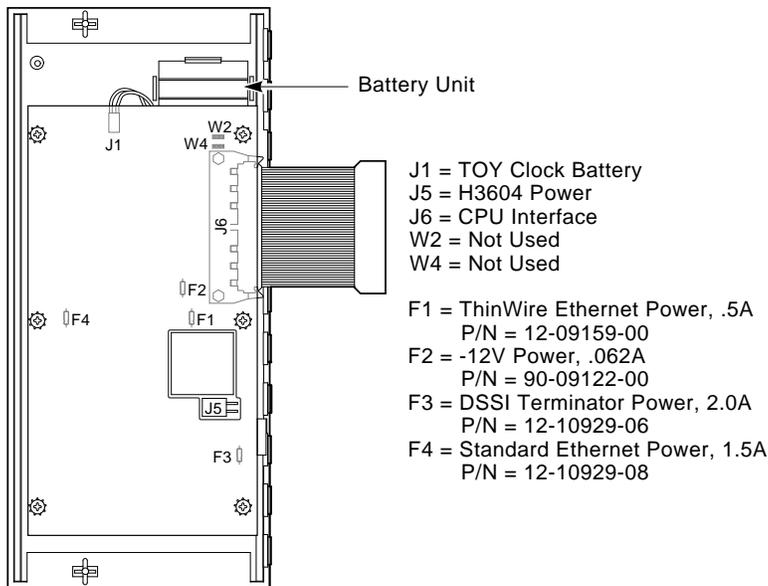
1.12 Interface Module M9715–AA (Used in BA430)

The M9715–AA interface module is located on the extreme right, next to the power supply (backplane slot 0). The M9715 I/O provides terminator power for both the DSSI and SCSI busses. Slot 0 is a dedicated dual C/D backplane slot on the Q22- bus (J24).

1.13 Power Supply (H7874)

Both the BA430 and BA440 enclosures contain a modular H7874 power supply (Table 1–3). The power supply plugs into the backplane through two connectors. The H7874 power supply delivers the following maximum current:

    22 amperes at +12.1 Vdc
    60 amperes at +5 Vdc
    7 amperes at +3.4 Vdc
    4 amperes at -12.1 Vdc

Figure 1–22: Power Supply Indicators

Power Switch
AC Present Indicator
DC OK Indicator
Fan Failure Indicator
Over Temperature Condition Indicator
Power Bus Connectors
Power Cable Connector
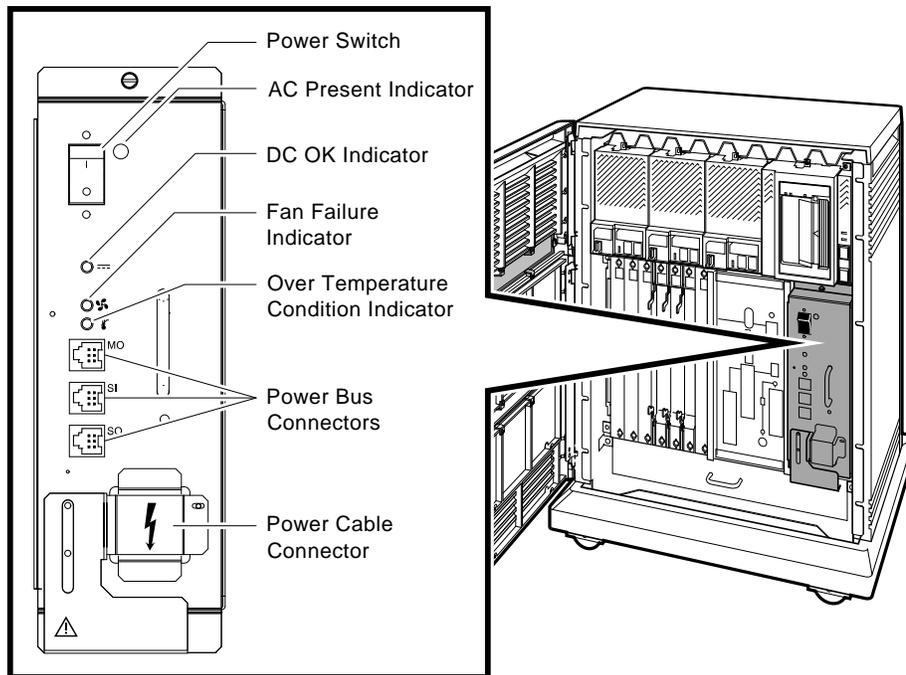
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The combined maximum current at +12.1 Vdc, -12.1 Vdc, +3.4 Vdc, and +5 Vdc must not consume more than 600 watts of power. See the configuration worksheet for details. Figure 1–22 for BA440 enclosure and Figure 1–22 for BA430 enclosure.

Each mass storage device receives power through an 80-pin connector on the backplane located in back of each drive unit.

Also, the H7874 power supply has an ac switch and three power controller I/O connectors for chained operation when used in a multienclosure configuration (Figure 3–22).

Table 1–3: H7874 Power Supply Switches, 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 system 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 system 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 indicator (amber)	The Over Temperature indicator lights if the system 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 a system expander. The power bus allows you to turn power on and off for the system through one power supply designated as the main power supply: this way, one power switch can control power for an expanded system (Figure 3–22).
MO	The main out connector 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.
SI	The secondary in connector receives the power bus control signal from the main 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.
SO	The secondary out connector sends the signal down the power bus for configurations of more than one expander.

NOTE: *The H7874 power supply automatically selects either 120 or 240 Vac when power is turned on.*

The power supply enters and completes a shutdown sequence whenever the BPOK H signal is negated. When BPOK H is asserted high on the Q22-bus, the power system is in a state to allow normal system operation. The following conditions negate BPOK H:

- Temperature sensor triggered

- An over current condition

- An over voltage condition

- Loss of ac input

- Fan failure

- Input voltage greater than 132 Vrms or less than 88 Vrms (if in 120 Vrms mode) or input voltage greater than 264 Vrms or less than 176 Vrms (if in 240 Vrms mode)

1.14 Fan Tray

The BA430/BA440 enclosure has two 15-cm (6-in) dc fans (Figure 1–16) and Figure 1–17 below the card cage. The air is pulled in through the top slots of the enclosure and forced through the ISEs, power supply, and module options, and then expelled through the vents at the bottom of the enclosure. A temperature sensor in the power supply adjusts the volume of air by varying the fan's speed based on the system's temperature. The input voltage to the fans varies between 10 Vdc and 20 Vdc, depending on the internal temperature of the power supply.

Figure 1–16:   BA430/BA440 Fan Tray Location
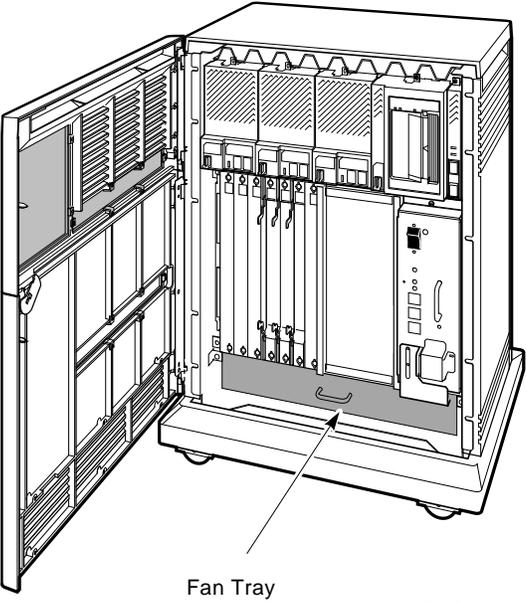
Fan Tray

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Figure 1–17:   Fan Tray Extended

Captive Screws
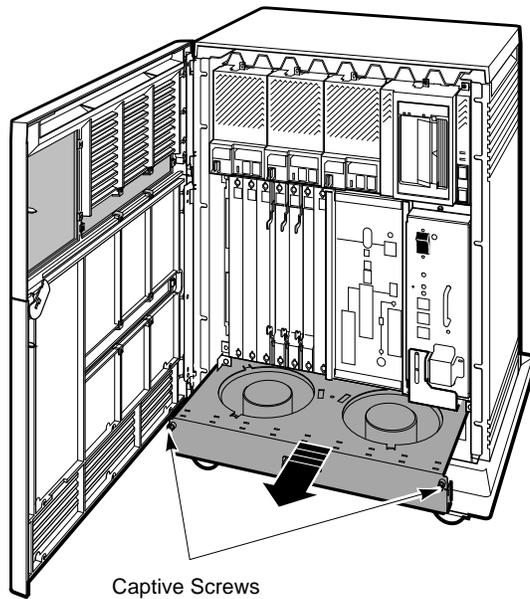
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1.14.1 Fan Speed Control Disable

Some system managers request that the enclosure fans run at the maximum rate at all times, to take advantage of a potential increase in system reliability.   The system environment must not exceed the limits described in the site preparation document. Figure 1–18 shows the location of the fan speed control (FSC) jumper.

Figure 1–18:   FSC Jumper Location

Factory
Setting

FSC
Disabled
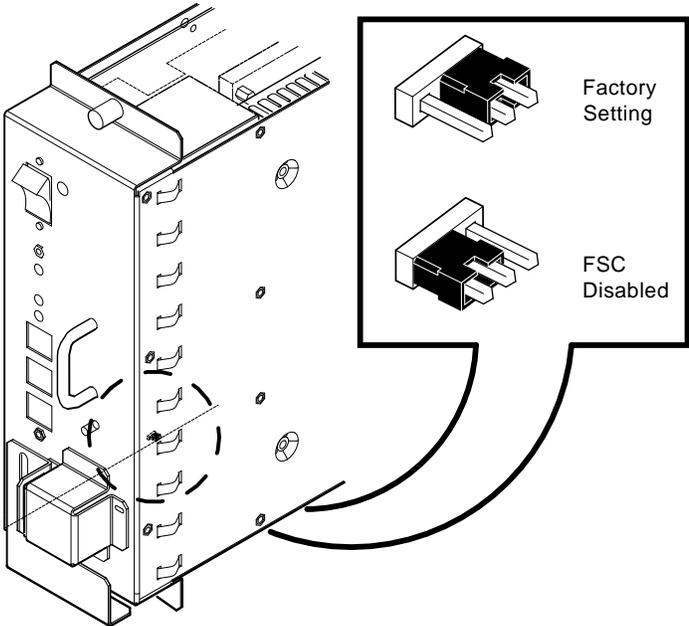
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1.15 Backplanes

Different backplanes are used in the BA430/BA440 Enclosures; backplane 54–20181–01 is used in the BA430 and backplane 54–19354–01 is used in the BA440 enclosure.

1.15.1 BA430 Backplane (54–20181–01)

The BA430 backplane contains connectors for DSSI and SCSI busses. This 40.7 cm x 52.1 cm (16.0 inch x 20.5 inch) 4-layer backplane contains two signal layers, one power layer and one ground layer.

Figure 1–19: BA430 Backplane
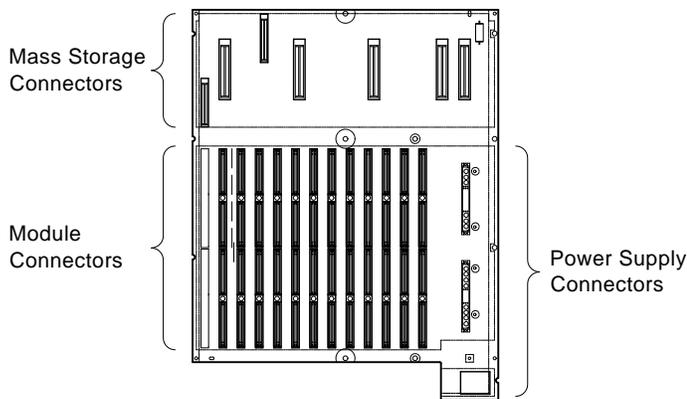
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1.15.2 BA440 Backplane (54–19354–01)

The BA440 enclosure has a 12-slot, quad-height backplane (Figure 1–20). The backplane is a 52.5 x 40.7-cm (21 x 16-in) assembly. The space between each backplane slot varies. The backplane's printed circuit board is an 8 layer, 2 sided etch board.

From right to left, the first five backplane slots are for the memories and CPU, while the other seven slots are Q22/CD bus slots.

The Q-bus can be extended using, an enclosure expander unit. The BA430/BA440 enclosure supports 35 equivalent ac loads and 20 dc loads from all the modules installed in the backplane. An *ac load* is the amount of capacitance a module presents to a bus signal line. One ac load equals

9.35 picofarads (pf). A *dc load* is the amount of dc leakage current a module presents to a bus signal line. One dc load is approximately 105 microamperes (μA). The backplane presents 4.0 ac loads to the Q22-bus.

There are connectors provided for each of the following:

- Fan tray
- System control panel (SCP)
- Four mass storage compartments
- Power supply
- Vterm regulator module

Figure 1–20: BA440 Backplane

MLO-004201
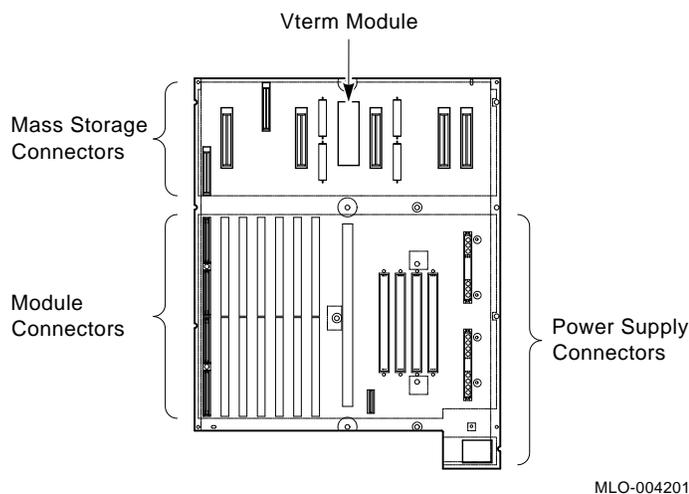
1.15.3 Configuration Guidelines

Before changing the configuration of the BA430/BA440 enclosure, you must consider the following factors:

1. Module order in the backplane
2. Module configuration
3. Mass storage device configuration

When adding a device to a system, you must know the capacity of the system enclosure in these areas:

1. Number of backplane slots

2. Power supply capacity

3. Mass storage device space

4. AC and DC loading

1.15.4 Module Order and Configuration

Module order in the backplane is specific, depending on the CPU. Refer to the applicable CPU maintenance manual for the preferred module order of a given system.

For information on how to configure modules, refer to Microsystems Options (EK–192AC–MG), which includes a listing of all supported options along with the following information for each module and device:

• Ordering information

• Operating system support

• Diagnostic support

• Option description

• CSR addresses and interrupt vectors

• LEDs

• Loopback connectors

• Self-tests

• FRUs (if applicable)

• Related documentation

1.15.5 Configuration Worksheets

Use Figure 1–21 or Figure 1–22 to be sure your configuration does not exceed system limits for expansion space, power, and bus loads. If you use standard Digital modules, you will not exceed the limits for bus loads.

When changing a configuration, choose one of the worksheets that applies to your system.

1. On the worksheet, list all the devices already installed in the system.

2. List all the devices you plan to install in the system.

3. Fill in the information for each device, using the data listed in Table 1–4.

4. Add up the columns. Make sure the totals are within the limits for the enclosure.

NOTE: *Check the CPU documentation to determine which options are supported for your specific system.*

Figure 1–21: BA430 Configuration Worksheet

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	—	—	12.5	—	—
CPU 1								
Mem 2								
Mem 3								
Mem 4								
Mem 5								
Q/CD 6								
Q/CD 7								
Q/CD 8								
Q/CD 9								
Q/CD 10							—	—
Q/CD 11								
Q/CD 12								
Mass Storage:								
Tape							—	—
1								
2								
3								
Total these columns:								
Must not exceed:		60.0 A	22.0 A	15.0 A	3.0 A	584.0 W	22	20

Note: Total output power from +3.3 Vdc and +5 Vdc must not exceed 330 W.

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Figure 1–22: BA440 Configuration Worksheet

SLOT	MODULE	Current (Amps)				Power (Watts)	Bus Load	
		+5 Vdc	+12 Vdc	-3.3 Vdc	-12 Vdc		AC	DC
MEM 1								
MEM 2								
MEM 3								
MEM 4								
CPU	L-4000A/B	7.40	0.35	0.27	0.04	42.6	4.0	1.0
MEM 6								
Qbus 1								
Qbus 2								
Qbus 3								
Qbus 4								
Qbus 5								
Qbus 6								
Qbus 7								
H3604		1.7	0.5	0.0	0.25	17.5	——	——
MASS STORAGE:								
Tape							——	——
1								
2								
3								
Total these columns:								
Must not exceed:		60.0 A	22.0 A	15.0 A	3.0 A	584.0 W	31	20

Note: Total output power from +3.3 Vdc and +5 Vdc must not exceed 330 W.

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Table 1–4: Power Requirements

Option	Module	Current (Amps) Max +5 V	Current (Amps) Max +12 V	Power Max Watts	Bus Loads AC	Bus Loads DC
AAV11–SA	A1009–PA	2.10	0.00	10.50	2.5	0.5
ADQ32–SA	A030	4.45	0.00	22.25	2.5	0.5
ADV11–SA	A1008–PA	2.00	0.00	10.00	2.3	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
DRV1W–SA	M7651–PA	1.80	0.00	9.00	2.0	1.0
DSV11	M3108	5.43	0.69	35.43	3.9	1.0
DTQNA–BC	M7130	6.00	2.00	54.00	3.9	0.5
H3602	–	1.70	0.50	14.50	–	–
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
KA660–AA/BA[2]	M7626–AA/BA	6.0	0.14	32.88	3.5	1.0
KA670–A/B[3]	L4000–A/B	7.40	0.35	41.20	4.0	1.0
KDA50–SA	M7164	6.93	0.00	34.65	3.0	0.5
—–	M7165	6.57	0.03	33.21	–	–
KFQSA–M	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
KRQ50–SA	M7552	2.70	0.00	13.50	2.7	1.0
KWV11–SA	M4002–PA	2.20	0.013	11.156	1.0	0.3
KXJ11–SF	M7616	6.00	1.40	46.80	2.7	1.0
KZQSA–SA	M5976	5.7	0.4	27.0	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/BB	M7622–BA/BB	3.25	0.00	16.25	–	–

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

[2]Also include 3.3 Vdc @ 15 A, 0.9 W and -12 Vdc @ 3.0 A, 0.5 W.

[3]Value is for the unpopulated module only.

Table 1–4 (Cont.): Power Requirements

Option	Module	Current (Amps) Max +5 V	Current (Amps) Max +12 V	Power Max Watts	Bus Loads AC	Bus Loads DC
RF31E–AA	–	1.00	2.80	38.60	–	–
RF71E–AA	–	1.25	1.64	25.93	–	–
TK70E–AA	–	1.50	2.40	36.30	–	–
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

Chapter 2

Installation

This chapter contains the procedure for installing the BA430/BA440 pedestal enclosure.

2.1 Site Preparation Considerations

2.1.1 BA430/BA440 Physical Dimensions

Figure 2–1 shows the dimensions of the BA430/BA440 enclosure. You must leave at least 61 cm (24 in) of clearance in front of the system to access the doors and the system controls. You must also leave at least 5 cm (2 in) of clearance at the sides and rear for airflow. Since the base of the enclosure is 5 cm (2 in) wider than the cabinet in front and rear, you can place the rear of the system against a wall or table, and the system has enough space around it for adequate airflow.

CAUTION: *Due to the weight of the equipment, Digital recommends that at least two people to move system and terminal boxes.*

Figure 2–1: BA430/BA440 Enclosure Dimensions

69 cm
(27 in)

45 cm
(17.88 in)

53 cm
(21 in)

WEIGHT: 49.9 kg to 68 kg
(110 lb to 150 lb)

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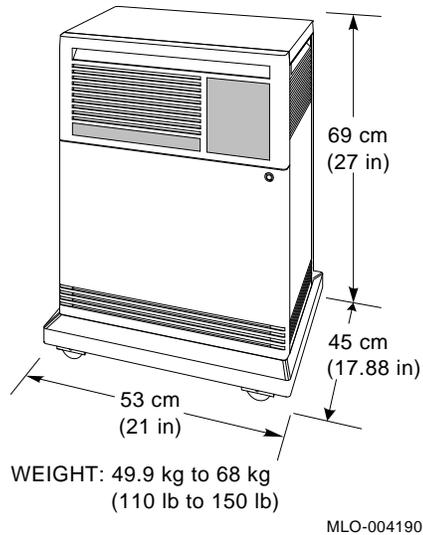
2.1.2 Additional Equipment

Make sure there is enough space for terminals and other peripheral equipment.

When you plan the cable routing for multiterminal systems, consider factors such as safety, convenience, future expansion, and cost. Cabling should be in place and labeled after you install the system.

2.1.3 Static Electricity

Static electricity can cause system failure and loss of data. To minimize static buildup, follow these guidelines:

- Maintain relative humidity of at least 40%.

- Place the system away from busy office corridors.

- Avoid using carpeting in the computer area, if possible. If carpeting is to be installed, recommend antistatic carpeting. If carpeting is already in place, place an antistatic mat under the system.

- Provide a separately fed electrical circuit for each enclosure ordered (whether an expander or system).

- Provide as many electrical outlets as are required for each additional device, such as any table top device and console terminal.

2.1.4 Acoustics

The BA430/BA440 pedestal is designed for use in offices and other general working areas. The following acoustic emission and heat dissipation levels are for the BA430/BA440 pedestal. Levels may be lower, depending on the kind and number of mass storage devices in the system. Data is measured in accordance with ANSI S12.10–1985 (American National Standards Institute) and ISO/DIS 7779 (International Standards Organization).

- LNPE (B) is the noise power emission level (A-weighted sound power level) measured in bels re 1 pw (reference 1 picowatt). LNPE for the BA430/BA440 enclosure is 5.8.

- LPA is the sound pressure measured in decibels at 1.0 m from the front edge of the unit and 1.5 m above the floor. LPA for the BA430/BA440 enclosure is 43.

2.1.5 Heat Dissipation

Heat dissipation is measured in British thermal units (Btu). Maximum heat dissipation in the BA430/BA440 enclosure is 2978 Btu/h.

2.1.6 Temperature and Humidity Values

Table 2–1 lists temperature and relative humidity values for the BA430/BA440 enclosure in a pedestal.

Table 2–1: Temperature and Relative Humidity Values

Parameter	Operating	Nonoperating
Temperature[1]	10°C to 40°C 50°F to 104°F	–40°C to 66°C –40°F to 151°F
Temperature rate of change	11°C per hour maximum 19.8°F per hour maximum	N/A
Relative humidity	20% to 80% (noncondensing)	10% to 95%
Maximum altitude	2438 m (8000 ft)	4870 m (16,000 ft)

[1]For operation above sea level, decrease the operation temperature by 1.8°C per 1000 m (or 1°F per 1000 ft).

2.1.7 Electrical Requirements

The power source should be adequate to handle the original system and allow for system expansion. Digital recommends a dedicated circuit from the power source to each system. Additional power equipment may be required to avoid power disturbances.

Table 2–2 lists the electrical requirements for systems in a BA430/BA440 pedestal. Table 2–3 lists the power cords required.

Table 2–2: BA430/BA440 Enclosure Electrical Requirements

Nominal AC Voltage ⟹	101 Vac	120 Vac	220–240 Vac
Voltage range	90 to 110 Vac	104 to 128 Vac	176 to 264 Vac
Power source phase	Single	Single	Single
Nominal frequency	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Frequency range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
Maximum steady state current at nominal voltage	10.2 A	8.6 A	4.7 A
Maximum steady state current at minimum voltage	12 A	11.1 A	6.82 A
Startup current (30 seconds)	13.7 A	11.5 A	6.3 A
Maximum inrush current	100 A	100 A	100 A
Maximum power consumption	1139 W	1139 W	1139 W

Table 2–3: Power Cords

Power Cord	Countries
BN20A–2E	United States, Japan, and Canada (17–00083–43 (120 V))
BN20B–2E	United States, Japan, and Canada (17–00083–44 (240 V))
BN22C–2E	Australia and New Zealand
BN22D–2E	Central Europe, Austria, Belgium, Finland, France, West Germany, Netherlands, Norway, Portugal, Spain, and Sweden
BN22E–2E	United Kingdom and Ireland
BN22F–2E	Switzerland
BN22H–2E	Denmark
BN22J–2E	Italy
BN22K–2E	India and South Africa
BN22L–2E	Israel

2.2 Unpacking the Shipment

The shipment may include several cartons:

- One contains the system unit.

- One contains cables for connecting additional devices to the system.

- Several contain components of the console terminal.

- Another, marked software, contains software documentation, system software, diagnostic software, and a software license.

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

Depending on the order, the shipment may also include additional terminals, printers, or modems.

When delivered, the system is packed in a cardboard container attached to a shipping skid or pallet.

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.

When you unpack the cartons, check the contents against the shipping list to ensure the order is complete.

Unpack the system according to the instructions on the system shipping carton.

After unpacking the system, move it by rolling it sideways or by sliding or walking it backward while gripping the hand holds (Figure 2–2).

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

Figure 2–2: Sliding the System into Place

Hand Holds

Slides Front
to Back

Rolls Left to Right

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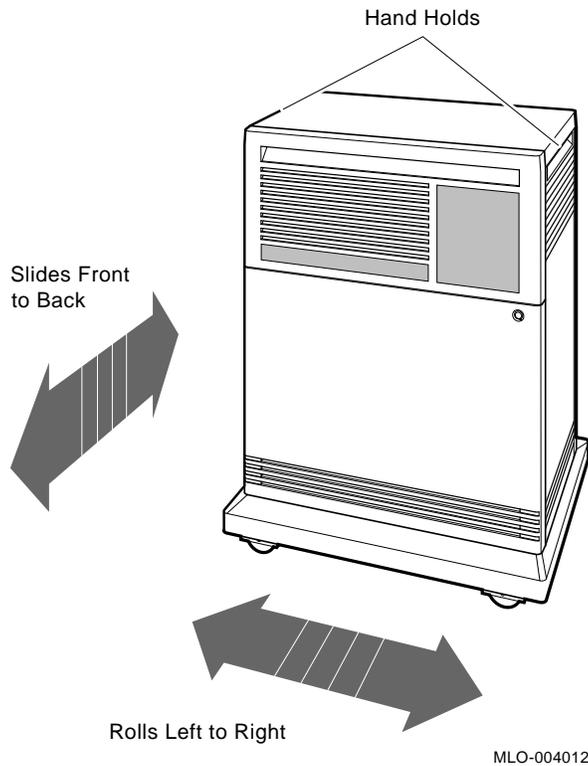
During installation, leave a few inches behind the system for routing cables underneath the system unit. Once installation is complete, you can place the system base against a wall.

2.3 Connecting the Console Terminal

Install the console terminal (Figure 2–3). Follow the instructions in the system installation manual.

Figure 2–3: Connecting the BA430 Console Terminal

DECconnect Office Cable
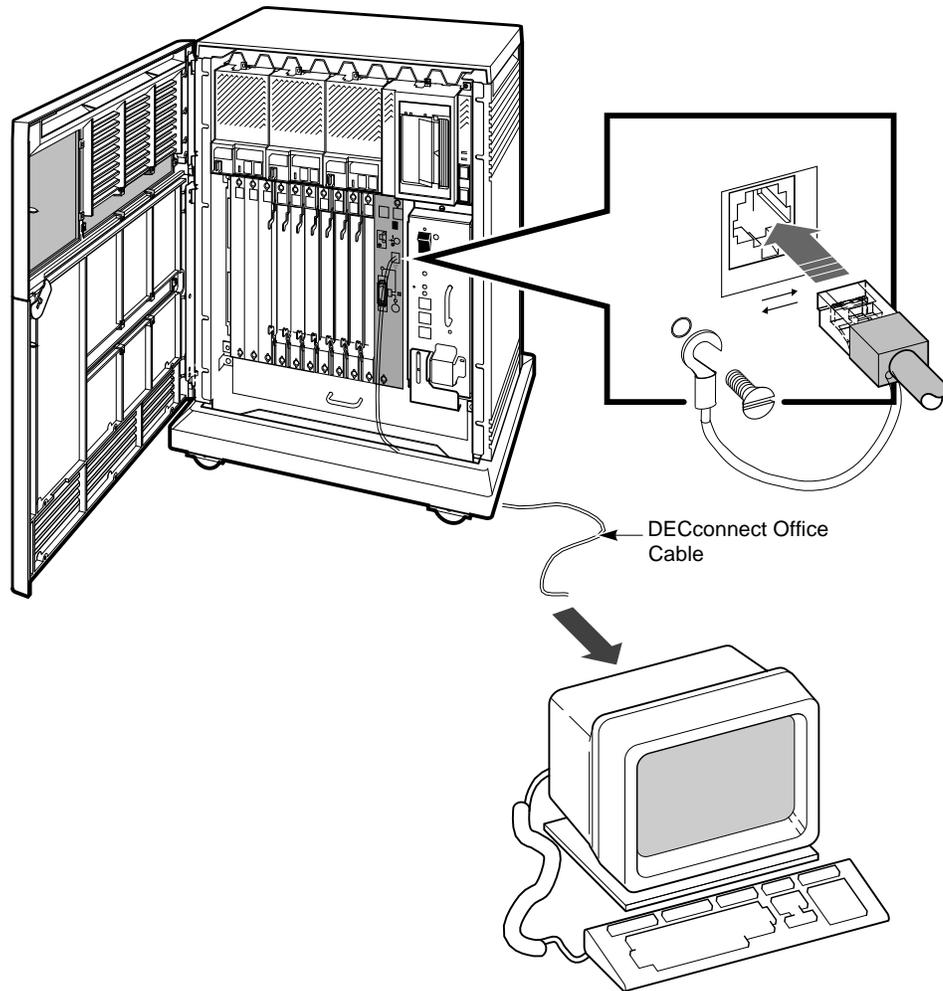
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2.4 Completing the Installation

Run the factory loaded system software with only the system connected before completing the installation by connecting other devices.

Make cable connections directly to the module handles/covers. Begin with the module on the far right and continue toward the left.

Figure 2–4: Connecting the BA440 Console Terminal
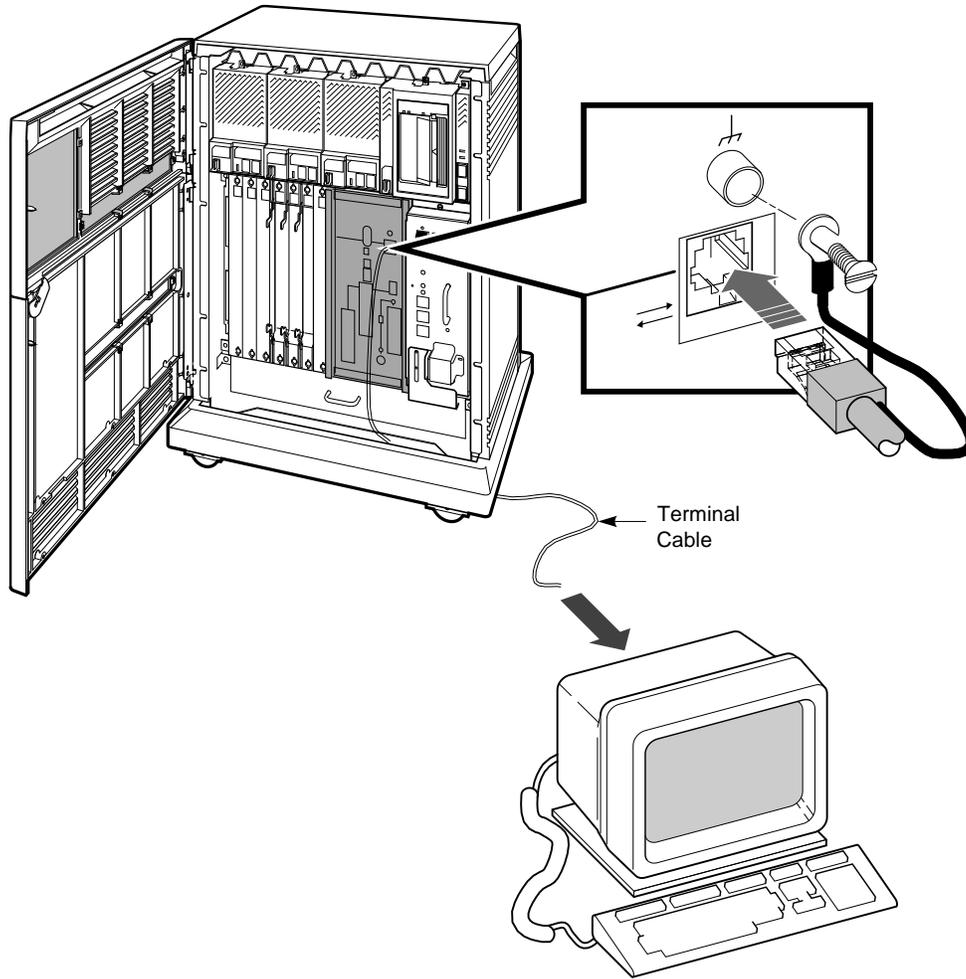
MLO-004014

Each module handle has a label at the top that contains the option number and module number. Table 2–4 lists the labels for modules requiring connections. Use the table to identify the modules as you connect additional devices to the system.

Table 2–4: Module Identification Labels

Module Number	Option Number	Enclosure Used	Functional Description
H3602–AA		BA430	CPU Cover Panel
H3604–AA		BA440	Console Module
KA660–AA/BA	M7626–AA/BA	BA430	CPU Module
KZQSA–AA	M5976–SA	BA430	C/D Rom/Rdat Controller
KN220	KN220	BA430	CPU Module
L4000–AA	KA670–AA	BA440	VAX 4000 Model 300 CPU
L4000–BA	KA670–BA	BA440	VAXserver 4000 CPU
L4001–BA	MS670–BA	BA440	VAX 4000 Model 300 memory, 32 Mb
M7857	MRV11–D	All	Programmable read-only memory
M3127–PA	DESQA	All	Ethernet adapter
M3118–YA	CXA16–SA	All	16-line asynchronous serial interface (RS–423–A) no modem support
M3118–YB	CXB16–SA	All	16-line asynchronous serial interface (RS–422–A noise immune)
M3119–YA	CXY08–SA	All	8-line asynchronous serial interface (full modem support)
M3018	DSV11–SA	All	2-line synchronous serial interface (full modem support)
M3121–PA	DFA01–AA	All	2-line asynchronous serial interface with integral modem
M7164, M7165	KDA50	All	Intelligent board controller
M7559–PA	TQK70–SA	All	TK70 tape drive controller
M7206–PA	TSV05–SA	All	TS05 tape drive controller
M7740–PA	KLESI	All	RV20 write-once optical disk (or TU81E tape controller)
M7552–PA	KRQ50–SA	All	RRD40/RRD50 CDROM controller

Table 2–4 (Cont.): Module Identification Labels

Module Number	Option Number	Enclosure Used	Functional Description
M7500–PA	KMV1A–SA	All	
M7626–AA/BA	KA660-AA/BA	BA430	CPU module
M7622–BA/BB	MS650-BA/BB	BA430	Memory module
M7638–PA		BA430	I/O module
M7658–PA	DRQ3B–SA	All	Real-time parallel interface
M7651–PA	DRV1W–SA	All	Real-time parallel interface
M7769	KFQSA–SA	All	DSSI mass storage adapter
M8020–PA	DPV11–SA	All	Synchronous serial line interface
M8086–PA	LPV11–SA	All	Dual parallel printer interface
M9715–PA		BA430	Interface card

Table 2–5: Option Cables

Module Number	Option Number	Cable Type
M3127–PA	DESQA–SA	Ethernet cable
M3118–YA	CXA16–AA	BC16D, H3104 cable concentrator (RS–423–A, no modem support)
M3118–YB	CXB16–AA	BC16D, H3104 cable concentrator (RS–422–A, noise immune)
M3119–YA	CXY08–AA	BC19N–12 (full modem support)
M3121	DFA01–AA	Telephone line
M8020	DPV11–SA	BC22E or BC22F
M8086–SA	LPV11–SA	BC27L–30
M7546	TKQ70–SA	Internal
M7164, M7165	KDA50–SE	BC26V–6
M7500	KMV1A–SA	BC22E or BC22F

2.4.1 Setting Controls on the System

The controls you must set to complete the installation vary, depending on the CPU and type of disks in the enclosure. Generally, you must set the baud rate of the console serial line to the same baud rate as the console terminal, and be sure the fixed disk drives are ready and not write protected.

Refer to the system's operation manual for detailed instructions on setting these controls for the particular system you are installing.

2.4.5 Connecting the Power Cord

Feed the power cord under the system from the rear and attach the power cord to the connector at the base of the power supply Figure 2–5. Plug the power cord into the wall outlet when all cabling has been installed.

Figure 2–5: Connecting the Power Cable

Feed Cable Under System and Through Opening
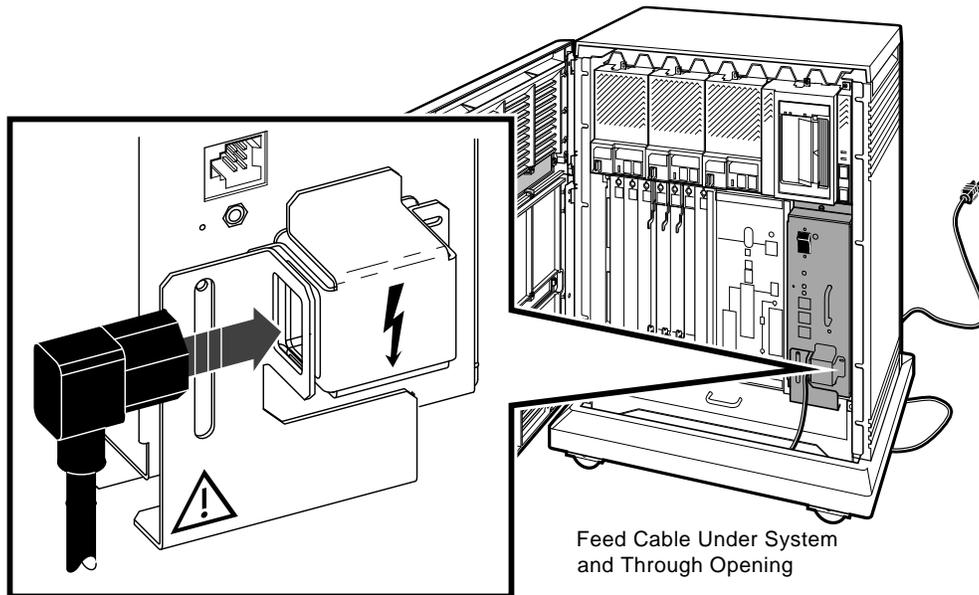
MLO-004029

2.4.3 Installing RF- and RZ-Series ISEs

NOTE: *Expanded systems configured at the factory already have ISEs properly installed.*

CAUTION: *Static electricity can damage integrated circuits. Use the wrist strap and antistatic mat found in the Antistatic Kit (part no. 29–26246) when you work with the internal parts of a computer system.*

Handle ISEs with care. Dropping or bumping the ISE can damage the disk surface. Carry or hold the ISEs by their metal brackets to avoid damaging the drive module.

Install an ISE as follows:

1. Unpack the ISE.

2. Remove the blank ISE front panel from the expander. The front panels are each secured with one captive Phillips screw.

3. With the ISE controller module facing the right, slide the ISE along the guide rails into a mass storage cavity (Figure 2–6A). For single bus configurations, install ISEs in the upper mass storage area first; then install ISEs in the lower mass storage area. Always install ISEs working from right to left.

    NOTE: *The first or rightmost mass storage cavity in the upper mass storage area is wider than the rest to accommodate a larger device. A small filler panel is used to fill the gap space when an RF- or RZ-series ISE is installed in this first cavity.*

4. Using the upper and lower finger cutouts on the ISE bracketry, firmly push the ISE brackets until the interface card at the rear of the ISE plugs into its backplane connector (Figure 2–6A). Tighten the two captive screws.

    CAUTION: *A small gap between the ISE mounting bracket tabs and the R400X frame is normal. Tighten the captive screws only until they are securely fastened. Do not try to force the tabs to fit flush against the frame.*

5. Plug the remote front panel cable into the module inside the ISE front panel (Figure 2–6B).

    NOTE: *The ISE front panel for RZ-series ISEs unlike the RF-series front panel has no buttons or indicators.*

6. Attach the ISE front panel to the enclosure by first fitting the panel's lower tabs and then fitting the panel into position. Secure the panel with its single screw (Figure 2–6C).

2.4.3.1 Inserting Bus Node ID Plugs

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 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, and working from upper mass storage area to lower.

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.*

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.*

Figure 2–6:   Installing an RF- or RZ-Series ISE

Captive Screws

A

Guide
Tabs

Finger Cutouts

B

Remote Front
Panel Cable

Velcro

C

Phillips Screw
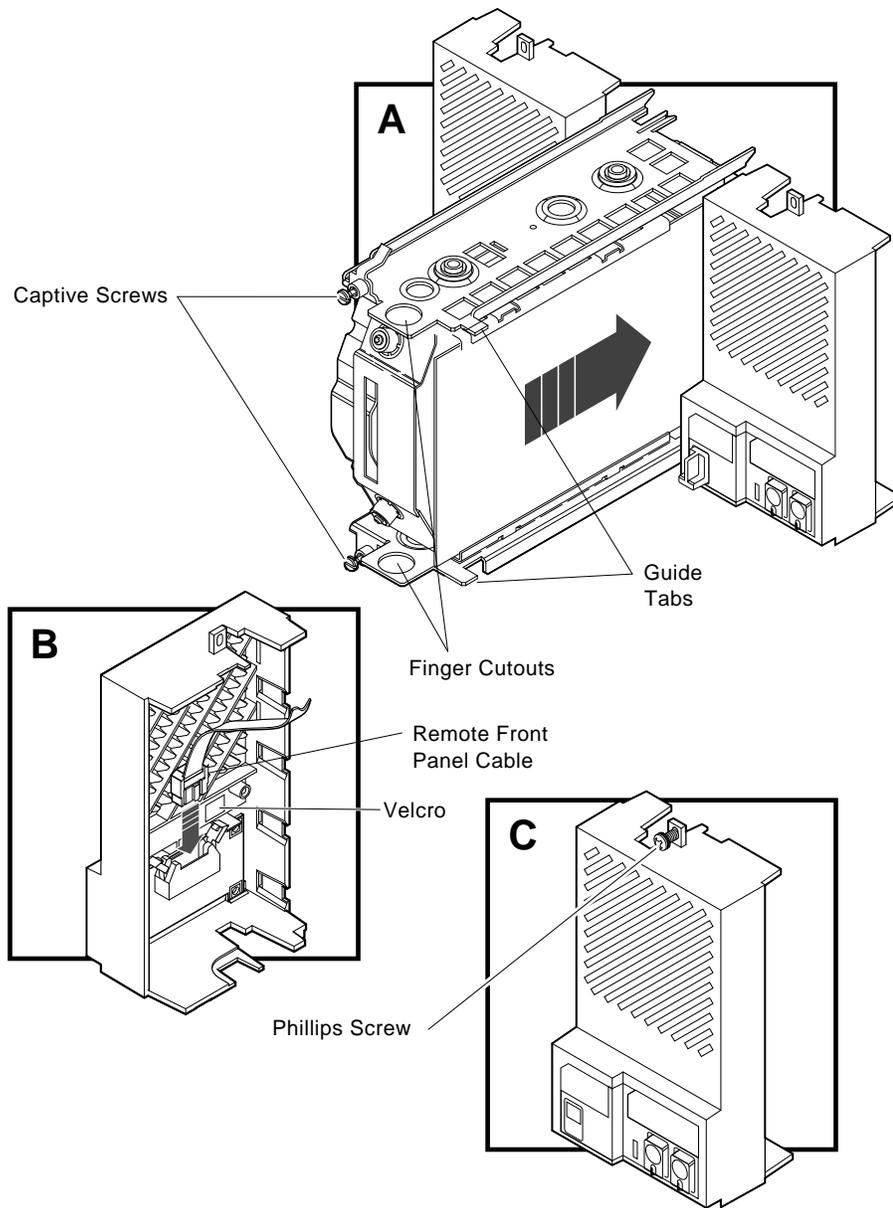
MLO-004236

Figure 2–7: Inserting Bus Node ID Plugs

Bus Node
ID Plug

MLO-004045
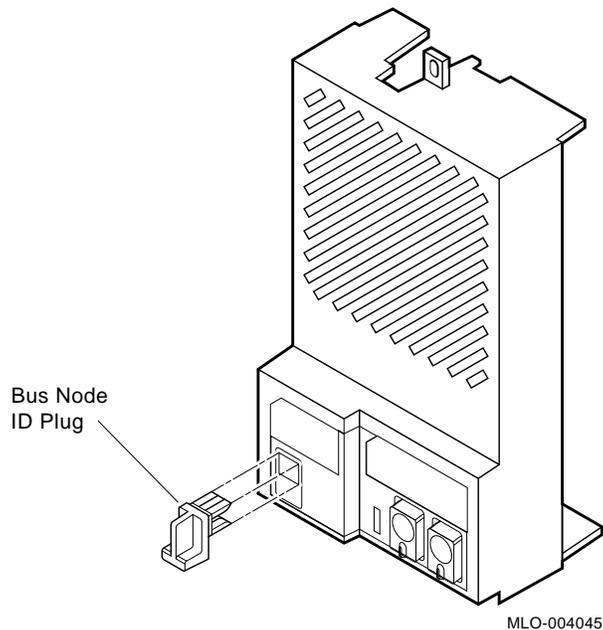
2.4.3.2 Labeling RF-Series ISEs for Systems with Multiple DSSI Busses

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 R400X 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 a later step describe how to
program new unit numbers, 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 2–11.

2.4.8 Installing a TLZ04 Tape Drive

NOTE: *Expanded systems configured at the factory already have storage devices properly installed.*

CAUTION: *Static electricity can damage integrated circuits. Use the wrist strap and antistatic mat found in the Antistatic Kit (part no. 29–26246) when you work with the internal parts of a computer system.*

Handle the TLZ04 tape drive with care. Dropping or bumping the drive can damage the product. Carry or hold the drive by its metal brackets to avoid damaging the drive.

Install the TLZ04 Tape Drive as follows:

1. Unpack the tape drive.

2. Remove the blank front panel and filler panel from the upper right-most storage cavity of the expander. The front panel and filler panel are each secured with one captive Phillips screw.

3. With the drive positioned so that the Unload button and indicators are up, slide the drive along the guide rails into the upper right-most mass storage cavity (Figure 2–8A).

4. Using the upper and lower finger cutouts on the brackets, firmly push the drive brackets until the interface card at the rear of the drive plugs into its backplane connector (Figure 2–8A). Tighten the two captive screws.

   CAUTION: *It is normal for there to be a small gap between the drive mounting bracket tabs and the R400X frame. Tighten the captive screws only until they are securely fastened. Do not try to force the tabs to fit flush against the frame.*

5. Plug the ID cable into the connector inside the drive front panel (<REFERENCE>(tinsert)B).

6. Attach the drive front panel to the enclosure by first fitting the panel's lower tabs and then fitting the panel into position. Secure the panel with its single screw (Figure 2–8C).

Figure 2–8: Installing the TLZ04

Captive Screws

A

Guide
Tabs

Finger Cutouts

B

Remote Front
Panel Cable

Velcro

C

Phillips Screw
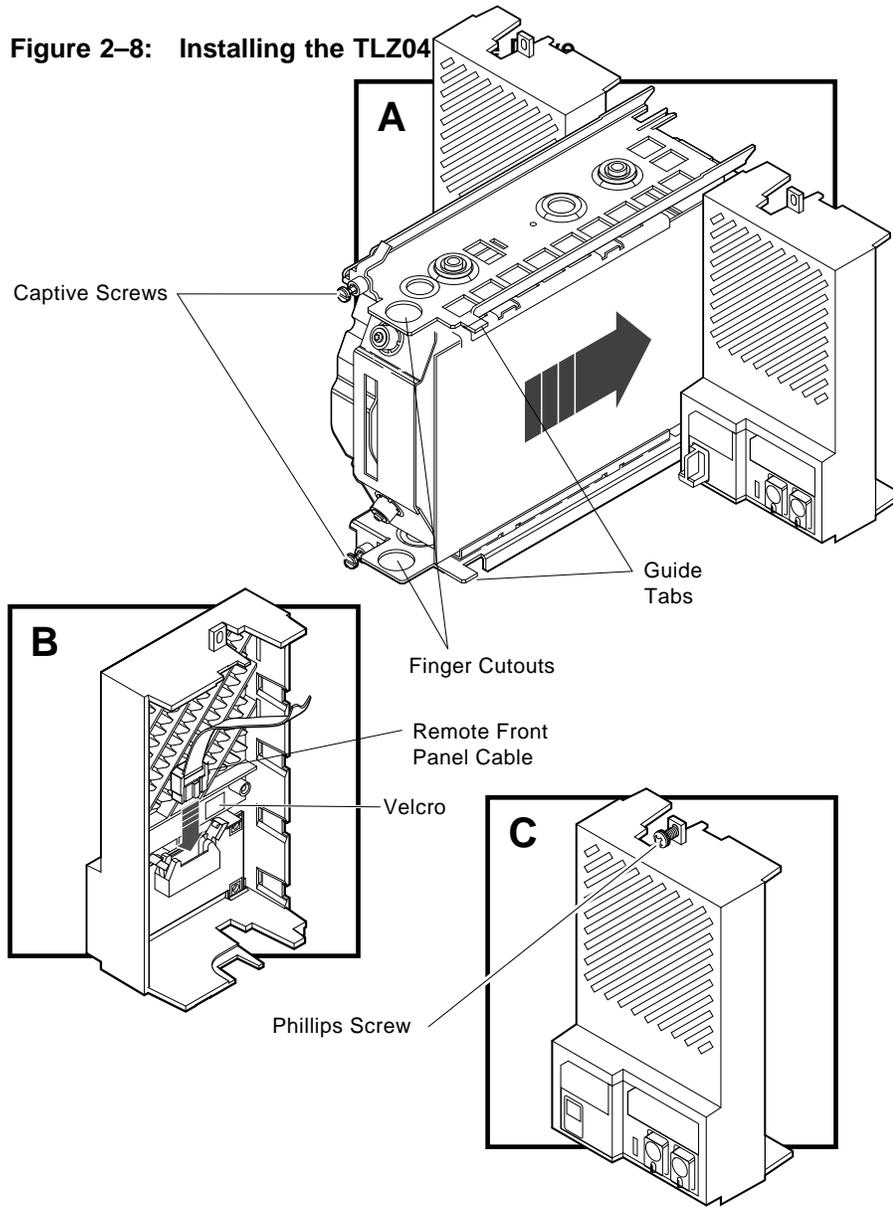
MLO-004236

2.5.8.1 Inserting the TLZ04 Bus Node ID Plug

The TLZ04 tape drive uses a SCSI bus node ID plug to identify the drive's node number to the system. Spare bus node ID plugs are supplies with your system and expander. SCSI plugs are light gray (PN 12-28766-28).

To insert a bus node ID plug, align the two center prongs with the two center slots on the drive front panel as shown in Figure 2–9. To remove a bus node ID plug, grasp it firmly and pull it straight out.

Use the rules below for numbering selecting an appropriate SCSI bus node ID for the TLZ04:

- For each SCSI bus or KZQSA adapter, do not duplicate bus node numbers. If you are installing multiple TLZ04 or RZ-series ISEs, the SCSI bus node ID for each SCSI device must be unique.

- By convention, the devices are numbered in increasing order from right to left starting with 0, and working from upper mass storage area to lower.

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

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.*

2.6 Installing RF- and RZ-Series ISEs

RF- and RZ-series ISEs are installed the same way. The RF-series ISE has a small flat cable which connects between the front panel and the CPU and a bus ID plug. The RZ-series ISE front panel has only an ID plug connected to it. No other controls or indicators are present on the RZ-series front panel. The RZ-series ISE is shown in Figure 2–10.
When installing ISEs, you should first fill all of the available mass storage compartments in the system enclosure first then install other ISEs into the expander (if applicable).

CAUTION: *Static electricity can damage integrated circuits. Use the wrist strap and antistatic mat found in the Antistatic Kit (29–26246–00) when you work with the internal parts of a computer system.*

Handle RF-series ISEs with care. Dropping or bumping the ISE can damage the disk surface.

Figure 2–9: Inserting the TLZ04 Tape Drive Bus Node ID Plug

Bus Node
ID Plug
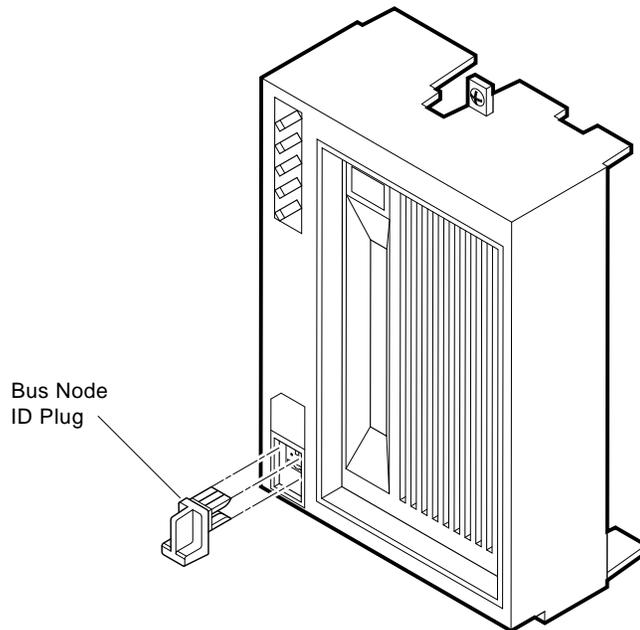
MLO-005789

Install an ISE as follows:

1. Unpack the ISE

2. Remove the blank IXE front panel from the enclosure. The front panels
    are secured with one Phillips screw.

3. With the ISE controller module facing to the right, slide the ISE along
    the guide rails into a mass storage cavity Figure 2–10 Install ISEs in
    the upper right mass storage area first, then install the next one to the
    left of the first.

    NOTE:: *The first or right-most mass storage cavity is wider than the
    rest to asccommodate a larger device. A small filler panel is used to fil
    the gap when an RF- or RZ-series ISE is installed in the first storage
    cavity.*

4. Using the upper and lower finger cutouts in the ISE brackets, firmly push the ISE brackets until the interface card at the rear of the ISE plugs into its backplane connector Figure 2–6. Tighten the two captive screws.

   CAUTION:: *It is normal for there to be a small gap between the ISE mounting bracket tabs and the frame. Do not force the tabs to fit flush against the frame.*

5. Plug the remote front panel cable into the module inside the ISE front panel.

   NOTE:: *The ISE front panel for RZ-series ISEs differ inside the ISE front panel Figure 2–10.*

6. Attach the ISE front panel to the enxlosure by first fitting the panel's lower tabs and then the upper tabs into position. Secure the panel with its single screw Figure 2–10

Figure 2–10: Installing an RF– or RZ–series ISE

Bus Node
ID Plug

MLO-005185
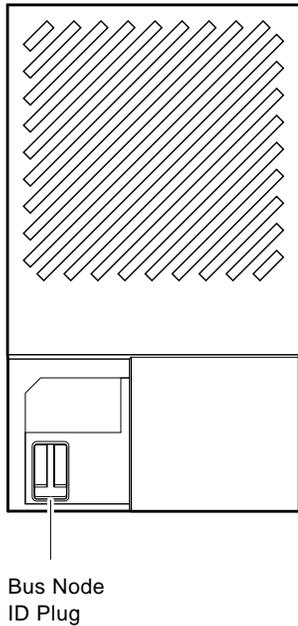
2.5.1 Inserting Bus Node ID Plugs

Spare bus node ID plugs are shipped with each system and expander. The part number for these plugs is 12–28766–19. The SCSI plugs for RZ-series ISEs are a light gray. The part number for these plugs is 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.

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 2–14. To remove a bus node ID plug, grasp it firmly and pull it straight out.

Use the following rules for numbering bus node IDs for RF-series ISEs:

• For each DSSI bus, do not duplicate bus node numbers for storage elements. You can have only one storage element on bus 0 identified

Figure 2–11: Unit Number Labels

Attach Unit Number Label — 10

MLO-004237
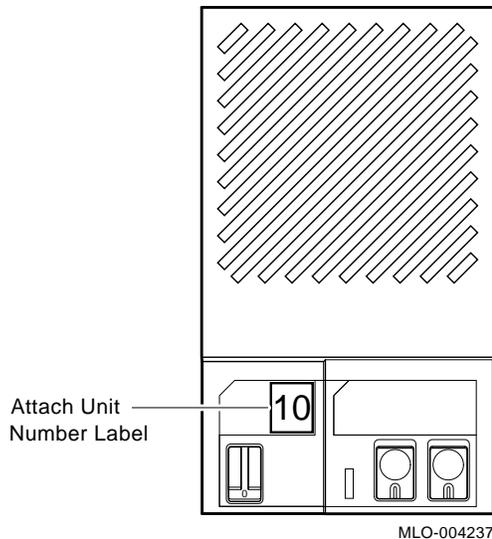
> as bus node 1, one storage assembly as bus node 2, and so on; you can have only one storage assembly on bus 1 identified as bus node 1, one storage assembly as bus node 2, and so on.

- By convention, the ISEs are numbered in increasing order from right to left starting with 0.

NOTE: *Bus node ID plugs are also used to supply node numbers on VAX 4000 model 200 and model 300 systems. The two DSSI host adapters.*

2.5.2 Labeling RF-Series ISEs

VAX 4000 systems have two separate DSSI adapters built into the CPU. Each bus can have up to seven ISEs (bus nodes 0–6). When devices are added to the second bus (bus 1) and the system's allocation class is not zero, you need to program new unit numbers for ISEs on one of the busses, as the unit numbers for ISEs throughout the system must be unique.

When both DSSI busses have ISEs, and the system's allocation class is non-zero, the unit numbers for one of the busses 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 2–12.

Figure 2–12: ISE Unit Number Labels

Attach Unit
Number Label
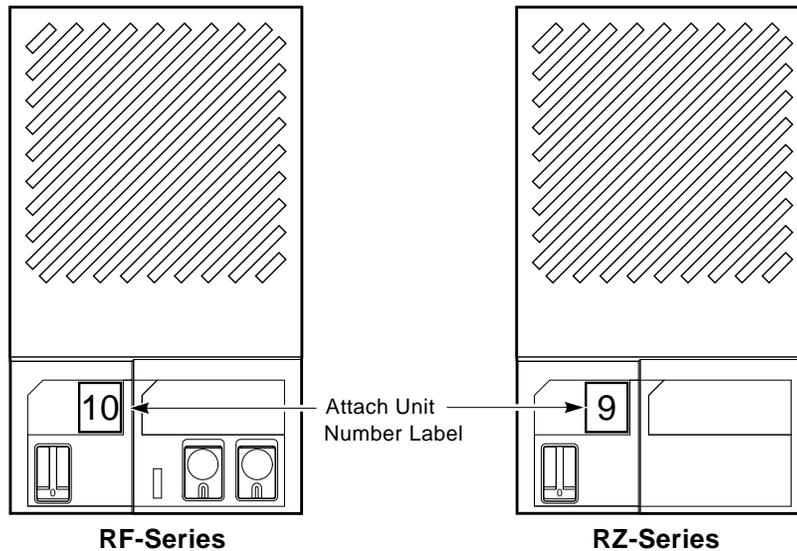
RF-Series

RZ-Series

MLO-005364

2.6 Installing a TL-Series Tape Drive

The TL-series ISEs are installed the same as the RF-series ISEs. The ISE front panels have no cable connection to the ISE except for the ID plug. No other controls or indicators are present on the TL-series front panel. The TL-series ISE is shown in Figure 2–13.

When installing ISEs, you should first fill all of the available mass storage compartments in the system enclosure first then install other ISEs into the expander (if applicable).

CAUTION: *Static electricity can damage integrated circuits. Use the wrist strap and antistatic mat found in the Antistatic Kit (29–26246–01) when you work with the internal parts of a computer system.*

Handle TL-series ISEs with care. Dropping or bumping the ISE can damage the disk surface.

Figure 2–13: Installing a TL-series Tape Drive

Captive Screw

Finger Cutouts

Guide Tabs

ID Cable

Phillips Screw

A

B

C
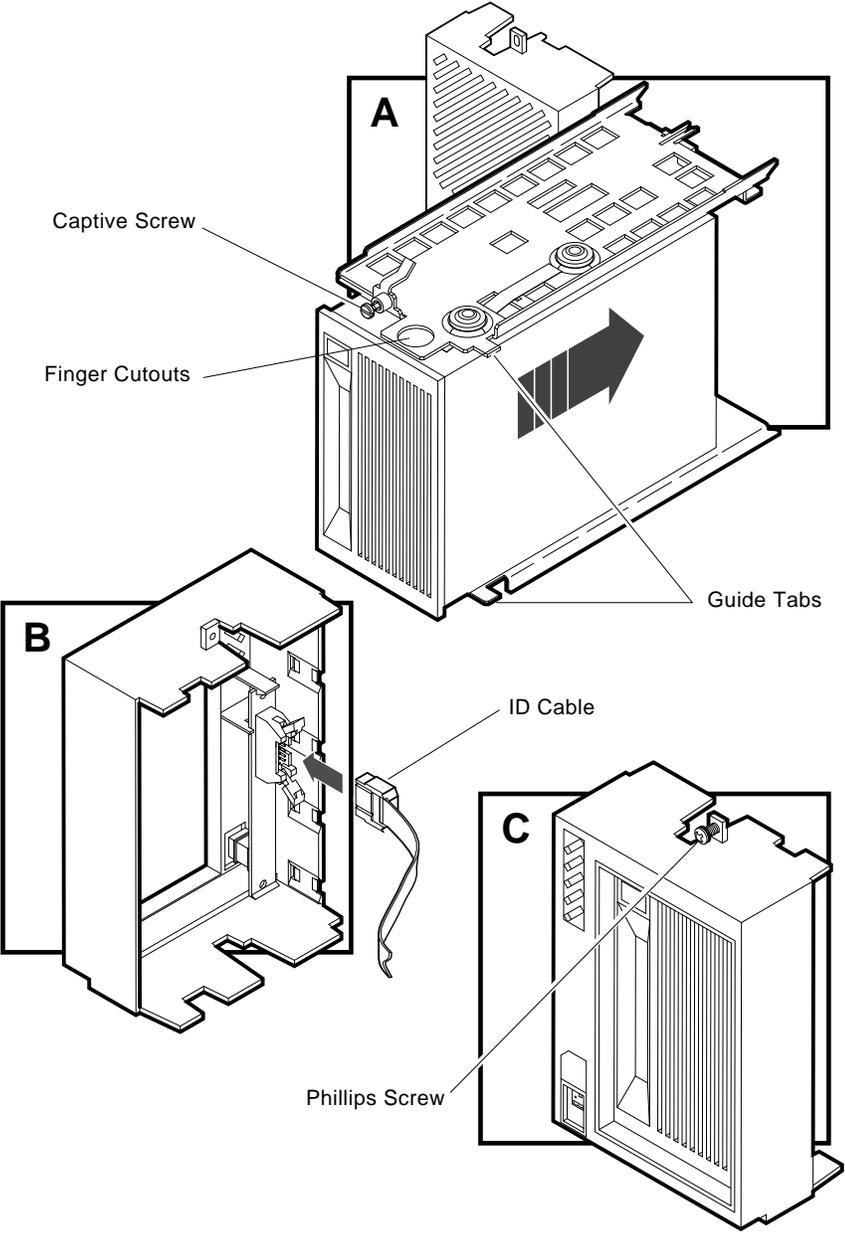
MLO-005788

Install TL-series (SCSI) ISEs as follows:

1. Unpack the TL-series ISE.

2. Install the TLZ04 ISE into the upper storage slot 0 only (on the far right side).

3. With the ISE controller module facing the right, slide the ISE along the guide rails into a mass storage cavity (Figure 2–6).

   NOTE: *The first compartment is considered slot 0 or rightmost mass storage cavity in the upper mass storage area is wider than the rest to accommodate a larger device such as a tape ISE.*

4. Using the upper and lower finger cutouts on the ISE bracketry, firmly push the ISE brackets until the interface card at the rear of the ISE plugs into its backplane connector (Figure 2–6). Tighten the two captive screws.

   CAUTION: *It is normal for a small gap to come between the ISE mounting bracket tabs and the frame. Tighten the captive screws only until they are securely fastened. Do not try to force the tabs to fit flush against the frame.*

5. Plug the remote front panel cable into the module inside the ISE front panel (Figure 2–6).

6. Attach the ISE front panel to the enclosure by first fitting the panel's lower tabs and then the upper tabs into position. Secure the panel with its single screw (Figure 2–6).

Figure 2–14: Inserting Bus Node ID Plugs for the TLZ04 Tape Drive

Bus Node
ID Plug
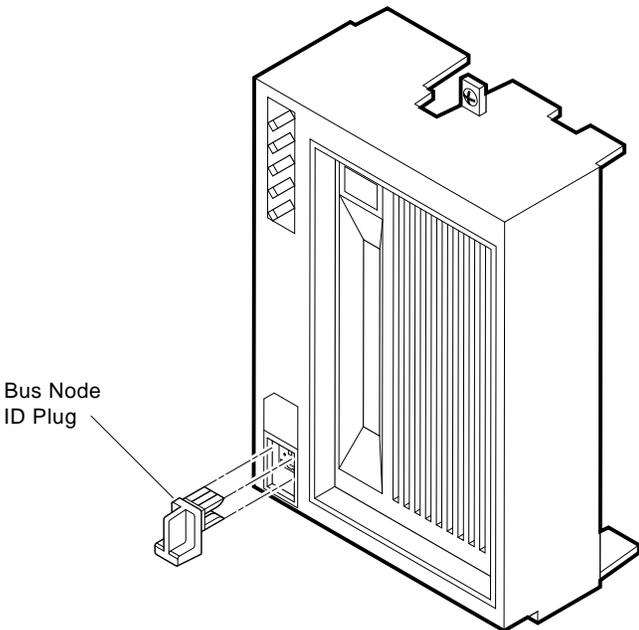
MLO-005789

Chapter 3

BA430/BA440 FRU Removal and Replacement

This chapter describes how to remove and replace the field replaceable units (FRUs) in the BA430/BA440 enclosure.

The following sections describe the removal procedure for each FRU. Unless otherwise specified, you can install an FRU by reversing the steps in the removal procedure.

System-specific FRU procedures vary slightly. As a result, some illustrations of system-specific procedures show an *example* of an FRU removal. The variations are noted in the text and in the title of the illustration.

CAUTION:

* *Only qualified service personnel should remove or install FRUs.*

* *Before you remove or install FRUs, power off the system.*

* *Static electricity can damage integrated circuits. Always use a grounded wrist strap (29–26246–00) and a grounded work surface when working with the internal parts of a computer system.*

3.1 Field Replaceable Units (FRUs)

Table 3–1 lists the BA430/BA440 enclosure FRUs and their part numbers.

Table 3–1:   BA430/BA440 FRUs

FRU	Part Number	Enclosure
Assembly, Bulkhead H3602	70–28083–01	BA430
Assembly, Console H3604	70–27400–01	BA440
Assembly, DSSI Interface Card	54–19787–01	BA440
Assembly, System Control	70–27044–01	BA430/BA440
Backplane, BA430	54–20181–01	BA430
Backplane, BA440	54–19354–01	BA440
Battery, Pack (H3604)	12–19245–01	BA440
Battery, Pack (H3602)	12–19245–01	BA430
Bezel, Front (RF-ISE)	70–27049–01	BA440
Board, Vterm Dual Regulator	54–20404–01	BA440
Cable, H3604 Data	17–02353–01	BA440
Cable, Remote Front Panel	17–02706–01	BA440
Cable, DSSI Bulkhead	17–02502–01	BA440
Cable, DSSI 50-cond.	17–02154–03	BA430
Cable, Power Bus	17–02638–01	BA430
Cable, SCSI (system box)	17–02659–03	BA430
Cable, SCSI (expander box)	17–02659–02	BA430
Cable, SCSI Data	17–02542–01	BA430/440
Cable, TQK70 Data	17–01363–01	BA430/440
Cable, TQK70 B/P Interface	54–20136–02	BA430/440
Cable, System Control (SCP)	17–02493–01	BA430/440
Cable, Power control (BA200 to BA200)/ (BC09F–01)	17–02638–01	BA430/440
Cable, Power control (BA400 to BA200)	17–02637–01	BA430/440
Fans, DC	12–31500–01	BA430/440
Ground Wire	12–13756–A8	BA430/440
Harness, Fan Tray	17–02507–01	BA430/440
Key	12–17119–01	BA430/440
Module, Console H3604	00–H3604–AA	BA440
Module, Bus Terminator	00–M9715–01	BA430
Module, Terminator SCSI	12–30552–01	BA430
Module, Power Harness (slim)	54–19789–01	BA440
Cover Panel, CPU H3602 (dual-height)	74–33507–01	BA430
Plug, Address I.D. Set SCSI	12–28766–28	BA430/BA440
Plug, Address I.D. Set DSSI	12–28766–19	BA430/BA440

Table 3–1 (Cont.): BA430/BA440 FRUs

FRU	Part Number	Enclosure
Power Supply, 120/240 V	00–H7874–00	BA430/BA440
Remote Front Panel Module	54–19791–01	BA440
Tape Drive, TK70	00–TK70–AX	BA430/BA440
Tape Drive, TLZ04	00–TLZ04–AX	BA430
Terminator, SCSI (with KZQSA)	12–30552–01	BA430
Wire, Ground	12–13756–A8	BA430

Several FRUs in the BA430/BA440 enclosure are system specific (Table 3–2). Their presence depends on which CPU and mass storage devices are installed. Several different modules, disk ISEs, and tape ISEs, may be present. Refer to the applicable CPU maintenance manual for a complete list of options. All such devices are also FRUs.

Table 3–2: System Specific BA440 FRUs

FRU	Part Number
Fuse, 0.5 A pico, 125 V	12–09159–00
Fuse, 2.0 A pico, 125 V	12–10929–06
Fuse, 1.5 A 125 V	12–10929–08
Fuse, .062 A, 125 V	90–09122–00
Module, Console (H3604)	70–27400–01

3.2 Installing and Removing Modules

NOTE: *The illustrations in this section show the BA440 enclosure. Duplicating the same basic illustrations for the BA430 enclosure is unnessary. The removal procedures are the same for both enclosures.*

Modules designed for BA400-series enclosures have wide handles that provide both external I/O connections and an electrical and environmental seal for the card cage. Standard Q22-bus modules that are also used in other enclosures, such as the TQK70, use a blank cover instead of a handle. There is a different removal procedure for the three types of modules.

- Modules with ratchet ejector handles
- Modules with attached handles
- Modules with covers

3.2.1 Removing Modules with Ratchet Ejector Handles

Ratchet ejector handles are used on the BA440 CPU and memory modules to ensure a snug fit against the system's backplane (Figure 3–1). This design ensures constant tension against the backplane for optimum connector pin contact.

Figure 3–1:   Ratchet Ejector Handles
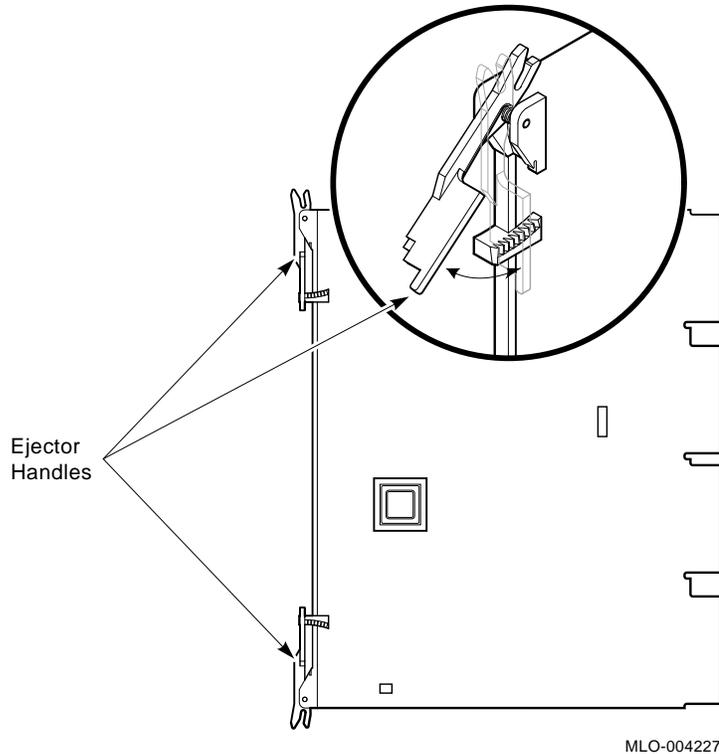
Ejector Handles

MLO-004227

1. Power off the system.

2. Unlock the front door and open both access doors together to reach the power switch on the power supply. Turn off the power switch.

3. Put on the grounded wrist strap and attach the alligator clip to the system's chassis.

4. Note the orientation of external cables connected to the H3604 console module. Label and disconnect the cables (if applicable).

5. Release the quarter-turn captive screws that hold the H3604 console module to the card cage (Figure 3–2).

6. Swing open the H3604 console module.

7. Note the orientation of the internal cables connected to the module. Carefully disconnect the internal cables (if applicable).

8. Move the ratchet handles to the side to release them from the sloping teeth, then gently pull the ratchet handles toward you and slide the module out of the card cage (Figure 3–3) (if applicable).

3.2.2 Removing Modules with Attached Handles

CAUTION: *Use the static-protective customer services kit (29–26246–01) when working with modules.*

1. Power off the system.

2. Put on the grounded wrist strap and attach the alligator clip to the metal part of the system's chassis.

3. Release the quarter-turn captive screws that hold the module handle to the card cage (Figure 3–2).

4. Gently release the ejector levers; then pull the module out. Remove the module (Figure 3–3).

3.2.3 Removing Modules with Covers

CAUTION: *Use the static-protective customer services kit (29–26246–00) when working with modules.*

1. Power off the system.

2. Unlock the front door and open both access doors together to reach the power switch on the power supply. Press off the power switch.

3. Put on the grounded wrist strap and attach the alligator clip to the system's chassis.

4. Note the orientation of external cables connected to the module. Label and disconnect the cables.

Figure 3–2: Releasing Quarter-Turn Captive Screws

To Release: Push In and Turn
Counterclockwise 1/4-Turn

To Fasten: Push In and Turn
Clockwise 1/4-Turn

Attach Antistatic
Wrist Strap to
System Chassis

MLO-004259
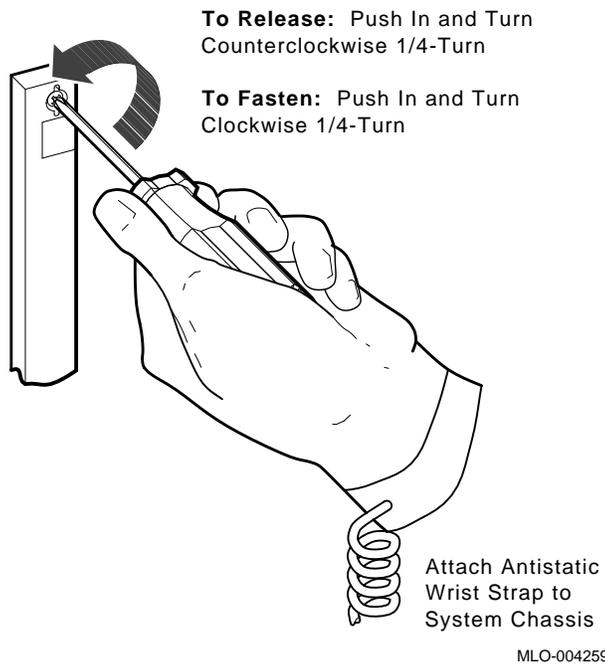
5. Release the quarter-turn captive screws that hold the handle to the card cage (Figure 3–2).

6. Pull the handle out at the top and bottom.

7. Note the orientation of any internal cables connected to the module. Some connectors are not keyed. Carefully disconnect the internal cables.

8. Gently pull the release handles at the top and bottom of the module toward you and slide the module out of the card cage. (Figure 3–3).

Figure 3–3: Removing a Module

Attach Antistatic
Wrist Strap to
System Chassis
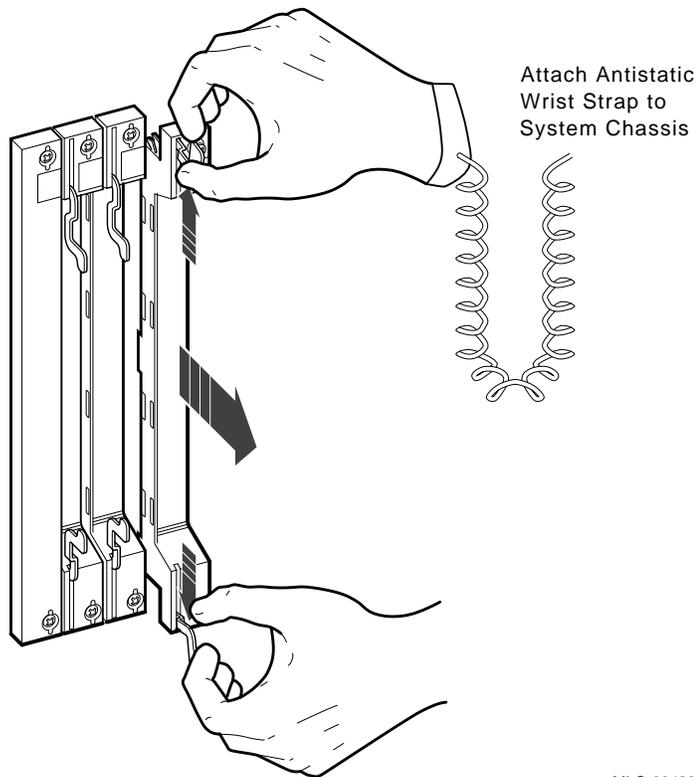
MLO-004209

3.3 Removing BA400-Series Enclosure Modules

To gain entrance to the module area, open the lower access door. The following, is a list of BA430/BA440 modules:

- Option modules
- CPU and memory
- H3602 CPU cover panel (BA430 enclosure)
- M9715 interface module (BA430 enclosure)
- M7638 I/O module (BA430 enclosure)
- H3604 console module (BA440 enclosure)

- H3605 I/O panel
- H7874 power supply
- Fan tray

3.3.1 M9715–YA Interface Module (BA430 Enclosure Only)

The M9715–YA interface module, is located to the left of the H7874 power supply. This module is positioned in a dedicated to the first backplane slot, slot 0. To remove the M9715 module, first remove the H3605 SCSI connector panel from slot 0. The M9715 module is installed in slot 0 under the H3605 cover.

3.3.2 M7638–YA I/O Module (BA430 Enclosure Only)

The M7638–YA I/O module is located in slot 1 next to the M9715 two bus slots away from the H7874 power supply. To remove the M7638 module, first remove the H3602 CPU cover panel from over slots 1 and 2. The M7638 I/O module is installed in slot 1 under the H3602 CPU cover panel.

3.4 Replacing RF and RZ Series Integrated Storage Elements (ISE)

NOTE: *The illustrations in this section show the BA440 enclosure. Duplicating the same basic illustrations for the BA430 enclosure is unnecessary. The removal procedures are the same for both enclosures.*

This section describes how to replace RF and RZ-series ISE's. In addition, procedures are provided to replace the following individual FRUs that comprise the integrated storage element:

- ISE Bus I.D. plug
- ISE front panel
- ISE front panel module (RF-series only)
- Interface card assembly (RF-series only)
- Remote front panel cable (RF-series only)

For information on troubleshooting strategy, error analysis, and RZ and RF-series diagnostics, as well as information on removal and replacement of the drive module and head-disk assembly (HDA), refer to the appropriate integrated storage element service guide. Replacing the drive module does not require removal of the ISE bracketry.

3.4.1 Removing an RZ or an RF-Series ISE

Use the following instructions to remove an RF-series ISE and refer to Figure 3–6.

CAUTION: *Static electricity can damage integrated circuits. Use the wrist strap and antistatic mat found in the antistatic kit (29–26246–00) when you work with the internal parts of a computer system.*

Handle the ISEs with care. Dropping or bumping an ISE can damage the disk surface. Carry or hold the ISEs by their metal brackets to avoid damage to the drive module.

Figure 3–4:   Removing an ISE Front Panel ID Plug

Bus Node
ID Plug

MLO-004045
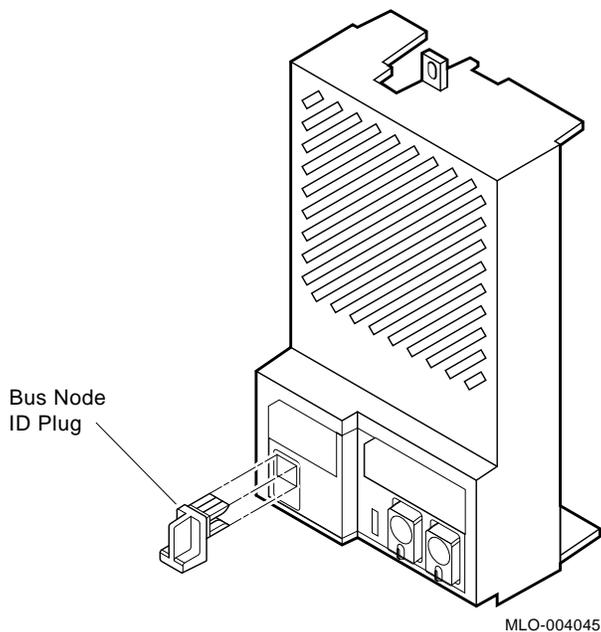
1. Remove the Bus I.D.Plug Figure 3–4.

2. Loosen the single captive Phillips screw that secures the ISE front panel (Figure 3–6A).

3. Separate the ISE front panel and unplug the cable from the enclosure and lay it aside (RF–series only).

4. Loosen the upper and lower captive screws that hold the ISE in place (Figure 3–6C).

5. Using the upper and lower finger cutouts on the ISE bracketry, carefully pull the ISE out of its backplane connector and slide the drive out of the enclosure. Support the weight of the ISE at the lower bracket as the ISE clears the enclosure (Figure 3–6C).

   CAUTION: *Do not touch the drive module. The drive module contains sensitive electronic circuitry.*

3.5 Replacing RZ-Series Integrated Storage Element

This section describes how to replace RZ-series ISEs information on troubleshooting strategy, error analysis, and diagnostics as well as information on removing and replacing an ISE.

3.5.1 Removing an RZ-Series ISE

Use the following instructions to remove an RZ-series ISE and refer to Figure 3–6.

CAUTION: *Static electricity can damage integrated circuits. Use the wrist strap and antistatic mat found in the antistatic kit (29–26246–00) when you work with the internal parts of a computer system.*

Handle RZ-series ISEs with care. Dropping or bumping the ISE can damage the disk surface. Carry or hold the ISEs by their metal brackets to avoid damage to the drive module.

1. Loosen the single Phillips head screw that secures the RZ-series front panel (Figure 3–6A).

2. Separate the ISE front panel from the enclosure. Set the front panel aside.

3. Loosen the upper and lower captive screws that secure the ISE to the chassis frame(Figure 3–6B).

4. Using the upper and lower finger cutouts on the ISE bracketry, carefully pull the ISE out of its backplane connector and slide the drive out of the enclosure. Support the weight of the ISE at the lower bracket as the ISE clears the enclosure (Figure 3–6C).

CAUTION: *Do not touch the drive module. The drive module contains sensitive electronic circuitry.*

Figure 3–5:   Removing RZ-series ID Plug
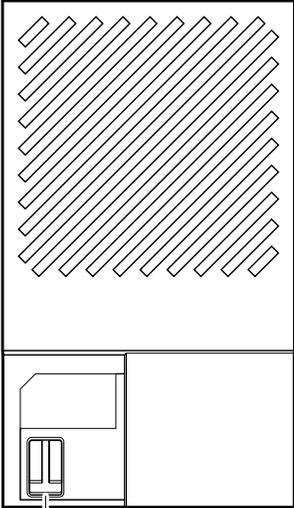
Bus Node
ID Plug

MLO-005185

Figure 3–6:   Removing an RF–series or RZ-series ISE

Phillips Screw

A

Remote Front
Panel Cable

B

Velcro

Captive Screws

C

Finger Cutouts
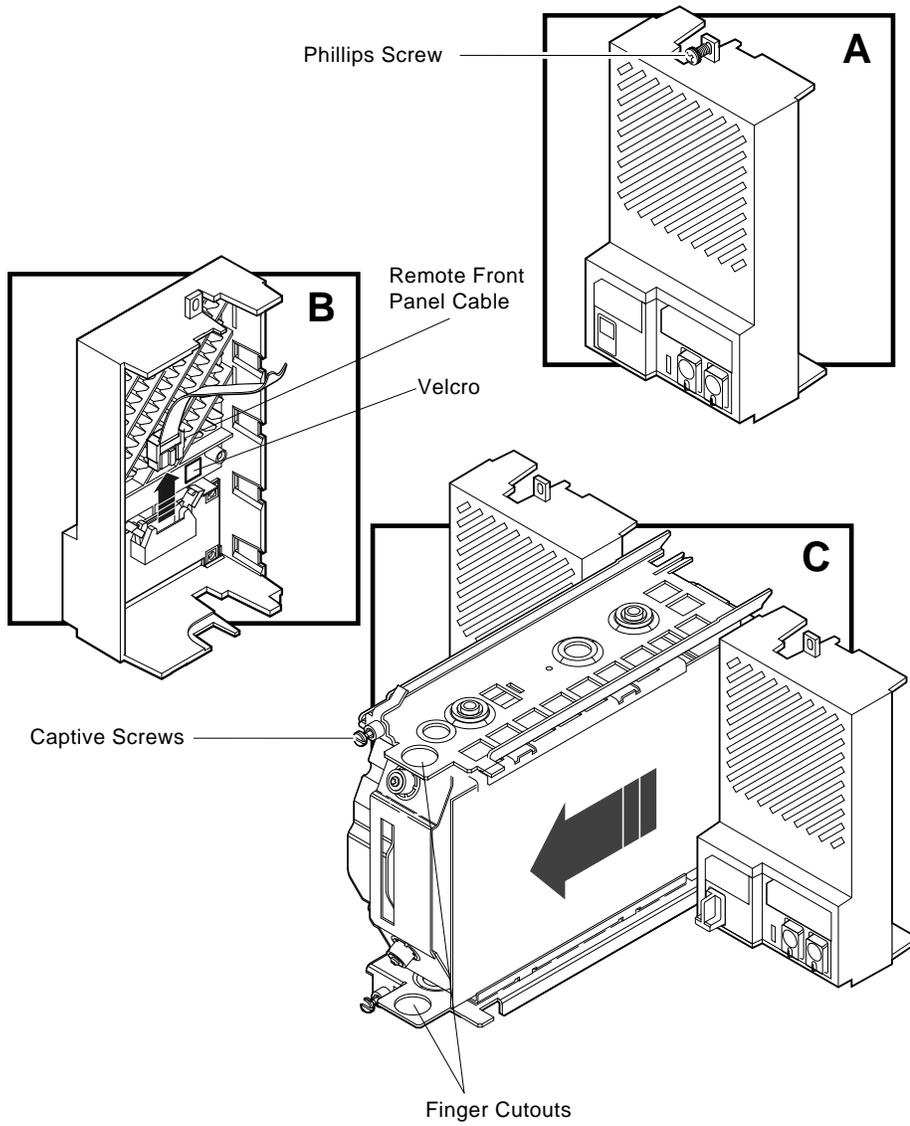
MLO-004210

NOTE: *The RF–series or RZ-series ISE has no switches or indicators on it and no external cables to install. The front panel contains a bus node ID plug.*

To install a new or replacement RZ-series ISE, follow the removal procedure in reverse.

3.5.1.1 Removing the ISE Upper Bracket

This procedure assumes you have removed the ISE as described in Section 3.4.1. Remove the ISE upper bracket as follows:

1. Place the ISE on an antistatic mat.

2. Remove the two Phillips screws at the rubber shock bushings that secure the upper bracket to the head-disk assembly (Figure 3–7).

   NOTE: *RF72s and RF71s are secured to the brackets using the outer bushing positions. RF31s are secured at the second and fourth (from the front) bushing positions.*

   CAUTION: *Early models of the RF-series ISEs use four screws of two different lengths to secure the upper and lower brackets. The two longer screws (by one-eighth of an inch) must only be used in the shock bushing toward the back of the drive.*

Figure 3–7: Removing Bracket Screws
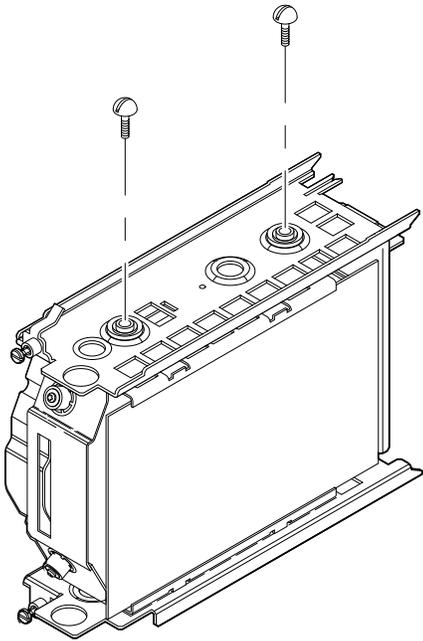
MLO-004213

3. Slide the interface card assembly up and lift off the upper bracket (Figure 3–8).

Figure 3–8:   Removing the ISE Upper Bracket

Upper Bracket

Interface Card
Assembly
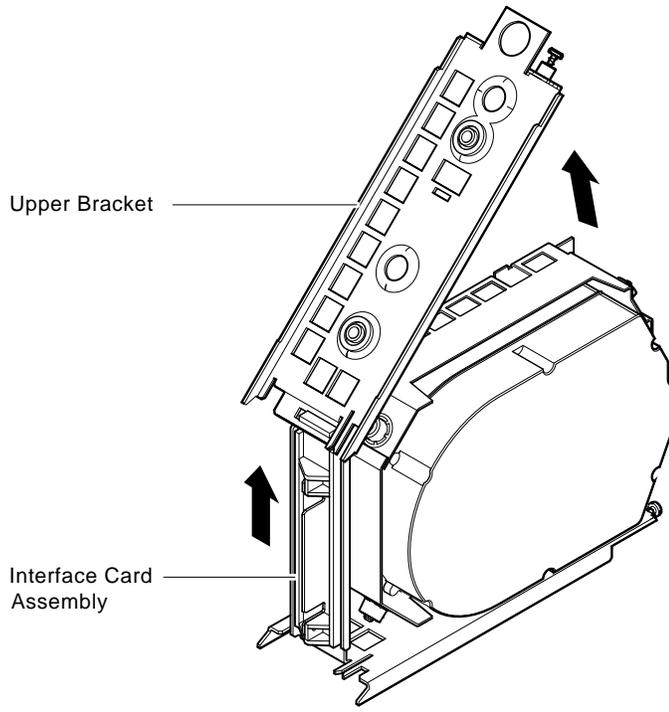
MLO-004214

3.5.1.2 Removing the Interface Card Assembly

Remove the interface card assembly as follows:

1. Unplug the 5-pin (RF-series) or 4-pin (RZ-series) power cable, the 50-pin signal cable, and the remote front panel cable from their connectors on the controller module.

    NOTE: *Observe cable routing to ensure that you route the cables properly when reassembling.*

2. Lift and remove the plastic interface card assembly being careful to guide the cables through the cutout in the metal bracket (Figure 3–9).

3. To remove the plastic assembly from the interface card, remove the two Phillips screws that hold it in place (Figure 3–9).

4. Reverse the procedure to install the interface card assembly.

Figure 3–9: Removing the Interface Card Assembly

Interface Card
Assembly

Phillips
Screws
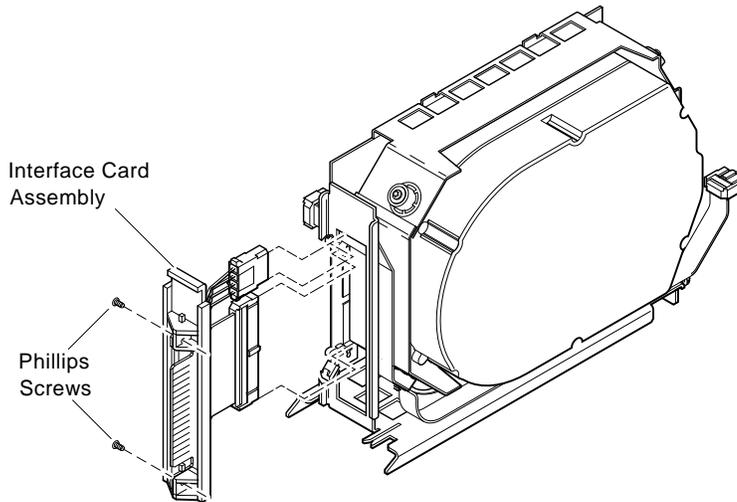
MLO-004257

3.5.1.3 Replacing the Remote Front Panel Cable

To remove the remote front panel cable, you first remove the ISE as described in Section 3.4.1 and the ISE upper bracket as described in Section 3.5.1.1. After completing those steps, remove the ISE lower bracket and remote front panel cable. See the following sections.

3.5.1.4 Removing the ISE Lower Bracket

Remove the ISE lower bracket by removing the two Phillips screws at the rubber shock bushings that secure the lower bracket to the head-disk assembly (Figure 3–10).

3.5.1.5 Removing the Remote Front Panel Cable

NOTE: *Observe cable routing to ensure that you route the cables properly when reassembling.*

To remove the remote front panel cable, unplug the cable from its connector on the drive module, then pull the cable free from the lower bracket at the two points where the cable is secured by Velcro. Reverse the procedure to install the remote front panel cable.

Figure 3–10: Removing the Remote Front Panel Cable

Remote Front
Panel Cable

Cable Velcro Pads

Bracket Velcro Pads

Bracket Screws

Interface Card Assembly
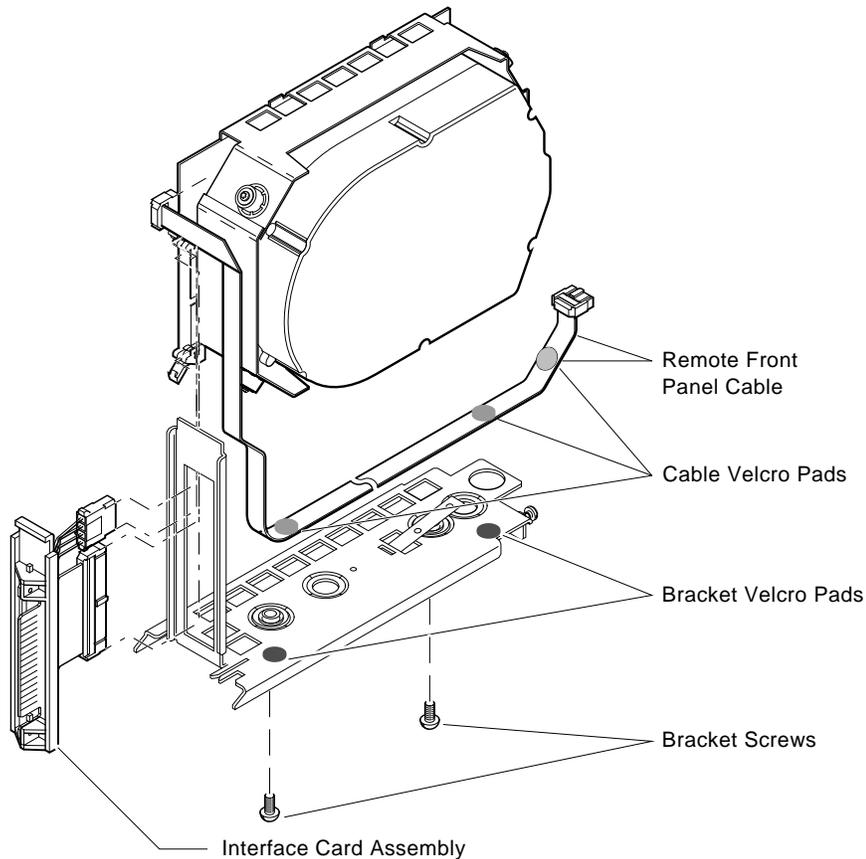
MLO-004258

3.5.2 Removing the TLZ04 Tape Drive

This section describes how to replace the TLZ04 tape drive. In addition, procedures are provided to replace the following individual FRUs that make up the mounting hardware for the integrated storage element:

- Tape drive front panel module

- Interface card assembly

- ID cable

For information on troubleshooting strategy, error analysis, and diagnostics, refer to the TLZ04 tape drive service manual.

Use the following instructions to a TLZ04 tape drive. Refer to Figure 3–11.

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

Handle the tape drive with care. Dropping or bumping it can damage the drive. Carry or hold the drive by its metal brackets to avoid damaging the drive.

1. Loosen the single captive Phillips screw that secures the TLZ04 front panel (Figure 3–11A).

2. Separate the TLZ04 front panel from the enclosure, being careful of the ID cable, which is connected to the TLZ04 front panel.

   NOTE: *If the cause of the drive failure is undetermined, inspect the connection of the ID cable and the TLZ04 front panel. The cable may not be connected securely, or the cable or connector is defective.*

   If the front panel appears to be the problem, refer to Section 3.5.2.2 for instructions on replacing the TLZ04 front panel. To replace the ID cable, continue removing the tape drive and then refer to Section 3.5.2.1 for instructions on replacing ID cable (PN 17–01936–02).

3. Unplug the remote ID cable from the TLZ04 front panel and set the front panel aside (Figure 3–11B).

4. Loosen the upper and lower captive screws that hold the drive in place (Figure 3–11C).

5. Using the upper and lower finger cutouts on the drive bracketry, carefully pull the drive out of its backplane connector and slide the drive out of the enclosure. Support the weight of the drive at the lower bracket as the drive clears the enclosure (Figure 3–11C).

   NOTE: *If the cause of the drive failure is undetermined, inspect the condition of the interface card and its associated cables and cable connections. Refer to Section 3.5.2.3 for instructions on replacing the interface card assembly (PN 54–20136–03).*

Figure 3–11:   Removing the TLZ04 Tape Drive

Phillips Screw

ID Cable

Captive Screw

Finger Cutouts
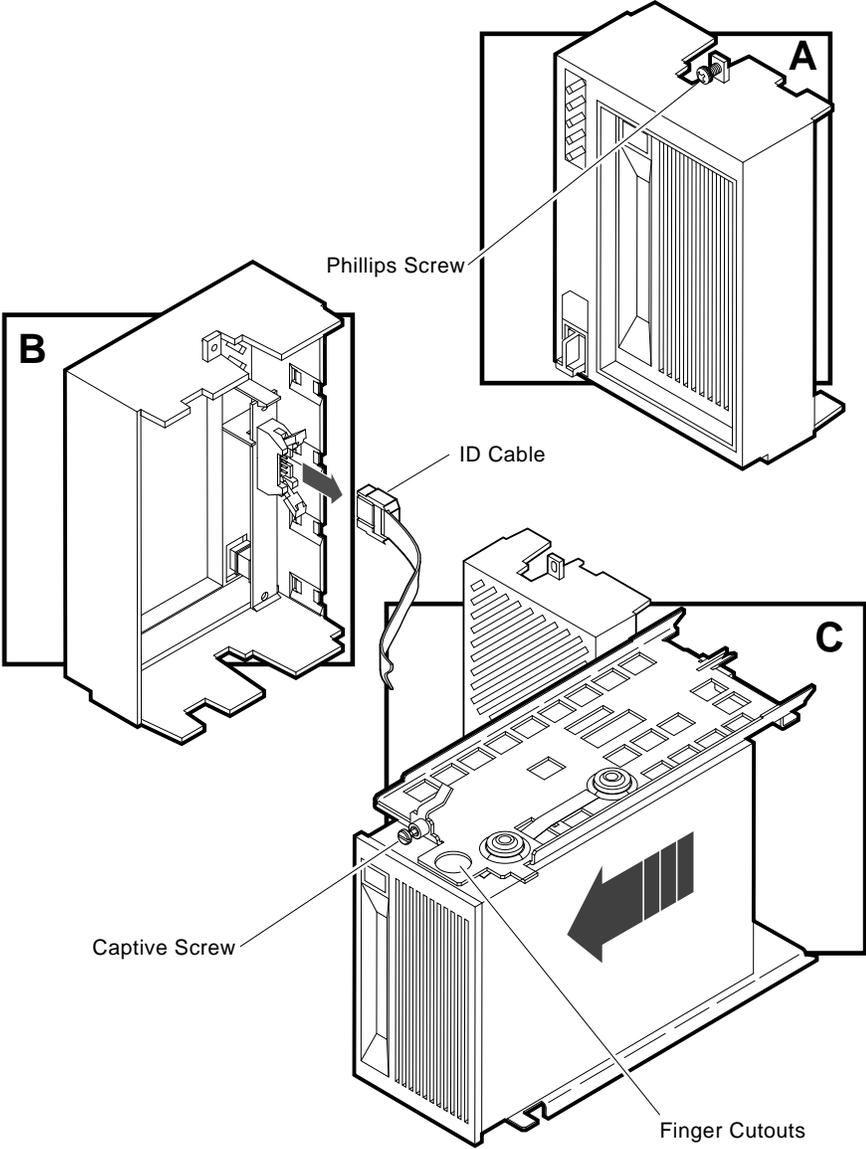
MLO-005795

To install a new or replacement TLZ04, refer to Figure 3–11.

3.5.2.1 Replacing the ID Cable

NOTE: *Observe cable routing to ensure that you route the cables properly when reassembling.*

To remove the ID cable, you first remove the drive and unplug one end of the ID cable as described in Figure 3–13. Unplug the opposite end of the ID cable from the rear of the tape drive (Figure 3–12).

Figure 3–12:   Removing the ID Cable

ID Cable
Connector
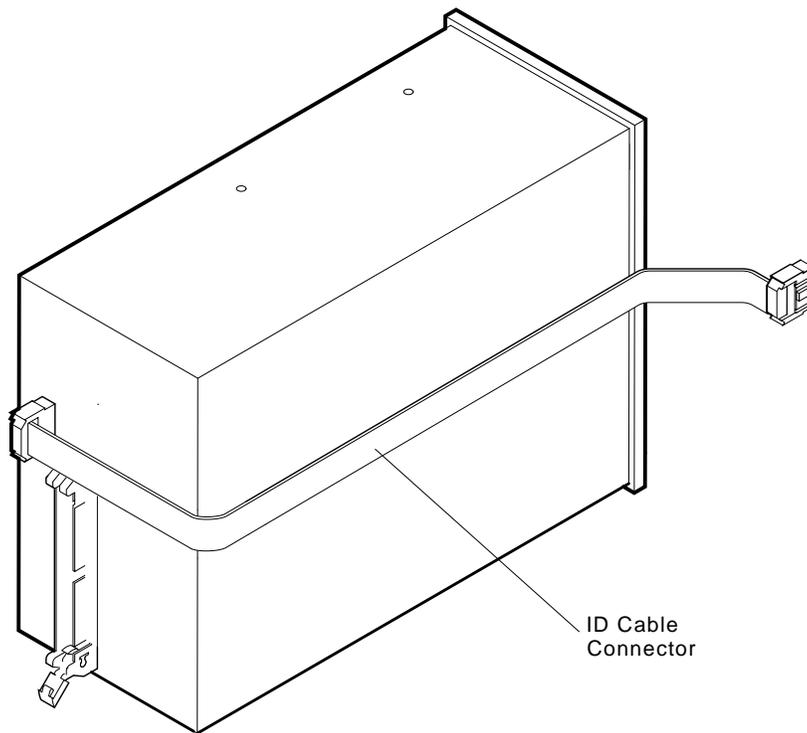
MLO-005796

3.5.2.2 Replacing the TLZ04 Front Panel Module

This procedure assumes you have completed steps one and two in Figure 3–13. Use the following instructions to remove the TLZ04 front panel module (PN 54–20438–01) and refer to Figure 3–13.

1. Unplug the ID cable from its connector on the TLZ04 panel.

2. Remove the bus node ID plug on the TLZ04 front panel by pulling it straight out.

3. Lift the plastic tab that holds the front panel module in place and remove the module.

4. Reverse the procedure to install a module.

Figure 3–13: Removing the TLZ04 Front Panel Module

Plastic Tab
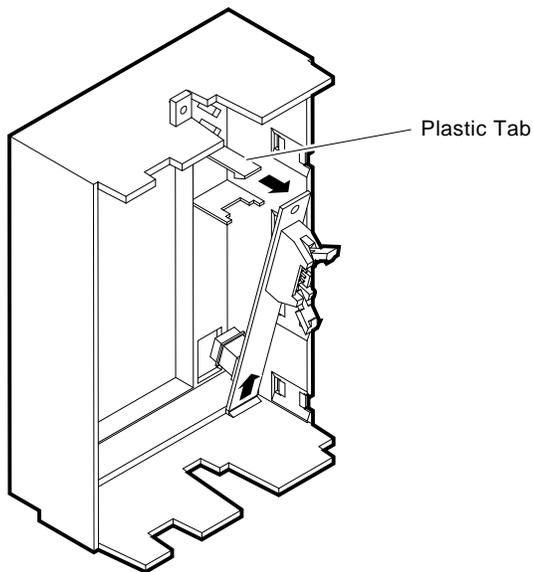
MLO-005797

3.5.2.3 Replacing the Interface Card Assembly

Use the following instructions to replace the interface card assembly (PN 54–20136–03). To remove the interface card assembly, first remove the upper mounting bracket.

3.5.2.4 Removing the Upper Mounting Bracket

This procedure assumes you have removed the drive as described in Figure 3–13. Remove the drive upper bracket as follows:

1. Place the drive on an antistatic mat.

2. Remove the two Phillips screws at the rubber shock bushings that secure the upper bracket to the drive (Figure 3–14).

Figure 3–14:   Removing Bracket Screws
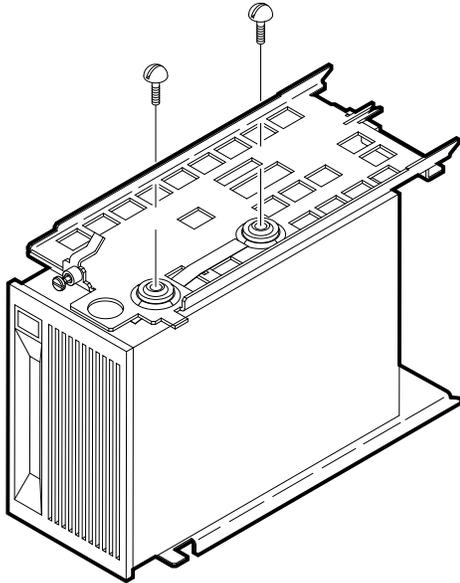
MLO-005799

3. Slide the interface card assembly up and lift off the upper bracket (Figure 3–15).

Figure 3–15:   Removing the Upper Mounting Bracket

Upper Bracket

Interface Card
Assembly
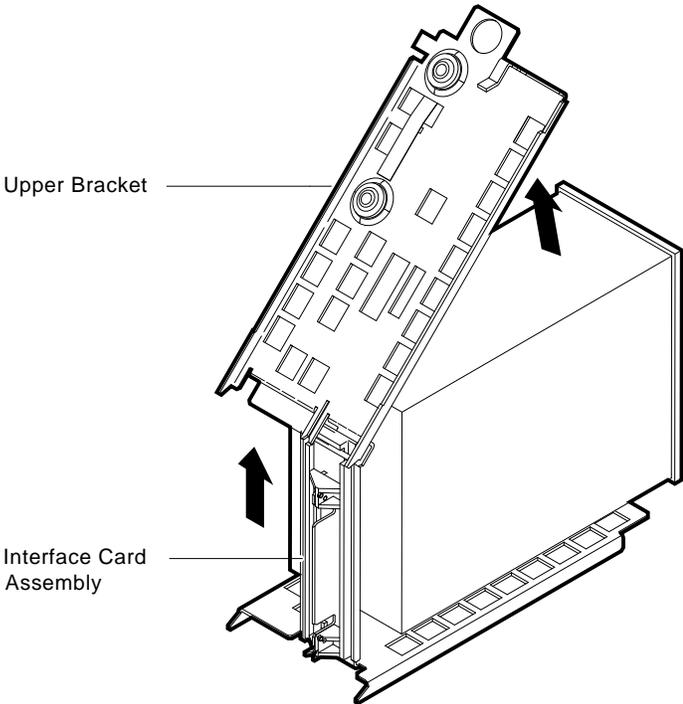
MLO-005800

3.5.2.5 Removing the Interface Card Assembly

Remove the interface card assembly as follows:

1. Unplug the 4-pin power cable, the 50-pin signal cable, and the remote front panel cable from their connectors on the controller module.

   NOTE: *Observe cable routing to ensure that you route the cables properly when reassembling.*

2. Lift and remove the plastic interface card assembly being careful to guide the cables through the cutout in the metal bracket (Figure 3–16).

3. To remove the plastic assembly from the interface card, remove the two Phillips screws that hold it in place (Figure 3–16).

4. Reverse the procedure to install the interface card assembly.

Figure 3–16: Removing the Interface Card Assembly

Interface Card
Assembly
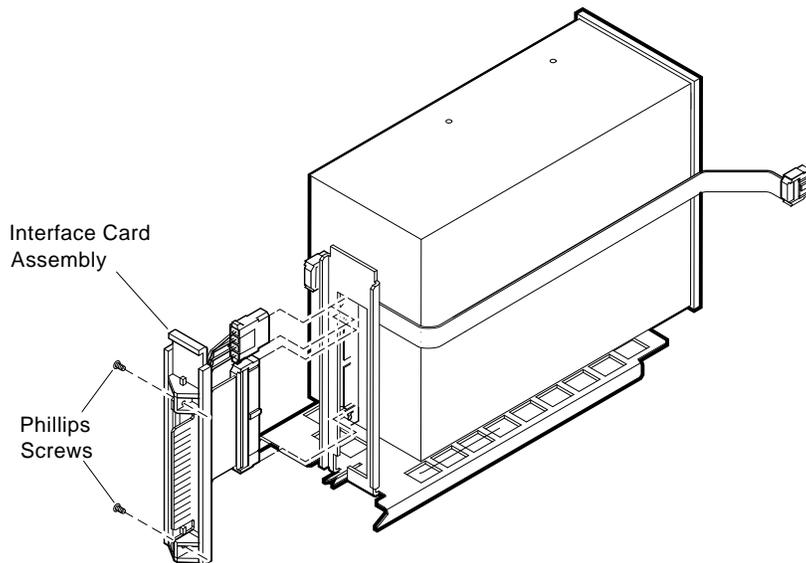
Phillips
Screws

MLO-005801

3.5.2.6 Removing the Lower Mounting Bracket

Remove the lower mounting bracket by removing the two Phillips screws at the rubber shock bushings that secure the lower bracket to the drive (Figure 3–17).

Figure 3–17: Removing Lower Mounting Bracket

ID Cable

Bracket Screws

Interface Card Assembly
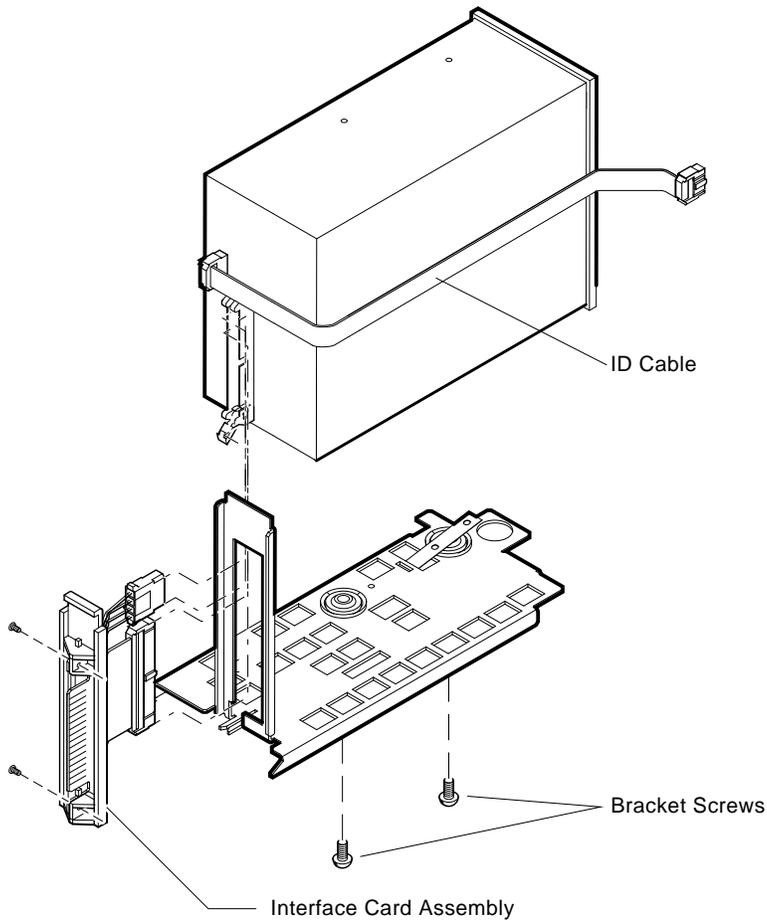
MLO-005802

3.6 Removing a TK-Series Tape Drive

NOTE: *The illustrations in this section show the BA440 enclosure. Duplicating the same basic illustrations for the BA430 enclosure is unnecessary. The removal procedures are the same for both enclosures.*

Remove a TK-series tape drive as follows:

1. Remove the screw at the top of the TK-series drive front panel and tilt the panel out and down.

2. Remove the tape drive front panel.

3. Release the TK-series drive from its enclosure by loosening the captive screws above and below the drive unit (Figure 3–18).

Figure 3–18:   Releasing TK-Series Captive Screws
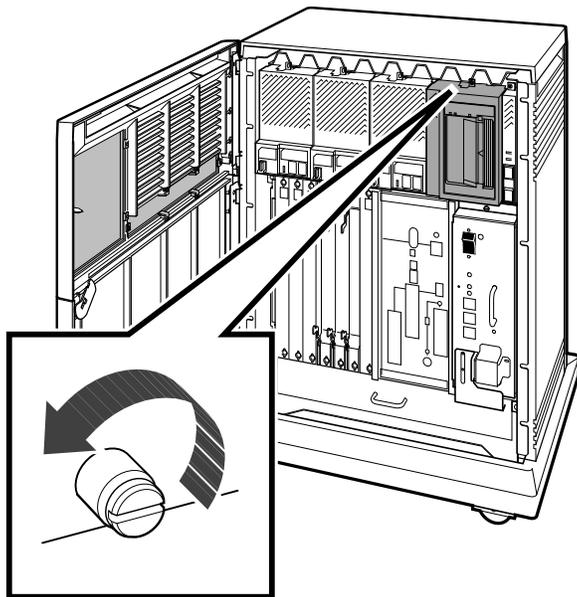
MLO-004215

4. Slowly slide the TK-series drive unit partway out of the BA430/BA440 enclosure until you can remove the data cable from the rear of the drive (Figure 3–20).

Figure 3–19: Removing a TK-Series Drive Unit
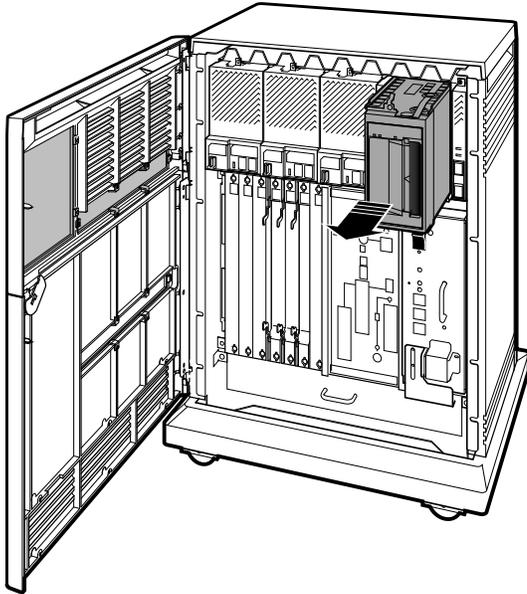
MLO-004216

5. Note the orientation of the data cable. Disconnect the data cable from the TK-series drive.

6. Continue to slide the TK-series drive unit out of the BA430/BA440 enclosure (Figure 3–19) and lay it left side down.

Figure 3–20: Removing a TK-Series Cable

Communication Cable

Interface Card Assembly
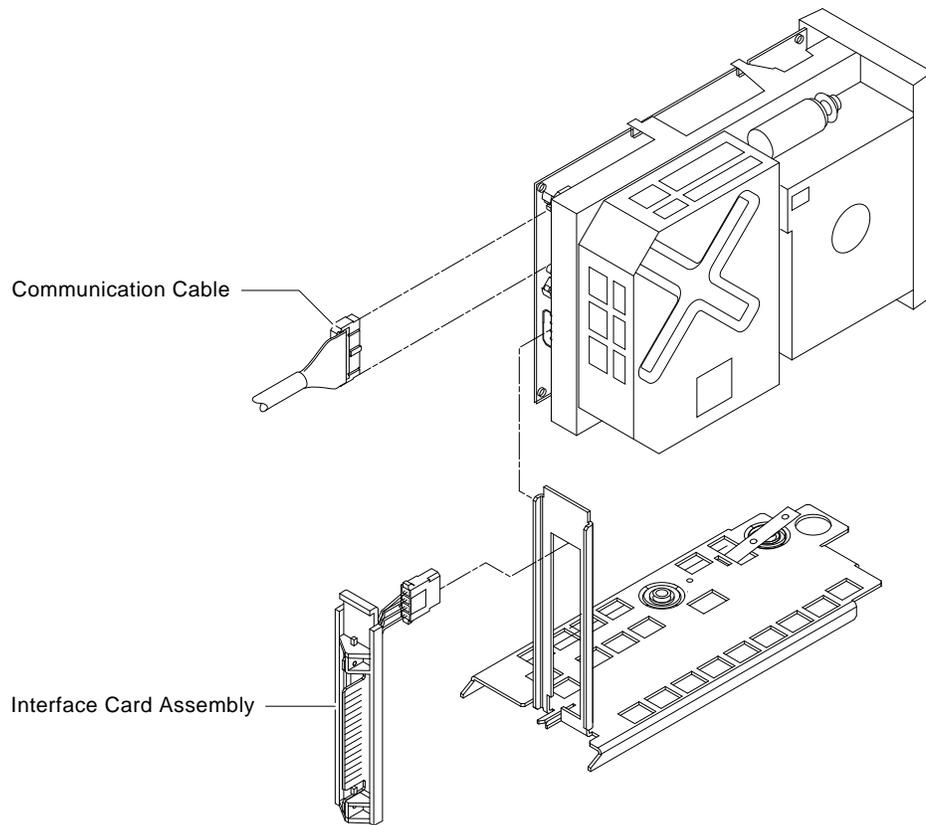
MLO-004228

7. Remove the cable from the rear of the TK-series drive and then remove
   the sliding tracks from the defective TK-series drive. Save the tracks
   and cable for the new TK-series drive.

Installation Notes

If the new TK-series tape drive unit is attached to a skid plate, you must
remove the skid plate from the new drive and install the skid plate on the
defective drive before returning the drive.

When replacing a TK-series drive, do not pinch any cabling at the rear
of the tape drive (Figure 3–20). If you feel resistance when sliding the
drive into the BA430/BA440 enclosure, remove the drive unit and check

that the cable is clear. Each module location will be identified as well as the enclosure used. If an enclosure is not identified, then the module or component is used in both enclosures.

3.7 Removing the System Control Panel

To remove the system control panel (Figure 3–21) follow the listed steps:

1. Open the upper access door.

2. Release the top captive screw securing the assembly.

3. Detach the interface cable.

4. Remove the system control panel.

5. Install a system control panel in the reverse order.

Figure 3–21:   Removing the System Control Panel (SCP)
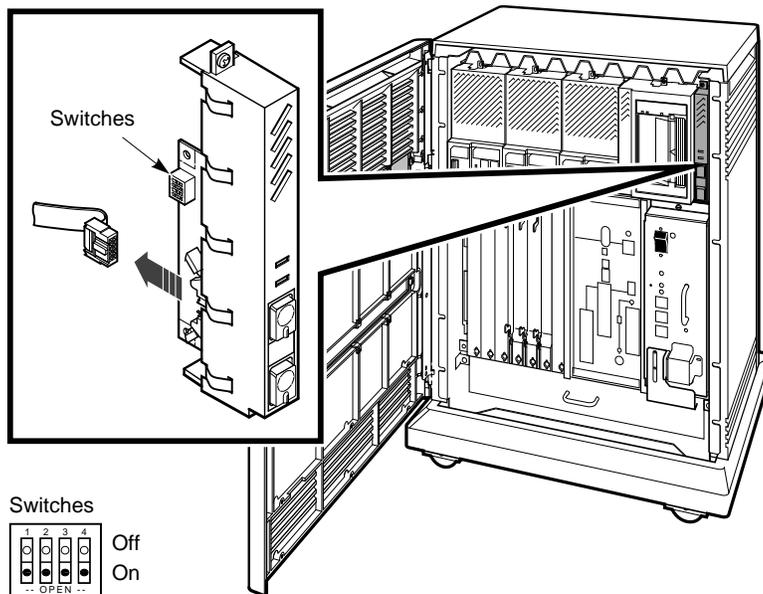
MLO-004217

Installation Note

The four switch pack switches when positioned ON allow the system controls to function. If the switch pack switches are all positioned OFF, the system controls on the panel are disabled.

3.8 Vterm Board Removal (BA440 Enclosure Only)

To remove the Vterm board from the BA440 enclosure backplane, follow the steps below:

1. Open the upper access door.

2. Remove the third tape drive device (if any, counting from the left).

3. Remove the Vterm board from the backplane.

To install a Vterm board, follow the removal procedure in reverse.

3.9 Removing the Power Supply

NOTE: *The illustrations in this section show the BA440 enclosure. Duplicating the same basic illustrations for the BA430 enclosure is unnecessary. The removal procedures are the same for both enclosures.*

The BA430/BA440 enclosure has one power supply Figure 3–22. To remove the power supply, follow the procedure carefully.

Danger High Voltage

.

This warning symbol indicates risk of electric shock.

WARNING: *The power cord must be removed from this unit's appliance inlet to disconnect ac power. The circuit breaker power switch is NOT a disconnect device.*

A plate covers one fastener that secures the system to the BA430/BA440 enclosure in such a way that the power cord set must be removed before this fastener can be disconnected. This fastener MUST BE TIGHTENED when service is completed before replacing the power cord.

NOTE: *The power supply stores an electrical charge which, if not bled (discharged) correctly, could cause physical harm. Bleed the power supply before removing. To bleed the power supply, remove the power cord and push up on the metal plate on the bottom of the power supply. This sliding plate depresses the bleed switch or button located under the power supply. Hold the discharge plate in the up position for at least 45 seconds after removing the ac power cord. This discharges the system and makes the power supply safe to handle.*

**Figure 3–22:   Power Supply Indicators, Connectors, and Switch Loca-
tions**

Power Switch

AC Present Indicator

DC OK Indicator

Fan Failure
Indicator

Over Temperature
Condition Indicator

Power Bus
Connectors

Power Cable
Connector

Hazardous
Warning Label
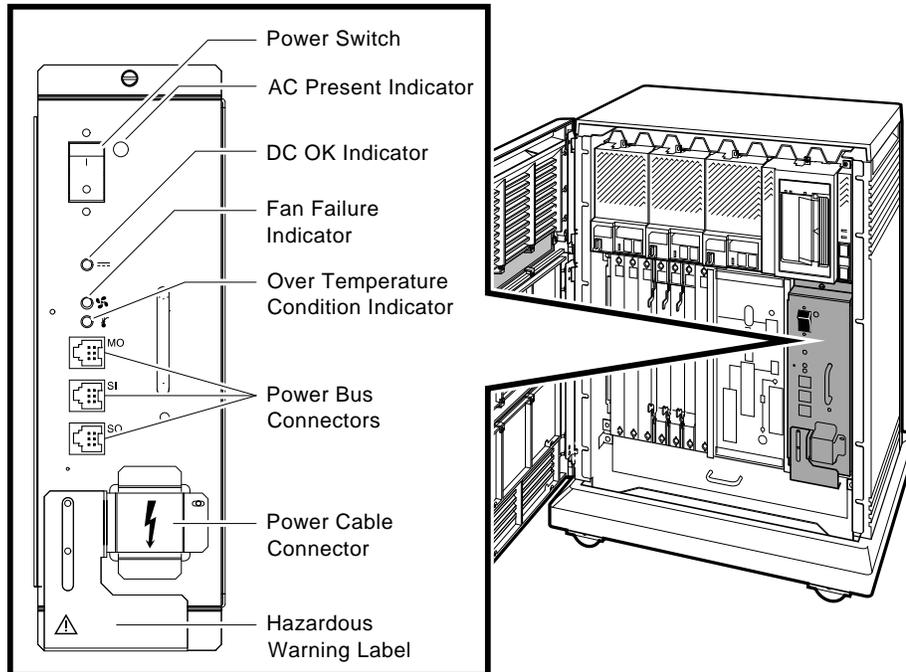
MLO-004218

1. Turn off the H7874 power supply switch and unplug the ac power cord
    from the wall outlet.

2. Remove the power cord from the power supply (Figure 3–23).

3. Remove the ground strap (if any) and power control bus cables (if any).

4. Release the top power supply captive screw.

5. Release the bottom captive screw by raising the metal plate up against
    the bottom of the power supply and hold for 45 seconds. The bottom
    screw is exposed when the plate is held up in the bleed position
    (Figure 3–24). Release the bottom screw.

6. Grasp the handle with one hand and pull the supply out from the
    backplane connection (Figure 3–25).

Figure 3–23: Removing the Power Supply Cord
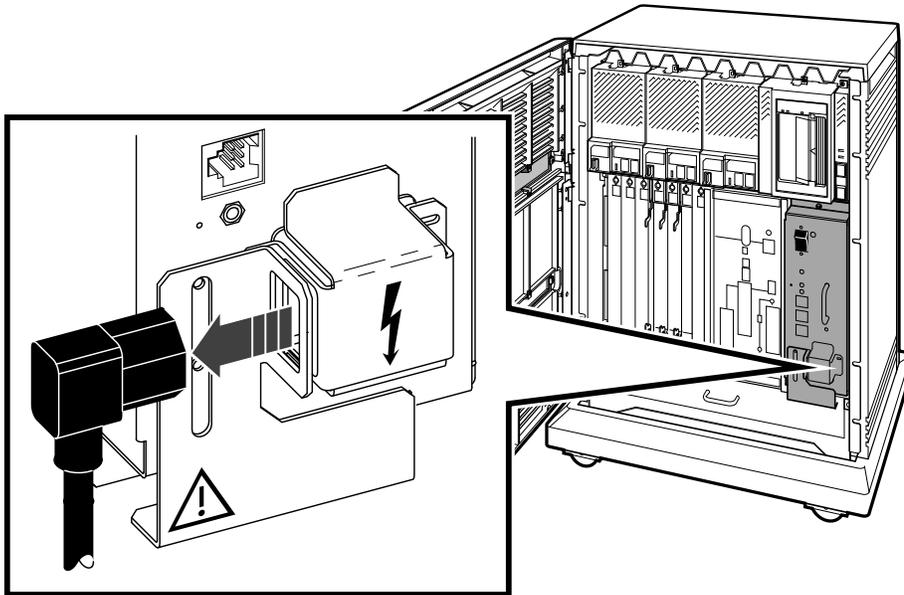
MLO-004219

7. Remove the power supply.

Installation Note

When installing the power supply, make sure the top and bottom edges of the supply are aligned and mounted in the plastic guides in the enclosure.

3.10 Removing Fans

A fan tray containing two 6-inch fans provides system cooling for the BA430/ BA440 enclosure. The fans are controlled by a heat sensor that accurately varies the fan speed according to the system's temperature needs. The two fans are attached to the metal tray by a single mounting bracket. The fan tray slides under the card cage and fastens to the chassis by two thumb screws.

NOTE: *The illustrations in this section show the BA440 enclosure. Duplicating the same basic illustrations for the BA430 enclosure is unnecessary. The removal procedures are the same for both enclosures.*

Figure 3–24:   Discharging the Power Supply

Discharge Switch

Captive Screw

Cover Plate
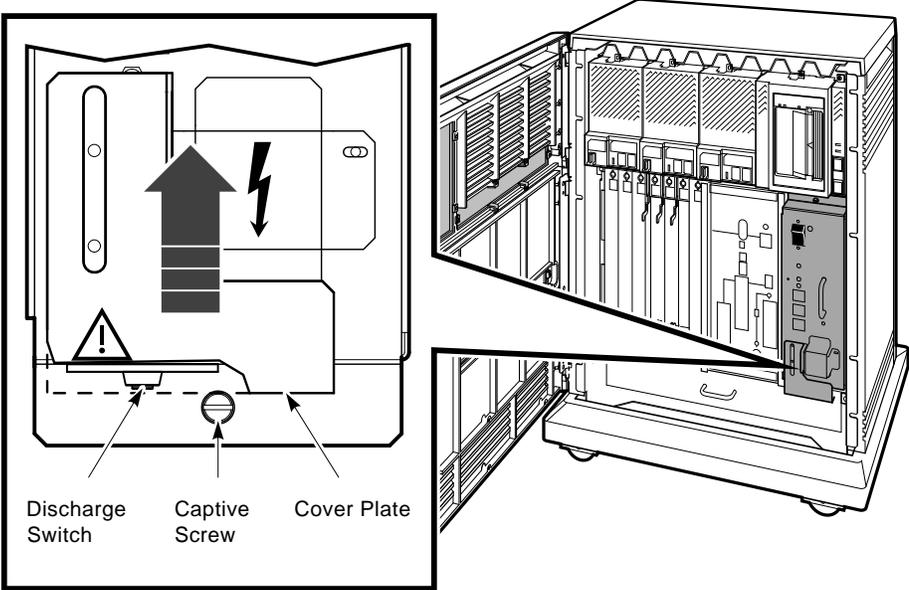
MLO-004229

Figure 3–25: Power Supply Pulled Out
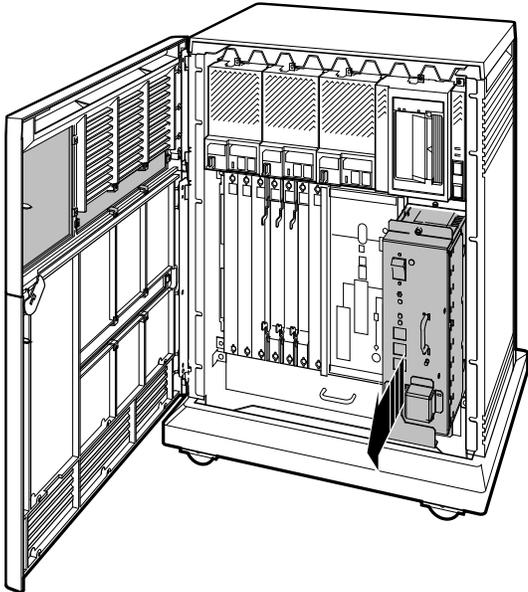
MLO-004226

Figure 3–26:   Removing the Fan Tray
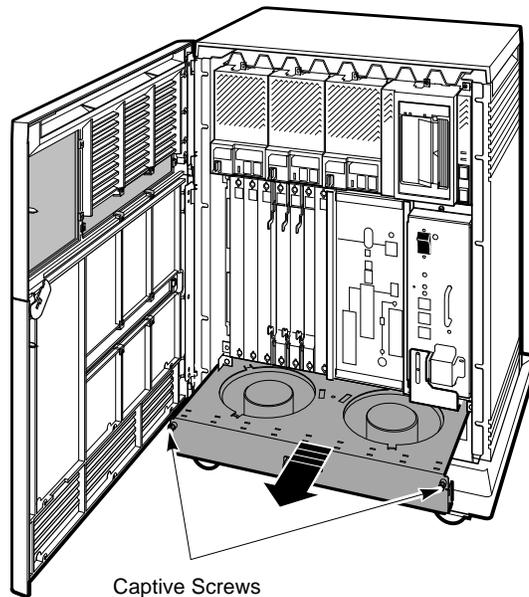
Captive Screws

MLO-004220

Remove the fans as follows:

1. Open the lower access door.

2. Remove or reroute any option cables away from the fan tray.

3. Unplug the power cord from the ac wall outlet.

4. Loosen the two captive screws that hold the fan tray to the chassis.

5. Pull out the fan tray (Figure 3–26) and flip it onto its back (Figure 3–27).

6. Disconnect the dc power cable connector from the fan.

7. Remove the center screw and bracket securing both fans to the tray (Figure 3–27).

8. Remove the fans.

    NOTE: *It is recommended that fans be replaced in sets (or pairs).*

9. To replace the fan tray, follow the removal procedure in reverse.

Figure 3–27: Removing the Fan Assembly

Continuity Clip

Mounting
Bracket

MLO-004221
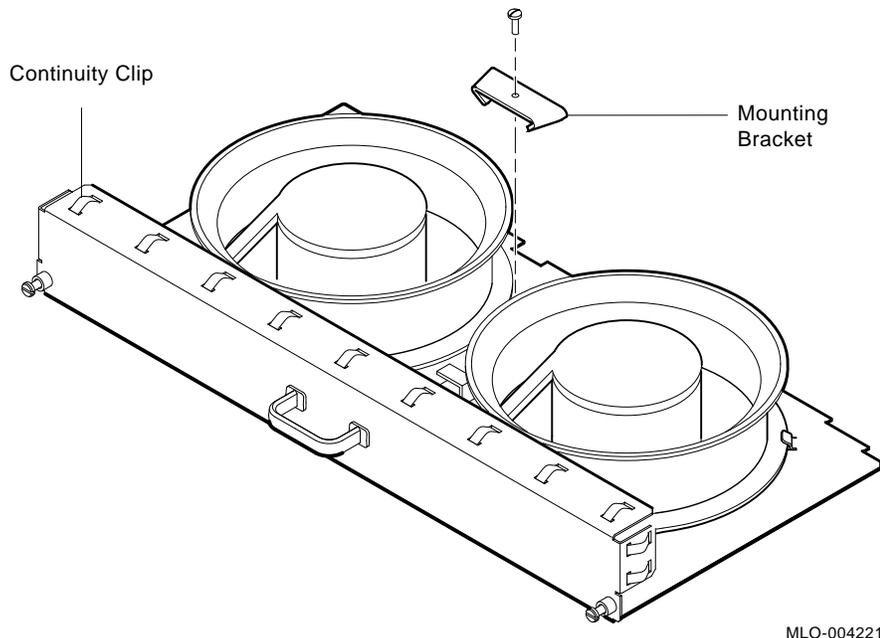
3.11 Removing a Backplane

This section covers the removal procedures for both the BA440 backplane
(54–19354–01) and the BA430 backplane (54–20181–01).

The backplane is the only part of the BA430/BA440 enclosure that must
be removed from the rear. To remove the backplane, follow the steps listed
below:

1. Turn off the system power switch and unplug the ac power cord from
   the wall outlet.

2. From the front of the BA430/BA440 enclosure

   a. Unlock and open both doors.

   b. Remove the top door by swinging it out past 90 degrees and lifting
      it off the hinges.

c. Remove the bottom door by swinging it out past 90 degrees and lifting it off the hinges.

d. To remove the right door latching bracket, remove the three self-tapping screws and one 6/32 screw. Remove the bracket. Remove the remaining self-tapping screws (Figure 3–28).

e. To remove the left hinge bracket, remove the five self-tapping screws (Figure 3–28).

3. Slide the enclosure's outer shell back and off. Lay the shell and other hardware aside.

4. Remove the power supply. See Warning Note (Section 3.9).

5. Remove the H3604 console module (BA440 enclosure) or H3602 CPU cover panel (BA430 enclosure).

a. Release the quarter-turn captive screws (BA430/BA440).

b. Swing open console module and disconnect cables (BA440 enclosure only).

c. Lift the console module from its hinge pins (BA440 enclosure only).

d. Lay the console module aside (BA440 enclosure only).

e. Disconnect the 50-pin connector cable and lay the H3602 panel aside (BA430 enclosure only).

6. Remove all module options from the card cage .

7. Remove the SCP (System Control Panel) and its cable.

8. Remove all ISEs and tape drive units from the upper enclosure.

9. Disconnect the extended bus cables from the upper left corner of the backplane (Figure 3–29).

10. Remove the Vterm regulator module from the backplane (BA440 enclosure only).

11. Turn the enclosure around so that you face the rear panel (Figure 3–30).

Figure 3–28: Outer Shell Removal

Door Hinge

Outer Shell

Bracket Pin

Upper Door

Lower Door

Door Brackets
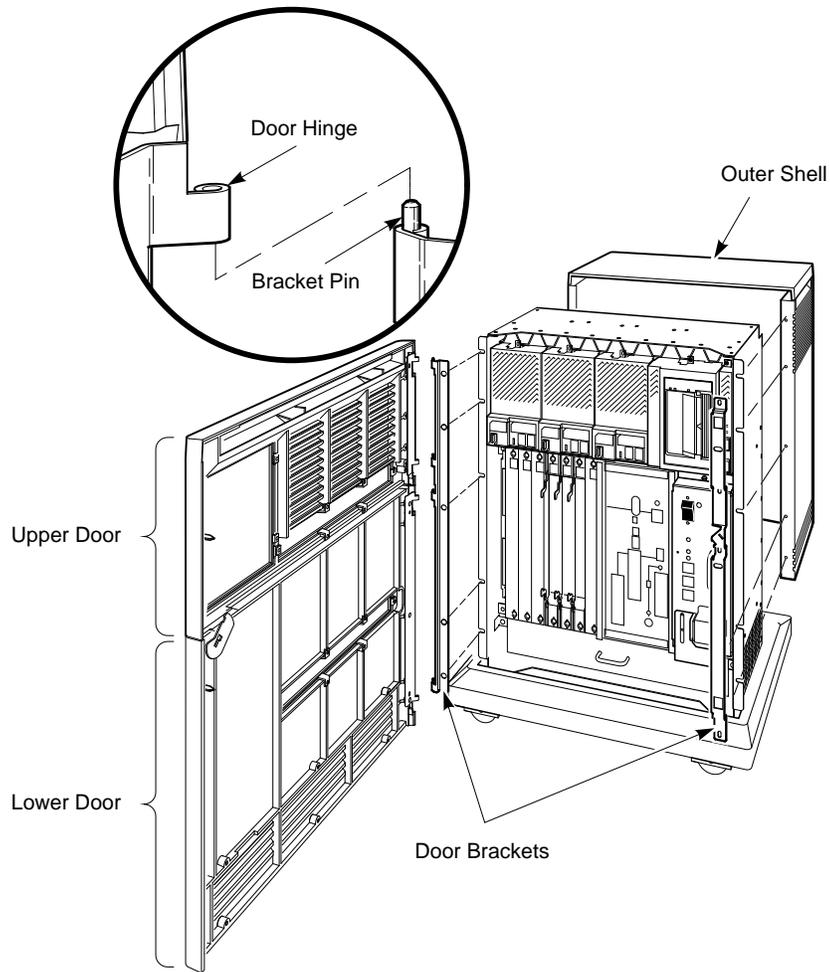
MLO-004222

12. Remove the screws that hold the rear panel. Remove the rear panel (Figure 3–30).

13. Remove the screws and nuts that hold the backplane to the enclosure. Remove the backplane (Figure 3–31).

Figure 3–29:   Bus Cable Locations

SCSI Cable

Vterm Module

DSSI Cable
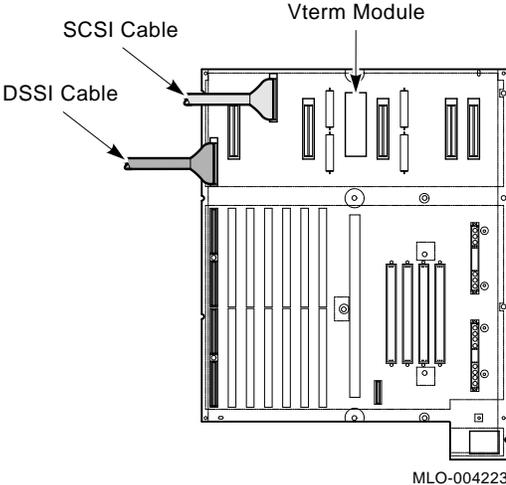
MLO-004223

14. Remove the Backplane.

Figure 3–30: Rear Panel Removal (BA430/BA440)
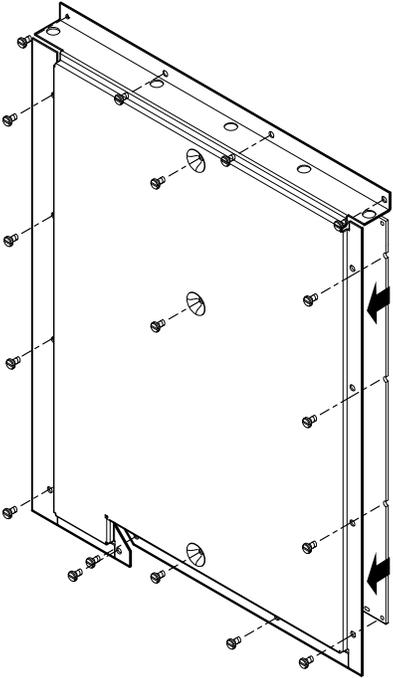
MLO-004224

Figure 3–31: Removing the BA430/BA440 Backplane

Backplane Screw

Backplane Nuts

Remove Last
Insert First
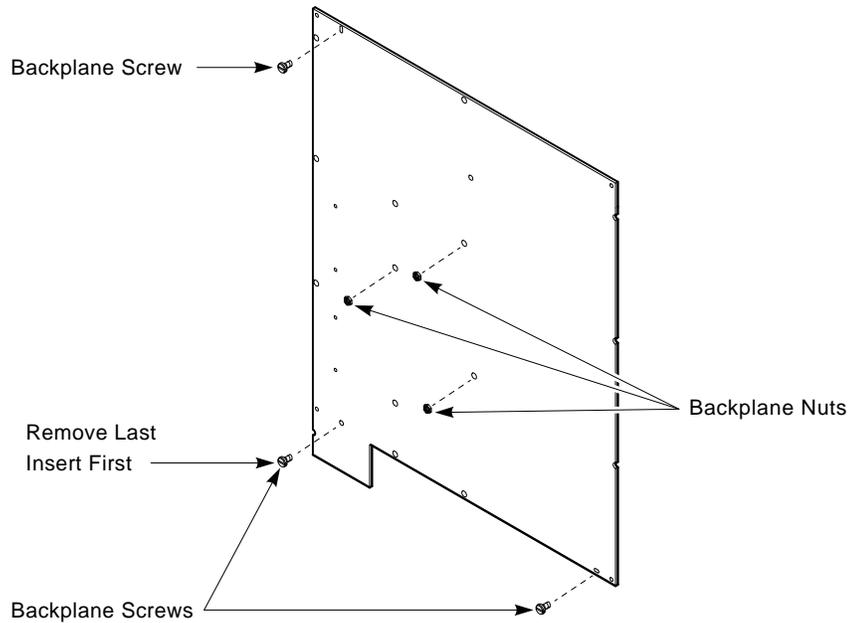
Backplane Screws

MLO-004225

3.12 Installing the BA430/BA440 Backplane

1. Align the new backplane assembly with the rear of the BA430/BA440 enclosure. Insert the two lower screws (left side first) and the upper left screw to align the backplane against the card cage. Tighten all screws.

2. Insert and tighten the Kep nuts (if applicable).

3. Install the metal cover over the backplane, using the screws previously removed, starting with the upper left, but do not tighten screws until all are inserted properly, then tighten.

4. Install the power supply.

5. Insert the two bus cables in the upper left corner of the backplane Figure 3–29.

6. Install the SCP and cable.

7. Install the ISEs.

8. Install the tape drive unit and cable (if applicable).

9. Install the modules in their correct slots.

10. Install the fan tray.

11. Install the H3602 CPU cover panel (BA430).

12. Install the H3604 console module (BA440).

13. Connect all external cables.

14. Position the outer shell on the chassis and move it forward toward the hinge and latching bracket positions.

15. Install two of the self-tapping screws (right side second and fourth from the bottom) to hold the shell against the chassis (BA430/BA440).

16. Install the right door latching bracket, using the three self-tapping screws and the 6/32 screw (Figure 3–32).

17. Install the left hinge bracket with the self-tapping screws previously removed (Figure 3–32).

18. Tighten all screws.

19. Install the upper and lower doors (Figure 3–32). Position the doors at approximately 90 degrees (half open position) and hook the door over the hinge bracket pin. They should drop into position.

    NOTE: *Check and adjust the door latching bracket alignment to ensure the door latch clears the door latching bracket.*

Figure 3–32: Door Installation

Door Hinge

Outer Shell

Bracket Pin

Upper Door

Lower Door

Door Brackets
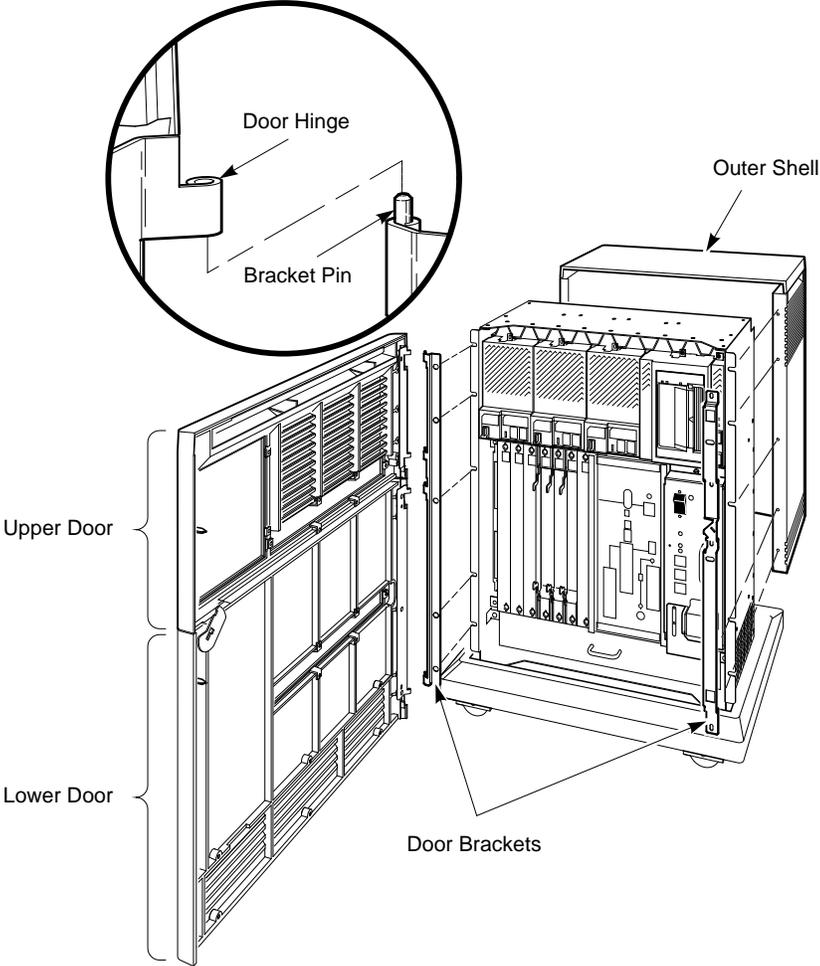
MLO-004222

Appendix A
Related Documentation

The following documents contain information relating to MicroVAX or MicroPDP–11 systems.

Document Title	Order Number
Module Options	
CXA16 Technical Manual	EK–CAB16–TM
CXY08 Technical Manual	EK–CXY08–TM
DEQNA Ethernet User's Guide	EK–DEQNA–UG
DESQA Ethernet Adapter Option Inst Guide	EK–DEQNA–IN
DESQA Technical Manual	EK–DEQNA–TM
DHV11 Technical Manual	EK–DHV11–TM
DLV11–J User's Guide	EK–DLV1J–UG
DMV11 Synchronous Controller Technical Manual	EK–DMV11–TM
DMV11 Synchronous Controller User's Guide	EK–DMV11–UG
DPV11 Synchronous Controller Technical Manual	EK–DPV11–TM
DPV11 Synchronous Controller User's Guide	EK–DPV11–UG
DRV11–J Interface User's Manual	EK–DRV1J–UG
DRV11–WA General Purpose DMA User's Guide	EK–DRVWA–UG
DZQ11 Asynchronous Multiplexer Technical Manual	EK–DZQ11–TM
DZQ11 Asynchronous Multiplexer User's Guide	EK–DZQ11–UG
DZV11 Asynchronous Multiplexer Technical Manual	EK–DZV11–TM
DZV11 Asynchronous Multiplexer User's Guide	EK–DZV11–UG
IBQ01 BITBUS Controller Technical Manual	EK–IBQ01–TM
IBQ01 BITBUS Controller Users Guide	EK–IBQ01–UG
IBQ01 Option Installation Guide	EK–IBQ01–IN
IEU11–A/IEQ11–A User's Guide	EK–IEUQ1–UG
KA630–AA CPU Module User's Guide	EK–KA630–UG
KA640–AA CPU Module User's Guide	EK–KA640–UG
KA650–AA CPU Module User's Guide	EK–KA650–UG
KDA50–Q CPU Module User's Guide	EK–KDA5Q–UG
KDJ11–B CPU Module User's Guide	EK–KDJ1B–UG
KDJ11–D/S CPU Module User's Guide	EK–KDJ1D–UG
KDF11–BA User's Guide	EK–KDFEB–UG

Document Title	Order Number
Module Options	
KFQSA Installation Guide	EK–KFQSA–IN
KMV11 Programmable Communications Controller User's Guide	EK–KMV11–UG
KMV11 Programmable Communications Controller Technical Manual	EK–KMV11–TM
LSI–11 Analog System User's Guide	EK–AXV11–UG
MRV11–D Universal PROM Module Users Guide	EK–MRV1D–UG
Q-Bus DMA Analog System User's Guide	EK–AV11D–UG
RQDX2 Controller Module User's Guide	EK–RQDX2–UG
RQDX3 Controller Module User's Guide	EK–RQDX3–UG
Disk and Tape Drives	
RA60 Disk Drive Service Manual	EK–ORA60–SV
RA60 Disk Drive User Guide	EK–ORA60–UG
RA81 Disk Drive Service Manual	EK–ORA81–SV
RA81 Disk Drive User Guide	EK–ORA81–UG
RA90 Disk Drive Service Manual	EK–ORA90–SV
RA90 Disk Drive User Guide	EK–ORA90–UG
RC25 Disk Subsystem User Guide	EK–ORC25–UG
RC25 Disk Subsystem Pocket Service Guide	EK–ORC25–PS
RF30 Integrated Storage Element	EK–RF30D–UG
RF30 Integrated Storage Element Installation Guide	EK–RF30D–IN
RF71 Integrated Storage Element Users Guide	EK–RF71D–UG
RRD40 Subsystem Optical Disc Drive Owner's Manual	EK–RRD40–OM
RRD50 Subsystem Pocket Service Guide	EK–RRD50–PS
RRD50 Digital Disc Drive User's Guide	EK–RRD50–UG
RX33 Technical Description Manual	EK–RX33T–TM
RX50–D, –R Dual Flexible Disk Drive Subsystem Owner's Manual	EK–LEP01–OM
SA482 Storage Array Service Manual (for RA82)	EK–SA482–SV
SA482 Storage Array User Guide (for RA82)	EK–SA482–UG
TK50 Tape Drive Subsystem User's Guide	EK–LEP05–UG
TK70E–SF & TQK70–SF Installation Guide	EK–TK70E–IN
TK70 Tape Drive Owner's Manual	EK–OTK70–OM
TS05 Tape Transport Pocket Service Guide	EK–TSV05–PS
TS05 Tape Transport Subsystem Technical Manual	EK–TSV05–TM
TS05 Tape Transport System User's Guide	EK–TSV05–UG

Document Title	Order Number
Systems	
630QB Maintenance Print Set	MP–02071–01
630QE Maintenance Print Set	MP–02219–01
630QY Maintenance Print Set	MP–02065–01
630QZ Maintenance Print Set	MP–02068–01
BA23 Enclosure Maintenance	EK–186AA–MG
BA123 Enclosure Maintenance	EK–188AA–MG
BA213 Enclosure Maintenance	EK–189AA–MG
BA214 Enclosure Maintenance	EK–190AA–MG
BA215 Enclosure Maintenance	EK–191AA–MG
H9642 Cabinet Maintenance	EK–187AA–MG
H9644 Cabinet Maintenance	EK–221AA–MG
KA630 CPU System Maintenance	EK–178AA–MG
KA640 CPU System Maintenance	EK–179AA–MG
KA650 CPU System Maintenance	EK–180AA–MG
KDF11–B CPU System Maintenance	EK–245AA–MG
KDJ11–D CPU System Maintenance	EK–247AA–MG
KDJ11–B/S CPU System Maintenance	EK–246AA–MG
MicroPDP–11 Hardware Information Kit (for BA23)	00–ZYAAA–GZ
MicroPDP–11 Hardware Information Kit (for BA123)	00–ZYAAB–GZ
MicroPDP–11 Hardware Information Kit (for H9642)	00–ZYAAE–GZ
MicroPDP–11 Hardware Information Kit (for BA213)	00–ZYAAS–GZ
Microsystems Options	EK–192AB–MG
Microsystems Site Preparation Guide	EK–O67AB–PG
MicroVAX II Hardware Information Kit (for BA23)	00–ZNAAA–GZ
MicroVAX II Hardware Information Kit (for BA123)	00–ZNAAB–GZ
MicroVAX II Hardware Information Kit (for H9642)	00–ZNAAE–GZ
MicroVAX 3500 Customer Hardware Information Kit	00–ZNAES–GZ
MicroVAX 3600 Customer Hardware Information Kit (for H9644)	00–ZNAEF–GZ
VAXstation 3200 Owner's Manual (BA23)	EK–154AA–OW
VAXstation 3500 Owner's Manual (BA213)	EK–171AA–OW
VAXstation II/GPX Owner's Manual (BA23)	EK–106AA–OW
VAXstation II/GPX Owner's Manual (BA123)	EK–105AA–OW

Document Title	Order Number
Diagnostics	
DEC/X11 Reference Card	AV–F145A–MC
DEC/X11 User's Manual	AC–FO53D–MC
MicroVAX Diagnostic Monitor Ethernet Server User's Guide	AA–FNTAF–DN
MicroVAX Diagnostic Monitor Reference Card	AV–FMXAC–DN
MicroVAX Diagnostic Monitor User's Guide	AA–FM7AE–DN
XXDP DEC/X11 Quick Reference Guide	AA–FK84A–TE
XXDP User's Manual	AA–FK83A–TE
Networks	
Ethernet Transceiver Tester User's Manual	EK–ETHTT–UG
VAX/VMS Networking Manual	AA–Y512C–TE
VAX NI Exerciser User's Guide	AA–HI06A–TE

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