H7237 Battery PIU Installation Guide

Order Number: EK–H7237–IN. B01

This manual is intended for Digital service engineers and self-maintenance customers installing battery blocks in the battery PIU and installing the battery PIU in DEC 7000, VAX 7000, and AlphaServer 8400 systems.

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Preface

Intended Audience

This manual is written for Digital customer service engineers and self-maintenance customers installing battery blocks in the H7237 battery plug-in unit (PIU) and installing the battery PIU in DEC 7000, VAX 7000, and AlphaServer 8400 systems.

Document Structure

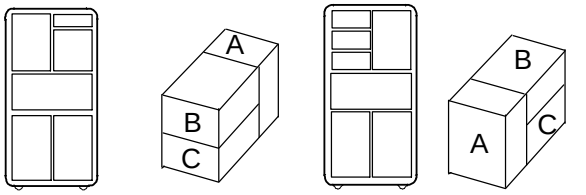
This manual uses a structured documentation design. Topics are organized into small sections for efficient online and printed reference. Each topic begins with an abstract. You can quickly gain a comprehensive overview by reading only the abstracts. Next is an illustration or example, which also provides quick reference. Last in the structure are descriptive text and syntax definitions.

This manual has three chapters, as follows:

- **Chapter 1, Preparation,** gives an overview of the battery PIU and tells how to prepare for the installation.
- **Chapter 2, Installation**, gives instructions on how to install batteries in the battery PIU and the battery PIU in a main cabinet or expander cabinet.
- **Chapter 3, Acceptance and Troubleshooting,** describes the acceptance procedure.

Conventions Used in This Document

Icons. Icons similar to those shown below are used in illustrations for designating part placement in the system described. A shaded area in the icon shows the location of the component or part being discussed.



Documentation Titles

Tables 1–4 list the books in the DEC 7000/VAX7000 and the AlphaServer 8400 documentation sets and other documents you may find useful.

Table 1 DEC 7000/VAX 7000 Documentation

Title	Order Number
Installation Kit	EK–7000B–DK
Site Preparation Guide	EK–7000B–SP
Installation Guide	EK–700EB–IN
Hardware User Information Kit	EK–7001B–DK
Operations Manual	EK–7000B–OP
Basic Troubleshooting	EK–7000B–TS
Service Information Kit—DEC 7000	EK–7002B–DK
Platform Service Manual	EK–7000A–SV
System Service Manual	EK–7002B–SV
Pocket Service Guide	EK–7000A–PG
Advanced Troubleshooting	EK–7001A–TS
Service Information Kit—VAX 7000	EK–7002A–DK
Platform Service Manual	EK–7002A–SV
System Service Manual	EK–7002B–SV
Pocket Service Guide	EK–7700A–PG
Advanced Troubleshooting	EK–7701A–TS
Reference Manuals	
Console Reference Manual	EK–70C0B–TM
KA7AA CPU Technical Manual	EK–KA7AA–TM
KN7AA CPU Technical Manual	EK–KN7AA–TM
MS7AA Memory Technical Manual	EK–MS7AA–TM
I/O System Technical Manual	EK–70IOA–TM
Platform Technical Manual	EK–7000A–TM

Table 2 AlphaServer 8400 Documentation

Title	Order Number
Hardware User Information and Installation	
Operations Manual	EK–T8030–OP
Site Preparation Guide	EK–T8030–SP
AlphaServer 8400 Installation Guide	EK–T8430–IN
Service Information Kit	QZ–00RAC–GC
Service Manual (hard copy)	EK–T8030–SV
Service Manual (diskettes)	AK–QKNFA–CA AK–QUW7A–CA AK–QUW6A–CA
Reference Manuals	
System Technical Manual	EK–T8030–TM
DWLPA/DWLPB PCI Adapter Technical Manual	EK–DWL84–TM
System Technical Manual Supplement: CPU	EK–T8030–TS

Chapter 1

Preparation

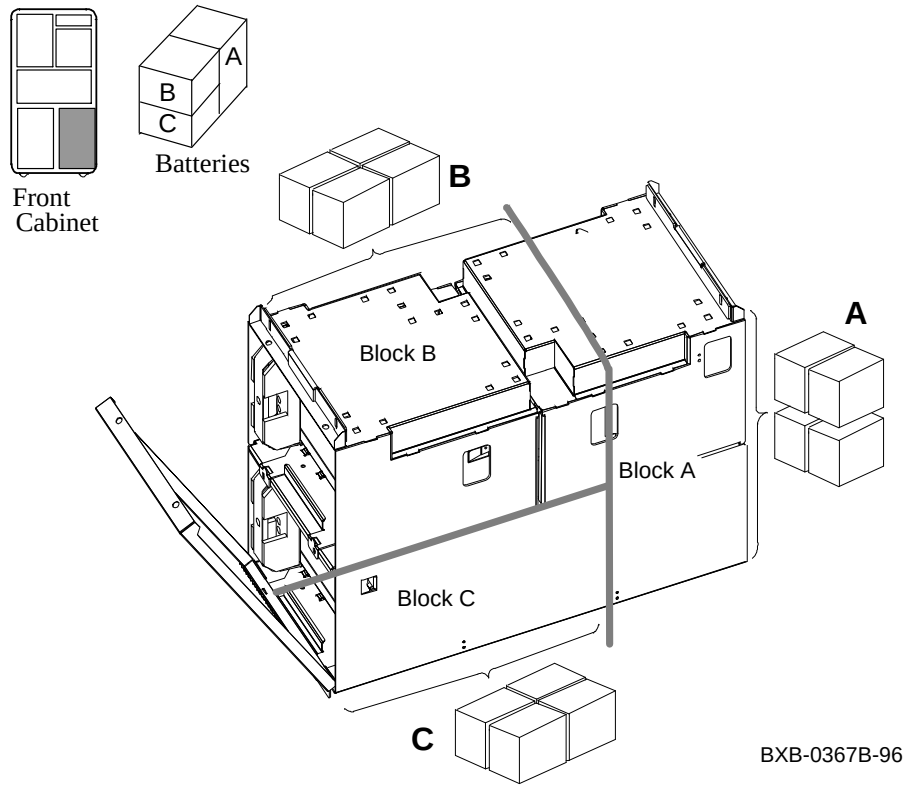
This chapter describes the H7237 battery plug-in unit (PIU) option and gives preparation guidelines for installing this option in an H9F00-Ax system cabinet or an H9F00-Bx expander cabinet. Chapter 2 describes the installation. If you are adding batteries to an installed battery PIU, begin the installation at Section 2.4. Sections in this chapter include:

- H7237 Battery PIU Description
- Battery PIU Specifications
- Battery PIU Configuration Rules
- Prepare Area, Kit, and Tools

1.1 H7237 Battery PIU Description

The battery plug-in unit (PIU) houses one to three battery blocks, each containing four batteries. The battery PIU is installed in the bottom of the system or expander cabinet.

Figure 1-1 Battery Plug-In Unit



The H7237-AA battery PIU is a battery backup system for DEC 7000, VAX 7000, and early models of AlphaServer 8400 systems. The H7237-BA (U.S.) and -CA (Europe and Asia) battery PIUs are battery backup systems for later models of AlphaServer 8400 systems. These PIUs also include an H7263-AA or -AB BBU-capable regulator. (Later AlphaServer 8400 systems are supplied with H7263-AC and -AD regulators, which are not BBU-capable regulators.)

The H7237 provides a true uninterruptible power source (UPS) for all the components in the cabinet in which it is installed. The battery PIUs together with the cabinet power system provide a complete power loss ride-through capability for CPU, memory, and the I/O subsystem, including disks in the cabinet. Each PIU battery block contains four batteries and provides backup power to one H7263-AA or -AB power regulator. The battery PIU provides a minimum of 8 minutes of full system operation.

1.2 Battery PIU Specifications

Each power regulator in the system is backed up by a block of four batteries. With one regulator in the system, the battery PIU will have four batteries. With two regulators, eight batteries are required. With three regulators, 12 batteries are required. Each battery weighs approximately 25 pounds.

Figure 1-2 Battery PIU Layout

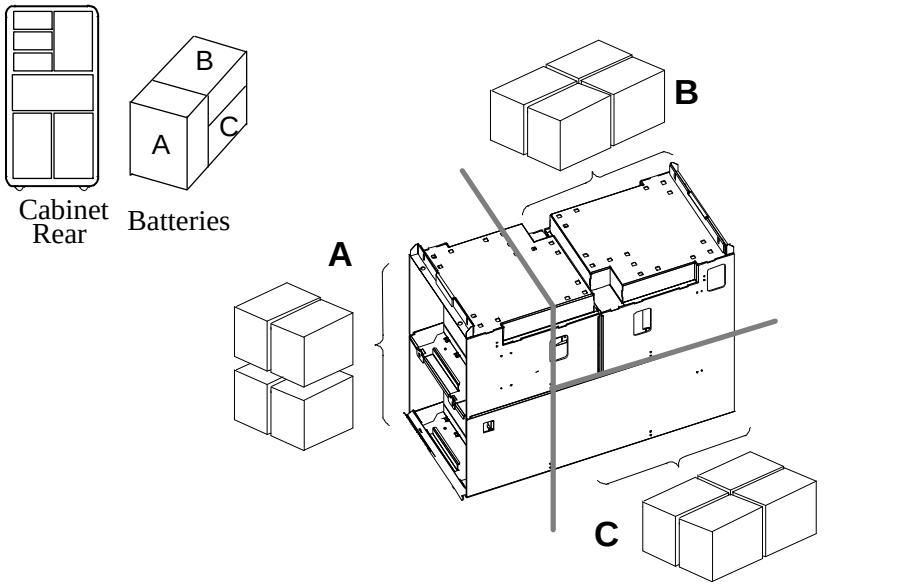


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Figure 1-2 illustrates the battery locations in the PIU. Each regulator requires four batteries. Each block of four batteries (A, B, and C) corresponds to one of the power regulators. The batteries for regulators B and C, in the front of the cabinet, occupy two trays. The tray located in the bottom housing contains the batteries for regulator C. The top tray, which occupies the top front housing and extends partially into the top rear housing, contains the batteries for regulator B. The batteries for regulator A, in the rear of the cabinet, are arranged with two in the bottom housing and two in the top rear housing.

Table 1-1 lists the H7237 battery PIU physical specifications.

Table 1-1 H7237 Battery PIU Physical Specifications

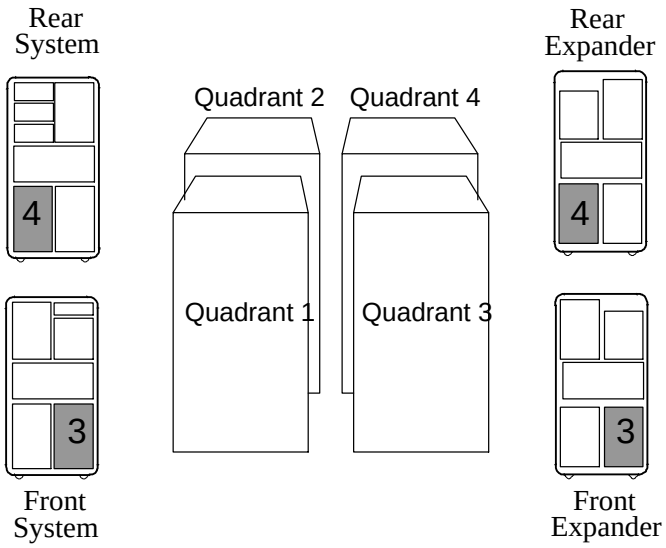
Item	Unit
Length	28.35 inches (720 mm)
Width	12.64 inches (321 mm)
Height[1]	20.35 inches (517 mm)
Weight without batteries	110 lbs (50 kg)
Weight with 4 batteries	210 lbs (95.5 kg)
Weight with 8 batteries	310 lbs (140.9 kg)
Weight with 12 batteries	410 lbs (186.4 kg)

[1]Not including top and bottom flanges.

1.3 Battery PIU Configuration Rules

Battery PIUs can be installed in the main cabinet or in an expander cabinet, as shown in Figure 1-3. The PIU must contain one battery block for each power regulator in the system.

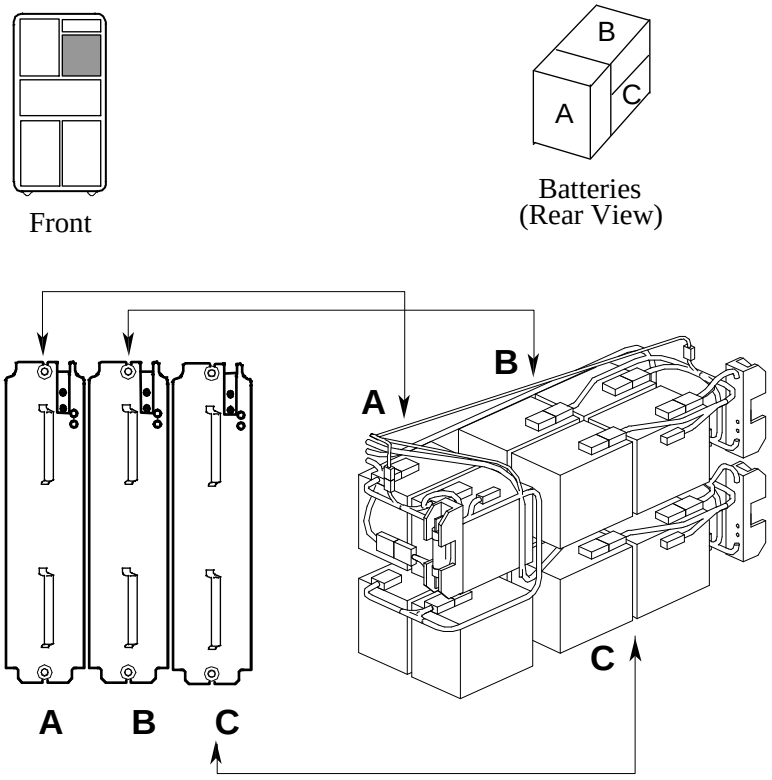
Figure 1-3 Cabinet Battery PIU Placement



Battery PIU Configuration Rules

- Each cabinet can have only one battery PIU. A battery PIU in the main or expander cabinet occupies two quadrants, Q3 and Q4 (See Figure 1-3).
- One battery block is required for each H7263-AA or -AB power regulator (regulators are designated A, B, and C; see Figure 1-4) .
- Each battery PIU contains a minimum of one and a maximum of three battery blocks; block A for regulator A, block B for regulator B, and block C for regulator C. Each block contains four batteries.

Figure 1-4 Correlation of Power Regulators and Battery Blocks



1.4 Prepare Area, Kit, and Tools

Set up a work space near the system where you can store components while you work on the battery PIU option installation. Table 1-1 lists the battery PIU components for the H7237-AA battery PIU. Table 1-2 lists the components supplied with H7237-BA and -CA battery PIUs. Prepare the system for shutdown.

Table 1-2 H7237-AA Option Components

Part Number	Quantity	Description
BA650-AA	1	Battery chassis (includes the following):
70-29948-01	1	Bottom housing assembly
70-29357-01	1	Front housing assembly
70-29358-01	1	Rear housing assembly
74-44159-01	2	Battery door
74-44200-01	2	Stop door
74-45418-01	2	CPU cabinet mounting plate bracket
74-45712-01	2	Battery tray stiffener plate
12-39982-01	3	Fuse (LPN-RK-90)
17-03421-01	1	Battery sensor cable
17-03492-01	1	Intermediate cable, battery block A
17-03493-01	2	Intermediate cables, battery blocks B/C
17-03494-01	1	Power regulator A to battery block A cable
17-03494-02	1	Power regulator B to battery block B cable
17-03494-03	1	Power regulator C to battery block C cable
12-36168-01	4	12-volt batteries
EK-H2737-IN	1	*H7237 Battery PIU Installation Guide*

Table 1-3 H7237-BA and -BC Option Components

Part Number	Quantity	Description
BA650-AA	1	Battery chassis (includes the following):
70-29948-01	1	Bottom housing assembly
70-29357-01	1	Front housing assembly
70-29358-01	1	Rear housing assembly
74-44159-01	2	Battery door
74-44200-01	2	Stop door
74-45418-01	2	CPU cabinet mounting plate bracket
74-45712-01	2	Battery tray stiffener plate
12-39982-01	3	Fuse (LPN-RK-90)
17-03421-01	1	Battery sensor cable
17-03492-01	1	Intermediate cable, battery block A
17-03493-01	2	Intermediate cables, battery blocks B/C
17-03494-01	1	Power regulator A to battery block A cable
17-03494-02	1	Power regulator B to battery block B cable
17-03494-03	1	Power regulator C to battery block C cable
12-36168-01	4	12-volt batteries
30-33796-0x	1	H7263-AA (U.S.) or H7263-AB (Europe and Asia) power regulator
EK-H2737-IN	1	*H7237 Battery PIU Installation Guide*

Adding a battery PIU to a system requires the H7237-AA, -BA, or -CA kit, which includes the PIU housing, cabling, and four batteries. The H7237-BA and -CA kits (for later-model AlphaServer 8400 systems only) also contain one H7263-AA (U.S.) or H7263-AB (Europe and Asia) BBU-capable power regulator to replace one H7263-AC or H7263-AD regulator, which are not BBU-capable.

If the system has more than one regulator that is to have battery backup, one H7238-AA kit (see Table 1-4) is required for each additional H7263-AA or H7263-AB regulator. (Additional H7263-AA or H7263-AB regulators are also needed to replace H7263-AC or -AD regulators in later-model AlphaServer 8400 systems.)

Table 1-4 H7238-AA Kit Contents

Part Number	Quantity	Description
12-36168-01	4	12-volt batteries
EK-H7237-IN	1	*H7237 Battery PIU Installation Guide*

1. Prepare an area near the system where you can place system components during the installation. The following tools are required :
   a. Phillips screwdriver
   b. 90-degree low-profile ratchet Phillips screwdriver
   c. 6 mm (1/4 inch), 8 mm (5/16 inch), and 13 mm (1/2 inch) open end or box wrenches
   d. 4 mm (5/32 inch) hex key wrench
   e. 2 meter (6.5 ft) length of wire to aid in routing cables.
2. Perform an orderly shutdown of the system.
3. Turn the control panel keyswitch to the Disable position.
4. Open the rear door of the cabinet and shut the circuit breaker off by pushing down the handle.

Chapter 2

Installation

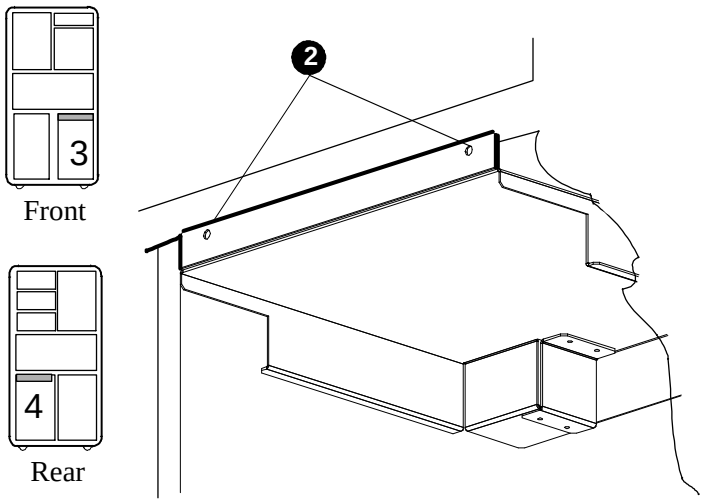
This chapter describes the installation of the H7237 battery PIU in the system or expander cabinet. Sections include:

- Remove the Cabinet Airflow Plates
- Disassemble the Enclosure and Install Pieces
- **For later-model AlphaServer 8400 systems only:**
  Replace H7263-AC or -AD regulator(s) with H7263-AA or -AB regulator(s).
- Attach Battery Cables to DC Distribution Box
- Attach Battery Fuse Block Cables
- Install and Cable Regulator A Batteries
- Install and Cable Regulator B and C Batteries
- Replace Fuse Covers and Attach PIU Doors

2.1 Remove the Cabinet Airflow Plates

Remove the front and rear airflow plates located below the blower in the battery PIU space. The plates control cabinet airflow when a PIU is not present.

Figure 2-1 Airflow Plates



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1. Open the front cabinet doors.
2. Disconnect all power regulators in the cabinet in which you are installing the battery PIU. Loosen the two captive screws (Phillips), one each at the top and bottom of the power regulator to be disconnected and back the regulators out of their slots approximately 1 to 2 inches.

   CAUTION: Failure to follow this precautionary step may lead to damage of the regulators and/or fuses. Do not reinstall regulators until battery assemblies have all been installed. Do not defeat the operation of the stop tabs on the regulators.

3. In an AlphaServer 8400 system, check to make sure that the regulators are H7263-AA or -AB regulators.

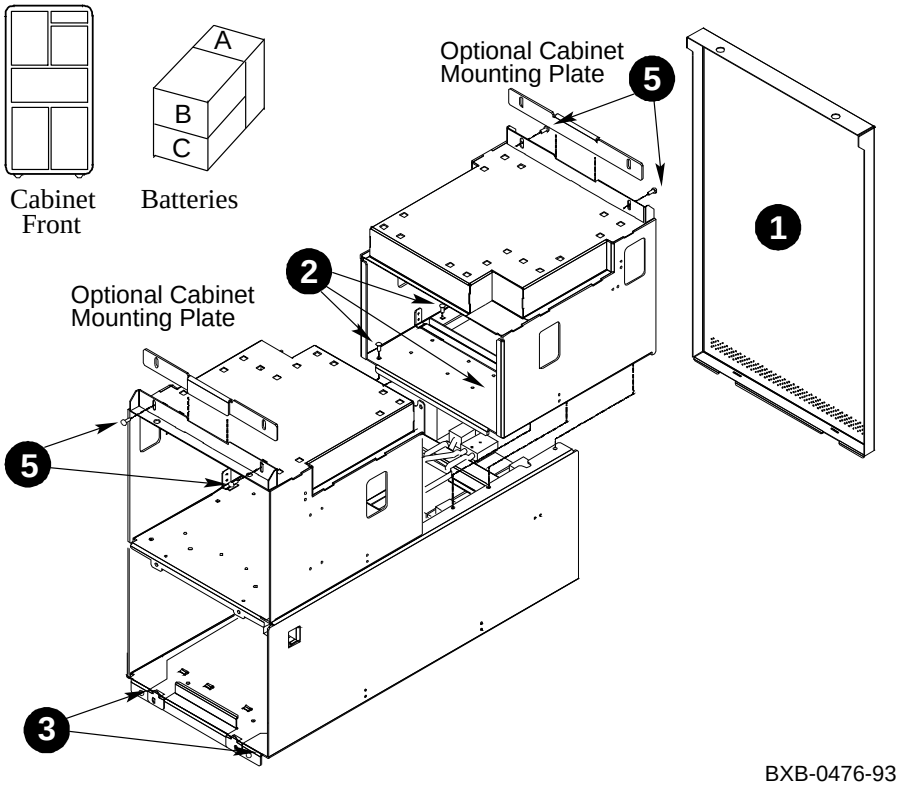
   NOTE: If you are installing battery backup in an Alphaserver 8400 system, note that the regulators connected to the battery backup must be H7263-AA or -AB regulators. The H7263-AC and -AD regulators supplied with the later-released AlphaServer 8400 systems are not equipped to handle battery backup.

4. Using a Phillips screwdriver, remove the two screws that hold each airflow plate to the cabinet frame (see ❷ in Figure 2-1). Save the two screws you remove, as you will need them to secure the bottom of the battery PIU to the frame.
5. Slide the front and rear airflow plates out of the cabinet.
6. Label and save the airflow plates. If a PIU is removed for maintenance or for a change in the configuration, these airflow plates must be reinstalled to ensure proper system ventilation.

2.2 Disassemble the Enclosure and Install Pieces

The battery PIU enclosure consists of three assemblies, which are shipped partially assembled. Separate the rear housing assembly from the bottom housing assembly. Install the unit in the cabinet and reattach the rear housing assembly.

Figure 2-2 Battery PIU Housing Assemblies



When both battery PIU doors are removed, the front of the unit is the end that has the slide-out trays. The top of the rear housing assembly has a flange that is fastened to the cabinet once the PIU is installed in the cabinet. The rear housing assembly must be removed in order to slide the PIU, which spans both quadrants, into the cabinet.

*CAUTION: The battery PIU enclosure weighs approximately 110 pounds without any batteries installed. Use **two** people to lift or move this unit. If you are working alone, remove both front and rear housings before moving bottom housing.*

Each battery weighs approximately 25 pounds. Be careful when lifting and moving batteries.

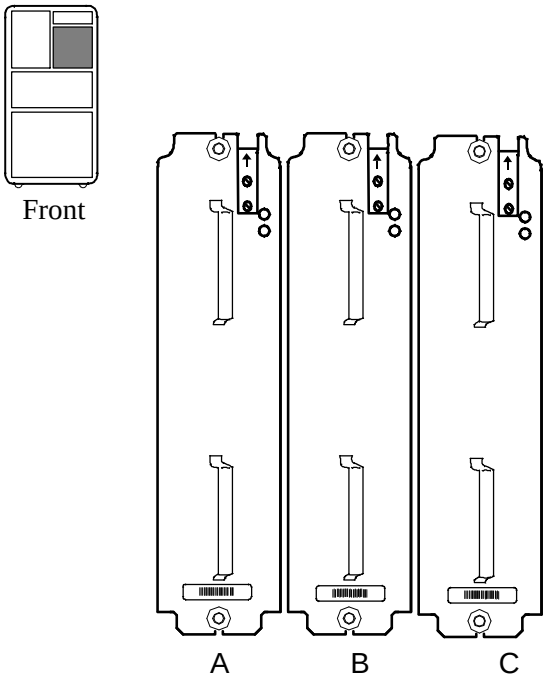
1. Remove the two battery PIU doors (74-44159-01) by using a Phillips screwdriver to unscrew the two 1/4 turn fasteners at the top of each door. When the two fasteners pop up, tilt away and remove the doors (see ❶ in Figure 2-2).
2. Remove the six flathead Phillips screws (see ❷) holding the rear housing assembly (70-29358-01) to the bottom housing assembly (70-29948-01). Remove and set aside the rear housing assembly. If you are working alone, remove the front housing assembly also.
3. Working from the front, slide the front and bottom housing assemblies into the cabinet (quadrants Q3 and Q4). Install the two Phillips screws at the bottom of the PIU enclosure (see ❸). It may be easier to install the bottom two batteries for regulator A (see Section 2.5) before reattaching the rear housing in step 4.
4. Working from the rear, reattach the rear housing assembly (that you removed in step 2) to the bottom housing assembly. If you removed the front housing assembly (70-29357-01), reattach it at this time.
5. Secure the top of the front and rear housings to the cabinet using two Phillips screws for each (see ❺). The cabinet mounting plates (74-45418-01) are optional but are supplied to be used as spacers, if necessary, due to fabrication tolerances.
6. Working from the rear, attach a flange stop (74-44200-01) to the bottom edge of the bottom housing assembly and the bottom edge of the rear housing assembly with two Phillips screws (see ❸ in Figure 2-6).

2.3 For AlphaServer 8400 Only: Replace Regulator

For later AlphaServer 8400 systems, replace H7263-AC or -AD regulator(s), which are not BBU-capable, with H7263-AA or -AB regulators, which are.

WARNING: The power regulator has a heated surface on one side.

Figure 2-3 H7263 Power Regulators



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Removal of H7263-AC or -AD Regulator(s)

1. Slide the power regulator out from the front of the cabinet. There will be some resistance.

   WARNING: One side of the power regulator has a heated surface. Do not touch the side when removing the regulator.

   CAUTION: The power regulator weighs 20 kg (40.4 lb). Because of the height of this unit in the cabinet, you should not remove the power regulator from the cabinet by yourself.

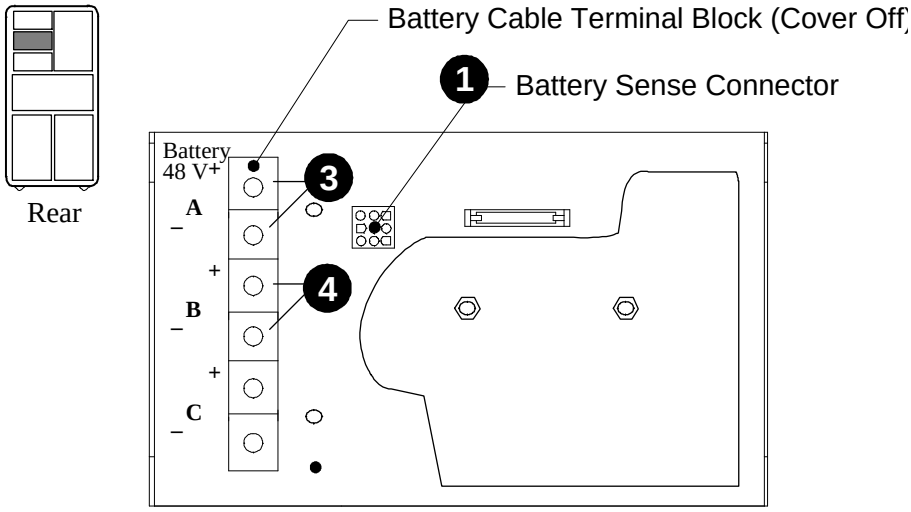
Replacing the H7263-AA or -AB Regulator(s)

1. From the front of the cabinet, seat the replacement regulator in its slot and push it in until its weight is held by the cabinet, **but do not engage it completely**. The process of engaging regulators occurs at the end of the installation procedure.

2.4 Attach Battery Cables to DC Distribution Box

Attach one end of the battery sensor cable to the DC distribution box and route the other end to the batttery PIU. Route the power regulator cables from the battery PIU to the DC distribution box and attach the proper end of each cable to the DC distribution box.

Figure 2-4 DC Distribution Box Battery Cable Connections

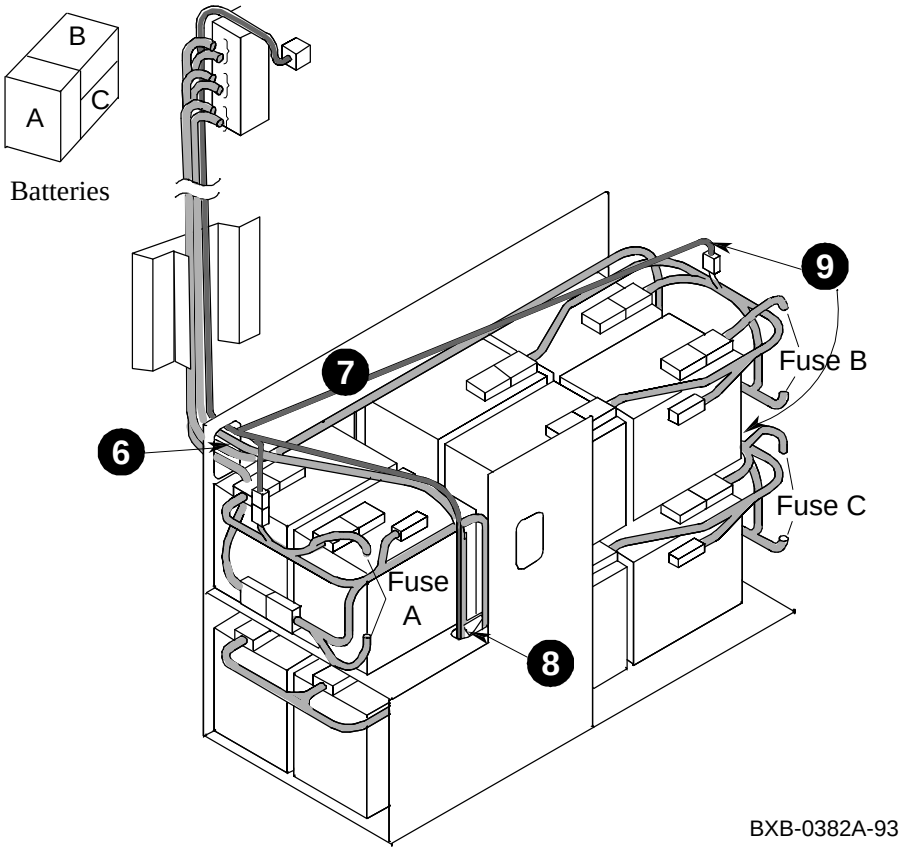


WARNING: Observe proper polarity when connecting battery cables. Failure to do so can cause severe power system damage, overheating, and emission of smoke. ORANGE wires are POSITIVE (+) polarity, and BLUE wires are NEGATIVE (–) polarity.

Before starting the following steps, make certain the power regulators are backed out (see Section 2.1) and are the correct model. Locate the DC distribution box above the circuit breaker. Remove the plastic cover of the battery cable terminal block by removing the two nuts.

1. Attach the 9-pin square connector of the battery sensor cable (17-03421-01) to the connector on the DC distribution box (see ❶ in Figure 2-4). Route the sensor cable up and to the left over the battery cable terminal block (so it will fit in the cutout in the plastic cover) and feed it down the left side of the cabinet frame to the battery PIU. Be careful the cable does not bear directly on any metal edges of the cabinet.
2. The six large diameter battery power cables are grouped as three pairs (17-03494-01, -02, and -03) of orange (+) and blue (–) wires. Each pair connects one of the three power regulators to a corresponding battery block. The end of each pair has a color coded label, indicating to which regulator the pair must be connected (green tag to regulator A, blue tag to regulator B, and white tag to regulator C). Route all three pairs from the battery PIU to the DC distribution box. Feed a wire down from the DC distribution box to the battery PIU, attach a pair of cables to the wire, and carefully pull the cables up (see Figure 2-5). Repeat for the other two pairs of battery power cables.
3. Observe the labeling of the battery cable terminal block . Connect the orange + and blue – leads of the cable pair labeled "A" (green label) to the top two terminals labeled + and – (see ❸ in Figure 2-4). The positive (+) lead has a special ring lug that prevents its attachment to a negative (–) terminal. When attaching this ring lug, make certain it is properly aligned to allow contact with the battery cable terminal block. Use a 13 mm wrench to tighten each connection (a maximum of 10 in-lbs is recommended).
4. Connect the cable pairs labeled "B" to the center two + and – terminals (see ❹). Connect the cable pairs labeled "C" to the bottom two + and – terminals.
5. Replace the cover of the battery terminal block. The cover has a cutout in its right side to admit the sensor cable and a cutout in its left side through which the six battery power cables and the sensor cable exit.

Figure 2-5 Battery PIU Cabling

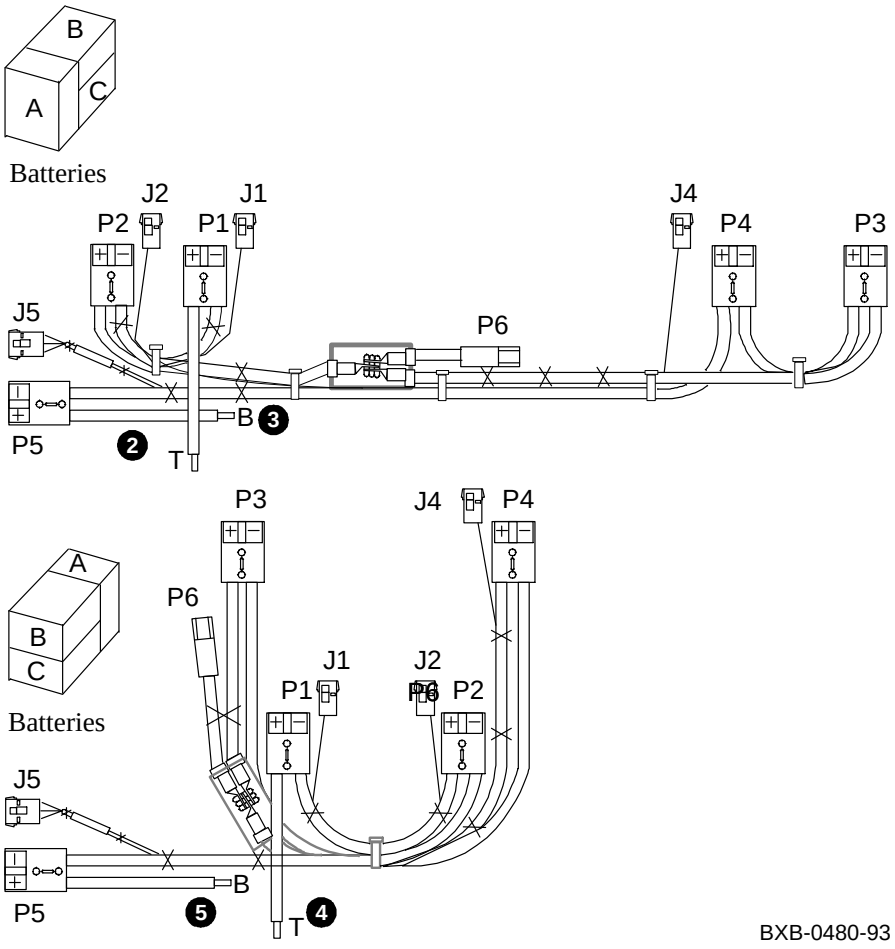


6. From the rear of the cabinet, feed all seven cables through the opening in the left of the rear housing (see ❻ in Figure 2-5).
7. From the rear, feed the power and sensor cables for B across the top of A toward the front of the cabinet (see ❼).
8. From the rear, feed the power and sensor cables for C across the top of A and through the opening to the right of the housing and toward the front of the cabinet (see ❽).
9. From the front of the cabinet, pull the power and sensor cables for B and C forward (see ❾).

2.5 Attach Battery Fuse Block Cables

Attach the intermediate cables (Figure 2-6) to block A, B, and C fuse holders (see Figure 2-5).

Figure 2-6 Intermediate Power/Sensor Cables



There are three intermediate power/sensor cables (see Figure 2-6), one for the rear battery block A (17-03492-01) and two for the front battery blocks B and C (17-03493-01).

Each harness has two orange leads that connect to the fuse block and five large connectors, four (P1, P2, P3, and P4) that connect to the battery connectors and one (P5) that connects to the orane and blue power cables coming from the DC distribution box (see Figure 2-5). Connector P6 is not used.

Each intermediate battery sensor cable has three single wires (red, white, and black) that terminate in keyed 2-pin Mate-N-Lok connectors (J1, J2, and J4) that attach to sensor wires from three of the four batteries. These three wires terminate in a keyed 3-pin Mate-N-Lok connector (J5) that attaches to the sensor cable from the DC distribution box (see Figure 2-5).

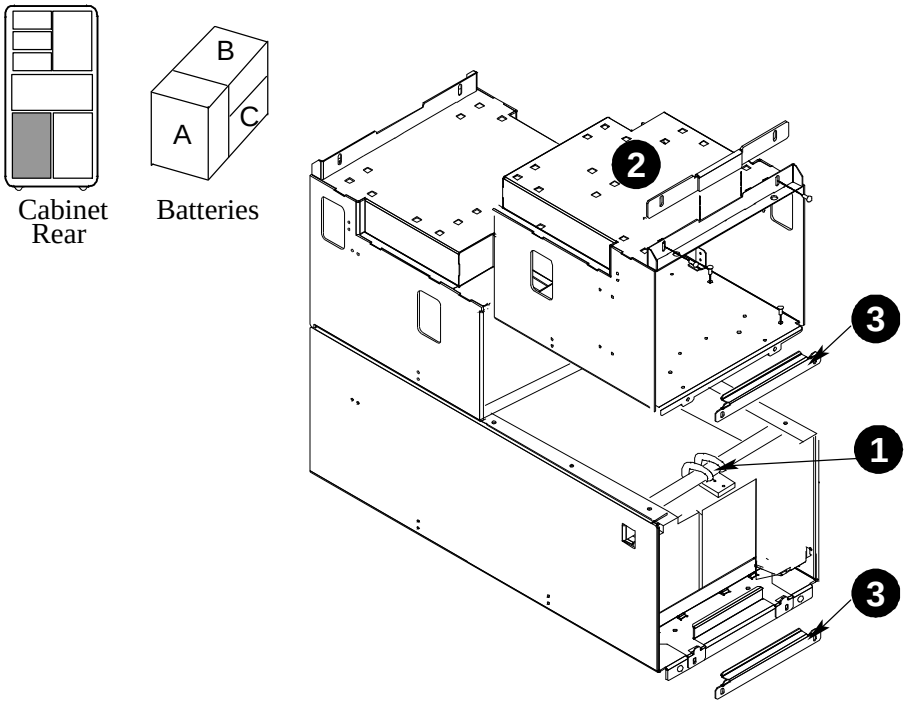
1. Remove the battery block fuse covers by removing the Phillips screw at the top of each cover and pulling the cover toward you and down.
2. Insert the stripped end of the orange lead (see ❷ in Figure 2-6) behind the top fuse block set screw and tighten the set screw with the 4 mm hex key wrench.
3. For regulator A, attach the other orange cable lead (see ❸) to the bottom of the fuse block.
4. For regulators B and C, attach the orange lead with the four-connector harness (see ❹) to the top of the fuse block and tighten the set screw with the 4 mm hex key wrench.
5. For regulators B and C, attach the other orange lead (see ❺) to the bottom of the fuse block. Attach the fuse covers (see Section 2.8).

2.6 Install and Cable Regulator A Batteries

2.6.1 Install Regulator A Batteries

Install the batteries for regulator A. If the system does not have a regulator in slot A, read the *warnings* in this section and then go to Section 2.7, which describes the procedures for installing battery block B and C batteries.

Figure 2-7 Regulator A Battery Installation



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WARNING: Batteries present a risk of electric shock and high short circuit current. Extreme care should be taken when handling batteries. Remove watches, rings, necklaces, and other conductive items that might accidentally short circuit a battery. Use gloves and tools with insulated handles such as those in the power safety tool kit (22-00518-02).

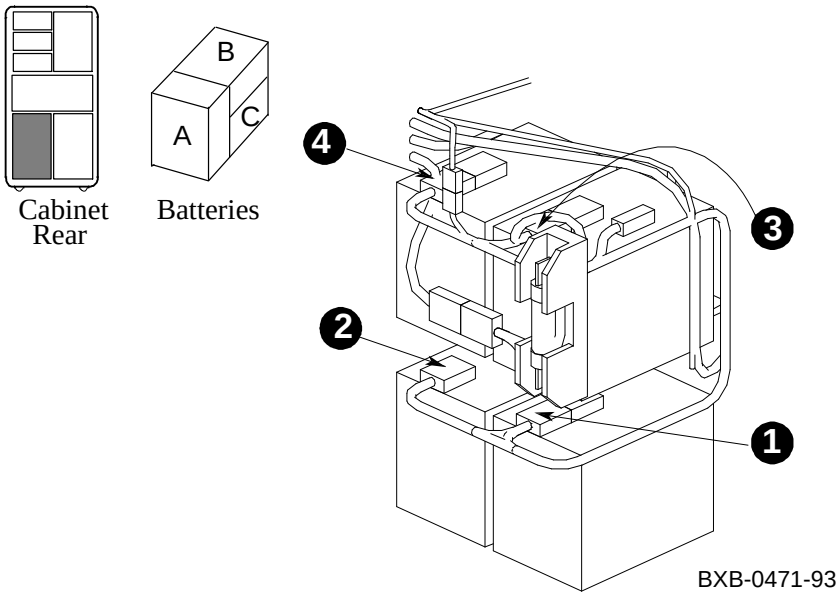
WARNING: Batteries are sealed and therefore gas or liquid emission is unlikely. If batteries should rupture, however, leaking electrolyte may be exposed and if the rupture is due to operational failure, highly dangerous and corrosive mist or fumes may be released. If electrolyte is exposed because of battery case damage, remove all power from the local area, mask or insulate the terminals of the undamaged batteries, and clean the immediate area. If, however, there is any possibility of mist or fumes having been released, evacuate all personnel immediately, shut down the power to the site, and disable all air circulation equipment. If appropriate, quarantine the site and start an environmental disaster recovery process. Avoid touching anything without proper protective clothing. If electrolyte contacts the skin, WASH IT OFF IMMEDIATELY and use the appropriate Customer Service Process for follow-up medical treatment. If electrolyte contacts the eyes, FLUSH IMMEDIATELY AND THOROUGHLY WITH WATER FOR 15 MINUTES and follow the recommended Digital Health and Safety Group procedure.

1. Working from the rear of the cabinet, remove the battery hold-down brackets (see ❶ in Figure 2-7) in the bottom housing. While holding the cables up and out of the way, slide two batteries into the bottom housing, making certain the negative terminal is pointing toward the center of the cabinet and the positive terminal toward the fuse holder. Push each battery past the battery flange (see ❸) and keep each against the side of the assembly to provide separation between the batteries. Reattach the hold-down bracket.
2. Repeat step 1 for the rear top housing (see ❷), installing the remaining two batteries of block A. Observe the proper battery polarity and positioning. Reattach the hold-down bracket as in step 1.

2.6.2 Cable Regulator A Batteries

Cable the batteries for regulator A.

Figure 2-8 Regulator A Battery Cabling



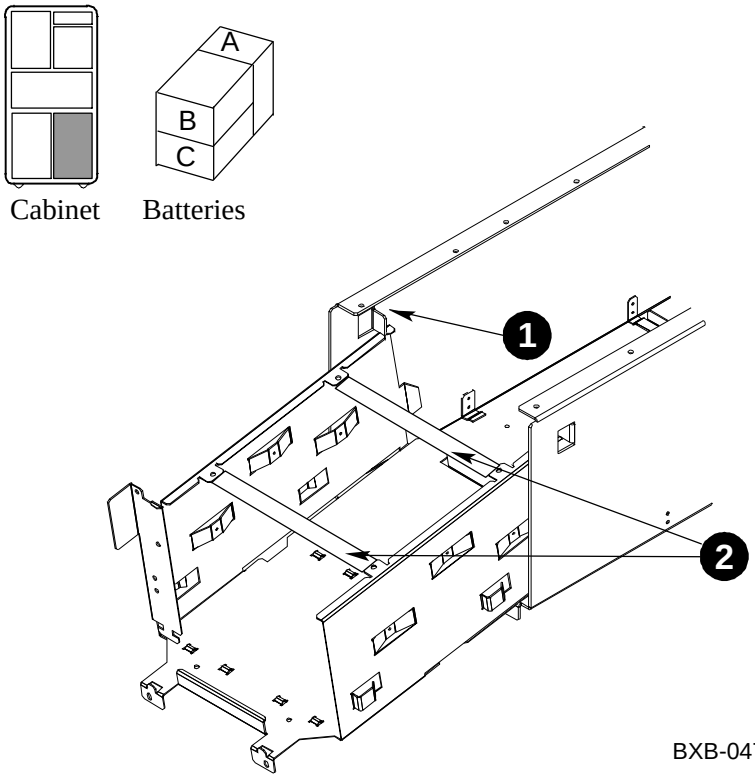
1. Attach the P4 connector of the intermediate power harness/sensor cable (see Figure 2-6) to the connector of battery 4 (see ❶ on Figure 2-8). Attach the J4 connector of the sensor cable to the sensor connector of battery 4.
2. Attach the P3 connector of the intermediate power harness/sensor cable to the connector of battery 3 (see ❷).
3. Attach the P1 connector of the intermediate power harness/sensor cable to the connector of battery 1 (see ❸). Attach the J1 connector of the sensor cable to the sensor connector of battery 1.
4. Attach the P2 connector of the intermediate power harness/sensor cable to the connector of battery 2 (see ❹). Attach the J2 connector of the sensor cable to the sensor connector of battery 2.
5. Attach the P5 connector to the connector of the power cable (17-03494-01) coming from the DC distribution box (see Figure 2-5). Attach the J5 connector of the sensor cable to the connector (labeled A) of the sensor cable (17-03421-01) coming from the DC distribution box.

2.7 Install and Cable Regulator B and C Batteries

2.7.1 Install Regulator B and C Batteries

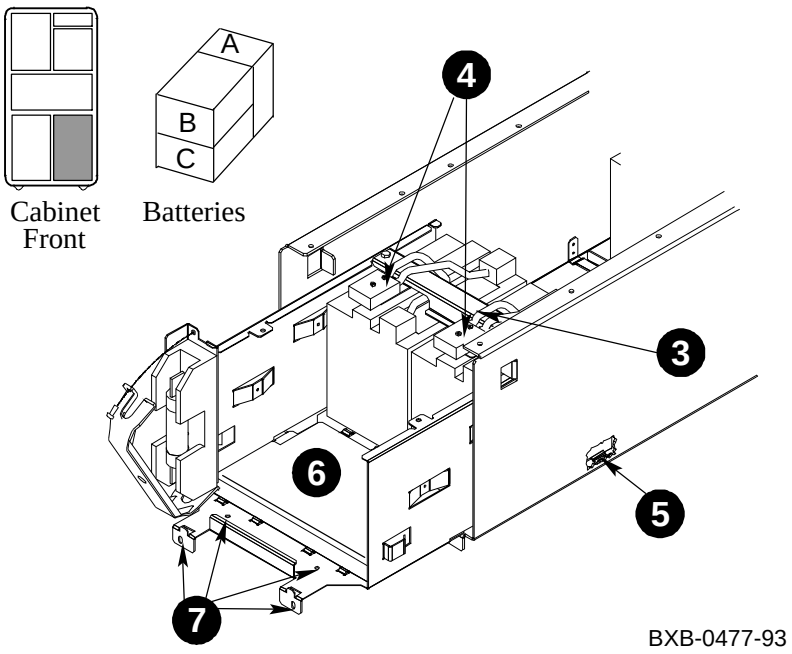
Working from the front of the cabinet, install the block B batteries in the front housing assembly tray. Repeat the same steps to install the block C batteries in the bottom housing assembly tray.

Figure 2-9 Block B and Block C Battery Tray



1. Working from the front of the cabinet, slide the upper front housing battery tray (see ❶ in Figure 2-9) out and tilt it down until it locks in place. This tray holds the block B batteries for power regulator B.
2. Remove the two battery hold-down brackets (see ❷).

Figure 2-10 Regulator B and C Battery Installation

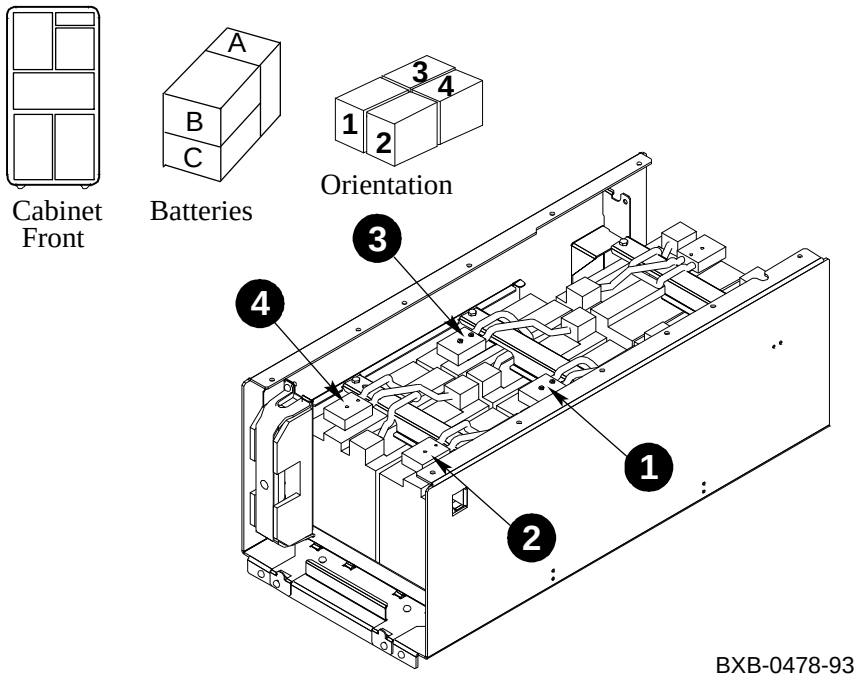


3. While holding the cables up and out of the way, place two batteries at the back of the tray (negative terminal pointing toward the cabinet center). Push the batteries all the way back and out to the sides of the tray. Reattach the battery hold-down clamp (see ❸ in Figure 2-10).
4. Place the battery connectors over the studs in the clamp (see ❹) and attach each with two nuts.
5. Tilt the tray up and push it in until the guide tabs engage the tray slot (see ❺), then pull the tray out far enough so you can add the battery stiffener plate and final two batteries.
6. Place a battery stiffener plate (74-45712-01) in the front of the battery tray (see ❻). Place two batteries (negative terminal pointing toward the cabinet center) in the front of the tray (pulled forward against the battery stop and pushed toward the sides of the tray) and reattach the battery clamp. The battery connectors for the front batteries are not clamped to studs as for the rear batteries.
7. Cable the batteries (see Section 2.7.2).

2.7.2 Cable Regulator B and C Batteries

Cable the block B batteries. Repeat the procedure for the block C batteries.

Figure 2-11 Regulator B and C Battery Cabling

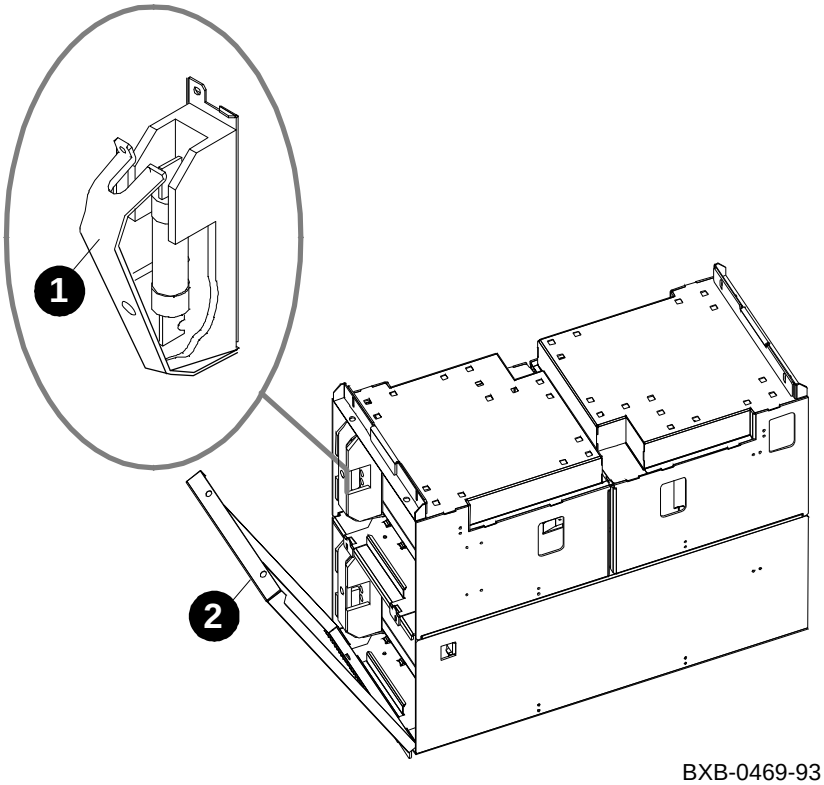


1. Attach the P4 connector of the intermediate power harness/sensor cable (see Figure 2-6) to the connector of battery 4 (see ❶ in Figure 2-11). Attach the J4 connector of the sensor cable to the sensor connector of battery 4.
2. Attach the P2 connector of the intermediate power harness/sensor cable to the connector of battery 2 (see ❷). Attach the J2 connector of the sensor cable to the sensor connector of battery 2.
3. Attach the P3 connector of the intermediate power harness/sensor cable to the connector of battery 3 (see ❸).
4. Attach the P1 connector of the intermediate power harness/sensor cable to the connector of battery 1 (see ❹). Attach the J1 connector of the sensor cable to the sensor connector of battery 1.
5. Attach the P5 connector to the connector of the power cable (17-03494-02) coming from the DC distribution box (see Figure 2-5). Attach the J5 connector of the sensor cable to the connector (labeled B) of the sensor cable (17-03421-01) coming from the DC distribution box.
6. Slide the tray in, and attach with four Phillips screws (see ❼ in Figure 2-10).

2.8 Replace Fuse Covers and Attach PIU Doors

Install the fuse cover for each battery block. Replace the front and rear batttery PIU doors.

Figure 2-12 Fuse Cover and Door Replacement



BXB-0469-93

1. Replace the fuse covers (see ❶ in Figure 2-12).
2. Attach the battery PIU covers by positioning the bottom of each cover over the tabs and tilt the cover closed (see ❷). Use a low-profile ratchet Phillips screwdriver to tighten the two 1/4 turn fasteners at the top of the cover.
3. From the front of the cabinet, reinstall all power regulators by pushing them in until the stop tab on the top of the power regulator is reached. Wait 5 seconds, lift the stop tab, and push the regulator in all the way. Tighten the two Phillips head screws on each regulator to complete the installation.

Chapter 3

Acceptance and Troubleshooting

This chapter discusses the acceptance procedure and troubleshooting guidelines for the H7237 battery PIU option. Sections include:

- Restore Power and Check Self-Test Results
- Set and Show Power Commands

3.1 Restore Power and Check Self-Test Results

Power up the system and check the self-test display.

Example 3-1 Self-Test Display

```
F  E   D   C   B   A   9   8   7   6   5   4   3   2   1   0  NODE #
                           A   A   M   M   .   .   P   P   P  TYP
                           o   o   +   -   .   .  ++  ++  ++  ST1
                           .   .   .   .   .   .  .E  EE  EB  BPD
                           o   o   +   -   .   .  .+  -+  ++  ST2
                           .   .   .   .   .   .  .E  EE  EB  BPD
                           +   +   +   -   .   .  .+  -+  ++  ST3
                           .   .   .   .   .   .  .E  EE  EB  BPD

    .   .   .   .   .   .   +   .   +   .   .   .   .   .     C0 XMI+
    .   .   .   .   .   .   .   .   .   .   .   .   .   .     C1
    .   .   .   .   .   .   .   .   .   .   .   .   .   .     C2
    .   .   .   .   .   .   .   .   .   .   .   .   .   .     C3

                    .   .   .   +   +   +   +   +   +   +   + C4 PCI+
                                                              C5

                                .   A1  A0   .   .   .   .   . ILV
                                . 256 256. .   .   .   .   .   . 512MB

AlphaServer 8400 Console V4.0, SROM V3.1, Sept 6 1996  08:06:35
P00>>>
```

1. Pull up the handle on the AC power circuit breaker.
2. Close the cabinet doors.
3. Turn the control panel keyswitch to the Enable position; the system will power up and run self-test.

Example 3-1 shows a sample self-test display.

3.2 Set and Show Power Commands

Use the set power command to configure the regulators for the battery PIU. Use the show power command to see the status of the power system.

You must enter a **set power** command to configure the power system. The **set power** command syntax is:

set power -b 4 <option>

where **-b** indicates battery backup, **4** is the number of batteries per regulator, and **<option>** is the cabinet containing the batteries (**main**, **left**, or **right**).

Example 3-2 Set Power Command

```
P04>>> set power -b 4 left
P04>>>
```

Example 3-3 Show Power Command

```
P00>>> show power  ❶
Cabinet:  Main              Regulator:     A          B          C
------------------------------------------------------------------------
        Primary Micro Firmware Rev:     2.0        2.0        2.0
      Secondary Micro Firmware Rev:     2.0        2.0        2.0
                Power Supply State:   NORMAL     NORMAL     NORMAL
           AC Line Voltage (V RMS):   113.71     114.35     115.93
             DC Bulk Voltage (VDC):   227.02     227.02     227.02
          48V DC Bus Voltage (VDC):    47.57      47.57      47.57
          48V DC Bus Voltage (ADC):    30.17      29.68      29.58
    48V Battery Pack Voltage (VDC):    50.85      50.72      47.91
    24V Battery Pack Voltage (VDC):    25.56      25.56      23.95
 Battery Pack Charge Current (IDC):     2.91       2.90       0
    Ambient Temperature (Degree C):    26.22      24.80      24.75
              Elapsed Time (Hours):   290.00     290.00     290.00
Remaining Battery Capacity (Minutes):   8.00       8.00       8.00
   Battery Cutoff Counter (Cycles):     0          1.00       1.00
           Battery Configuration:  4 Batteries  4 Batteries  4 Batteries
                   Heatsink Status:  NORMAL      NORMAL      NORMAL
               Battery Pack Status:  CHARGING    CHARGING    DISCHG'G
              Last UPS Test Status:  PASSED      PASSED      TESTING
LDC POWER Status      :  OK   ❷
PIU Primary Status    :  OK
PIU Secondary Status  :  OK
```

❶ The user enters a **show power** command (Example 3-3). The main cabinet has three power regulators.

❷ The bottom three lines of the output, showing PIU power status, are printed for the main cabinet only.

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