DIGITAL AlphaServer 8400 RM System

Installation/Owner's Guide

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ACOUSTICS: Declared values per ISO 9296 and ISO 7779:

	Sound Power Level L_{wAd}, B		Sound Pressure Level L_{pAm}, dBA (Bystander Positions)	
Product	**Idle**	**Operating**	**Idle**	**Operating**
DWLPR-B9 in H9A15 cabinet				
	7.0	7.0	51	51
BA356 (diskless) in H9A15 cabinet				
	5.9	5.9	36	36
CT-AN1BC-AX (AlphaServer 8400 RM 5/300 in H9A15 cabinet)				
	7.7	7.7	57	57
AlphaServer 8400 RM 5/300, 2 x DWLPR-B9, 4 x BA356, in H9A15 cabinet				
	7.8	7.8	59	59

Current values for specific configurations are available from DIGITAL representatives. 1 B = 10 dBA.

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	Schalleistungspegel L_{wAd}, B		Schalldruckpegel L_{pAm}, dBA (Zuschauerpositionen)	
Gerät	**Leerlauf**	**Betrieb**	**Leerlauf**	**Betrieb**
DWLPR-B9 in H9A15 cabinet				
	7,0	7,0	51	51
BA356 (diskless) in H9A15 cabinet				
	5,9	5,9	36	36
CT-AN1BC-AX (AlphaServer 8400 RM 5/300 in H9A15 cabinet)				
	7,7	7,7	57	57
AlphaServer 8400 RM 5/300, 2 x DWLPR-B9, 4 x BA356, in H9A15 cabinet				
	7,8	7,8	59	59

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Overview

The *DIGITAL AlphaServer 8400 RM System Installation/Owner's Guide* provides information to properly trained DIGITAL service personnel and customer maintenance personnel on the installation of the DIGITAL AlphaServer 8400 RM system, and information on the operation and maintenance of the equipment.

Organization

The *DIGITAL AlphaServer 8400 RM System Installation/Owner's Guide* is organized in the following manner:

- **Chapter 1, Introduction –** Provides an overview of the DIGITAL AlphaServer 8400 RM system, and describes the major chassis, the control panel, and the power system that makes up this system. Specifications for the TLSB chassis and the PCI (BA602-AA) chassis are also included.
- **Chapter 2, Installation –** Discusses site preparation, environmental and electrical requirements, checking the shipment, installing the H9A15 extended-depth cabinet with the TLSB chassis inside, installing the PCI chassis, and cabling the chassis and storage shelves that make up the system.
- **Chapter 3, Operation –** Describes how to turn on and turn off the equipment.
- **Chapter 4, Troubleshooting –** Describes the performance of various steps in basic troubleshooting and routine maintenance procedures.
- **Chapter 5, Removal and Replacement –** Describes the removal and replacement procedures for the field-replaceable units (FRUs) that are unique to the AlphaServer 8400 RM system and the PCI chassis.
- **Appendix A, Option Installation –** Contains installation instructions for the options that are available for the PCI chassis.

- **Appendix B, Field-Replaceable Units –** Lists all FRUs and their part numbers for the TLSB and PCI chassis.

Reader's Comments

DIGITAL welcomes your comments on this or any other manual. You can send your comments to DIGITAL by mail to the following address:

Digital Equipment Corporation
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Conventions

The following conventions are used in this document:

NOTE	A note calls the reader's attention to any item of information that may be of special importance.
CAUTION	A caution contains information essential to avoid damage to the equipment.
WARNING	A warning contains information essential to the safety of personnel.

The following symbols appear on the chassis. Please review their definitions below:

This Dangerous Voltage warning symbol indicates risk of electric shock and indicates hazards from dangerous voltage.

This Attention symbol is used to alert the reader about specific safety conditions, and to instruct the reader to read separate instructional material.

Related Documentation

For more information on the AlphaServer 8400 RM system, refer to the following documentation:

AlphaServer 8200/8400 Operations Manual	EK-T8030-OP
AlphaServer 8400 Installation Guide	EK-T8430-IN
AlphaServer 8200/8400 Service Manual	EK-T8030-SV
KFTHA System I/O Module Installation Guide	EK-KFTHA-IN
KFTIA Integrated I/O Module Installation Guide	EK-KFTIA-IN
MS7CC Memory Installation Card	EK-MS7CC-IN
Site Environmental Preparation Guide	EK-CSEPG-MA
BA356-SB 16-Bit Modular Storage Shelf Subsystem User's Guide	EK-BA356-UG
DWZZB 16-Bit SCSI Bus Converter User's Guide	EK-DWZZB-UG

1
Introduction

1.1 General

The DIGITAL AlphaServer 8400 RM system (see Figure 1–1) consists of a TurboLaser system bus (TLSB) chassis **1** and one or more of the following rackmountable options in an H9A15 extended-depth RETMA cabinet.

- BA356 storage shelf (BA356-SB) **2**
- Peripheral component interconnect (PCI) chassis (BA602-AA) **3**

The TLSB chassis contains the CPU and memory modules, along with I/O port controller modules. The KFTHA I/O port controller module has four hose connectors to support up to four PCI I/O chassis. The KFTIA I/O port controller module has one hose connector, three fast wide differential (FWD) SCSI connectors, one single-ended SCSI connector, and two Ethernet connectors. An optional FDDI daughtercard can be installed in the KFTIA module to provide either a multimode FDDI connector or a twisted-pair copper FDDI connector. The TLSB chassis includes an ac input unit, a 48 Vdc power-regulator unit, a 48 Vdc card-cage filter, and a front and rear blower assembly for moving the cooling air. The ac input unit has its own circuit breaker and power cord that requires a single-phase, 200-240 Vac (nominal), 50-60 Hz power source.

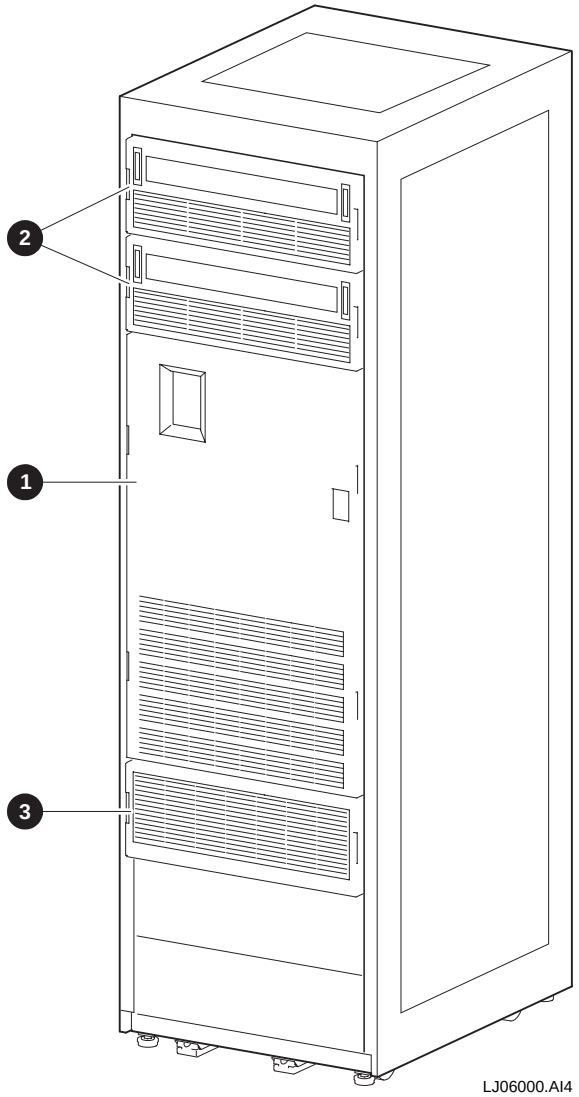
The PCI chassis mounts *below* the TLSB chassis in the cabinet and can accept up to 12 PCI or EISA technology I/O cards. The PCI chassis includes a 48 Vdc power supply and fans for moving the cooling air. In addition, the PCI chassis has its own power cord that requires a single-phase, 120/240 Vac (nominal), 50-60 Hz power source.

A single H7600 power distribution unit is mounted in the bottom rear of the H9A15 cabinet to provide ac receptacles for the PCI chassis and/or the BA356 storage shelves.

Introduction

The PCI chassis is interconnected to the TLSB chassis via a shielded I/O hose ribbon cable connected between an I/O port controller module hose connector in the TLSB chassis and the PCI backplane in the PCI chassis.

Figure 1–1 AlphaServer 8400 RM System in an H9A15 Cabinet (Example)



1.2 TurboLaser System Bus Chassis

The TLSB chassis, shown in Figure 1–2 (front view) and Figure 1–3 (rear view), contains a control panel **1** , the front four-slot half of the card cage **2** , a 48 Vdc card-cage filter **3** , a front blower assembly **4** , a pouch on the front and rear of the chassis containing an antistatic wriststrap **5** , a 48 Vdc power-regulator unit **6** , the rear five-slot half of the card cage **7** , an ac input unit **8** , a rear blower assembly **9** , the tach alarm module **10**, the cabinet control logic (CCL) module **11**, and the Power Take-Off (PTO) module **12**.

The following sections describe some of the basic components of the TLSB chassis.

Figure 1–2 TLSB Chassis (Front View)

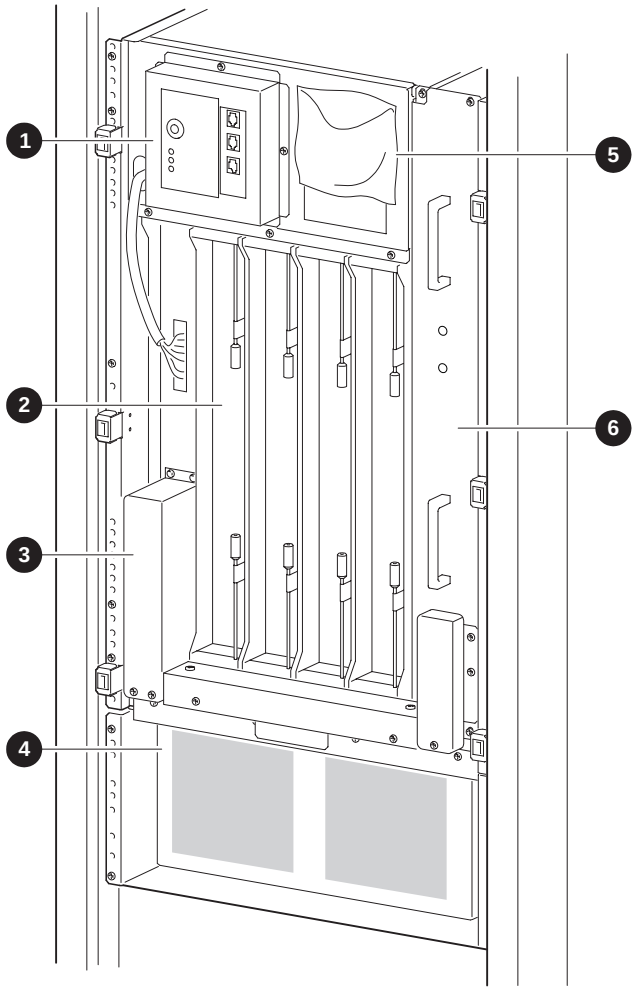
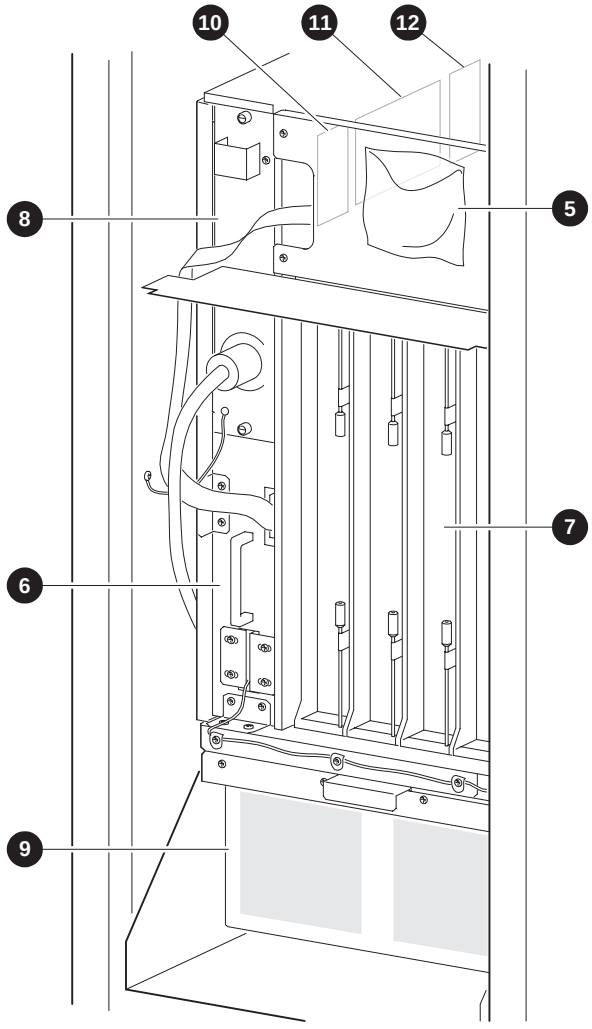


Figure 1–3 TLSB Chassis (Rear View)



1.2.1 TLSB Chassis Card Cage

The TLSB chassis front card cage contains four slots that are numbered 0 through 3 from right to left as viewed from the front of the chassis. The TLSB chassis rear card cage contains five slots that are numbered 4 through 8 from right to left as viewed from the rear of the chassis. The system must have at least one I/O module (KFTIA or KFTHA), one CPU module, and one memory module in order to function.

The first I/O module *must* be installed in slot 8 with additional I/O modules installed in adjacent slots to the right. A maximum of three I/O modules can be installed in the AlphaServer 8400 RM system. The first CPU module *must* be installed in slot 0 with additional CPU modules installed in adjacent slots to the left. A maximum of six CPU modules can be installed in the AlphaServer 8400 RM system. The first memory module *must* be installed in the first slot to the right of the I/O module(s) with additional memory modules installed in adjacent slots to the right. A maximum of seven memory modules can be installed in the AlphaServer 8400 RM system. Any slot that does not have an I/O module, memory module, or CPU module installed *must* have a terminator module installed.

Table 1–1 contains a list of the different types of modules that can be installed in the TLSB chassis, and a description of each.

Table 1–1 TLSB Card-Cage Modules

Option No.	Part No.	Description
KFTHA-AA	E2052-AA	4-hose connector I/O module
KFTIA-AA	E2054-AA	1-hose connector I/O module
KN7CC-AA	E2056-CA	Single-processor CPU module
KN7CC-AB	E2056-DA	Dual-processor CPU module
MS7CC-BA	E2035-BA	128-MB memory module
MS7CC-CA	E2035-CA	256-MB memory module
MS7CC-DA	E2035-DA	512-MB memory module
MS7CC-EA	E2035-EA	1-GB memory module
MS7CC-FA	E2036-AA	2-GB memory module

1.2.2 TLSB Chassis Control Panel

The AlphaServer 8400 RM systems have a control panel located on the front of the TLSB chassis (see Figure 1–4). The TLSB chassis control panel consists of a four-position keyswitch **1** , three LED status indicators (Key On **2** , Run **3** , Fault **4**), a Left Expander **5** and Right Expander **6** connector that are not used for the AlphaServer 8400 RM systems, and a Console **7** connector.

Figure 1–4 TLSB Chassis Control Panel

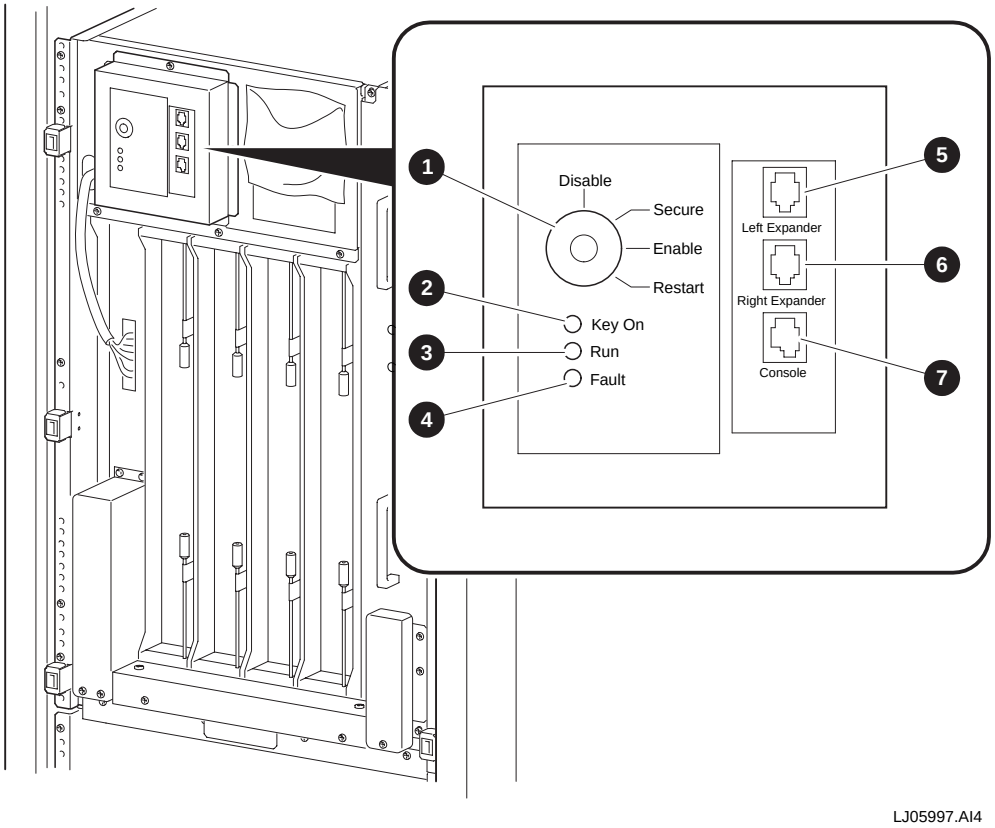


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Table 1–2 lists the four keyswitch positions and describes their functions.

Table 1–2 TLSB Control Panel Keyswitch Positions

Position	Description
Disable	Removes 48 Vdc power from the system. Power is still supplied to the cabinet control logic (CCL) module.
Secure	Prevents entry into console mode; position used while system executes programs.
Enable	Allows entry into console mode; position used while system executes programs.
Restart	A momentary switch position that is used to reinitialize the system; causes self-test to start running.

The TLSB control panel also includes three status LED indicators. Table 1–3 lists these LEDs and describes their functions.

Table 1–3 TLSB Control Panel Status LED Indicators

LED Name	Color	State	Description
Key On	Green	On	Power is supplied to the entire system; the blowers are running.
		Off	Power is only supplied to the cabinet control logic (CCL) module.
Run	Green	On	System is executing operating programs or certain power-up tests. Ctrl/P halts the execution of operating-system programs when the keyswitch is in the Enable position.
		Off	System is in console mode, operating system is not running, or the system is turned off.
Fault	Yellow	On	Fault on system bus.
		Slow Flash	Power sequencing is in progress or airflow error is detected.
		Fast Flash	Power system error, airflow error, or keyswitch in Disable position transition is detected.
		Off	No faults were detected.

1.2.3 TLSB Chassis Power System (N+1)

The TLSB power system consists of an ac input unit that mounts in the rear of the 48 Vdc power-regulator unit, a 48 Vdc power-regulator unit that mounts in the right side of the chassis, and a 48 Vdc card-cage filter that is located at the left front of the chassis.

The ac input unit contains an ac input circuit breaker and a removable power cord with a NEMA L6-20P connector that requires an external, single-phase, 200-240 Vac (nominal), 50-60 Hz power source with a NEMA L6-20R receptacle.

The 48 Vdc power-regulator unit converts the single-phase ac power to a 48 Vdc output that goes to the blower assemblies, the cabinet control logic (CCL) module, and the 48 Vdc card-cage filter.

There are two LED indicators located on the front of the 48 Vdc power-regulator unit. Each of these LEDs represent the operational status of a power-regulator board within the unit. There are two power-regulator boards in the 48 Vdc power-regulator unit and each power-regulator board "drives" one of the LEDs.

The upper LED (Supply 1) represents the status of the upper power-regulator board (power-regulator board number one) in the 48 Vdc power-regulator unit. The lower LED (Supply 2) represents the status of the lower power-regulator board (power-regulator board number two) in the 48 Vdc power-regulator unit.

The output of each power-regulator board is diode coupled and "wire-ORd" to the other power-regulator board. This ensures power redundancy and the high availability of the DIGITAL AlphaServer 8400 RM system.

The normal condition for the two power-regulator boards is to share the required power supply load and both of the LEDs will be on. Either of the two power-regulator boards has enough capacity to run the system on it's own should the other board fail. If one of the power-regulator boards fails, it's associated LED will turn off. If one of the two LEDs is off, the system is running on one power-regulator board and power redundancy is no longer available. The failed power-regulator board should be replaced at the first convenient time.

Table 1–4 lists the two 48 Vdc power-regulator unit LEDs along with a description of their states.

Table 1–4 LSB 48 Vdc Power-Regulator Unit Status LED Indicators

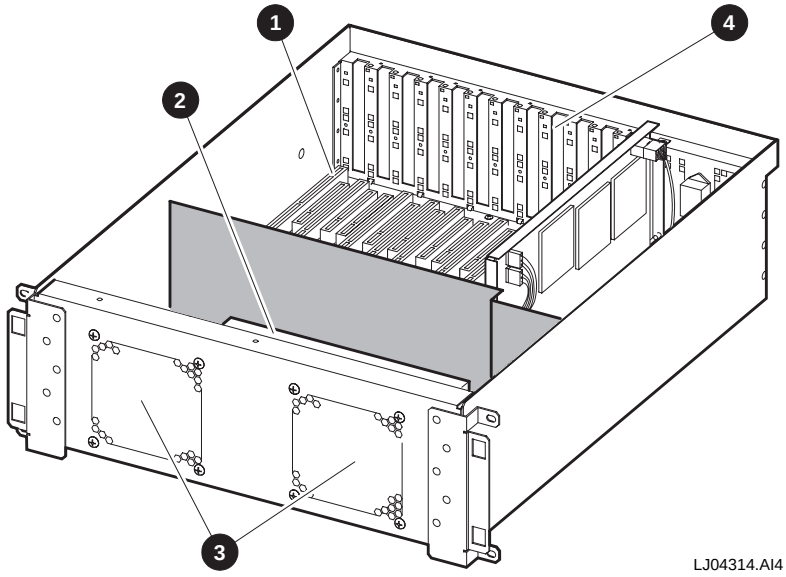
LED Name	Color	State	Description
Supply 1	Green	On	Power-regulator board number one is operational.
		Off	Power-regulator board number one has failed.
Supply 2	Green	On	Power-regulator board number two is operational.
		Off	Power-regulator board number two has failed.

1.3 Peripheral Component Interconnect (BA602-AA) Chassis

The PCI (BA602-AA) chassis, shown in Figure 1–5, includes a 12-slot card cage, a 48 Vdc power supply, two fans, and an I/O bulkhead. The rear of the chassis contains the interface area for connecting external cables.

The following sections describe the basic components of the PCI chassis.

Figure 1–5 PCI (BA602-AA) Chassis with Top Cover Removed



1 Card cage
2 48 Vdc power supply
3 Fans
4 I/O bulkhead

1.3.1 PCI Chassis Card Cage

The PCI chassis contains a 12-slot card cage that houses up to 12 PCI options. With the installation of the KFE70-CA PCI-to-EISA adapter kit in slot 0 and 2 of the PCI chassis, ten slots are available for a mixture of PCI and EISA options. Other modules are available for installation in the PCI chassis, such as: disk controllers, network interfaces, and bus adapters. Table 1–5 lists the options that are available for installation in the PCI chassis.

Table 1–5 PCI Options

Interface	Option	Description
Ethernet	DE435-AA	PCI adapter that supports either ThinWire, thickwire, or twisted-pair
	KFE70-CA	PCI-to-EISA adapter kit that consists of a standard I/O module that supports either thickwire or twisted-pair and a connector module
FDDI	DEFPA-AA	PCI FDDI controller with single-attachment multimode fiber connectors
	DEFPA-DA	PCI FDDI controller with dual-attachment multimode fiber connectors
	DEFPA-UA	PCI FDDI controller with a twisted-pair connector
	DEFEA[1]	EISA FDDI controller
DSSI	KFESB-AA[1]	EISA DSSI controller
SCSI	KZPAA	PCI single-ended SCSI adapter
	KZPBA-BB	PCI FWD SCSI adapter
	KZPSA-BB	PCI FWD SCSI adapter

[1]Requires installation of the KFE70-CA PCI-to-EISA adapter kit.

With the KFE70-CA PCI-to-EISA adapter kit installed in the PCI chassis, Table 1–6 lists how the 12 slots in the chassis are used.

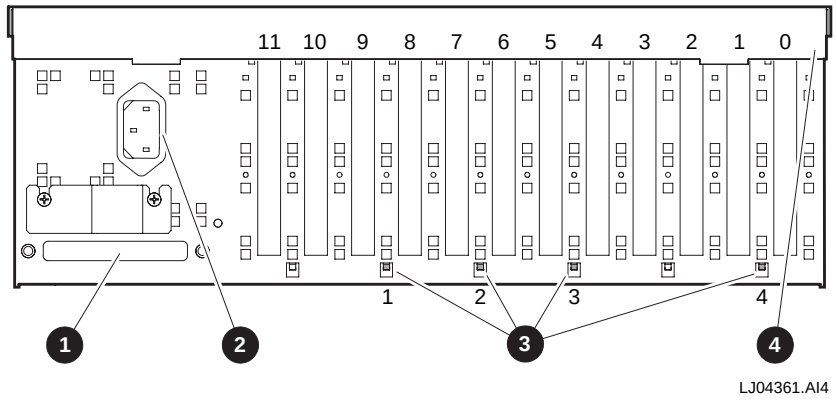
Table 1–6 PCI/EISA Slot Usage

Slot Number	Usage
0	Standard I/O module (part of KFE70-CA adapter kit)
1	EISA option only
2	Connector module (part of KFE70-CA adapter kit)
3	EISA option only
4	PCI or EISA option
5	PCI or EISA option
6	PCI option only
7	PCI or EISA option
8	PCI or EISA option
9	PCI or EISA option
10	PCI option only
11	PCI or EISA option

1.3.2 PCI Chassis I/O Bulkhead and Indicators

The PCI chassis has an I/O bulkhead (see Figure 1–6) located at the rear of the chassis. Blank filler panels cover all slot openings that do not have option cards installed. This is where external cables are connected to the option card connectors.

Figure 1–6 PCI Chassis I/O Bulkhead and Indicators



1 Hose connector
2 AC input jack
3 Status LEDs
4 Card-cage slot numbers

The PCI chassis also has four status LED indicators located at the rear of the chassis (see Figure 1–6). Table 1–7 lists these LEDs and describes their functions.

Table 1–7 PCI Status LED Indicators

LED	Name	State/Color	Indication
1	Internal power system OK	On (Green)	Power is applied to the PCI chassis and the internal power system is functioning properly.
		Off	The fans or the power board have failed.
2	Motherboard self-test OK	On (Green)	The motherboard has passed self-test.
		Off	The motherboard has failed self-test.
3	48 Vdc power OK	On (Green)	The 48 Vdc power supply is functioning properly.
		Off	The 48 Vdc power supply has failed or is improperly connected to the power board.
4	Hose error	On (Green)	The hose cable is improperly connected or has failed.
		Off	The hose cable is connected and functioning properly.

1.3.3 PCI Chassis Power Supply

A 48 Vdc power supply is located inside the PCI chassis attached to the bottom of the chassis behind the fans. This power supply provides 48 Vdc to the power board for distribution to the PCI motherboard and the two fans.

1.4 Specifications

The following sections contain the physical, electrical, and environmental specifications for the TLSB chassis and the PCI (BA602-AA) chassis.

1.4.1 TLSB Chassis Specifications

Table 1–8 lists the TLSB chassis specifications.

Table 1–8 TLSB Chassis Specifications

Physical Characteristics		
Enclosure	Height	92.70 cm (36.50 in.)
	Width	48.26 cm (19.00 in.)
	Depth	85.80 cm (33.78 in.) with bezel
Electrical Requirements		
AC Input Voltage	200-240 V rms nominal single phase	
AC Input Current	16 A rms	
Line Frequency	50 Hz or 60 Hz nominal	
Mating Receptacle	NEMA L6-20R	
Environmental Requirements		
Operating Temperature	15°C to 28°C (59°F to 82°F)	
Relative Humidity	20% to 80% noncondensing	
Storage Temperature	-40°C to 66°C (-40°F to 151°F)	
Relative Humidity	10% to 95% noncondensing	

1.4.2 PCI Chassis Specifications

Table 1–9 lists the PCI chassis specifications.

Table 1–9 PCI Chassis Specifications

Physical Characteristics		
Enclosure	Height	17.78 cm (7.00 in.)
		22.23 cm (8.75 in.) (with KFE70-CA adapter kit)
	Width	48.26 cm (19.00 in.)
	Depth	55.88 cm (22.00 in.)
	Weight	19.05 kg (42 lb) maximum
Electrical Requirements		
AC Input Voltage		200-240 V rms nominal single phase
AC Input Current		2.5 A rms
Line Frequency		50 Hz or 60 Hz nominal
Mating Receptacle		NEMA L6-15R
Environmental Requirements		
Operating Temperature		15°C to 28°C (59°F to 82°F)
Relative Humidity		20% to 80% noncondensing
Storage Temperature		-40°C to 66°C (-40°F to 151°F)
Relative Humidity		10% to 95% noncondensing

2
Installation

2.1 Introduction

This chapter discusses the installation of the AlphaServer 8400 RM systems. Topics covered in this chapter include:

- Site preparation
- Checking the shipment
- Installing the TLSB chassis
- Installing the PCI (BA602-AA) chassis
- Cabling
- Connecting the power cords

2.2 Site Preparation

The following sections describe the environmental and electrical requirements for the AlphaServer 8400 RM systems.

2.2.1 Environmental Requirements

The following list contains the environmental requirements for the AlphaServer 8400 RM systems:

- Keep the environment between 15°C and 28°C (59°F and 82°F).
- Keep the environment between 20% and 80% relative humidity (noncondensing).
- Keep the air around the equipment well circulated to prevent heat from building up and to provide an exhaust space at the front and rear of the cabinet.
- Keep the equipment away from heaters, photocopiers, and direct sunlight.
- Provide 1.5 m (4.9 ft) front and rear clearance for service access.
- Decrease static electricity buildup by locating the equipment away from busy areas such as office corridors, and keep the environment at the recommended humidity levels. Static electricity can cause the equipment to fail, data to be lost, and other problems to occur.
- Keep the area where the equipment is located clean. Do not place food or liquids on or near the equipment.
- Keep the area where the equipment is located free from dust (dust particles can interfere with chassis cooling and can damage the hardware).

2.2.2 Electrical Requirements

A dedicated 20-ampere (200-240 Vac nominal) 3-wire branch circuit for the power distribution unit is required for the H9A15 extended-depth cabinet. A dedicated 20-ampere, single-phase, 200-240 Vac (nominal) circuit is required for the TLSB chassis ac input unit power cord. These circuits must meet national and local standards, provide a good system ground, be stable, and be free from electrical noise. If power disturbances cannot be prevented, add power-conditioning equipment. Consult with Multivendor Customer Service personnel about the electrical requirements for the AlphaServer 8400 RM systems.

The ac power source should allow for system expansion. Do not connect other equipment (such as air conditioners or office copiers) to the circuit dedicated to the AlphaServer 8400 RM systems.

2.3 Checking the Shipment

The AlphaServer 8400 RM system TLSB chassis is factory installed in an H9A15 extended-depth cabinet. Other cartons included in the shipment may contain the BA356 storage shelves and/or the PCI (BA602-AA) chassis.

Check the shipment to verify that all items listed on the packing slip have been received.

Warning

The H9A15 extended-depth cabinet with the TLSB chassis factory installed can weigh up to 590.59 kg (1,302.00 lb), and the PCI chassis weighs approximately 19.05 kg (42.00 lb). Use sufficient personnel, or proper lifting equipment, when lifting or moving the H9A15 extended-depth cabinet or the PCI chassis.

If the equipment is damaged or if any items are missing, notify the delivery agent and contact the Digital sales representative.

Save all shipping cartons in case the equipment needs to be moved to a new location, or needs to be returned for repair.

2.4 Unpacking the H9A15 Cabinet with the TLSB Chassis

The following sections discuss the installation of the H9A15 cabinet with the TLSB chassis factory installed. The TLSB chassis is factory installed with 35.56 cm (14.00 in.) between the top of the TLSB chassis and the top of the cabinet. This space allows for two BA356-SB storage shelves to be installed above the TLSB chassis.

The following tools are required for installing the H9A15 cabinet:

- Utility knife
- Phillips-head screwdriver
- 5/8-inch box wrench or adjustable wrench

The H9A15 extended-depth cabinet with the TLSB chassis factory installed is shipped on a wooden pallet. Proceed as follows to unpack the cabinet:

1. Position the pallet with the cabinet in an area that provides sufficient workspace for unpacking. Ensure that there is sufficient clearance in front of the pallet (marked with a large F) to roll the cabinet down the ramps.
2. Refer to Figure 2–1. Cut and remove the plastic bands **1** that secure the corner posts **2** and the carton **3** to the cabinet. The carton contains the two ramps.
3. Remove the corner posts **2** and the carton **3** from the pallet **4** .

Caution

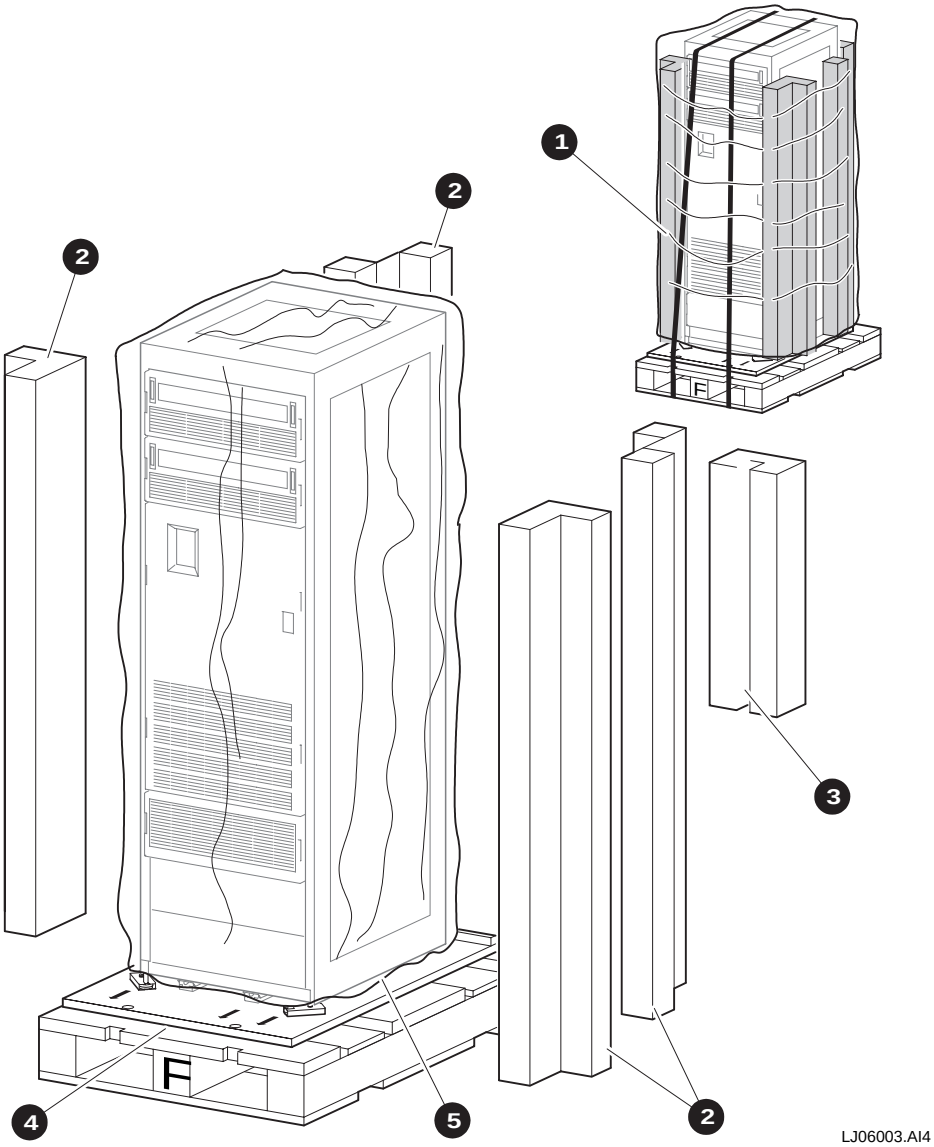
In the next step, take care not to damage the cabinet finish when removing the plastic bag.

4. Remove the plastic bag **5** covering the cabinet.
5. Check the cabinet and the associated equipment for any external damage. Report any damage to Digital Customer Service or a Digital sales office, and to the responsible freight carrier.

Note

Keep all packing material and receipts in case a damage claim is filed.

Figure 2–1 Unpacking the Cabinet



6. Refer to Figure 2–2. Remove the four shipping bolts **6** and brackets **7** that secure the four cabinet leveler feet **8** to the pallet **4** .

Note

The ramps attach to the front of the pallet. Therefore, the cabinet will have to be rolled frontwards down the ramps.

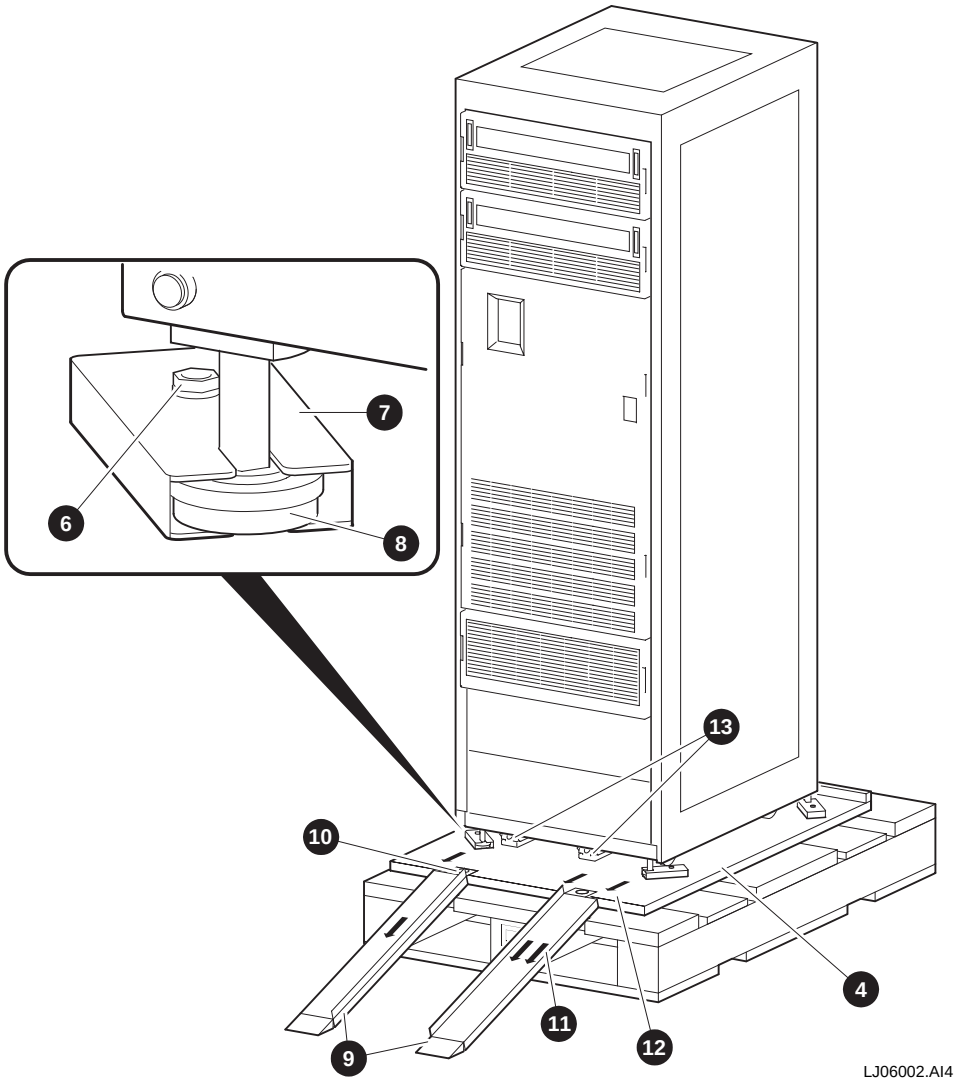
7. Remove the ramps **9** from the shipping carton and set the ramps in the holes **10** provided at the front of the pallet **4** . Ensure that the arrows **11** on the ramps match the pallet arrows **12** as shown in Figure 2–2.

Caution

In the next step, the leveler feet must be fully retracted to prevent contact with the ramp or the floor when the cabinet is unloaded from the pallet.

8. Adjust the four cabinet leveler feet **8** and the leveler feet on the stabilizer bars **13** to the maximum upward position.

Figure 2–2 Installing the Ramps



Warning

In the following step, use sufficient personnel to move the cabinet off the pallet. Depending on the other options installed in the cabinet besides the TLSB chassis, the cabinet can weigh up to 590.59 kg (1,302.00 lb) fully configured.

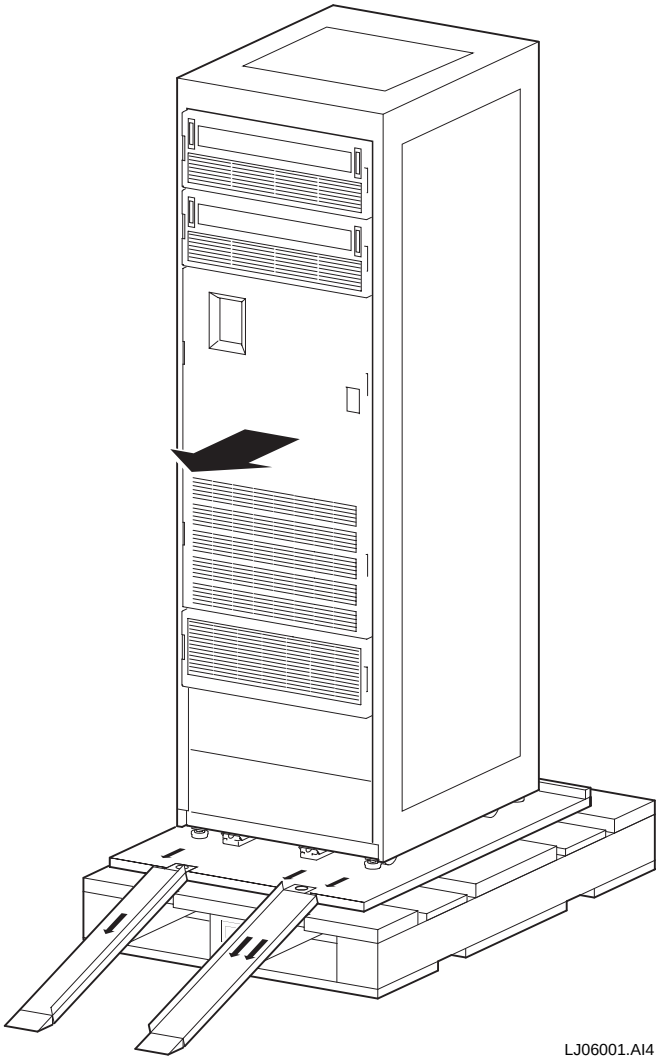
The cabinet may become top heavy and could accelerate rapidly down the ramps if not restrained. Be prepared to guide and control the motion of the cabinet.

9. Refer to Figure 2–3 and roll the cabinet down the ramps using sufficient personnel for safety.
10. Wheel the cabinet to the desired location.
11. Adjust the leveler feet downward so that the cabinet is level and the load is removed from the casters.

Caution

Ensure that the leveler feet extend enough to carry the load of the cabinet so that the casters spin freely. If not, damage to the casters will result over an extended period of time.

Figure 2–3 Deskidding the Cabinet



2.4.1 Removing and Replacing the Front Filler Panels

To remove a front filler panel, refer to Figure 2–4 and proceed as follows:

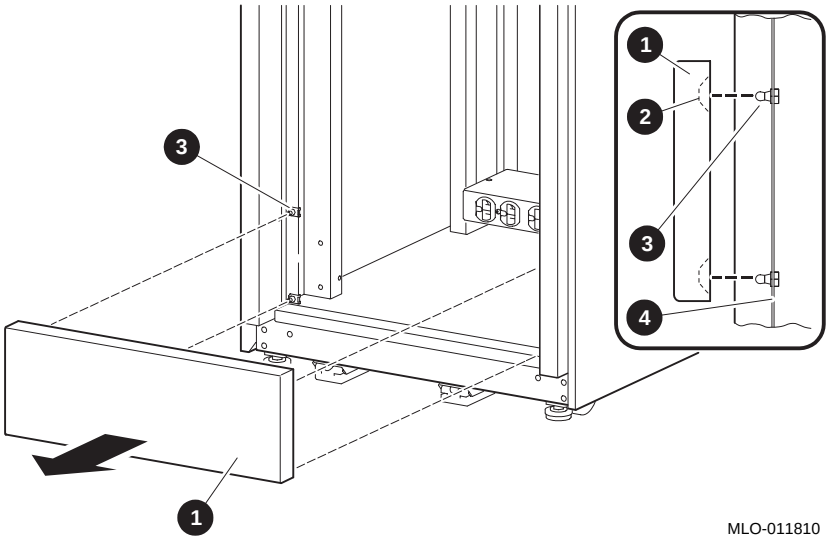
Removal

Grasp the front filler panel **1** on both sides and then pull straight back away from the cabinet.

Replacement

To replace a front filler panel **1** , align the sockets **2** on the front filler panel (refer to the exploded view) with the appropriate ball studs **3** on the rails **4** and push the panel into place.

Figure 2–4 Removing and Replacing the Front Filler Panels



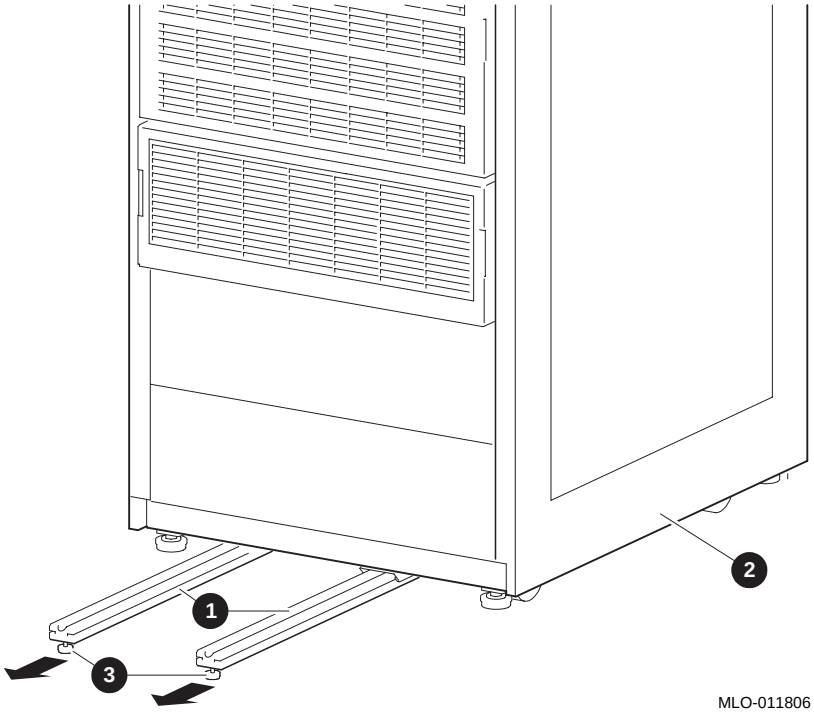
2.4.2 Adjusting the Stabilizer Bars

The stabilizer bars **1** pull straight out from the bottom front of the cabinet **2** as shown in Figure 2–5. When the stabilizer bars are fully extended, adjust the feet **3** at the end of the stabilizer bars until they touch the floor.

Warning

The stabilizer bars must be fully extended before any system is extended out of the cabinet on its slides.

Figure 2–5 Pulling Out and Adjusting the Stabilizer Bars



2.5 Installing the PCI Chassis

The following sections discuss the installation of the optional PCI (BA602-AA) chassis in a standard RETMA 48.26 cm (19.00 in.) wide equipment cabinet such as Digital's H9A15 cabinet. The PCI chassis occupies 17.78 vertical centimeters (7.00 vertical inches) of space in the equipment cabinet and is installed in the space *below* the TLSB chassis. Open the rear door of the cabinet before installing the chassis.

Note

The PCI chassis with the KFE70-CA PCI-to-EISA adapter kit installed occupies 22.23 vertical centimeters (8.75 vertical inches) of space in the equipment cabinet.

Warning

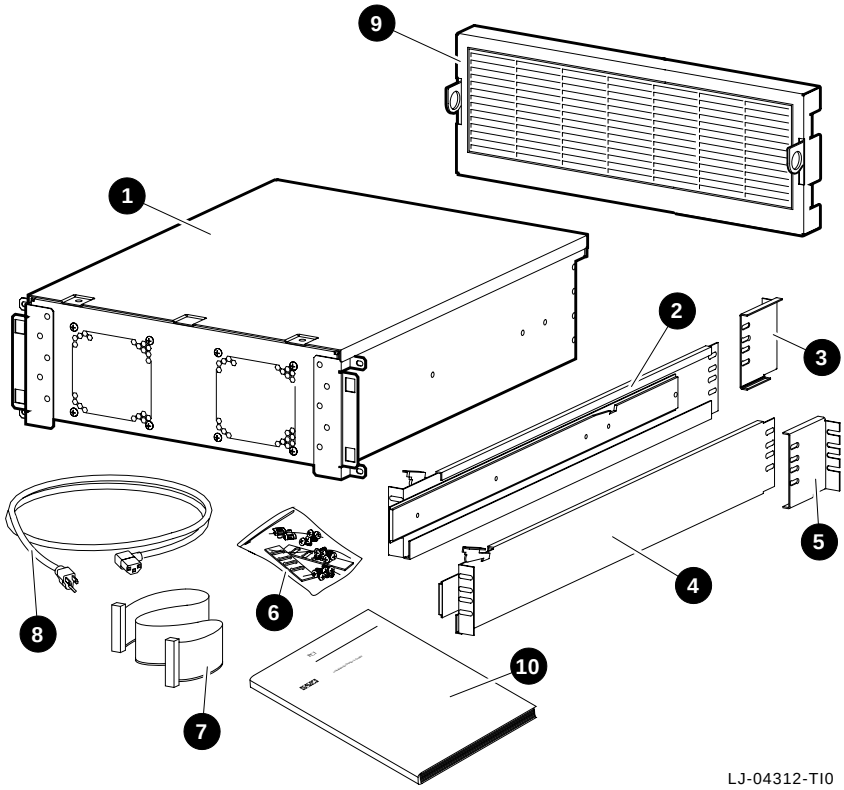
Before attempting to install the equipment into a cabinet or rack, ensure that the cabinet is stable and that all provided stabilizing features have been activated. The stabilizing features for the rack or cabinet are configuration dependent.

The following tools are required for installing the PCI chassis:

- Medium Phillips-head screwdriver
- Small Phillips-head screwdriver
- Small flat-blade screwdriver
- Adjustable wrench

Figure 2–6 shows the contents of the PCI shipping carton.

Figure 2–6 Contents of the PCI Shipping Carton



1 PCI chassis

2 Left PCI chassis slide

3 Rear left slide mounting bracket

4 Right PCI chassis slide

5 Rear right slide mounting bracket

6 Bag of hardware and bar nuts

7 I/O hose cable

8 Power cord

9 PCI front bezel

10 *AlphaServer 8400 RM System Installation /Owner's Guide*

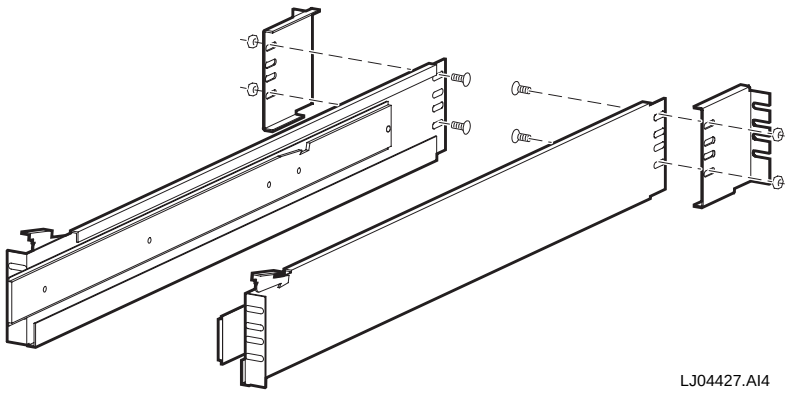
2.5.1 Attaching the Rear Slide Mounting Brackets to the Outer Slide Assemblies

Each PCI chassis is shipped with a pair of RETMA chassis slides and two rear slide mounting brackets (see Figure 2–6 and Figure 2–7).

To attach the rear slide mounting brackets to the outer slides, refer to Figure 2–7 and perform the following procedure:

1. Attach the left rear slide mounting bracket to the rear of the *left* outer slide using two 8-32 pan-head screws, two split lockwashers, two flat washers, and two nuts, but *do not* tighten.
2. Adjust the rear slide mounting bracket so that the left outer slide fits between the front and rear vertical mounting rails. Now tighten the hardware installed in step 1.
3. Repeat steps 1 and 2 to attach and adjust the right rear slide mounting bracket on the *right* outer slide.

Figure 2–7 Attaching the Rear Slide Mounting Brackets



2.5.2 Installing the PCI Left/Right Outer Slide Assemblies

To install the left/right outer slide assemblies, perform the steps in the following procedure:

1. Check each slide for any damage and for smooth operation.
2. Identify the PCI chassis location in the rack and establish a datum line. The datum line serves as a reference to identify the mounting hole positions for the slide brackets and U-nuts. To establish a datum line:
   a. Determine the area of the rack where the PCI chassis will be installed. The PCI chassis is installed in the space of an equipment cabinet located below the TLSB chassis and requires 17.78 cm (7.00 in.) of height, or 12 contiguous holes.

Note

The PCI chassis with the KFE70-CA PCI-to-EISA adapter kit installed requires 22.23 cm (8.75 in.) of height.

   b. Refer to Figure 2–8 and establish a datum line by locating the first two holes with 1.3 cm (.5 in.) of spacing below the TLSB chassis. Measure down 17.78 cm (7.00 in.) of height, or 12 contiguous holes, from between these two holes. This establishes the location of the bottom edge of the PCI chassis. The first hole above the datum line is identified as hole 1.

Note

For a PCI chassis with the KFE70-CA PCI-to-EISA adapter kit installed, ensure that an extra 4.45 cm (1.75 in.) of space exists below the established datum line.

3. Install the outer slide assemblies between the front and rear vertical mounting rails from the front of the cabinet as follows:
   a. Determine the proper mounting holes for the slide brackets using the four-hole pattern in the bar nut. This pattern repeats every 4.45 cm (1.75 in.) along the rails. The proper four-hole pattern for the slide on the front and rear rails is the 5th, 6th, 7th, and 8th holes up from the datum line (see Figure 2–8).

b. Position a bar nut in the correct position on the inside of the rear RETMA rail and start the four screws (the 5th, 6th, 7th, and 8th holes up from the datum line), then from the front, slide the rear slide mounting bracket between the rail and the bar nut.

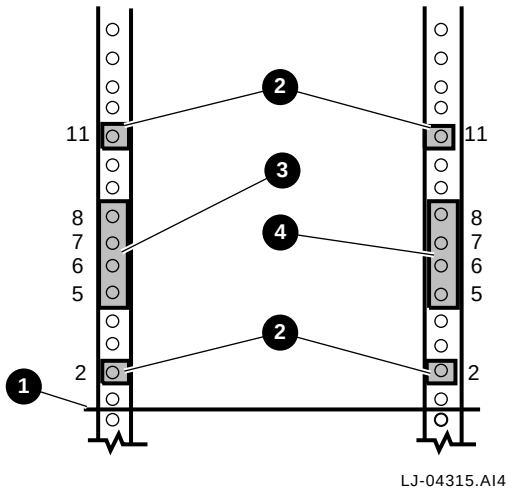
c. Position the front slide mounting bracket and a bar nut in the correct position on the inside of the front RETMA rail and start the four screws (the 5th, 6th, 7th, and 8th holes up from the datum line).

d. Tighten all eight screws to secure each slide.

Note

Pull the slide upward when securing it to the rails. Also, ensure that the slide is level and that the slides are at the same height within the cabinet.

Figure 2–8 PCI Chassis Slide Mounting Pattern



1 Datum line
2 U-nuts
3 Left slide bracket
4 Right slide bracket

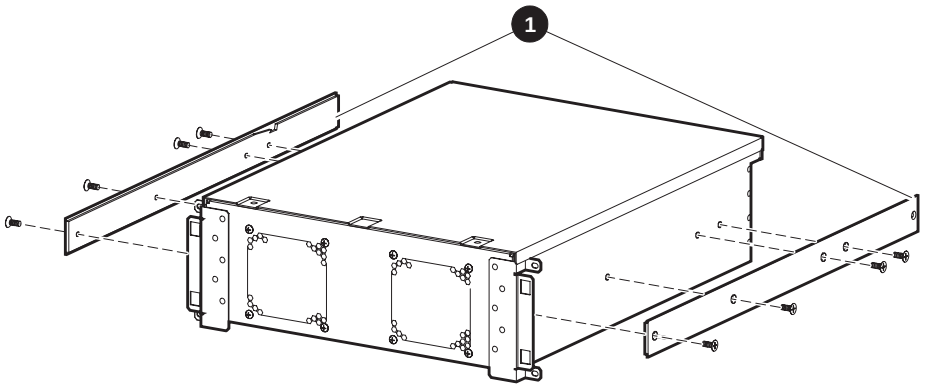
4. Install two U-nuts on each front rail over the 2nd and 11th holes up from the datum line by sliding them over the edge of the rail and aligning them with the holes (see Figure 2–8). These are used for securing the PCI chassis, in the closed position, to the rails.

2.5.3 Attaching the Inner Slide Races to the Chassis

To attach the inner slide races to the PCI chassis, refer to Figure 2–9 and perform the following procedure:

1. Remove the right inner slide race from the right slide assembly by extending it forward as far as it will go, then push the slide lock down and continue extending the right inner slide race until it is completely free from the right slide assembly.
2. Attach the right inner slide race to the right side of the chassis using four pan-head screws.
3. Repeat steps 1 and 2 to remove the left inner slide race from the left slide assembly and attach it to the left side of the chassis.

Figure 2–9 Attaching the Inner Slide Races to the Chassis



1 Right and left inner slide races

2.5.4 Securing the PCI Chassis to the Outer Slide Assemblies

To secure the PCI chassis to the outer slide assemblies, refer to Figure 2–10 and perform the following procedure:

1. Extend the stabilizing legs at the front of the cabinet (if stabilizing legs are provided).

Warning

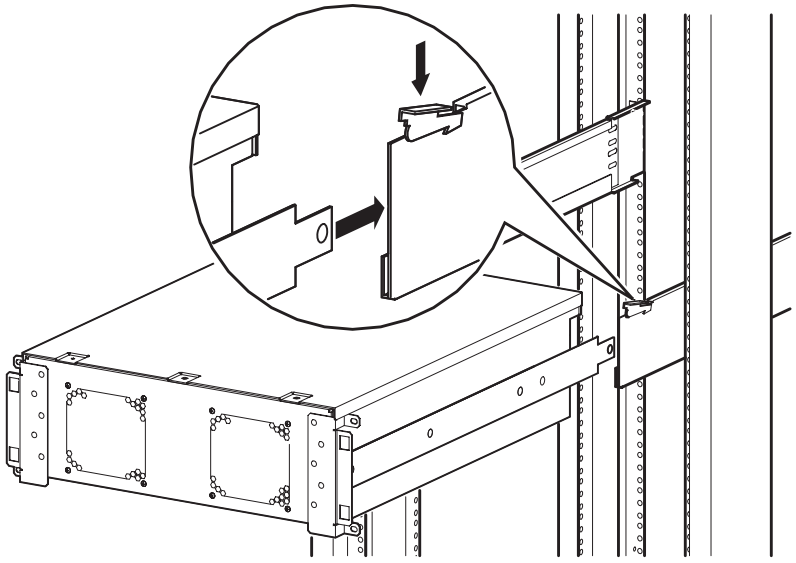
Before attempting to install the equipment into a cabinet or rack, ensure that the cabinet is stable and that all provided stabilizing features have been activated. The stabilizing features for the rack or cabinet are configuration dependent.

Warning

The PCI (BA602-AA) chassis weighs approximately 19.05 kg (42.00 lb). Use sufficient personnel, or proper lifting equipment, when lifting or moving this chassis.

2. Use **sufficient personnel or proper lifting equipment** to lift the PCI chassis and position it so that the left and right inner slide races attached to the chassis align with the outer slide assemblies that are attached to the cabinet rails.
3. Move the PCI chassis into the cabinet while ensuring that the inner slide races slide into the outer slide assemblies.
4. Release the slide locking levers on both slides and carefully slide the PCI chassis into the cabinet. Ensure that the chassis is level, can clear all other equipment in the cabinet, and that the slides operate smoothly.
5. Secure the chassis to the equipment rails by tightening the four screws into the U-nuts that were placed on the front RETMA rails during installation of the outer slide assemblies.
6. Install the front bezel on the PCI chassis by grasping both sides of the bezel and pushing it onto the front of the chassis.

Figure 2–10 Installing the PCI Chassis in the Cabinet



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2.6 Cabling

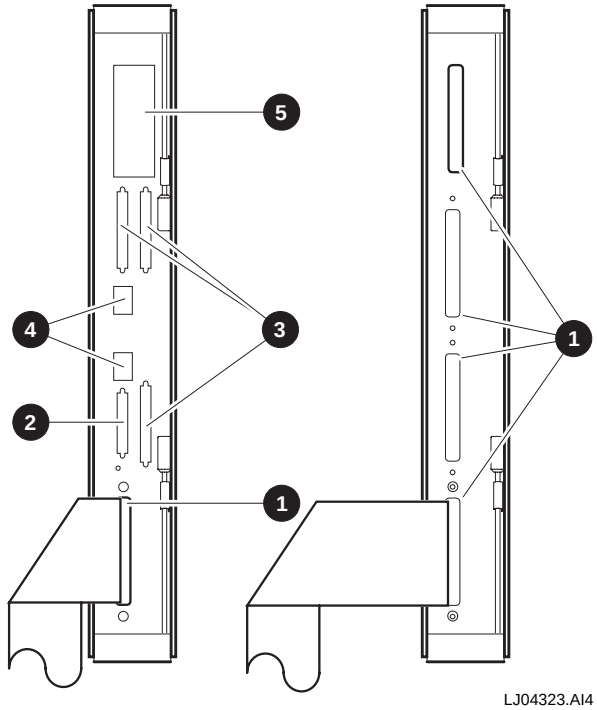
The following sections contain the procedures for connecting the I/O hose cable(s), the single-ended SCSI cable, the FWD SCSI cables, the Ethernet cables, the FDDI cables, and the console cable.

2.6.1 Connecting the I/O Hose Cable to the PCI Chassis

Use the following procedure to connect the I/O hose cable from the KFTIA or KFTHA I/O module in the TLSB chassis to the I/O bulkhead connector on the PCI chassis.

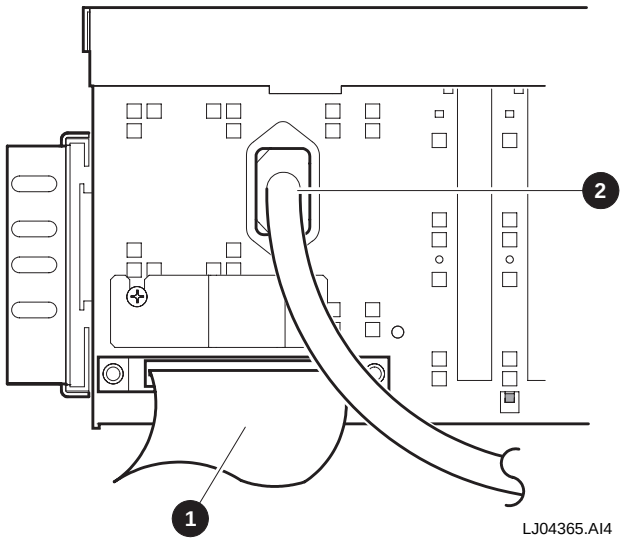
1. Open the rear door on the H9A15 cabinet.
2. Remove the cover plate and connect the TLSB end of the I/O hose cable to the bottom-most available connector of the four hose connectors on the KFTHA module or to the single hose connector on the KFTIA module (see Figure 2–11), and alternately tighten the two slotted captive screws to secure it in place.
3. Replace the cover plate over any unused hose connectors on the KFTHA module.
4. Route the I/O hose cable down to the rear of the PCI chassis.
5. Connect the other end of the I/O hose cable to the I/O connector on the rear bulkhead of the PCI chassis (see Figure 2–12), and alternately tighten the two slotted captive screws to secure it in place.

Figure 2–11 Connecting the I/O Hose Cable to the KFTIA or KFTHA Module



1 Hose connectors
2 Single-ended SCSI connector
3 FWD SCSI connectors
4 Ethernet connectors
5 FDDI connectors

Figure 2–12 Connecting the I/O Hose Cable to the PCI Bulkhead Connector



1 I/O hose cable **2** Power cord

2.6.2 Connecting the Single-Ended SCSI Cable to the KFTIA Module

Use the following procedure to connect a single-ended SCSI cable from a single-ended SCSI device or a single-ended SCSI BA356 storage shelf, to the single-ended SCSI connector on the KFTIA I/O module in the TLSB chassis.

1. Open the rear door on the H9A15 cabinet.
2. Connect one end of the SCSI cable to the single-ended SCSI connector on the KFTIA I/O module (see Figure 2–11).
3. Connect the other end of the SCSI cable to the single-ended SCSI device or the single-ended SCSI BA356 storage shelf.

Note

All SCSI buses *must* be terminated at both ends.

2.6.3 Connecting the FWD SCSI Cable to the KFTIA Module

Use the following procedure to connect an FWD SCSI cable from an FWD SCSI device or an FWD SCSI BA356 storage shelf, to an FWD SCSI connector on the KFTIA I/O module in the TLSB chassis.

1. Open the rear door on the H9A15 cabinet.
2. Connect a BN21W-0B Y cable to an FWD SCSI connector on the KFTIA module (see Figure 2–11).
3. Connect one end of the SCSI cable going to the FWD SCSI device or the FWD SCSI BA356 storage shelf to this Y cable. The other end of this Y cable *must* have a SCSI terminator installed.
4. Connect the other end of the SCSI cable to the FWD SCSI device or the FWD SCSI BA356 storage shelf.

Note

All SCSI buses *must* be terminated at both ends.

2.6.4 Connecting an Ethernet Transceiver Cable to the KFTIA Module

Use the following procedure to connect an Ethernet transceiver cable to an Ethernet connector on the KFTIA I/O module in the TLSB chassis.

1. Open the rear door on the H9A15 cabinet.
2. Connect the transceiver cable (BN25G-xx [unshielded] or BN26M-xx [shielded]) to an Ethernet connector on the KFTIA I/O module (see Figure 2–11).
3. Connect the other end of the transceiver cable to an Ethernet transceiver or an appropriate conversion box.

2.6.5 Connecting an FDDI Cable to the KFTIA Module

Use the following procedure to connect an FDDI cable to an optional FDDI daughtercard connector on the KFTIA I/O module in the TLSB chassis.

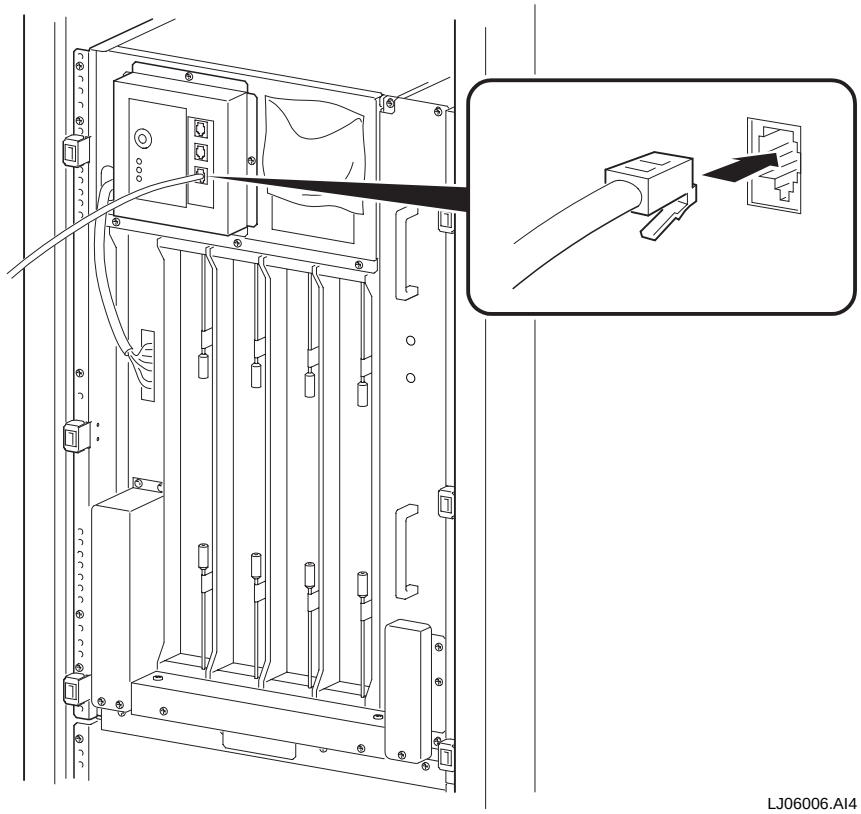
1. Open the rear door on the H9A15 cabinet.
2. Connect the appropriate FDDI cable (multimode fiber or twisted-pair) to the FDDI connector on the KFTIA I/O module (see Figure 2–11).
3. Connect the other end of the FDDI cable to the FDDI network.

2.6.6 Connecting the Console Cable

Use the following procedure to connect the console cable from the TLSB chassis to the console terminal.

1. Remove the front bezel from the TLSB chassis.
2. Connect one end of the console cable to the console connector located on the TLSB control panel (see Figure 2–13).

Figure 2–13 Connecting the Console Cable



3. Route the console cable down and to the rear of the TLSB chassis.
4. Open the rear door on the H9A15 cabinet.
5. Route the console cable through the cable egress area of the H9A15 cabinet.
6. Connect the other end of the console cable to the console terminal.

2.7 Connecting the Power Cords

The TLSB chassis has its own permanently attached power cord. The PCI chassis has a removable power cord. The TLSB chassis power cord is connected to an external source of 200-240 Vac (nominal), single-phase power. The PCI chassis power cord is connected to the power distribution unit located in the bottom rear of the H9A15 cabinet.

The power distribution unit is connected to an external source of 200-240 Vac (nominal), single-phase power.

2.7.1 TLSB Chassis Power Cord

Use the following procedure to connect the TLSB chassis power cord:

1. Open the rear door on the H9A15 cabinet.
2. Route the TLSB chassis power cord out through the cable egress area of the H9A15 cabinet.
3. Connect the TLSB chassis power cord to an external source of 200-240 Vac (nominal), single-phase power.

2.7.2 PCI Chassis Power Cord (PN 17-00083-04)

Use the following procedure to connect the PCI chassis power cord:

1. Connect one end of the PCI power cord to the ac input jack on the rear of the PCI chassis.
2. Connect the other end to a receptacle on the power distribution unit.

3
Operation

Operation of the AlphaServer 8400 RM system begins with connecting the TLSB chassis power cord to an external 200-240 Vac (nominal) single-phase power receptacle. The power cords for the other chassis (BA356 and/or PCI) are connected to receptacles on the power distribution unit. Place the circuit breakers on the rear of the chassis to the ON position.

Warning

The only way to remove all power from a chassis is to place the circuit breaker in the OFF position and disconnect the power cord from the power receptacle.

Refer to Section 1.2.2 for the TLSB chassis controls and indicators.

Refer to Section 1.3.2 for the PCI chassis indicators.

Refer to the *BA356-SB 16-Bit Modular Storage Shelf Subsystem User's Guide* for the BA356-SB indicators.

For information on booting the system, the console user interface, and the console commands, refer to the *AlphaServer 8200/8400 Operations Manual*.

4

Troubleshooting

This chapter discusses basic troubleshooting and diagnostic testing information and aids in troubleshooting the TLSB and PCI chassis.

For more information on the system operation, testing, and troubleshooting, refer to the *AlphaServer 8200/8400 Service Manual* and the *AlphaServer 8200/8400 Operations Manual*.

Troubleshooting

Table 4–1 lists indications of possible hardware problems that may occur in the TLSB chassis and the corrective action to take for each problem.

Table 4–1 TLSB Chassis Troubleshooting

Indication	Possible Cause	Corrective Action
No LEDs light when control panel is placed in the Enable position.	Power cord is not plugged in.	Plug in the power cord.
	Circuit breaker is not on.	Place the circuit breaker in the ON position.
	Cable between the PTO module and the control-panel module is loose or not connected.	Check the cable between the PTO module and the control-panel module.
	Both 48 Vdc power-regulator units may have failed.	Refer to Section 1.2.3 for N+1 power-regulator unit information and LED description.
	Control-panel module has failed.	Replace the control-panel module.
Fault LED goes out after power-up, but no self-test display	Console terminal is not powered up and online.	Power up the terminal and set it online (at proper terminal settings).
	Console cable is not properly connected between the TLSB chassis and the console.	Check the console cable connections on the TLSB chassis and the console.
	Improper baud rate.	Set to the correct baud rate.
Fault LED fails to blink during the power-up sequence	A blower has failed.	Check both blowers to see if they are rotating. If not, replace the failed blower.
	Blower status cable to the tach alarm module is loose or disconnected.	Check the blower status cable connection to the tach alarm module.
Fault LED stays lit after power-up self-test	A memory module, CPU module, or one of the I/O modules in the TLSB chassis has failed self-test.	Check the self-test display on the console and replace the failed module.

Table 4–2 lists indications of possible hardware problems that may occur in the PCI chassis and the corrective action to take for each problem.

Table 4–2 PCI Chassis Troubleshooting

Indication	Possible Cause	Corrective Action
48 Vdc power OK LED (LED 3) is not lit	Power cord is not plugged in.	Plug in the power cord.
	48 Vdc power supply ac input connector or dc output connector are improperly connected.	Ensure that the ac input connector and the dc output connector are properly connected to the 48 Vdc power supply.
	Power board dc input connector is improperly connected.	Ensure that the dc input connector is properly connected to the power board.
	48 Vdc power supply has failed.	Replace the 48 Vdc power supply.
48 Vdc power OK LED (LED 3) is lit, but the internal power system OK LED (LED 1) is not lit	Fans are improperly connected to the power board.	Ensure that the fans are properly connected to the power board.
	A fan has failed.	If a fan is not running, replace the fan.
	The power board has failed.	Replace the power board.
Motherboard self-test OK LED (LED 2) is not lit	The motherboard has failed.	Replace the motherboard.
Hose error LED (LED 4) is lit	Hose cable is improperly connected.	Ensure that the hose cable is properly connected to the KFTHA or KFTIA module in the TLSB chassis and to the PCI chassis.
	Hose cable has failed.	Replace the hose cable.
	Motherboard has failed.	Replace the motherboard.
	KFTHA or KFTIA module in the TLSB chassis has failed.	Replace the KFTHA or KFTIA module in the TLSB chassis.

5

Removal and Replacement

5.1 Introduction

This chapter contains the procedures for removing and replacing the components that are unique in the AlphaServer 8400 RM systems TLSB and PCI (BA602-AA) chassis.

The following tools are required for servicing the TLSB and PCI chassis:

- Medium Phillips-head screwdriver
- Small Phillips-head screwdriver
- Small flat-blade screwdriver
- Adjustable wrench

5.2 TLSB Chassis Components

The following sections contain the removal and replacement procedures for the components that are unique to the TLSB chassis in the AlphaServer 8400 RM systems.

Warning

Before servicing the TLSB chassis, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

5.2.1 Front Bezel

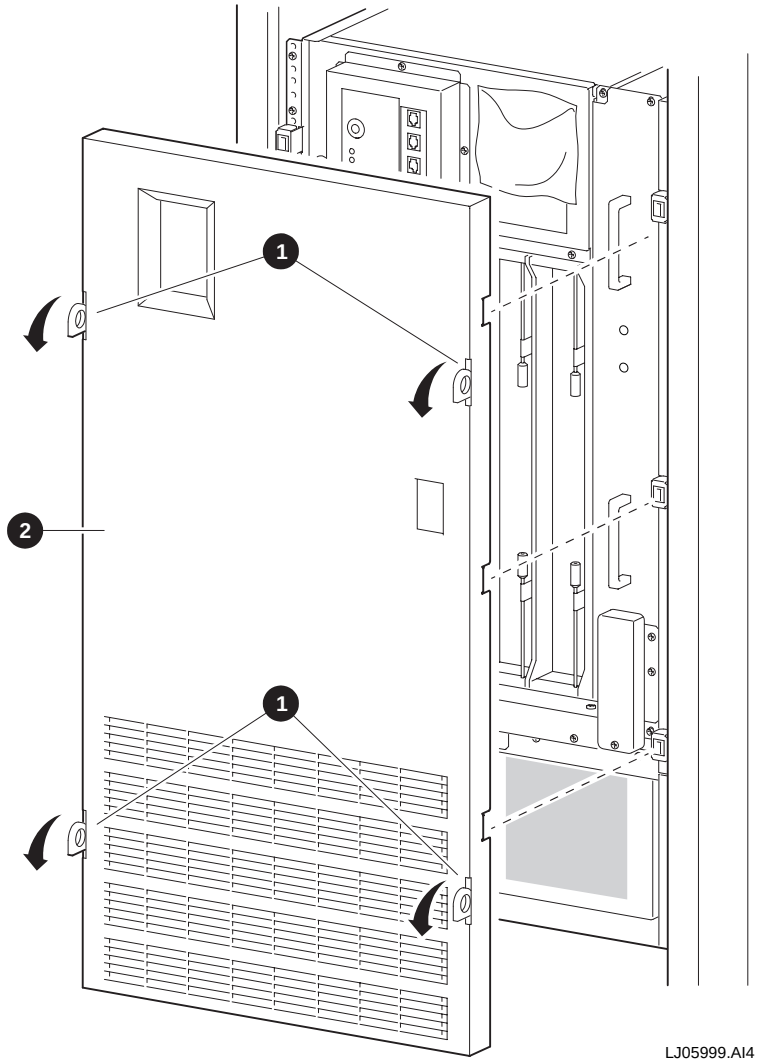
Perform the following procedure to remove the front bezel from the TLSB chassis:

1. Press in at the bottom of the four pull loops **1** on the front bezel **2** to rotate them down and out from the bezel (see Figure 5–1).
2. Using the four pull loops, pull the bezel away from the system.

To replace the front bezel, refer to Figure 5–1 and proceed as follows:

1. Align the ball-stud receivers on the front bezel with the ball studs on the front of the system.
2. Press the front bezel into place.

Figure 5–1 Removing the Front Bezel from the TLSB Chassis



5.2.2 CPU, Memory, I/O, and Terminator Modules

Perform the following procedure to remove CPU, memory, I/O, or terminator modules:

Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. For CPU, memory, or terminator modules in the front half of the card cage, remove the front bezel (see Section 5.2.1).

   For CPU, memory, I/O, or terminator modules in the rear half of the card cage, open the rear door of the H9A15 cabinet.

2. Put on an antistatic wriststrap.

Caution

An antistatic wriststrap must be worn when handling any module to prevent damage to the module.

Note

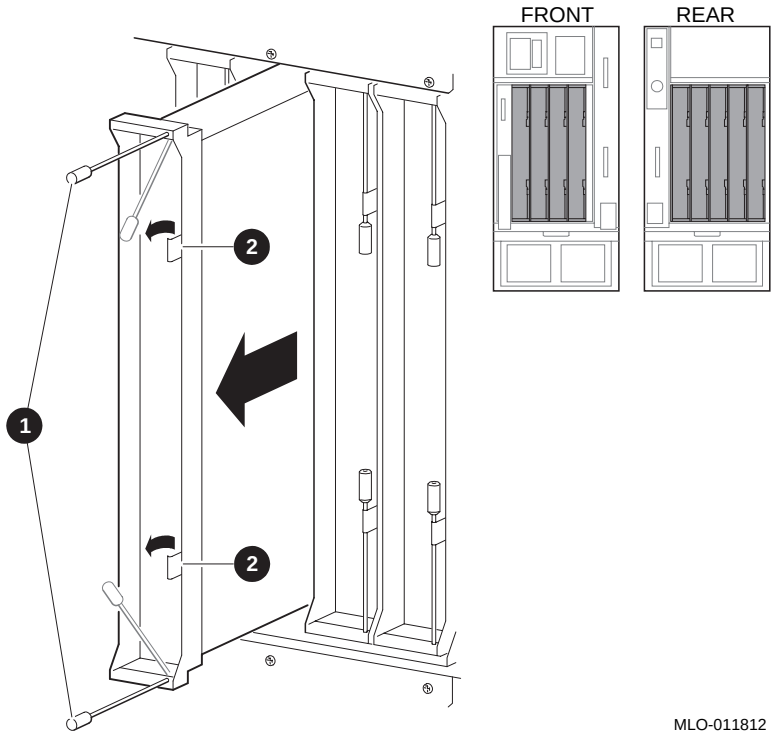
If an I/O module is being replaced, disconnect all I/O cables from the module *before* proceeding with this procedure.

3. On the module being removed, push the two levers **1** in and to the left to release them from the locking stops **2** (see Figure 5–2).
4. Pull both levers out at the same time until they are perpendicular to the front of the module (see Figure 5–2). This frees the module from the backplane.
5. Holding the levers, pull out on the module until it is extended far enough to be able to hold it underneath as it is being removed.

6. When the module is free of the card cage, place it on an ESD pad in a safe area, or pack it in the box that the new module was shipped in.

To replace a CPU, memory, I/O, or terminator module, align the tracks of the module with the tracks in the card-cage slot, and reverse steps 1 through 6.

Figure 5–2 Removing CPU, Memory, I/O, and Terminator Modules



5.2.3 System Clock Module (PN 54-21728-05)

Perform the following procedure to remove the system clock module:

Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. Remove the front bezel (see Section 5.2.1).
2. Remove all of the CPU, memory, or terminator modules from the front half of the card cage (see Section 5.2.2).
3. Put on an antistatic wriststrap.

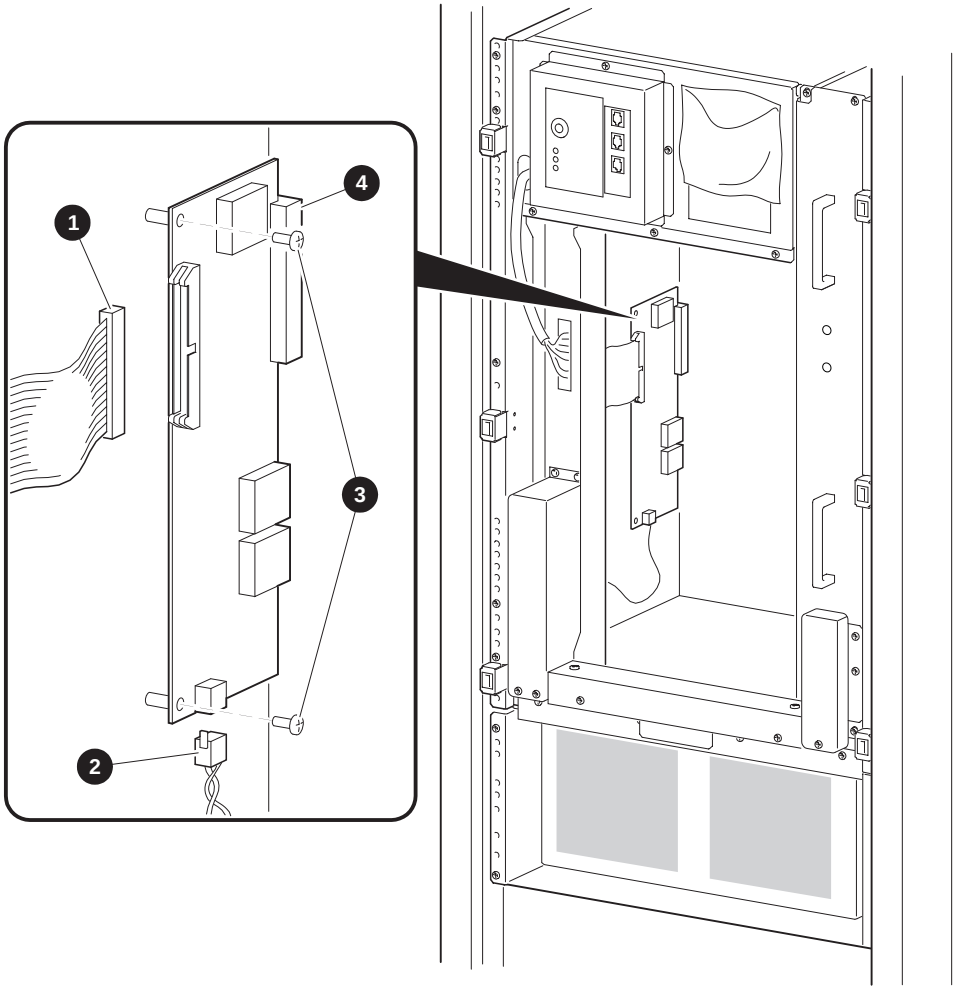
Caution

An antistatic wriststrap must be worn when handling any module to prevent damage to the module.

4. Disconnect the ribbon cable from J3 **1** on the system clock module (see Figure 5–3).
5. Disconnect the power cable from J4 **2** on the system clock module (see Figure 5–3).
6. Remove the two Phillips-head screws **3** that secure the system clock module to the card cage (see Figure 5–3).
7. Pull the system clock module toward the front of the chassis to unplug it from its centerplane connector **4** , and then remove the system clock module.

To replace the system clock module, reverse steps 1 through 7.

Figure 5–3 Removing the System Clock Module



5.2.4 Cable Covers

Perform the following procedure to remove the three cable covers on the front of the TLSB chassis:

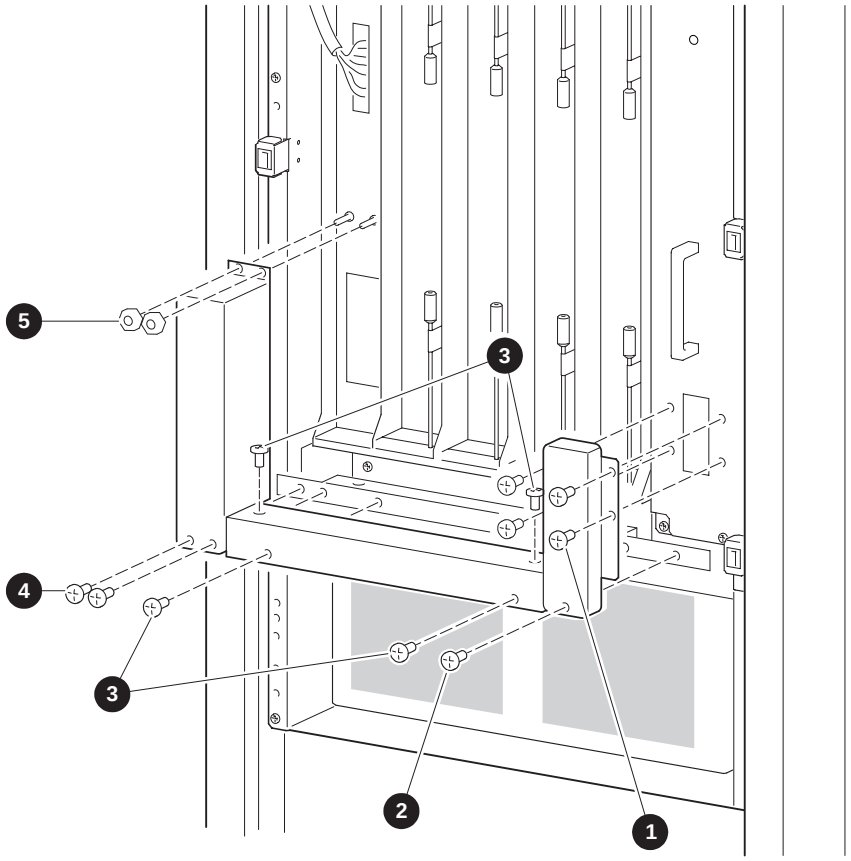
Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. Remove the front bezel (see Section 5.2.1).
2. Remove the four screws **1** that secure the right cable cover to the 48 Vdc power-regulator unit, and the one screw **2** that secures the right cable cover to the bottom card-cage bracket, and then remove the right cable cover (see Figure 5–4).
3. Remove the four screws **3** that secure the middle cable cover to the bottom card-cage bracket, and then remove the middle cable cover (see Figure 5–4).
4. Remove the two screws **4** that secure the left cable cover to the bottom card-cage bracket, and the two nuts **5** that secure the left cable cover to the 48 Vdc card-cage filter, and then remove the left cable cover (see Figure 5–4).

To replace the three cable covers, reverse steps 1 through 4.

Figure 5–4 Removing the Cable Covers



5.2.5 Card-Cage Assembly (PN 70-30430-01)

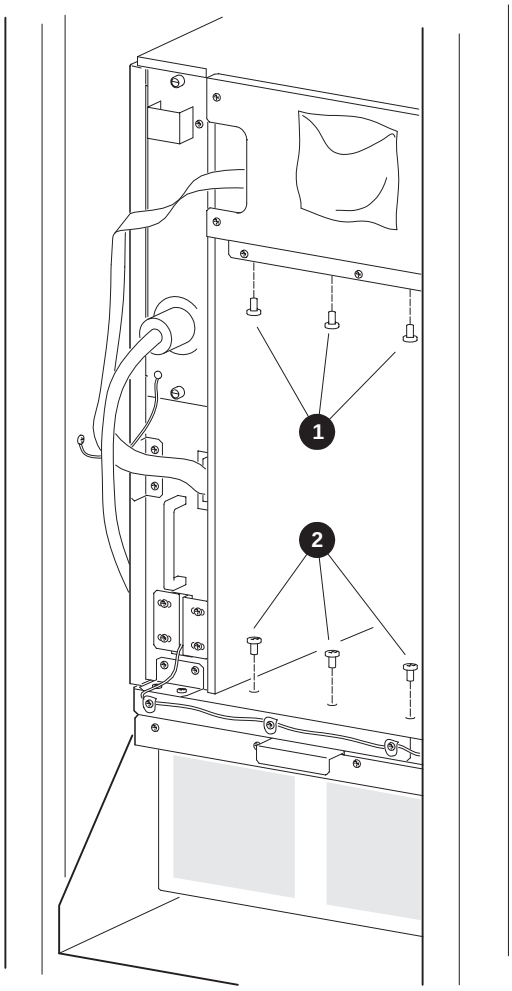
Perform the following procedure to remove the card-cage assembly:

Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. Open the rear door of the H9A15 cabinet.
2. Remove all of the CPU, memory, I/O, or terminator modules from the rear half of the card cage (see Section 5.2.2).
3. Remove the three flat-head screws **1** that secure the top rear of the card-cage assembly to the chassis (see Figure 5–5).
4. Remove the three flat-head screws **2** that secure the bottom rear of the card-cage assembly to the chassis (see Figure 5–5).
5. Remove the front bezel (see Section 5.2.1).
6. Remove all of the CPU, memory, or terminator modules from the front half of the card cage (see Section 5.2.2).
7. Remove the system clock module (see Section 5.2.3).
8. Remove the three cable covers on the front of the TLSB chassis (see Section 5.2.4).
9. Remove the two nuts **3** that secure the power **4** and return **5** cables to the 48 Vdc card-cage filter (see Figure 5–6).
10. Disconnect the CCL module ribbon cable **6** from the 48 Vdc card-cage filter (see Figure 5–6).
11. Remove the three screws **7** that secure the top front card-cage bracket to the chassis (see Figure 5–6).
12. Remove the three screws **8** that secure the bottom front card-cage bracket to the chassis (see Figure 5–6).

Figure 5–5 Removing the Card-Cage Assembly (Rear View)



Warning

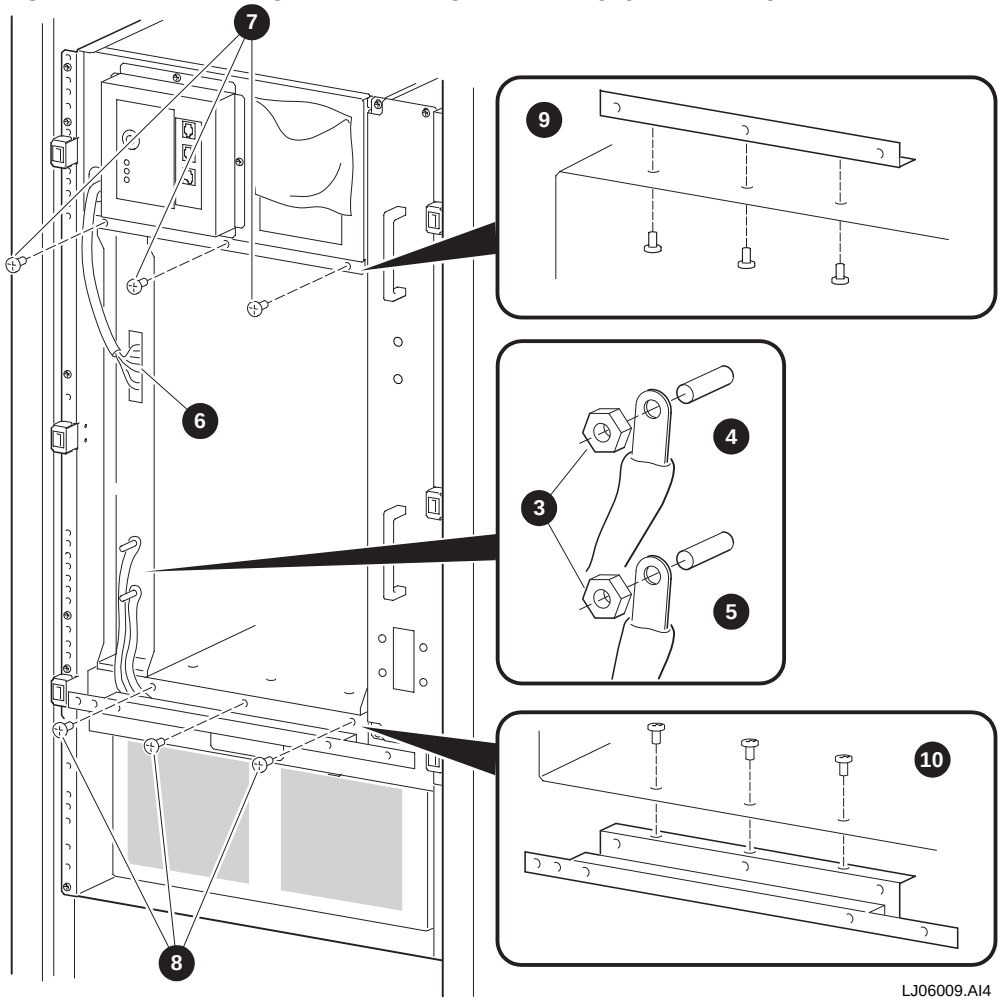
The card-cage assembly weighs approximately 22.68 kg (50.00 lb). Use sufficient personnel, or proper lifting equipment, when removing or replacing the card-cage assembly.

13. Slide the card-cage assembly out of the front of the chassis.

14. Remove the three flat-head screws **9** that secure the top front card-cage bracket to the card-cage assembly (see Figure 5–6).
15. Remove the three flat-head screws **10** that secure the bottom front card-cage bracket to the card-cage assembly (see Figure 5–6).

To replace the card-cage assembly, reverse steps 1 through 15.

Figure 5–6 Removing the Card-Cage Assembly (Front View)



5.2.6 Control-Panel Assembly (PN 70-32623-01)

Perform the following procedure to remove the control-panel assembly:

Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. Remove the front bezel (see Section 5.2.1).
2. Disconnect the console cable, if one is connected, from the console connector **1** (see Figure 5–7).
3. Put on an antistatic wriststrap.

Caution

An antistatic wriststrap must be worn when handling any module to prevent damage to the module.

4. Remove the four 8-32 pan-head screws **2** that secure the control-panel assembly to the chassis (see Figure 5–7).
5. Disconnect the ribbon cable **3** from the back of the control-panel assembly (see Figure 5–7).

To replace the control-panel assembly, reverse steps 1 through 5.

5.2.7 Control-Panel Module (PN 54-20308-01)

Perform the following procedure to remove the control-panel module:

Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. Remove the front bezel (see Section 5.2.1).
2. Remove the control-panel assembly (see Section 5.2.6).
3. Put on an antistatic wriststrap.

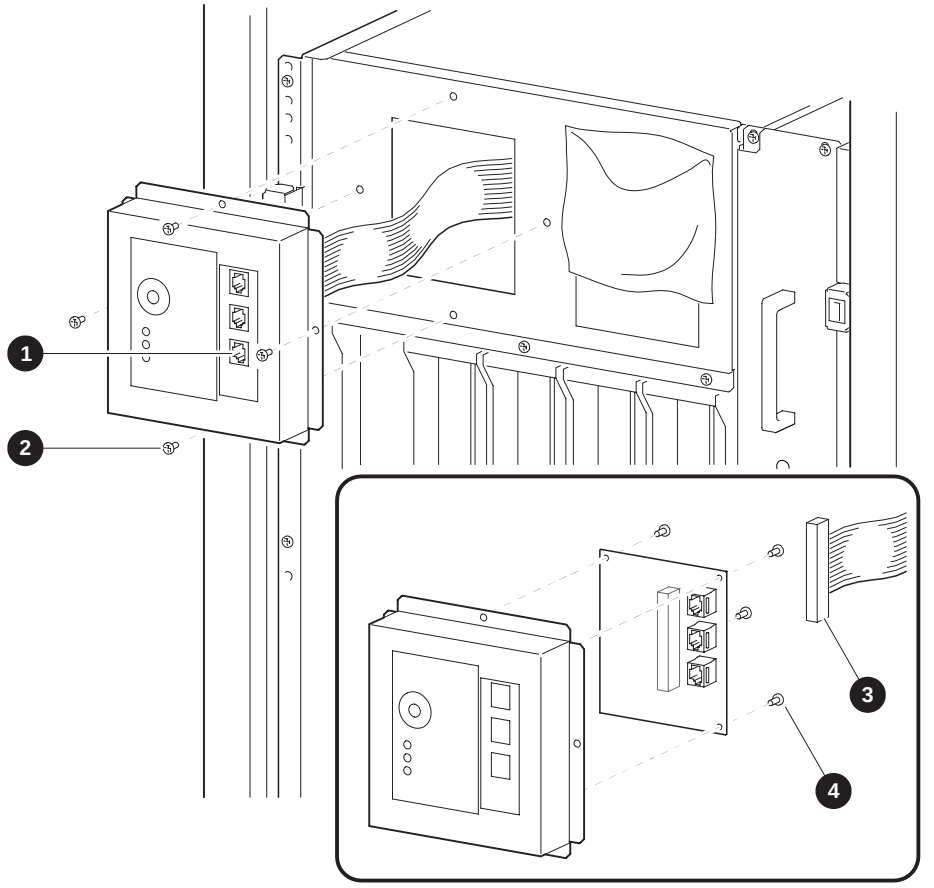
Caution

An antistatic wriststrap must be worn when handling any module to prevent damage to the module.

4. Remove the four screws **4** that secure the control-panel module to the control-panel assembly, and then remove the control-panel module (see Figure 5–7).

To replace the control-panel module, reverse steps 1 through 4.

Figure 5–7 Removing the Control-Panel Assembly and Control-Panel Module



5.2.8 Front or Rear Blower Assembly (PN 70-32624-01)

Perform the following procedure to remove the front or rear blower assembly:

Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. For the front blower assembly, remove the front bezel (see Section 5.2.1).

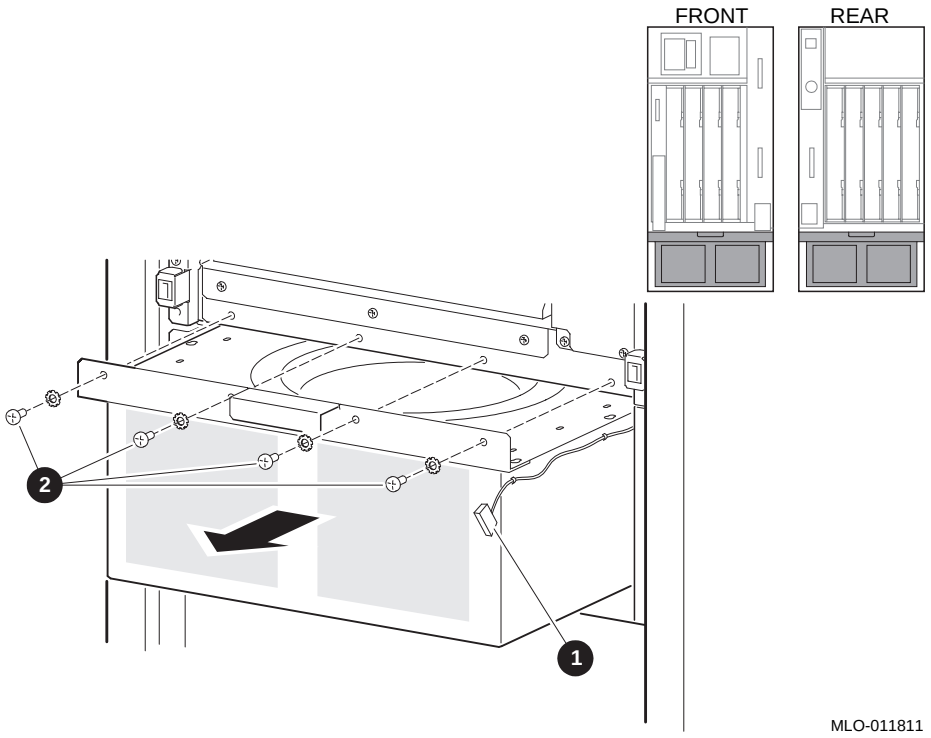
   For the rear blower assembly, open the rear door of the H9A15 cabinet.
2. Disconnect the blower assembly power connector **1** located at the top right corner of the blower assembly (see Figure 5–8).
3. Remove the four 10-32 pan-head screws **2** that secure the blower assembly to the TLSB chassis (see Figure 5–8).
4. Slide the blower assembly out of the cabinet.

To replace the front or rear blower assembly, reverse steps 1 through 4.

Note

While sliding the new blower assembly into the cabinet, lift up on the rear of the blower assembly so that the flange on the top rear of the blower assembly slides *over* the metal bar in the top rear of the installation area.

Figure 5–8 Removing the Front or Rear Blower Assembly



5.2.9 48 Vdc Power-Regulator Unit (PN 70-32965-01)

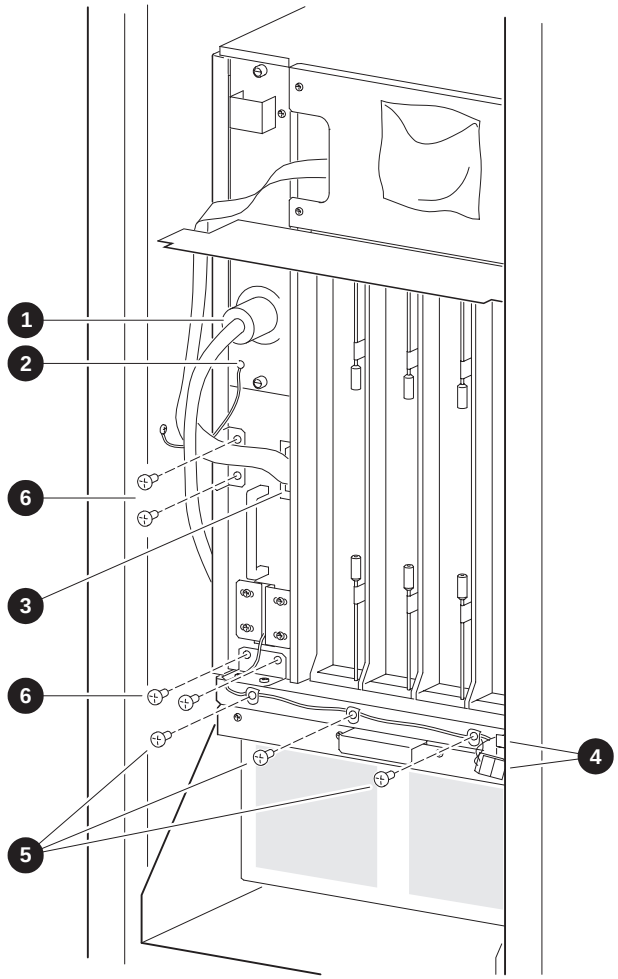
Perform the following procedure to remove the 48 Vdc power-regulator unit:

Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. Remove the front bezel (see Section 5.2.1) and open the rear door of the H9A15 cabinet.
2. At the rear of the cabinet, disconnect the power cord **1** from the ac input unit (see Figure 5–9).
3. At the rear of the cabinet, remove the nut **2** that secures the ground cable to the ground stud on the ac input unit, and disconnect this cable from the ac input unit (see Figure 5–9).
4. At the rear of the cabinet, disconnect the ribbon cable **3** from the rear of the 48 Vdc power-regulator unit (see Figure 5–9).
5. At the rear of the cabinet, disconnect the two connectors **4** located at the top right corner of the rear blower assembly, and remove these two power cables from the three cable clamps **5** located below the rear card cage (see Figure 5–9).
6. At the rear of the cabinet, remove the four 10-32 pan-head screws **6** that secure the 48 Vdc power-regulator unit to the chassis (see Figure 5–9).
7. At the front of the cabinet, remove the three cable covers on the front of the TLSB chassis (see Section 5.2.4).
8. At the front of the cabinet, remove the two nuts **7** that secure the power **8** and return **9** cables to the 48 Vdc card-cage filter (see Figure 5–10).
9. At the front of the cabinet, disconnect the two connectors **10** located at the top right corner of the front blower assembly (see Figure 5–10).
10. At the front of the cabinet, remove the four 10-32 pan-head screws **11** that secure the 48 Vdc power-regulator unit to the chassis (see Figure 5–10).

Figure 5–9 Removing the 48 Vdc Power-Regulator Unit (Rear View)



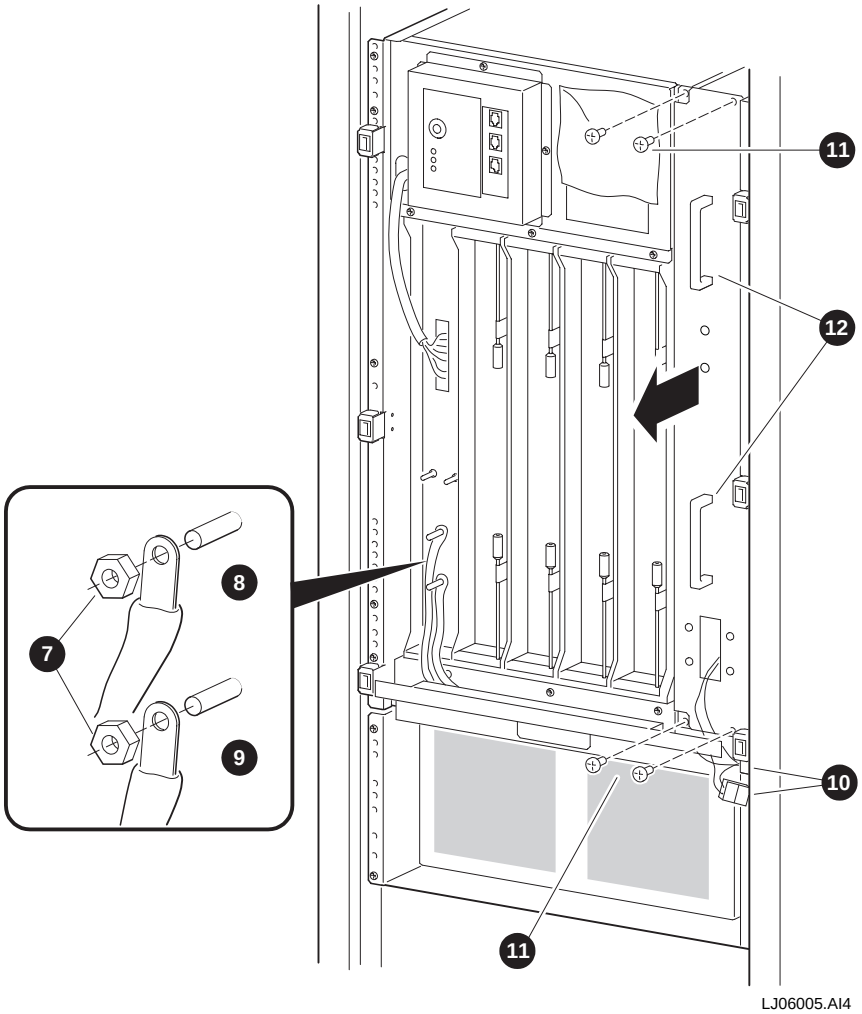
Warning

The 48 Vdc power-regulator unit weighs approximately 31.75 kg (70.00 lb). Use sufficient personnel, or proper lifting equipment, when removing or replacing the 48 Vdc power-regulator unit.

11. At the front of the cabinet, use the two handles 12 on the front of the 48 Vdc power-regulator unit, and slide the unit out of the chassis (see Figure 5–10).

To replace the 48 Vdc power-regulator unit, reverse steps 1 through 11.

Figure 5–10 Removing the 48 Vdc Power-Regulator Unit (Front View)



5.2.10 AC Input Unit (PN 30-39579-03)

Perform the following procedure to remove the ac input unit:

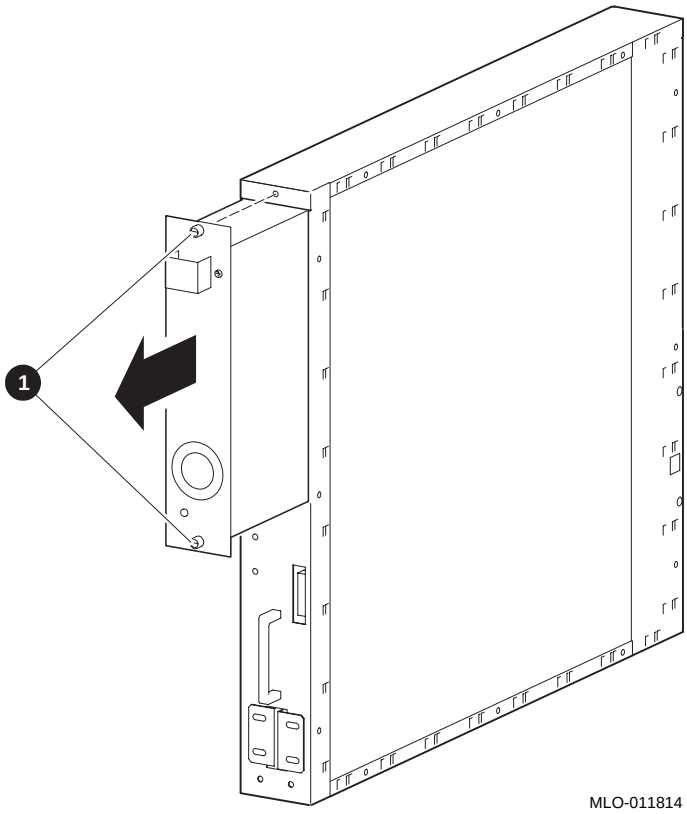
Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. Remove the front bezel (see Section 5.2.1) and open the rear door of the H9A15 cabinet.
2. Remove the 48 Vdc power-regulator unit (see Section 5.2.9).
3. Reach into the open side of the 48 Vdc power-regulator unit and disconnect the two power cables from the rear of the ac input unit.
4. At the rear of the 48 Vdc power-regulator unit, loosen the two captive screws **1** that secure the ac input unit to the 48 Vdc power-regulator unit (see Figure 5–11).
5. Slide the ac input unit out of the 48 Vdc power-regulator unit.

To replace the ac input unit, reverse steps 1 through 5.

Figure 5–11 Removing the AC Input Unit



5.2.11 Tach Alarm Module (PN 30-46144-01)

Perform the following procedure to remove the tach alarm module:

Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. Open the rear door of the H9A15 cabinet.
2. Remove the seven screws that secure the access panel **1** at the top rear of the TLSB chassis. Tilt the access panel out and lift to remove (see Figure 5–12).
3. Put on an antistatic wriststrap.

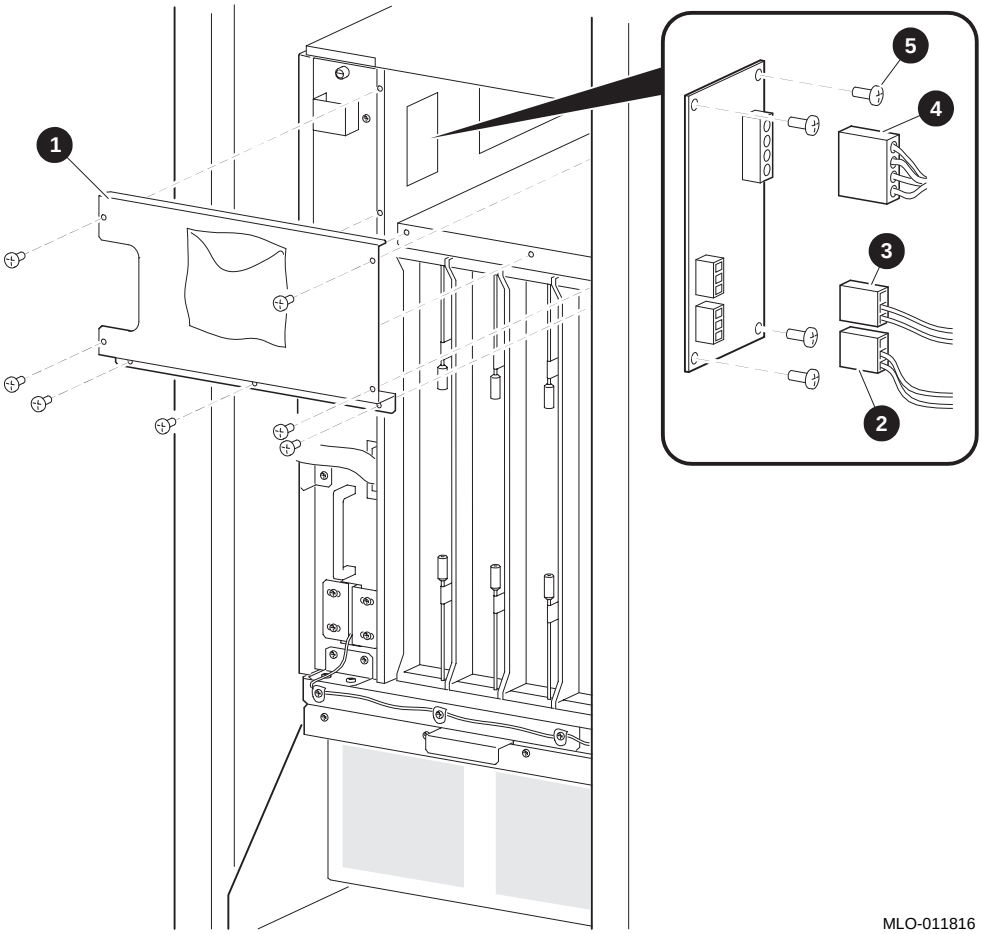
Caution

An antistatic wriststrap must be worn when handling any module to prevent damage to the module.

4. Disconnect the front blower connector (J1) **2** , the rear blower connector (J2) **3** , and the PTO module connector (J4) **4** from the tach alarm module (see Figure 5–12).
5. Remove the four 6-32 pan-head screws **5** that secure the tach alarm module to the chassis, and then remove the tach alarm module.

To replace the tach alarm module, reverse steps 1 through 5.

Figure 5–12 Removing the Tach Alarm Module



5.2.12 Cabinet Control Logic (CCL) Module (PN 54-20300-01)

Perform the following procedure to remove the CCL module:

Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. Open the rear door of the H9A15 cabinet.
2. Remove the seven screws that secure the access panel **1** at the top rear of the TLSB chassis. Tilt the access panel out and lift to remove (see Figure 5–13).
3. Put on an antistatic wriststrap.

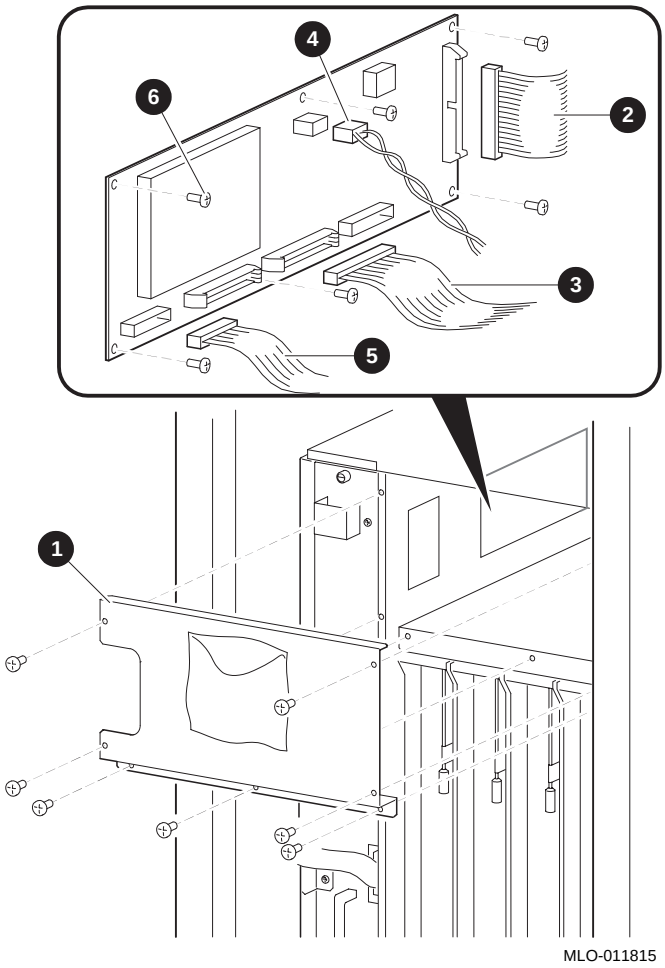
Caution

An antistatic wriststrap must be worn when handling any module to prevent damage to the module.

4. Disconnect the PTO module connector (J1) **2** , the 48 Vdc card-cage filter connector (J4) **3** , the tach alarm module connector (J5) **4** , and the 48 Vdc power-regulator unit connector (J7) **5** from the CCL module (see Figure 5–13).
5. Remove the six 6-32 pan-head screws **6** that secure the CCL module to the chassis, and then remove the CCL module (see Figure 5–13).

To replace the CCL module, reverse steps 1 through 5.

Figure 5–13 Removing the CCL Module



5.2.13 PTO Module (PN 54-24399-01)

Perform the following procedure to remove the PTO module:

Warning

Before performing the following removal and replacement procedures, perform an orderly shutdown of the operating system, place the OCP keyswitch in the Disable position, place the circuit breaker in the OFF position at the rear of the TLSB chassis, and unplug the power cord from the external power receptacle.

1. Remove the front bezel (see Section 5.2.1).
2. Put on an antistatic wriststrap.

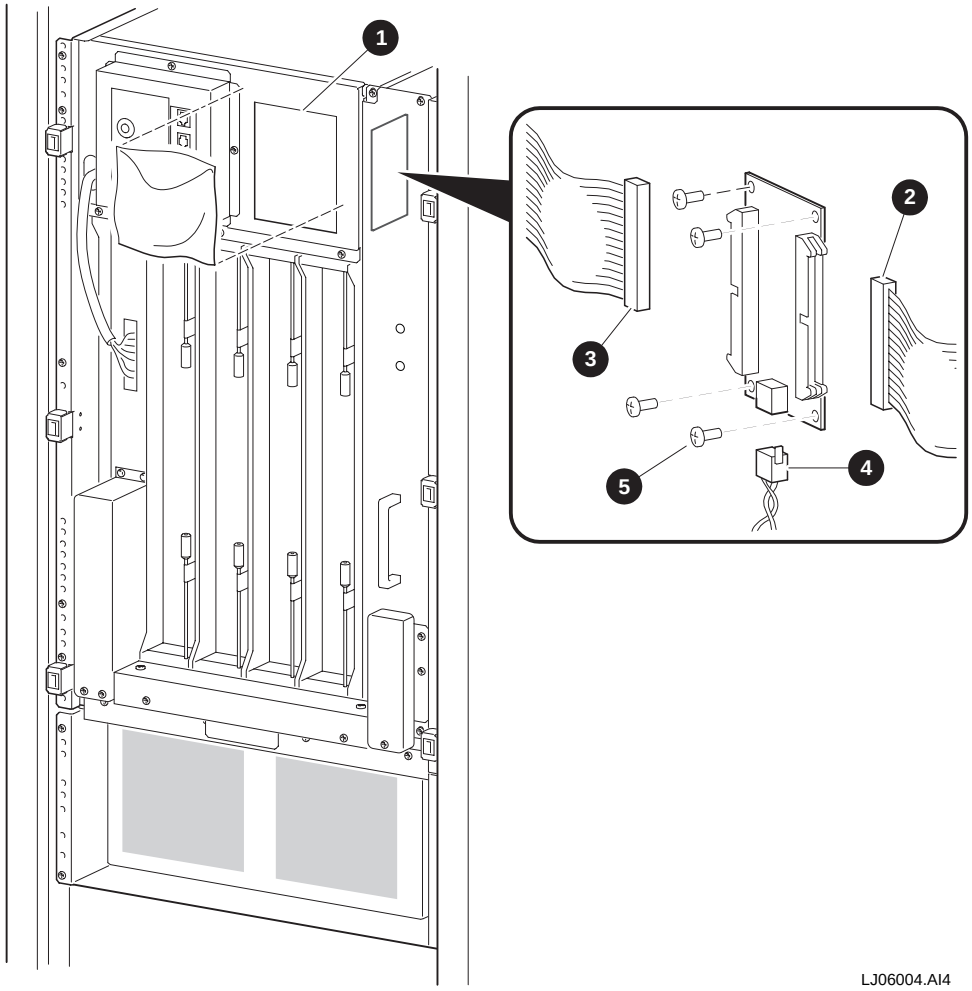
Caution

An antistatic wriststrap must be worn when handling any module to prevent damage to the module.

3. Reach through the access opening **1** behind the antistatic wriststrap pouch on the access panel at the top front of the TLSB chassis (see Figure 5–14).
4. Disconnect the OCP connector (J1) **2** , the CCL module connector (J2) **3** , and the tach alarm module connector (J3) **4** from the PTO module (see Figure 5–14).
5. Remove the four 6-32 pan-head screws **5** that secure the PTO module to the chassis, and then remove the PTO module (see Figure 5–14).

To replace the PTO module, reverse steps 1 through 5.

Figure 5–14 Removing the PTO Module



5.3 PCI Chassis Components

The following sections contain the removal and replacement procedures for the components that are unique to the PCI chassis in the AlphaServer 8400 RM systems.

Warning

Before servicing the PCI chassis, ensure that the power cord is unplugged from the receptacle on the power distribution unit.

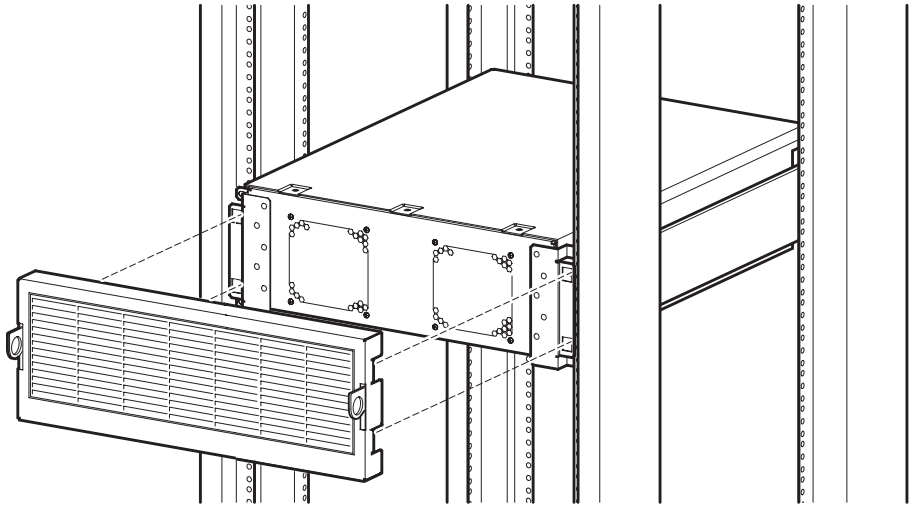
5.3.1 Front Bezel

Perform the following procedure to remove the front bezel from the PCI chassis:

1. Grasp the front bezel by the flip-up pull tabs or by each side.
2. Pull straight out until the bezel unsnaps from the catches (see Figure 5–15).

To replace the front bezel, push it onto the front of the chassis until it snaps into place.

Figure 5–15 Removing the Front Bezel from the PCI Chassis



5.3.2 Extending the PCI Chassis for Service

Warning

Before extending the PCI chassis for service, ensure that the cabinet is stable and that all provided stabilizing features have been activated. The stabilizing features for the rack or cabinet are configuration dependent.

Perform the following procedure to extend the PCI chassis for service:

1. Extend the stabilizing legs at the front of the cabinet (if stabilizing legs are provided).
2. Remove the PCI front bezel (see Section 5.3.1).
3. Remove the four retaining screws that secure the chassis to the front rails (see Figure 5–16).

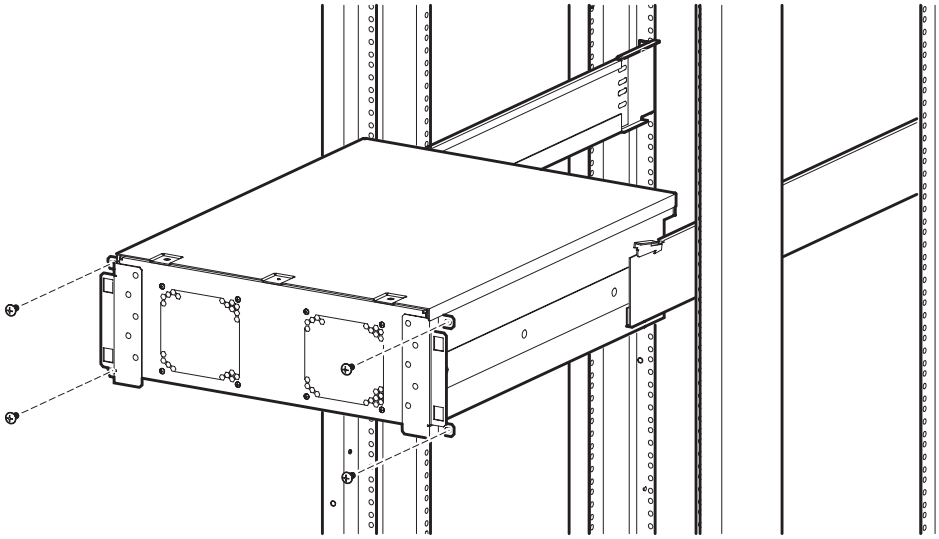
Caution

Check and ensure that all cables are free to follow the chassis before extending the chassis.

4. Carefully pull the PCI chassis forward until the slides lock in the extended position.

To secure the chassis in the cabinet, press down on the left and right slide locks and reverse steps 1 through 4.

Figure 5–16 Extending the PCI Chassis



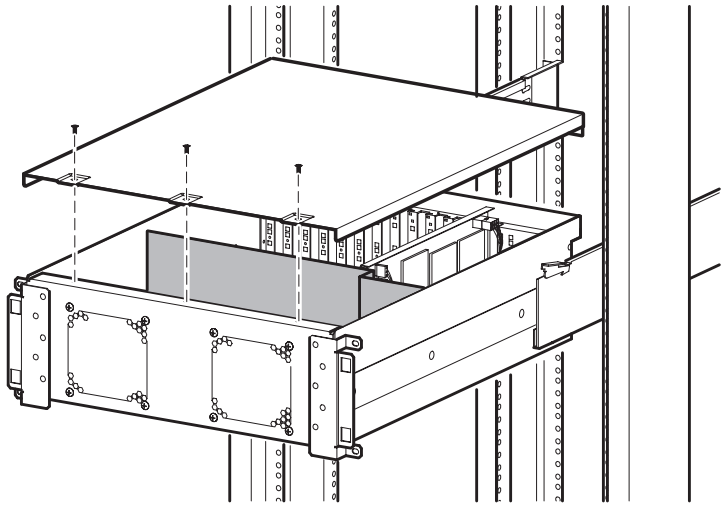
5.3.3 Top Cover

Perform the following procedure to remove the top cover:

1. Extend the PCI chassis for service (see Section 5.3.2).
2. Remove the three screws along the top front edge of the chassis that secure the top cover (see Figure 5–17).
3. Lift up on the front edge of the top cover and push toward the rear until the tabs on the rear of the cover slide out of the retaining slots (see Figure 5–17).
4. Lift the top cover off of the chassis.

To replace the top cover, reverse steps 1 through 4.

Figure 5–17 Removing the Top Cover



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5.3.4 48 Vdc Power Supply (PN 30-46068-01)

Perform the following procedure to remove the 48 Vdc power supply:

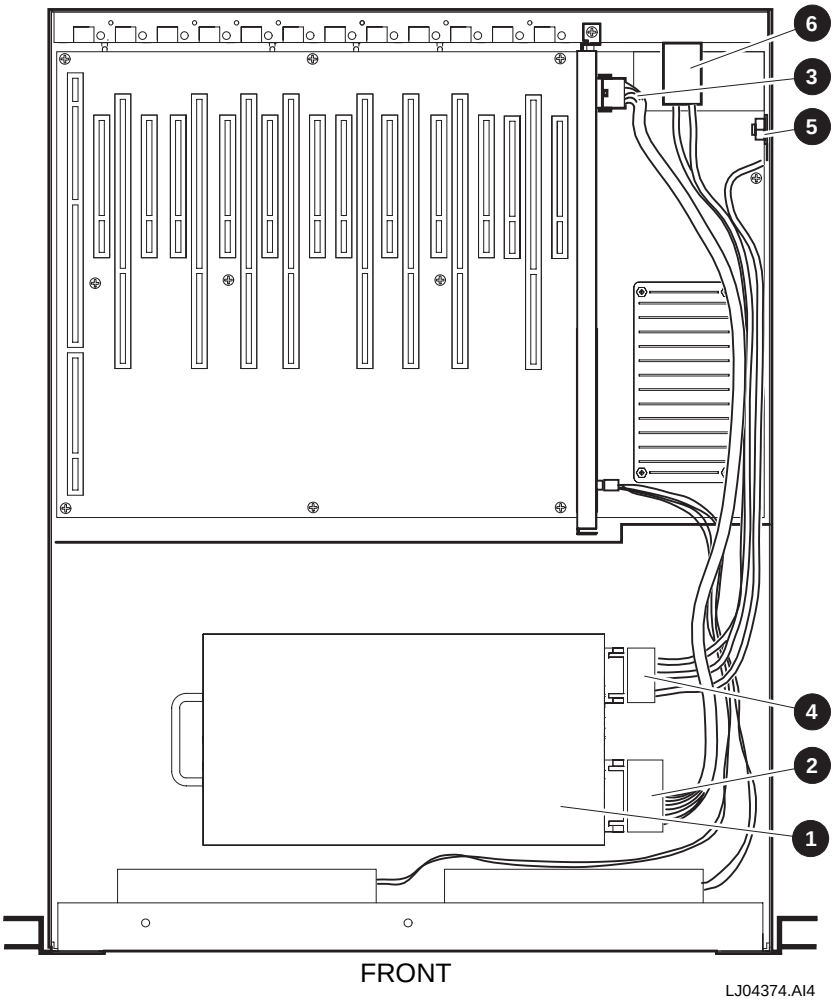
Warning

Before performing the following removal and replacement procedures, ensure that the power cord is unplugged from the receptacle on the power distribution unit.

1. Extend the PCI chassis for service (see Section 5.3.2).
2. Remove the top cover (see Section 5.3.3).
3. Disconnect the ac input connector **4** from the power supply (see Figure 5–18).
4. Disconnect the dc output connector **2** from the power supply (see Figure 5–18).
5. From the bottom of the chassis, remove the four screws that secure the power supply (see Figure 5–19).
6. From the top, lift the power supply from the chassis.

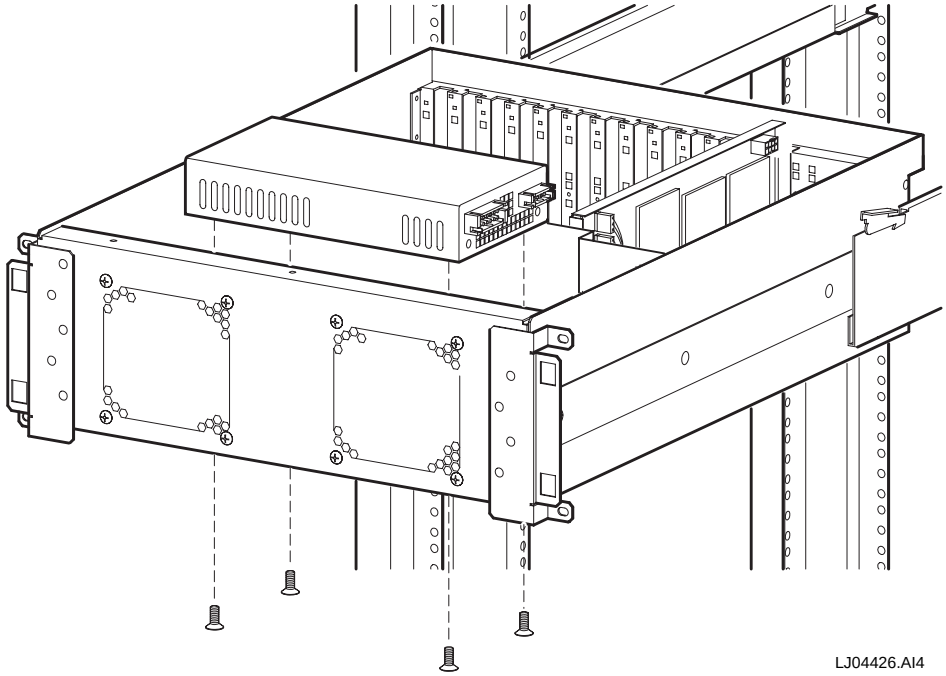
To replace the power supply, reverse steps 1 through 6.

Figure 5–18 Disconnecting the Power Supply Connectors



1 48 Vdc power supply
2 DC output connector
3 DC input connector to power board
4 AC input connector
5 Ground stud
6 AC input filter

Figure 5–19 Removing the Power Supply



5.3.5 Fans (PN 12-23609-19)

Perform the following procedure to remove the fans:

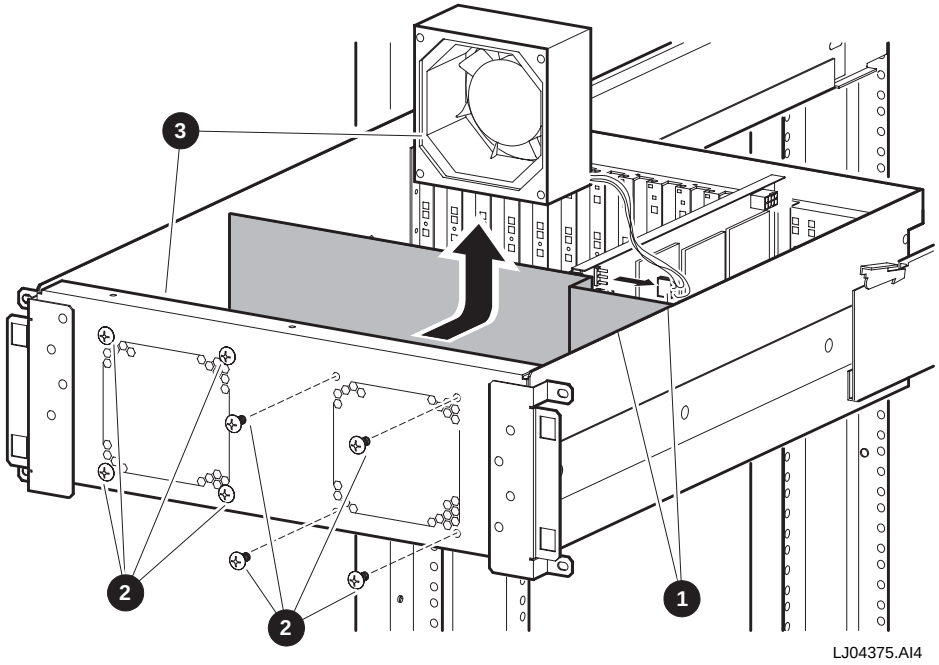
Warning

Before performing the following removal and replacement procedures, ensure that the power cord is unplugged from the receptacle on the power distribution unit.

1. Extend the PCI chassis for service (see Section 5.3.2).
2. Remove the top cover (see Section 5.3.3).
3. Disconnect the failing fan's power cable **1** from the power board (see Figure 5–20).
4. Remove the four screws **2** that secure the failing fan to the chassis (see Figure 5–20).
5. Lift the failing fan **3** from the chassis.

To replace the fans, reverse steps 1 through 5.

Figure 5–20 Removing the Fans



5.3.6 Power Board (PN 54-23470-01)

Perform the following procedure to remove the power board:

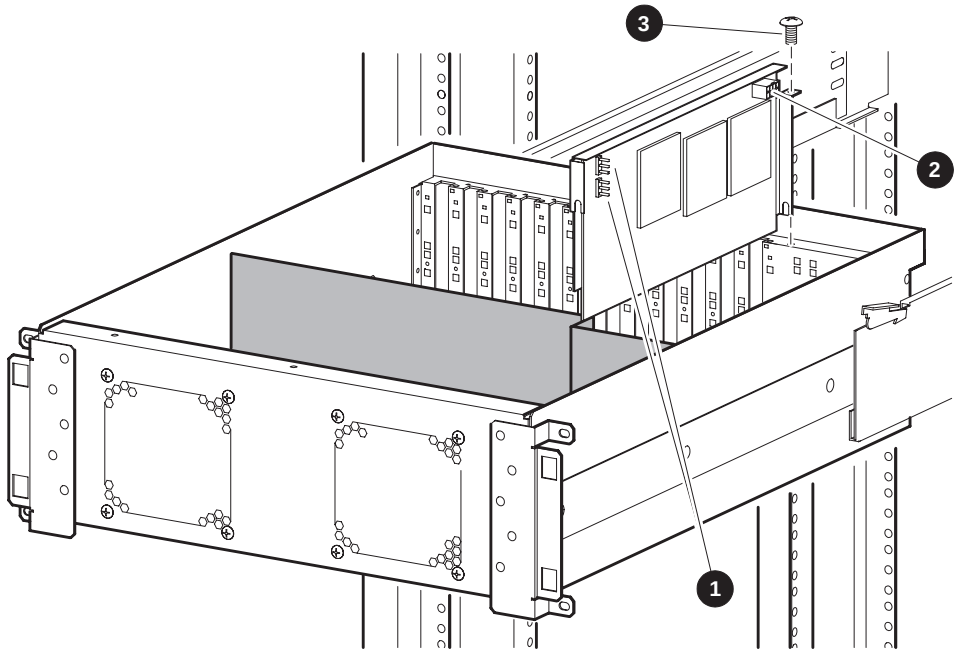
Warning

Before performing the following removal and replacement procedures, ensure that the power cord is unplugged from the receptacle on the power distribution unit.

1. Extend the PCI chassis for service (see Section 5.3.2).
2. Remove the top cover (see Section 5.3.3).
3. Disconnect the two fan power cables **1** from the power board (see Figure 5–21).
4. Disconnect the power supply cable **2** from the power board (see Figure 5–21).
5. Remove the screw **3** that secures the power board in place (see Figure 5–21).
6. Lift the power board from the chassis.

To replace the power board, reverse steps 1 through 6.

Figure 5–21 Removing the Power Board



5.3.7 Motherboard (PN 54-23468-01)

Perform the following procedure to remove the motherboard:

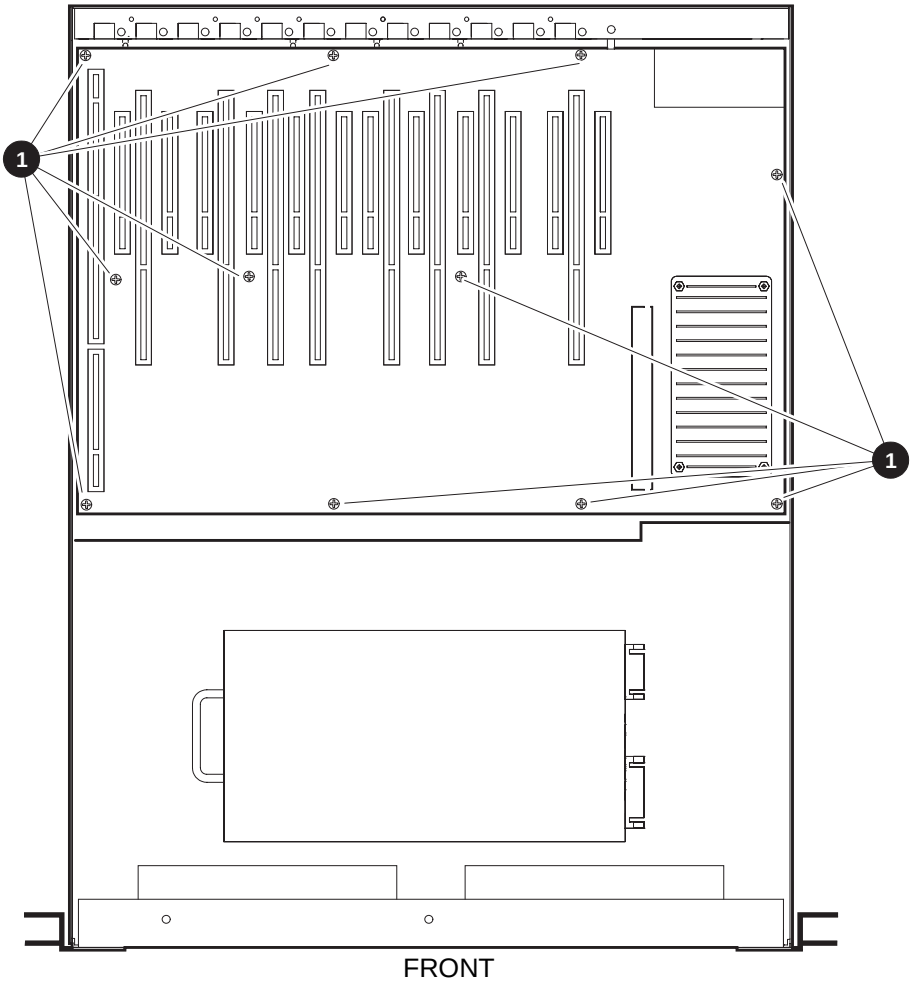
Warning

Before performing the following removal and replacement procedures, ensure that the power cord is unplugged from the receptacle on the power distribution unit.

1. From the rear of the cabinet, disconnect all of the cables that are connected to the PCI option cards. Ensure that the cables are properly labeled for reconnection.
2. Extend the PCI chassis for service (see Section 5.3.2).
3. Remove the top cover (see Section 5.3.3).
4. Remove all of the PCI option cards that are installed in the chassis. Ensure that they are properly labeled for replacement into the same slot from which they were removed.
5. Remove the power board (see Section 5.3.6).
6. Remove the 11 screws **1** that secure the motherboard to the chassis (see Figure 5–22).
7. Lift the motherboard from the chassis.

To replace the motherboard, reverse steps 1 through 7.

Figure 5–22 Removing the Motherboard



A

PCI Option Installation

This appendix contains instructions for installing options in the PCI chassis.

A.1 PCI Chassis Option Installation

The following sections contain general instructions for installing options in the PCI chassis and the specific installation instructions for installing the KFE70-CA PCI-to-EISA adapter kit.

A.1.1 Installing Option Cards

Perform the following procedure to access the PCI card cage and install an option card:

Warning

Before performing this procedure, unplug the PCI chassis from the receptacle on the power distribution unit.

1. Extend the stabilizing legs at the front of the cabinet (if stabilizing legs are provided).

Warning

Before extending the PCI chassis for service, ensure that the rack or cabinet is stable and that all provided stabilizing features have been activated. The stabilizing features for the rack or cabinet are configuration dependent.

2. Extend the PCI chassis for service (see Section 5.3.2).

Option Installation

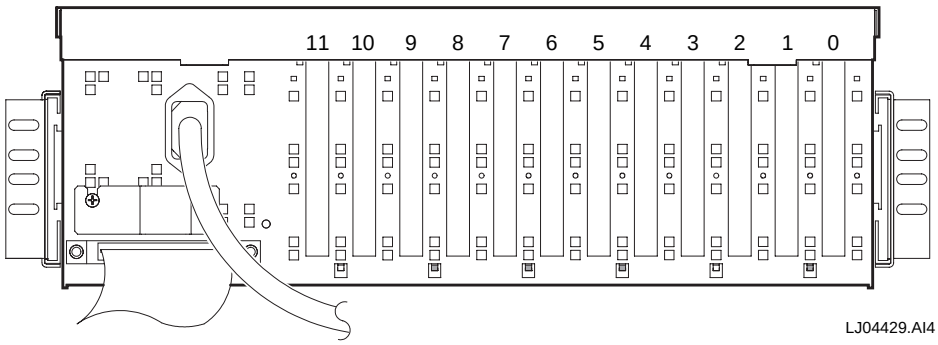
3. Remove the top cover (see Section 5.3.3).

Caution

You must wear an antistatic wriststrap attached to the chassis when handling any cards or modules.

4. Put on the antistatic wriststrap.
5. Select the slot where the option card is to be installed and remove the blank filler panel from the selected slot (save the filler panel screw for securing the option card in place). Figure A–1 shows the slot designations (0 through 11) of the PCI card cage as viewed from the rear of the chassis.
6. Align the option card with the chosen slot and slide the option card down into the slot until it is seated properly.
7. Secure the option card in place with the filler panel screw that was saved in step 5.
8. Replace the top cover.
9. Proceed to Section A.1.2 and perform the cabling of the option.

Figure A–1 Rear View of PCI Card Cage Slot Designations



A.1.2 Cabling of Options Installed in the PCI Chassis

Perform the following procedure to access the rear of the PCI chassis to install the option cables:

Warning

Before performing this procedure, unplug the PCI chassis from the receptacle on the power distribution unit.

1. Open the rear door on the H9A15 cabinet.
2. Connect the cables to the connector(s) on the rear of the option card.

A.1.3 Installing the KFE70-CA PCI-to-EISA Adapter Kit

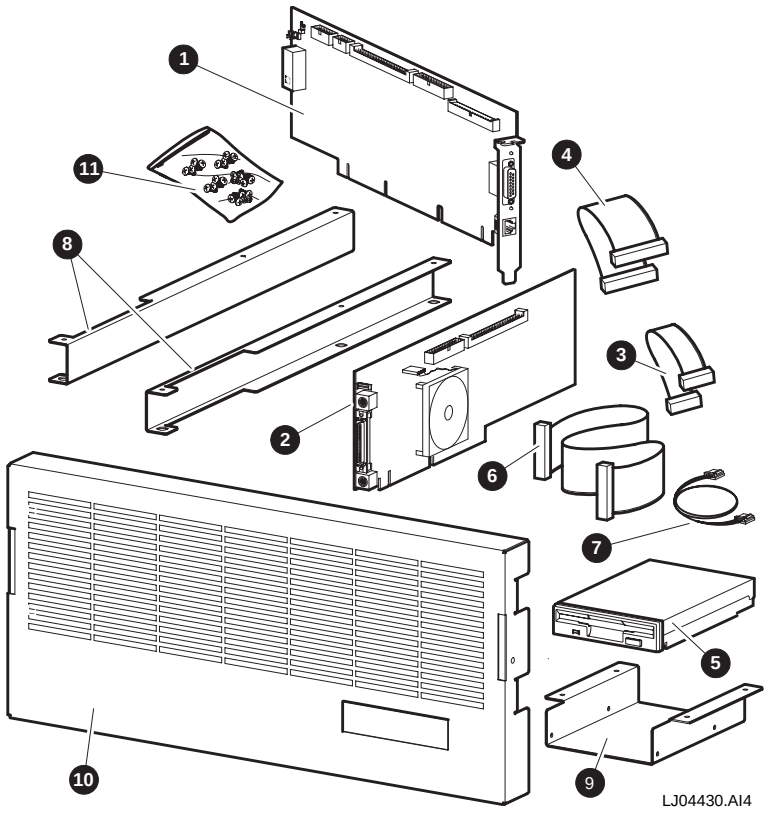
The PCI chassis contains a 12-slot card cage that houses up to 12 PCI options. With the installation of the KFE70-CA PCI-to-EISA adapter kit in slot 0 and 2 of the PCI chassis, 10 slots are available for a mixture of PCI and EISA options. With the KFE70-CA PCI-to-EISA adapter kit installed in the PCI chassis, Table A–1 lists how the 12 slots in the chassis are used.

Table A–1 PCI/EISA Slot Usage

Slot Number	Usage
0	Standard I/O module (part of KFE70-CA adapter kit)
1	EISA option only
2	Connector module (part of KFE70-CA adapter kit)
3	EISA option only
4	PCI or EISA option
5	PCI or EISA option
6	PCI option only
7	PCI or EISA option
8	PCI or EISA option
9	PCI or EISA option
10	PCI option only
11	PCI or EISA option

Figure A–2 shows the contents of the KFE70-CA PCI-to-EISA adapter kit.

Figure A–2 KFE70-CA PCI-to-EISA Adapter Kit Contents



1 B2110-AA standard I/O card
2 Connector card
3 34-pin ribbon cable
4 60-pin ribbon cable
5 RX26-AA 2.8 MB 3.5" diskette drive
6 RX26 signal cable
7 RX26 power cable
8 PCI chassis extension brackets
9 Diskette drive bracket
10 22.23 cm (8.75 in.) front bezel
11 Bag of hardware

Option Installation

Refer to Figure A–3 and perform the following procedure to install the KFE70-CA PCI-to-EISA adapter kit:

Warning

Before performing this procedure, unplug the PCI chassis from the receptacle on the power distribution unit.

1. Extend the stabilizing legs at the front of the cabinet (if stabilizing legs are provided).

Warning

Before extending the PCI chassis for service, ensure that the rack or cabinet is stable and that all provided stabilizing features have been activated. The stabilizing features for the rack or cabinet are configuration dependent.

2. Extend the PCI chassis for service (see Section 5.3.2).
3. Remove the top cover (see Section 5.3.3).

Caution

You must wear an antistatic wriststrap attached to the chassis when handling any cards or modules.

4. Remove the blank filler panel from slot 0 (save the filler panel screw for securing the installed card in place).
5. Align the B2110-AA standard I/O card **7** with slot 0 and slide the card down into the slot until it is seated properly.
6. Secure the B2110-AA standard I/O card in place with the filler panel screw that was saved in step 4.
7. Remove the blank filler panel from slot 2 (save the filler panel screw for securing the installed card in place).
8. Align the connector card **6** with slot 2 and slide the card down into the slot until it is seated properly.

9. Secure the connector card in place with the filler panel screw that was saved in step 7.

Important

If an option card is going to be installed in slot 1, install the option card now before proceeding with this procedure.

10. Connect the 34-pin ribbon cable between the B2110-AA standard I/O card and the connector card.
11. Connect the 60-pin ribbon cable between the B2110-AA standard I/O card and the connector card.
12. Replace the top cover.
13. Install the PCI chassis extension brackets **1** on the bottom left and right edges of the chassis with three screws **2** each.
14. Install the diskette drive bracket **3** on the bottom right front of the chassis (viewed from the front) with four screws **4** . DO NOT tighten these screws at this time.
15. Set the mode switch on the diskette drive to 1. The mode switch is located on the right side of the drive at the back corner.

Important

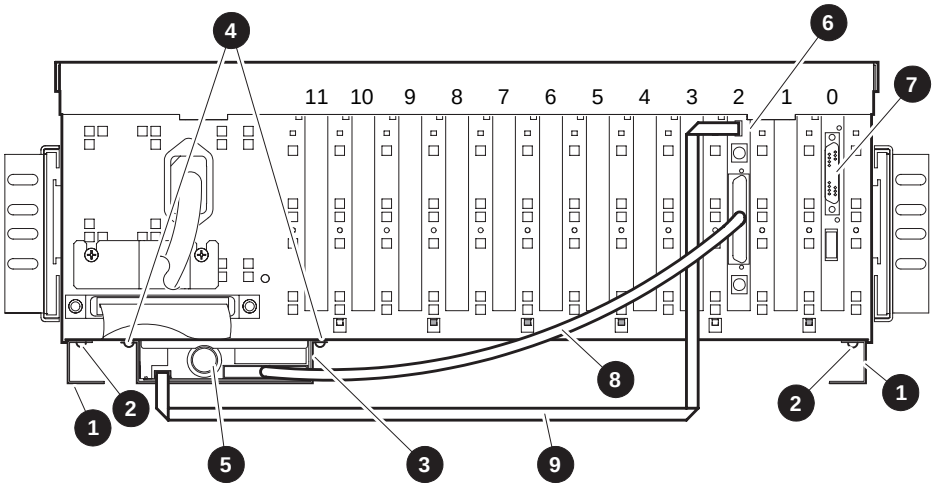
Ensure that the mode switch is set to 1 before performing the next step, since the diskette drive bracket covers the switch.

16. Slide the diskette drive **5** into the diskette drive bracket with the front of the drive facing the front of the chassis.
17. Tighten the four diskette drive bracket screws.
18. Connect one end of the RX26 signal cable **8** to the signal connector on the rear of the diskette drive.
19. Connect the other end of the RX26 signal cable to the signal connector on the connector card.
20. Connect one end of the RX26 power cable **9** to the power connector on the rear of the diskette drive.
21. Connect the other end of the RX26 power cable to the power connector on the connector card.

Option Installation

22. Release the slide locking levers and push the chassis into the cabinet.
23. Secure the chassis to the front rails with the four retaining screws.
24. Install the 22.23 cm (8.75 in.) front bezel that comes with the kit on the chassis.

Figure A–3 KFE70-CA PCI-to-EISA Adapter Kit Installation



B

Field-Replaceable Units

This appendix lists the major field-replaceable units (FRUs) for the TLSB and the PCI (BA602-AA) chassis.

Field Replaceable Units

Table B–1 lists the major field-replaceable units (FRUs) and part numbers for the TLSB chassis.

Table B–1 TLSB Chassis Field-Replaceable Units

Part Description	Part Number
48 Vdc Power-Regulator Unit	70-32965-01
Control-Panel Assembly	70-32623-01
Control-Panel Module	54-20308-01
Blower Assembly (Front and Rear)	70-32624-01
AC Input Unit	30-39579-03
KFTHA-AA I/O Module	E2052-AA
KFTIA-AA I/O Module	E2054-AA
Single-Processor CPU Module	E2056-CA
Dual-Processor CPU Module	E2056-DA
128-MB Memory Module	E2035-BA
256-MB Memory Module	E2035-CA
512-MB Memory Module	E2035-DA
1-GB Memory Module	E2035-EA
2-GB Memory Module	E2036-AA
Terminator Module	E2034-AB
Card-Cage Assembly	70-30430-01
System Clock Module	54-21728-05
Cabinet Control Logic (CCL) Module	54-20300-01
Tach Alarm Module	30-46144-01
PTO Module	54-24399-01
Console Cable	17-01364-02

Field Replaceable Units

Table B–2 lists the major field-replaceable units (FRUs) and part numbers for the PCI (BA602-AA) chassis.

Table B–2 PCI Chassis Field-Replaceable Units

Part Description	Part Number
Front Bezel Assembly [17.78 cm (7.00 in.)]	70-32515-01
Front Bezel Assembly [22.23 cm (8.75 in.)]	70-32515-02
48 Vdc Power Supply	30-46068-01
Fan	12-23609-19
Power Board	54-23470-01
Motherboard	54-23468-01
Power Cord	17-00083-04