

# HP UPS R12000 XR Models Maintenance and Service Guide



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## About This Guide

This maintenance and service guide can be used for reference when servicing the HP UPS R12000 XR model.



**WARNING:** To prevent personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs can create conditions that are hazardous.

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## Audience Assumptions

This guide is for service technicians. HP assumes you are qualified in the wiring and installation of high-voltage equipment and the local laws governing such installation. You should have specific experience in, or relating to, the installation and operation of UPSs.

## Symbols on Equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions:



**WARNING:** This symbol, in conjunction with any of the following symbols, indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.

---



This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

**WARNING:** To prevent personal injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

---



This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

Weight in kg  
Weight in lb

**WARNING:** To prevent personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

---

## Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



**WARNING:** Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

---



**CAUTION:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

---

**IMPORTANT:** Text set off in this manner presents clarifying information or specific instructions.

**NOTE:** Text set off in this manner presents commentary, sidelights, or interesting points of information.

## Technician Notes



**WARNING:** Only authorized technicians trained by HP should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

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**WARNING:** To prevent personal injury from electric shock and hazardous energy levels, observe the following precautions:

- The installation of options and routine maintenance and service of this product must be performed by HP authorized service technicians who are knowledgeable about the procedures, precautions, and hazards associated with AC power products.
  - Remove all watches, rings, and any other metal or loose-fitting jewelry.
  - Avoid the use of conductive tools that could bridge live parts.
- 



**CAUTION:** To properly ventilate the system, you must provide at least 30.5 cm (12.0 inches) of clearance at the front and back of the UPS.

---

**NOTE:** Any indications of component replacement or printed wiring board modifications may void any warranty.

## CarePaq Considerations

CarePaq packaged technical services are also available for purchase. You can choose the precise level of support that you need, from basic to business-critical. Services available are listed below.

### Technical Support Services for UPS R12000 XR

Description	Part Numbers
9x5, 4-hour response, 3-year on-site coverage	171254-002, FM-US4HR-36
24x7, 4-hour response, 3-year on-site coverage	171255-002, FM-US724-36
Hardware installation	171256-002, FM-USINS-IN

## Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- User documentation
- *Service Quick Reference Guide*
- Service training guides
- Service advisories and bulletins
- QuickFind information services
- Power management software

## Telephone Numbers

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, refer to [www.hp.com](http://www.hp.com) for locations and telephone numbers.

For technical support:

- In the United States and Canada, call 1-800-652-6672.
- Outside the United States and Canada, refer to  
[www.hp.com](http://www.hp.com)

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## Safety and Product Information

This chapter provides general service information. You must follow the procedures and precautions described in this chapter to correctly and safely service the uninterruptible power system (UPS).

### General



**WARNING:** This UPS contains hazardous voltage levels and energy circuits.

To prevent personal injury from electric shock and hazardous energy levels, installation or service procedures must be performed by an HP authorized service technician who is knowledgeable about the procedures, precautions, and hazards associated with AC power products.

---

### Rack



**WARNING:** To prevent personal injury, verify that the rack containing the UPS is stable. The following conditions must be met:

- The leveling feet are extended to the floor.
  - The full weight of the rack rests on the leveling feet.
  - The stabilizing feet are attached to the rack if it is a single-rack installation.
  - The racks are coupled together if it is a multi-rack installation.
  - Only one component should be extended at a time. A rack may become unstable if more than one component is extended for any reason.
-



## Weight



190 kg  
420 lb

**WARNING:** To prevent personal injury or damage to the equipment:

- Have the floor-loading requirements evaluated by a facilities engineer before installation.
  - Observe local occupational health and safety requirements and guidelines for manual material handling.
  - Obtain adequate assistance to lift and stabilize the product during installation or removal. The UPS is unstable when not fastened to the rails.
  - Remove all batteries and electronics modules to reduce the overall weight of the UPS chassis.
  - Use three people to lift and place the UPS in the rack.
- 

## Communication Ports

The UPS includes two integrated communication ports that allow for in-band communication.



**CAUTION:** Use only the specific cable supplied with the UPS to connect the communications port to the host computer.

---

## Batteries and Extended Runtime Modules

Observe these precautions when handling or connecting batteries and Extended Runtime Modules (ERMs).



**WARNING:** To prevent personal injury or damage to equipment, take the following precautions:

- The maintenance and replacement of batteries and ERMs must be carried out by an HP authorized service representative.
  - Do not attempt to replace batteries unless all battery circuit breakers on any connected ERMs are in the off (down) position. There is a 120-V potential across the batteries.
  - Remove watches, rings, or other metal objects.
  - Use tools with insulated handles.
- 



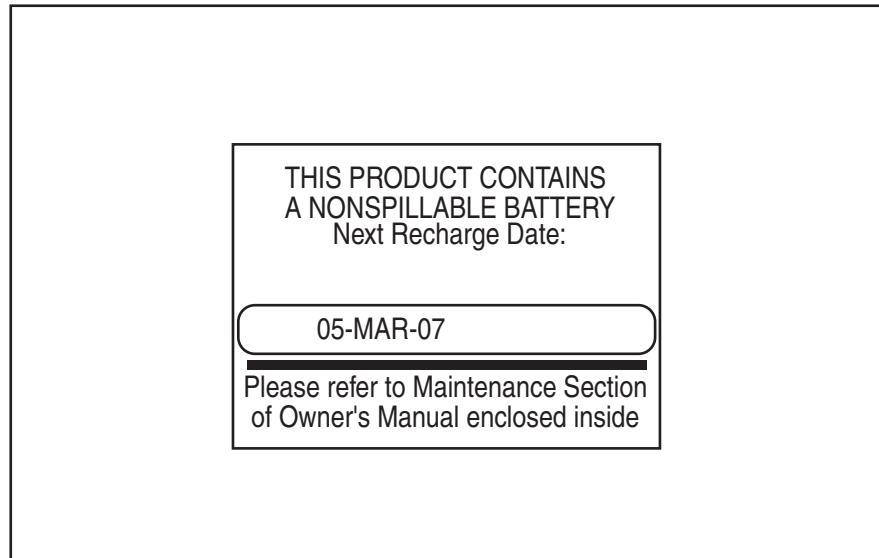
**WARNING:** The UPS contains an internal lithium battery and a sealed lead-acid battery module. To prevent fire or chemical burns, take the following precautions:

- Do not attempt to recharge batteries after removal from the UPS.
  - Do not disassemble, crush, or puncture the batteries.
  - Do not short the external contacts of the batteries.
  - Do not immerse the batteries in water.
  - Do not expose the batteries to temperatures higher than 60°C (140°F).
-

Check the battery recharge date specified on the battery recharge date label.

**IMPORTANT:** Do not use the batteries if the recharge date has passed. If the date on the battery recharge date label has passed without the batteries being recharged, contact an HP authorized service representative for directions.

**NOTE:** The following label is only an example date. The date on your carton may be different.



**Figure 1-1. Checking the battery recharge date label**

**IMPORTANT:** Because of the short shelf life of the battery, avoid storing a battery spare as a backup. Do not maintain an inventory of spare batteries on-site unless a procedure to keep these batteries charged while in storage is implemented.



Do not dispose of used batteries with general office or household waste. Return the used modules for proper disposal to either:

- HP, authorized HP Partners, or their agents
- A recycling center that meets all local environmental standards

## Remote Emergency Power Off

The UPS includes a Remote Emergency Power Off (REPO) port. When properly wired, the REPO port allows the power at the UPS output receptacles to be switched off from a remote location. Local or national wiring regulations may require REPO capabilities.



**WARNING:** To prevent personal injury or damage to equipment, take the following precautions:

- The REPO port must be wired by a qualified electrician.
  - The main breaker switch must be in the off position before wiring the REPO port.
  - Remote circuits connected to the REPO port must comply with local building wiring codes and methods. In North America, the NEC (NFPA 70, Article 725) is a minimum requirement.
-

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## Illustrated Spare Parts List

This chapter provides the illustrated parts breakdown and spare parts list for the UPS and ERM. Refer to Table 2-1, Table 2-2, and Table 2-3 for the names and descriptions of referenced spare parts.

## UPS Exploded View of Spare Parts (Front)

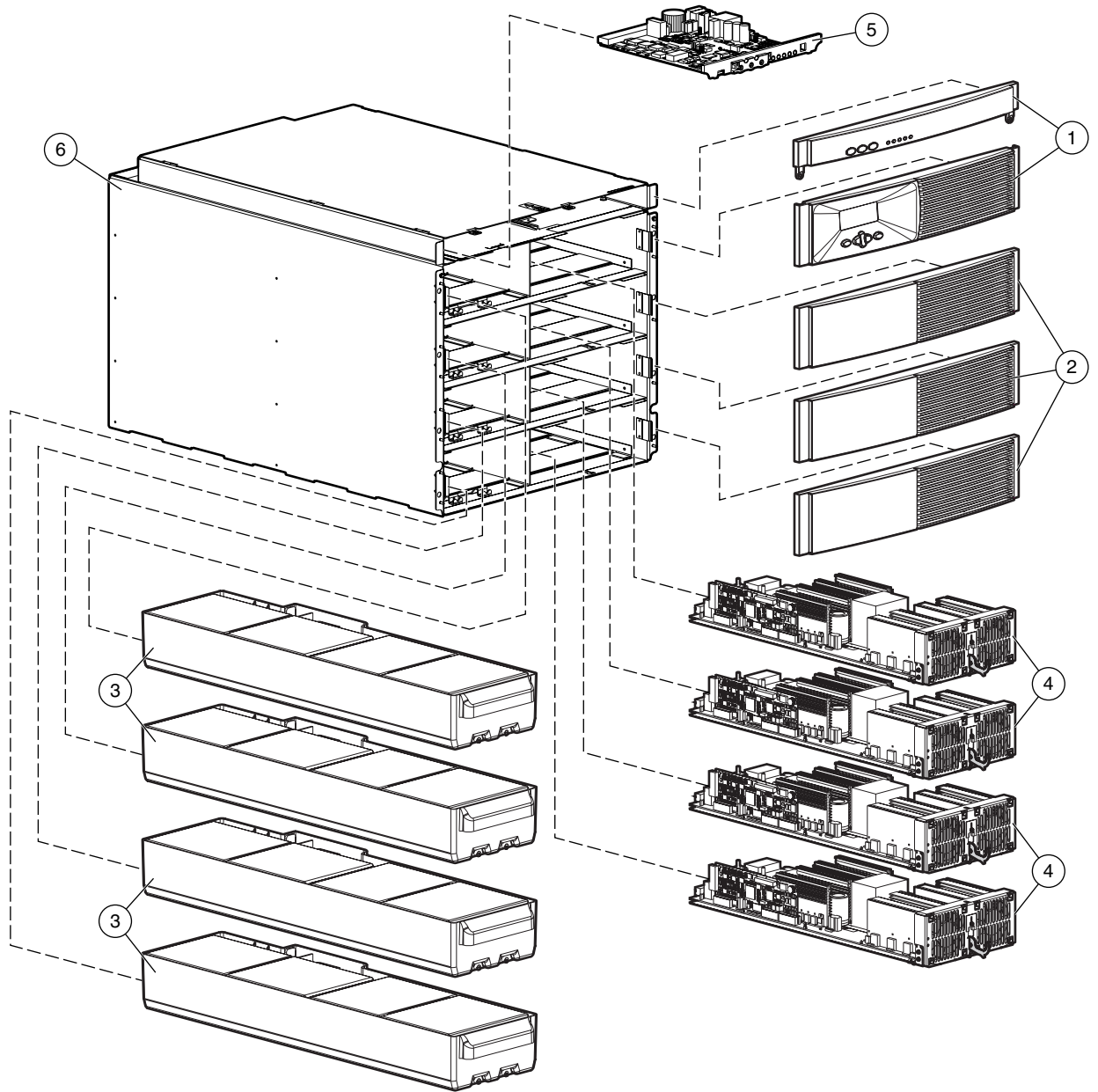


Figure 2-1: UPS exploded front view

**Table 2-1: UPS Spare Parts List (front)**

Reference	Description	Spare Part #
1	SPS-BEZEL, UPS, SPRVSRV	228286-001
2	SPS-BEZEL, UPS, 12 KVA	228287-001
3	SPS-BATTERY, UPS, 12 KVA	228288-001
4	SPS-MODULE, ELECT, UPS, 12 KVA	228289-001
5	SPS-BD, UPS, 12 KVA, SPRV	228290-001
6	SPS-CHASSIS, UPS, 12 KVA	228285-001
7	SPS-RETURN KIT, UPS	228293-001*
8	SPS-RETURN KIT, BATTERY	228294-001*
9	SPS-RETURN KIT, ELCT MD	228295-001*
10	SPS-PDU, 40 A, 200-240 V, WW	212430-001*
11	SPS-CA, MPUPS-SRVRINTFC, X, 12 FT	204508-001*

\* Not shown in figure

## UPS Exploded View of Spare Parts (Rear)

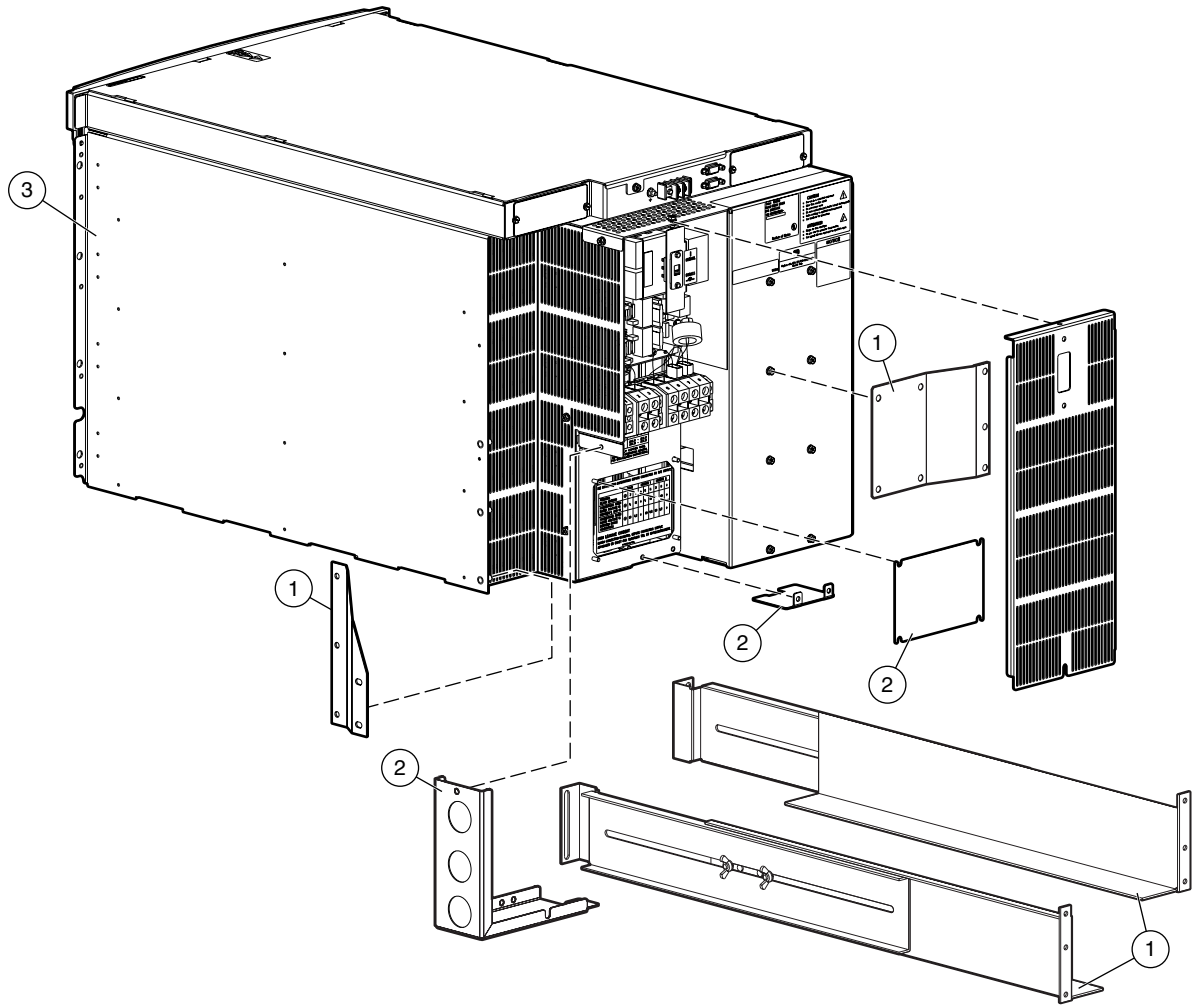


Figure 2-2: UPS exploded rear view

Table 2-2: UPS Spare Parts List (rear)

Reference	Description	Spare Part #
1	SPS-HRDW, MOUNT, UPS, 12 KVA	228292-001
2	SPS-PANEL, UPS, ERM, W/HRDW	252048-001
3	SPS-CHASSIS, UPS, 12 KVA	228285-001

## ERM Exploded View of Spare Parts

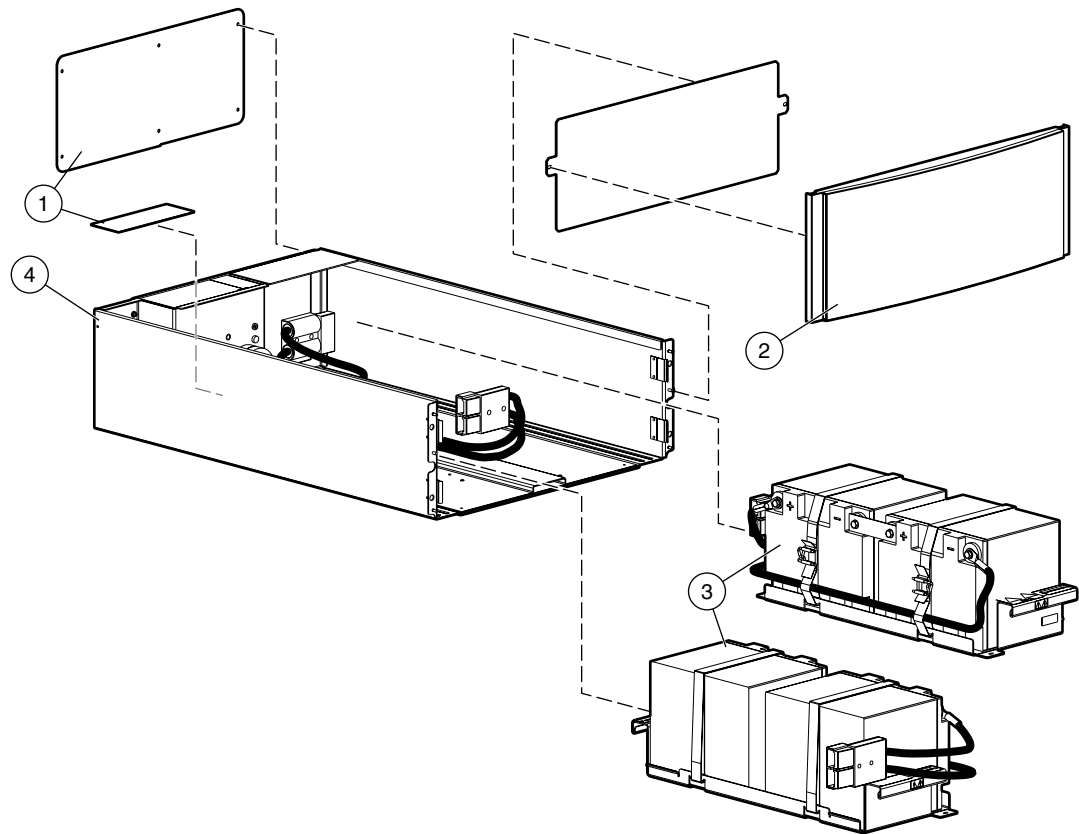


Figure 2-3: ERM exploded view

Table 2-3: ERM Spare Parts List

Reference	Description	Spare Part #
1	SPS-PANEL, UPS, ERM, W/HRDW	252048-001
2	SPS-BEZEL, ACCESSORY, ERM	252049-001
3	SPS-BATTERY, 12 KVA, 1 SET, ERM	252050-001
4	SPS-MODULE, EXTD RUN	228291-001
5	SPS-RAIL KIT, ADJUST FIXED	332578-001*
6	SPS-RETURN KIT, BTRY 12 KVA, ERM	252051-001*
7	SPS-RETURN KIT, ERM	228296-001*

\* Not shown in figure



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## Identifying Components

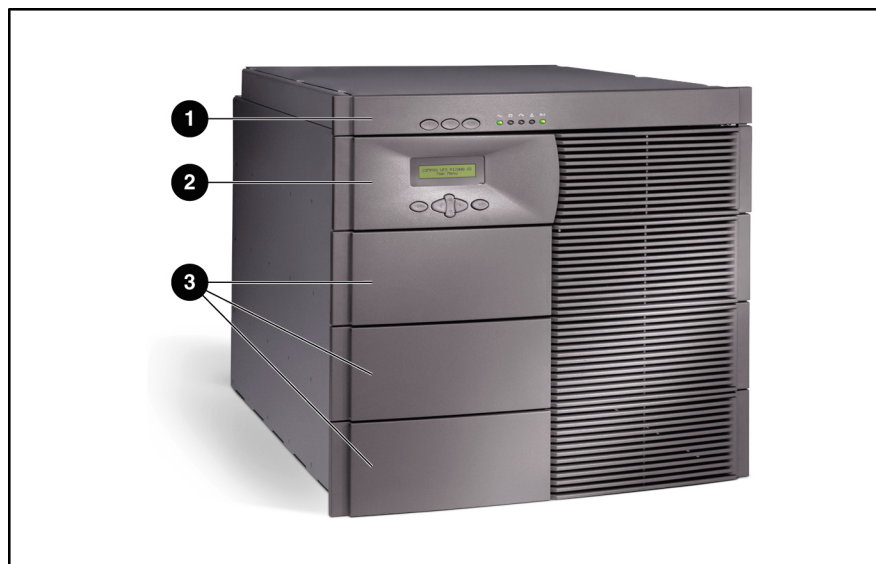
This chapter provides illustrations and detailed descriptions of the UPS front and rear components. Use the information in this chapter to locate and identify these components. This UPS also contains an LCD menu for unit configuration. The functions on the LCD menu are explained in detail at the end of the chapter.

### Front Components

Use the following illustrations to locate and identify the front components of the UPS.

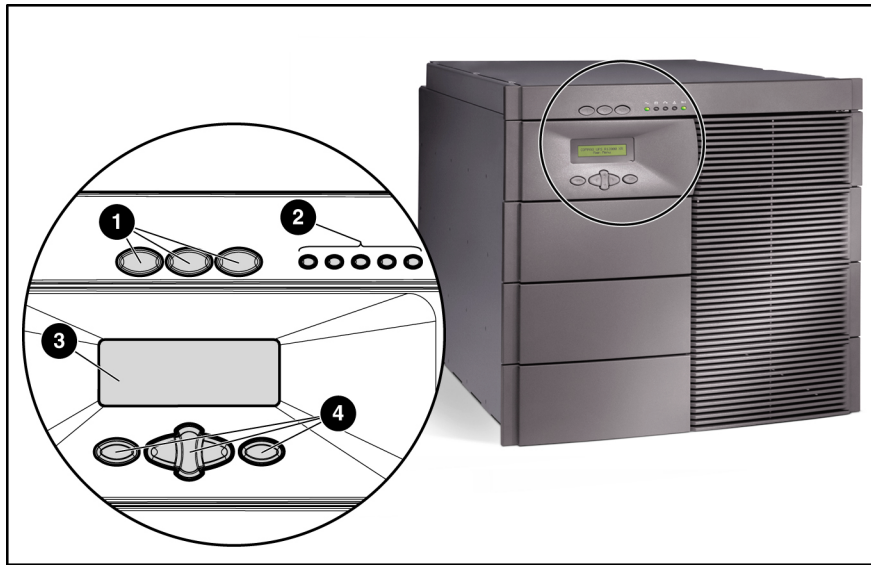
#### Front Panel Views

The overall front panel view of the UPS is shown in Figure 3-1 and Figure 3-2.



**Figure 3-1: UPS bezels**

- 1 Supervisory bezel
- 2 Control bezel
- 3 Front bezels



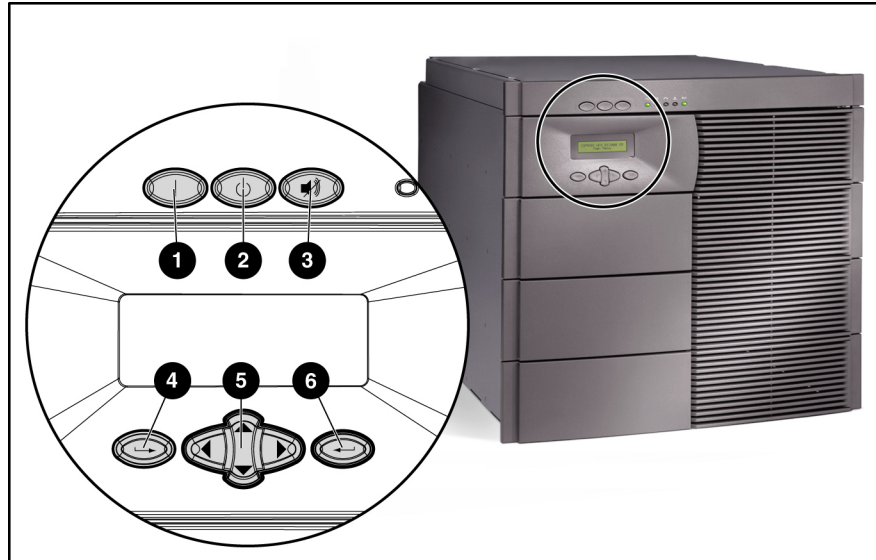
**Figure 3-2: UPS indicators and control buttons**

- 1 UPS control buttons
- 2 LED indicators of UPS status
- 3 LCD status and configuration screen
- 4 LCD configuration control buttons

For more information on using the LCD, refer to the section, “Configuring the UPS Using the LCD Menu,” in this chapter.

## Control Buttons

The UPS control buttons and LED indicators are described and illustrated in Figure 3-3 and Figure 3-4.



**Figure 3-3: Front panel control buttons**

Item	Description	Function
1	On	Starts the UPS power-up of the load.
2	Standby	Places the UPS in Standby mode.
3	Test/Alarm Reset	Resets alarms or initiates self-tests.
4	Escape	Navigates and deselects options in the LCD menu structure.
5	Center	Is a large four-way rocking button that controls navigation through the LCD menu structure: up, down, left, and right.
6	Enter	Navigates and selects options in the LCD menu structure.

## LED Indicators

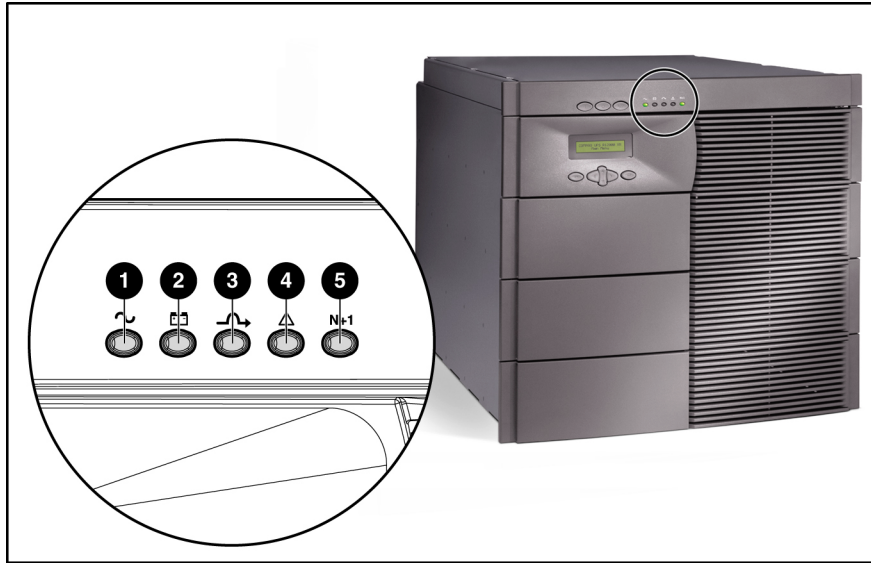


Figure 3-4: Front panel LED display

Item	Description	Symbol	Meaning/Function
1	Utility	~	Solid Green—Normal operation Rapidly Flashing Green—Startup in progress Slowly Flashing Green— Standby mode (batteries charging)
2	Battery	+	Solid Amber—UPS is running on battery power Flashing Amber—Battery test in progress
3	Bypass	↪	Solid Amber—UPS is in Bypass mode Flashing Amber—Bypass not available
4	Alarm	⚠	Solid Red—One or more alarms may be present or active
5	Redundant	N+1	Solid Green—Redundant mode (one or more redundant electronics modules operating in system) Flashing Green—Battery self-test initiated Off—Nonredundant (not Redundant mode)

**NOTE:**

- Upon first powering up, the time required for the UPS to reach Standby mode ranges from 45 seconds to several minutes, depending on the battery state of charge.
- In Standby mode, the batteries charge and there is no output to the load.
- If **no** electronics modules are installed and utility is present, the LED lights cycle. In this situation, the unit will be in either Bypass or Standby mode.

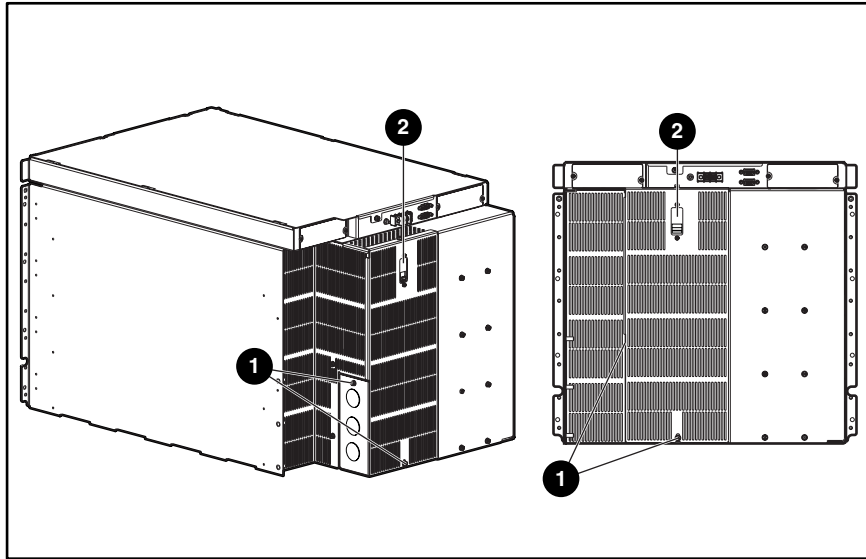
## Modes of Operation

The UPS has five modes of operation, indicated by the LEDs indicators (see Figure 3-4):

- **Standby Mode**
  - When utility is present and output is off, the Utility LED (1) flashes slowly.
  - Power is not available at the UPS output.
  - The UPS monitors and charges batteries, if required.
- **Operate Mode**
  - The Utility LED (1) is solid green.
  - The UPS is supplying power to the loads.
  - The UPS monitors and charges batteries, if required.
- **Bypass Mode**
  - The Utility LED (1) and Battery LED (2) are off.
  - The Bypass LED (3) is solid amber, and an audible alarm is active.
  - The Alarm LED (4) is solid red.
  - The utility is bypassing the unit and going directly to the load.
  - The UPS monitors and charges batteries, if required.
- **Battery Mode**
  - The Battery LED (2) is solid amber.
  - The Alarm LED (4) is solid red.
  - Utility power is not present.
  - The UPS does not charge the batteries.
  - Power is available at UPS outputs.
- **Redundant Mode**
  - The Redundant LED (5) is solid green.
  - At least one electronics module of the load can be in a redundant state (two or more electronics modules working).
  - All electronics modules share the load, but there is enough power to allow an electronics module to go out of service.

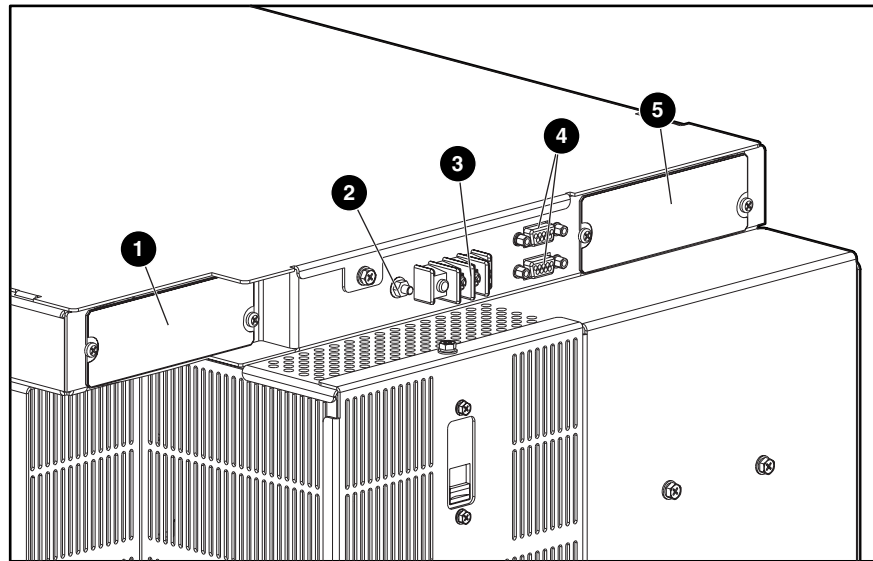
## Rear Components

Use the following illustrations to locate and identify the rear components of the UPS.



**Figure 3-5: Rear panel**

- 1 Terminal block wiring punch-out points
- 2 Bypass switch



**Figure 3-6: Rear panel components**

- 1 Option slot for future expansion
- 2 Ground bonding screw
- 3 REPO port
- 4 Serial communication ports (2)
- 5 Option slot for future expansion

## Matching the Utility Voltage

Use configuration parameters to select the UPS voltage range (see Table 3-1).

- If the utility voltage is within this range, the UPS supplies **utility** power to the output receptacles.
- If the utility voltage is outside this range, the UPS supplies **battery** power to the output receptacles.
- If the utility voltage frequently varies outside the operating range, update the UPS configuration to match.

**NOTE:** When you set the voltage through the LCD panel (as described in the “Setting the Voltage” section of this chapter), you are setting the UPS **output voltage**.

**Table 3-1: Voltage Ranges (VAC)**

Nominal Utility Voltage Level	Normal Utility Voltage Range	UPS Output Voltage
200	166-240	200
208	166-248	208
220	176-264	220
230 (default)	184-276	230
240	192-288	240

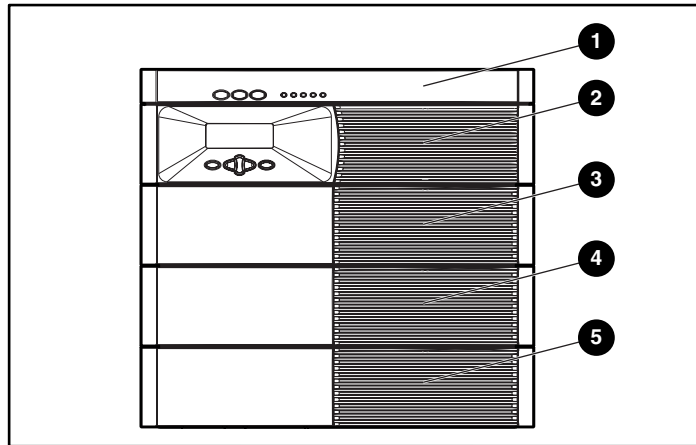
To update the configuration:

1. Have a licensed electrician measure your utility voltage.
2. Use Table 3-1 to identify the operating range that most closely matches your nominal utility voltage level.
3. Update the UPS output voltage as required. Refer to the section, “Setting the Voltage,” in this chapter for more information.



## Module Locations

Use the LCD menus to configure either the main module or one of the electronics modules.



**Figure 3-7: UPS electronics modules, numbered**

- 1 Main Module MM (includes all four electronics modules)
- 2 Module M1
- 3 Module M2
- 4 Module M3
- 5 Module M4

## Configuring the UPS Using the LCD Menu

Use the LCD display to access the menu. The menu contains information about the status, meters, battery data, and firmware version of the main module or other electronics modules. Use the menu options to set the time or date, conduct an LCD display test, and change the system setup. The LCD display and control buttons are shown in Figure 3-3.

### Initial Power-Up Display

When the UPS is powered up, the LCD displays the **Main Menu**.

COMPAQ R12000 XR
Main Menu

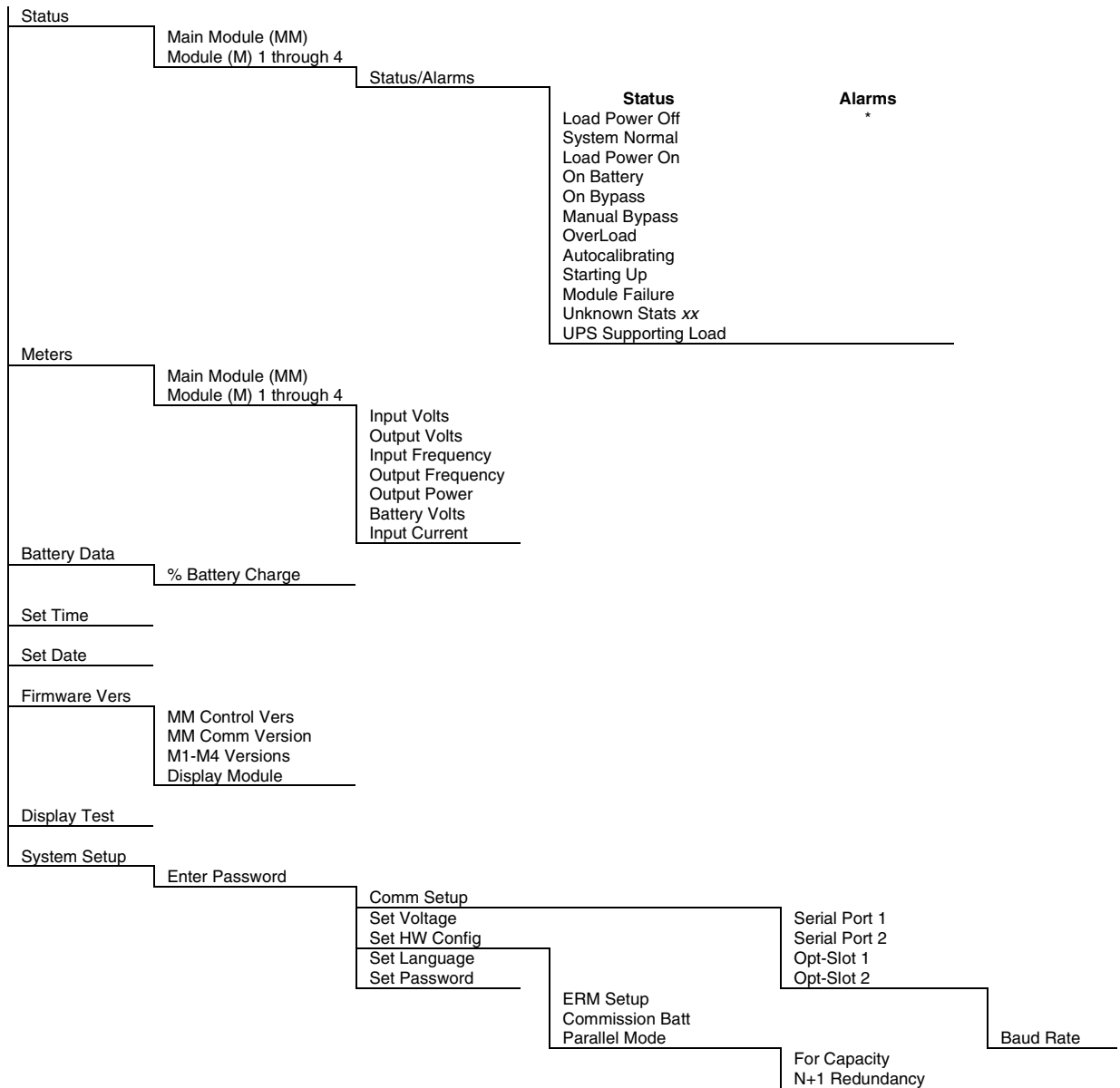
### Top Level Main Menu

After pressing the Enter button, **Main Menu** appears on the top line of the display. Use the Center button to scroll through the choices displayed on the lower line of the display.

For a list of all menu options, refer to the section, “Menu Map,” in this chapter. The variable **xxxxxx** is one of the choices in the left column of the menu map. Submenu choices are shown to the right.

Main Menu
xxxxxx

## Menu Map



\* For a list of all possible alarm displays, refer to the section, "Alarms," in this chapter.

## Alarms

If an alarm exists, one or more of the following alarms will be displayed on the LCD panel, and an audible alarm will sound. For a descriptive list of alarm causes and actions to take, refer to the section, “LCD Alarm Troubleshooting,” in Chapter 5.

**Table 3-2: Alarms**

Ambient Over Temperature	Inverter Startup Failure
Automatic Shutdown Pending	Inverter Uncalibrated
Batteries Disconnected	Level 2 Overload – Phase A
Battery DC Over Voltage	Level 3 Overload – Phase A
Battery Low	Level 4 Overload – Phase A
Battery <i>n</i> Needs Service	Loss of Redundancy
Battery Not Charged	Loss of Sync-Bus
Battery <i>n</i> Test Failed	Low Battery Shutdown
Bypass Not Available	Non-volatile Memory Checksum Fail
Calibration Failed	On Manual Bypass
DC Link Over Voltage	Output AC Over Voltage
Fan Failure	Output AC Under Voltage
Fuse Failure	Output Overload
Heatsink Over Temperature	Program Checksum Fail
Input AC Over Voltage	Rectifier Input Over Current
Input AC Under Voltage	Remote Emergency Power Off
Input Under Or Over Frequency	Software Incompatibility Detected
Internal Communications Failure	UPS On Battery
Inverter Contactor Open	UPS On Bypass
Inverter Fault	Utility Fail
Inverter Output Over Current	Utility Not Present

## Displaying the Status or Active Alarms

The first option on the **Main Menu** is **Status**. Select this option and press the Enter button to display the status or active alarms for either the main module (MM) or electronics modules (M1-M4).

Main Menu
Status

### Main Module (MM) Status and Alarms

Select **Main Module MM** to display **Status** and **Alarms** for the main module. Table 3-3 lists the possible status options. For a descriptive list of alarm causes and solutions, refer to the section, “LCD Alarm Troubleshooting,” in Chapter 5.

Status: Select
Main Module MM

**NOTE:** A display of **x Alarms** means that one or more alarms are present. The variable x indicates the number of alarms.

**Table 3-3: Main Module Status Options**

LCD Display	Explanation
Load Power Off	The UPS is in Standby mode and is not supporting the load.
System Normal 0 Alarms	The UPS is operating normally from utility and is protecting the load. No alarms are present.
Load Power On x Alarms	The UPS is operating from utility and is protecting the load.
On Battery x Alarms	The UPS is operating from battery and is protecting the load.
On Bypass x Alarms	The UPS is operating from Automatic Bypass mode and is <b>not</b> protecting the load.
Manual Bypass x Alarms	The UPS is operating from Manual Bypass mode and is <b>not</b> protecting the load.
Overload x Alarms	The UPS is protecting the load. The current load level is exceeding the maximum operational range for the UPS.
Autocalibrating x Alarms	The UPS is operating from utility and is protecting the load while it is performing the module-sharing calibration process.

*continued*

**Table 3-3: Main Module Status Options** *continued*

LCD Display	Explanation
Starting Up x Alarms	The full UPS or a single electronics module (hot-swap) is ramping up.
Module Failure x Alarms	At least one electronics module or the supervisory board has experienced a critical failure and is offline.
Unknown Stats x x Alarms	The UPS issues an unrecognized status code. This is normal in certain situations, such as when the UPS is busy or powering down. The variable x indicates the specific status code.
UPS Supporting Load x Alarms	The UPS is powering the load.

### Electronics Modules (M1-M4) Status and Alarms

Select **Module Mx** to display **Status** and **Alarms** for an electronics module. The variable *x* indicates one of the electronics modules (Module M1-M4). Table 3-4 lists the possible status options. For a descriptive list of alarm causes and solutions, refer to the section, “LCD Alarm Troubleshooting,” in Chapter 5.

Status: Select
Module Mx

**Table 3-4: Electronics Modules M1-M4 Status Options**

Message	LCD Display	Explanation
Submodule Status + Active Alarm Count	System Normal 0 Alarms	In this example, the UPS has detected no problems with the electronics module and there are no alarms.
Submodule not Detected	Module Mx Not Detected	Module Mx is not detected ( <i>x</i> is 1-4). Either an electronics module is not installed, or the UPS is gathering system configuration information during initialization. This condition should not persist for more than 60 seconds after startup.

## Displaying the Frequency, Power, and Current Data

Select **Meters** on the **Main Menu** to view the frequency, power, and current information for either the main module or any of the other electronics modules.

Main Menu
Meters

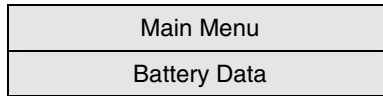
This submenu provides information on virtual meters that monitor the UPS voltages. Scroll up and down through the menu using the Center button. If the words continue off the screen, scroll right and left to read the message. Press the Enter button to view selections. Table 3-5 lists the options under the **Meters** menu.

**Table 3-5: Main Module and Electronics Modules M1-M4 Meter Options**

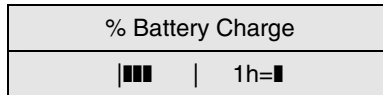
LCD Display	Explanation
Input Volts	The utility voltage
Output Volts	The voltage available at the UPS output receptacles
Input Frequency	The utility frequency in Hertz
Output Frequency	The frequency in Hertz available at the UPS output receptacles
Output Power   ■■■■■■■■   ■■ MM or Mx	The output power as shown in a bar graph. This example shows 120% load (overload). There are ten squares in front of the 100% line. Each represents a 10% load. The two squares past the line each represent 10% of overload (20% overload in all).
■■■■■---   -- MM or Mx	In contrast, this display shows a 60% load.
Battery Volts	The battery voltage
Input Current	The input current

## Displaying the Battery Charge Data

Select **Battery Data** on the **Main Menu** to display the amount of charge on the battery in 10 percent increments.



When the UPS goes into Battery mode, the following LCD is displayed.



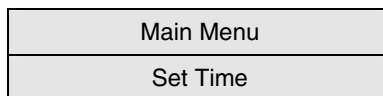
The remaining battery energy is shown, where the tag “1h=■” means that each block represents one hour. For example, this LCD shows three hours of remaining battery time. Possible tags are listed in Table 3-6.

**Table 3-6: Possible Tags**

Tag	Time
1m	1 minute per block
5m	5 minutes per block
10m	10 minutes per block
30m	30 minutes per block
1h	1 hour per block

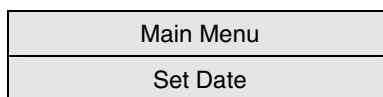
## Setting the Time

Select **Set Time** from the **Main Menu** to set the correct time.



## Setting the Date

Select **Set Date** from the **Main Menu** to set the correct date.





## Displaying the Firmware Version

Select **Firmware Vers** on the **Main Menu** to display firmware versions for UPS components. Press the Enter button to view selections. Table 3-7 lists the firmware version options. The version number is represented by *xxx*.

Main Menu
Firmware Vers

**Table 3-7: Firmware Version Options**

LCD Display	Explanation
MM Control Vers <i>xxx</i>	Version of firmware that the control board is running
MM Comm Version <i>xxx</i>	Version of firmware that the communication board is running
M1-M4 Versions <i>xxx...xxx...xxx...xxx</i>	Version of firmware in each electronics module
Display Module <i>xxx</i>	Version of display firmware that the UPS is running

## Testing the LCD Display

Select **Display Test** from the **Main Menu** to light all pixels to test the LCD display.

Main Menu
Display Test

LCD TEST scrolls across the screen in both upper and lower display lines. Use the Escape button to exit the test.

■■■LCD TEST■■■
■■■LCD TEST■■■

## Changing the System Setup Options

Select **System Setup** from the **Main Menu** to enter the menu for changing system setup options.

Main Menu
System Setup

To change the system setup, you must enter the correct password. Use the Center and Enter buttons to select the six digits for the password [0-9 and A-Z].

**NOTE:** The password must be six characters long. The default password is COMPAQ. For information on setting or changing a password, refer to the section, "Setting the Password," in this chapter.

Enter Password
COMPAQ

1. Select the first digit using the up and down arrow keys on the Center button.
2. Press the right arrow key on the Center button to move to the next digit.
3. To change a digit, use the left arrow key on the Center button to go back.
4. After entering the entire password, press the Enter button.

**IMPORTANT:** Record your password. After 30 minutes with no key presses, security is automatically restored and the display changes to the main status display.

## Setting the Baud Rate

Select **Comm Setup** from the **System Setup** menu to set the baud rate for the communication ports and options slots.

System Setup
Comm Setup

**Table 3-8: Communication Setup Choices**

LCD Display	Explanation
Comm Setup Serial Port <i>x</i>	Select the communication port to set up. <i>x</i> is either 1 or 2.
Comm Setup Opt-Slot <i>x</i>	Select the option slot to set up. <i>x</i> is either 1 or 2.

Choose the baud rate for the selected serial port or option slot.

**Table 3-9: Baud Rate Setup**

LCD Display	Explanation
Baud Rate	Choose the baud rate for the serial port or option slot selected. Here, x is the baud rate and can be equal to 1200, 2400, 4800, 9600 (default), or 19200.
x	An asterisk (*) indicates the current baud rate.

## Setting the Voltage

Select **Set Voltage** from the **System Setup** menu to set the voltage. An asterisk (\*) indicates the current configuration. The options for voltage are 200, 208, 220, 230 (default), and 240.

System Setup
Set Voltage

**NOTE:** This option is only available when the UPS is in Standby mode or Manual Bypass mode. Otherwise, the LCD panel indicates Not Available.

## Setting the Hardware Configuration

Select **Set HW Config** from the **System Setup** menu to set the hardware configuration for the UPS.

System Setup
Set HW Config

**Table 3-10: Hardware Configuration Choices**

LCD Display	Explanation
Set HW Config	Select this option to configure the number of ERMs installed.
ERM Setup	
Set HW Config	Select this option to enable a battery commissioning test.
Commission Battery	
Set HW Config	Select this option to go to the <b>Parallel Mode</b> menu options.
Parallel Mode	

The **Parallel Mode** menu options allow you to configure the UPS mode of operation, as described in Table 3-11.

**Table 3-11: Parallel Mode Choices**

LCD Display	Explanation
Parallel Mode For Capacity	Select this option to configure the UPS for capacity operation.
Parallel Mode N+1 Redundancy	Select this option to configure the UPS for redundant operation.

### Setting the Language

Select **Set Language** from the **System Setup** menu to select from seven different languages for the menu display. The available choices are English, Francais, Deutsch, Espanol, Japanese, Nederlands, and Italiano. An asterisk (\*) indicates the current configuration.

System Setup
Set Language

### Setting the Password

Select **Set Password** from the **System Setup** menu to set the password.

System Setup
Set Password

To access some of the more critical UPS operations, you must have a password. Use the Center and Enter buttons to select the six digits for the password [0-9 and A-Z].

**NOTE:** The password must be six characters long. The default password is COMPAQ.

Enter Password
COMPAQ

1. Select the first digit using the up and down arrow keys on the Center button.
2. Press the right arrow key on the Center button to move to the next digit.
3. To change a digit, use the left arrow key on the Center button to go back.
4. After entering the entire password, press the Enter button.

**IMPORTANT:** Record your password. After 30 minutes with no key presses, security is automatically restored and the display changes to the main status display.

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## Removal and Replacement Procedures

**IMPORTANT:** Before beginning any of the procedures in this chapter, read and understand the cautions and warnings in Chapter 1.

This chapter explains the procedures for removing and replacing spare parts for the UPS.

Before you begin any of these procedures, you must shut down the UPS. After you complete all necessary removal and replacement procedures, power up the UPS to verify that all components are operating properly.

### Shutting Down the System

To shut down the system:

1. Place the UPS in Standby mode by pressing the Standby button for three seconds. The load relays open and the Utility LED begins to flash **slowly**. (For more information on the control buttons, refer to the section, “Control Buttons,” in Chapter 3.)

**NOTE:** Pressing the Standby button for seven seconds reboots the system and drops the load. The system recovers to Standby mode.

2. Disconnect the AC mains by opening the switch or circuit breaker at the utility panel.

## Replaceable Parts

The UPS contains the following replaceable parts:

- Bezels
- Battery modules
- Electronics modules
- Supervisory board
- Chassis

## Tools Required

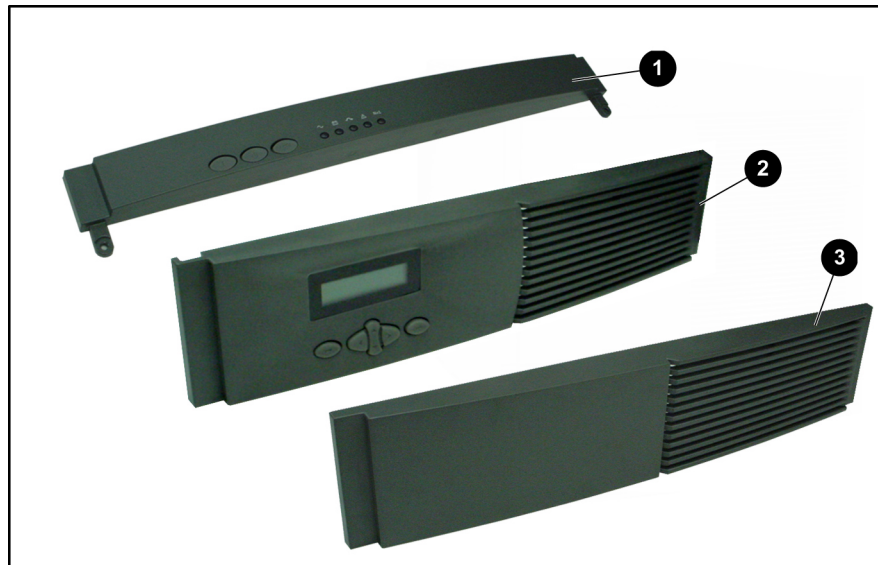
To service the UPS, you will need the following tools:

- Torque wrench
- Medium flat-bladed screwdriver
- #1 Philips screwdriver bit
- #3 Philips screwdriver bit
- Metric tools
  - 7-mm
  - 8-mm
  - 10-mm
- Sheetmetal hole punch tools, up to 44.45 mm (1¾ inches) in diameter

The following items are supplied with the rack:

- Screws
- Cage nuts
- Cage nut-fitting tool

## Bezels



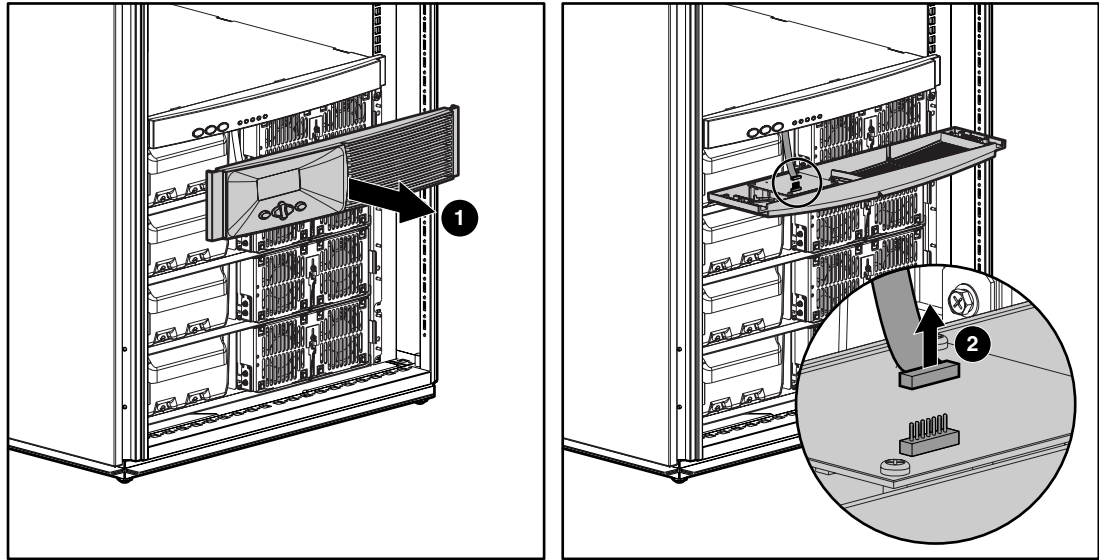
**Figure 4-1: Bezels**

- 1 Supervisory bezel
- 2 Control bezel
- 3 Front bezel

## Removing and Replacing the Control Bezel

To remove the control bezel:

1. Pull both ends of the control bezel and lift it off the chassis (1).
2. Disconnect the LCD cable from the connector on the control bezel (2).



**Figure 4-2: Removing the control bezel**

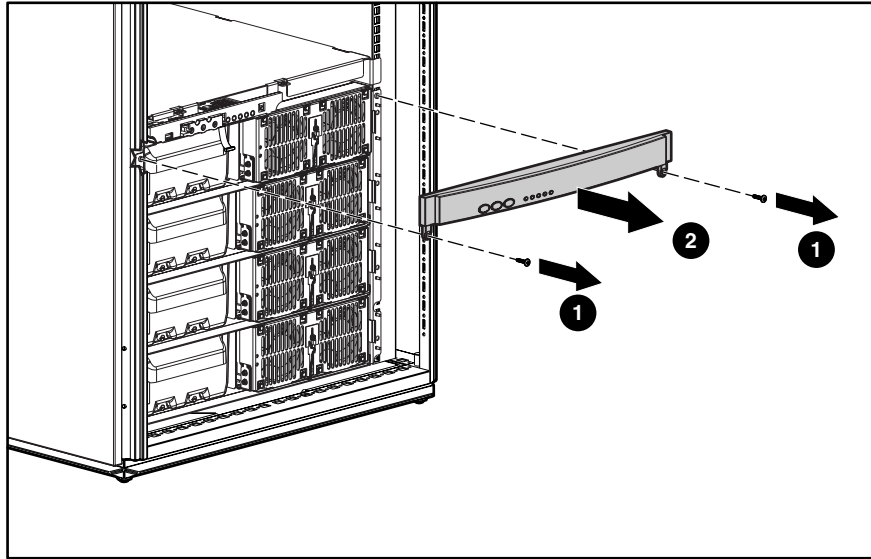
3. To replace the control bezel, reverse the preceding steps.



## Removing and Replacing the Supervisory Bezel

To remove the supervisory bezel:

1. Remove the control bezel. For more information, refer to the section, “Removing and Replacing the Control Bezel,” in this chapter.
2. Remove the screw from each end of the supervisory bezel (1).
3. Press both ends of the supervisory bezel and pull it off the chassis (2).



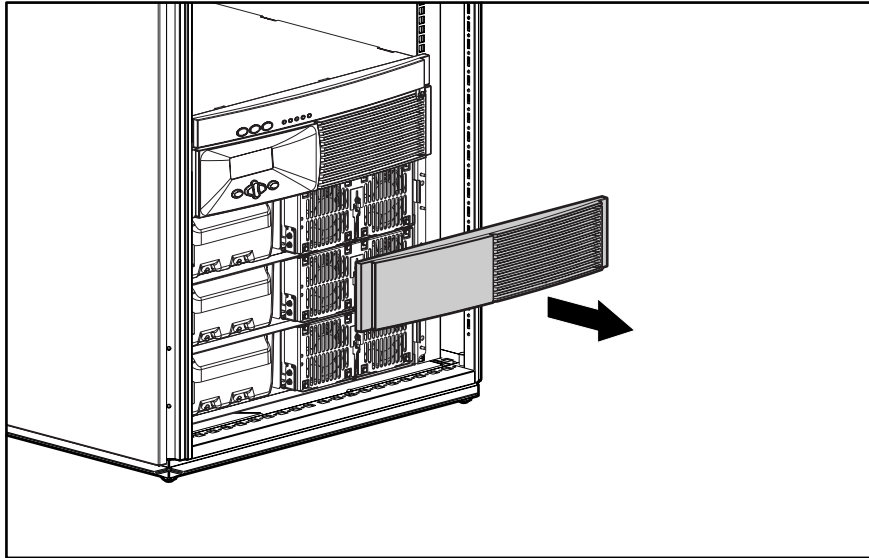
**Figure 4-3: Removing the supervisory bezel**

4. To replace the supervisory bezel, reverse the preceding steps.

## Removing and Replacing a Front Bezel

To remove a front bezel:

1. Pull in on each end of the bezel and pull it off the chassis.
2. Repeat for the remaining bezels you want to remove.



**Figure 4-4: Removing a front bezel**

3. To replace a front bezel, reverse the preceding steps.

**NOTE:** Verify that the ventilation holes are over the electronics modules.

## Battery Module



Figure 4-5: Battery module

## Removing and Replacing the Battery Module

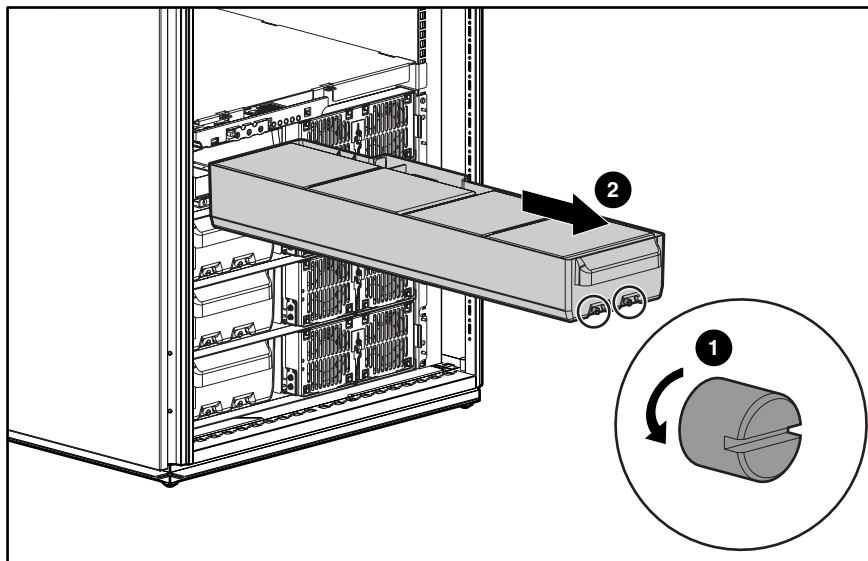


27 kg  
60 lb

**WARNING:** To prevent personal injury, prepare the area and observe all materials-handling procedures for removing the battery module, which weighs 27 kg (60 lb).

To remove the battery module:

1. Remove the front bezel at the location of the battery module you want to remove. For more information, refer to the section, “Removing and Replacing a Front Bezel,” in this chapter.
2. Remove the two screws that secure the battery module in place (1) and slide out the battery module (2).



**Figure 4-6: Removing the battery module**

3. Set aside the used battery module for proper disposal.
4. To replace the battery module, reverse the preceding steps.

## Disposing of Used Batteries

The spare battery kit includes the instructions and packaging required to return used batteries to the appropriate location for disposal.



Do not dispose of used batteries with general office or household waste. Return the used modules for proper disposal to either:

- HP, authorized HP Partners, or their agents
- A recycling center that meets all local environmental standards

## Testing the New Battery Module

After installing the new battery module, press the Test/Alarm Reset button. Refer to the UPS user guide for more information on initiating a self-test.

**IMPORTANT:** The UPS schedules the battery test, but does not execute the test until the batteries are at least 90 percent charged.

If the installation has been successful, the Alarm LED is illuminated.

If the installation has **not** been successful, the Alarm LED turns red and the LCD menu indicates an alarm. If this occurs, repeat the procedures in the “Removing and Replacing the Battery Module” section of this chapter, and check the battery terminal connections. If the Alarm LED is still red, refer to the section, “LCD Alarm Troubleshooting,” in Chapter 5 for more information on the cause of the alarm.

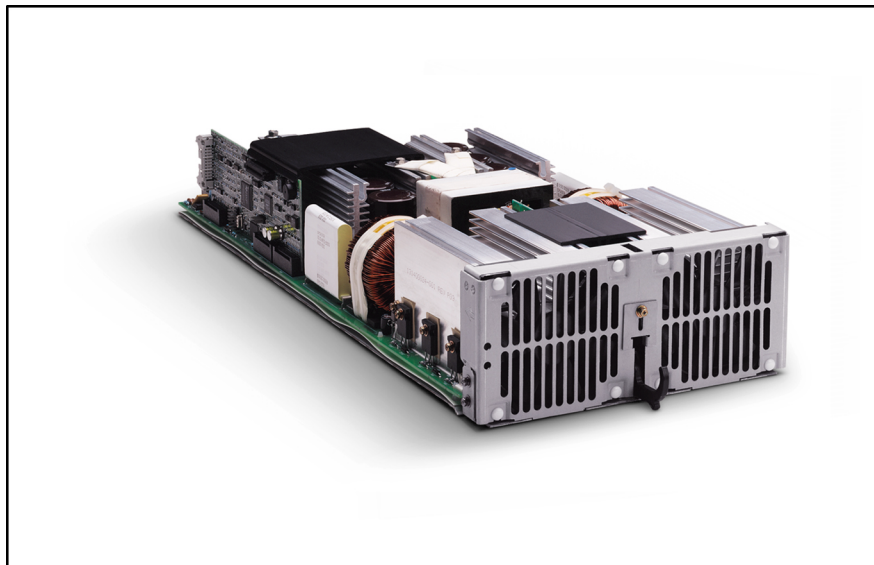
**IMPORTANT:** The batteries charge to 80 percent of their capacity within approximately three hours. Charge the batteries for at least 24 hours before you use the UPS to supply backup power to devices. The load may not be fully protected for 48 hours.

## Conducting a Battery Commissioning Test

When replacing battery modules, you should run a battery commissioning test. This test sets a base line so that the UPS accurately displays battery runtime. For information on how to enable the battery commissioning test, refer to the section, “Setting the Hardware Configuration,” in Chapter 3.

**NOTE:** The battery commissioning test runs in the background. After it is enabled, the test can take up to three days to run.

## Electronics Module



**Figure 4-7: Electronics module**

## Removing and Replacing the Electronics Module

To remove the electronics module:

1. Remove the front bezel at the location of the electronics module you want to remove. For more information, refer to the section, “Removing and Replacing a Front Bezel,” in this chapter.
2. Loosen the security screw in the front of the electronics module (1), slide the security panel upward (2), and pull the hook latch all the way down (3).

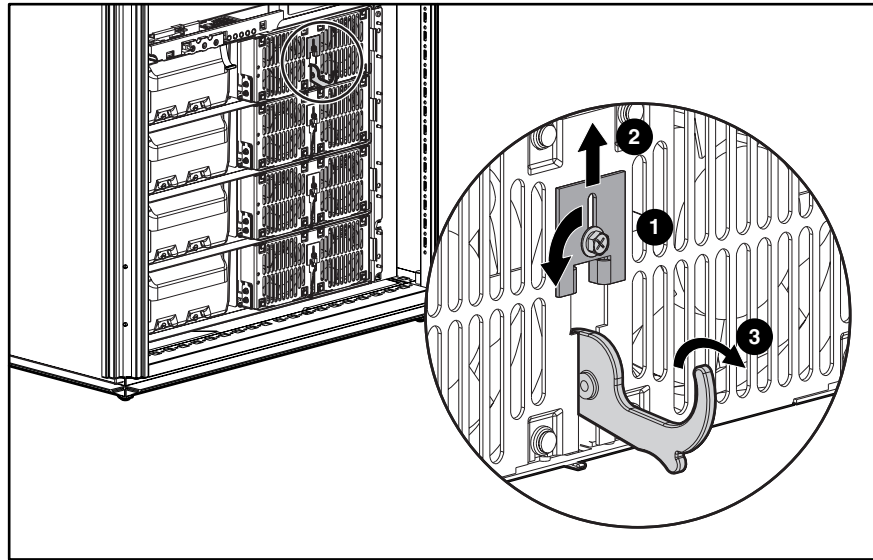
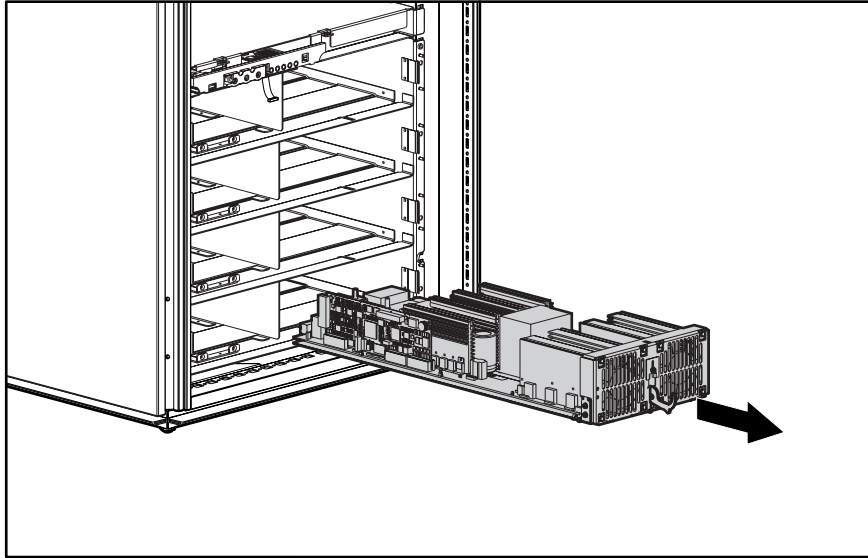


Figure 4-8: Preparing to remove the electronics module

3. Slide the electronics module out of the chassis.



**Figure 4-9: Removing the electronics module**

4. To replace the electronics module, reverse the preceding steps.



## Supervisory Board

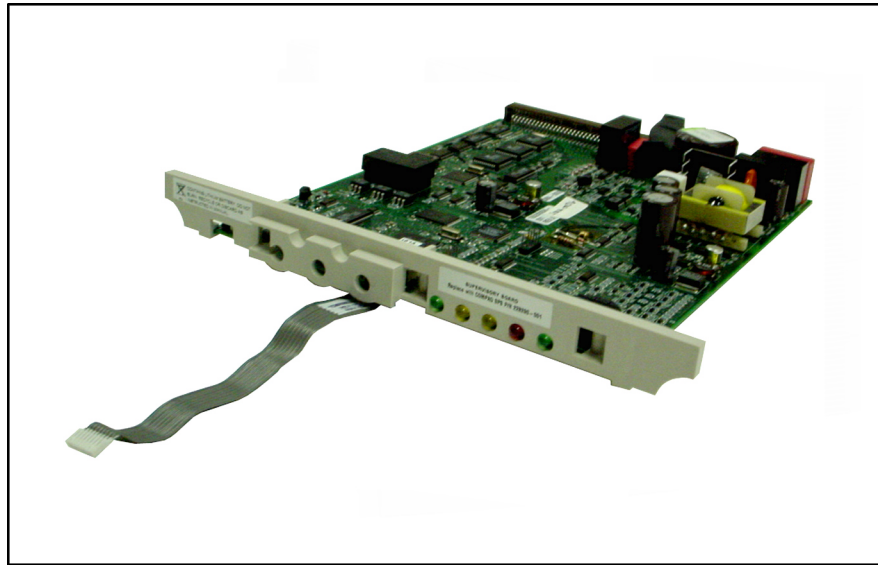
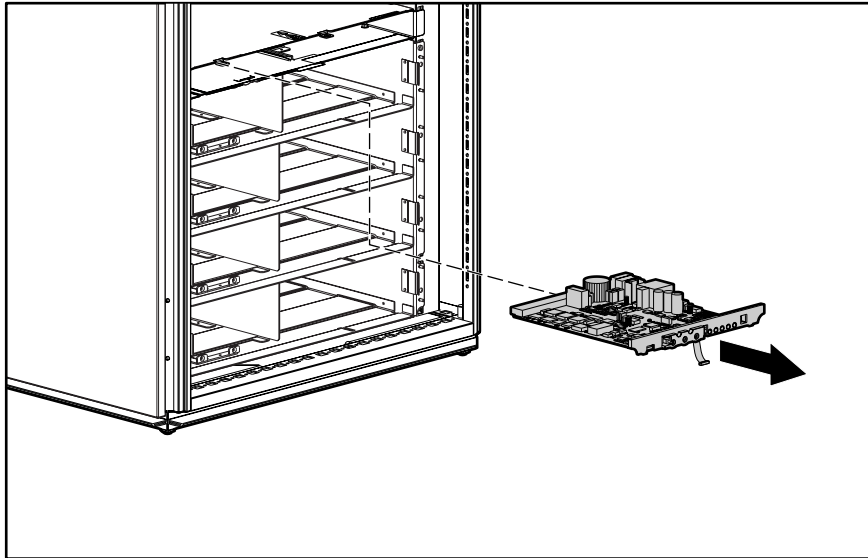


Figure 4-10: Supervisory board

## Removing and Replacing the Supervisory Board

To remove the supervisory board:

1. Remove the control bezel and the supervisory bezel. For more information, refer to the sections, “Removing and Replacing the Control Bezel” and “Removing and Replacing the Supervisory Bezel,” in this chapter.
2. Pull the supervisory board out of the chassis.



**Figure 4-11: Removing the supervisory board**

3. To replace the supervisory board, reverse the preceding steps.

This chapter serves as a troubleshooting guide when problems occur with the UPS. Solutions for main and electronics module alarms are provided, as well as general solutions for UPS problems that occur both during and after startup.

## LCD Alarm Troubleshooting

Table 5-1 lists the possible alarms of the main module or electronics modules. When these alarms occur, the LCD displays the number and type of alarms. An audible alarm may also sound. For each alarm listed in the table, an explanation of the cause is provided, as well as a recommended action to take to resolve the problem.

As shown in Table 5-1, ***x* Alarms** on the first line of the LCD display means that one or more alarms are present, with the variable *x* indicating the number of alarms. The type of alarm is displayed on the second line of the LCD. In Example 5-1, three alarms are present. The **Fan Failure** alarm has occurred, as well as two other alarms. Use the arrow keys on the Center button to scroll through the rest of the alarms list.

### Example 5-1: Alarm Display

3 Alarms
Fan Failure

For more information on the LCD display and menus, refer to the section, “Configuring the UPS Using the LCD Menu,” in Chapter 3.

**Table 5-1: Main Module (MM) and Electronics Modules (M1-M4) Active Alarms**

LCD Display	Possible Cause	Actions to Take
<p>x Alarms</p> <hr/> <p>Ambient Over Temperature</p>	<p>The UPS triggers an alarm if the ambient temperature inside the detecting electronics module exceeds the preset threshold of 80°C (176°F). Other than the alarm, no UPS action is currently associated with this condition.</p>	<ul style="list-style-type: none"> <li>• Verify that unit grills are not blocked and fans are operational.</li> <li>• Correct any environmental conditions that may be causing the condition. Verify that the ambient temperature is less than 40°C (104°F).</li> <li>• Switch to Manual Bypass mode. Locate and replace the faulty electronics module.</li> </ul>
<p>x Alarms</p> <hr/> <p>Automatic Shutdown Pending</p>	<p>Batteries are depleted beyond their lower limits due to the UPS being on battery for an extended period. The load has been disengaged and the system has entered the 30-second power-down mode.</p>	<p>This is a normal operation. The UPS restarts when utility power is restored.</p>
<p>x Alarms</p> <hr/> <p>Batteries Disconnected</p>	<p>This alarm is triggered by one of the following events:</p> <ul style="list-style-type: none"> <li>• The UPS detects that at least one battery is installed incorrectly.</li> <li>• Not enough battery modules are installed to support the current load levels.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove bezels and check that each battery module is firmly seated in its slot. Verify that the load does not exceed 12 kW.</li> <li>• If necessary, replace the faulty battery module.</li> </ul>
<p>x Alarms</p> <hr/> <p>Battery DC Over Voltage</p>	<p>At least one electronics module detects that battery voltage is abnormally high while operating in Battery mode.</p>	<p>Switch to Manual Bypass mode. Locate and replace the faulty electronics module.</p>
<p>x Alarms</p> <hr/> <p>Battery Low</p>	<p>The UPS detects that the current battery voltage level has dropped below the preset threshold configured in the EEPROM for this alarm.</p>	<p>This is a normal operation. The UPS begins the shutdown process.</p> <p>This is to be expected when operating in Battery mode and when the batteries discharge.</p>
<p>x Alarms</p> <hr/> <p>Battery <i>n</i> Needs Service</p>	<p>The UPS detects a battery fuse failure or an automated battery test failure. An automated battery test failure is reported when battery voltage is less than 1.8 volts per cell during the first 75 seconds of unscheduled Battery mode operation.</p>	<p>The variable <i>n</i> indicates the slot in which the faulty battery module is installed. (For example, slot 1 is the uppermost bay of the four battery bay slots.)</p> <p>Replace the faulty battery module.</p>
<p>x Alarms</p> <hr/> <p>Battery Not Charged</p>	<p>At least one battery string fails to reach float voltage after charging for 24 hours. This could indicate a problem in one or more battery modules.</p>	<p>Replace the faulty battery module.</p>

*continued*

**Table 5-1: Main Module (MM) and Electronics Modules (M1-M4) Active Alarms** *continued*

LCD Display	Possible Cause	Actions to Take
<p>x Alarms</p> <hr/> <p>Battery <i>n</i> Test Failed</p>	<p>The UPS detects a manual battery test failure. A manual battery test failure is reported when battery voltage is less than 1.8 volts per cell during the first 75 seconds of unscheduled Battery mode operation.</p>	<p>The variable <i>n</i> indicates the slot in which the faulty battery module is installed. (For example, slot 1 is the uppermost bay of the four battery bay slots.)</p> <p>Replace the faulty battery module.</p>
<p>x Alarms</p> <hr/> <p>Bypass Not Available</p>	<p>Bypass mode is currently unavailable due to the voltage or frequency being outside the valid operating range for the UPS.</p>	<ul style="list-style-type: none"> <li>To verify that the voltage settings are correct, refer to the section, "Matching the Utility Voltage," in Chapter 3.</li> <li>If the condition persists, contact an electrician.</li> </ul>
<p>x Alarms</p> <hr/> <p>Calibration Failed</p>	<p>The UPS triggers this alarm when the autocalibration process fails to complete successfully. This could be the result of an interruption from an operating mode transition or because of UPS load changes occurring while autocalibration was in progress.</p>	<ul style="list-style-type: none"> <li>The autocalibration process reschedules and automatically restarts when the UPS conditions are conducive for the operation to complete.</li> <li>If the condition persists, locate and replace the faulty module.</li> </ul>
<p>x Alarms</p> <hr/> <p>DC Link Over Voltage</p>	<p>At least one electronics module detects abnormally high rail voltage levels and shuts down to protect itself and the load from damage.</p> <p>This could be caused by a hardware failure.</p>	<p>Switch to Manual Bypass mode. Locate and replace the faulty module.</p>
<p>x Alarms</p> <hr/> <p>Fan Failure</p>	<p>At least one electronics module detects that one or both of its cooling fans has failed. The detecting module immediately shuts down to protect its heat-sensitive components.</p>	<ul style="list-style-type: none"> <li>Check the fans for blockage. If a fan is blocked, remove the blockage, switch to Manual Bypass mode, and restart the system.</li> <li>If a fan is not blocked and the problem persists, switch to Manual Bypass mode. Locate and replace the faulty module.</li> </ul>
<p>x Alarms</p> <hr/> <p>Fuse Failure</p>	<p>The UPS detects that one or more of the internal module fuses have failed.</p>	<p>Switch to Manual Bypass mode. Locate and replace the faulty module.</p>

*continued*

**Table 5-1: Main Module (MM) and Electronics Modules (M1-M4) Active Alarms** *continued*

LCD Display	Possible Cause	Actions to Take
<p>x Alarms</p> <hr/> Heatsink Over Temperature	An electronics module detects a heatsink over-temperature condition. The detecting module immediately shuts down to protect its heat-sensitive components.	<ul style="list-style-type: none"> <li>• Check the ventilation grills for blockage. If the grills are blocked, remove blockage, switch to Manual Bypass mode, and restart the system. Verify that the ambient temperature is less than 40°C (104°F).</li> <li>• If the grills are not blocked and the problem persists, switch to Manual Bypass mode. Locate and replace the faulty module.</li> </ul>
<p>x Alarms</p> <hr/> Input AC Over Voltage	The UPS detects that the input utility voltage is above the maximum operating range of about 277 V (288 V - hysteresis).	<ul style="list-style-type: none"> <li>• If this occurs in a running system, the system immediately transitions to Battery mode until valid utility returns. If this occurs before a system has entered an online state, its startup sequence does not complete and the system shuts down until valid utility returns.</li> <li>• If the condition persists, contact an electrician.</li> </ul>
<p>x Alarms</p> <hr/> Input AC Under Voltage	The UPS detects that the input utility voltage is below the minimum operating range of about 172 V (160 V + hysteresis).	<ul style="list-style-type: none"> <li>• If this occurs in a running system, the system immediately transitions to Battery mode until valid utility returns. If this occurs before a system has entered an online state, its startup sequence does not complete and the system shuts down until valid utility returns.</li> <li>• If the condition persists, contact an electrician.</li> </ul>
<p>x Alarms</p> <hr/> Input Under Or Over Frequency	The UPS detects that the input frequency has a greater deviation than $\pm 5$ Hz from the nominal window of operation.	<ul style="list-style-type: none"> <li>• If this occurs in a running system, the system regulates output frequency to its nominal 50 or 60 Hz. If this occurs before a system has entered an online state, its startup sequence does not complete and the system shuts down until valid utility returns.</li> <li>• If the condition persists, contact an electrician.</li> </ul>

*continued*

**Table 5-1: Main Module (MM) and Electronics Modules (M1-M4) Active Alarms** *continued*

LCD Display	Possible Cause	Actions to Take
x Alarms Internal Communications Failure	The UPS encounters an internal communication problem that is hindering its ability to successfully manage its activities and monitor the current electronics module status. The UPS immediately transfers to Battery mode and issues the Low Battery alarm until communications are restored.	Switch to Manual Bypass mode. Locate and replace the faulty module or faulty supervisory board.
x Alarms Inverter Contactor Open	The UPS detects that an electronics module has timed out while waiting for its load relay to close during a module hot-swap. The electronics module has failed to complete its startup sequence successfully.  This alarm is accompanied by one or more alarms from the electronics module that indicates the root cause of the problem.	Select the <b>Status</b> option on the LCD menu. Scroll through and examine the additional alarms related to the failed electronics module for details on handling this condition.
x Alarms Inverter Fault	At least one electronics module detects a hardware failure in its inverter, generates this alarm, and subsequently shuts down. The UPS may have transitioned into Automatic Bypass mode due to the failure, depending on the load levels present at the time of the failure.	Switch to Manual Bypass mode. Locate and replace the faulty module.
x Alarms Inverter Output Over Current	At least one electronics module generates this alarm when it has reached its maximum operating output hardware current limits, as defined in the EEPROM. The module has shut down to protect itself and the load from damage. The UPS may have transitioned into Automatic Bypass mode due to the failure, depending on the load levels present at the time of the failure and the number of modules affected.	<ul style="list-style-type: none"> <li>Reduce the load level to within UPS operational limits. Initiate a Manual Bypass recovery if the UPS remains in Bypass mode for more than 30 seconds. Refer to the LCD panel to determine which electronics module generated the alarm.</li> <li>If the UPS was operating within its supported load limits when the problem occurred, switch to Manual Bypass mode. Replace the faulty module.</li> </ul>

*continued*

**Table 5-1: Main Module (MM) and Electronics Modules (M1-M4) Active Alarms** *continued*

LCD Display	Possible Cause	Actions to Take
<p>x Alarms</p> <p>Inverter Startup Failure</p>	<p>This alarm is triggered by one of the following events:</p> <ul style="list-style-type: none"> <li>The UPS detects that at least one electronics module failed to complete its startup sequence as expected and was most likely shut down. In this situation, the alarm is more of a general status indicator. It should be accompanied by another alarm, indicating the reason for the failure of the module to start.</li> <li>An electronics module has briefly (for approximately one-quarter of a second) disconnected from the system and is attempting to restart. In this situation, no other alarms associated with this failure occur, with the exception of a possible Internal Communications Failure alarm.</li> </ul>	<ul style="list-style-type: none"> <li>The electronics module may not be fully seated. Remove the bezels and verify that each of the electronics modules is fully inserted into the chassis.</li> <li>Switch to Manual Bypass mode. Disengage the module, inspect for open fuses, and re-engage in the chassis.</li> <li>If the problem persists, replace the module.</li> </ul>
<p>x Alarms</p> <p>Inverter Uncalibrated</p>	<p>At least one electronics module has not been calibrated with others as a set, which is required for efficient load-sharing operations.</p>	<ul style="list-style-type: none"> <li>An autocalibration is required, and the UPS automatically schedules the autocalibration process on detection of this condition.</li> <li>Switch to Manual Bypass mode. Replace the faulty module.</li> </ul>
<p>x Alarms</p> <p>Level 2 Overload – Phase A</p>	<p>The UPS detects that the current load has exceeded 102% of the maximum capacity available, which means that it is operating in Nonredundant mode.</p> <p>The UPS transfers to Bypass mode after two minutes of this sustained load level.</p>	<ul style="list-style-type: none"> <li>Reduce the load level to clear the alarm. If the alarm persists after load reduction, refer to the LCD panel to determine which electronics module is reporting overload.</li> <li>During overload, switch to Manual Bypass mode. Replace the faulty module.</li> </ul>
<p>x Alarms</p> <p>Level 3 Overload – Phase A</p>	<p>The UPS detects that the current load has exceeded 110% of the maximum capacity available, operating in Nonredundant mode.</p> <p>The UPS transfers to Bypass mode after 30 seconds of this sustained load level.</p>	<ul style="list-style-type: none"> <li>Reduce the load level to clear the alarm. If the alarm persists after load reduction, refer to the LCD panel to determine which electronics module is reporting overload.</li> <li>During overload, switch to Manual Bypass mode. Replace the faulty module.</li> </ul>

*continued*



**Table 5-1: Main Module (MM) and Electronics Modules (M1-M4) Active Alarms** *continued*

LCD Display	Possible Cause	Actions to Take
x Alarms Level 4 Overload – Phase A	<p>The UPS detects that the current load has exceeded 120% of the maximum capacity available, which means that it is operating in Nonredundant mode.</p> <p>The UPS transfers to Bypass mode within one second and remains in that mode due to the excessive overload condition.</p>	<ul style="list-style-type: none"> <li>Reduce the load level to clear the alarm. If the alarm persists after load reduction, refer to the LCD panel to determine which electronics module is reporting overload.</li> <li>During overload, switch to Manual Bypass mode. Replace the faulty module.</li> </ul>
x Alarms Loss of Redundancy	<p>The UPS detects that the current load level has exceeded the maximum safe load level limits that would provide redundant protection to the electronics modules.</p> <p>The system continues to operate, but is no longer in Redundant mode. The load could be at risk if an electronics module fails.</p>	<p>If you still want redundant operation, reduce the load until the alarm clears.</p>
x Alarms Loss of Sync-Bus	<p>The UPS detects that its electronics modules are having trouble synchronizing with the input utility source.</p> <p>The most likely cause is a poor utility source supplying the UPS.</p>	<ul style="list-style-type: none"> <li>Switch to Manual Bypass mode, and restart the system.</li> <li>Verify that the input source is stable.</li> </ul>
x Alarms Low Battery Shutdown	<p>While on battery, the UPS detects that the battery voltage level has dropped below the lowest preset threshold value. The UPS shuts down.</p> <p>This normal alarm condition occurs at the end of a battery discharge cycle. The threshold represents the lowest allowable battery discharge level for the batteries before they can no longer safely support the load. After valid utility returns and a minimum charge level has been restored to the batteries, the UPS assumes the load and begins a complete battery recharge cycle.</p>	<p>This is a normal operation.</p>

*continued*

**Table 5-1: Main Module (MM) and Electronics Modules (M1-M4) Active Alarms** *continued*

LCD Display	Possible Cause	Actions to Take
<p>x Alarms</p> <p>Non-volatile Memory Checksum Fail</p>	<p>The UPS detects an EEPROM Checksum Failure in the electronics module or supervisory board. This condition must be resolved before the UPS can complete its initialization and start successfully.</p> <p>This alarm is most common after a Flash upgrade that requires an EEPROM upgrade for the new embedded software to function correctly. The upgrade documentation describes this condition.</p>	<ul style="list-style-type: none"> <li>Check the website (<a href="http://www.hp.com/products/ups">www.hp.com/products/ups</a>) for Flash upgrades.</li> <li>Upgrade failure: Upgrade the system in accordance with applicable documentation.</li> <li>Operational failure: Switch to Manual Bypass mode. Locate and replace the faulty module or faulty supervisory board.</li> </ul>
<p>x Alarms</p> <p>On Manual Bypass</p>	<p>The UPS has been manually switched into Manual Bypass mode. The UPS can no longer protect the load or condition the utility to the load.</p>	<p>This is a normal operation.</p>
<p>x Alarms</p> <p>Output AC Over Voltage</p>	<p>The UPS detects that its output voltage is higher than its configured operational range. The UPS immediately initiates a transfer to Bypass mode, if that mode is available. If Bypass mode is not available at the time of this failure, the UPS shuts down immediately to protect the load.</p> <p>This problem could be caused by a hardware component failure.</p>	<ul style="list-style-type: none"> <li>Switch to Manual Bypass mode. Locate and replace the faulty module or faulty supervisory board.</li> <li>Verify the output voltage on the LCD display.</li> </ul>
<p>x Alarms</p> <p>Output AC Under Voltage</p>	<p>This alarm is triggered by one of the following events:</p> <ul style="list-style-type: none"> <li>The UPS detects that its output voltage is lower than its configured operational range. The UPS immediately initiates a transfer to Bypass mode if that mode is available.</li> <li>A significant change in load or load types has occurred that is causing a temporary sag in output voltage. If Bypass mode is available, the UPS attempts to automatically recover and return to an online mode after a couple of seconds.</li> </ul> <p>If Bypass mode is not available at the time of the failure, the UPS shuts down immediately to protect the load.</p>	<ul style="list-style-type: none"> <li>Switch to Manual Bypass mode. Locate and replace the faulty module or faulty supervisory board.</li> <li>Verify the output voltage on the LCD display.</li> </ul>

*continued*

**Table 5-1: Main Module (MM) and Electronics Modules (M1-M4) Active Alarms** *continued*

LCD Display	Possible Cause	Actions to Take
x Alarms Output Overload	The current load exceeds 100% of the maximum capacity that this UPS supports in Nonredundant mode. The UPS issues an alarm but does not take any other action for this level of overload.	<ul style="list-style-type: none"> <li>Reduce the load level to clear the alarm. If the alarm persists after load reduction, refer to the LCD panel to determine which electronics module is reporting overload.</li> <li>During overload, switch to Manual Bypass mode. Replace the faulty module or faulty supervisory board.</li> </ul>
x Alarms Program Checksum Fail	The UPS detects that the Module Flash Program Space has been corrupted. This problem is usually caused by a Flash Upgrade Failure.	<ul style="list-style-type: none"> <li>This problem only occurs during product upgrade.</li> <li>Reflash the failing electronics module with the latest upgrade package.</li> </ul>
x Alarms Rectifier Input Over Current	At least one electronics module generates this alarm when it detects an abnormally high input current. The detecting module shuts down to protect itself from damage. The UPS may have transitioned into Automatic Bypass mode due to the failure, depending on the load levels present at the time of the failure and the number of modules affected.  This problem could be caused by a hardware failure.	Switch to Manual Bypass mode. Locate and replace the faulty module.
x Alarms Remote Emergency Power Off	The UPS detects a Remote Emergency Power Off signal. The electronics modules immediately shut down and battery starts are inhibited.	<ul style="list-style-type: none"> <li>Determine if REPO was legitimate.</li> <li>Verify the terminal block wiring and site installation.</li> <li>For more information, refer to the section, "Remote Emergency Power Off," in Chapter 1.</li> </ul>
x Alarms Software Incompatibility Detected	At least one electronics module failed the code validation check. The code revision currently installed is incompatible with the rest of the system.	Verify that all modules are at the same firmware revision level.
x Alarms UPS On Battery	This is an alarm <b>and</b> a status to indicate that the UPS is currently operating in Battery mode.	This is a normal operation. This alarm may be accompanied by other alarms that indicate the root cause of the problem.
x Alarms UPS On Bypass	This is an alarm <b>and</b> a status to indicate that the UPS is currently operating in Bypass mode.	This is a normal operation. This alarm may be accompanied by other alarms that indicate the root cause of the problem.

*continued*

**Table 5-1: Main Module (MM) and Electronics Modules (M1-M4) Active Alarms** *continued*

LCD Display	Possible Cause	Actions to Take
x Alarms Utility Fail	The UPS detects that the utility source voltage is not within an acceptable range.	<ul style="list-style-type: none"> <li>Verify the utility power.</li> <li>If the problem persists, contact an electrician.</li> </ul>
x Alarms Utility Not Present	The UPS detects that the utility source voltage is either not present, or so abnormally low that the UPS classifies it as not being present.	<ul style="list-style-type: none"> <li>Verify the utility power.</li> <li>If the problem persists, contact an electrician.</li> </ul>

## Problems During Startup

If problems occur when starting the UPS, refer to Table 5-2 for possible causes and suggested actions.

**Table 5-2: Troubleshooting Problems During UPS Startup**

Symptom	Possible Cause	Actions to Take
UPS will not start.	There is no utility power.	Unit is hardwired. Contact a qualified electrician to check power at the utility receptacle.
	Batteries are disconnected.	Install the battery trays. If the batteries are installed, remove and then reinsert the electronics modules.
	REPO: Audible alarm sounds and Alarm LED is lit.	Verify that the REPO switch is in the proper position (open) and utility is present. Press the On button.

## Problems After Startup

If problems occur after starting the UPS, refer to Table 5-3 for possible causes and suggested actions.

**Table 5-3: Troubleshooting Problems After UPS Startup**

Symptom	Possible Cause	Actions to Take
Audible alarm sounds. Alarm LED is lit.	An alarm condition exists.	Scroll through the LCD menu for system <b>Alarms</b> to determine the cause.
Bypass LED is flashing.	Automatic Bypass mode is not available.	Scroll through the LCD menu for system <b>Alarms</b> to determine the cause.  Manual Bypass mode is <b>not</b> recommended during this condition.
Utility LED is flashing slowly, and all other LEDs are off.	Utility power is within acceptable range.  The UPS is operating normally and is in Standby mode.	Press the On button to assume the load.
Utility LED is flashing rapidly.	The full UPS or an electronics module is in the process of starting up.	Wait for a continuous Utility or Battery LED light, or slowly flashing Utility LED.
All LEDs flash on and off together.	Autocalibration is in process.	Wait for a continuous Utility LED.
Redundant LED and audible alarm frequently turn on and off.	Redundant mode is not available.	Reduce the output load to allow the system to remain in Redundant mode.
Audible alarm sounds. Bypass LED and Alarm LED are lit.	UPS is in Bypass mode.	Do one of the following: <ul style="list-style-type: none"> <li>• Scroll through the LCD menu to view current alarms.</li> <li>• Use the power management software to view the alarm history to determine the reason for the transfer to Bypass mode.</li> </ul>

*continued*

**Table 5-3: Troubleshooting Problems After UPS Startup** *continued*

Symptom	Possible Cause	Actions to Take
Audible alarm sounds. Battery LED and Alarm LED are lit. Redundant LED is off.	UPS is on battery.	Do one of the following: <ul style="list-style-type: none"> <li>• Scroll through the LCD menu to view current alarms.</li> <li>• Use the power management software to view the alarm history to determine the reason for the transfer to Battery mode.</li> </ul>
Audible alarm sounds. Battery LED, Alarm LED, and Redundant LED are lit.	UPS is on battery.	Do one of the following: <ul style="list-style-type: none"> <li>• Scroll through the LCD menu to view current alarms.</li> <li>• Use the power management software to view the alarm history to determine the reason for the transfer to Battery mode.</li> </ul>
UPS frequently switches between utility and battery power.	The utility voltage is frequently outside the UPS operating range.	Update the configuration.
Utility LED and Redundant LED are lit.	UPS is on utility.	The UPS is operating normally.  The system is configured to run in Redundant mode and is operating within normal load limits.
Audible alarm sounds. Utility LED and Alarm LED are lit.	UPS is on utility.	Redundant mode is not available and the Loss of Redundancy alarm is present. Reduce the load and verify that no other alarms are present.
Utility LED is lit.	UPS is on utility.	No action is required. The UPS is operating normally.  The system is configured to run in Nonredundant mode and is supporting between a 9 KVA and 12 KVA load.

## Repairing the UPS

Repairs to the UPS must be carried out by an HP authorized service technician. Other than battery replacement, there are no user-serviceable parts.

---

## Specifications

This chapter provides the physical, input, and output specifications for the UPS. Topics include battery descriptions, battery runtime estimates, and environmental requirements when operating the UPS.

### Physical Specifications

**Table 6-1: Physical Specifications**

Feature		Metric	U.S.
Dimensions	Width	44.45 cm	17.50 in
	Height	44.45 cm	17.50 in
	Depth	72.64 cm	28.60 in
Weight		189 kg	420 lb

### Input Specifications

**Table 6-2: Input Specifications**

UPS Model	Utility Voltage Frequency (Hz)	Default Settings—Nominal Voltage (VAC) Range	Available Settings—Utility Voltage (VAC)
R12000 XR WW (worldwide)	50/60	200-240	200, 208, 220, 230, or 240



## Output Specifications

**Table 6-3: Output Specifications**

UPS Model	Effective VA	Nominal Power Rating (W)
R12000 XR WW (worldwide)	12000	12000
Characteristics	Configuration Setting (VAC)	Available Nominal Output Voltage (VAC)
Voltage	The input voltage range is 200-240 $\pm$ 20%.	200, 208, 220, 230, or 240
Output	Source of Power	Regulation
	Utility power (normal range)	$\pm$ 3% of nominal output voltage rating (within the guidelines of the Computer Business Equipment Manufacturers Association)
Other features	Battery power	$\pm$ 3% of nominal output voltage rating
	Feature	Specification
	Online efficiency	>83%
	Voltage wave shape	Sine wave; 3% THD with typical PFC load
Surge suppression	High energy 6500 A peak	
Noise filtering	The input noise suppression is comprised of Normal Mode Filtering, Common Mode Filtering, or a combination of both.	

## Overcurrent Protection

A power distribution unit (PDU) provides overcurrent protection.

## Battery Specifications

**Table 6-4: Battery Specifications**

Feature	Specification
Type	Each module contains maintenance-free, sealed, valve regulated lead-acid (VRLA) batteries with an eight-year minimum float service life at 25°C (77°F).
Voltage	The battery module has a battery string voltage of 48 Vdc.
Charging	Complete charge takes no more than 48 hours.  The UPS recharges in three hours to 80% usable capacity.  ERMs recharge in less than eight hours to 80% usable capacity.

## Battery Runtime

**Table 6-5: Estimated Battery Runtime**

Load (percent)	Estimated Battery Runtime (minutes)	UPS with ERM Runtime (minutes)
20	43	69
50	14	28
80	7	15
100	5	11

## Environmental Specifications

**Table 6-6: Environmental Specifications**

Feature	Specification
Operating temperature	10°C to 40°C (50°F to 104°F) UL-tested at 25°C (77°F)
Relative humidity	0% to 95%; noncondensing
Operating altitude	Up to 2,000 m (6,562 ft) above sea level
Audible noise	Typically, 60 dBA
Transit temperature	-25°C to 55°C (-13°F to 131°F)
Transit altitude	15,000 m (49,212 ft) above sea level

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