

HP Uninterruptible Power System R12000 XR Models User Guide



December 2002 (Second Edition)
Part Number 146316-002

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About This Guide

This guide provides information about operation, configuration, battery maintenance, and troubleshooting for the UPS.

Intended Audience

This guide is intended for individuals requiring information about the use of UPSs. No installation or service procedure should be carried out by someone other than a technician with specific experience with high-voltage equipment.

Important Safety Information

Before installing this product, read the *Important Safety Information* document provided.

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 injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.



Weight in kg
Weight in lb

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

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

Rack Stability



WARNING: To prevent personal injury or damage to the equipment, verify that:

- 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 multiple-rack installation.
 - Extend only one component at a time. A rack may become unstable if more than one component is extended for any reason.
-

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.

Text Conventions

This document uses the following conventions:

- *Italic type* is used for complete titles of published guides or variables. Variables include information that varies in system output, in command lines, and in command parameters in text.
- **Bold type** is used for emphasis, for onscreen interface components (window titles, menu names and selections, button and icon names, and so on), and for keyboard keys.
- Monospace typeface is used for command lines, code examples, screen displays, error messages, and user input.
- Sans serif typeface is used for uniform resource locators (URLs).

Related Documents

For additional information on the topics covered in this guide, refer to the following documents:

- *HP Uninterruptible Power System R12000 XR Models Installation Instructions*
- *HP UPS R12000 XR Models Extended Runtime Module Installation Instructions*
- *HP UPS XR Products Power Cord and Options Reference Guide*
- *HP Power Products Glossary*

Getting Help

If you have a problem and have exhausted the information in this guide, further information and other help is available in the following locations.

HP Technical Support

For telephone numbers of worldwide Technical Support Centers, go to www.hp.com.

Have the following information available before you call:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level
- Power management software type and version

HP Website

For information on this product as well as the latest drivers, firmware, and service packs, go to www.hp.com.

HP Authorized Reseller

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, see the HP website for locations and telephone numbers.

Reader's Comments

To comment on this guide, send an email to ServerDocumentation@hp.com.

This chapter contains a general overview of the UPS, including an introduction to the model configuration, power management software, available hardware options, and warranties. Read this chapter to become familiar with the features of the UPS before installing the unit.

UPS Features

The following features make this UPS versatile and easy to use:

- Single phase, 200-240 V, Unity rated
- Parallel redundant (N+x) capabilities in the following configurations:
 - 12 KW + 0
 - 9 KW + 1 (3 KW)
 - 6 KW + 2 (6 KW)
 - 3 KW + 3 (9 KW)
- Online topology
- 10U rack-mountable form factor
- Modular design—up to four 3 KW modules
- Serviceability—hot-swappable batteries and electronics modules
- Hardwired input and output
- Front panel controls and LCD display
- Software shipped with the unit
- Support for HP Extended Runtime Modules (ERMs)
- Support for Remote Emergency Power Off (REPO)
- Two output terminal block connections to power HP Power Distribution Units (PDUs)

Communication Ports

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



CAUTION: To avoid damage to the equipment, use only communications cables with the part number 201092-002 (12-foot serial interface cable). One is supplied with your kit. This UPS/Computer Interface Cable carries power and is specifically designed for UPS communications.

UPS R12000 XR Model Part Number

The worldwide HP part number for the UPS R12000 XR with an HP 40 A HV WW PDU is 207552-B22.

Front View

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

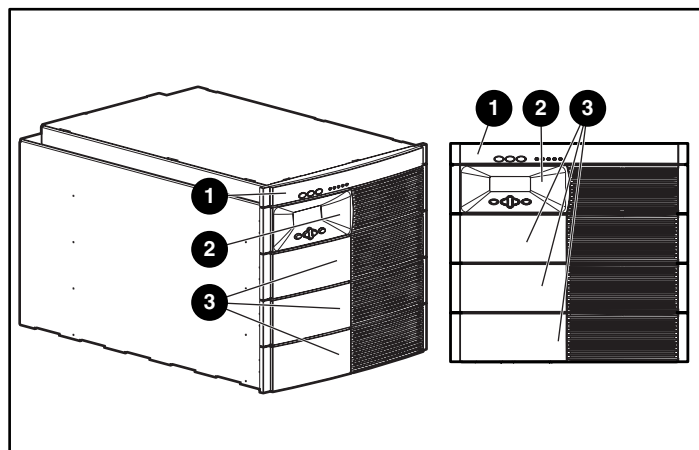


Figure 1-1: UPS bezels

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

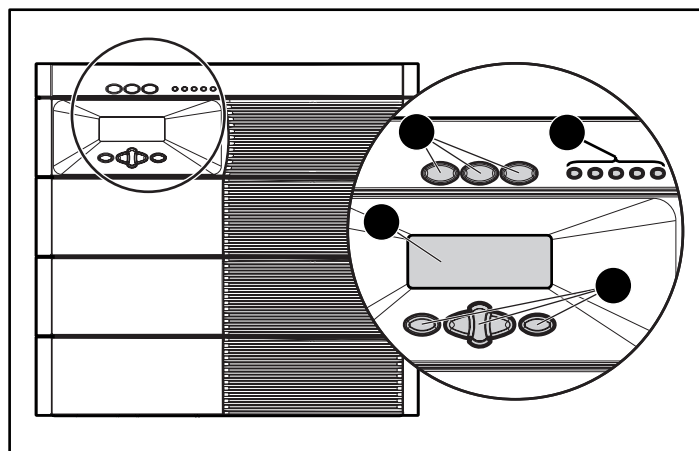


Figure 1-2: UPS indicators and control buttons

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

Refer to the section, “Front Panel LEDs,” in Chapter 2 for detailed information on the meanings of the LED indicators. Refer to the section, “Front Panel Controls and LCD Display,” in Chapter 2 for information on operating the UPS using the control buttons.

Rear View

The rear view of the UPS is shown in Figure 1-3 and Figure 1-4.

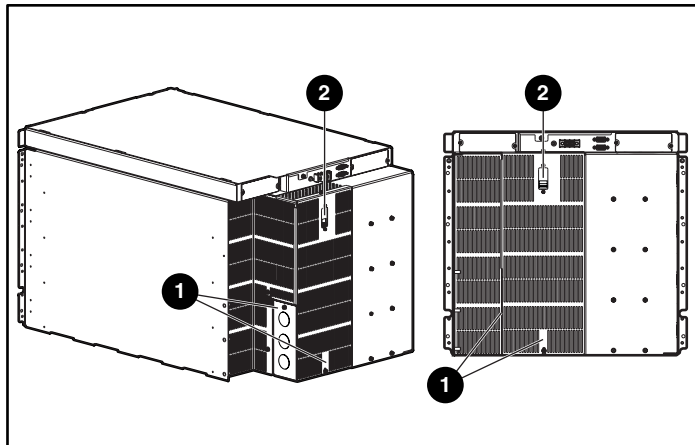


Figure 1-3: UPS rear view

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

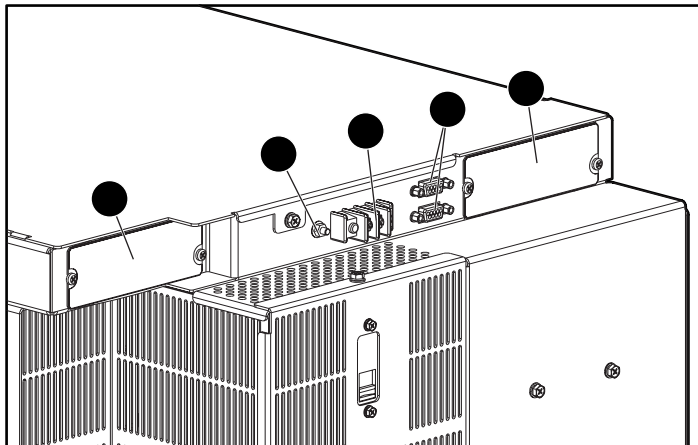


Figure 1-4: Close-up of the UPS rear view

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

Power Management Software

Power management software ensures maximum power reliability of computer systems through comprehensive control of UPSs. Specifically, power management software:

IMPORTANT: Not all UPSs are equipped to support the entire feature set listed below.

- Manages graceful shutdown of attached equipment during utility power failures.
- Manages independent UPS load segments to provide separate power control of connected equipment.
- Prioritizes the timing of equipment shutdowns, and reboots connected equipment by load segment.
- Shuts down and reboots any UPS and attached equipment based on a user specified schedule.
- Delays restart by load segment after a power outage to sequence the startup of system components.
- Customizes alert generation with modifiable pop-up dialog boxes, command execution, and email and broadcast messages.
- Monitors the status of the UPS and performs UPS diagnostics.
- Displays power log for analysis.

For more information, refer to the power management CD provided with the UPS. For the most current information, refer to www.hp.com.

UPS Hardware Options

The following options are available for the UPS.

Table 1-1: Hardware Options

Option	Part Number
HP ERM	217800-B21
PDU 40 A WW	207590-B23
mPDU 40 A WW	252663-B21

Extended Runtime Modules

The UPS supports up to two ERMs (extended runtime modules). Each ERM consists of two battery packs in a 4U chassis. When operating at the recommended 80 percent load, one ERM will extend the available UPS runtime by up to 15 minutes.

For more information, refer to the HP website at www.hp.com.

Power Distribution Units

The UPS supports up to two PDUs. A PDU offers power surge protection and allows you to distribute power among units.

Remote Emergency Power Off Port

The UPS includes an isolated REPO port. When properly wired, the REPO feature allows the power at the UPS output receptacles to be switched off from a remote location. To use this feature, the REPO port must be connected to a remote, normally open switch (not supplied). When this switch is closed, the UPS immediately disconnects power to its loads. The REPO switch is used in conjunction with a main disconnect device that removes the AC source from the input of the UPS. To power down the entire network in the event of an emergency, the REPO ports of multiple UPS units can be connected to a single switch.

IMPORTANT:

- The REPO port meets the requirements of NFPA Articles 645-10 and 645-11 for a Disconnecting Means.
- If the remote switch is closed, the REPO feature immediately powers down protected devices and does not utilize the orderly shutdown procedure initiated by power management software.
- The REPO feature shuts down UPS units operating under either utility or battery power.
- If the UPS was operating on battery power when the remote switch was closed, no power will be available to the devices until utility power is restored and the UPS has been manually powered up.
- To restore power to the load after the REPO feature is activated, press the On button after the AC source is reconnected to the UPS.
- Pressing and holding the On button *without* utility present would normally initiate a battery start and the UPS would assume the load. However, if the On button is pressed and a REPO is detected, battery start is inhibited and the UPS will not be able to assume the load. The electronic module fans will spin and the Alarm LED and an audible alarm will be active as long as the On button is held.

Warranties

To back up the wide range of features offered with the UPS, a three-year limited warranty is provided.

\$25,000 Computer Load Protection Guarantee

In addition to the limited warranty, a \$25,000 Computer Load Protection Guarantee (provided by the original equipment manufacturer) is offered.

IMPORTANT: The \$25,000 Computer Load Protection Guarantee is offered only in North America.

The \$25,000 Computer Load Protection Guarantee applies only if:

- A qualified electrician properly wires the UPS to utility power.
- The UPS installation complies with all applicable electrical and safety codes specified by the National Electrical Code (NEC).
- The UPS is used under normal operating conditions. Users must comply with all instructions and labels.
- The UPS is not damaged by accident (other than a utility power transient), misuse, or abuse.

Pre-Failure Battery Warranty

Refer to the section, “Pre-Failure Battery Warranty,” in Chapter 4 for specific information on the battery warranty.

This chapter contains information on operating the UPS. Topics include using the front panel controls, LCD display, LED indicators, and modes of operation. Knowledge of these features is helpful when configuring the system and performing more advanced functions on the unit.

NOTE: See the instructions included with the UPS kit for installation considerations and procedures. Copies of this document can be downloaded from the website at www.hp.com.

Front Panel Controls and LCD Display

The front panel controls and LCD display provide an easy-to-use UPS interface for setup, load control, and status monitoring.

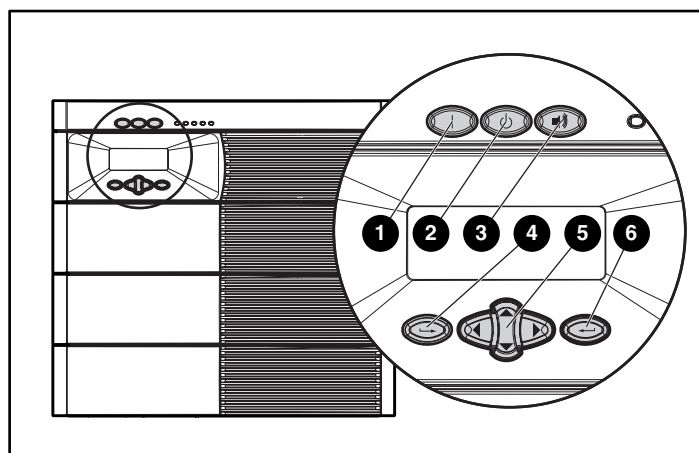


Figure 2-1: Front panel button controls

Item	Description	Function
1	On	Starts UPS powering the load
2	Standby	Places UPS into Standby mode/Reset
3	Test/Alarm Reset	Resets alarm or initiates self-test
4	Escape	Navigates and deselects options in the LCD menu structure
5	Center	Large four-way rocking button. Controls navigation through LCD menu structure: up, down, left, and right
6	Enter	Navigates and selects options in the LCD menu structure

Front Panel Indicators

The UPS displays information through the following indicators:

- Front panel LCD
- Front panel LEDs

Front Panel LCD

The front panel has a two-line LCD display that guides you through operation, configuration, and monitoring of the UPS. Refer to the section, “Changing Configuration Parameters,” in Chapter 3 for configuration instructions.

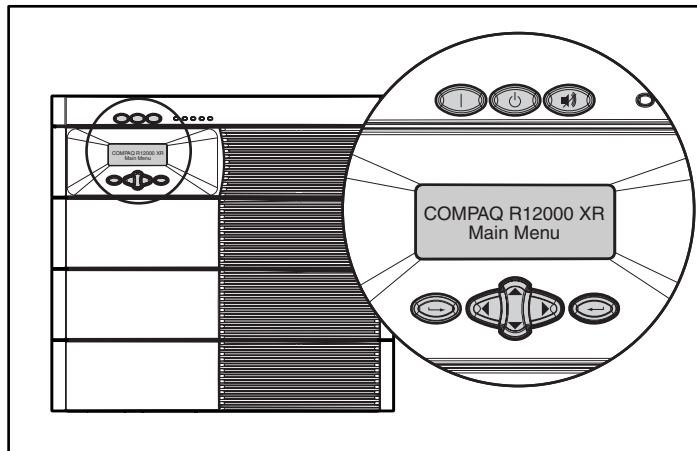


Figure 2-2: Front panel LCD display

Front Panel LEDs

The front panel has five LEDs that indicate the status of the UPS.

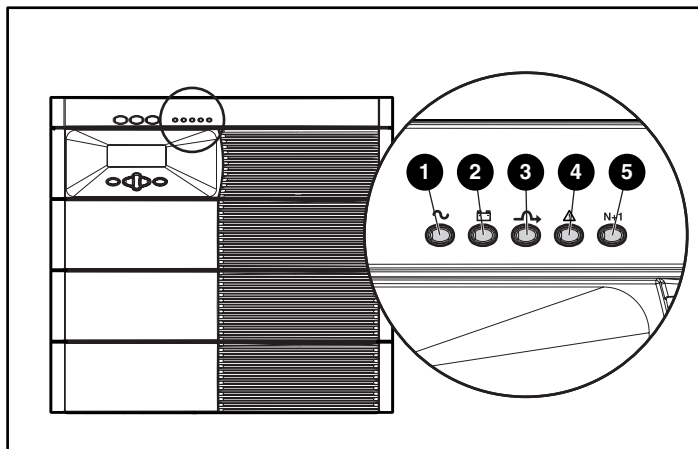




Figure 2-3: Front panel LED display

Item	Description	Symbol	Meaning
1	Utility	~	Solid green—Normal operation Rapidly flashing green—Ramp Up mode Slowly flashing green—Standby mode (batteries charging)
2	Battery	+	Solid amber—On Battery Flashing amber—Battery test in progress
3	Bypass		Solid amber—On Bypass Flashing amber—Bypass not available
4	Alarm		Solid red—One or more alarms may be present or active
5	Redundant	N+1	Solid green—N+1 mode (one or more redundant electronics modules operating in system) Flashing green—Battery self-test initiated Off—Non-redundant, not N+1 mode

NOTE: The LED lights cycle when no electronics modules are installed and utility is present. In Standby mode, there is no output but the batteries will be charging. The time required to reach Standby mode can range from 45 seconds to several minutes, depending on the state of charge of the batteries.

Modes of Operation

The UPS has five modes of operation, indicated by the LEDs (see Figure 2-3):

- **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.

Turning on the Main Circuit Breaker

After a qualified electrician has properly wired the UPS to utility power and has installed all electronics modules, turn on the AC mains at the service panel. All LEDs come on for three seconds as part of the system initialization. Each electronics module turns on in sequence (with approximately 10 seconds between modules), synching up with the utility power. The Utility LED **rapidly** flashes green during Startup mode.

After all electronics modules have synchronized, the UPS enters Standby mode, indicated by the Utility LED **slowly** flashing green. The system will begin charging the batteries, but will not assume the load. The system will remain in Standby mode until the UPS On command is received.

NOTE: The time required to transition from Startup mode to Standby mode can range from 45 seconds to several minutes, depending on the state of charge of the batteries.

Charging the Batteries

When the UPS is in Standby mode, allow the batteries to charge before putting the UPS into service. The battery status can be monitored using the LCD display. Refer to the section, “Displaying the Battery Charge Data,” in Chapter 3 for information on how to view current battery charge on the LCD display.

IMPORTANT: The battery modules will charge to:

- 80 percent of their capacity within 3 hours.
- 100 percent of their capacity within 48 hours.

Charge the batteries for at least 24 hours before supplying backup power to your devices.

Placing the UPS in Operate Mode

Press the On button (1) to transfer the system to Operate mode.

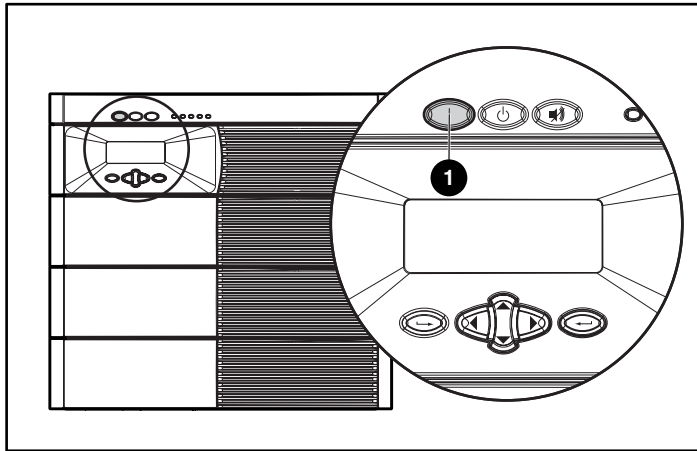


Figure 2-4: UPS On button

Initiating a Self-Test

NOTE: On initial utility startup, you may receive an **Inverter Uncalibrated** alarm. Press the On button to start the autocalibration process, which lasts approximately 2 to 4 minutes. Until you start this process, the UPS will remain in Standby mode and continue to sound the alarm.

To initiate a self-test, press and hold the Test/Alarm Reset button (1) for three seconds.

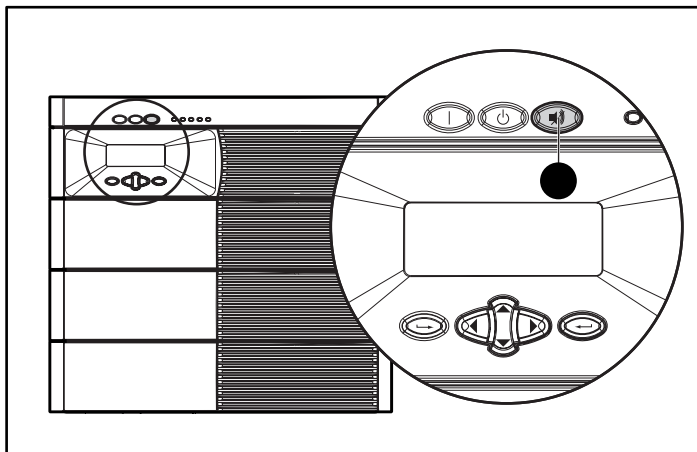


Figure 2-5: Test/Alarm Reset button

Because a portion of the self-test requires battery power, the self-test will not be initiated if the batteries are less than 90 percent charged. If the UPS detects a problem, the Alarm LED (4) will be solid red (see Figure 2-3), and the UPS sounds an audible alarm.

NOTE: Refer to Chapter 5, “Troubleshooting,” for information on what to do if the self-test detects a problem.

Audible Alarms

The UPS sounds an audible alarm to warn of a problem.

To identify the problem, select the Status option from the LCD Main Menu. The LCD will display *X* Alarms on the top line, where *X* is equal to the number of alarms. The bottom row will describe the nature of the alarm condition. Scroll through multiple alarms using the up and down arrow keys on the Center button. Refer to the section, “Displaying the Status or Active Alarms,” in Chapter 3 for more information on displaying the alarms using the LCD menu.

The Main Menu displays active alarms for the entire system. Under the electronics modules M1-M4 menus, only the individual electronics modules that have alarms are indicated. As a result, you can pinpoint individual modules that are having problems.

Refer to the section, “LCD Alarm Troubleshooting,” in Chapter 5 for causes and suggested actions for all alarm conditions.

Silencing an Audible Alarm

To silence the alarm, press the Test/Alarm Reset button (1) and hold for one second.

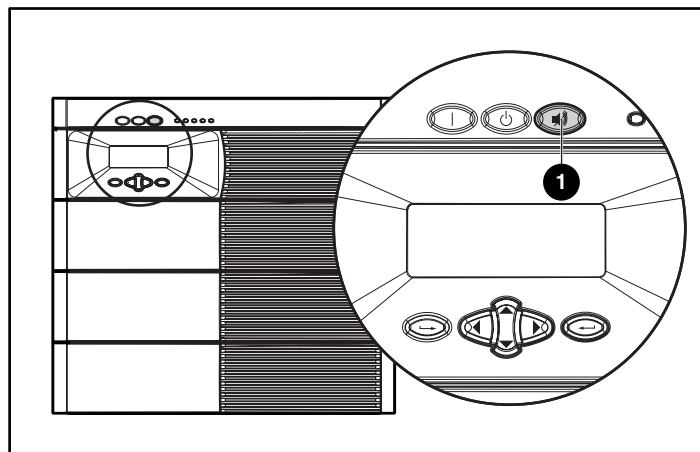


Figure 2-6: Test/Alarm Reset button

IMPORTANT: Although the Test/Alarm Reset button silences the audible alarm, the condition that caused the alarm still exists. Refer to Chapter 5, "Troubleshooting," for information on what to do if the UPS detects an alarm condition.

The silencing of the alarm is based on the **current** set of alarms that is present when the button is pressed. If the alarm set changes and at least one alarm condition still exists, the audible alarm reactivates.

If the condition that caused the alarm is a utility power failure, the alarm is silenced shortly after utility power is restored.

Placing the UPS in Bypass Mode

This mode can be enabled by any of the following events:

- Using the Bypass switch on the rear panel
- Overload conditions
- Manual removal of an electronics module when in Operate mode

NOTE: HP does not recommend enabling Manual Bypass mode when the Bypass LED is flashing (Bypass mode not available).

Shutting Down the System

To shut down the system:

1. Place the UPS in Standby mode by pressing the Standby button for four seconds. The load relays open and the Utility LED begins to flash **slowly**.

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

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

LCD Configuration and Status

This chapter contains information on configuring the UPS. Topics include a description of the LCD display menu structure, procedures for configuring the UPS, and the details of the various UPS status options. Proper configuration of the UPS and familiarity with the menu display is important in performing other functions on the unit, such as maintaining the battery and troubleshooting alarms.

Changing Configuration Parameters

Use the front panel controls and LCD display to change the configuration of the UPS. The LCD menu has a two-line LCD display with three-button control for up, down, left, right, Enter, and Escape. The LCD is used for configuration, monitoring, and status.

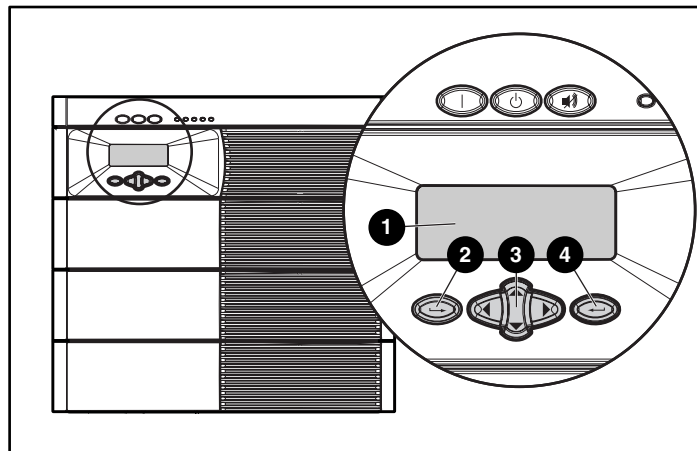


Figure 3-1: LCD display and control buttons

Item	Description	Function
1	LCD Display	Displays your menu position, showing UPS, electronics module, and battery
2	Escape	Navigates and deselects options in the LCD menu structure
3	Center	Controls navigation through LCD menu structure: up, down, left, and right
4	Enter	Navigates and selects options in the LCD menu structure

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.

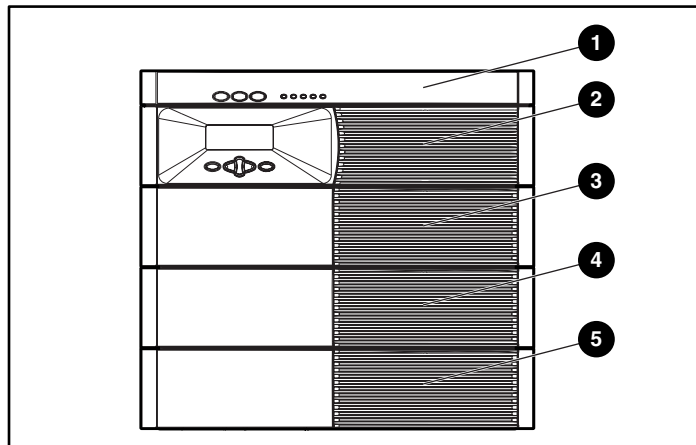


Figure 3-2: UPS electronics modules, numbered

- 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 control buttons are shown in Figure 3-1.

Initial Power-Up Display

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

R12000 XR
Main Menu

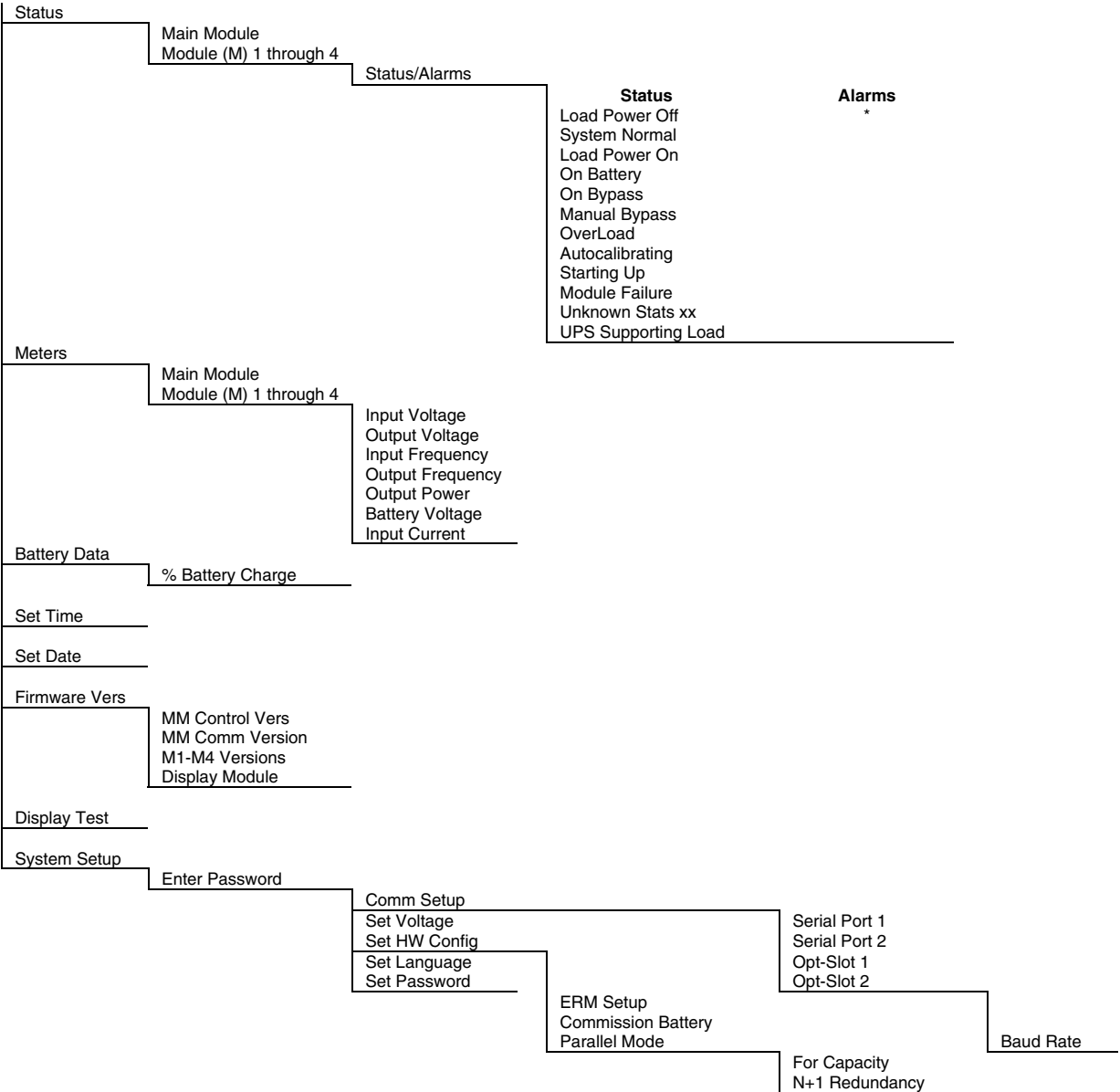
Top Level Main Menu

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 display on the LCD panel. For a descriptive list of alarm causes, 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 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	The UPS is operating normally from utility and is protecting the load.
0 Alarms	No alarms are present.
Load Power On	The UPS is operating from utility and is protecting the load.
<i>x</i> Alarms	
On Battery	The UPS is operating from battery and is protecting the load.
<i>x</i> Alarms	
On Bypass	The UPS is operating from Automatic Bypass mode and is not protecting the load.
<i>x</i> Alarms	
Manual Bypass	The UPS is operating from Manual Bypass mode and is not protecting the load.
<i>x</i> Alarms	
Overload	The UPS is protecting the load. The current load level is exceeding the maximum operational range for the UPS.
<i>x</i> Alarms	
Autocalibrating	The UPS is operating from utility and is protecting the load while it is performing the module-sharing calibration process.
<i>x</i> Alarms	

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 off-line.
Unknown Stats x x Alarms	The UPS issues an unrecognized status code of x. This is normal in certain situations, such as when the UPS is busy or powering down.
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. Refer to the section, “LCD Alarm Troubleshooting,” in Chapter 5 for a descriptive list of alarm causes and solutions.

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 of either the main module or any of the other electronics modules.

Main Menu
Meters

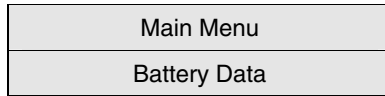
This submenu provides information on virtual meters monitoring the UPS voltages. Scroll up and down through the menu using the Center button. If the words continue off the screen, scroll right and left to read the message. Press the Enter button to view selections. Table 3-5 lists the options under the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

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

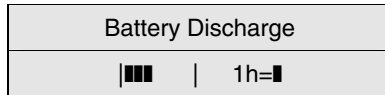
LCD Display	Explanation
Input Volts	The utility voltage
Output Volts	The voltage available at the UPS output receptacles
Input Frequency	The utility frequency in Hertz
Output Frequency	The frequency in Hertz available at the UPS output receptacles
Output Power ■■■■■■■■ ■■ MM or Mx	The output power is 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).
Output Power ■■■■■--- -- 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 displays.



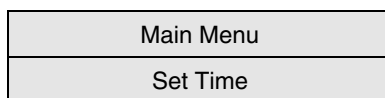
The remaining battery energy is shown, where the tag “1h=█” means that each block represents one hour. For example, this LCD shows three hours of remaining battery time. Other possible tags are listed in Table 3-6.

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

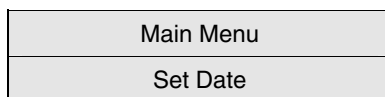
Setting the Time

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 the control board is running
MM Comm Version <i>xxx</i>	Version of firmware 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 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. To establish or change the 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 up the baud rate for the communication ports and option slots.

System Setup
Comm Setup

Table 3-8: Communications 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 above. 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. The 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 Parallel Mode 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. The 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.

Battery Maintenance

This chapter contains information for properly maintaining batteries for the UPS, including battery charging, replacement, disposal procedures, and warranties.

Precautions



WARNING: There is a risk of personal injury from the hazardous energy levels associated with UPS batteries. The maintenance and replacement of batteries must be carried out by an HP authorized service representative.



WARNING: The UPS contains an internal lithium battery and a sealed lead-acid battery module. To reduce the risk of 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 to temperatures higher than 60°C (140°F).
-



WARNING: To reduce the risk of personal injury from hazardous energy, take these precautions:

- Remove watches, rings, or other metal objects.
 - Use tools with insulated handles.
-

Charging Batteries

When connected to utility power, the UPS automatically charges the batteries. No user intervention is required while the UPS is in use. Refer to the section, “Care and Storage of Batteries,” in this chapter for information on keeping the batteries charged while the UPS is in extended storage.

Determining When to Replace Batteries

When the Alarm LED (1) is solid red, and the LCD displays either a Battery Needs Service or Battery Test Failed alarm, you may need to replace the battery module. Depending on usage and environmental conditions, the batteries should last three to six years.

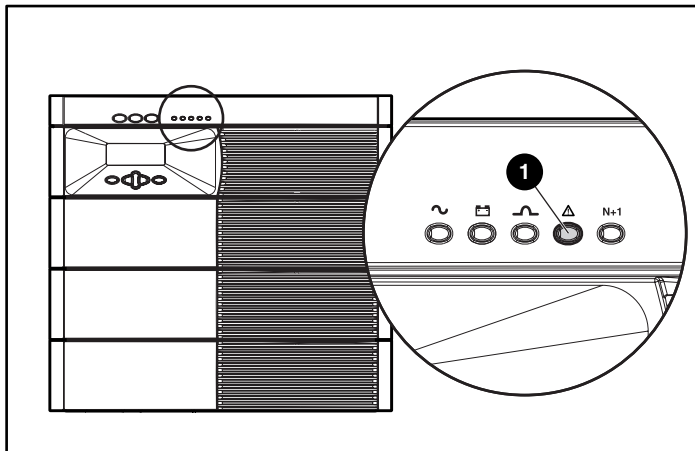


Figure 4-1: Alarm LED

To verify the above alarms, initiate a UPS battery self-test to verify that battery replacement is required. If the Alarm LED (1) is solid red and the alert displays on the LCD status menu, replace the bad battery module as soon as possible.

Refer to the section, “Initiating a Self-Test,” in Chapter 2 for more information on initiating a self-test.

Obtaining New Batteries

New batteries may be required within 30 to 60 days when the Alarm LED is solid red and the LCD displays either a Battery Needs Service or Battery Test Failed alarm. Obtain spare batteries for the UPS when this occurs.

HP supplies spare battery modules for UPS R12000 XR models. The UPS spare battery kit part number is 228288-001.



CAUTION: Because of the short shelf life of the battery, avoid storing a battery spare as a backup. It is recommended that an inventory of spare batteries not be maintained onsite unless a procedure to keep these batteries charged while in storage is implemented.

Replacing the Batteries

The batteries in the UPS are hot-swappable. Batteries may be replaced (hot-swapped) without powering off the UPS if the UPS is not supplying battery power to devices. The Utility LED will be solid green if the UPS is supplying utility power.

The UPS is provided with an internal lithium battery and a sealed lead-acid battery module. There is a danger of explosion and risk of personal injury if the batteries are incorrectly replaced or mistreated. Replacement is to be done by an HP authorized service provider using the spare designated for the product. For more information about battery replacement or proper disposal, contact your HP authorized reseller or HP authorized service provider.

Removing and Replacing the Battery Module



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).

27 kg
60 lb

To remove the battery module:

1. Remove the front bezel by pulling on both ends.

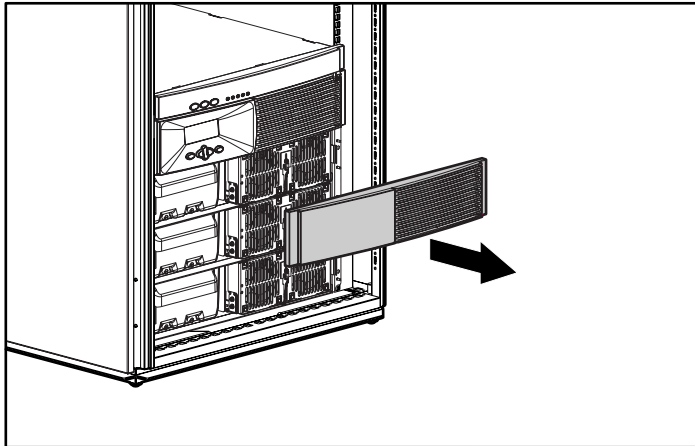


Figure 4-2: Removing the front bezel

2. Remove the two screws that secure the battery module in place (1) and slide out the battery module (2).

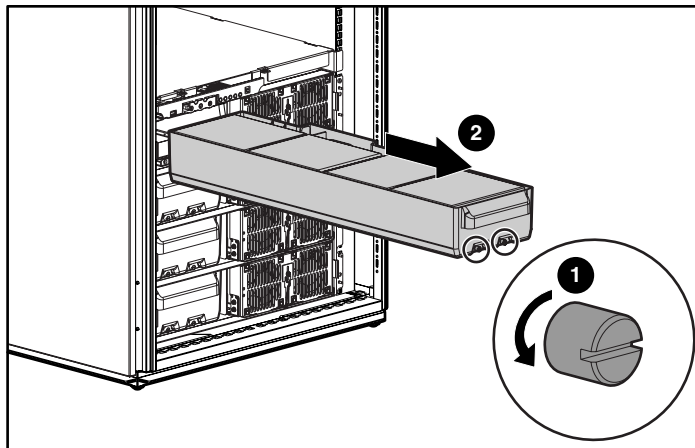


Figure 4-3: Removing the battery module

3. Set aside the used battery module for proper disposal. Refer to the section, “Disposing of Used Batteries,” in this chapter.
4. To replace the battery module, reverse the preceding steps.

Testing the New Battery Module

After installing the new battery module, press the Test/Alarm Reset button. Refer to the section, “Initiating a Self-Test,” in Chapter 2 for more information on initiating a self-test.

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

If the installation has been successful, the Alarm LED will not be 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 “Replacing the Batteries” section of this chapter, and check the battery terminal connections. If the Alarm LED is still red, refer to Chapter 5, “Troubleshooting,” for more information on the cause of the alarm.

IMPORTANT: The batteries will charge to 80 percent of their capacity within approximately three hours. Charge the batteries for 24 hours before using 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, it is recommended running a battery commissioning test. This test will set a base line so that the UPS accurately displays battery run-time. Refer to the section, “Setting the Hardware Configuration,” in Chapter 3 for instructions on enabling the battery commissioning test.

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

Disposing of Used Batteries

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



Batteries, battery modules, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, use the public collection system or return them to HP, your authorized HP Partners, or their agents.

Care and Storage of Batteries

To maximize the life of batteries:

- Minimize the amount of time the UPS uses battery power by matching the UPS configuration with utility voltage. Refer to the section, “Matching the Utility Voltage,” in Chapter 3 for more information.
- Keep the area around the UPS clean and dust-free. If the environment is very dusty, clean the outside of the UPS regularly with a vacuum cleaner.
- Maintain the ambient temperature at 25°C (77°F).
- If storing a UPS for an extended period, recharge the batteries every six months:
 - Connect the UPS to utility power.
 - Allow the UPS to remain in Standby mode.
 - Allow the UPS to charge the batteries for 24 hours.
 - Update the Battery Recharge Date label.



CAUTION: Because of the short shelf life of the battery, avoid storing a battery spare as a backup.

Pre-Failure Battery Warranty

The Pre-Failure Battery Warranty, standard on all UPS units, extends the advantage of a three-year limited warranty by applying it to the battery before it actually fails. Specifically, the Pre-Failure Battery Warranty ensures that when customers receive notification from power management software that the battery may fail, the battery is replaced free of charge under the warranty.

The highest standards in the industry are maintained, as evidenced by the Pre-Failure Battery Warranty. This warranty is beneficial in at least two significant ways:

- Reduced total cost of ownership
- Reduced downtime

A Pre-Failure Battery **warning** is given 30 days prior to a battery failure. The warning is indicated in one or both of the following ways:

- An LED showing that the battery is low
- Notification from power management software

This warning provides ample time to order a spare battery. To order a spare, go to www.hp.com.

The battery warranty coverage is three years for parts. The warranty for the first year of ownership includes parts and labor. If battery spares are not available for a particular UPS model, then the entire UPS, including its battery, is replaced.

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 and Electronics Modules M1-M4 Active Alarms

LCD Display	Possible Cause	Suggested Action
<p>x Alarms</p> <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>	<p>Ensure that unit grills are not blocked and fans are operational. Correct any environmental conditions that may be causing the condition. Verify that the ambient temperature is less than 40°C (104°F).</p> <p>Contact Technical Support for assistance.</p>
<p>x Alarms</p> <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 powerdown mode.</p>	<p>This is a normal operation. The UPS will restart when utility power is restored.</p>
<p>x Alarms</p> <p>Batteries Disconnected</p>	<p>This alarm is triggered by the one of the following events:</p> <ul style="list-style-type: none"> • The UPS detects that at least one battery is installed incorrectly. • Not enough battery modules are installed to support the current load levels. 	<p>Remove bezels and check that each battery module is firmly seated in its slot. Verify that the load does not exceed 12 kW.</p> <p>Contact Technical Support for assistance.</p>
<p>x Alarms</p> <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 Maintenance Bypass mode, and contact Technical Support for assistance.</p>
<p>x Alarms</p> <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. This is to be expected when operating in Battery mode and when the batteries discharge.</p>	<p>This is a normal operation. The UPS will begin the shutdown process.</p>
<p>x Alarms</p> <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 faulted battery module is installed. (For example, slot 1 is the uppermost bay of the four-battery bay slots.)</p>	<p>Contact Technical Support for assistance.</p>

continued

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

LCD Display	Possible Cause	Suggested Action
x Alarms Battery Not Charged	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.	At least one battery module needs replacing. Contact Technical Support for assistance.
x Alarms Battery <i>n</i> Test Failed	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. The variable <i>n</i> indicates the slot in which the faulted battery module is installed. (For example, slot 1 is the uppermost bay of the four-battery bay slots.)	At least one battery module needs replacing. Contact Technical Support for assistance.
x Alarms Bypass Not Available	Bypass mode is currently unavailable due to the voltage or frequency being outside the valid operating range for the UPS.	Refer to the section, "Matching the Utility Voltage," in Chapter 3 to verify that voltage settings are correct. If the condition persists, contact an electrician.
x Alarms Calibration Failed	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.	The autocalibration process reschedules and automatically restarts once the UPS conditions are conducive for the operation to complete. Contact Technical Support for assistance.
x Alarms DC Link Over Voltage	At least one electronics module detects abnormally high rail voltage levels and shuts down to protect itself and the load from damage. This could be caused by a hardware failure.	Contact Technical Support for assistance.
x Alarms Fan Failure	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.	Check the fans for blockage. If a fan is blocked, remove the blockage, switch to Maintenance Bypass mode, and restart the system. If a fan is not blocked and the problem persists, contact Technical Support for assistance.

continued

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

LCD Display	Possible Cause	Suggested Action
x Alarms Fuse Failure	The UPS detects that one or more of the internal module fuses has failed.	Contact Technical Support for assistance.
x Alarms Heatsink Over Temperature	An electronics module detects a heatsink over temperature condition. The detecting module immediately shuts down to protect its heat sensitive components.	Check the ventilation grills for blockage. If the grills are blocked, remove blockage, switch to Maintenance Bypass mode, and restart the system. Verify that the ambient temperature is less than 40°C (104°F). If the grills are not blocked and the problem persists, contact Technical Support for assistance.
x Alarms 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).	If this occurs in a running system, the system will immediately transition to Battery mode until valid utility returns. If this occurs before a system has entered an online state, its startup sequence will not complete, and the system will shut down until valid utility returns. If the condition persists, contact an electrician.
x Alarms 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).	If this occurs in a running system, the system will immediately transition to Battery mode until valid utility returns. If this occurs before a system has entered an online state, its startup sequence will not complete, and the system will shut down until valid utility returns. If the condition persists, contact an electrician.
x Alarms Input Under Or Over Frequency	The UPS detects that the input frequency has a greater deviation than ± 5 Hz from the nominal window of operation.	If this occurs in a running system, the system will regulate output frequency to its nominal 50 or 60 Hz. If this occurs before a system has entered an online state, its startup sequence will not complete, and the system will shut down until valid utility returns. If the condition persists, contact an electrician.

continued

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

LCD Display	Possible Cause	Suggested Action
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 will immediately transfer to Battery mode and issue the Low Battery alarm until communications are restored.	Switch to Maintenance Bypass mode, and contact Technical Support for assistance.
x Alarms Inverter Contactor Open	The UPS detects that an electronics module has timed out 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 Status 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. This could be caused by a hardware failure.	Contact Technical Support for assistance.
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.	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. See the LCD panel to determine which electronics module generated the alarm. If the UPS was operating within its supported load limits when the problem occurred, or if the problem persists, contact Technical Support for assistance.

continued

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

LCD Display	Possible Cause	Suggested Action
<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"> 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 modules failure to start. 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 will occur, with the exception of a possible Internal Communications Failure alarm. 	<p>The electronics module may not be fully seated. Remove the bezels and ensure that each of the electronics modules is fully inserted into the chassis.</p> <p>Contact Technical Support for assistance.</p>
<p>x Alarms</p> <p>Inverter Uncalibrated</p>	<p>At least one electronics module has not been calibrated together as a set, which is required for efficient load-sharing operations.</p>	<p>An autocalibration is required, and the UPS will automatically schedule the autocalibration process on detection of this condition.</p> <p>Contact Technical Support for assistance.</p>
<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 it is operating in Nonredundant mode.</p> <p>The UPS will transfer to Bypass mode after two minutes of this sustained load level.</p>	<p>Reduce the load level to clear the alarm. If the alarm persists after load reduction, see the LCD panel to determine which electronics module is reporting overload.</p> <p>Contact Technical Support for assistance.</p>
<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, which means it is operating in Nonredundant mode.</p> <p>The UPS will transfer to Bypass mode after 30 seconds of this sustained load level.</p>	<p>Reduce the load level to clear the alarm. If the alarm persists after load reduction, see the LCD panel to determine which electronics module is reporting overload.</p> <p>Contact Technical Support for assistance.</p>

continued

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

LCD Display	Possible Cause	Suggested Action
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 it is operating in Nonredundant mode.</p> <p>The UPS will transfer to Bypass mode within one second and remain in that mode due to the excessive overload condition.</p>	<p>Reduce the load level to clear the alarm. If the alarm persists after load reduction, see the LCD panel to determine which electronics module is reporting overload.</p> <p>Contact Technical Support for assistance.</p>
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 redundancy protection to the electronics modules.</p> <p>The system will continue to operate, but will no longer be in Redundant mode. The load could be at risk if an electronics module fails.</p>	<p>If redundant operation is desired, 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. The most likely cause is a poor utility source supplying the UPS.</p>	<p>Switch to Maintenance Bypass mode, and restart the system.</p> <p>Contact Technical Support for assistance.</p>
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 will be shut 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. Once valid utility returns, the UPS will assume the load after a minimum charge level has been restored to the batteries, and it will begin a complete battery recharge cycle.</p>	<p>This is a normal operation.</p>
x Alarms Non-volatile Memory Checksum Fail	<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 will describe this condition.</p>	<p>Check the website (www.hp.com) for Flash upgrades.</p> <p>Contact Technical Support for assistance.</p>

continued

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

LCD Display	Possible Cause	Suggested Action
x Alarms On Manual Bypass	The UPS has been manually switched into Maintenance Bypass mode. The UPS can no longer protect the load or condition the utility to the load.	This is a normal operation.
x Alarms Output AC Over Voltage	The UPS detects that its output voltage is higher than its configured operational range. The UPS will immediately initiate a transfer to Bypass mode, if that mode is available. If Bypass mode is not available at the time of this failure, the UPS will shut down immediately to protect the load. This could be caused by a hardware component failure.	Contact Technical Support for assistance.
x Alarms Output AC Under Voltage	This alarm is triggered by one of the following events: <ul style="list-style-type: none"> The UPS detects that its output voltage is lower than its configured operational range. The UPS will immediately initiate a transfer to Bypass mode, if that mode is available. A significant change in load or load types occurs that causes 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. <p>If Bypass mode is not available at the time of the failure, the UPS will shut down immediately to protect the load.</p>	Contact Technical Support for assistance.
x Alarms Output Overload	The current load exceeds 100% of the maximum capacity available that this UPS will support in Nonredundant mode. The UPS issues an alarm, but does not take any other action for this level of overload.	Reduce the load level to clear the alarm. If the alarm persists after load reduction, see the LCD panel to determine which electronics module is reporting overload. Contact Technical Support for assistance.
x Alarms Program Checksum Fail	The UPS detects that the Module Flash Program Space is corrupt. This is usually caused by a Flash Upgrade Failure.	This only occurs during product upgrade. Re-flash the failing electronics module with the latest upgrade package.

continued

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

LCD Display	Possible Cause	Suggested Action
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 could be caused by a hardware failure.	Contact Technical Support for assistance.
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.	Refer to the section, "Remote Emergency Power Off Port," in Chapter 1 for more information.
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.	Contact Technical Support for assistance.
x Alarms UPS On Battery	This is an alarm and 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 will indicate the root cause of the problem.
x Alarms UPS On Bypass	This is an alarm and a status to indicate that the UPS is currently operating in Bypass mode.	This alarm may be accompanied by other alarms that will indicate the root cause of the problem.
x Alarms Utility Fail	The UPS detects that the utility source voltage is not within an acceptable range.	Verify the utility power. If the problem persists, contact an electrician.
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.	Verify the utility power. If the problem persists, contact an electrician.

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	Suggested Action
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.	Ensure 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	Suggested Action
Audible alarm sounds. Alarm LED is lit.	An alarm condition exists.	Scroll through the LCD menu for system alarms to determine the cause.
Bypass LED is flashing.	Automatic Bypass mode is not available.	Scroll through the LCD menu for system alarms to determine the cause. Manual Bypass is not 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 continuous Utility or Battery LED light, or slowly flashing Utility LED.

continued

Table 5-3: Troubleshooting problems after UPS startup *continued*

Symptom	Possible Cause	Suggested Action
All LEDs flash on and off together.	Autocalibration is in process.	Wait for continuous Utility LED.
Redundant LED and audible alarm frequently turn on and off.	Redundancy mode is not available.	Reduce output load to allow system to remain in Redundancy mode.
Audible alarm sounds. Bypass LED and Alarm LED are lit.	UPS is on bypass.	Do one of the following: <ul style="list-style-type: none"> • Scroll through the LCD menu to view current alarms. • Use the power management software to view the alarm history to determine the reason for the transfer to Bypass mode.
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"> • Scroll through the LCD menu to view current alarms. • Use the power management software to view the alarm history to determine the reason for the transfer to Battery mode.
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"> • Scroll through the LCD menu to view current alarms. • Use the power management software to view the alarm history to determine the reason for the transfer to Battery mode.

continued

Table 5-3: Troubleshooting problems after UPS startup *continued*

Symptom	Possible Cause	Suggested Action
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.

CarePaq Considerations

Packaged 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 in Table 5-4.

Table 5-4: 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

Repairing the UPS

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

Regulatory Compliance Notices

Regulatory Compliance Serial Numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique series number. The series number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this series number. The series number is not the marketing name or model number of the product.

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (for example, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The FCC rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. After the Class of the device is determined, refer to the corresponding statement in the following sections.

Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Declaration of Conformity for Products Marked with the FCC Logo, United States Only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, contact us by mail or telephone:

- Hewlett-Packard Company
P. O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000
- 1-800-652-6672 (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000
- 1-281-514-3333

To identify this product, refer to the part, series, or model number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B Equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (the equivalent international standards are in parentheses):

- EN55022 (CISPR 22) – Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) – Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) – Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) – Power Line Flicker
- EN60950 (IEC950) – Product Safety

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

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BSMI Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Battery Replacement Notice

Your computer is equipped with an internal lithium battery or battery pack. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. Unless specific replacement instructions are provided as part of this guide, replacement is to be done by an authorized service provider using the HP spare designated for this product. For more information about battery replacement or proper disposal, contact your authorized reseller or your authorized service provider.



WARNING: Your computer contains an internal lithium battery or battery pack. There is risk of fire and burns if the battery pack is not properly handled. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose to temperatures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.

Replace only with the HP spare designated for this product.



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, your authorized HP partners, or their agents.

Electrostatic Discharge

Preventing Electrostatic Damage

A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

- To prevent electrostatic damage when setting up the system or handling parts, avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods To Prevent Electrostatic Damage

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm \pm 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have a Compaq authorized reseller install the part

For more information on static electricity, or assistance with product installation, contact your authorized reseller.

Specifications

This appendix 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 C-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 C-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 C-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 VAC \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)
	Battery power	\pm 3% of nominal output voltage rating
Other features	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 C-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 will recharge in less than eight hours to 80% usable capacity.

Battery Runtime

Table C-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 C-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%; non-condensing
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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